OECD REVIEWS OF REGULATORY REFORM

REGULATORY REFORM IN SWITZERLAND

# ELECTRICITY REFORM

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

**ORGANISATION FOR ECONOMIC CO-OPERATION**

**AND DEVELOPMENT**

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## FOREWORD

Regulatory reform has emerged as an important policy area in OECD and non-OECD countries. For regulatory reforms to be beneficial, the regulatory regimes need to be transparent, coherent, and comprehensive, spanning from establishing the appropriate institutional framework to liberalising network industries, advocating and enforcing competition policy and law and opening external and internal markets to trade and investment.

This report on the *Electricity Sector* analyses the institutional set-up and use of policy instruments in Switzerland. It also includes the country-specific policy recommendations developed by the OECD during the review process.

The report was prepared for *The OECD Review of Regulatory Reform in Switzerland* published in March 2006**.** The Review is one of a series of country reports carried out under the OECD's Regulatory Reform Programme, in response to the 1997 mandate by OECD Ministers.

Since then, the OECD has assessed regulatory policies in 22 member countries as part of its Regulatory Reform programme. The Programme aims at assisting governments to improve regulatory quality — that is, to reform regulations to foster competition, innovation, economic growth and important social objectives. It assesses country's progresses relative to the principles endorsed by member countries in the 1997 *OECD Report on Regulatory Reform*.

The country reviews follow a multi-disciplinary approach and focus on the government's capacity to manage regulatory reform, on competition policy and enforcement, on market openness, specific sectors such as electricity and telecommunications, and on the domestic macroeconomic context.

This report was prepared by Caroline Varley, Consultant. It benefited from extensive comments provided by colleagues throughout the OECD Secretariat, as well as close consultations with a wide range of government officials, parliamentarians, business and trade union representatives, consumer groups, and academic experts in Switzerland. The report was peer-reviewed by the 30 member countries of the OECD. It is published under the authority of the OECD Secretary General.

**TABLE OF CONTENTS**

**Boxes**



**Tables**



**Figures**

## Introduction

Electricity reform figures prominently in Swiss proposals for promoting stronger economic growth, which has lagged other OECD countries over the last decade. It figures on the list of actions- drawn up both by the Swiss Federal authorities and the OECD in its recent economic surveys of Switzerland- to strengthen the Swiss internal market and improve competitiveness. A better performance of the sector can only be achieved by reform. A recent study of the Swiss infrastructure sectors[1] underlines that the best price and competitiveness performance across Europe in this sector can be directly associated with countries that have established an independent regulator, an independent system operator, and a wholesale market underpinned by regulated third party access to the grid.

None of these yet exist in Switzerland and change is therefore essential. Reform is also needed to harmonise with market opening in the EU, which is considerably more advanced. Switzerland's central geographical position in Europe as a major electricity transit and trading hub requires this. But for now, there is no regulatory framework to require market opening. The electricity market remains closed to effective competition, despite attempts by some market players to test the limits of what is possible under the current competition law framework. Security of supply is also an issue of growing urgency. The 2003 Italian blackout, which originated in a Swiss transmission line overload linked to intensive cross border trade, has raised issues about the European and Swiss regulatory framework for securing reliable supply.

The Swiss Federal government has been keenly aware for some time of the need for reform, and a first effort was launched a few years ago, but was narrowly defeated in a popular referendum in 2002. A new reform package has been proposed by the Federal government and is currently being debated by Parliament. It too may be the subject of a popular vote. This time round, there is room for cautious optimism about reform prospects. It appears not only that a majority of political and commercial interests are conscious of the need for change, but that they are better informed on, and therefore more supportive of, key issues such as the need for independent system operation and an independent regulator.

The reform process raises some specific challenges for Swiss policy makers. First, they need to find a way of managing a complex reform which takes account of the ordinary Swiss citizen's direct involvement in decision making. Second, the Federal level is relatively weak and significant responsibilities for the sector lie at sub Federal level. Third, effective reform will involve a fundamental change in the structure and orientation of a highly fragmented industry, in which certain powerful interests have been traditionally dominant, and no two sets of interests easily converge. Managing the transition to a new approach will be as important as getting the technical elements of the reform package right in the first place.

Switzerland is therefore a particularly good example of the need, common to all reform processes, for a clear initial understanding of, and commitment to, the core needs of an effective reform, ongoing political leadership and co-ordination which does not lose sight of these core needs, effective and continuing communication with the public as well as other stakeholders, and close attention to the way reform will unfold in practice over coming years, so as to take corrective action if this is needed.

The report is divided into four parts. The first part reviews the key features of the Swiss electricity sector and its current performance. The second part considers the European dimension of reform. The broader European regulatory developments for the promotion of a competitive European internal electricity market and regional system reliability are of central importance to Switzerland's own electricity sector prospects. The third part assesses the reform package, both at a strategic level in terms of meeting the country's key energy policy goals of efficiency, security of supply, and promotion of the environment, and also in the important institutional and technical details that make up the proposed new regulatory framework. The fourth part covers issues for managing the transition to a new framework.

The report concludes that some aspects of the proposed reforms are essential, others less so at this stage. If the essentials can be firmly anchored into place, this will pave the way for a positive evolutionary process toward a more effective and competitive market structure, stronger price performance, and more robust system reliability.

# PART ONE

## History and general context

The Swiss electricity sector's structural and policy development can be divided into four phases: the period in the first part of the last century with the adoption of important framework laws; technical integration with the European grid and large new plant construction after the second World War; the period from the 1970s in which environmental concerns rose up the agenda and the Federal government started to exercise a stronger policy role; and from the 1990s onwards, planning for reform against the background of EU developments.

### *Turn of the twentieth century: setting the framework for the exploitation of hydropower, development of distribution and supply*

The first phase at the turn of the last century saw the adoption of important framework laws that have survived to the present day, including the 1916 Law on the use of hydropower resources, which reflects the country's significant endowment in hydropower and the political importance attached to ensuring that this served local interests and development. This phase also saw the development of a dense network of distribution companies serving their local communities, many of which exploited local hydro power resources.

### *Post World War Two: technical integration with the European transmission grid, hydro and nuclear plant construction*

Further important structural developments came after the Second World War, as part of the reconstruction of Europe. The 1950s and 1960s saw the rapid development of an integrated European grid, and the construction of large new hydro and nuclear plants. Switzerland was a founder member of the UCPTE (Union for the Co-ordination of Production and Transport of Electricity) and contributed to the development of technical rules which allowed the first international exchanges of power. The first (synchronous) interconnection with France and Germany was in 1958. The first nuclear power plant (Beznau I) was constructed in 1969, followed by Beznau II (1971) and Mühleberg (1972).

### *1970s onwards: growing importance of environmental issues, and a stronger Federal policy role*

Environmental issues started to rise up the agenda, as well as a stronger Federal role on energy policy matters. There was opposition in 1973 to the proposed Kaiseraugst nuclear power plant which was eventually shelved (although 1985 saw the commissioning of the most recent nuclear power plant, Leibstadt). An Environmental Protection Law was adopted in 1985. A stronger Federal voice in energy was also beginning to develop. In 1990, a Constitutional amendment on energy gave the Federal government a clear energy policy mandate. The 1985 Federal Law on Price Surveillance (a general law which covers electricity prices among others) had already paved the way for a stronger voice at the Federal centre. 1990 also saw a popular vote in favour of a ten year moratorium on new nuclear plants. These broad trends continued, with a growing policy emphasis on efficient energy use and renewables. "Energy2000", a ten year energy efficiency and renewables promotion programme was started in 1991, and was followed in 1992 with a Federal Ordinance on the Rational Use of Energy, and a Law on Water Protection.

***1990s to the present day: planning for reform against the background of EU developments, continuing emphasis on the environment, and the future of nuclear power***

The fourth and current phase has been marked by efforts at fundamental reform of the regulatory framework, as well as a continued emphasis on environmental protection and efficient energy use, and the start of a process to determine the future of energy supply. Drafting of the first reform law (Electricity Market Law-EML) started in 1998, in the wake of the first EU market opening Directive in 1996. After adoption by Parliament, it was attacked by interest groups and eventually rejected by referendum in 2002. Meanwhile an Energy Law and ordinance were adopted in 1999, strengthening Federal demand side management powers, and a CO2 mitigation Law was adopted in 2000. Three proposals to promote renewable and solar energy were, however, rejected by popular votes in the same year. 2001 saw the start of the "SwissEnergy" ten year energy efficiency and renewables programme (a follow up to the "Energy 2000" programme). In 2003, in a reversal of previous positions, two popular initiatives to extend the ten year nuclear moratorium and phase out nuclear energy were rejected by popular votes. In 2005, the minister for energy took a public stance in favour of keeping the nuclear energy option open.

**Box 5.1. The first Electricity Market Law and referendum**

The Electricity Market Law (EML) aimed at liberalising the market through a six year transition phase, broadly following the EU's approach. Adopted by Parliament in December 2000, it secured a broad measure of initial support. But the unions, later rallied by a coalition of political interests, incumbent monopolies and environmentalists, launched a referendum against it. Contentious issues were: too much regulation, proposals for a single Swiss Transmission System Operator (TSO), compensation for stranded investments, and disagreement on the timetable for market opening. But more broadly, the debate on the proposed law became a general battle against deregulation. General public resentment developed in reaction to what was perceived as an ultra liberal dismantling of public service, against an unhelpful backdrop of foreign as well as domestic disasters including the California electricity crisis (January 2001), the Enron scandal and the grounding of Swissair (October 2001) and UK rail accidents (October 2000, March 2001, May 2002). The complexity of the law did not help and it was rejected by a narrow majority (52.6%) in a referendum.

The reform efforts have continued with the current draft reform package which comes in the wake of the latest EU legislation to open the EU market to competition, address regional grid management issues, and promote renewables.

***General economic context***

The Swiss economy has experienced relatively slow growth over the last twenty years compared with other OECD countries. Growth continues at a lower rate than elsewhere in the OECD. The lack of competition in the Swiss market has been identified by Switzerland itself, as well as by the OECD, as one of the key factors behind poor performance. The Swiss Federal Council and Parliament approved in 2003 a package of measures to promote growth, including reform of the electricity sector.

**Main features of the Swiss electricity sector**

***Industry structure and ownership***

An important characteristic of the Swiss power sector is the large number and structural diversity of its electricity companies.[2] There are currently over 900 companies.[3] Key differences between companies are ownership and legal form (which covers not only private and public ownership but also differences within these categories such as partnerships, cantonal, city or municipal utility structures, and local co-operatives); size (from large trading and grid owning companies to regional and city utilities, and tiny village structures); and activity (from vertical integration through the whole value chain from generation to end user supply, to part of the chain or just one activity). There are also marked differences between the regions. For example *Suisse Romande*- French-speaking Switzerland- is home to some large city based

utilities (and the concept of *service public*- public service- is particularly strong), whereas some parts of eastern Switzerland have a much denser network of small distribution companies. Autoproducers (railways and industry) account for 7% of generation. A very broad characterization would be that the sector is made up of a small number of large utilities, which generate and distribute most of the electricity sold, and a large number of very small utilities, which distribute electricity to their communities (and are often interwoven with municipal budgets).

Some important features nevertheless stand out from the diversity:

- *Small distribution companies.* Most of the 900 or so companies are distributors and suppliers to end users, operating at cantonal or municipal level, and are usually owned by the cantons and municipalities. They are often involved in other activities such as gas and water distribution, and district heating. Within this group most are small municipal utilities that supply power only to their communities.

- *Vertically integrated companies.* About 200 larger companies, mostly at the regional and cantonal levels and including city utilities, cover at least two of the generation, transmission and distribution activities. The largest ones are based in Zurich, Basel and Bern.

- *Very large vertically integrated companies.* Five very large entities (the *Uberlandwerke*) cover the whole value chain from generation through transmission to distribution and end user supply (table x): Atel, Axpo,[4] BKW, EOS and EWZ. All apart from EWZ operate at the supra cantonal level. These are highly significant players not only for the Swiss power sector but also for the Swiss economy, and also to some extent for the European power market, in terms of the scale, range and international as well as national scope of their activities.[5] They account for nearly 80% of Swiss electricity production, including the largest hydro and nuclear plants. Between them they own and operate the Swiss high voltage transmission grid. Three of the companies (Atel, Axpo and BKW) are significant international electricity traders (not just in Western Europe but also in Eastern Europe and the Baltics). They are also major distributors (directly or indirectly).

- *Cross linkages.* There are important cross linkages between and within the different categories. The distribution utilities purchase electricity mainly from the *Uberlandwerke.* Two of the big five - Axpo and EOS- are holding companies for cantonal or other large utilities. The *Uberlandwerke* themselves share a close relationship. They have mutual access agreements to each other's grids. Around 80 of the largest power plants (hydro and nuclear) are organised as joint ventures (*Partnerwerke)* of the big five and some of the largest canton owned utilities.[6]

- *Public ownership.* Most companies are partly or wholly publicly owned. 80% of the electricity sector's share capital[7] is publicly owned (50% by the cantons, 26% by municipalities, 4% by the Federal government). Three of the big five (Axpo, EOS and EWZ) are 100% publicly owned and the other two (Atel and BKW) are in mixed ownership. Private interests are by and large confined to production and transmission, public interests are in distribution.

- *Foreign stakes in Swiss companies.*[8] Some 12% of total share capital is held by foreigners. Foreign electricity companies (including EdF, E.ON and EnBW) have bought stakes in major Swiss electricity companies.[9]

- *Swiss stakes in foreign companies.* A number of Swiss companies (not only the big five) have made important foreign acquisitions, especially of generation capacity in Italy, but also of trading subsidiaries.[10]

**Table 5.1. Structure and activities of the major five Swiss electricity companies**

| Company | Ownership | Activities | Sales |
|---|---|---|---|
| Atel | Private/public ownership. 58.5% owned by Motor Columbus (which in turn is 55.6% owned by UBS bank, 20% by EdF, 10% by EOS). Remainder owned by cantonal and municipal utilities | Production: 8.3 TWh (2.5 TWh hydro, 5.8 TWh nuclear- owns 40% of Gosgen nuclear plant and 30% of Leibstadt nuclear plant)<br>Transmission: owns 17% of the national system. "Owns"42% of transit capacity to Italy.<br>Distribution: 9.3 TWh of sales through fully or partly owned subsidiaries and partner utilities | CHF 5.28 billion (2003) including trade (net).<br>68.5 TWh of which 10% domestic, 90% abroad. |
| Axpo | 100% public ownership (cantons or publicly owned cantonal utilities). Holding company of three large utilities: CKW, EGL and NOK | Production: 30.6 TWh (22.3 TWh nuclear, 8.3 TWh hydro)<br>Transmission: Owns major systems in north east and central Switzerland.<br>Distribution: 14.1TWh through shareholding companies, 10.3TWh through partner utilities outside home area | CHF 5.74 billion (2003-4) including trade (net).<br>19.3 TWh domestic (to direct consumers in central-eastern Switzerland), 74 TWh to trade customers.<br>63.1 TWh trade purchases. |
| BKW | Private/public ownership. Main shareholders: canton of Berne 52.9%, E.On 20% | Production: 8.03 TWh (3.91 TWh hydro, 4.12 TWh nuclear)<br>Transmission: Owns major system in canton of Berne<br>Distribution: 6.2TWh direct sales and through partner utilities | CHF 2.95 billion (2003).<br>6.7 TWh domestic, 4.4 TWh abroad, 32.1 TWh to trade customers.<br>34.5 TWh trade purchases. |
| EOS | 100% public ownership. Holding company of the main public cantonal and city utilities in western Switzerland | Production: 2.77 TWh (2.34 TWh hydro + 0.43 TWh nuclear)<br>Transmission: Owns major system in western Switzerland.<br>Distribution: 4.87 TWh through shareholding companies | CHF 1.05 billion (2004).4.87 TWh. |
| EWZ | 100% public ownership. Owned by the city of Zurich public utility | Production: 1.4 TWh hydro<br>Distribution: 2.9 TWh direct sales | CHF 0.6 billion (2003).<br>6.02 TWh. |

Notes: Transmission = the Swiss high voltage grid.

Source: Country submission and company websites.

The sector is also in evolution, partly in response to the challenge of market opening:

- *Consolidation.* There are important trends at two levels. The first involves the *Uberlandwerke*. Of particular importance is the mooted creation of a so-called "Western Group", which could entail the merger of Atel, EOS and BKW as a result of UBS divesting its majority stake in Atel (via Motor Columbus, see Table 5.1). Some foreign companies have also shown interest in acquiring at least part of UBS's stake. The purpose of the "Western Group" would be to counterweigh Axpo, which dominates eastern Switzerland, and to establish a strong presence in the European arena.[11] The small distribution sector is also on a consolidation trend.[12] The 900 or so companies in the market today are down from some 1200 in the mid 1990s and a significant number of further mergers are anticipated.

- *Partnership and co-operation.* An important development among the larger companies is the creation of holding companies, co-operation and sales agreements, and other forms of joint venture (in other words, everything short of actual mergers).[13] Swisspower, for example, is a company set up by a partnership of 20 large municipal utilities to pool their marketing, distribution, sales and billing activities.[14] Avenis is EOS's trading arm and supplies the six largest western Swiss distributors.
- *Sale of public equity.* Some large public shareholders plan to sell, or have already sold, their stakes in electricity companies (for example the canton of Berne has plans to reduce its 52.9% stake in BKW, the canton of Jura having already sold its 3% stake in the company).

The industry is represented by a number of overlapping associations. The most important are VSE (*Verband Schweizerischer Elektrizitätsunternehmen* -Swiss Electricity Suppliers Association), which represents the interests of some 460 electricity companies that supply 90% of electricity, and Swisselectric, which represents the big five.

***Generation technologies, production and capacity***

Swiss power generation is dominated by hydro and nuclear power. Hydro power accounts for some 58% of total production, but its share fluctuates from year to year (as well as within the year) depending on hydrological conditions,[15] which means that the share of nuclear power also fluctuates from year to year.

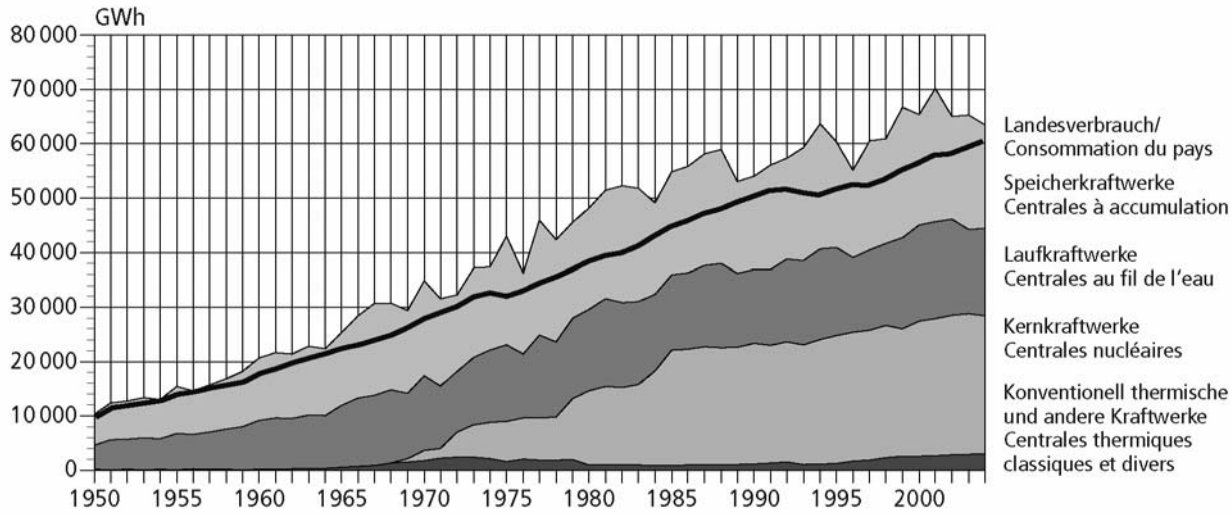
Swiss hydro power is made up of run of the river plants (powered by the flow of water in rivers) and storage plants in the mountains (which store water behind dams), including pumped storage plants.[16] The former generate most in the summer months. The latter's reservoirs fill up in spring and are at their highest capacity in early autumn Nuclear power is the second most important source of electricity, with a production share of some 38%. Of the remaining 4% or so of production, 2% comes from thermal plants powered by natural gas and fuel oil, and just 2% from renewable energy sources (mainly wood, waste and biogas).[17] But if large scale hydro and other renewables are counted together, Swiss production is 60% renewables based.

Total electricity generating capacity was 17 388 MW in 2003/04. Hydropower accounted for 13 027 MW; nuclear 3 220 MW; fossil fuels 75 MW; and combustible renewables and wastes 286 MW. Industrial autoproducers accounted for 246 MW, Combined Heat and Power (CHP)/District Heating (DH) plants 85 MW, decentralized gas or diesel-fired CHP 140 MW, solar photovoltaics (PV) 21 MW, and wind 5 MW.

Generation also reflects the structural diversity of the industry. There are some 2300 electricity generating plants, the 25 largest accounting for almost 60% of power generation. At the other end of the spectrum, there are some 800 micro hydro plants, 450 CHP plants, and 600 PV and windpower installations.[18]

The only significant change in the share of different technologies in the generation portfolio has been nuclear production. This has increased about 12% over the last ten years following a capacity upgrade at the Leibstadt plant. The share of thermal power has remained around 3%, while the share of non-hydro renewables has marginally increased to 1.57% (2004 figures).

**Figure 5.1. Evolution of the different generation technologies since 1950**




Note: The total represents domestic consumption plus exports. The black line shows the level of domestic consumption.

Source: SFOE (Swiss Federal Office of Energy), 2004**.**

The nuclear/hydro mix is well balanced, and has been efficiently exploited in order to secure efficient and reliable generation across the domestic load curve. The run of the river plants and nuclear plants are generally used to satisfy domestic baseload and medium load demand. The nuclear plants produce more in winter when the run of the river plants are less productive. The hydro storage plants are used to satisfy peak load demand.

**Table 5.2. Electricity production and consumption 2003-2004, GWh**

| | Hydrological year (1) | Winter | Summer |
|---|---|---|---|
| Hydro | 34056 | 13880 | 20176 |
| run of the river | 15738 | 5207 | 10531 |
| storage | 18318 | 8673 | 9645 |
| Nuclear | 25499 | 14185 | 11314 |
| Thermal and other | 2912 | 1507 | 1405 |
| Total net production (2) | 60004 | 28719 | 31285 |
| Gross domestic consumption | 60032 | 32475 | 27557 |
| exports (imports) | 28 | (3756) | 3728 |

Notes: (1) Hydrological year = October 2003-September 2004, subdivided into winter and summer (2) Total production = production minus consumption for storage pumps

Source: SFOE (Swiss Federal Office of Energy).

***System operation***

In the highly meshed European transmission system, co-operation between national system operators is essential, backed up by strong technical rules to secure system reliability. In 2000, the *Uberlandwerke* formed a joint subsidiary, Etrans, to co-ordinate system operation across the five control areas which make up the Swiss high voltage transmission network that they own, and to form the technical interface with European system operators. Etrans is a member of ETSO (European Transmission System Operators) and the UCTE (Union for the Co-ordination of Electricity Transport).

The 2003 Italian blackout has led to a reappraisal of the organisation of system operation in Switzerland. In 2004, the *Uberlandwerke* decided to replace Etrans with a legally separate company, Swissgrid, which they co own.[19] Swissgrid was originally planned by the companies to become operational in January 2005, but this has been delayed because of their objections to conditions attached by the competition authority to its establishment. The appeal process can be expected to take a number of months, if not longer. Meanwhile Etrans continues the task of co-ordination with European system operators, a necessary but unsatisfactory stopgap pending the establishment of a proper system operator with appropriate powers and governance. Switzerland is currently debating changes as part of the current reform package that would set up a transmission system operator (TSO) in line with the provisions of EU legislation.

**Box 5.2. Swissgrid**

The proposals for Swissgrid have been the subject of considerable controversy. After examination of the proposals under the abuse of dominance provisions of the Cartel Law, the competition authority (Comco) authorised Swissgrid subject to conditions. Comco concluded that the creation of Swissgrid would give rise to a dominant position in the market for high voltage transport of electricity in some parts of the country. The Cartel Law does, however, allow Comco to authorise a market concentration which creates a dominant position if it improves the conditions of competition in another market which outweigh the disadvantages created elsewhere. On the basis that Swissgrid would improve conditions of competition in electricity supply to end users by facilitating its transport, Comco gave its conditional authorisation. ComCo's conditions, aimed at improving prospects that Swissgrid would in fact help competition in end user supply by facilitating access to the grid, are:

- Swissgrid must guarantee open and non discriminatory access by third parties to the grid (to facilitate third party access)
- It must publish tariffs and other conditions of network access and use (ditto)
- Swissgrid and its shareholders must establish separate accounts[20] for the high voltage networks (to help monitor tariffs)
- It is forbidden to engage in the commercial production, sale or trading of electricity, and from holding shares in companies active in these areas (to prevent conflicts of interest)
- Swissgrid's Governing Board and Management[21] cannot also belong to the bodies of another electricity company (ditto)

However, the companies have appealed the ruling (to the Competition Authority Appeal Commission in the first instance. If this does not give satisfaction, a further appeal can be made to the Federal Tribunal), asking for changes to some of the conditions. They object, in particular, to the provisions governing the composition of the Board, as well as the provision for non discriminatory grid access. In respect of the first, they argue that it would be "irresponsible for Swissgrid to be overseen by a Board… that has neither the required expertise nor the necessary experience in operating national and international grids", whilst agreeing that the Board should not be involved in the operation of Swissgrid. As for third party access, whilst agreeing with the principle of third party access, they argue that a transition period is necessary for implementation, for technical reasons (based on the experience of other EU countries).

***Transmission and international trade***

*Transmission capacity*

Switzerland has a dense and highly developed transmission network. It has some 6,500 km of high voltage (380/220 kV) lines. It also has significant cross border transmission capacity: 5 350 MW (5 000 MW in winter) from France, 2750 MW (4000 MW in winter) with Germany, 3000 MW (2900 MW in winter) with Austria,[22] and 4 550 MW with Italy.

The network is nevertheless struggling to cope with trade developments. Parts of the grid and some cross border interconnections are under strain due to the growth of trade. It has recently been reinforced to support domestic and cross border traffic.[23] The interconnection between Switzerland and Italy is a major bottleneck, but there can also be some congestion in the interconnections with France and Germany at times of high load and strong loop flows.[24]The commissioning in early 2005 of the 1 300 MW San Fiorano-Robbia interconnection will ease chronic bottlenecks with Italy. Additional interconnections with Italy are planned with the Piedolago-Airolo 1500 MW line, to be commissioned by 2010, and a 400 kV DC merchant line project.

*International trade*

The combination of its central geographical location in Europe and the opportunities afforded by its hydropower to store electricity have made Switzerland a major trader as well as a major hub for the transit of electricity in the European market.[25] It accounts for some 11% of electricity trade and nearly 20% of cross-border transmission capacity within the UCTE area. Switzerland's central geographical position in Europe as a major electricity transit and trading hub effectively requires it.

Overall, Switzerland has been a net electricity exporter. It usually generates an export surplus over much of the year, but imports electricity in winter months when reservoirs are low and demand is high. In 2004, the total volume of imports was some 37.7 TWh and exports some 38.4 TWh. The export surplus fluctuates from year to year. In net terms, France (imports to Switzerland)) and Italy (exports from Switzerland) are the country's main electricity partners. France is the main source of hourly imports (60%) followed by Germany (31%). Italy is the main destination for hourly exports (57%) followed by Germany (25%).[26] Two main factors underlie this trade:

- *Exploitation of hydropower's storage capacity.* Switzerland is an important peak electricity producer for the European market. Some 60% of electricity exports are high tariff daytime exports. Hydro pumped storage plants are exploited to this end in support of profitable cross border trade with neighbouring countries. Electricity is imported cheaply during off peak hourly periods, used to fill the reservoirs, and then exported at peak periods at high tariffs. The Swiss load curve over the course of a day is a good illustration of this trade: it typically ranges from less than 6000MW at night, to daytime peaks of up to 11-12000MW, a large part of the difference reflecting production for export.

- *Seasonal fluctuation of Swiss electricity production and demand*. Imports are needed to cover domestic winter consumption when hydro production is lowest and demand greatest.[27] The rest of the year, a surplus is produced for export. Long term drawing rights on French nuclear power plants of some 2500MW, accounting for about a third of gross annual imports, help to meet the winter deficit. In recent years, demand has increasingly shifted toward the winter season, leading to increasing imports over that part of the year.[28]

Cross border physical flows of electricity[29] have increased considerably over time as a result of growing international electricity trade (a combination of transit traffic and Swiss cross border trade), particularly to Italy. In 2003, physical cross border flows totalled 87.9 TWh, exceeding domestic production by 35% (2004 figures slightly lower: 76.1 TWh). Contractual flows over the last decade have at the same time become much larger than the physical flows. In 2001 total contractual flows were 126.4 TWh, compared with physical flows of 58.6 TWh. This has led to a growing problem of congestion.[30]

The contractual basis for Swiss trade has also been changing, from long term contracts to short term contracts and trading on the European power exchanges. The share of Swiss electricity exports under long term contracts (two years or more) has steadily declined since the mid 1990s, from 63% of total exports in 1996 to 19% in 2001, and levelled off at 16% in 2004. Conversely, short term and spot deliveries have grown from 26% of total exports in 1996 to 76% in 2001 and have since stabilised at 75-79%. The contractual trend for electricity imports is less clear. Imports under long term contracts decreased from 72% in 1996 to 43% in 2001, whereas imports under short term contracts increased from 27% in 1996 to 56% in 2001, but there has since been a trend reversal (long term contracts went back up to 68% in 2004, and short term contracts down to 31%).

**Table 5.3. Electricity imports and exports, 1950-2003, GWh**

| Calendar year | Exports | Imports |
|---|---|---|
| 1950 | 948 | 306 |
| 1960 | 3822 | 1306 |
| 1970 | 9619 | 3594 |
| 1980 | 18128 | 9947 |
| 1990 | 24907 | 22799 |
| 1994 | 34566 | 22723 |
| 1995 | 36219 | 28948 |
| 1996 | 34431 | 33485 |
| 1997 | 37409 | 30655 |
| 1998 | 43373 | 37419 |
| 1999 | 47293 | 37064 |
| 2000 | 46990 | 39920 |
| 2001 | 68407 | 57963 |
| 2002 | 51620 | 47112 |
| 2003 | 45464 | 42352 |
| *of which*: | | |
| Germany | 11362 | 13018 |
| France | 5718 | 25509 |
| Italy | 25791 | 2162 |
| Austria | 2159 | 1591 |
| Other | 434 | 72 |

Source: Swiss Federal Office of Energy statistics 2003.

### *Distribution and supply*[31]

Distribution companies typically supply and sell to a demarcated distribution area either with direct sales, or with indirect sales through partners or shareholders. The *Uberlandwerke* are all involved in distribution. Axpo and EOS are indirectly involved, selling power that they produce or purchase through their shareholding companies. Atel, BKW and EWZ act as distributors to end consumers or sell to local distributors.

Most supply is linked to physical distribution, through entities that also own and operate the distribution grid. The accounts of many small distribution companies are often bundled into municipal finances.

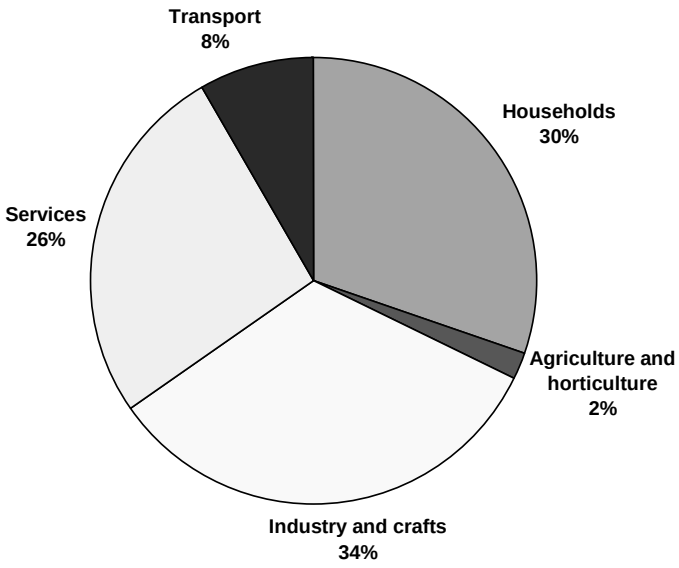
A number of market players for electricity supply are, however, seeking to extend the reach of their sales beyond traditional areas. To do this, some city and municipal utilities have bundled their sales and marketing services into units such as Swisspower.

The distribution sector has an immensely varied structure, ranging in size from village utilities selling 100 000 kWh to large utilities selling over 10 000 000 kWh. The average number of people supplied by a utility is around 6 000. The 15 largest utilities account for around 50% of total electricity sales to end users, the 100 largest for 80% and around 1 000 utilities for the remaining 20%.

***Demand and consumption***

The largest consumers are industry (34%), followed by households (30%), services and commerce (26%), transport (8%) and agriculture (2%). Electricity consumption has risen slowly but steadily over the last couple of decades,[32] outpacing economic growth. The main factor behind this trend is demographic growth, together with economic activity. Growth in 2004 was 1.9% (compared with 2% in 2003), a new record. This is in line with OECD trends.

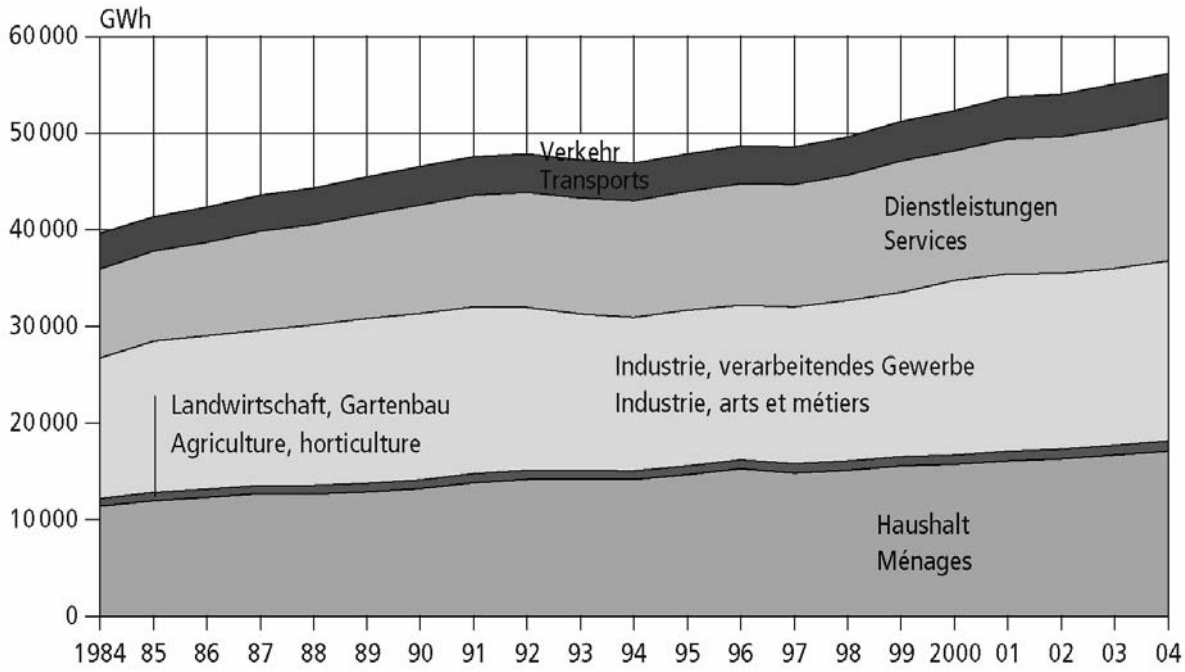
**Figure 5.2. Electricity consumption by category**




Source: Swiss Federal Office of Energy statistics 2003.

The SFOE projects a continuing slight growth in demand over the next few years, by 0.3% pa until 2010. From 2010-20, electricity demand is projected to increase by 0.2% pa.[33] The assumptions underlying these projections are demographic stabilisation at 7.6 million inhabitants in the next decade. GDP growth is the main variable with projections ranging between 0.5% and 1.5% growth pa. The introduction of a CO2 tax would also affect demand. The projection without a CO2 tax suggests a 23.5% rise in electricity demand by 2035 relative to 2003, provided no gas-fired power plants are built. The projection with a CO2 tax suggests a 24.6% rise by 2035.[34]

**Figure 5.3. Electricity demand growth**




Quelle: Schweizerische Elektrizitätsstatistik 2004
Source: Statistique suisse de l'électricité 2004

The SwissEnergy programme objective to limit the increase of electricity consumption to 16% between 1990 and 2000 was achieved (it rose only by 11.5%, mainly because of sluggish economic growth). The SwissEnergy objective is now to limit the increase between 2000 and 2010 to 5%. The target was already breached by the end of 2004, as demand grew by 7.3% from 2000 to 2004.

## The current legal and regulatory framework

### *The legal framework*

Swiss energy- including electricity- policy is guided at the strategic level by Article 89 of the Federal Constitution, which promotes a very broad set of policy objectives (the goal of sufficient, reliable, diversified, cost effective and environmentally sound energy supply), particularly stressing the importance of energy efficiency. The legal system grants significant lawmaking, regulatory and implementing powers and autonomy to the cantons on electricity matters. Broadly speaking the Federal level legislates on strategic issues, and the cantons implement this legislation (with near total autonomy over the way they do this).[35] The cantons legislate and regulate directly on most non strategic issues, including anything that is not specifically identified for the Federal level (Article 3 of the Constitution grants autonomy to the cantons and municipalities over sectors that are not regulated directly by the Constitution itself). The precise distribution of responsibilities at Federal and cantonal levels is defined in the Constitution and in primary legislation.

International commitments are also important. Switzerland is not a member of the EU or of the EEA so there is no formal requirement to follow EU rules. Instead, a number of bilateral accords have been negotiated, though not including electricity yet. The reform package currently being debated would require making an agreement with the EU. Switzerland is a member of the WTO, which covers electricity including the issues of market access on the basis of National Treatment (NT).[36] It is also a member of the Energy Charter Treaty (ECT), which may have some relevance- at least in principle- for transit regulation.[37]

*Primary legislation*

The main Federal laws relevant to electricity are the 1998 Energy Law, the 1902 Law on Electricity, the 1916 Law on the use of Hydropower Resources, and the 2003 Nuclear Energy Law. Some general laws are also highly relevant for the electricity sector, including the Cartel Law. Cantons also have legislation of their own. Some of the legal "*acquis*"(accumulated legislation) is quite old- two of the laws date back to the early part of last century- and taken as a whole it is strikingly free of any provisions relating to competition, its main focus being energy efficiency, the promotion of renewables, and technical and safety issues. The relatively recent 1998 Energy law is mainly concerned with energy efficiency and renewables, and none of the current laws address market/competition issues, except in a restrictive way (for example cantonal laws which provide the legal basis for monopoly concessions of electricity distribution and supply).[38]

**Box 5.3. Main electricity laws and relevant general laws**

The main electricity laws are:

Energy Law (1998): Policy measures for the energy sector, mainly focused on efficient energy use and renewables, and R&D. Regulates conditions of connection to the grid for certain independent power producers (small hydropower and non hydropower renewables, CHP among others).

Law on Electricity (1902): Regulates construction and safety issues. Federal government supervises and regulates the construction and operation of electricity infrastructure, and issues safety regulations.

Law on the use of Hydropower Resources (1916): Regulates the use of hydropower resources. Federal government oversees and issues regulations, cantons designate concessionaires. Law also sets up and regulates royalty tax on water use, levied by the cantons.

Nuclear Energy Law (2003): Regulates nuclear power plant construction, operation, and decommissioning, and waste disposal and safety issues. Federal government in overall charge.

Two general laws are of considerable importance for electricity:

Cartel Law (revised in 2004): Considered in more detail below. Prevention of the harmful economic or social effects of cartels or other restrictions on competition.

Price Surveillance Law (1995): Prevention of abusive increase or maintenance of prices.

Other more general laws are also relevant, including the CO2 Law (1999), the Internal Market Law (1995), and the Law on Economic Supply (1982).

Annex 1 gives more detail on these laws.

*The competition law*[39]

The lack of any competition provisions in the electricity specific laws has put the spotlight on the Cartel Law as the main law, in practice, that has the scope for dealing with competition issues in the electricity sector. The Cartel Law defines its broad aim as: "to prevent the damaging economic and social consequences arising from cartels and other restrictions on competition, and hence to promote competition in the interests of a market economy founded on liberal principles".

The law only has one clear exemption for electricity: the exclusive rights of cantonal or municipal public enterprises or entities over production and distribution, as well as network rights of way, in their territory. That said, the law and its impact on the electricity sector needs to be considered as a whole. A number of more general provisions are relevant. These include a provision allowing that abuse of a dominant position can be justified for "legitimate business reasons", though this has not so far been used with success; justification of agreements for reasons of economic efficiency; and provision for the Federal Council to override, exceptionally and temporarily, decisions to prohibit agreements where the case raises overwhelming public interests that need protection. Of the two cases brought under this last provision so far, one concerns the electricity sector (and was unsuccessful in that the parties withdrew their appeal before the Federal Council passed judgment).

In the absence of a specific electricity reform law, the competition law and the use made of it by the competition authority (Comco) has proved effective at opening important breaches in the current unliberalised framework. Comco has made use of its powers to launch a number of investigations, mainly linked to abuse of dominance. The most important case of this kind, which has opened the way to negotiated third party access to the grid, was the 2001 EEF/WATT decision. Comco has also sought to restrain potentially anti competitive actions by the industry, notably in the conditions that it has stipulated for the establishment of Swissgrid, which anticipate the provisions of the draft electricity reform law.

**Box 5.4. Third party access under the Cartel Law: the EEF/WATT case**

In anticipation of market opening, electricity companies had been offering significant discounts to large consumers, some of them outside their established home territory. Following the rejection of the Electricity Market Law in 2002, some of these sales agreements could not be carried out because incumbent utilities denied third party access to competitors across their territory and cases were brought to the competition authority's attention.

Comco ruled in the EEF/WATT case that the refusal of EEF (the canton of Fribourg utility) to allow use of its grid to another company (Watt, now part of Axpo) for the supply of a client (Migros- a large Swiss supermarket chain) in its distribution territory was an abuse of a dominant position. Comco came to the conclusion that there was no law (either Federal or cantonal) that prevented the application of the Cartel Law in this respect, and that the absence of an electricity market opening law was not a constraint either. EEF appealed, arguing that it could not fulfil its public service obligation if forced to offer third party access. The appeal went to the Federal Tribunal, which upheld the arguments used by Comco, stating that « refusal to allow access to the network for transit is an abuse of a dominant position under the Cartel Law". But the Federal Tribunal's explanation of its ruling also noted that the Federal Council may, under the Cartel Law, approve actions that have a market distorting potential if it considers that an overwhelming public interest is at stake. Although EEF's appeal was withdrawn in early 2004, the Federal Council confirmed the Supreme Court ruling in March 2004.

In a further development, the canton of Fribourg has legislated to make distribution a legal monopoly. The canton has justified this as an action to safeguard the legal status of the companies in the context of a legal vacuum, absent the existence of a Federal law on electricity. Two other cantons (Vaud and Neuchatel) have followed suit. Another issue that could be weighed up if the case were to go back to the Supreme Court is whether cantonal monopolies of this kind contravene the Constitution (Article 27 on "Freedom of Entreprise"). A further case would need to be brought[40] in order to clarify the situation.

This complex set of events, which is still unfolding and in which the parties are using different parts of the law to argue their case, suggests that there is some legal uncertainty over third party access via the competition law route.41 Also, this is not regulated third party access. Would be electricity suppliers must negotiate case by case with the network owners for grid access.

The Cartel Law was strengthened in 2003. The revisions took effect in April 2004, with a transition period until the end of March 2005, so there has been little time to test the new provisions. A number of relevant court cases are pending. Some of the revisions are very relevant to the electricity sector, because they clarify the conditions under which market power may be challenged:

- *Coverage.* There is a tighter definition of "enterprise" so as to secure coverage of certain kinds of entity. The law now states that it applies to any enterprise "participating in economic activity which involves the sale or purchase of goods or services on the market, regardless of its organization or legal form". The targets of this clarification are the public authorities (at Federal, cantonal and municipal level) without a particular legal form but which nonetheless play a significant role in the market. It is not yet clear, however, how this will work out in practice: two issues are a possible conflict with procurement law, and the extent to which Comco may be able to intervene at Federal level.

- *Abuse of a dominant position.* The revision has tightened the definition of a dominant enterprise. The law now states that a dominant position may exist if an enterprise has a position of strength on the market relative to its competitors, especially if the other enterprises are dependent on it for structural reasons, either as buyers or sellers. The law also now provides for direct sanctions if there is abuse of a dominant position. Here too, it is still unclear how far these provisions will reach, for example whether they could be applied to international transit cases as well as imports, or whether these are excluded because the beneficiary of the law must be established in Switzerland.

Over 25 enquiries related to abuse of dominance are currently underway. In 2003 for example, an investigation was launched into the possible dominant position of Axpo in the distribution areas of some of its shareholding utilities. The contracts were designed to lock established customers into long term commitments so as to prevent them from changing their suppliers if the market opened. The case is pending.

Comco has also reviewed some electricity related mergers and acquisitions: including the planned joint EWZ-Enron electricity trading company (2001), and the possible dominant position of E.On and NOK as shareholders of Watt after NOK's acquisition of EnBW's shares in Watt (2001). Neither case was blocked.

*Regulation*

Reflecting the general legal framework and the subsidiarity principle, specific regulation is largely, though not exclusively, in the hands of the cantons and municipalities. Only rough generalizations can be made about the nature of this regulation as, beyond what is imposed by Federal law, they are essentially free to implement Federal law and to regulate directly as they see fit, and this has led to great diversity.[42]

Regulation broadly covers market entry, end user prices, and quality and conditions of service, including the obligation to serve all customers in a concession area:

- *Entry into generation.* All power plants need a licence, which is issued by cantons, with the exception of hydropower plants built at the Swiss border and nuclear power plants, which require a licence from the Federal government. Large new plants and extensions of existing plants are subject to an environmental impact assessment. In addition the use of water resources, both during the construction and operation of hydro power plants, is subject to licences. No licences are required for imports or exports. Current Federal legislation does not provide for a right to a licence upon fulfilment of pre defined criteria. Neither Article 55 of the Law on the Use of Hydropower Resources nor Article 12 of the Nuclear Energy Law provide exhaustive lists of criteria, and decisions remain ultimately political.

- *End user prices.* End user prices are regulated by cantons or municipalities, and approved by political bodies (cantonal parliaments, city councils). Individual cost factors, including "public service", cannot be singled out in the accounts. Prices for large industry are set by the utilities and are not subject to price control or monitoring. Prices for other consumers are set by the utilities or local authorities. When they are set by the utilities, formal approval by the local authorities is needed in most cases. In some municipalities, electricity prices are approved by popular referendum. Municipalities and cantons also influence price setting through their shareholdings.

- *End user supply and public service.* This is regulated by the cantons and municipalities, which decide how to organise distribution in their territory. It is often vague because it predates any idea of market opening. Broadly speaking the main approaches are: (1) distribution through a municipality's own public electric utility (2) distribution through a public utility owned by another municipality or a canton (3) distribution through a private utility. In the last two cases the utilities operate as franchised monopolies in their (legally defined) service territories. In all three cases competition is unlikely to be possible in practice in the service territory, partly because of the attribution of an exclusive right to supply to one entity, partly because of the lack of regulated TPA.

- *Independent power producers.* The 1998 Energy Law requires that non renewable electricity from independent producers be purchased at market prices[43] and at feed in tariffs for renewables.

***Regulatory authorities***

The current regulatory authorities essentially consist of the different levels of government (Federal, cantonal and municipal). At the Federal level two ministries and related offices and authorities are relevant.

*DETEC, the SFOE and other energy Offices*

The Federal Department (Ministry) of Environment, Transport, Energy and Communication (DETEC), through its Swiss Federal Office of Energy (SFOE),[44] has the main responsibility for energy policy (both domestic and international) at Federal level. The SFOE's areas of activity cover: the preparation of legislation and implementation of energy policy especially as regards efficient energy use; renewable energy; energy technologies and systems; nuclear installations and materials; radiation protection; pipelines (it is the dispute settlement body for third party access to pipelines); electricity; energy statistics; the SwissEnergy Action Programme; and international agreements and co-operation. The SFOE is the approval authority for siting of new energy infrastructure.

Other relevant Offices which are part of the DETEC include the Federal Inspectorate for Heavy Current Installations (ESTI). ESTI is the "guardian" of technical standards for electricity infrastructure (which includes tree cutting near transmission lines). The Swiss Nuclear Safety Inspectorate (HSK) is the authority for safety and radiation standards of all nuclear facilities (power plants, research reactors, nuclear fuels handling and intermediate storage, scientific evaluation of potential sites for final waste disposal, etc.).The Swiss Federal Office of Water and Geology (*Bundesamt für Wasser und Geologie* – BWG) oversees the use of hydropower resources.

*SECO, the Competition Authority and the Price Surveillance Authority*

The State Secretariat for Economic Affairs (SECO, part of the Federal Department (Ministry) of Economic Affairs) examines the impact of energy policy on the economy. It also oversees the Federal Office for National Economic Supply, which is responsible for emergency oil stocks. It has played an important role in the efforts to reform the electricity sector, as part of a series of measures aimed at boosting trend growth and the competitiveness of the economy.

The competition authority (Comco), an entity with independent powers, is linked to the Economics Ministry. In the absence of any electricity specific market opening law, it has been increasingly drawn into issues relating to competition in the electricity market. Most of the cases have been driven by claims that market incumbents are abusing a dominant position, using the Cartel Law as the legal basis for the claims.

The Price Surveillance Authority (PSA) is another public authority under the Economics Ministry that has some influence over electricity market developments in the absence of a reform law. Its role (not confined to electricity) is to monitor prices charged by dominant enterprises, and take action *ex post* if it determines that prices are abusive.

Its powers are based on the 1985 Law on Price Surveillance for preventing abusive price increases, or the maintenance of abusive prices, fixed by cartels and dominant enterprises (using the Cartel Law definitions), including the prices regulated by public authorities. This is taken to include electricity distribution utilities, which are usually monopolies in their local area, whether they fix their own prices or prices are fixed by the public or political authorities (cantonal or municipal authorities, local Parliaments). Measures to remove or prevent abusive pricing are usually taken with the agreement of the interested parties. However fines of up to CHF 100 000 may be imposed on enterprises or associations that do not follow the PSA's recommendations.

Public authorities which fix prices must first take the Authority's advice. The appointment of the head of the Authority is political: he/she is normally selected from members of Parliament. The Authority has a right of access to all relevant price data. But it has limited resources, and cannot engage in permanent monitoring. Consumers can complain to the Authority about abusive prices. For example it is currently investigating a complaint by the cities of Thun, Biel and Interlaken over allegedly inflated prices charged by BKW.

Its limited resources have led the Authority over the last couple of years, on its own initiative, into the promotion of price transparency and benchmarking as a relatively resource efficient way of putting pressure on dominant electricity enterprises. A particularly important initiative has been the establishment of an interactive Internet database on end user electricity prices. The system has been well designed, is very user friendly and has already attracted attention, at any rate on the part of electricity suppliers. Although still quite recent, it seems to have had some of the desired effect already, and is beginning to yield considerable information. The Authority notes that a first wave of price reductions (covering more than 100 enterprises) has taken place.

**Box 5.5. Price Surveillance Authority Internet database on electricity prices**

This initiative was launched in 2003 and prices started to be put on the Authority's website from September 2003. The first step was to standardise the main tariff structures, which are complex, so as to allow a comparison. The Authority uses fourteen client categories based on consumption level and patterns (these range from the smallest dwellings to large companies). Data was requested from the 900 plus electricity companies, and the categorised results sent back for checking before putting on the Internet. The site *http://prix-electricite.monsieur-prix.ch* allows users to check prices not just for different categories but also geographically (by canton and municipality), and is permanently updated.

The data confirms that there are significant price differences between different parts of the country (for example very high prices in parts of western Switzerland which have to purchase their power, and very low prices in areas with their own small hydro plants). But there can also be significant price differences between adjoining municipalities. Not all the utilities were aware of prices charged in neighbouring areas. Those with relatively high prices have reduced them, and those with relatively low prices have drawn this to the attention of their clients.

The Authority underlines that the exercise does not give any direct indication as to whether prices are abusive (which needs careful analysis of such factors as network density, local geography etc). But it is following up with questions to the most expensive companies, asking whether they plan price reductions and the reasons for their high prices. Replies so far have justified high prices because of the high cost of power and/or distribution, but have also triggered a further wave of price reductions.

Part of the information collected is on company revenues: this exercise suggests that compared with prices charged, the revenues appear high.

The Authority has also carried out some work on transmission prices. In the absence of an electricity reform law and regulator, it is being increasingly drawn into this area. A few companies are now offering third party access and have submitted their grid tariff calculations to the Authority for approval. The Authority would like to do more, but is prevented by lack of resources. It is a strong advocate of benchmarking. As well as making proposals for a benchmarking approach to third party access, it has proposed a study of distribution costs based on a sample of distribution companies.

**Assessment of the current regulatory framework**

The current framework is best described as *ad hoc* with regard to market regulation and competition. It was not designed to promote competition, so this is a major weakness for the long term efficient development of the sector. Specifically, there is no independent regulator,[45] no independent system operator, no regulated third party grid access, and no legal requirement for consumer choice of supplier at any level of consumption. Nevertheless, a broad evolutionary process has been underway for some time toward greater Federal engagement.

Comco and the Price Surveillance Authority (especially the former) have, in the absence of a regulator and reform law, been drawn into exercising a significant but nonetheless constrained influence over the electricity sector. Market opening with the Cartel Law would, however, be an unsatisfactory *ex post* form of market opening: disputes on network access on this basis would have to be settled individually, probably in the courts. The time this takes would be a major disincentive for all but the most determined competitors with deep pockets. It is not that a regulatory approach would avoid litigation altogether,[46] but the latter is likely to be simpler to handle than under competition law which requires difficult case by case evaluations of market power. In the Swiss case there is also some legal uncertainty over the position reached in relation to third party access under the competition law.

System reliability is also increasingly an issue under the current framework. Etrans is a system co-ordinator, rather than a system operator, lacking the formal powers that would formally secure necessary responsibilities for grid management and a strong interface with other system operators in Europe.

Another issue with the regulatory framework is the significant role played by the cantons and municipalities. The cantons have much of the regulatory responsibility in practice. They also have important powers over taxes and charges affecting the electricity sector. This structure of responsibilities is an integral part of the Swiss political and governance system. It does, however, have consequences for reform of the regulatory framework, in that the sub Federal level will need to play a crucial role in securing change aimed at developing competition, for example helping to promote benchmarking, transparency and new forms of company governance that are compatible with a more open market.

## Performance of the electricity sector

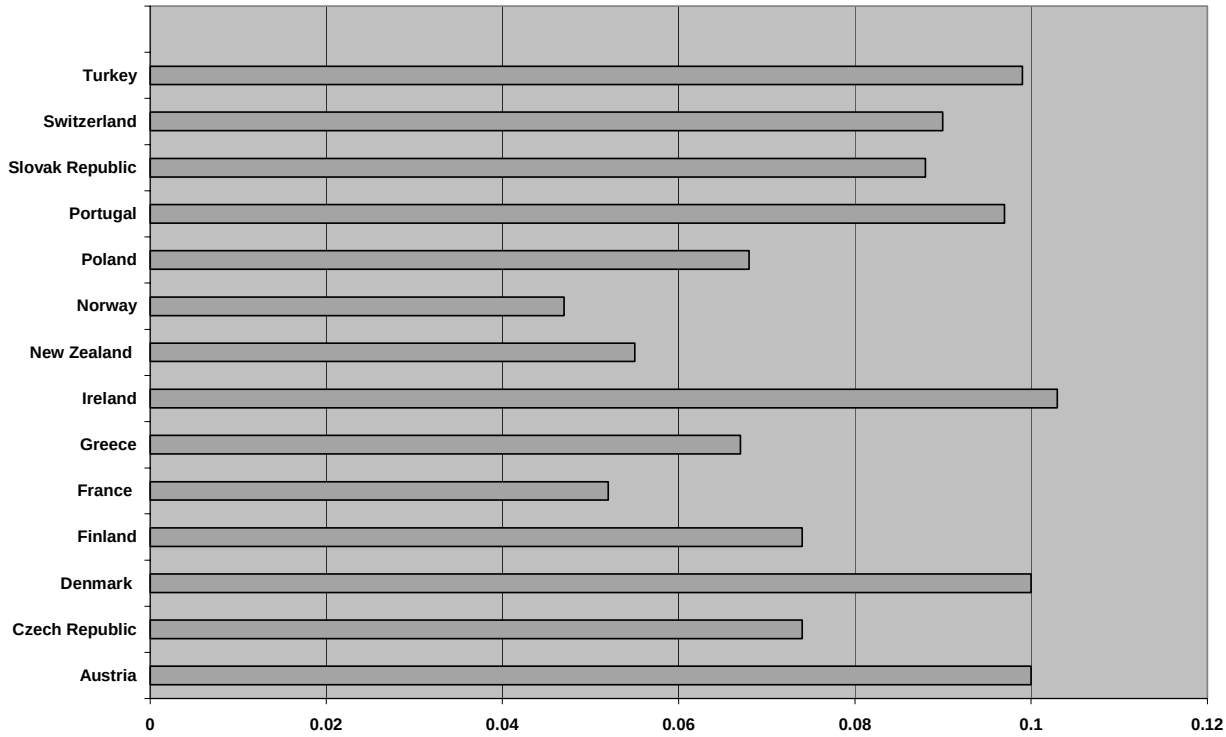
There are two main issues for Switzerland. The first is efficiency, and the second is system reliability. An analysis of both issues leads to the conclusion that reform is necessary.

### *Prices, costs and efficiency*

*Price levels and price variability*

Price levels are overall relatively high for industry in international comparison, but the picture varies significantly by category (Figure 5.4 below aggregates all industry categories). Prices are especially high for SMEs which pay about 50% above the EU average. Medium sized multisite enterprises (supermarkets, banks etc) are also likely to be relative losers. The prices paid by large Swiss enterprises, which are able to negotiate from a position of strength with their suppliers, are probably in the range of what their competitors in Europe are paying.[47]

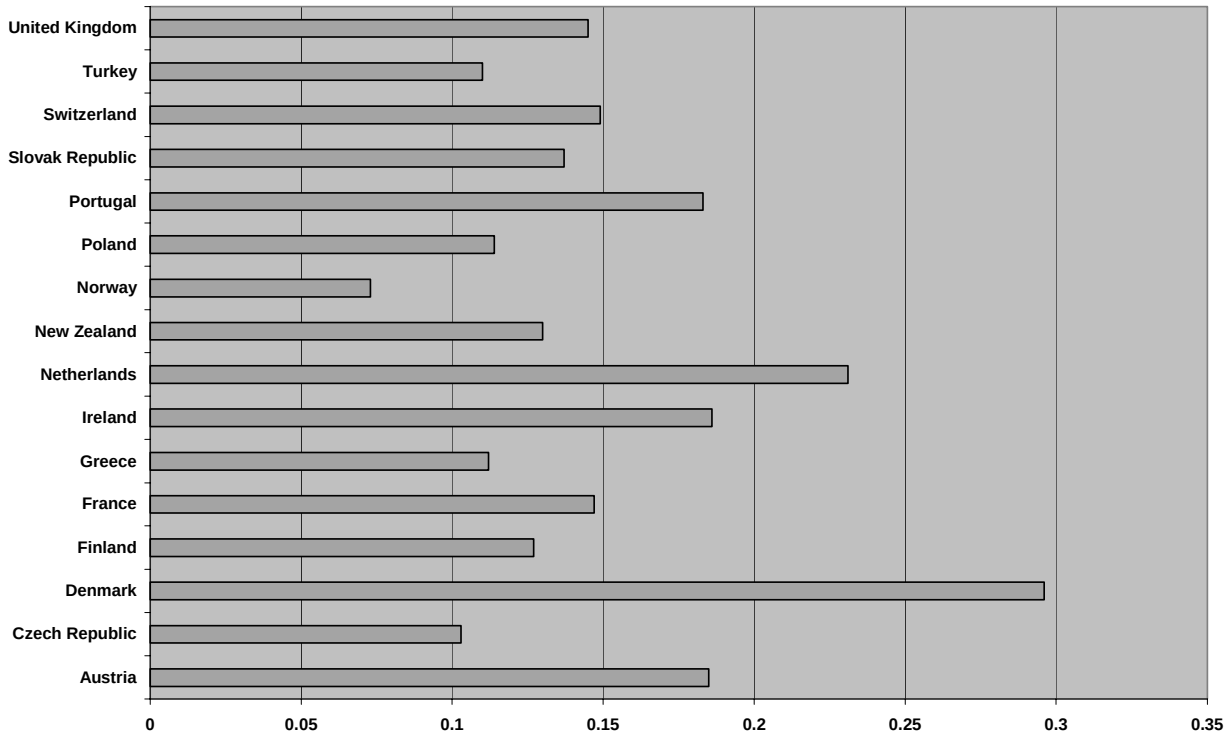
**Figure 5.4. Comparative prices for industry consumers in the OECD**




Source: Energy Prices and Taxes, IEA/OECD, 1st quarter 2005.

Figure 5.5 below shows that households as a whole are not strongly disadvantaged in OECD comparison. However the main issue for households is even greater price variability than for industry customers. The Price Surveillance Authority's Internet database highlights that average household prices vary greatly (+/- 50%) throughout the many distribution zones of the country.

**Figure 5.5. Comparative prices for household consumers in the OECD**




Source: Energy Prices and Taxes, IEA/OECD, 1st quarter 2005.

The relatively high price levels need to be judged against a context in which (1) power generation is largely based on depreciated hydro and nuclear power plants which have low marginal production costs and (2) there are significant differences in prices across the country for consumers with comparable profiles. These factors strongly suggest that prices do not currently reflect true costs.

*Cross subsidization and monopoly rent*

Part of the gap between costs and prices can be explained by excess profit. This is either recycled into municipal revenues or pocketed by companies as monopoly rent. It is generally acknowledged that, where a distribution company is under local public ownership or has close ties with the local public authorities, the profits from the distribution sector are used to subsidise local public services. High prices may be charged by municipal utilities which pay out dividends to local budgets and cross subsidise other local infrastructure. This is sometimes justified by the claim that the "fat" goes into the local public budgets for "local development", and is a simple and hence efficient means of funding public works.

Since there is no cost information (there are no requirements, as yet, for the unbundling of company accounts), it is hard to judge how much excess profit and cross subsidisation is involved. An indication of profits is that reported average industry prices dropped by 25% in 1998-2003 in anticipation of the first electricity reform law.[48] But reported average pre-tax household prices fell only some 10% during the same

period. When the large electricity companies offered their discounts, considerable write offs appeared in their accounts. From these, observers estimated the monopoly rent of Atel, Axpo/NOK/EGL and BKW at nearly CHF 3 billion.[49]

*Inefficiency*

For the same reason that it is hard to judge the extent of profits and cross subsidies, it is hard to judge the extent to which the sector may be inefficient and incurring unnecessary costs. One indication of inflated costs is the acknowledged scope for improving the efficiency of hydro power. Some efficiency gains have been achieved and price reductions passed on to large consumers since the late 1990s/early 2000s. Average hydro production costs are now "close to" European levels, but some further cost cutting is possible. At the same time however, nuclear generation is very efficient. The 2003 IEA energy review of Switzerland notes that "reactor operation of…plants is routinely achieving some of the highest availability factors in the world".

*A complex structure of energy taxes and fees*

Energy taxes and fees (which are levied at all three levels of government- Federal, cantonal and municipal) further complicate the effort of working out what is going on.

The main Federal tax that is directly relevant to electricity is VAT for the non commercial use of energy (*i.e.* household use), at 7.6%. However a range of further taxes is imposed by the cantons and municipalities, the extent and level of which varies significantly.[50] The most important is the royalty tax on water use. Cantons which have hydro plants may levy royalties based on the gross capacity of the plant, in exchange for granting water use rights.[51] Water royalties together with other charges are estimated to account for 20-25% of the total costs of hydro power. The maximum rate of the royalty is capped by the Federal government at CHF 80/kW net capacity/year, raised from CHF 54/kW in 1997. Most cantons set the royalty at the maximum limit, and the funds contribute (among other uses) to the financing of public infrastructure, including public lighting. Other taxes and charges include electricity delivered free of charge to municipalities, and fees based on the amount of electricity distributed to end users. At sub Federal level, the electricity sector yielded CHF 360 million in corporate taxes, and CHF 479 million in water royalties and concession fees for cantons and municipalities in 2002, providing significant revenue for some remote mountain regions.

*Two underlying issues: lack of transparency and lack of incentives for efficiency*

Two major problems stand out from this analysis. First, there is a lack of transparency (although the recent efforts of the Price Surveillance Authority are beginning to change this). Second, there is a chronic lack of incentives to improve efficiency and cut costs. The best way to improve efficiency is competition. But even in the absence of strong competition, cost reflective pricing can still be encouraged in the transition to a more competitive market. This can be done by improving transparency, and by deploying a range of tools such as benchmarking.

Price monitoring and analysis, not given enough importance so far, should be vigorously pursued. Benchmarking prices across regions can be expected to encourage voluntary change, as consumers become more aware of prices, and producers seek to maintain their market (though the scope for competitors to enter that market also needs to be secured by reform). A longer term and admittedly more difficult goal is to review the regulatory and structural basis for the distortions to local distribution markets, and work toward a less market distortive means of supporting local economies.

### *System reliability*

**Box 5.6. Defining the components of system reliability**

The International Energy Agency (IEA) defines security of supply as the likelihood that energy will be supplied without disruption (economic variables such as price levels and price volatility are excluded from the definition)[52]. For electricity, the IEA notes that security of supply depends on three factors: adequate investment to provide enough generation capacity to meet demand, adequate transmission and distribution networks to transport electricity, and an adequate portfolio of technologies to deal with variations in the availability of input fuels. These three elements are intertwined and should not be considered in isolation. For example, a well meshed transmission network allows more distant generation capacity to be taken into account in calculating the reserve margin.

*Generation capacity and reserve margins*

The generation reserve margin is the measure normally used to determine whether there is enough generation capacity to meet demand. This may be broadly defined as the percentage of installed capacity in excess of peak demand over a given period (such as a year, month or day). Installed capacity generally refers to the generation assets located within a given geographical area but can be adjusted in a number of ways, for example by adding import transmission capacity, and making allowances for outages (capacity which becomes unavailable due to maintenance needs and equipment failure).

*Transmission and distribution networks*

Though transmission accounts for a relatively small share of the total cost of electricity supply, it is an essential part of the investment that needs to be made in an electricity system. Investment to strengthen transmission networks is a growing issue in many parts of the OECD. Well meshed transmission lines with adequate capacity underpin a smooth and reliable system operation, which can withstand unexpected power plant outages or other unplanned events. They also reduce the cost of supplying electricity, because generation reserve margins can be pooled. Conversely congested transmission lines increase the cost of supplying electricity, as power from low cost generation sources may be unavailable where it is needed. A congested network also creates a major difficulty in the liberalisation of electricity markets. Transmission links often need to be strengthened to accommodate new patterns of trade under competition. However building new lines is increasingly difficult because of siting and environmental restrictions, as well as local resistance. Incumbent utilities, to the extent they remain vertically integrated, may lack incentives to increase interconnections as it is not in their interest to facilitate electricity trading by competitors.

*Power production technologies and input fuels*

The third element of system reliability is the mix of power generation technologies, linked to the availability of input fuels. An adequate portfolio of technologies needs to be in place to deal with potential variations in input fuels. The availability of the major input fuels used in a country's power system should at the same time be secured and strengthened, where necessary.

The elements of system reliability which need particular attention in the Swiss context are the reliability of the transmission network, and power technologies and input fuels in the longer term.[53]

*Transmission system reliability*[54]

Important issues were highlighted by the Italian blackout crisis. The November 2003 Swiss report on the blackout (prepared by the SFOE) emphasises that its underlying cause was a chronic and worsening mismatch between scheduled and actual power flows along the high voltage lines transiting Switzerland toward Italy. The backdrop is that Italian imports have grown sharply due to large differences in electricity production costs (reflected in high Italian prices) between Italy and the rest of Europe. The report goes on to explain:

"The fact that Switzerland has not been directly involved in developments within the European electricity market has meant that… imports into Italy have been distributed among France and Switzerland…. without any influence on the part of the Swiss authorities, so that loads on cross border transmission lines often deviate from allocated trading quotas, and ever greater- and unplanned- volumes have to be absorbed by the Swiss transmission lines. Over the past years, French electricity traders have been allocated export volumes that exceed France's maximum permissible physical cross border transmission capacity to Italy. By contrast, Swiss electricity traders have been allocated export volumes that are below Switzerland's available physical capacity for export to Italy. Commercial allocations of this nature give rise to deviating physical loads on transit and cross border transmission lines from Switzerland to Italy (loading above agreed levels) and from France to Italy (loading below agreed levels)".

In short, capacity allocations by the Italian and French system operators increasingly ignore Swiss concerns about capacity limits, and Swiss exclusion[55] from key European discussions and negotiations has both overloaded the Swiss grid and has also made for an inefficient use of the grid. The report concludes from this that application of the EU transit Regulation is "of the utmost urgency", as are an independent Swiss network operator, a "strong regulator", and a comprehensive Federal law for the electricity sector.

At the same time, there are complaints that Switzerland does not provide enough timely information on capacity or on essential related issues such as terms for grid access, and a perception that Swiss companies are benefiting handsomely, not to say excessively, from the country's position as a European hub for power flows.[56] Switzerland is certainly not the only country which may be less than transparent about capacity but it appears to have contributed to an acrimonious climate in which system operators and their owners sometimes engage in "tit for tat" actions that are damaging for reliability as well as for the market.[57]

Immediate measures were taken after the blackout to address some of the specific and easily manageable issues, such as a review of tree cutting regulation and practices, more staff for Etrans, and cross training of Swiss and Italian operators. But the underlying issues are still work in progress, both at European level and for Switzerland, which - nearly three years after the blackout and two and a half years after the SFOE report- still does not have an electricity law adapted to market reform, nor a framework to give effect to the transit Regulation, and especially, no independent TSO or regulator.

*Generation technologies and fuel inputs*

Switzerland's generation technologies currently serve it well. But there is a need to consider the longer term, which is acknowledged by the Federal government as well as the industry. As a landlocked country with no domestic energy resources (except hydropower), securing energy supplies through diverse trade relations and fuel diversification is important. Demand also continues to grow. On the supply side, current construction and upgrades will increase total capacity only marginally from 17 346 MW to 17 540 MW by 2010 (with hydro capacity rising from 13 295 MW to 13 410 GW, and thermal capacity from 831 MW to 910 MW, while nuclear capacity will remain unchanged), although major new capacity could stem from EOS's plans to de-mothball the Chavalon plant and install a 357 MW CCGT.[58]

Assessment of supply options in the Swiss context is challenging for a number of reasons, and a clear vision of the way forward will be important. One challenge is the constraints imposed by the CO2 Law. The Law mandates a CO2 tax should Switzerland not be on track to meet its Kyoto target (which it is currently not). Another is the future of nuclear power, a controversial topic in most countries, Switzerland being no exception. As well, hydropower capacity has more or less reached its practical limits. The topic of future generation sources is a complex one and largely beyond the scope of this paper, but some points are worth noting:

- *Hydropower.* Most hydropower sites are already being exploited, and those that remain are probably environmentally impossible to develop. The issue is therefore the maintenance of current hydro capacity rather than new capacity. The reform proposals include a provision for maintaining hydropower capacity at its 2000 level until 2030. This is to stay on the safe side of developments. However, concerns about the future of hydropower in a competitive market are likely to be exaggerated. Hydropower is an extremely flexible form of energy that can not only be profitably deployed (as it already is) to meet peak demand in regional trade, but also to counter the relative inflexibility of some other forms of renewables such as wind energy. If the plants are efficiently operated, they should be able to hold their own in a competitive market.

- *Natural gas.* This is perhaps the most important option for development. Switzerland is already a transit country for European gas and therefore already has high pressure pipelines that could be used for power generation imports. It also has a mothballed power plant (originally run on fuel oil) that could be converted. Current legislation provides for third party access to the high pressure pipelines and a first case concerning a gas shipper is under preliminary discussion. In short, the conditions exist for an expansion of natural gas in the power mix.

- *Nuclear.* Additional nuclear capacity was banned during a ten year moratorium which ended in 2000. Nuclear capacity will therefore remain stable for some years to come. But decisions are needed from 2010 onwards to secure its future as the older plants reach the end of their operational life in 2020, or to decide on alternatives.

- *New renewables.* There is a need for realism about the contribution that new renewables could make to future generation, given their very minor current contribution to generation, and their cost. It would not be sensible, or indeed possible, to envisage using them to replace existing major sources of supply such as nuclear power.

Domestic supply options are of course not the only option. A stronger reliance on imports is another option, and it seems quite likely that Switzerland will need to become a significant importer. The management of security of supply is increasingly an issue to be shared with regional partners, or at least taking account of developments in neighbouring countries. Inputs to power generation have traditionally been linked to a country's indigenous fuel sources, but increased trade involves, for example, calculations of generation capacity reserve margins that take neighbouring systems into account. Demand side management is another key option which is already a central part of Swiss energy policy.

## PART TWO

### The European dimension

As a major trader and transit hub in Europe, Switzerland is strongly affected by the European regulatory framework and developments. The two main institutions for taking issues forward are the EU (in which governments participate directly, increasingly with their national regulators), and the UCTE (in which countries are generally represented by their system operators). Over the last decade, the EU has adopted framework legislation for market opening and cross border grid management, and more legislation to reinforce security of supply aspects is on the way. The UCTE has also been active in updating technical system security rules in the wake of the Italian blackout. Efforts are being made to strike the right balance between commercial freedom, and the security needs of a densely meshed regional grid system which leads to a high degree of interdependence between European countries.

These developments have some way to go still. For example the transit Regulation needs considerable further development, notably with a more precise set of rules for managing auctions. This is anticipated in the Regulation which provides institutional mechanisms involving the EU Commission and member states to carry out this further work. So there are opportunities for Switzerland to help shape important aspects of European electricity developments. But at the same time, some of this work is moving forward quite rapidly. Within two years or so, the window of opportunity for helping to shape some of the basic issues is likely to have passed.

This underlines the urgent need for Switzerland to reform in order to be in a position to influence the regulatory setting in which its electricity sector will need to operate in future. This is commercially important given Switzerland's position as a major trader. The aim should be to ensure, as far as possible, that Swiss companies can continue to trade freely in the internal EU market. It is also important for security. The Italian blackout highlighted a number of issues but perhaps the most fundamental is the interdependence of European countries, especially Switzerland which sits at the geographical centre of the European grid.

**Box 5.7. Key EU legislation on market opening and system reliability[59]**

**1996: Adoption of the first market opening Directive**

This started the process of market opening. It set a succession of dates for progressively smaller consumers to have a choice of supplier via regulated or negotiated third party access to the grid, starting with consumers of 40GWh and above (to be implemented by 1999). It did not, however, require choice for all consumers. The defined end point was consumers of 9 GWh and above, to be implemented by 2005 (the targets have now been displaced by the second Directive). It also required member states to set up an independent regulator, and accounting/management unbundling of the networks.

**2003: Adoption of the second market opening Directive**

The second market opening Directive was promoted by the EU Commission because of the relative lack of progress toward a competitive market in some EU member states. Key provisions are reinforced compared with the first Directive, including independent regulation and system operation, stronger network unbundling, regulated grid access (the negotiated option was removed), and full consumer choice (to be achieved by 2007).

**2003: Adoption of the cross-border electricity Regulation**

The Regulation puts capacity allocation under the oversight of national regulators and emphasises transparency and market friendly approaches. It seeks to improve the transparency with which information on capacity is made available. It defines how the available capacity should be allocated, with a strong preference for explicit or implicit auctions.

**2005: Negotiations for a draft Directive on electricity infrastructure and security of supply**

The draft establishes measures "aimed at ensuring the proper functioning of the EU internal market by safeguarding security of electricity supply and by ensuring an adequate level of interconnection between member states to ensure competition at European and national level". It requires member states to define general, transparent and non discriminatory policies on security of supply.

The EU Commission's proposal is currently undergoing its first reading in the European Parliament, so has some way to go in the adoption process.

Annexes 3 and 4 give more detail on the 2003 Directive and Regulation.

### *The European dimension: market opening*

*Market opening linked with new institutional and regulatory frameworks*

The EU has steadily been accelerating its efforts to bring about an open internal EU market for electricity. The aim of the 2003 Directive is to push this process toward an end point (in 2007) when all consumers will have a choice of supplier. The regulatory and institutional apparatus for achieving this is also developed in the Directive. The content of the Directive can be viewed as a template against which Swiss market opening reforms should be judged. This is not for reasons of principle, but rather to avoid the very practical risk of triggering the reciprocity provision if the new Swiss regulatory regime is not adequate, at least on the essentials. This could be very damaging to Swiss commercial interests.

**Box 5.8. The 2003 market opening Directive**

*Public service obligations*

Article 3: *Public service obligations and customer protection*: Defines what may be covered by public service obligations (security, social and environmental), which shall be "clearly defined, transparent, non discriminatory, verifiable and shall guarantee equality of access for EU electricity companies to national consumers". Measures to promote security of supply, economic and social cohesion, and environmental protection must be taken. Obligation to ensure that electricity suppliers specify information on energy sources in bills.

*Security of supply*

Article 4: *Security of supply*: Requirement to monitor security of supply, which may be delegated to the regulator. To cover the supply/demand balance on the national market, level of expected future demand, plans for additional capacity, network maintenance, and provisions to cover peak demand and shortfalls.

Articles 6 and 7: *Generation capacity*: Requires the adoption of an authorization procedure for new capacity, based on objective, transparent and non discriminatory criteria, to be made public. Should this not prove adequate to support security of supply, environmental protection or the promotion of new technologies, there is provision for a possible tendering procedure, based on published criteria, for which the regulator or another independent body designated by the member state is responsible.

*Transmission System Operators*

Articles 8 -12:

*TSO responsibilities*: A TSO (or TSOs) shall be designated. The TSO is responsible for (1) ensuring that the system is able to meet long term demand (2) ensuring security of supply (adequate transmission capacity and system reliability (3) managing energy flows in the context of exchanges with other systems, including ensuring the availability of ancillary services (4) providing adequate information to other TSOs (5) ensuring non discrimination between system users.

*TSO independence and unbundling*: A TSO which is part of a vertically integrated utility must be independent "at least in terms of its legal form, organization and decision making" from the other activities which are not related to transmission. Specific de minimis requirements underpin this independence: (1) TSO managers cannot at the same time be part of the day to day management of generation, distribution and supply (2) TSO managers' professional interests must not be allowed to interfere with their independence (3) a TSO must have "effective decision making rights, independent of the integrated (utility), with respect to assets necessary to operate, maintain or develop the network" (4) a TSO must set up a compliance programme to exclude discriminatory conduct.

*Dispatch and system balancing*: TSOs are responsible for this- if they have this function and without prejudice to contractual supply obligations including those arising from a tendering procedure (see Article 6 and 7). Dispatch of generators and the use of interconnectors must follow objective criteria, and be non discriminatory and transparent. Priority may be given to renewable sources or CHP in dispatch. Indigenous sources- but no more than 15% of the total- may be given preference for security of supply reasons. TSOs' procurement of energy to cover losses and reserve capacity, and their rules for system balancing (including cost reflective user charges) shall be objective, transparent and non discriminatory.

*Distribution system operators*

Articles 13-17:

*Distribution operator responsibilities*: One or more distribution operators shall be designated, for a period of time to be determined by member states having regard to considerations of efficiency and economic balance. Their tasks are defined as: maintenance of a secure, reliable and efficient electricity distribution system (with due regard for the environment); no discrimination between system users, especially in favour of related undertakings; provision of information needed by system users; possible requirement to give priority in dispatch to renewables or waste or CHP; non discriminatory, transparent and market based procurement of reserve energy (without prejudice to pre January 2002 contracts)

*Unbundling*: Independence at least in terms of legal form, organization and decision making from other activities not relating to distribution (but no obligation for divestiture of ownership). Minimum criteria: distribution management not to participate in company structures of the integrated company; measures to be taken to ensure that professional interests are taken into account in order to ensure independence; effective decision making rights independent of the integrated company for assets needed to operate, maintain or develop the network, although co-ordination mechanisms are allowed in order to respect the parent company's rights such as return on assets, including parent approval of financial plan and indebtedness (stopping short of parent involvement in day to day operations); compliance plan on measures to prevent discriminatory conduct, and annual report on this to the regulator. Derogation possible for distribution companies serving less than 100 000 connected customers or small isolated systems. Confidentiality provision. Combined transmission/distribution operator possible, under the same conditions.

*Unbundling of accounts*

Articles 18-19:

*Unbundling of accounts*: right of access by member state or regulator to accounts. Electricity undertakings, whatever their legal form or system of ownership, shall draw up, submit to audit and publish annual accounts in accordance with national and EU law. Separate accounts to be kept for transmission and distribution, as if these were carried out by separate undertakings, in order to avoid discrimination, cross subsidization and distortion of competition. Accounts also to be kept for other electricity activities. Revenue from ownership of distribution/transmission to be specified in the accounts. Audit to pay special attention to discrimination issues.

*Third party access to the transmission and distribution systems*

Article 20: *Implementation of third party access:* Member states to ensure implementation of third party access based on published tariffs, applied objectively and without discrimination between system users. Tariffs or methodologies underlying their calculation subject to prior approval and to be published. Access may be refused where an operator lacks capacity. Refusal must be substantiated, with special regard to Article 3.

*Market opening and reciprocity*

Article 21: *Timetable for market opening and reciprocity rules:* Until July 2004, eligible customers are as specified in 1996 Directive; from July 2004, all non household customers; and from July 2007, all customers. Contracts for the supply of electricity with an eligible customer in another member state shall not be prohibited if the customer is considered eligible in both systems. If such transactions are refused because the customer is eligible only in one system, Commission may (taking into account the market situation and the common interest) oblige the refusing party to allow the supply at the request of the member state where the eligible customer is located.

*Regulatory authorities*

Article 23: *Designation of independent regulators:* Member states shall designate one or more competent bodies with the function of regulatory authorities. They shall be wholly independent from the interests of the electricity industry. They shall at least be responsible for ensuring non discrimination, effective competition and the efficient functioning of the market.

*Monitoring responsibilities*: rules on management and allocation of interconnection capacity; any mechanisms to deal with congested capacity within the national system; time for transmission and distribution companies to make connections and repairs; publication of information by transmission and distribution operators on interconnectors, grid usage and capacity allocation; effective unbundling of accounts; terms, conditions and tariffs for connecting new producers so as to secure non discrimination, especially as regards renewables; fulfilment of operators tasks under Articles 9 and 14; level of transparency and competition. Regulators shall publish an annual report on monitoring.

*Tariff responsibilities*: Responsibility for fixing or approving, prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for (1) connection and access to national networks, including transmission and distribution tariffs, allowing for adequate investment (2) provision of balancing services. Member states may nonetheless provide for the regulators to submit tariffs or methodologies for approval. The regulators' proposals and any rejection of these (together with a justification) must be published. Authority to require operators to modify terms and conditions, tariffs, rules, mechanisms and methodologies to ensure non discrimination. Complaints to be referred to the regulator which, acting as a dispute settlement authority, shall issue a decision within two months. Decision to have binding effect unless overruled on appeal. Complaints shall not have suspensory effect pending the decision. Member states shall ensure that the regulator can carry out duties in "an efficient and expeditious manner".

*Abuse of dominance*: Member states shall create appropriate and efficient mechanisms for regulation, control and transparency so as to avoid any abuse of a dominant position, in particular to the detriment of consumers, and any predatory behaviour. Member states shall provide the Commission with an annual report on these issues, which will also review changing ownership patterns.

*Cross border disputes*: The deciding regulator shall be the one which has jurisdiction in respect of the system operator which refuses use of or access to the system.

*Derogations*

Article 26: Member states can apply for derogations if they can show substantial problems for the operation of small isolated systems.

*Reporting*

Article 28: The Commission shall monitor and review the application of the Directive and submit a progress report to the European Parliament and the Council before the end of the first year following its entry into force and then annually. It may submit proposals, especially to ensure the independence of distribution system operators, by July 2007, again with special reference to dominance problems.

Annex 3 gives a more detailed review of the Directive.

*Cross border congestion management*[60]

**Box 5.9. The traditional European approach to cross border capacity allocation**

The traditional method for allocation of transmission capacity for cross border trade is based on capacity allocation agreements between system operators. The allocation is negotiated between countries/national system operators on an annual basis. The definitions and principles underlying the calculations are as follows. Net Transfer Capacity (NTC) defines the amount of cross-border transmission capacity available. NTC is Total Transfer Capacity (TTC) minus Transmission Reliability Margin (TRM). Total Transfer Capacity is the maximum feasible power exchange that can flow between systems A and B reliably and without affecting system security. Transmission Reliability Margin is the part of Total Transfer Capacity that is reserved to cover uncertainties. As the European Transmission System Operators (ETSO) explain: "At the interface between two interconnected transmission systems A and B, NTC is estimated for direction A-B and for direction B-A. NTC equals TTC less TRM in one direction….. NTC is the expected maximum value of generation that can be wheeled (moved) through the interface between the two systems, which does not lead to network constraints in either system, respecting some technical uncertainties on future network conditions."

ETSO publishes indicative values for NTC for each summer and winter, based on information provided by system operators. These values are indicative, and their use for the actual allocation of cross border capacity to network users is likely to be limited, both for technical reasons (for example the difficulty of using seasonal values to predict actual short term physical flows, and mismatches of data definitions used by different system operators) and commercial (system operators may understate the amount of capacity available to promote the commercial interests of their national companies).

Cross border congestion management was not a major issue until the increase in trade triggered by market opening put pressure on the physical structure of the European grid. Reflecting the need to take action, a new approach is now required by the 2003 EU transit Regulation. This puts capacity allocation under the oversight of national regulators and emphasises transparency and market friendly approaches. The Regulation seeks to improve the transparency with which information on capacity is made available, as well as defining how the available capacity should be allocated, with a strong preference for explicit or implicit auctions as the mechanism for allocation, at least in the short term until market structures are more mature to cope with other approaches, and technical discussions on these are more advanced.

The traditional approach lacks transparency and may in practice be likened to a form of barter. In other words system operators /grid owners simply ensure that they balance out their exchanges of power, rather than buying and selling (if the net flow is in one direction for a given week, they arrange to get it back the following week). NTC requires an analysis and valuation of "constraints" and "uncertainties", and depends on calculations and information supplied by national system operators. It is therefore both complex and controversial. Moving to a market based approach for capacity allocation therefore implies a completely different mindset.

**Box 5.10. The new European approach to cross border capacity allocation: the 2003 EU transit Regulation and market friendly approaches**

*The Regulation*

The Regulation seeks to address two fundamental issues: the amount of capacity available for cross border flows, and how this capacity should be allocated. Its main provisions are:

The provision of information on interconnection capacities, and its publication;

The management of congestion through market based solutions that give efficient economic signals and the use of allocation of revenue to guarantee availability of allocated capacity, and/or for network interconnection investment, and/or as income for regulators to take into account in calculating network tariffs;

The adoption of guidelines on the management and allocation of available transfer capacity, with the aim of progressive harmonization;

Compliance with the Regulation to be assured by national regulators;

Provision of relevant information by member states to the EU Commission;

Penalties for infringement of the Regulation to be laid down by member states; the establishment of a committee of member states to assist the EU Commission;

Monitoring and reporting by the EU Commission on the implementation of the Regulation;

A set of (binding) guidelines on the management and allocation of available transfer capacity of interconnections between national systems, which encourages the use of auctions.

*Market friendly approaches for cross border capacity allocation*

*Auctions*

The system operators on both sides of a border agree to conduct an auction on a regular basis (daily, weekly or monthly). Each market participant offers a price for the use of transfer capacity in one direction. The system operators find out which direction is constrained and give the highest priority to the highest bid. Bids for transfer capacity in the constrained direction are accepted until capacity is fully committed.

Auctions may be explicit (tradable rights for market participants to use capacity) or implicit (based on the lowest offered electricity prices, through power exchange market splitting). Implicit auctions/market splitting probably offer the most efficient mechanism in the long run for dealing with day ahead and intra day use of constrained transmission capacity, but organising them in a meshed network across national borders is challenging. They are usually applied in systems which already have a common power exchange (as in the Nordic countries). The spot market prices on either side of the bottleneck are allowed to diverge if necessary. Thus, electricity in the area which is oversupplied becomes cheaper than electricity in the undersupplied area. Consequently fewer market participants are interested in buying power from the area that becomes more expensive, and the resulting flow over the bottleneck is reduced.

Alternative methods which seek to allocate capacity directly without using price as the determining factor either risk discrimination between users or require arbitrary rules to decide who does (and does not) qualify for an allocation. To ensure that the outcome of explicit capacity auctions does not unduly favour dominant incumbents, it may be necessary to restrict their bidding.

Auction revenues need careful management, as sales of congested capacity can lead to high levels of revenue recovery in the short term, especially if the true amount of available capacity is underestimated. Auction income earned by system operators should be reserved for (1) covering the cost of managing congestion and ensuring firmness of the capacity (2) developing the grid to relieve congestion (3) reimbursement to grid users. The use of auction income is especially important where ownership of the system operator is not fully separated from that of generation companies, to prevent it being used in a discriminatory way. System operators should also have a positive financial incentive to alleviate congestion and to build new capacity. Regulators therefore need to strike a delicate balance between preventing excessive returns, and giving system operators scope to increase profits.

*Countertrading and redispatching*

Other market friendly approaches include countertrading and redispatching.

Countertrading is based on the fact that if a physical flow reaches the capacity of the transmission line (meaning that the line is congested in that direction) any further contractual transaction in the congested direction can only be carried out if at the same time a corresponding contractual flow is arranged in the opposite direction. The system operator intervenes by unblocking the congestion with the corresponding purchase or sale of electricity from generators or consumers.

Redispatching is similar to countertrading. In this case, however, the system operator does not engage in offsetting trading contracts, but directly changes the dispatching order of the power plants to create overall electricity flows which remain within the limits of the transmission line constraints.

The Regulation is an important initiative. But it only sets framework conditions for congestion management, and the crucial tasks of compliance and enforcement are the responsibility of member states and their national regulators. There are also important gaps in the framework, such as aspects of grid access regulation (for example non tariff terms such as balancing are not covered). Over the longer term, issues such as increasing the scale of system control areas and integrating balancing markets probably also need to be addressed.

A great deal depends therefore on the strength and determination of member states and the EU Commission to flesh out the detail of how the provisions (notably capacity auctions) will be handled in practice, and on the national regulators to police the system operators, who have been used to considerable independence as regards capacity allocations in the past.

This is still very much work in progress. Europe is currently working through a messy transition from the old system. The availability and allocation of capacity remain somewhat opaque. Electricity traders suspect that spare capacity may exist in particular cases. But it is not in the interests of vertically integrated companies to release it, and system operators may be managing congestion in their system so as to push it to their national borders. There is also a need to unwind existing contracts which still account for some 50% of capacity, or at the least to monitor their management so as to ensure that they are not used as an excuse for capacity shortages. Many regulators are struggling to assert themselves in the promotion of the new approach. This is perhaps not surprising as national interests are at stake and the Regulation is seeking, in effect, to pool national interests for the benefit of a better functioning regional European market.

Greater transparency would be a major step forward on which further progress could be built. The next step is a meeting of the Florence Forum of European regulatory and other interests in autumn 2005 to review the guidelines on congestion management in the Regulation. This will be followed by a first meeting of the regulatory Committee set up under the 2003 EU Directive to review the proposals which it is hoped will emerge from these discussions.

Switzerland has every interest in working alongside European colleagues to ensure that the new approaches can be effectively implemented, both for commercial and system reliability reasons.

*Prospective new developments: market coupling*

As well as the immediate task of giving effect to current legislation, Europe is also exploring longer term developments in the various fora that now bring together governments, regulators and system operators. Among the initiatives under discussion is flow based market coupling. This may be of particular interest to Switzerland as a major trader.

**Box 5.11. New ideas: flow based market coupling**

Flow based market coupling is an attempt to combine congestion management by system operators with power market operation. It has been proposed by ETSO and Europex (European power exchanges group) in order to improve the efficiency of system management and market operation. It is under discussion in Europe in the Florence Forum.

Fully integrated markets would be the most efficient approach, but as this is unrealistic in the near (or even medium term) future, the coupling of regional markets offers a more realistic way forward for achieving efficiency benefits in the short to medium term. The idea is that system operators would support trade between different markets by taking explicit account of the physical flows of electricity between them (flow based modelling). Market based congestion management mechanisms (such as auctions) would be used at the borders between countries, and would be co-ordinated to take account of the interdependence of physical flows.

The flow based part of the idea is as follows. It would be assumed that the European system can be operated as a number of single price regions, each of which can be represented as a single node in a simplified transmission model. The regional nodes are connected by notional transmission circuits. The flow properties of this simplified model are described as "flow factors", and limits ("bottleneck capacities") are placed on the notional inter regional circuits to represent the effects of cross border transmission constraints.

The market coupling part of the idea is as follows. It assumes that an administered day ahead market exists in each region ie at each node of the simplified transmission model. Subject to the ability of the transmission model to support the associated flows, market coupling enables the regional markets to trade with each other if it is economically efficient to do so.

Flow based modelling supports system security: it provides the means to maximise the inter regional transmission capacity that can be made available without compromising system security. Market coupling enhances market efficiency by providing the efficiency advantages of integrated markets, subject to the availability of inter regional transmission capacity.

The idea is still some way from implementation. It implies a highly integrated set of processes involving system operators and power exchanges working together, with implications for accountability (as not all power exchanges are regulated), harmonisation, and the regulatory/contractual framework that joins the parties together.

### *The European dimension: security of supply*

The importance of the European dimension for system reliability is illustrated by the experience of the 2003 Italian blackout, which highlighted the vulnerability of current European reliability rules and institutional relationships, as well as the underlying problem of increased trade flows leading to cross border congestion. The European reliability dimension covers a range of issues, including rules for short term system reliability; institutional frameworks to promote reliability; and regulation to promote reliability via appropriate investment.

**Box 5.12. The Italian blackout**

The 28 September 2003 Italian blackout was investigated by a UCTE committee of experts from Belgium, Germany, the Netherlands and Spain (none of which were involved in the event). The committee's report was published in April 2004.

*Immediate causes: reliability rules and institutional relationships failed to meet the test*

The blackout was triggered by a rapid cascade of events starting in Switzerland where an overloaded (and hence overheated) line tripped *i.e.* automatically disconnected from the network. The load (electricity) on the tripped line was taken over by other lines including another Swiss line which because of its proximity was also overloaded, an overload that was acceptable in such an emergency for about 15 minutes. To help deal with the situation, Etrans contacted the Italian system operator asking for a reduction of Italian imports to bring these down to schedule (300 MW more than scheduled were transiting the Swiss system). The reduction was carried out within the 15 minutes, but this and other Swiss measures were not enough to relieve the overloads, and the second Swiss line also tripped, probably through sagging of the overheated wires on to a tree (tree flashover). The loss of two important lines created intolerable overloads on the remaining lines in the area, which triggered the tripping of interconnectors to Italy and isolated the Italian system from the rest of the European network. The brief period of very high overloads before Italy was disconnected lowered the voltage level in Italy to such an extent that several Italian generation plants tripped and the Italian system (now also disconnected from the rest of Europe) collapsed as a result. The report also notes that it took considerable time (thirteen and a half hours) to restore the whole of the Italian power system.[61]

The committee's report cited four immediate reasons for the blackout: the impossibility of reopening the first tripped line because of an automatic device to protect equipment against very high loads; failure of the system operators to appreciate the urgency of the situation facing them, linked with inadequate communication (late phone call by Etrans 10 minutes after the first line trip); voltage collapse leading to system collapse in Italy (Italy was not ready to operate as a single island as provided for in the UCTE rules); and maintenance practices (*i.e*. tree cutting along the lines). The committee noted that the blackout was *not* caused by some extraordinary event such as a storm or terrorist attack, and that prior to the blackout the system complied with the UCTE security criteria (notably N-1).

*Underlying causes: market liberalisation and international trade have put the European grid under severe pressure*[62]

The committee also underlined that the European interconnected transmission system was not designed to cope with the high level of cross border exchanges promoted by market liberalisation. The growth of this traffic has led system operation ever closer to its security limits. The report noted that "security standards are currently based on the results of classical stationary load flow analysis" which means that the overall stability margin of the interconnected system is reduced by the high level of power flows, and it therefore suggests that an N-2 standard (the system should be capable of withstanding two failures not just one) be investigated.

*Short term system reliability rules*

Europe has a long standing set of rules and relationships for technical grid management and security, developed after the second World War as the grids of European countries became increasingly interconnected, and co-ordinated by the UCTE.

**Box 5.13. The Union for the Co-ordination of Electricity Transmission (UCTE) and system reliability rules**

The Union for the Co-ordination of Electricity Transmission (UCTE, formerly UCPTE -the Union for the Co-ordination of Electricity Production and Transmission) was set up after the Second World War It oversees the technical aspects of transmission grid interconnection over a large part of Europe. It was set up as a voluntary group which relies on co-operation between members.

Most European countries are closely interconnected and form together what is called a "synchronous area". National system operators collectively operate the system as a whole, with each directly in charge of a subsystem called a control area, and are UCTE members.

Countries currently part of the UCTE are: Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, the Republic of Serbia and Montenegro, France, FYROM (Former Yugoslav Republic of Macedonia), Germany, Greece, Hungary, Italy, Luxembourg, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain and Switzerland. The system operator of Denmark is an associated member.

From a technical standpoint, reliability may be defined in terms of the performance requirements of the elements of an integrated electric power system that allows electricity to be delivered to customers within accepted standards and in the amount desired. It has two dimensions (1) short term security: the ability of the system to withstand sudden disturbances such as short circuits or unanticipated loss of system elements (2) long term adequacy: the ability of the system to supply customers' aggregate demand at all times, taking into account outages (shutdown) of system elements.

The N-1 system reliability rule, used worldwide (with regional variations), is currently applied in the UCTE area. The rule states that the system must be operated in such a way that any single incident, for example the loss of a line, should not jeopardise the security of the interconnected system. It implies two steps: (1) the application of corrective measures following an incident, to secure the continued stable operation of the interconnected network (2) after securing stable operation, the application of complementary measures, if necessary, to return the system to the N-1 security state as soon as possible.

The current N-1 system reliability rule, which states in broad terms that the system should be operated so as to withstand the failure of a major component without disabling the whole system, was put to a severe test in the blackout, and in effect, failed. There is now an acknowledged degree of risk associated with the rule under today's grid conditions, as it proved inadequate when faced with two successive system failures.

The UCTE report on the Italian blackout had recommendations for the UCTE itself. These included the regular update of its operational handbook, a review of some key rules such as harmonisation of criteria for compliance with N-1, reinforcement of emergency security procedures between system operators, more work on day ahead congestion forecasts, and extension of real time data exchange among system operators.

Collective efforts have since been made to give effect to these recommendations and strengthen the rule book. Two years on the UCTE is in the process of implementing important changes. An agreement was reached in 2004 to launch a "security package" setting out targets to improve the functioning of the European grid and update security standards for such issues as reserves, monitoring and generation control. The UCTE announced in May 2005 that its general assembly had agreed to make UCTE security and reliability standards binding for all member system operators. This is a major step forward as compliance used to be voluntary. However it is not yet quite clear how the rules of a voluntary club can be enforced. An inter system operator multilateral agreement giving effect to the package entered into force in July 2005. A compliance monitoring procedure is due to be introduced later in 2005.

*Institutional framework to support system reliability*

Market liberalisation and the disaggregation of vertically integrated utilities has required a fundamental reappraisal of the institutional pillars on which European regional electric system security rests. Prior to market reform, each utility managed its own control area both in terms of generation and transmission. This meant that a single party was usually able to ensure compliance with security requirements. There was no regulator. The absence of competition, coupled with generous implicit or explicit provisions for returns on investment, also helped to promote a high level of voluntary compliance with security rules.

The EU legal framework, though not so far explicitly oriented to this issue, promotes institutional change that is crucial to system reliability. The 2003 Directive for example requires that member states set up independent regulators and independent system operators. This underlines that the well functioning of the international system depends on the well functioning of national systems.

The UCTE made a number of recommendations for the European regulatory framework in its Italian blackout report. It recommended adoption of the Transmission System Operator (TSO) model proposed in the 2003 EU Directive to avoid incompatibilities that could endanger security. This includes the adoption of the Directive's rules on legal unbundling and TSO decision making rights with respect to network assets, their operation, maintenance and development. The report judged that the blackout, rather than casting doubt on this model, strengthens the case for it, as system operators need to be both empowered and independent to assure system security. Their specific tasks should include the assessment of transmission capacity, the redispatch of generation or activation of reserves when security is at stake, and the management of defence plans as a last resort.

*Regulation to promote system reliability*

This concerns both the regulations of individual countries, and EU level regulation. The UCTE made a number of recommendations aimed at countries in its report on the Italian blackout. It drew attention to the importance of national grid codes or regulations governing the technical and operational requirements of the supply chain,[63] and proposed harmonisation around a minimum set of requirements. It also recommended the review of tree trimming practices.

Investment in transmission is the major regulatory issue for long term system reliability. There is a need for appropriate investment in transmission "in a system with steadily increasing loads and dramatic changes in the location and structure of the generation mix",[64] which the regulatory framework should encourage through adequate returns on investment. Another important security risk is an imbalance between generation and load (demand), and the consequent need for the regulatory framework to build in adequate incentives for generation investment too (which include the need to address issues such as taxation, the regulatory framework for siting new plants, and environmental constraints).

EU law has so far been tilted in the direction of market opening and has not directly addressed long term security issues. The EU Commission's proposal for an electricity supply and infrastructure Directive is a step forward. The proposal (correctly) rests on the idea that security and functioning open markets go hand in hand. For example better interconnections help security but also make it easier for new suppliers to enter the market. Put simply, if the lights go out, there is no trade and no market. The draft has also raised an important and ongoing debate about the role of system operators and regulators in infrastructure development.

**Box 5.14. Proposal for an EU Directive on electricity infrastructure and security of supply**

The Commission's proposal is currently undergoing its first reading in the European Parliament, so has some way to go in the adoption process.

The draft establishes measures "aimed at ensuring the proper functioning of the EU internal market by safeguarding security of electricity supply and by ensuring an adequate level of interconnection between member states to ensure competition at European and national level". It requires member states to define general, transparent and non discriminatory policies on security of supply, taking account of the need to:

- Ensure continuity of electricity supplies
- Promote cross border co-operation
- Reduce the trend rate of growth of electricity demand to meet environmental commitments
- Diversify generation in order to ensure a reasonable balance between different primary fuels
- Promote the use of new technologies
- Renew- on an ongoing basis- transmission and distribution networks

Article 4- the "anti blackout" article- links to the UCTE work on tightening technical security. The draft also contains measures to maintain a supply-demand balance under market conditions. Article 5 requires "market design" to be published. Articles 6 and 7 require member states to have a regulatory framework to support network investment, including co-ordination between TSOs and regulators about financing of projects, and potential "step in" rights for regulators (they may intervene to speed up the completion of projects, for example by offering financial incentives; and work on certain projects may be allocated by tender if the TSO is unable or unwilling to carry them out). TSOs must submit multiannual investment strategies to their regulator, and the latter must provide the Commission with a summary of investment programmes, for discussion in the European Regulators Group on Electricity and Gas (ERGEG).

## PART THREE

NOTE TO THE READER: The reform package described below has since been the subject of debate and changes in Parliament. Perhaps the most important development is that Parliament has- at this stage- decided to go for a full reform package (instead of opting for change limited to the international dimension and issues of transit). The status of the package as of September 2005, following debate in the National Council (lower chamber) was:

1. Revision of the 1902 Federal Electricity Law: Agreement on the establishment of ElCom and the TSO (the latter with a clause to ensure that the majority of Board members are independent).

2. New Electricity Supply Law: Agreement on a two phase market opening, with the aim of market opening by 2007 for consumers above 100 MWh consumption, and full market opening five years later, with the option for households to remain captive. Full market opening no longer to be subject to an optional referendum, but to a Parliamentary vote.

3. Revision of the 1998 Energy Law: Renewables (existing plus new) to be increased by 5.4 TWh by 2030, to be financed through 0.3 Swiss cent/kWh grid fee. Total fee revenues capped at CHF 165m pa. Modalities yet to be defined.

The proposals now go to the upper chamber for debate, probably in spring 2006.

### The proposed reforms and their assessment

#### *The Federal Council reform package*

*A second attempt at reform*

This package is the second attempt at reform. The first was rejected by popular referendum in 2002 despite initially gaining wide support and parliamentary approval. The Swiss Federal government (as well as many others in the confederation) has been aware for a number of years of the need to reform the electricity sector, not least because of EU reform initiatives which have gathered momentum since the first market opening Directive in 1996. There is a growing consciousness of the fact that the unreformed Swiss electricity sector, a major trading and transit hub for the European market, now sits at the centre of a region that is experiencing changes in which it has so far played little active part.

Since the failure of the first Swiss reform attempt, the EU has reinforced legislation for the development of a single European market in electricity with the adoption in 2003 of a new and even stronger market opening Directive, as well as a regulation for the management of cross border electricity trade.

Two other factors have intervened since 2002 which strengthen the case for reform. The first is the Italian blackout in 2003 which has raised questions about system reliability. The second is unanticipated developments under the competition law which have started to unravel the *status quo* (notably the competition authority ruling in support of negotiated *ex post* third party access to the grid), without any corresponding regulatory framework (or a regulator in place) to manage these developments. The Federal Council thus rightly underlines that the reasons for reform are both technical (to enhance security and reliability) and commercial, also citing the boost to innovation which can be expected to come from a more open market.

Reform nonetheless remains controversial, and efforts have been made to secure the best possible prospects for this second reform attempt. The new package, tabled in December 2004 by the Federal Council as a Bill to Parliament, reflects a careful examination of the reasons for failure the first time round and extensive public consultation, as well as the work of a committee of experts representing a wide spectrum of opinions and interests.[65]

It is clear that, as with all significant Swiss legislation which must face a complex process of adoption that includes the likelihood of a public referendum, a delicate balancing act between a wide spectrum of different interests is underway. One effect is that the tabled package is much less detailed than the one originally submitted for consultation. This means that, if adopted, it will need to be fleshed out with secondary ordinances (which are developed and implemented by the government). Parliament is currently reviewing the package, a process that is expected to continue until the summer of 2006.

*The reform package*

The package is made up of two main proposals: amendments to the existing Federal Electricity Law (LE) aimed at dealing with transit issues, and a new Electricity Supply Law (LEPS) to carry out a major reform, including market opening and a new regulatory and institutional framework. The split is for political reasons. There is a particularly urgent need to align Switzerland with the key EU provisions relating to cross border trade, which may have to take precedence over broader and more domestically oriented reform. However it is hoped that this will not be necessary and that the major reform will go through as well as the cross border reform.

**Box 5.15: The Federal Council reform package**

**Transit: 1902 Federal Electricity Law (LE) amendments**

The LE amendments are designed to introduce quickly (in 2005) the provisions considered essential for "EU compatibility" in respect of cross border trade: a regulator and a transmission system operator (TSO) with responsibilities provisionally limited to cross border trade. They would bridge a transitional period until 2007, the date by which the LEPS is proposed for enactment.

**Market reform: New Electricity Supply Law (LEPS) draft law**

The LEPS provides for the liberalization of the domestic market: market opening for all except households in the first five years, and full market opening in 2012 whilst retaining an option for households, if they so wish, to remain with their existing supplier. The package is designed to align the Swiss market and regulatory framework with EU legislation, except for the date of full market opening (the EU prescribes 2007) and accounting unbundling for all distribution companies (the EU requires a stronger-legal- unbundling for distribution companies with more than 100 000 customers). It establishes an independent regulator (ElCom) and an independent transmission system operator.

LE amendments (if they came first) would be transposed into the LEPS, and the tasks of the regulator and TSO expanded to cover the domestic market.

**Renewables: 1998 Energy Law amendments**

The package also includes provisions in support of renewables via amendments to the 1998 Energy Law.

Annex 1 provides further details on the content of the package.

*General assessment*

The proposals seek to address market opening, security and environmental goals at the same time. The objective is understandable given recent events such as the Italian blackout- which raise both commercial and security issues- and the need for Switzerland to catch up in Europe across a broad front. The package is a comprehensive attempt to cover all the issues, although (in line with the legal tradition) much is left to be developed in ordinances that would follow adoption of the main law. This allows scope for fine tuning important details, but it also opens the way to a potential weakening of the provisions under political pressure. The Federal government will need to take the lead among political actors in promoting the strongest possible stance to avoid any weakening of original intent.

The transit issues need settling urgently so as to pave the way for full Swiss participation in EU discussions that will secure both Swiss and regional system reliability, and a more effective long term commercial framework for Swiss enterprises. The transit proposals, which closely track the EU transit Regulation (as they must), are well conceived.

The rest of the package is, however, just as important and only a little less urgent if the Swiss electricity sector is to thrive over the longer term and contribute to a stronger economic performance. The broader proposals are also generally well conceived, but some important specific issues need further attention, and are covered below. These include, especially: unbundling for the distribution sector and corporate governance at that level; regulatory oversight of the system operator and its responsibilities for grid asset management; benchmarking network use prices; regulation of public service; and the powers of the new regulator, its resources, and its relationship to the existing institutional structure.

***Detailed review of the package***

The following sections take a closer look at the proposals. The issues are grouped into the following categories:

- Market opening, network unbundling and corporate governance
- System operation, transmission pricing and cross border congestion management
- Public service
- Independent regulation
- Security of supply
- Renewables

***Market opening, network unbundling and corporate governance***

*The proposals for market opening*

Much of the draft LEPS is relevant to market opening, if indirectly: the provisions for an independent regulator and unbundling for example.[66]

Some provisions – third party access to the grid and consumer choice – address market opening directly:

- *Article 13 on third party access (TPA) to the network.* All network operators must guarantee network access without discrimination, except if network operations are jeopardised or for lack of available capacity. In the case of cross border TPA, access can be denied if the electricity originates from a country which does not reciprocate TPA for Swiss electricity. Precedence for allocating capacity is given to households and for renewables. The Article sets out a range of valid grounds for denying access, and network operators must provide written evidence to support their decision. If network security is at stake, operators are obliged to deny access. Lack of available capacity may also be justified by the need to allow for maintenance.

- *Article 30 on consumer choice.* A two phase market opening is proposed. In the first five years after enactment of the LEPS, all households will remain captive customers with regulated end use tariffs. Five years after enactment and subject to an optional referendum, households will be free to opt between staying with their existing supplier or choosing another supplier.

It is estimated that the first phase will bring choice to around 380 000 end users (65% of consumption, or 36 TW pa). Why a partial initial approach and why make households the dividing line? The Federal Council explains that various options were thoroughly reviewed. Lower transaction costs, a more stable client portfolio for suppliers to aid procurement, and the fact that households will be able to benefit from the choice available to their suppliers, are among the (non political) reasons cited for a cautious initial approach. A five year transition to full consumer choice will also allow developments to be monitored and assessed. As to the dividing line, the approach reflects the EU approach, ensures that all commercial and industrial clients have a choice from the start, and avoids arbitrary consumption lines that may deny choice to some SMEs for example.

*Assessment*

For competition to take root in a market that has been effectively closed and tightly controlled by local and regional monopolies across the whole value chain, a number of issues need to be firmly addressed. The most important are: a strong and effective regulator (and competition authority), effective *ex ante* regulation of access to and use of the grid without which suppliers cannot link up with customers, effective unbundling of the grid from other activities in the supply chain, and the development of a regulated, organised and transparent wholesale power market that supports competition between generators and facilitates the development of new links between suppliers and customers.

Assessed against these criteria, large parts of the package are strong in principle but some parts need to be reinforced. The establishment of an electricity regulator is a major step forward but its powers, independence and resources raise questions at this stage (which may be resolved by a strong ordinance). The proposals for regulated *ex ante* TPA are good, so long as enforcement is strong, and if benchmarking is considered too. Unbundling is confined to accounting separation for distribution companies (the weakest form of unbundling) and again, it is not yet clear whether this can be adequately enforced.

The establishment of clear and transparent rules for the wholesale power market would be a major reinforcement. An effective wholesale market based in Switzerland could also act as a powerful lever for the furtherance of Swiss interests in a liberalising European market which counts a growing number of power exchanges. Switzerland does in fact already have a form of exchange: a limited initiative launched by some of the *Uberlandwerke* in 1998 for the exchange of surplus power between utilities based on short term bilateral contracts. But this market lacks any clear system or rules and especially lacks transparency. To trade in this market generally means buying and selling from/to Swiss companies in order to gain access to the Swiss grid for transactions.

**Box 5.16: Power exchanges in competitive electricity markets**

A competitive electricity market is one in which electricity is traded between generating companies, traders, suppliers, distributors and customers (this may cover retail as well as wholesale customers). Electricity is traded either bilaterally between these market players or in markets called power exchanges. Power exchanges can be either formally or informally organised, and may (or not) be regulated, in which case participation can be mandatory (all trade must take place in the market) or voluntary. Electricity markets include arrangements for both immediate trade, and futures and forwards financial transactions, as well as trade in longer term contracts. Factors which make for an efficient spot market are liquidity linked to a large enough number of players and transactions, and transparency. These factors help to avoid problems such as the abuse of market power (for example agreements to raise prices or create artificial shortages). Spot market prices may be volatile, but the more players in the market the more liquid the market and the less this is likely to be a problem.

European power exchanges range from the long established Nordpool in Scandinavia to the power exchanges around the Swiss border in Germany and elsewhere. Belgium is the latest European country to start up a power exchange (Belpex) which will be coupled with the French and Dutch exchanges.

The proposals for consumer choice clearly seek to address deep rooted sensitivities over the effects of rapid and full market opening in a country which includes a large number of small and remote communities. The cost of supplying mountain villages is high, and the fear is that competition could jeopardise supply to these areas.

The proposals link two issues which are best kept separate: the issue of market opening, and the issue of ensuring a defined public service under conditions of competition. As regards the first, the purist approach to market opening would say that full consumer choice should be implemented immediately so as to maximise the scope for competitive forces to develop the market. This is a powerful argument. But there are also arguments for a more measured approach. Notably there is a need to ensure that the institutional and regulatory conditions for managing competition effectively are in place and can be expected to work well. Full consumer choice alone is not enough to secure effective competition.[67] In the Swiss case, given that all the necessary new structures need to be established as none yet exist (even in embryonic form), the argument that a gradual approach should allow for testing of the new structures (which, importantly, implies their adjustment if necessary) is a valid one. The other arguments for a gradual approach (such as stability for suppliers) are less valid as they imply that partial market opening is an acceptable end point. It is right that the proposals set full market opening as an end goal (subject to a Federal resolution and optional referendum).

The second issue- management of public service under competition- is addressed later. If limited market opening does appear to be the likely outcome, the proposals for securing public service/service to households via designated network operators would then need careful review, to minimise as far as possible the inevitable distortion to competition.

*The proposals for network unbundling*

These are:

- Article 10: *Unbundling*: Requires that "utilities secure the independence of network operation" and prohibits cross subsidisation between network activity and other areas of activity. Economically sensitive information obtained by utilities relating to the network shall be treated as strictly confidential. Requires that distribution activities be unbundled at least in terms of accounting. Requires that utilities legally unbundle their activities relating to transmission networks from their other business operations. The Federal Council notes that the purpose of unbundling is to secure clear and non discriminatory third party access to the grid (Article 13). The proposal for accounting- rather than legal- unbundling of distribution networks is justified by the large number of small companies in this sector and the consequent difficulties of monitoring

compliance. This is in line with the EU Directive which states that organisational unbundling does not compellingly apply to integrated utilities with fewer than 100 000 connected customers. The provision for legal unbundling of transmission networks is linked to the provision for a new integrated TSO (Article 18).

- Article 11: *Unbundled financial and cost statement*: Network operators/owners must submit, for each network, an annual unbundled financial and cost statement to ElCom. Federal Council may stipulate minimum requirements for standardisation of accounts. The requirement for an unbundled cost statement is intended to cover all relevant market players as it would apply regardless of the legal nature of the company, so it includes public law institutions as well as the transmission and distribution network owners. The account standardisation provision aims at ensuring that accounts will serve their purpose: to allow comparability in the evaluation of recoverable costs for network owners.

- Article 12: *Provision of information and changing supplier*: Requirement on network operators to "make all necessary information" on the use of the network "readily accessible", and to publish tariffs, technical and operational requirements and the annual financial statements. Invoices must be transparent and comparable and any payments to the community or state must be shown separately. Network operators are not allowed to bill any costs related to a change of supplier to their customers.

*Assessment*

Unbundling is important both for the distribution part of the Swiss value chain, as well as for the larger vertically integrated enterprises which own the grid. If unbundling is not adequately secured, it may compromise both balanced system development and commercial efficiency. Inadequate unbundling may compromise transmission investment in favour of generation investment, if grid owners are left to make their own choices. It also increases the difficulty of market entry. The proposals therefore rightly provide for the stronger legal form of unbundling as regards the transmission grid. Monitoring, enforcement and compliance with the requirements will be important.

The proposals as they affect the distribution part of the value chain are strong on the importance of ensuring that no cross subsidies between the different activities of vertically integrated utilities are possible. This principle is of crucial importance in an environment that can otherwise be expected to promote the interests (if not the supremacy) of existing suppliers. The reasons for this are first, the fact that households will remain captive to their current suppliers for five years (and possibly beyond), and second, that accounting separation is the proposed basic means of preventing cross subsidisation.

Accounting separation is the weakest form of separation. It can reduce the ability, but not the incentive, to discriminate, and can act on the former only if it is implemented effectively. If management or legal separation is not an option,[68] there are some best practices that should be implemented with strength and determination.

Effective accounting separation needs two essential ingredients. The first is a strong independent regulator with the authority, powers, resources and expertise to enforce effective separation. The second is a requirement on the incumbent to provide clear and precise accounting information. Accounting rules need to show the cost basis for activities and charges such as grid access charges, and also to demonstrate that there is no cross subsidy of competitive or potentially competitive activities with monopoly activities. The 2001 OECD Council Recommendation also underlines that the benefits and costs of opting for accounting separation need to be carefully balanced, and should be recognised by the relevant agencies including the competition authority.

The European telecommunications regulators- who have something of a head start over electricity because the liberalisation of that sector started earlier- underline other important principles of accounting separation, not least the need to insist on regulatory accounts that serve their purpose effectively (to prevent cross subsidisation etc) and that these differ significantly from ordinary financial accounts.

**Box 5.17. Accounting separation**

*The 2001 OECD Council Recommendation*[69]

The 2001 OECD Council recommendation on structural separation in regulated industries addresses the need to separate potentially competitive activities from regulated utility networks, as well as the need to guarantee access to essential network facilities to all market entrants on a transparent and non-discriminatory basis. It notes that incumbents, in the absence of antitrust or regulatory controls, have both the ability and the incentive to restrict competition, and that this generally harms efficiency and consumers. They can, in particular, cross subsidise competitive from non competitive activities. Commercially sensitive information can also be made available between different company activities, which can advantage the incumbent's competitive activities relative to those of other players.

The OECD Council recommends that "member countries should carefully balance the benefits and costs of structural measures against the benefits and costs of behavioural measures" to achieve this. Behavioural measures means regulation aimed at controlling the ability of an integrated firm to restrict competition (incentives to restrict competition remain). Structural measures aim to separate the monopoly from competitive activities, the weakest form being accounting separation and the strongest divestiture (separating the management of different activities, into autonomous subsidiaries for example, goes a step further than accounting separation). The benefits and costs to be balanced include the effects on competition, effects on the quality and cost of regulation, the transition costs of structural modifications and the economic and public benefits of vertical integration, based on the economic characteristics of the industry in the country under review. The benefits and costs to be balanced should be those recognised by the relevant agency(ies) including the competition authority, based on principles defined by the member country.

*Guidelines for "regulatory" accounts*

A group of European telecoms regulators has set out guidelines for the preparation of regulatory accounts, noting that "financial information prepared and published for regulatory purposes often differs significantly from other financial information prepared by companies for statutory or other purposes" and that "the basis on which regulatory accounts are prepared requires special regulatory rules as well as the application of generally accepted accounting practices". They also note the value of procuring an independent audit opinion on the accounts, which enhances the quality, objectivity and credibility of the information presented". Their regulatory accounting guidelines, which are equally relevant to the electricity sector, are as follows:

*Regulatory accounting principles.* These principles should establish the key doctrines to be applied in the preparation of regulatory accounting information. They should include, inter alia, the principles of cost causality, objectivity, transparency and consistency.

*Methods for attributing costs, revenues, assets and liabilities.* A description of the attribution methodologies used to fully allocate revenues, costs, assets and liabilities, should be given.

*Basis for transfer charging.* A description of the basis used to transfer charge between different parts of the entity should be given, as required under the accounting separation rules. Typically this will prescribe methodologies for ensuring that an entity charges itself on the same basis as other entities for similar services.

*Accounting policies.* These should follow the form used for the preparation of standard statutory accounts and should include, for example, details of fixed asset depreciation periods. Where the regulatory accounts are prepared on a current cost basis, the basis on which the assets are valued should be included.

*Long run incremental cost (LRIC) methodologies.* If LRIC applies, a description of the methodologies used to prepare long run incremental cost information should be given. It should include details of the identification and treatment of shared or common costs.

The proposals are clear on the principle of precise accounting information, and this needs to be backed up with a regulator who can enforce this. An important weakness is the lack of any direct proposal aimed at separating the accounts of the utilities from the political bodies to which many of them are attached. The typical distribution company is at least partly owned by the municipality that it serves. This means that separation needs to act in two directions: down the vertical supply chain to separate the potentially competitive activity of supply from the grid, and between the municipality and electricity accounts.

If distribution functions are to be extricated from the municipal accounts, fiscal change also needs to be on the agenda (at least in the long term). A first step is to improve transparency, which an effective implementation of cost accounting will achieve. Beyond this, the electricity public service elements and the non electricity elements of current budgetary arrangements need to be disaggregated from the commercial supply of electricity and handled separately, for example through separate and transparent budgets for these purposes.

**Box 5.18. A level playing field**

If competition is to be introduced and sustained effectively in a market which includes publicly owned incumbents, careful measures are needed to ensure that the latter do not enjoy an unfair competitive advantage relative to private sector competitors, and in particular, that the prices charged fully reflect costs, to avoid distorted decisions on production, consumption, and investment. Several OECD countries- including the Netherlands and Australia- have set up competitive neutrality frameworks to address these and other issues with an overall aim of promoting equitable treatment between activities carried out by public authorities and those of the private sector. These frameworks, which may set general objectives such as rules for conduct, can help to capture issues that may not easily be identified in advance and which may emerge as competition develops.

Issues that need attention at the outset include:

- *Initial balance sheet.* The balance sheet of publicly owned entities at the time competition is introduced affects their basic cost structure, and hence their competitive position in the market. If assets taken on the books are substantially undervalued, and if debt and equity positions do not conform with private sector norms, the State entity starts out in a competitive market with a built-in competitive advantage over private sector rivals.

- *Pension and other liabilities.* Ditto.

- *Taxation.* Publicly owned entities may enjoy unfair tax advantages over competitors, if their tax regime is not reformed prior to competition. Typically, public entities often start with some tax exemptions.

- *Separation from the public budget.* The budget needs to be transparent and ring fenced, so that public authorities do not have to choose between funding the electricity public service and wider government interests.

- *Internal subsidies and cross subsidies.* This means effective accounting separation, at the very least, to prevent cross-subsidisation of competitive activities (generation for example) out of revenues from non competitive activities.

- *Rate of return on assets*. Public entities need to recover their costs fully, including an appropriate rate of return on capital (neither too high nor too low).

- *Public guarantees.* Public guarantees, meaning that the public authorities are liable if the publicly owned entity cannot meet its debts, lowers the risk attached to their borrowing compared with a private company. Public guarantees, explicit or implicit, should be unwound as far as possible.

Another set of weaknesses relates to the issues that are **not** tackled in the draft legislation. For distribution to become part of the liberalisation process (and contribute to it) accounting separation needs effective management but other issues need to be tackled too. These include ensuring a level playing field (securing competitive neutrality), and reviewing corporate governance. Benchmarking of cantonal or municipal performance with regard to distribution (including with other countries) offers a further means of applying pressure for positive change in a less than ideal context where competition can be expected to struggle for the foreseeable future. A good start has been made with the PSA price initiative.

It is unfortunate that the proposals have given rise to fears that privatisation is on the agenda. This misses the point that the reform is not about privatisation, but about more efficient and open management of a sector that can be expected to have both private and public elements for the foreseeable future.

*Corporate governance*

The reform proposals do not include anything on this issue, which probably reflects the sensitivity of local fiscality, and the fact that the reform proposals are addressed at the Federal level. Yet it is of key importance for the longer term health of the Swiss electricity sector.

**Box 5.19. OECD Principles for effective corporate governance**

The OECD Principles on Corporate Governance were originally endorsed by Ministers in 1999 and updated in 2004. The Principles include guidelines which are grouped under six headings: (1) ensuring the basis for an effective corporate governance framework (2) the rights of shareholders and key ownership functions (3) the equitable treatment of shareholders (4) the role of stakeholders (5) disclosure and transparency and (6) responsibilities of the Board.

The preamble includes the following:

"Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Good corporate governance should provide proper incentives for the board and management to pursue objectives that are in the interests of the company and its shareholders and should facilitate effective monitoring. The presence of an effective corporate governance system helps to provide a degree of confidence that is necessary for the proper functioning of a market economy. As a result, the cost of capital is lower and firms are encouraged to use resources more efficiently, thereby underpinning growth".

Of particular interest in the Swiss electricity context are the following Principles:

- *Ensuring the basis for an effective corporate governance framework.* "The ... framework should promote transparent and efficient markets, … and clearly articulate the division of responsibilities among different supervisory, regulatory and enforcement authorities".
- *The role of stakeholders in corporate governance*. "The corporate governance framework should ……..encourage active co-operation between corporations and stakeholders in creating wealth, jobs, and the sustainability of financially sound enterprises".
- *Disclosure and transparency*. "The corporate governance framework should ensure that timely and accurate disclosure is made on all material matters regarding the corporation, including the financial situation, performance, ownership, and governance of the company". These include issues such as company objectives, financial results, governance structures and an independent annual audit". A strong disclosure regime that promotes real transparency is a pivotal feature of market based monitoring of companies ... disclosure also helps improve public understanding of the structure and activities of enterprises, corporate policies and performance with respect to environmental and ethical standards, and companies' relationships with the communities in which they operate.

Countries seeking to implement the Principles should "monitor their corporate governance framework". An important element of this is "effective and continuous consultation with the public". If these conditions are met, the governance system is more likely to avoid overregulation, support the exercise of entrepreneurship, and limit the risks of damaging conflicts of interest in both the private sector and in public institutions".

Effective corporate governance is a major step on the road to more efficient management of the distribution sector. Yet no aggregated study or information appears to be available on current company governance arrangements. What can be said is that the influence of the public authorities over the utilities varies significantly, linked to the degree of public ownership. In utilities with mixed ownership, influence is mostly limited to a control by a surveying board. Far greater public control is exerted over public and majority public owned utilities. In some cases- mostly the very small municipal level distribution utilities- the utilities are part of the public authority. In anticipation of market reform, some cantons and municipalities have started to depoliticize the day to day management of the utilities and allow them to operate more like private companies. For example the utilities of Basel, Bern and Zurich are publicly owned but their management has been made fully independent and financial management partly independent, whereas tariff setting still remains under local parliament. But there is clearly some way to go in strengthening corporate governance at this level for it to be compatible with a more open market and meet best practice standards.

***System operation, transmission pricing and cross border congestion management***

*The proposals for system operation*

These are:

- Article 18: *Establishment of Swiss Transmission System Operator (TSO):* "The nationwide transmission network shall be operated by a single domestic company". It "shall be a joint stock corporation under private law". It shall "neither carry out any commercial activities in the areas of electricity production, distribution and trading, nor hold interests in any companies that carry out commercial activities in said areas." "The purchase and supply of electricity required for operational reasons, especially for the provision of system services, shall be permitted". Board members and company management "may not simultaneously exercise any executive or management functions in companies that are active in the areas of electricity production and trading". The cantons have the right to appoint two representatives to the board. ElCom must approve the statutes for the TSO. The Federal Council notes that the provisions leave open the issue of grid ownership. They do not require ownership by the TSO but neither do they prohibit this.
- Article 19: *Duties of the TSO:* Operation and supervision of the nationwide transmission network, responsibility for planning and control, balance management, and provision of system services including reserve power supply (on the basis of transparent and non discriminatory procedures). It "shall order the implementation of all necessary measures in the event that the stable operation of the network should be endangered" (*i.e*. it may issue directives to the grid owners if security is threatened). It "shall define transparent and non discriminatory procedures for dealing with network congestions". It 'shall represent Switzerland's interests (abroad)". The Federal Council may assign additional duties to the TSO. The TSO "shall regulate disposal rights over the network facilities that are required for the performance of its duties by concluding contracts with the (owners)". The Federal Council may grant "expropriation rights to the TSO for the performance of its duties". The grid owners "shall secure the capacity and interoperability of their networks" failing which the TSO may ask ElCom to "take the necessary measures at the (owners) cost". The Federal Council notes that ElCom would arbitrate over any disputes concerning performance of the TSO's duties. It would also be responsible for supervising the reserve energy market. It explains that the regulation of disposal rights by the TSO is to ensure that clear interfaces and competencies are created between the proprietors and the TSO, and its expropriation rights are to ensure that the TSO can fulfil its responsibility of operating a secure and efficient network even if the owners fail to fulfil their obligations. Importantly it explains that the last provision means that the grid owners are responsible for "securing its efficient operation, and in particular for its maintenance and expansion, as well as for activities related to interoperability".

*General assessment*

The proposals are a major and essential step forward from the current unsatisfactory situation under which Etrans has no formal powers of control and is best described as a system co-ordinator under the direct influence of the grid owners- the *Uberlandwerke*. The current arrangements create serious problems. Apart from the domestic problem of a lack of independence which is incompatible with competition,[70] they create difficulties for full Swiss participation in relevant EU fora. Etrans represents Switzerland in ETSO and the UCTE (albeit alongside its owner companies which are also represented) and has access to the technical task forces, but is often excluded from higher level policy meetings organised by the EU Commission to discuss issues such as the future development of congestion management.[71] Also, Etrans' uncertain status in the fora of which it is a member can prevent it from gaining access to important information, with potentially severe consequences both for regional system security and Swiss commercial interests in the European market.[72] This is in a context where the need for full, accurate and very short term information is becoming increasingly important, with the deployment of short term market based instruments such as auctions for allocating cross border capacity.[73]

Set against this inauspicious starting point, the proposals are a good start in the right direction. There appears to be broad support for the establishment of an independent TSO, as understanding grows of the security risks of not being a full participant in the EU discussions. But the proposals need further development. The two most important features needed to secure effective transmission management and system operation under competition, as well as long term transmission investment, are:

- Adequate powers of control over grid management and development, as well as system operation.

- Independence (notably from generation and supply interests).

*Asssessment: TSO powers*

The proposals are clear about allocating full powers over system operation to the new company, and would transform the current system co-ordinator into a system operator with the necessary powers of control. They assign the TSO responsibility for the operation of the transmission network. Ownership of transmission assets remains with the existing owners. In the event that these owners fail to take due account of long term system needs such as investment in network maintenance and extension, the TSO may request ElCom to take the necessary measures, at the owners' cost. Allocating and achieving the best balance of responsibilities for short and long term transmission management issues is not an easy task. A variety of approaches – asset-owning and non asset-owning system operators – have been deployed across the OECD. The proposed Swiss legislation assigns the duty of long term grid planning to all network operators and vests the authorities with supervising and sanctioning powers. The approach proposed by Switzerland will need monitoring for its effectiveness over time.

*Assessment: TSO independence*

As regards independence, the proposals are clear in general terms about the need for a TSO that is separate from its shareholders/grid owners. But here too they have weaknesses and are relatively undeveloped in important respects. They need to be assessed against the strength of the supporting arrangements for (1) regulatory oversight (2) specific regulatory provisions covering the TSO's powers and duties and (3) corporate governance. Regulatory oversight is divided between ElCom and the Federal Council. There is nothing wrong with this.[74] It would be helpful, however, to see a specific attribution to ElCom of TSO regulatory oversight, for example by listing this as a key task.[75] The TSO's accountability is not addressed in sufficiently broad terms either.[76] If the reasons for this lack of precision lie in a concern

about the strength and competence of the new regulator, the answer should be to review the proposals for the regulator. The issue of ElCom's own independence and competence, addressed later, matters particularly in the Swiss context because the TSO will not be a wholly separate company vested with ownership of grid assets.

The specific regulatory provisions for the TSO's activities also remain to be fleshed out. There is, as might be expected, relatively little in the LEPS. Issues such as the rules for system dispatch and operation, quality standards, and more specific rules governing the procurement of reserve capacity[77] need to be transparently laid out and approved by the regulator, whether this is through grid codes, licences or other processes consistent with transparency and the promotion of competition.

The governance proposals, which mirror what Comco has already laid down as conditions for the establishment of Swissgrid, are essential for independence. Whilst it is true that an understanding of system operation is required on the board of a TSO, the means to achieve this should not, and does not need to be via the co-option of members with a direct interest in the generation and trading of electricity. The conflict of interest would be blatant in the Swiss case, with representatives of the powerful vertically integrated *Uberlandwerke* on the board. The post of CEO is as important as the provisions for the board, and the independence of this post should be promoted through appropriate rules covering recruitment and terms of appointment.

*The issue of TSO ownership*

TSO ownership- public or private- is a second order issue relative to others that are far more important (ability of the regulatory and governance structure to support independence; asset management; appropriate powers). But if a TSO is privately owned, securing its independence whilst giving it asset control is especially important. There are effective examples of both publicly and privately owned TSOs around Europe.[78] Ownership should not be considered the main test of whether the TSO proposals will be effective, and it is a pity that part of the political debate around reform has centred on this issue. The argument that public ownership would cement public control over the sector is mistaken. A well regulated private company will be more effective in helping to meet social and security as well as economic goals than a poorly managed public company which may be over influenced by special interests in the public sector. In any event Switzerland does not, practically speaking, have the choice as the privately owned grid would have to be bought out. The current proposals are anyway perhaps best seen as a first, albeit major, step in an evolutionary process.

**Box 5.20. Transmission management, ownership and system operation: evolutionary possibilities**

*The experience of other European countries*

Different developments can be envisaged, if one looks at experiences elsewhere in the OECD. Migration to a fully independent, asset owning company (public or private) is one strong possibility, given the other commercial interests of the current owners which may lead them to focus over time away from transmission and on trading for example. An independent asset owning system operator does not, however, preclude the development of other interests: companies such as Red Eléctrica and the NGC have expanded their portfolio of interests to cover sectors such as telecommunications and specialised consultancy services.

*The US experience*

The Swiss system may migrate toward a more US inspired model in which TSO functions are coupled with management of a power exchange. System operation and grid management can be coupled with responsibility for running a power exchange. For example the system operator for the Pennsylvania-New Jersey-Maryland (PJM) region in the US also administers a power market which covers the pricing of balancing services. There are three arguments in favour of this coupling. Coupling covers the pricing of balancing services (such as reserve power) and as the system operator is anyway involved in managing imbalances, it has the merit of simplicity (at least relatively speaking) which is likely to enhance efficiency. Keeping the power exchange separate from system operation is likely to require disaggregated procurement of balancing services, which increases complexity. It also simplifies the task of congestion management. The third argument is that integration with the market may promote a more efficient management of the network that is more responsive to the needs of competitive electricity markets. On the other hand, keeping the two functions separate may optimise prospects for the power market to be run commercially as the system operator may be more focused on the technical demands for maintaining system stability than on promoting an effective market.

Opening up the share capital to new investors could lead to yet other developments. The regulatory framework can be adapted to encourage movement in a particular direction.

*The proposals for network use pricing*

These are:

- Article 14: *Remuneration for network operators and principles for charging end users*: Sets out a system of cost based remuneration for network operators. Tariffs charged for use of the network shall "not exceed the recoverable costs and fees and payments to the community or state". They must have simple structures and not be based on the postage stamp principle, and must be uniform for the same categories of client. Cantons must take "necessary measures to offset any inappropriate discrepancies…". Federal Council steps in if this is inadequate, and may arrange an "offset fund" to which all network operators must contribute. The Federal Council explains that remuneration would be based on the costs of an efficiently operated network (the costs being defined in Article 15). Costs need to be substantiated by the network operators on the basis of cost accounting, as well as including relevant fees and payments to the community and state (so production related water royalties are not included, though this is also because the Federal government has no jurisdiction over the rates which are set by the cantons or municipalities). Remuneration should not exceed this overall cap. The Federal Council also underlines the need for simple structures that pass on costs to end users on the "user pays" principle; the need to avoid a postage stamp approach (ie avoiding a charging system under which all users pay the same tariff regardless of location); and the need to apply the principle of equal treatment for the same type of end user. Costs already charged to network users (such as charges for network access) should not be included in the tariffs to end users. Efficient energy use should not be penalised by the charging system (for example the consumption component should be emphasised). A "solidarity principle" is established: cantons must balance out excessive variations, and if this does not happen, the Federal Council may order measures such as an equalisation (offset) fund.

- Article 15: *Definition of recoverable costs:* Defined as "the operating and capital costs that are required for the secure, productive and efficient operation of the network. They shall include a reasonable operating profit." Capital costs are calculated "on the basis of the original acquisition and production costs of the existing facilities". Federal Council is responsible for defining principles for calculations and for cost pass through to users. The Federal Council explains that recoverable costs are based on the principle of coverage of average costs, to be measured in relation to the efficiency of network operations. Using calculation periods, an assessment would be made of whether the remuneration of network operators at the end of a calculation period is higher than the allowable costs, the difference if any being deducted in the subsequent period.

The Federal Council specifies the details relating to the calculation of recoverable operating and capital costs. The principles for these calculations- asset life and depreciation, capital structure (equity/debt) assumptions, rates of return on capital, interest on borrowings, risk premia etc- are also explained, one important emphasis being on supporting future transmission maintenance and investment. As regards cost pass through to users, it is "assumed" that all network operators will use the same charging approach based on the "user pays" principle (separation into voltage levels etc), but adjusted to reflect the fact that most network costs are fixed, which will help the mountain regions that cost more to supply.

*Assessment*

These proposals reflect many of the best practice principles that are emerging from experience elsewhere. The cost reflective principle- the crucial starting point- is firmly embedded in the proposals at a general level, which also appropriately tackle the two main issues: the overall revenues that network owners will be allowed to recover, and the way they should charge network users.

There is also a strong and helpful emphasis on the need to provide incentives for investment as well as minimising charges for use of the network. Benchmarking is an issue that should also be considered. There are no clear proposals for benchmarking alongside the rate of return regulation that is proposed for capping the revenues of network owners.[79] The Swiss context lends itself to benchmarking, at least at the level of distribution, given the large number of distribution companies. It would enhance the prospects of "getting it right" given the present opaque starting point and weak unbundling proposals for information to the regulator, which is essential for the rate of return calculations. There is also scope to consider international benchmarking of distribution businesses in the longer term, with comparable regions such as the Nordic area. As for transmission network benchmarking, which is inherently more problematic than for distribution given the lack of comparable networks, Finland offers a way forward that is worth considering. That said, benchmarking has proved to be resource intensive in countries that have applied it, and a careful cost-benefit assessment would be a good idea before embarking on this approach.

In terms of the details, the proposals for calculating recoverable costs appear basically sound. It will be important to ensure that they are not too generous to the network owners, and it is not clear what mechanism will be available to make any necessary adjustments to the methodology. The provision of adequate and accurate information to the regulator is essential, as is the means of enforcing the provision of such information. The proposals for user charging are also basically sound, but again, it will be important to ensure that there is no implicit cross subsidisation of the more costly user groups. The solidarity principle raises some doubts, as does the reference to helping the mountain regions. At the very least such subsidies should be transparent and should not be provided in a manner that distorts cost reflective pricing.

The institutional arrangements are unclear at this stage. The standard approach elsewhere is to put the regulator in charge of these issues, once the broad principles have been agreed.

**Box 5.21. Best practice in network use pricing**

*The cost reflectiveness principle*

The most important general principle is that pricing should reflect costs. Cost reflective and transparent price signals are essential for the effective development of competitive markets. In electricity markets which are moving away from centralised decision making to independent and decentralised decision making, they create incentives for efficient behaviour, and provide signals for investment. Cost reflective prices are also critical for the financial viability of market participants. In particular, the "user pays" principle for network pricing strengthens price signals for efficient network use and the development of efficient electricity trading.

*Balancing incentives for cost minimisation and for investment*

The challenge to regulatory policy in this area is also to balance incentives on network owners to minimise costs and network charges (so as to encourage grid access, and ensure that efficiency gains are passed through to users via lower charges), with incentives to invest efficiently in maintaining and developing the network. This is not an easy task, and regulators are still developing their approaches. On the one hand the rate of investment in transmission networks is slowing generally across the OECD, at the same time as different patterns of usage are being generated by competition which often put existing systems under strain. On the other, competition rests on effective grid access and use, which implies pricing that does not unduly deter would be competitors. Another factor that needs to be weighed is that if chronic price differences persist across countries that are linked, it is possible that increased capacity will be absorbed by increased trade flows, instead of supporting better reliability.

*Putting transmission pricing into practice*

To achieve cost reflective pricing in practice, principles are not enough. The two main implementation issues are the overall revenues that network owners will be allowed to recover, and how users will be charged.

(1) Capping network revenues

Two main approaches have been developed for capping the revenue earned by network operators: rate of return regulation, and incentive based regulation based on a price cap. Broadly, rate of return regulation sets a cap on the rate of return (on capital) which may be earned by the company after allowable costs and depreciation. Price cap or incentive regulation allows price rises by the retail price index minus x% each year, so as to squeeze efficiency gains out of the company. Traditionally, it has been considered that the latter is the better approach, because it provides the regulated company with a sustained incentive to improve efficiency and reduce costs, whilst the rate of return approach may give the company an incentive to over invest. But both methods depend on difficult calculations which rely on accurate information from the company, and regulators have found this a challenge in both cases: it is often hard to get the necessary information (the company inevitably knows more than the regulator but it is probably not in its interests to pass on what it knows), and equally challenging to calculate an appropriate rate of return, or the extent of the efficiency gains which may be possible, that has the desired effect of promoting both efficient operation and efficient as well as adequate and timely investment.

Regulators have therefore had to refine their approach. Thus price cap regulation, which has been successful in driving down operating costs and passing through savings to users, may focus the network owner's attention too much on reducing operating costs, at the expense of incentives for improving the efficiency of operational performance and efficient maintenance and investment (a decision, for example, to take a major transmission line out of service for maintenance in peak periods may reduce operating costs but does nothing to promote effective network operation). So regulators are developing the basic price cap model with new elements such as performance incentives which link a part of the regulated return to the achievement of prescribed network availability standards. The UK regulator, Ofgem, for example has refined its price cap regulation with incentive schemes for efficient investment, new quality of supply standards, and guaranteed outputs for consumers (as well as arrangements to improve environmental performance and reporting).

(2) Capping network revenues: benchmarking

Benchmarking- the price a company can charge is a function of the costs other companies incur, as well as its own costs- is increasingly used alongside other methods to improve the chances of "getting it right". The Finnish regulator, the Energy Market Authority (EMA), regulates network revenues through a mix of rate of return regulation and benchmarking. The EMA undertakes an *ex post* assessment of network revenues based on an *ex ante* regulatory decision on the methods to be applied in network pricing including: the principles for valuation of the capital invested in the network, a reasonable permitted rate of return on the capital invested, and an efficiency goal. The efficiency goal is justified thus: "The cost level of a network operator should not necessarily be approved as such, but final costs should be compared to cost levels of efficient operators i.e. the cost level to which the network operator can feasibly aspire". It is, in other words, a reality check on whether inevitably complex rate of return calculations which carry an inherent risk of relative "failure" have in fact been effective. The efficiency goals are company specific. The EMA notes that it will normally be determined on the basis of an efficiency study which "will investigate the differences in company cost effectiveness and the enhancement potential of each company in relation to the most efficient businesses in the sector". But in relation to transmission networks, the lack of comparable operators is acknowledged to be a problem, and a procedure based on negotiation is proposed. The new German regulator is also planning to introduce benchmarking alongside rate of return regulation. Benchmarking, however, is very resource intensive.

(3) User charges

The other important issue in transmission pricing is the way in which revenue is collected from users. There are three main approaches to revenue collection: (1) "postage stamp" pricing (the traditional approach): all customers pay the same rate regardless of differences in cost by location. Costs or permitted revenues of the transmission system are instead shared among grid users depending on their generating capacity, peak demand, total generation or total consumption. This is inefficient because it does not reflect true costs. For example a company deciding where to locate a new factory will not consider the higher cost to the electricity system of locating that factory a long distance away from generation facilities (2) "extent of use" pricing: this resembles postage stamp pricing, but shares the costs among users depending on their actual use, or average use, of the grid (3) Long run marginal cost approach: this provides clear signals to users with respect to location, and clear signals for expansion of the grid. The last two move progressively closer to a system of pricing for the use of the grid that varies by location to reflect differences in cost. But they are also increasingly complex to implement. The best current and tested long term approach to stimulate location efficient investment is (3) ie pricing to reflect the different costs of service in congested and non congested regions, which will influence decisions on where to locate generators, as well as encourage demand side management of power to minimise costs. There are two ways of doing this (a) zonal pricing: at times of congestion a different price is determined in each zone, where zones are separated by points of congestion (b) nodal pricing: prices are "discovered" at a number of "nodes" (major connection points) in the network. The price at each node equates to the system marginal cost and price differences reflect congestion (assuming effective competition).

The UK regulator Ofgem provides an example of good current international practice. The National Grid Company (NGC) is required to develop a methodology for user charging, to be approved by the regulator, based on the principle of cost reflectiveness for each customer or group of similar customers. Ofgem estimates the savings from efficient location driven charging at £174m pa (based on the heat losses that might otherwise be incurred by generators inefficiently located a long way from demand centres). This example is also interesting because the regulator does not prescribe the means by which efficient user charging is to be implemented: this is for the NGC to determine, subject to approval by Ofgem.

*The proposals for cross border congestion management*

These are:

- Article 16: *Network remuneration for cross border supply*: Shall be based on the "costs incurred through (the) actual (cross border) utilisation". Must be calculated separately and not be charged to domestic end users. Calculation based on Long Run Average Incremental Costs (LRAIC). Federal Council may define depreciation period and market interest rates for assets. The Federal Council notes that cost calculations must comply with the EU transit regulation. It cannot therefore be made on the same basis as for network elements used by national end consumers (the average cost principle). The starting point for calculations is those costs that arise as a result of additional cross border transactions. Current cost accounting is recommended because of its effect on asset valuation, given intensive competition for cross border capacity. Calculation of the risk premium on return on equity should be based on the CAP (Capital Asset Pricing) model, which will help with transparency and comprehensibility relative to risk.

- Article 17: *Congestion management*: If demand for capacity exceeds supply, TSO "may distribute the available capacities on the basis of standard market procedures such as auctions. The Federal Council may regulate such procedure". Allocation priority is given to households (Article 13) and to international sales and supply contracts concluded before 31 October 2002. Any unutilised capacity may be reallocated on the basis of standard market procedures. Revenue from the allocations must be used to cover common costs of deliveries, expenditure on the grid, and are part of recoverable costs. Federal Council may provide for exceptions concerning network access and the calculation of recoverable costs in relation to new cross border capacities. The Federal Council explains that "market procedures" refers to procedures such as auctions or similar. Imports for the supply of households are a priority for allocation, as well as prior contracts for which the cut off date was set in line with the date of the decision in the Florence Forum to go ahead with market based congestion management after which there is no excuse for not knowing how the future system would work. The reallocation of unutilized capacity is to prevent such capacity from being hoarded ("use it or lose it"). The aim of the revenue methodology is to prevent revenues from being used by network owners to cross subsidise their other activities. The exceptions provision is to help support new investment to which significant risk is attached (reflecting the EU provision on merchant lines). It is broadly phrased because investment incentives for cross border capacity expansion are still under discussion in the EU.

*Assessment*

The proposal closely tracks the EU transit Regulation. The main, and very positive, implication of its adoption is that (alongside related proposals for the establishment of a regulator and TSO) it should allow Switzerland to play a full part in EU management of cross border flows. As staying on the sidelines of these developments carries both security and commercial risks, *not* adopting these proposals is no longer a realistic option. As regards the detail of the proposals, these are well conceived. Revenues will be kept in the country and used as amortisation for grid strengthening investments in Switzerland. The management of revenues is important: if vertically integrated owners retain the rent they may not put the money into new interconnectors for example. The TSO is given appropriate powers. It will specify procedures governing the allocation of cross border transmission capacity in co-ordination with other TSOs abroad, and is responsible for their practical implementation.

***Public service***

*The proposals for public service*

These are:

- Article 5: *Network zones and connection guarantee*: tasks the cantons with defining network zones and designating network operators for these zones on a non discriminatory basis. A "service level agreement" may be linked to designation. The network operators are obliged to connect suppliers and end users throughout their concession zone. Cantons may also oblige network operators to connect end users outside their zone. They may make "provisions" governing connections outside the populated area. Cantons must monitor compliance with the network connection guarantee. The Federal Council may "lay down transparent and non discriminatory regulations governing the allocation of end users, electricity producers and network operators to a specific voltage level". The Federal Council explains that the aim of network zones is to prevent the formation of "orphan" zones in which users are not connected or supplied. The allocation of zones is on the basis of cantonal legislation, and existing network ownership should be maintained as far as possible. The cantons may designate the allocation of zones to the municipalities. Cantons may make a service contract with network operators (for

example for public lighting, or energy related services) "to promote basic supply"(i.e. public service). Any obligation imposed on network operators to connect end users outside the network zone (aimed at helping remote areas) is subject to the principles of appropriateness and proportionality. The last point, which provides for possible Federal Council regulation, aims at dealing with potential issues arising from the monopoly character of network zones.

- Article 6: *Delivery guarantee and pricing*: (applies only during the first stage of market opening). Network operators must ensure that they can deliver "the desired quantity of electricity to households at the desired quality and at reasonable prices". They must specify a uniform tariff for households with similar characteristics. Tariffs must be published showing "a clear distinction between network use, energy supply, fees and payments to the community or state" and must be valid for at least one year. Network operators must keep "cost unit accounts" for the tariff component of energy supply and price benefits from their free network access must be passed through to households. Requirement on network operators to keep separate cost unit accounts for tariff components of energy supply. The Federal Council explains that this provision underpins households' legal entitlement (in the absence of supplier choice) to be supplied with the electricity they need, at acceptable prices. The solidarity principle is reflected in the provision for uniform tariffs, and cost disaggregation aims to ensure that households are protected from unforeseen seasonal fluctuations. The provision on cost unit accounts promotes transparency, cost reflectiveness and the avoidance of cross subsidisation. Since distribution operators will be free to choose their own supplier, the pass through provision is to ensure that households benefit from this.

- Article 7: *Right to stay with existing supplier*: (applies after full market opening, if this is agreed). Network operators are required to be able to continue to supply households who do not want to exercise their right to choose a supplier ("do not make use of their network access") after full market opening with the "desired quantity of electricity… at the desired quality and at reasonable prices". The provisions of Article 6 on uniform tariffs, cost disaggregation, price validity for at least one year and cost unit accounts are reiterated for these households. The Federal Council regulates the procedure, including contractual modalities. The Federal Council explains that the regulatory role covers the conditions of supply (quantity, quality, price) to captive households, and that its regulation of contracts is aimed at deadlines in the event of a change of supplier.

*Assessment*

The proposals set a policy which echoes what many other European countries have put in place for universal service. It is important that the distinction between security of supply and basic supply (the Swiss term for universal service)[80] is emphasised, in order to sustain a clear vision as to the aim of this special regulation. The provisions for cost reflectiveness in tarification are important, and the principles are soundly articulated, but they risk being undermined by the network zone approach. The costs of supplying mountain villages is high, and one challenge will be to determine the size of the supply area in which price solidarity through uniform tariffs should apply. The more differentiated the costs of supply across this area, the more cross subsidisation this implies. It would be better to have a more direct form of subsidy for supporting remote areas. More broadly, the promotion of energy efficiency measures is another way of helping to contain costs for consumers.

The proposals helpfully steer clear of direct regulation of prices. But, since this is legislation that does not affect sub Federal regulation unless it is explicitly covered, it seems likely that the cantons' current practice of regulating prices will continue. Enforcement is mainly with the cantons, which also raises the question of how this will work in practice. The danger is not so much that consumers will lose supply, but that designated network operators (who are overwhelmingly likely to be the current incumbents, many of whom are partly or wholly publicly owned) will be able to take competitive advantage of their position.

Service quality standards are not addressed. The current situation is that utilities must comply with rules set out in the Electricity Law as well as international technical standards. But these provisions address the more technical aspects of security of supply. In a liberalised market, consumers (not just the vulnerable ones) need to know what they can expect of their suppliers, beyond price.

**Box 5.22. Sustaining electricity public service in a competitive market**

Public service is often a controversial issue in liberalizing markets as it implies that special arrangements for its provision need to be superimposed on a competitive market framework, which risk distorting the latter. But at the same time there is wide agreement that a form of public service needs to be maintained as an expression of solidarity and support for social, regional and other societal goals. Three main issues need to be addressed for public service to function efficiently, as well as effectively, in a competitive electricity market:

*Definition*

A clear definition is an essential starting point but this is not always easy to achieve as different policy goals are often put forward to support public service. The definition nevertheless needs to be narrowed down as far as possible, to cover only those elements that are strictly necessary for meeting the desired goal(s) that public service is intended to support, such as regional or social solidarity. Otherwise it risks excessive distortion of an otherwise competitive market. The EU has developed some general definitions for the gas and electricity sectors. The first defines the possible goals of public service obligations: they may relate to "security, including security of supply, regularity, quality and price of supplies and environmental protection". The second is a more targeted definition of universal service in the EU electricity Directive: the "right to be supplied with electricity of a specified quality within (their) territory at reasonable, easily comparable prices". The concept of universal service (as opposed to the broader concept of public service) seeks to make a distinction between a range of potential very broad policy goals and the very specific policy goal of protecting consumer rights. This is an important distinction.

Nearly all the EU member states apply a universal service provision via an obligation to connect and supply all electricity customers, especially households.

*Means of delivery*

The key principles for public- or universal- service delivery are transparency, cost reflectiveness and use of the least cost approach, both to ensure that consumers get the best deal, and to minimize damage to competition. The EU has defined a concept of Supplier of Last Resort, as a necessary fall back position to protect customers in case of (1) bankruptcy of the current supplier (2) supply of vulnerable customers who are unable to pay and (3) supply to remote customers. Most member states have designated a Supplier of Last Resort, and in most cases this is the distribution system operator.

*Regulation*

There needs to be effective regulation of the costs of public service. Efforts to reconcile the designation of a supplier of last resort with the principles of least cost and cost reflectiveness are still work in progress. The right balance must be struck between compensating the operator for providing the universal service, and ensuring that the operator does not profit from the situation. Methods that have been deployed in the EU so far include compensation funds and direct social payments, as well as attempts to regulate designated operators' prices to reflect costs. EU public service obligations need to be "clearly defined, transparent, non discriminatory and verifiable and shall guarantee equality of access for EU electricity companies to national consumers". The EU electricity and gas Directives also stipulate that when a financial compensation is granted by a member state to fulfill public service obligations, this should be done in full compliance with the principles of transparency and non discrimination.

Although most OECD countries already meet high quality of service standards, it is important to control, maintain and improve standards of service as markets open up to competition and new suppliers emerge. Appropriate obligations should be considered for the transmission and distribution operators, and possibly also for end suppliers.

The provision of clear information on public service to customers is important, and this also helps them to assess different sources of supply in an often confusing market. For example, the French gas/electricity utility EDF/GDF identifies the "contribution to the electricity public service" in its itemised bills to households.

End user pricing regulation should be avoided if possible from the start, although experience in liberalising markets suggests that this usually does not happen overnight. This may be partly because of an understandable desire to protect consumers against abuse by still powerful incumbents in the early stages of competition. But it should be seen as a transitional measure, to be unwound as quickly as possible.

Finally, the vehicle for covering regulation needs attention. For example licences may be used to spell out obligations such as service standards. This also aids transparency.

***Independent regulation***

*The proposals for independent regulation*

These are:

- Article 20: *Establishment of an independent Electricity Commission (ElCom):* "The Federal Council shall appoint an Electricity Commission (ElCom) made up of five to seven members (commissioners), and shall designate its president and vice president. All members shall be independent experts." "The resolutions of the ElCom shall not be subject to any directives of the Federal Council and the Department of the Environment, Transport, Energy and Communications (DETEC). It shall be independent of the administrative authorities and operate its own secretariat." "For the purpose of enforcing the Electricity Act, the ElCom may call on the Swiss Federal Office of Energy (SFOE) and issue it with directives". "The ElCom shall draw up a set of regulations governing its structure and management. These regulations require the approval of the Federal Council." "The costs of the ElCom shall be covered by administration fees. The Federal Council shall regulate this process." The Federal Council explains that ElCom's two main duties are regulation and supervision of the electricity market. Its structure is based on that of the existing Communications Commission. It will have judicial powers. Consumer as well as electricity specific experience will be looked for in the appointment of members, and its independence is underpinned by the fact that it cannot be instructed by the Federal Council, DETEC or any other administrative body. The size of its secretariat will depend on the extent to which it draws on the enforcement related decisions and rulings of the SFOE, also the fact that it can ask the SFOE to arrange technical help such as expert reports. There will be perhaps 10-15 full time staff initially, with the legal status of civil servants. The Federal Council supervises ElCom's management.

- Article 21: *Duties of ElCom*: Regulation. To ensure that "the provisions of this Act are complied with…"and "to take decisions and pronounce rulings that may be required for enforcement." Particular responsibilities are for (1) resolution of disputes over network access and charges, and electricity tariffs, including "provisional rulings" on access (2) examination of network use remuneration and charges, and electricity tariffs, for which it may order reductions or prohibit increases (3) decisions regarding the use of revenue from capacity allocation under congestion. Monitoring role over the electricity market to ensure "a secure and economical supply in all parts of the country". May propose measures to the Federal Council if supply is threatened. Represents Switzerland abroad. Must inform the public about its activities and submit an annual report to the Federal Council. The Federal Council explains that the list of duties is not exhaustive but

identifies the main ones. ElCom's power to make provisional rulings for network access aims at ensuring that access is not unduly delayed by legal procedures. ElCom can take action on network charges both *ex ante*, i.e. without the trigger of a dispute, as well as *ex post*. As for price supervision, it oversees network remuneration and charges, as well as electricity tariffs to end users (including the failure to pass on reduced transmission charges to end users) with the exception of electricity tariffs exposed to competition (i.e. tariffs for households in stage one of market opening, and tariffs for captive customers in stage two). It must consult the Price Surveillance Authority before taking any decisions. ElCom's duties also extend to security of supply related monitoring (linked to Article 8 which requires network operators to submit annual updates to ElCom on network security).

- Article 26: *Supervision fee:* "The Federal Council shall collect an annual fee from the TSO to cover the costs of supervisory activities of the ElCom and the SFOE that are not covered by other fees". The fee may be recovered by the TSO via network use remuneration. The Federal Council specifies the amount. The Federal Council notes that the SFOE and ElCom may also charge fees to cover the costs of supervision, controls, rulings and other special services.

Enforcement and sanctions

- Article 23: *Information and access obligation on companies*: Companies must provide "relevant authorities" with information needed for enforcement of the Act and grant access to their premises. Obligation on Federal and cantonal authorities to co-operate in "clarifications" by ElCom. The Federal Council explains that the obligations on Federal and cantonal authorities is linked to the security of supply provisions may need to rely on information provided by the cantons, hence an extension of the obligation beyond private citizens.

- Article 27: *Provision for fines*: Fines of up to CHF 100 000 may be applied if price benefits are not passed on (Article 6), activities are not unbundled as required (Article 10), costs for network use are not clearly shown or wrongly charged (Article 12), TPA is illegally denied (Article 13), or information requested is not supplied (Article 23). Negligence is also punishable by a fine. The SFOE shall prosecute and judge infringements in accordance with the Federal Penal Code. The Federal Council notes that intentionally committing any of the cited deeds or omissions is punishable in accordance with the criminal law. The fine maximum is based on the 1995 Cartel Law and the relevant provisions of the penal code. As the relevant law enforcement authority, the SFOE is both empowered and obliged to prosecute and judge offences.

*Assessment*

The establishment of an independent electricity regulator now appears to be widely accepted in the Swiss debates on reform. The arguments are more about what kind of regulator it should be and specifically, whether it should be a "lean" one, overseeing a light touch benchmarking approach to network use pricing rather than the proposed approach of regulated pricing.

The first consideration, however, should be for the regulator's status. Do the proposals provide it with adequate independence? This matters especially in the Swiss context because there is no tradition of independent regulators in the sense that is increasingly understood elsewhere in Europe, but rather, a tradition of oversight bodies staffed with part time members (in the spirit of the "*Milice*" administration).[81] Given the current non competitive industry structure, a strong and independent regulator is essential to act as a motor for the development of competition.

Some aspects of the proposals for ElCom are positive, others less so, and some important details are missing. The proposed collegiate structure is positive, as such a structure generally helps to ensure independence in decision making, especially when the board is made up of independent experts.

There is a lack of supporting detail which is manifest across a number of issues: for example transparent selection procedures, specific conditions to bolster independence such as a prohibition on having a financial interest in the regulated sector, or rules to protect the board from politically inspired dismissal. These types of rules are not yet part of the Swiss administrative culture.

Resources and staff are an important issue. Anticipated staffing looks very low relative to the work that needs to be done and could raise the issue of the regulator's independence relative to SFOE/DETEC. Switzerland's small size may not allow for a much larger entity and may require some sharing of expertise with the ministry, but the costs of a new regulator (even a slightly larger one) will be low relative to the expected benefits of reform, and other small countries have larger regulators. Germany has put some 180 staff in place for gas and electricity regulation, compared to the tentative 10-15 staff for ElCom. Even allowing for the fact that this covers gas, and that Germany is a much larger country, the Swiss proposals are low given that it has a similar distribution structure with many small companies, and the relative absence of "regulatory economies of scale" in this sector. Table 5.4 below shows the picture for a range of European countries. It is also noteworthy that the 2004 CEER report notes a range of fifteen to sixty staff for the SEE countries reviewed, so Switzerland is at the bottom end of the European scale. Various approaches for covering the costs of an adequately sized regulator can be taken, including a levy on the industry, or more specifically, on wholesale electricity prices.

The competences of the staff also merit careful attention. Industry and consumer experts are certainly needed, but specific competences in economics, law, and accounting are also essential. A knowledge of accounting, for example, will be invaluable in the work that lies ahead to master unbundling in Switzerland's highly complex network of industry relationships.

The new regulator will need a clear identity and place in the institutional framework in order to function effectively and with authority. This place is not yet wholly clear given the anticipated sharing arrangements with SFOE and the absence so far of a designated oversight ministry (which will presumably be covered in an ordinance and be DETEC,[82] though it could also be the Finance ministry). Horizontal institutional relationships should also be covered.

The most important ones are with the competition authority and the Price Surveillance Authority (PSA). The proposals helpfully assign the PSA the task of advising ElCom on prices, which should help any problem of capture as it provides for a second opinion. But there is no direct reference to the relationship with Comco, despite the fact that Comco remains responsible for tackling abuses of market power, which is an important issue for the healthy development of the Swiss electricity sector. Comco will also oversee merger activity, where a judicious approach is needed that gives scope for some rationalization of numbers, especially in the highly fragmented distribution sector. At the least co-ordination mechanisms need to be put in place. Formal links between Comco and ElCom might also be developed in such a way as to share expertise, given general resource constraints. Provision for a commissioner from each authority to sit on the other's board would also be helpful.

The relationship with the cantons and municipalities is also not covered.[83]

Accountability needs attention. The only provision that directly addresses accountability is that ElCom must inform the public about its activities and submit an annual report to the Federal Council (appeals will go to SFOE). Other countries are deploying a variety of approaches to secure accountability, including compliance with requirements for high quality regulation, consultation, publicizing regulatory

decisions, and systematic reporting to interested parties. There is also performance evaluation,[84] which is less developed in Switzerland and which requires the establishment of clear objectives against which performance can be measured. ElCom does not have any clear strategic objectives (for example to develop a more competitive market, to protect the consumer etc), against which it might eventually be judged.

The draft law instead promotes a list of duties and responsibilities which lack this broader vision. Strategic responsibilities which are absent and should be considered include regulatory oversight of the new TSO, and oversight of public (universal) service obligations.

ElCom's powers are focused on the central need for independent regulation of transmission, as well as on monitoring security of supply. Transmission regulation is a key role of most other electricity regulators and ElCom appears to have well developed powers for this activity. Dispute resolution relating to grid access, grid use conditions, grid charges and end use electricity tariffs for captive customers (excepting the tax and public levy components of tariffs) are all put under its responsibility. It can take action to adjust grid and electricity tariffs without being asked, and it may order an injunction for TPA to prevent third party access being undermined by procedural delays.

The ability to obtain information, so that it can be verified, from what are likely to be recalcitrant regulatees is especially important e.g. for checking that there is effective separation of activities. The proposals assign ElCom a wide monitoring role, whilst prosecution and sanctions for non compliance with rulings issued by ElCom are with the SFOE, reflecting the latter's responsibility for applying the (non electricity specific) penal code. The way that this split of responsibilities works in practice may need attention.

**Box 5.23. The development of independent electricity regulators**

Electricity regulators have undergone a rapid development over the past few years. This is illustrated in a 2004 report for the Council of European Energy Regulators (CEER), which reviews energy regulatory development in (relatively undeveloped) South Eastern Europe. All the countries reviewed have laws creating a regulatory authority as a separate legal entity; the majority have budgets separate from the central budget; a majority may issue decisions without the approval of a governmental body; review of tariffs is typical, as is review of investment plans; most have dispute settlement powers and some rule making powers; and most have accounting systems for unbundled activities. Staff size is mainly in the range of fifteen to sixty, and most have procedures for some level of public participation in regulatory hearings.

To exert effective influence, an electricity regulator needs a minimum of powers, which include powers of enforcement in respect of those issues for which it is responsible (and may include the possibility of inflicting direct penalties for non compliance). The responsibilities of the more established electricity regulators (as well as some of the less established ones) appear to be converging, which is partly due to factors such as the EU drive for a harmonised internal market. The main power usually held in this sector is the management of TPA, and this is normally associated with related issues such as the management of accounting (or legal) unbundling. But there are differences in the extent of this power. Some regulators are directly responsible for setting or approving the calculations for network revenue. Regulators may also have other powers, such as responsibility for granting licences to network operators. They may also control prices not just for transmission but for end user electricity supply (if this is still regulated). Some regulators are also involved in setting rules for system operation and in network investment decisions. Powers to require information may be quite developed (it is difficult to police TPA if the regulator suspects but cannot prove the existence of cross subsidies by the dominant operator), with sanctions if market players do not comply with requests. Where powers are relatively weak, an advisory role can be given greater impact if the advice is made public.

A particularly important issue for the electricity sector is the relationship with the competition authority. The respective responsibilities need to be carefully defined and co-ordination mechanisms put in place. A wide range of mechanisms has been put in place around the OECD: the three main approaches are for the regulator to (1) share competition powers with the competition authority, as in the UK (2) have its own powers which are separate from the competition law, or (3) form part of sector specific arrangements within the competition institutional framework, as in Australia with the ACCC. The ACCC is also an interesting case of a multisector "regulator". Advantages of this approach are that it may help to avoid capture, improve efficiency because of synergies between sectors (the need for example to deal with unbundling is common to all the infrastructure sectors), which may also minimize the problem of finding enough competent staff.

**Table 5.4. Independent regulators across European countries**

| Country | Regulatory form | Network access conditions | Dispute settlement | Ministry involvement | Information collection powers | Staff numbers | Annual budget 2003 (€m) |
|---|---|---|---|---|---|---|---|
| Austria | Ex ante | Regulator | Regulator | general guidelines | strong | 60 | 8 |
| Belgium | Ex ante | Regulator | Regulator | no | strong | 99 | 17 |
| Denmark | Ex post | Regulator | Regulator | yes | strong | 25 | 2.5 |
| Finland | Ex post | Regulator | Regulator | no | strong | 16 | 1.25 |
| France | Ex ante | Regulator | Regulator | Tariff approval | strong | 96 | 12 |
| Germany | Moving to ex ante | Regulator | Currently the competition authority | Not yet clear | Not yet clear | 180 (covers gas as well) | na |
| Ireland | Ex ante | Regulator | Regulator | no | strong | 39 | 10 |
| Italy | Ex ante | Regulator | Regulator | General guidelines | strong | 104 | 18.6 |
| Luxemburg | Ex ante | Ministry/regulator | Regulator | Not known | strong | 2 | 0.3 |
| Netherlands | Ex ante | Regulator | Competition authority | Issues instructions | strong | 55 | 7 |
| Portugal | Ex ante | Regulator | Regulator | no | strong | 53 | 6.4 |
| Spain | Ex ante | Ministry | Regulator | yes | strong | 187 | 21 |
| Sweden | Ex post | Regulator | Regulator | no | strong | 42 | 3 |
| United Kingdom | Ex ante | Regulator | Regulator | no | strong | 302 | 57 |
| Norway | Ex ante | Regulator | Regulator | no | strong | 33 | 57 |
| Czech Republic | Ex ante | Regulator | Regulator | no | strong | 88 | 3.8 |
| Hungary | Ex ante | Ministry | Regulator | Tariff approval | strong | 95 | 6.2 |

### *Security of supply*

*The proposals for security of supply*

Security of supply, as the earlier section on performance explains, covers generation capacity and reserve margins; transmission and distribution networks; and power production technologies and input fuels. A number of Articles which have already been reviewed address the different facets of security of supply, including the proposals for an independent TSO (Articles 18 and 19); the proposals for network revenues and pricing (Articles 14 and 15); and for cross border congestion management (Articles 16 and 17). Articles 8 and 9 address further issues relating to grid reliability- responsibilities for grid maintenance and investment- as well as issues related to generation investment and overall security of supply:

- Article 8: *Security of supply obligations on network operators*: Network operators must co-ordinate their activities. Their responsibilities are to operate a secure, productive and efficient network; to structure and regulate the use of the network; to provide the necessary reserve supply capacities; and to specify minimum technical and operational requirements (taking account of international standards). They must also draw up long term network plans, and keep ElCom informed annually of developments. The Federal Council may impose sanctions if duties are violated. The Federal Council explains that the provisions are to be understood as a comprehensive obligation of adequate expansion, secure operation and permanent maintenance of the network. This responsibility is supported by the possibility of sanctions in case of non compliance (responsibility for this to be allocated by the Federal Council in a separate ordinance).

- Article 9: *Measures in the event of threats to security of supply*: The Federal Council may take measures to increase the efficiency of electricity use and procure electricity (for which it may issue a call for tenders); and support and expand electricity networks. If the call for tenders imposes additional costs, these will be offset by the TSO via a surcharge on the transmission costs for high voltage networks. The Federal Council notes that the starting point is Article 89 of the Constitution which stipulates that the state is to refrain from intervening so long as companies are able to fulfill their obligations i.e. the onus for security of supply is on the companies. The provision should also be read in the context of the responsibility placed on ElCom (Article 21) to monitor and supervise the market. If ElCom judges that action needs to be taken (a generation shortfall for example), it must submit proposals to the Federal Council, which may include export bans, or measures to reduce electricity consumption.

*Assessment*

The proposals are basically sound but two points need to be emphasized:

- The issue of transmission and system reliability is linked to European developments, and the key point in this regard is the need for Switzerland to play a full part in these developments in order to sustain its own supply security.

- As the earlier section on performance noted, the issue of future generation sources needs to be addressed sooner rather than later.

***Renewables***

*The proposals for renewables*

These are:

- Article 7a (Energy Law): *Objectives and voluntary measures for the production of electricity from renewable energy sources:* Sets a target for the share of renewable energy sources from electricity production to end use consumption to rise to 77% by 2030. This may take account of renewable energy generated outside the country. The production of electricity from existing hydropower plants shall be maintained "at least at the level recorded in 2000". The costs incurred by network operators in relation to renewables, that cannot be recovered via market prices, may be financed by a surcharge on transmission costs. The DETEC may, after consulting the cantons, conclude agreements with trade and industry groups for the development and implementation of tender programmes. The Federal Council specifies the stages in which objectives are to be met, and reviews the situation every five years. It may order further measures (see Articles 7b and 7c) if the staged objectives are not being met, taking account of international trends. The Federal Council notes that this provision is based on the 2001 EU renewables Directive, under which the share of renewables in net electricity consumption is to rise from 14% (1997 level) to around 22% by 2010 in the EU (with each member state committed to a national target). The share of renewables in net electricity consumption in Switzerland is to rise from 67% to 77% by 2030, which implies additional production from renewables of around 5400 GWh at constant end use electricity consumption. The aim is to increase production of renewables in line with consumption. An ordinance will specify this in more detail. The provision for existing hydropower aims at maintaining stable production through the upgrade of existing plants (noted to be a challenge due to regulations on water use). The provision for a grid surcharge to cover additional costs of renewables ensures that consumers bear a part of this cost. Tender programmes will be subject to SFOE approval. An allocation mechanism will allow prioritisation of the technologies, and "write offs" may be agreed in order to help to promote those renewables with long term potential but which are still costly. As regards

efficiency, there is no quantitative target, but (reflecting a provision in EU guidelines on energy efficiency) Article 5 LEPS has a provision for cantons to award service mandates to network operators for efficient electricity use, and Article 14 LEPS requires the structure of network tariffs to promote efficiency rather than encourage consumption.

- Article 7b (Energy Law): *Quotas and certificates for increasing the production of electricity from renewable energy sources*: Suppliers to end users must supply their customers "with a minimum quantity of electricity generated from renewable sources", this minimum to be specified by the Federal Council. Suppliers that deliver more than the minimum can have the extra recorded in a certificate. Those that fail to deliver the minimum must purchase certificates. The certificates trading procedure is regulated by the Federal Council. This Article may apply if objectives are not being met, and would involve the establishment of quota system by the Federal Council. An ordinance will cover management and enforcement issues including certificates trading, provisions for failure to meet quotas etc.

- Article 7c (Energy Law): *Feed in tariff for increasing the production of electricity from renewable energy sources:* Network operators are obliged to accept all electricity from producers "that is generated via new facilities through the use of solar energy, geothermal energy, wind energy or biomass and to remunerate these producers". Remuneration is based on the acquisition costs of reference production plants. The Federal Council regulates the procedure. To finance the costs incurred which cannot be offset by market prices, network operators may "impose a surcharge on transmission costs". This Article may also apply if objectives are not being met. Both suppliers and network operators would have to accept all the renewable energy produced from new renewable sources. An ordinance will set out the regulatory details, including differentiated tariffs depending on technology and a gradual reduction in tariffs to take account of technological and cost developments.

*Assessment*

The reform proposals include a reworking of the current policy framework for renewables (both existing large hydro and "new" renewables) in electricity generation, given the changes that can be expected from liberalisation, the need to meet CO2 reduction targets, and the growing importance of aligning the electricity sector's regulatory framework with that of the EU.

But it is important to stand back from the more detailed, often subjective and politically charged debates over this part of the reform, to consider what can be realistically be expected of renewables' contribution to Swiss policy goals. Security of supply, support for the environment and social and regional cohesion have all been put forward as reasons for the promotion of this form of energy.

In the Swiss context, the security of supply argument is weak, as the prospects for new large hydro plants are effectively non existent, and the current share of other renewables so small (1.57% of generation) that it would take an immense and costly effort to bring it up to the level where it makes a large contribution. The environmental argument also needs careful examination. Swiss power generation is already 97% carbon free.[85] The regional/social argument (small new renewable generation is likely to be dispersed, including small hydro that supports the more isolated communities) highlights the fact that Swiss electricity policy has traditionally tended to accept that the sector's structure and regulation is an implicit instrument of regional policy. It is better, however, to tackle regional/social issues directly than via energy policy. In short, **if** reform in this area is well conceived and cost effective, renewables have a place in the reform and should not be seen as a major policy issue.

The proposals are based on a two phase approach in which the first phase tests the scope of a voluntary approach. If this fails, mandatory measures may be applied, either as quotas on suppliers with an associated trading system, or as cost based feed in tariffs to producers. The package, in terms of support for the growth of "new" renewables, is potentially much stronger than the current system which is based on an obligation only to purchase electricity that exceeds the generator's consumption (at feed in tariffs).

The voluntary first phase is a very positive approach, and given existing work to promote co-operative actions under the SwissEnergy programme, stands a good chance of making headway. The main issue lies in the second phase which offers two options. It is quite possible that the second phase would need to be triggered given the ambitious nature of the target (a growth to 10% for new renewables, since the aim for large hydro is "stability"). In that case, and if the feed in tariff option is chosen, which offers less scope to bear down on costs than more market based instruments such as quotas and trading,[86] the proposal could prove to be very costly.

**EU Directive 2001/77 EC on the promotion of electricity from renewable energy sources**

The EU has recognized that the promotion of electricity from renewables is a priority in the context of security and diversification of energy supply, environmental protection, and social and economic cohesion. The Directive sets a general target for the promotion of electricity from renewable sources, linked to the commitments made under the 1997 Kyoto Protocol,[87] and contains the following main provisions:

- It covers electricity produced from non fossil renewable energy sources such as wind, solar, geothermal, wave, tidal, hydroelectric, biomass, landfill gas, sewage treatment gas and biogas energies.
- Member states must adopt and publish, by October 2002, and every five years subsequently, a report setting the indicative member state targets for future electricity consumption from renewables for the following ten years, and showing what measures have or are to be taken to meet those targets. The member state targets must take account of the indicative targets proposed by member states and be compatible with EU obligations under the Kyoto Protocol.
- Member states are required to publish in October 2003, and every two years subsequently, a report which includes an analysis of success in meeting the national targets. The Commission will publish a biannual report, the first in October 2004, based on the national reports and assessing the extent of progress. If this report shows that national targets are likely to fall short of the EU target, the Commission may present further proposals, including possibly proposals for obligatory targets.
- The Commission will present, by October 2005 at the latest, a report on the experience gained concerning the application and coexistence of the different support schemes in the member states. The report will evaluate the success, including the cost effectiveness ratio, of the support schemes, and may be associated with a proposal for a Community framework for support schemes.
- The Directive also provides for a system, to be set up at national level by October 2003, for the guarantee of origin of renewables for electricity, to facilitate exchanges, increase transparency and facilitate consumer choice. This indicates both the renewable energy source and the date and place of production, and (for hydro) the state and capacity. The guarantees are to be mutually recognized by member states.
- Member states must review their legislation and regulation related to authorization procedures relevant to renewable technologies and must publish by October 2003 a report on this review.
- Member states must put in place a framework for network operators to guarantee the transport and distribution of renewable sources of electricity, which may include priority access; to define and publish standard rules on responsibility for the costs of technical adaptations needed for a renewables producer to feed electricity on to the grid, and on cost sharing among producers; and to supply estimates of connection costs. Calls for tenders for connection work may be made by producers. Member states must ensure that network costs do not discriminate against renewables producers.
- The Commission must present a report on the Directive's overall implementation by December 2005 and every five years afterwards, which may be accompanied by further proposals.

International (and especially EU) developments should be used to help guide the best choices.[88] The EU renewables Directive makes a number of provisions for the promotion of renewables including a system of guarantee of origin, and a review of legislation and regulation to make this more renewables friendly, including network access regulation. The EU Commission is due to produce a report by October 2005 on experiences with the application of different support schemes. Alignment with EU developments would help to ensure that Switzerland is not excluded from useful mechanisms such as emissions trading and green power exchanges.

Opinion appears to be in general favour of support for renewables, but often not for support via feed in tariffs. This should encourage the Federal government to take a strong stand in favour of more market based approaches. If renewables are confirmed as part of the reform package, further efforts should be made to communicate the advantages of quotas and trading over feed in tariffs to a wider audience than those who are already engaged in the debate.

***Other issues in the reform package***

Two other issues in the reform package merit attention:

- Voluntary agreements and support of the private sector (Articles 3 and 28): Reliance on voluntary agreements, the private sector (for enforcement), existing processes and structures, and the principle of subsidiarity should not displace the core need for an effective new regulatory regime established at Federal level.

- Definitions (Article 2): Some important definitions are not included, and therefore not clear, including the definition of electric utilities and network operators.

## PART FOUR

### Taking reform forward

#### *Focusing on essentials, sustaining coherence*

An important lesson of past difficulties with electricity reform in other countries is the failure to ensure that the essential building blocks of an effective new regulatory regime are firmly anchored. The transition to a new framework is always challenging, but if there is a clear vision of essentials, this sets the scene for a positive evolution in the right direction.

In the Swiss case the strategic essentials are clear, partly because there has been no market opening reform so far.

- In the context of the European regional market of which Switzerland is an integral part, the specific proposals for congestion management based on EU legislation are essential.

- A strong and independent regulator to regulate and encourage change, an independent transmission system operator to promote grid reliability and facilitate access to the grid, and effective management of third party access to the grid are essentials for a more fundamental domestic change.

- The development of a wholesale power exchange would also encourage the rapid evolution of a more competitive market.

- These elements, together with a strong cross cutting focus on transparency and benchmarking which would help to pull the distribution sector forward, can be expected to move the market toward greater efficiency without compromising reliability.

Other elements contained in the reform package are also very desirable and if well designed and politically possible, should also be included. Full market opening should be the goal for example, and some provision should be retained for this to happen in due course.

Focusing on essentials does **not** mean adopting a weak approach. Benchmarking and the public dissemination of information on prices to encourage voluntary change will require adequate resourcing and commitment to deploy these tools. The ordinances that will flesh out the primary laws on the main issues need to be clear and complete, for example as regards the powers, resources and institutional place of the new regulator. Not only is a strategic focus needed, but the translation of strategic objectives into detailed practical implementation is equally important. Another lesson of reform failures elsewhere is the specific failure to master technical details effectively.

Possible political opposition to the Federal Council's proposal for a complete package- covering both the international transit issues and the domestic reforms- may raise a challenge for the coverage of essentials. Would it be enough just to have the cross border reforms? Given the mechanics of the Swiss political system, this is perhaps the last opportunity over coming years to promote significant change in the Swiss market as well. The prospects for a strong, efficient and competitive Swiss electricity sector are dim if these domestic changes are abandoned. Not only is Switzerland likely to fall foul of the EU internal market reciprocity provisions, which will damage both industry and consumer interests, but it will continue to find itself at least partly excluded from European discussion groups that are working on the future evolution of a competitive and reliable European market. The case by case market opening potential of the competition law is no substitute for proper reform: it is

slow, uncertain and generally inadequate and will generate more complexity. That said, if it becomes clear that the alternatives are no reform at all, or acceptance of the transit proposals, the urgency of the reliability issues, highlighted by the Italian blackout, suggests that it would be better to have the cross border proposals than nothing at all.

***Maintaining effective communication***

Effective communication of electricity reform is complex, sensitive, takes time, and requires forward thinking and a strategy. The details are often technical and difficult to convey. These are important for certain stakeholders such as market players, but the broad picture, objectives and expected results also need to be laid out for users and the wider public.

The Swiss political context for reform is quite special: the Federal Constitution grants its citizens extensive political rights and participation in law making. The particular challenge for the Federal government is to sustain a positive interest and broad support on the part of the majority in the country (sufficient to win a popular vote if needed) for this second attempt at reform.

This time round, however, there are some positive aspects to build on. First, it is likely that there is a better understanding of the issues, reflecting the communication that has already taken place. This is reflected in a broad support for a strong independent regulator and system operator. Second, the international context is less dire, and lessons have been learnt that Switzerland can use. The first attempt at reform took place against a background of successive high profile failures in recently reformed sectors around the world. The following list identifies some of areas for continued attention over coming months (and years, as the reform process unfolds):

- Address justified fears and worries: Some concerns are directly addressed in the reform package, for example public service. Other concerns may need further attention outside the package because what is planned or may happen is not so obvious. It should be reemphasized that the reform is not about privatisation (a major worry with the first attempt at reform), and a public/private mix can be expected to continue. There is no reason to foresee significant foreign acquisitions of large Swiss companies, given their robust balance sheets and often sizeable public ownership structure. The argument about the alleged need for a publicly owned TSO is misplaced: more important than ownership is effective regulation and unbundling. Prices do not appear to be the main worry for the general public, but attention could be drawn further (as it already has been) to the fact that price rises elsewhere in Europe often reflect the higher cost of gas for power generation, which is not an issue for Switzerland. Longer term structural issues should also be directly addressed, notably employment prospects under reform and measures to help the losers.

- Focus on benefits: These are already laid out in the campaign documents and briefing for the draft law but some elements could be highlighted further, and others made more accessible. Examples are the significant benefits that can be expected by SMEs which currently pay much higher electricity prices than their European counterparts; the broader benefits to the Swiss economy, using conclusions from the studies that have been carried out on the benefits of reform and conversely, the costs of doing nothing; the importance of playing a full part in European developments (short of becoming an EU member) given the traditional Swiss role at the geographic centre of Europe.

- Target the general public: Direct citizen participation in law making, together with the fact that households account for some 30% of electricity consumption, means that the ordinary citizen should be a prime focus of communication. The public should be kept informed, directly by the Federal government, throughout the remaining process of reform. Sustaining public interest helps the domestic part of the reform package as the international transit issues are of more direct relevance to a smaller group.

- Set up a broad institutional support mechanism: The committee of experts that was set up to advise on the reform proposals has now been disbanded but it would be worth considering the establishment of a widely based group of stakeholders to help sustain coherence, essentials and understanding of often complex issues (even if this still leaves the challenge of entrenched ideological positions). More important still, such an arrangement might help prevent the "hijack" of reform debate by minority vested interests.

***Managing the EU dimension***

In the absence of a formal negotiating mandate (which is one of the proposals in the reform package) the Federal Council cannot do more than continue informal discussions. A formal mandate is therefore essential to progress an agreement with the EU,[89] and an agreement with the EU is essential to secure recognition of Switzerland as full participant in European grid management at least, preferably more.

But it is also fair to say that alignment with the EU regulatory framework should prove to be a "win win" situation for Switzerland. If domestic reform is effectively handled, there is little cost attached to following the EU path, and considerable domestic advantage to be gained once competition develops, and in terms of securing system reliability for Swiss consumers. There are major opportunities to help shape the EU framework, even without being formally part of the EU. Although the EU may open negotiations with a formal request for Switzerland to adopt the full electricity legislative *acquis*, this would be excessive. There is mutual benefit on both sides from a fuller Swiss integration in Europe (Switzerland has traditionally been a net exporter to EU neighbours and an important peak power producer for the EU market).

Switzerland should therefore participate, but should not necessarily aspire to be ahead on specifics. Not all EU countries are yet in full compliance with EU rules on electricity. It is not yet clear how well some countries are implementing the structural requirements concerning independent regulators, unbundling and independent TSOs. The transit Regulation is in a phase of development. Switzerland has a national tradition of effective compliance with new rules, and some other countries do not have the same tradition. The cross border issues are a Europe wide as well as a Swiss specific issue: universal compliance is the only way to ensure lasting progress on regional grid management issues.

One issue which Switzerland should press is participation, formally and on equal terms as far as possible, in the European electricity discussion groups, committees and fora. For this it needs a recognised independent regulator and independent system operator. It is important because these groups are developing the details of EU rules as well as debating new approaches to regional market and reliability issues. They are also a useful way of keeping in touch with emerging best regulatory practice.

**Box 5.24. European regulatory groups**

- *European Regulators' Group for Electricity and Gas (ERGEG):* Set up November 2003. One key objective is to help ensure a consistent application in all member states of the transit Regulation (including management and allocation of capacity, and network tariffs). Switzerland not a member because it does not yet have a regulator.

- *Florence Forum and mini fora:* Started in 1998 to debate the way forward on the internal market, major building block for 2003 Directive and Regulation. Participants are the national regulatory authorities, member states, EU Commission, electricity traders, consumers, network users and power exchanges. Meets once or twice a year. Currently addressing cross border trade, especially tarification and congestion management. Swiss participation as observer.

- *European Transmission System Operators (ETSO):* Originally created in 1999, reflecting the EU requirement to unbundle competitive from other power activities, which promoted the emergence of transmission system operators as entities distinct from the vertically integrated utilities. Now has some 50 TSO members from the EU membership plus Norway and Switzerland. Switzerland a member (represented by Etrans and grid owners).

- *Union for the Co-ordination of Electricity Transmission (UCTE):* Set up after the second World War, oversees the technical aspects of transmission grid interconnection over a large part of Europe. Voluntary group which relies on co-operation between members. Switzerland a member (represented by Etrans and grid owners).

- *Council of European Energy Regulators (CEER):* Set up in 2000, a forum for debate among EU gas and electricity regulators, aimed at developing an integrated European gas and electricity market. Switzerland an observer, because it does not yet have a regulator.

- *EU Regulatory committee:* Set up in 2003 as part of the institutional framework for the 2003 Directive. Regulatory committee to take decisions, with the Commission, on fleshing out detailed provisions in the Directive as well as the 2003 transit Regulation. Expected to meet for the first time autumn 2005 to discuss congestion management guidelines. Switzerland not a member because not part of the EU.

### *A long term vision*

Much of the debate about Swiss electricity reform looks at expected problems, but there are significant opportunities too. There is still plenty of time for Switzerland to participate in the development of an integrated European market. It remains at the geographical centre of this market from which it is almost inconceivable that it can be displaced. At the same time, the 2003 Directive and Regulation need development in crucial and especially, technical details, and some EU member states are at an early stage of implementation. A good general record on compliance with rules once they are adopted is a major Swiss asset. This all means that there is scope for Switzerland not only to catch up, but even to aspire to leadership in key issues, if it succeeds in its own internal reform:

- *Commercial leadership*. Switzerland is already an important regional trader and supplier of peak electricity to the European market. But it needs to be part of the rapidly developing network of European power exchanges from a position of strength, which implies active participation in discussions (which are still at an early stage) on new ideas such as market coupling, at the same time as it should be developing a much stronger and more influential power exchange of its own.

- *Regulatory leadership*. Setting up an independent regulator should not just be seen as a means of keeping up with others in the OECD but of ensuring that Switzerland's voice is strong and authoritative in European (and wider) regulatory discussions. Specific opportunities to develop best practice such as in benchmarking, for which the structure of Swiss industry is especially well suited, could even put Switzerland ahead on these approaches.

- *Technical leadership*. The establishment of an independent system operator also opens opportunities to make a much fuller contribution than in recent years to regional grid reliability. Switzerland was one of the first countries to participate in the technical development of an integrated European grid and could once again aspire to a leading role.

**Conclusions**

There is a compelling need for reform of the Swiss electricity sector, both as regards the domestic market and the regional European issues. Domestically the sector suffers from inefficiency reflected in relatively high prices, especially for key groups such as small business, which probably also conceal inflated costs and an uneven distribution of profits. These high prices are harming overall competitiveness. Regionally, Switzerland's current unreformed institutional structures are contributing to the serious problem of European grid reliability, an issue that was highlighted by the 2003 Italian blackout. An *ad hoc* approach which relies on the competition law will not be effective in bringing about the desired market changes. There is also evidence that the current absence of a country wide regulatory framework for competition is generating unhelpful market and sub Federal regulatory developments.

Reform is not just- or even mainly- an issue of principle. Failure to be part of European market liberalisation and the new approaches to issues such as cross border congestion management is a highly practical issue: it will undermine Swiss commercial prospects in the regional electricity market as well as the economy's competitiveness. The construction of an EU electricity market can be viewed as both a challenge and an opportunity: progressively excluding those jurisdictions which fail to align themselves with its regulatory framework, but also increasingly attractive commercially to those which can expect to take part in it.

This is the second attempt by the Federal government to implement reform, and if it fails, reform could well be postponed into the next decade. To ensure that the reform is adopted, a continued effort at communication, especially to the general public, will be needed and should continue into the implementation phase. Ongoing Federal government co-ordination if not leadership is also needed to keep the reform process on course, to ensure that potential "roadblocks" are addressed, and to prevent the disintegration of an initially well conceived plan under political pressure. In particular, there needs to be a strong counterweight to the influence of the larger companies in the debate, whose real interests are to keep the monopoly rent which they currently enjoy, based on market power which is threatened by reform and is hurting general competitiveness.

Reform can be expected to be an evolutionary process, in the course of which the management of key issues can be fine tuned and hence further improved, once the process is underway. A stronger Federal voice will be an asset for this sector, leading to more effective overall management and control of the sector's development. Conversely, continued drift and reliance on *ad hoc* market and regulatory developments risks being unhelpful to the great majority of stakeholders, not least the general public.

If the reform is to achieve its purpose, it will need to stay focused on the key essentials of effective and independent regulation and system operation, backed up by well conceived details in the secondary rules. These are major lessons from reform failures elsewhere. By and large the reform package presented by the Federal Council to Parliament achieves this, although there are important issues that need review. To promote a self sustaining momentum, transparency needs to be strengthened so that stakeholders (citizens as well as business) can see and be actively involved in developments, and benchmarking needs to be deployed so as to encourage comparison and the spread of best practice. Progression may be conceived in two phases: a transition phase in which an effective new institutional and regulatory framework pulls the country forward into new market structures and behaviour, and a second phase to confirm the new structures and, for example, to move to full market opening.

The EU dimension of the reform raises broader issues about current EU developments in support of a competitive and reliable regional European market. The 2003 EU Directive and Regulation set a potentially effective framework but implementation, compliance and key technical issues such as the management of grid congestion require further attention. Switzerland has an excellent opportunity to contribute to these developments and strengthen its own domestic market in the process, but only if it can successfully establish a strong reform of its own market.

**Recommendations**

The recommendations below are based on the reform package submitted at the end of 2004 by the Federal Council to Parliament. The status of the package as of September 2005, following debate in the National Council (lower chamber) was:

1. Revision of the 1902 Federal Electricity Law: establishment of ElCom the TSO (the latter with a clause to ensure that the majority of Board members are independent) and regulated TPA for cross-border transmission lines.

2. New Electricity Supply Law: two phase market opening, with the aim of market opening by 2007 for consumers above 100 MWh consumption, and full market opening five years later, with the option for households to remain captive. Full market opening no longer to be subject to an optional referendum, but to a Parliamentary vote.

3. Revision of the 1998 Energy Law: renewables to be increased by 5.4 TWh by 2030, to be promoted through feed-in tariffs and other incentives. Total additional costs generated by feed-in tariffs would be capped at 0.3 Swiss cent/kWh. Modalities are yet to be defined.

The proposals now go to the upper chamber for debate, probably in spring 2006.

**A. General recommendations**

Reform of the domestic market as well as addressing cross border issues is necessary and increasingly urgent. At the time of writing these recommendations in September 2005, the prospects for moving forward on both fronts at the same time seemed reasonably positive. That said, if it becomes clear that the alternatives are no reform at all, or acceptance of the cross border proposals, the urgency of the reliability issues, highlighted by the Italian blackout, suggests that it would be better to have the cross border proposals than nothing at all.

***1. Anchor essential changes firmly into place.***

Essentials need to be anchored firmly into place. These are an independent regulator, an independent system operator, and regulated third party access to the grid. The development of an organised wholesale market should also be formally encouraged. This will provide the foundations for future progress toward a more effective and competitive market structure, stronger price performance and more robust system reliability. An important lesson of past difficulties with electricity reform in other countries is the failure to provide firm foundations of this kind. The role of ordinances to flesh out the primary legislation is also crucial in this context. Another lesson of reform failures elsewhere is the specific failure to master technical details effectively. Ordinances allow scope for fine tuning, but there is also a danger of weakening original intent, which may generate investor uncertainty. The Federal government needs to sustain a strong co-ordinating role among political actors to ensure this does not happen.

### *2. Set the scene for a self sustaining evolution of the market*

*Promote transparency and benchmarking*

Transparency and benchmarking can be valuable allies in the development of a competitive market. The aim should be to promote greater transparency wherever possible, including end user and grid access prices, and clear unbundling of the networks. The initiative of the Price Surveillance Authority to collect and disseminate information on end user prices and grid access tariffs should be supported with the necessary resources. A regular flow of reliable information is needed to sustain popular support. It would also be useful to extend the work to wholesale prices, in order to encourage the development of a transparent and well functioning wholesale market and to discourage gaming by market players. Benchmarking retail prices across regions can be expected to encourage voluntary change, as consumers become more aware of prices, and producers or suppliers seek to maintain (or increase) their market share.

*Engage and sustain the support of the cantons and municipalities for reform*

The cantons play a major role in defining public service obligations and in the management of the electricity sector. They will also have a major role in securing change aimed at developing competition. Areas in which they need to be particularly engaged include benchmarking, transparency, new forms of company governance that are compatible with a more open market, and competition friendly management of their responsibilities for enforcing the public service aspects of the reform to ensure that local designated network operators do not abuse their position.

Fiscal change will be needed in the long run, to help extricate the distribution sector from local public budgets. A long term goal should be to review the regulatory and structural basis for the distortions to local distribution markets, and work toward a less market distorting and more transparent means of supporting local economies.

*Promote a level competitive playing field, including stronger corporate governance*

This is especially relevant to the distribution sector. Best practice can be found in the competitive neutrality frameworks set up elsewhere in the OECD such as in Australia and the Netherlands. The OECD Principles for effective corporate governance can also help to define helpful changes in this area.

*Ensure that Comco and the Price Supervisor have the means to continue supporting the reform process*

Comco and the Price Supervisor have crucial supporting roles in the transition to competition, even after a reform law has been enacted. Comco will need to continue to deploy its powers through the Cartel Law, to act on abuse of dominance and on mergers and acquisitions, both of which will need careful monitoring in the foreseeable future. The latter does not necessarily mean opposing mergers. The Swiss industry structure is currently very disaggregated, and further mergers in the distribution sector especially may help the reform process. Comco will need a strong and defined relationship with ElCom. The Price Supervisor's initiatives in the promotion of price transparency and benchmarking have already started to have an effect on the companies, and it should be adequately resourced to continue this work.

### *3. Manage the transition to a new framework.*

Managing the transition to a new approach will be as important as getting the technical details right. This implies ongoing political co-ordination at the federal level of all important players at all levels of government and across key institutions, which does not lose sight of core needs, effective and continuing communication with the public as well as other stakeholders, and close attention to the way reform will unfold in practice over coming years, so as to take corrective action if this is needed.

Maintaining effective communication is crucial. This means, especially, addressing justified fears and worries, focusing on the benefits of reform, and targeting the general public.

Consideration should be given to setting up a broad institutional support mechanism, perhaps modelled on the lines of the committee of experts that reviewed the Federal government's draft proposals. This *ad hoc* committee or commission would have the specific purpose of addressing electricity market development, and could draw in representatives of the cantons and municipalities as well as federal administrations, and business and consumer representatives. Periodic evaluation of progress to check that reforms are moving in the right direction should be considered.

### *4. Ensure that security of supply in generation remains on the strategic agenda.*

A clear vision of the way forward will be important. This should, especially, consider the potential of natural gas. It should also ensure that the scene is set for timely decisions on nuclear power. The contribution that new renewables can make to the generation mix needs a sound assessment.

## B. The EU dimension

The combination of its central geographical location in Europe and the opportunities afforded by its hydropower to store electricity and to provide peak power have made Switzerland a major trader as well as a major hub for the transit of electricity in the European market. It is an important peak electricity producer for the European market. But at the same time, imports are needed to cover domestic winter consumption when hydro production is at its lowest and demand greatest. Switzerland therefore needs to be able to influence the regulatory setting in which its electricity sector will operate in future.

### *5. Secure an equitable agreement with the EU.*

An agreement with the EU is essential to secure recognition of Switzerland as full participant in European grid management at least, preferably more.

*Aim to participate on equal terms, as far as possible, in the EU and other European regulatory and technical groups*

For this Switzerland needs a recognised independent regulator and an independent system operator. Participation is important because these groups are developing the details of EU rules as well as debating new approaches to regional market and reliability issues. They are also a useful way of keeping in touch with emerging best regulatory practice.

***6. Play a strong and positive role in the development of a new European framework for system reliability.***

The Swiss transmission grid is under growing pressure from increased international trade. Capacity allocations increasingly ignore Swiss concerns about capacity limits, and Swiss exclusion from key European discussions and negotiations has both overloaded the Swiss grid and also promoted an inefficient use of the grid. But the ongoing European discussions also represent an opportunity to shape developments. Switzerland should continue to work with the UCTE on developing better reliability standards and compliance mechanisms, as well as taking as active part as possible in the EU fora (which should become much easier once there is an independent regulator and system operator).

***7. Participate in the discussions on new commercial market ideas.***

Some of the ideas under discussion in Europe, such as market coupling, are of considerable potential interest to Switzerland as a major trader.

**C. Specific reform issues**

***8. Establish a fully independent regulator.***

A strong independent regulator is essential for the EU as well as the domestic context. The reform proposals are a good start but some issues need more careful treatment.

*Strengthen the provisions for independence*

This matters especially in the Swiss context because there is no tradition of independent regulators. Given the current non competitive structure a strong and independent regulator is essential to act as a motor for the development of competition. The proposed collegiate structure is positive, as such a structure generally helps to ensure independence in decision making, especially when the board is made up of independent experts. But specific areas such as selection procedures, conditions to promote independence such as a prohibition on having a financial interest in the regulated sector, or rules to protect the board from politically inspired dismissal, are also needed. Open decision-making procedures, such as posting the record of Board meetings on the Web site, also help to reinforce independence (as well as strengthening accountability).

*Ensure that ElCom can exert its proposed powers, and highlight its key strategic responsibilities*

ElCom's powers are potentially broad, as defined in the draft law which underlines its role in ensuring that the provisions of the new law are complied with. It will be important to ensure that it can deploy these powers effectively in practice. Also, its strategic responsibilities are not clearly defined. These should be clearly earmarked to include strategic responsibility for the oversight of the new TSO, the oversight of public (universal) service obligations and protection of the consumer, and for the enforcement of grid access, network tariffs and accounting separation.

*Strengthen the provisions for resources*

Anticipated staffing looks very low relative to the work that needs to be done. Switzerland's small size may not allow for a much larger entity and may require some sharing of expertise with and technical support from the ministry, but the costs of a new regulator (even a slightly larger one) will be low relative to the benefits which can be expected from a successful reform of which a strong regulator is a central component, and other small countries have larger regulators. A levy on the industry, as proposed in the draft federal law, is one way of raising funds.

The competences of the staff also merit attention. Industry and consumer experts are certainly needed, but specific competences in economics, law, and accounting are also essential. A knowledge of costing and accounting, for example, will be invaluable in the work that lies ahead to master unbundling in Switzerland's highly complex network of industry relationships.

*Address relationships with existing institutional structures*

The new regulator will need a clear identity and place in the institutional framework in order to function effectively and with authority. This place is not yet wholly clear. Horizontal institutional relationships should also be covered. The most important ones are with Comco and the Price Supervisor. The proposals assign the Price Supervisor the task of advising ElCom on prices, which should help any problem of capture as it provides for a second opinion. There is no direct reference to the relationship with Comco. Based on the existing competition law, Comco remains responsible for tackling abuses of market power, an important issue for the healthy development of the Swiss electricity sector. Co-ordination mechanisms with ElCom need to be put in place through ordinances or formal agreements. One option is to have a Board member of Comco sit on the ElCom Board and vice versa. The relationship with the cantons and municipalities should also be covered.

*Strengthen the provisions for accountability*

Countries are deploying a variety of approaches to secure accountability, including compliance with requirements for high quality regulation, consultation, publicising regulatory decisions, and systematic reporting to interested parties. Performance evaluation is another approach, which requires the establishment of clear objectives against which performance can be measured. Giving ElCom a list of strategic objectives and responsibilities against which it might be judged, beyond the specific duties and responsibilities that are already laid out, would help with this.

*Ensure that ElCom has adequate powers to ensure that its rulings are respected*

The ability to obtain information, so that it can be verified, from what are likely to be recalcitrant regulatees is especially important *e.g.* for checking that there is effective separation of activities. The proposals assign ElCom a wide monitoring role, whilst prosecution and sanctions for non compliance with rulings issued by ElCom are with the SFOE, reflecting the latter's responsibility for applying the (non electricity specific) penal code. The way that this split of responsibilities works in practice may need attention.

### *9. Establish an independent system operator.*

Etrans, a co-ordinator rather than a proper system operator, is an unsatisfactory stopgap. It is essential to move toward a proper system operator, for the EU as well as for the domestic context. The proposals are in the right direction but some issues need to be strengthened.

*Secure the TSO's full independence*

The TSO will need strong regulatory oversight and carefully designed corporate governance. These are important because it will not be a wholly separate company vested with ownership of grid assets. The governance proposals are well conceived and should not be weakened. The TSO Board must be wholly independent of its owners. The independence of the Board's CEO should be secured through appropriate rules covering recruitment and terms of appointment.

*Ensure an effective evolution of the new system operator that will address the needs of short term system operation and long term investment planning in a balanced way*

The proposals assign the TSO responsibility for the operation of the transmission network. Ownership of transmission assets remains with the existing owners. All network managers need in particular to establish multi-year plans to ensure the safety and efficiency of the network. In the event that the owners fail to take due account of long term system needs such as investment in network maintenance and extension, the TSO may request ElCom to take the necessary measures, at the owners' cost. Allocating and achieving the best balance of responsibilities for short and long term transmission management issues is not an easy task. A variety of approaches – asset-owning and non asset-owning system operators – have been deployed across the OECD. The proposed Swiss legislation assigns the duty of long term grid planning to all network operators and vests the authorities with supervising and sanctioning powers. The approach proposed by Switzerland will need monitoring for its effectiveness over time.

*Ensure an appropriate regulatory framework for other important issues*

Issues such as rules for system dispatch, quality standards, procurement of reserve capacity, need to be transparently laid out and approved by the regulator, whether through grid codes, licences or other processes consistent with transparency and the promotion of competition. Reliability standards and incentives need to be put in place.

***10. Promote consumer choice and separate the issue of market opening from the provision of public service.***

Separating the issues of market opening, and ensuring a defined public service under conditions of competition, is important and not wholly achieved in the proposals. Full consumer choice would be desirable in the longer term, and if provisions for its achievement can be agreed now, so much the better. A measured approach, as proposed by the Federal Council, would allow the new regulatory and institutional apparatus for competition to evolve and be tested. It should be noted that stability for local suppliers is not a good argument in support of this approach.

***11. Ensure regulated and* ex ante *third party access to the grid.***

Market opening with the Cartel Law is an unsatisfactory case by case and *ex post* way form of market opening. Disputes on network access on this basis would have to be settled individually, probably in the courts. The time this takes would be a major disincentive for all but the most determined competitors with deep pockets. There is also some legal uncertainty over the position reached in relation to third party access via this route. A regulatory approach does not mean that there will be no challenges, but it provides for a more consistent approach and may generate a test case that will ease subsequent challenges. It will also provide for a more consistent approach.

***12. Unbundle the grid effectively.***

Effective unbundling is essential both for the transmission grid and the distribution network. If it is not adequately secured, it may compromise both balanced system development and commercial efficiency by increasing the difficulty of market entry. Unbundling is also important for transparency. It will help to highlight costs and help to pinpoint cross subsidies and inefficiencies. It will be important to ensure the effective and accurate monitoring, enforcement and compliance with new regulatory requirements.

*Strengthen the provisions for distribution reform*

The principle of ensuring that there are no cross subsidies is strongly articulated, but not given sufficiently strong effect in the proposals. This is especially important given that households will remain captive to existing suppliers for at least five years (and possibly beyond). Accounting separation is the weakest form of separation and it would be better to have legal separation of distribution companies too. But if not, best practice approaches to make the most of accounting separation have been developed elsewhere and should be considered. The proposals should also be strengthened to separate the accounts of utilities from the political bodies to which many are attached, as well as separating them down the supply chain. Provision should be made for reviewing the arrangements with a view to stronger unbundling in due course.

***13. Encourage the development of a transparent wholesale power market.***

A wholesale power market can be expected to develop out of the TSO's activities in buying and selling power for system balancing purposes. It is crucial that the market which develops is organised according to clear and transparent rules. The draft law provides the basis for the Federal Council to assign ElCom or the TSO additional duties *e.g.* to improve market conditions. The development of a strong Swiss power market could act as a powerful lever for the furtherance of Swiss interests in the European market which counts a growing number of power exchanges.

***14. Minimise distortions to competition from public (universal) service obligations.***

The proposals set a policy which echoes what many other European countries have put in place for universal service. It is important that the distinction between security of supply and basic supply (the Swiss term for universal service) is made, so as to sustain a clear vision as to the aim of this regulation. Provisions for cost reflectiveness in tarification are important and the principles are soundly articulated but risk being undermined by the network zone approach. One challenge will be to determine the size of the supply area in which price solidarity through uniform tariffs should apply. The more differentiated the costs of supply across this area, the more cross subsidisation this implies. It would be better to have a more direct form of subsidy for supporting remote areas. If there is limited market opening, the implementation of the proposals for public service needs particular attention in order to minimise the inevitable distortions to competition.

Service quality standards should be addressed and provision made for their enforcement. In a competitive market, consumers (not just the vulnerable ones) need to know what they can expect of their suppliers, beyond price.

***15. Monitor the development of transmission (network use) pricing.***

The proposals reflect much of the best practice that has been emerging around the OECD. The cost reflective principle is firmly embedded and the two key issues – overall revenues that network owners will be allowed to recover and the way they should charge network users, are addressed. The regulator should be in charge of implementation once the broad principles are agreed, in accordance with best practice elsewhere.

*Include benchmarking*

There are no explicit proposals for benchmarking transmission prices. The Swiss context lends itself to this approach, given the large number of companies at least in distribution. It would enhance prospects of "getting it right", given present non transparency and weak unbundling proposals for information to the regulator, which is essential for the rate of return calculations. There is also scope to consider international benchmarking for distribution with comparable regions such as the Nordic area. For transmission benchmarking the Finnish approach (a procedure based on negotiation) offers a way forward worth considering. However the resource intensive nature of benchmarking needs to be taken into account.

*Provide for an adjustment mechanism for the calculation of recoverable costs*

The proposals are basically sound. It will be important to ensure that they are not too generous to network owners, and it is not clear what mechanism will be available for making any necessary adjustments to the methodology. Provision of adequate and accurate information to the regulator is essential, as is the means of enforcing the provision of such information.

*Ensure that provisions for user charging do not distort the market*

It will be important to ensure that there is no implicit cross subsidisation of the more costly user groups. The solidarity principle raises some doubts, as does the reference to helping the mountain regions. Such subsidies should be transparent and should not be provided in a manner that distorts cost reflective pricing.

***16. Promote market-based instruments for renewables support.***

The voluntary first phase is a positive approach. The main issue lies in the second phase. If the feed in tariff option is chosen, which offers less scope to bear down on costs than more market-based instruments such as quotas and trading, the proposal could prove to be very costly.

International (and especially EU) developments should be used to help guide the best choices. Alignment with EU developments would help to ensure that Switzerland is not excluded from useful mechanisms such as emissions trading and green power exchanges. There is growing international experience with cost effective mechanisms for renewables support, such as the quota style approaches.

Further efforts should be made to communicate the advantages of quotas and trading over feed in tariffs, and the disadvantages of the latter, to a wider audience than those who are already engaged in the debate.

## ABBREVIATIONS

ACCC (Australian Competition and Consumer Commission- Federal competition authority and regulator for electricity)
BWG (Federal Office of Water and Geology, part of DETEC)
CAP (Capital Asset Pricing)
CCGT (Combined Cycle Gas Turbine)
CEER (Council of European Energy Regulators)
CEO (Chief Executive Officer)
CHF (Swiss francs)
CHP (Combined Heat and Power)
Comco (Competition Commission)
CRE (Commission de Régulation de l'Electricité- French electricity regulator)
DETEC (ministry-department- of Environment, Transport, Energy and Communications)
DH (District Heating)
ECT (Energy Charter Treaty)
EEA (European Economic Area)
EFET (European Federation of Energy Traders)
EMA (Energy Market Authority- Finnish regulator)
EML (Electricity Market Law- the first draft reform law)
ERGEG (European Regulators' Group on Electricity and Gas)
ESTI (Federal Inspectorate for Heavy Current Installations, part of DETEC)
ETSO (European Transmission System Operators)
EU (European Union)
Europex (European Power Exchanges Group)
GATS (General Agreement on Trade in Services)
GATT (General Agreement on Tariffs and Trade)
GHG (Greenhouse Gases)
HSK (Nuclear Safety Inspectorate, part of DETEC)
IEA (International Energy Agency)
LE (Federal Electricity Law)
LEPS (draft Electricity Supply Law- the current draft reform law)
LRIC (Long Run Incremental Cost)
MFN (Most Favoured Nation)
MW (Megawatt)
NGC (National Grid Company- for England and Wales)
NT (National Treatment)
NTC (Net Transfer Capacity)
OECD (Organisation for Economic Co-operation and Development)
OFGEM (Office of Gas and Electricity Markets- regulator for England and Wales)PSA (Price Surveillance Authority)
PJM (Pennsylvania-New Jersey-Maryland- region of the US covered by a single system operator)
PV (Photovoltaic)
RTE (Réseau de Transport de l'Electricité- French grid manager)
SECO (State Secretariat for Economic Affairs, an Office of the Finance ministry)
SEE (South East Europe)
SFOE (Swiss Federal Office of Energy, an Office of the ministry of Environment, Transport, Energy and Communications- DETEC)
SME (Small and Medium Sized Enterprise)
TPA (Third Party Access)
TSO (Transmission System Operator)
TW (Terawatt)
UCTE (Union for the Co-ordination of Transport of Electricity, formerly UCPTE- Union for the Co-ordination of Production and Transport of Electricity)
UNFCC (United Nations Framework Convention on Climate Change)
VAT (Value Added Tax)
VSE (*Verband Schweizerischer Elektrizitätsunternehmen* -Swiss Electricity Suppliers Association)
WTO (World Trade Organisation)

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**ANNEX 1: MAIN SWISS LAWS RELEVANT TO THE ELECTRICITY SECTOR**

| Law | Main purpose and coverage | Detailed provisions |
|---|---|---|
| Energy Law (1998) | Policy measures for the energy sector, mainly focused on efficient energy use and renewables, and R&D. Regulates conditions of connection to the grid for certain independent power producers (small hydropower and non hydropower renewables, CHP among others). | Art.1: sets out energy policy objectives of economically effective and environmentally sound energy supply, energy efficiency, increased use of domestic and renewable energy sources. Art.2: co-ordination between Federal government, cantons and private sector. Art. 3: basic principles of energy use, including efficiency and cost reflection. Art. 4: vests main responsibility for energy supply with the private sector, whereas Federal and cantonal authorities must ensure appropriate framework conditions. Art. 5: guidelines for energy supply, including diversification, cost reflection, international co-ordination, environmental soundness. Art. 5bis: declaration of origin of electricity. Art. 6: cantons must consider renewables and cogeneration favourably when planning new power generation capacity. Art. 7: mandates connection of independent power producers, including renewables and small hydro (less than 1 MW). Art. 8: authorises Federal government to set efficiency standards for installations, vehicles and appliances, including through voluntary agreements with manufacturers or, if voluntary agreement is reached, through prescriptive measures. Art. 9: mandates cantons to adopt energy efficiency legislation in the buildings sector. Art. 10 and 11: both Federal government and cantons are responsible for information, advice and education in the field of energy policy. Art.12: Federal government promotes energy R&D. Art.13: Federal government may support measures for the promotion of energy efficiency, renewables, cogeneration, energy use from waste incineration and sewage. Art. 14: specifies financing of R&D and support measures. Art. 15: provides for Federal financing of cantonal projects. |
| Law on Electricity (1902) | Regulates construction and safety issues. Federal government supervises and regulates the construction and operation of electricity infrastructure, and issues safety regulations. | Art. 1: Federal government supervises and regulates for the construction and operation of electricity infrastructure. Art.3: Federal government issues safety regulation. Art.16: cantonal regulation is subordinate to Federal regulation. Art. 19: establishes the Federal Inspectorate for Heavy Current Installations (ESTI). Construction plans must be authorised by the ESTI, with SFOE acting as dispute settlement body. |
| Law on the Use of Hydropower resources (1916) | Regulates the use of hydropower resources. Federal government oversees and issues regulations, cantons designate concessionaires. Law also sets up and regulates royalty tax on water use, levied by the cantons. | Art.1: Federal Government oversees the use of hydropower resources. Art. 2, Art.38-48: cantons designate concessionaires. Art.5: Federal Government issues regulations relating to the use and promotion of hydropower, with the Federal Office of Water and Geology acting as supervisory body. |

| Law | Main purpose and coverage | Detailed provisions |
|---|---|---|
| Nuclear Energy Law (2003) | Regulates nuclear power plant construction, operation, and decommissioning, and waste disposal and safety issues. Federal government in overall charge. | Art.5: Federal government is responsible for safety regulations. Art.6-9: issues authorisations for handling nuclear material (incl. exports for reprocessing).Art.12-29: construction, operation and decommissioning of nuclear power plants. Art.33: issues siting authorisation for waste repositories, which must give due consideration to views of the host and adjacent cantons and countries. Art.37-60: framework authorisation for a repository must be approved by Parliament. Art.70-71: Swiss Nuclear Safety Inspectorate (HSK) is in charge of safety supervision. |
| CO2 Law (1999) | Sets a target for the reduction of CO2 emission in line with Swiss obligations under the Kyoto Protocol. | Law sets a target of 10% reduction in CO2 emissions by 2010 (compared with 1990), with differentiated targets depending on the fuel. The targets are to be achieved primarily by voluntary measures. But if these prove insufficient to keep Switzerland on track for meeting its Kyoto obligations, the Federal government may introduce a CO2 tax (subject to Parliamentary approval), from 2004 at the earliest. The tax should be fiscally neutral Large emitters which achieve large reductions voluntarily, may be exempted. |
| Cantonal laws | Varied regulation covering generation and distribution planning, assignment of network/supply areas, connection conditions for end users. | |
| Cartel Law (1995, revised 2004) | Not energy specific. Prevention of the harmful economic or social effects of cartels or other restrictions on competition. | |
| Price Surveillance Law (1985) | Not energy specific. Prevention of abusive increase or maintenance of prices. | |
| Internal Market Law (1995) | Not energy specific. Aims to reduce barriers imposed by cantonal and local regulation to the free circulation of goods and services within Switzerland. Confirms a general right for suppliers to offer products and services (including electricity) outside their “home” territory.It states that any person having an establishment and any enterprise having its registered office in Switzerland is entitled to offer goods and services on Swiss territory. Access to the market is governed by the rules of the place of origin of the goods or services, so that if the latter meet the standards or other conditions set by their canton or municipality of origin, they can be traded across the country without having to be recertified according to the rules of their destination (this is the “Cassis de Dijon” principle, first applied in a landmark EU court case for the circulation of goods across the EU). | Currently under revision to address weaknesses. Relative failure stems from institutional and legal factors: Federal Tribunal case law has put the principle of federalism before the internal market, in effect excluding the right of establishment from the scope of the law; Article 3 gives the cantons significant scope to restrict access to their market (for reasons of public interest, for example); and the right of appeal against abusive practices has not had the intended effect. |
| Law on Economic Supply (1982) | Not energy specific. Provides for precautionary security of supply measures across the economy including government interventions when supply crises cannot be handled by the private sector. | |

## ANNEX 2: FEDERAL GOVERNMENT REFORM PACKAGE

***Draft Law on Electric Power Supply (LEPS)***

*1. General provisions*

Article 1: *Objectives of the law*: secure and sustainable electricity supply, and competition in the electricity sector.

Article 2: *Scope of the law*: electricity networks operated with 50 Hz alternating current.

Article 3: *Subsidiarity and co-operation*: mandates co-ordination between the Federal government and the cantons within their respective remits; also that prescriptive regulation is to be used only after voluntary measures by the private sector have proved insufficient.

Article 4: *Definitions*

*2. Security of supply*

Article 5: *Network zones and connection guarantee*: tasks the cantons with defining network zones and designating network operators for these zones on a non discriminatory basis. A "service level agreement" may be linked to designation. The network operators are obliged to connect suppliers and end users throughout their concession zone. Cantons may also oblige network operators to connect end users outside their zone. They may make "provisions" governing connections outside the populated area. Cantons must monitor compliance with the network connection guarantee. The Federal Council may "lay down transparent and non discriminatory regulations governing the allocation of end users, electricity producers and network operators to a specific voltage level".

Article 6: *Delivery guarantee and pricing*: (applies only during the first stage of market opening). Network operators must ensure that they can deliver "the desired quantity of electricity to households at the desired quality and at reasonable prices". They must specify a uniform tariff for households with similar characteristics. Tariffs must be published showing "a clear distinction between network use, energy supply, fees and payments to the community or state" and must be valid for at least one year. Network operators must keep "cost unit accounts" for the tariff component of energy supply and price benefits from their free network access must be passed through to households.

Article 7: *Right to stay with existing supplier*: (applies after full market opening, if this is agreed). Network operators are required to be able to continue to supply households who do not want to exercise their right to choose a supplier ("do not make use of their network access") after full market opening with the "desired quantity of electricity… at the desired quality and at reasonable prices". The provisions of Article 6 on uniform tariffs, cost disaggregation, validity for at least one year and cost unit accounts are reiterated for these households. The Federal Council regulates the procedure, including contractual modalities.

Article 8: *Security of supply obligations on network operators*: Network operators must co-ordinate their activities. Their responsibilities are to operate a secure, productive and efficient network; to structure and regulate the use of the network; to provide the necessary reserve supply capacities; and to specify minimum technical and operational requirements (taking account of international standards). They must also draw up long term network plans, and keep ElCom informed annually of developments. The Federal Council may impose sanctions if duties are violated.

Article 9: *Measures in the event of threats to security of supply*: The Federal Council may take measures to increase the efficiency of electricity use and procure electricity (for which it may issue a call for tenders); and support and expand electricity networks. If the call for tenders imposes additional costs, these will be offset by the TSO via a surcharge on the transmission costs for high voltage networks.

*3. Network use*

Article 10: *Unbundling*: Requires that "utilities secure the independence of network operation" and prohibits cross subsidisation between network activity and other areas of activity. Requires that distribution activities be unbundled at least in terms of accounting. Requires that utilities legally unbundle their activities relating to transmission networks from their other business operations.

Article 11: *Unbundled financial and cost statement*: Network operators/owners must submit, for each network, an annual unbundled financial and cost statement to ElCom. Federal Council may stipulate minimum requirements for standardisation of accounts.

Article 12: *Provision of information*: Requirement on network operators to "make all necessary information" on the use of the network "readily accessible", and to publish tariffs, technical and operational requirements and the annual financial statements. Invoices must be transparent and comparable and any payments to the community or state must be shown separately.

Article 13: *Third party access (TPA) to the network*: All network operators must guarantee network access without discrimination, except if network operations are jeopardised or for lack of available capacity. In the case of cross border TPA, access can be denied if the electricity originates from a country which does not reciprocate TPA for Swiss electricity. Precedence for allocating capacity is given to households and for renewables.

Article 14: *Remuneration for network operators and principles for charging end users*: Sets out a system of cost based remuneration for network operators. Tariffs charged for use of the network shall "not exceed the recoverable costs and fees and payments to the community or state". They must have simple structures and not be based on the postage stamp principle, and must be uniform for the same categories of client. Cantons must take "necessary measures to offset any inappropriate discrepancies..". Federal Council steps in if this is inadequate, and may arrange an "offset fund" to which all network operators must contribute.

Article 15 : *Definition of recoverable costs*: Defined as "the operating and capital costs that are required for the secure, productive and efficient operation of the network. They shall include a reasonable operating profit." Capital costs are calculated "on the basis of the original acquisition and production costs of the existing facilities". Federal Council is responsible for defining principles for calculations and for cost pass through to users.

Article 16 : *Network remuneration for cross border supply*: Shall be based on the "costs incurred through (the) actual (cross border) utilisation". Must be calculated separately and not be charged to domestic end users. Calculation based on Long Run Average Incremental Costs (LRIC). Federal Council may define depreciation period.

Article 17 : *Congestion management*: If demand for capacity exceeds supply, TSO "may distribute the available capacities on the basis of standard market procedures such as auctions. The Federal Council may regulate such procedure". Allocation priority is given to households (Article 13) and to international sales and supply contracts concluded before 31 October 2002. Any unutilised capacity may be reallocated on the basis of standard market procedures. Revenue from the allocations must be used to cover common costs of deliveries, expenditure on the grid, and are part of recoverable costs. Federal Council may provide for exceptions concerning network access and the calculation of recoverable costs in relation to new cross border capacities.

Article 18 : *Establishment of Swiss Transmission System Operator (TSO)*: "The nationwide transmission network shall be operated by a single domestic company". It "shall be a joint stock corporation under private law". It shall "neither carry out any commercial activities in the areas of electricity production, distribution and trading, nor hold interests in any companies that carry out commercial activities in said areas." "The purchase and supply of electricity required for operational reasons, especially for the provision of system services, shall be permitted". Board members and company management "may not simultaneously exercise any executive or management functions in companies that are active in the areas of electricity production and trading". The cantons have the right to appoint two representatives to the board. ElCom must approve the statutes for the TSO.

Article 19 : *Duties of the TSO*: Operation and supervision of the nationwide transmission network, responsibility for planning and control, balance management, and provision of system services including reserve power supply (on the basis of transparent and non discriminatory procedures). It "shall order the implementation of all necessary measures in the event that the stable operation of the network should be endangered" (ie it may issue directives to the grid owners if security is threatened). It "shall define transparent and non discriminatory procedures for dealing with network congestions". It 'shall represent Switzerland's interests (abroad)". The Federal Council may assign additional duties to the TSO. The TSO "shall regulate disposal rights over the network facilities that are required for the performance of its duties by concluding contracts with the (owners)". The Federal Council may grant "expropriation rights to the TSO for the performance of its duties". The grid owners "shall secure the capacity and interoperability of their networks" failing which the TSO may ask ElCom to "take the necessary measures at the (owners) cost".

*4. Electricity Commission*

Article 20 : *Establishment of an independent Electricity Commission (ElCom)*: "The Federal Council shall appoint an Electricity Commission (ElCom) made up of five to seven members (commissioners), and shall designate its president and vice president. All members shall be independent experts." "The resolutions of the ElCom shall not be subject to any directives of the Federal Council and the Department of the Environment, Transport, Energy and Communications (DETEC). It shall be independent of the administrative authorities and operate its own secretariat." "For the purpose of enforcing the Electricity Act, the ElCom may call on the Swiss Federal Office of Energy (SFOE) and issue it with directives". "The ElCom shall draw up a set of regulations governing its structure and management. These regulations require the approval of the Federal Council." "The costs of the ElCom shall be covered by administration fees. The Federal Council shall regulate this process."

Article 21: *Duties of ElCom*: Regulation. To ensure that "the provisions of this Act are complied with…"and "to take decisions and pronounce rulings that may be required for enforcement." Particular responsibilities are for (1) resolution of disputes over network access and charges, and electricity tariffs, including "provisional rulings" on access (2) examination of network use remuneration and charges, and electricity tariffs, for which it may order reductions or prohibit increases (3) decisions regarding the use of revenue from capacity allocation under congestion. Monitoring. Monitoring role over the electricity market to ensure "a secure and economical supply in all parts of the country". May propose measures to the Federal Council if supply is threatened. Represents Switzerland abroad. Must inform the public about its activities and submit an annual report to the Federal Council.

*5. International agreements*

Article 22: Powers to the Federal Council to conclude international agreements within the scope of the Act.

*6. Reporting obligations, official and business secrecy, supervisory fee*

Article 23: *Information and access obligation on companies*: Companies must provide "relevant authorities" with information needed for enforcement of the Act and grant access to their premises. Obligation on Federal and cantonal authorities to co-operate in "clarifications" by ElCom.

Article 24: Official and business secrecy.

Article 25: Data protection.

Article 26: *Supervision fee*: "The Federal Council shall collect an annual fee from the TSO to cover the costs of supervisory activities of the ElCom and the SFOE that are not covered by other fees". The fee may be recovered by the TSO via network use remuneration. The Federal Council specifies the amount.

Article 27: *Provision for fines:* Fines of up to CHF 100 000 may be applied if price benefits are not passed on (Article 6), activities are not unbundled as required (Article 10), costs for network use are not clearly shown or wrongly charged (Article 12), TPA is illegally denied (Article 13), or information requested is not supplied (Article 23). Negligence is also punishable by a fine. The SFOE shall prosecute and judge infringements in accordance with the Federal Penal Code.

Article 28: *Enforcement of the Act*: Federal Council specifies necessary provisions for enforcement of the Act, and may delegate "formulation of technical and/or administrative provisions" to the SFOE. It may call on private sector organisations to assist with enforcement.

Article 29: Amendments to existing legislation.

Article 30: *Consumer choice*: A two phase market opening is proposed. In the first five years after enactment of the LEPS, all households will remain captive customers with regulated end use tariffs. Five years after enactment and subject to an optional referendum, households will be free to opt between staying with their existing supplier or choosing another supplier.

***Amendment to 1902 Law on Electricity (LE)***

The amendments cover the transition until 2007, the date at which the LEPS is scheduled to be enacted. They establish the independent TSO and set out its transitional responsibilities (Articles 18a-f) as well as the independent regulator ElCom and its responsibilities (Article 18g and h). Their tasks and obligations are provisionally limited to cross border trade. It also provides the Federal Council with authority to conclude international agreements (Article 18i), for the provision of company information (Article 18k) and for sanctions for non compliance (Article 55 Para 1bis). The amendments will be transposed into the new LEPS (Articles 20 and 21) on its enactment, at the same time as the tasks and obligations of ElCom and the TSO are expanded to the domestic market. The amendments are subject to an optional referendum, and would remain in effect until the LEPS is enacted or until 31 December 2008 at the latest.

***Amendments to 1998 Energy Law***

Article 7a: *Objectives and voluntary measures for the production of electricity from renewable energy sources*: Sets a target for the share of renewable energy sources from electricity production to end use consumption to rise to 77% by 2030. This may take account of renewable energy generated outside the country. The production of electricity from existing hydropower plants shall be maintained "at least at the level recorded in 2000". The costs incurred by network operators in relation to renewables, that cannot be recovered via market prices, may be financed by a surcharge on transmission costs. The DETEC may, after consulting the cantons, conclude agreements with trade and industry groups for the development and implementation of tender programmes. The Federal Council specifies the stages in which objectives are to be met, and reviews the situation every five years. It may order further measures (see Articles 7b and 7c) if the staged objectives are not being met, taking account of international trends.

Article 7b: *Quotas and certificates for increasing the production of electricity from renewable energy sources*: Suppliers to end users must supply their customers "with a minimum quantity of electricity generated from renewable sources", this minimum to be specified by the Federal Council. Suppliers that deliver more than the minimum can have the extra recorded in a certificate. Those that fail to deliver the minimum must purchase certificates. The certificates trading procedure is regulated by the Federal Council.

Article 7c: *Feed in tariff for increasing the production of electricity from renewable energy sources*: Network operators are obliged to accept all electricity from producers "that is generated via new facilities through the use of solar energy, geothermal energy, wind energy or biomass and to remunerate these producers". Remuneration is based on the acquisition costs of reference production plants. The Federal Council regulates the procedure. To finance the costs incurred which cannot be offset by market prices, network operators may "impose a surcharge on transmission costs".

## ANNEX 3: EU MARKET OPENING DIRECTIVE

**Directive 2003/54/EC on establishing common rules for the internal market in electricity**

The Directive, adopted in June 2003 for implementation by member states into their national laws by July 2004, replaces an earlier 1996 Directive which had started the process of opening the EU electricity market. It takes the process further, notably as regards full market opening (choice of supplier for all consumers by 2007), the conditions for achieving this such as the establishment of independent transmission system operators (TSOs) responsible for system operation and reliability over the long as well as the short term, and principles for the management of public service obligations.

The preamble to the Directive notes that experience since 1996 underlines the need for stronger provisions to ensure a level playing field in generation and to reduce the risks of market dominance and predatory behaviour, as well as the need for *ex ante* transmission regulation, but also the need to protect the rights of small and vulnerable consumers. It underlines the importance of effective independent regulators, with the competence to fix or approve transmission tariffs, or at least methodologies for the calculation of tariffs.

*Key articles:*

*Article 3: Public service obligations and customer protection:* Defines what may be covered by public service obligations (security, social and environmental), which shall be "clearly defined, transparent, non discriminatory, verifiable and shall guarantee equality of access for EU electricity companies to national consumers". Measures to promote security of supply, economic and social cohesion, and environmental protection must be taken. Obligation to ensure that electricity suppliers specify information on energy sources in bills.

A separate provision requires member states to ensure "universal service" for all household customers (and small companies if desired), defined as the "right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable and transparent prices". To this end a supplier of last resort may be appointed. The article also makes reference to the needs of vulnerable customers such as those in remote areas, and the need to ensure that customers can actually switch supplier.

Member states are required to establish third party access to distribution grids.

*Derogation provision.*

*Article 4: Security of supply*: Requirement to monitor security of supply, which may be delegated to the regulator. To cover the supply/demand balance on the national market, level of expected future demand, plans for additional capacity, network maintenance, and provisions to cover peak demand and shortfalls.

*Articles 6 and 7: Generation capacity*: Requires the adoption of an authorization procedure for new capacity, based on objective, transparent and non discriminatory criteria, to be made public. Should this not prove adequate to support security of supply, environmental protection or the promotion of new technologies, there is provision for a possible tendering procedure, based on published criteria, for which the regulator or another independent body designated by the member state is responsible.

*Articles 8 -12:* Transmission System Operators:

*TSO responsibilities*: A TSO (or TSOs) shall be designated. The TSO is responsible for (1) ensuring that the system is able to meet long term demand (2) ensuring security of supply (adequate transmission capacity and system reliability (3) managing energy flows in the context of exchanges with other systems, including ensuring the availability of ancillary services (4) providing adequate information to other TSOs (5) ensuring non discrimination between system users.

*TSO independence and unbundling*: A TSO which is part of a vertically integrated utility must be independent "at least in terms of its legal form, organization and decision making" from the other activities which are not related to transmission. Specific *de minimis* requirements underpin this independence: (1) TSO managers cannot at the same time be part of the day to day management of generation, distribution and supply (2) TSO managers' professional interests must not be allowed to interfere with their independence (3) a TSO must have "effective decision making rights, independent of the integrated (utility), with respect to assets necessary to operate, maintain or develop the network" (4) a TSO must set up a compliance programme to exclude discriminatory conduct.

*Dispatch and system balancing*: TSOs are responsible for this- if they have this function and without prejudice to contractual supply obligations including those arising from a tendering procedure (see Article 6 and 7). Dispatch of generators and the use of interconnectors must follow objective criteria, and be non discriminatory and transparent. Priority may be given to renewable sources or CHP in dispatch. Indigenous sources- but no more than 15% of the total- may be given preference for security of supply reasons. TSOs' procurement of energy to cover losses and reserve capacity, and their rules for system balancing (including cost reflective user charges) shall be objective, transparent and non discriminatory.

*Articles 13-17:* Distribution system operators:

*Distribution operator responsibilities*: One or more distribution operators shall be designated, for a period of time to be determined by member states having regard to considerations of efficiency and economic balance. Their tasks are defined as: maintenance of a secure, reliable and efficient electricity distribution system (with due regard for the environment); no discrimination between system users, especially in favour of related undertakings; provision of information needed by system users; possible requirement to give priority in dispatch to renewables or waste or CHP; non discriminatory, transparent and market based procurement of reserve energy (without prejudice to pre January 2002 contracts); (if responsible for system balancing) application of objective, transparent and non discriminatory rules approved by the regulator; consideration of energy efficiency and demand side measures and/or distributed generation instead of capacity expansion when planning system development.

*Unbundling:* Independence at least in terms of legal form, organization and decision making from other activities not relating to distribution (but no obligation for divestiture of ownership). Minimum criteria: distribution management not to participate in company structures of the integrated company; measures to be taken to ensure that professional interests are taken into account in order to ensure independence; effective decision making rights independent of the integrated company for assets needed to operate, maintain or develop the network, although co-ordination mechanisms are allowed in order to respect the parent company's rights such as return on assets, including parent approval of financial plan and indebtedness (stopping short of parent involvement in day to day operations); compliance plan on measures to prevent discriminatory conduct, and annual report on this to the regulator. Derogation possible for distribution companies serving less than 100 000 connected customers or small isolated systems. Confidentiality provision. Combined transmission/distribution operator possible, under the same conditions.

*Articles 18-19: Unbundling of accounts*: right of access by member state or regulator to accounts. Electricity undertakings, whatever their legal form or system of ownership, shall draw up, submit to audit and publish annual accounts in accordance with national and EU law. Separate accounts to be kept for transmission and distribution, as if these were carried out by separate undertakings, in order to avoid discrimination, cross subsidization and distortion of competition. Accounts also to be kept for other electricity activities. Revenue from ownership of distribution/transmission to be specified in the accounts. Audit to pay special attention to discrimination issues.

*Article 20: Third party access to the transmission and distribution systems*: Member states to ensure implementation of third party access based on published tariffs, applied objectively and without discrimination between system users. Tariffs or methodologies underlying their calculation subject to prior approval and to be published. Access may be refused where an operator lacks capacity. Refusal must be substantiated, with special regard to Article 3.

*Article 21: Market opening and reciprocity*: Until July 2004, eligible customers are as specified in 1996 Directive; from July 2004, all non household customers; and from July 2007, all customers. Contracts for the supply of electricity with an eligible customer in another member state shall not be prohibited if the customer is considered eligible in both systems. If such transactions are refused because the customer is eligible only in one system, Commission may (taking into account the market situation and the common interest) oblige the refusing party to allow the supply at the request of the member state where the eligible customer is located.

*Article 22: Direct (merchant) lines*: Measures must be in place to enable electricity producers and supply companies to supply their own premises, subsidiaries and eligible customers through a direct line, and for eligible customers to be supplied through a direct line.

*Article 23: Regulatory authorities*: Member states shall designate one or more competent bodies with the function of regulatory authorities. They shall be wholly independent from the interests of the electricity industry. They shall at least be responsible for ensuring non discrimination, effective competition and the efficient functioning of the market.

Monitoring responsibilities: rules on management and allocation of interconnection capacity; any mechanisms to deal with congested capacity within the national system; time for transmission and distribution companies to make connections and repairs; publication of information by transmission and distribution operators on interconnectors, grid usage and capacity allocation; effective unbundling of accounts (see Article 19); terms, conditions and tariffs for connecting new producers so as to secure non discrimination, especially as regards renewables; fulfillment of operators tasks under Articles 9 and 14; level of transparency and competition. Regulators shall publish an annual report on monitoring.

Tariff responsibilities: Responsibility for fixing or approving, prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for (1) connection and access to national networks, including transmission and distribution tariffs, allowing for adequate investment (2) provision of balancing services. Member states may nonetheless provide for the regulators to submit tariffs or methodologies for approval. The regulators' proposals and any rejection of these (together with a justification) must be published. Authority to require operators to modify terms and conditions, tariffs, rules, mechanisms and methodologies to ensure non discrimination. Complaints to be referred to the regulator which, acting as a dispute settlement authority, shall issue a decision within two months. Decision to have binding effect unless overruled on appeal. Complaints shall not have suspensory effect pending the decision. Member states shall ensure that the regulator can carry out duties in "an efficient and expeditious manner".

Abuse of dominance: Member states shall create appropriate and efficient mechanisms for regulation, control and transparency so as to avoid any abuse of a dominant position, in particular to the detriment of consumers, and any predatory behaviour. Member states shall provide the Commission with an annual report on these issues, which will also review changing ownership patterns.

Cross border disputes: The deciding regulator shall be the one which has jurisdiction in respect of the system operator which refuses use of or access to the system.

*Article 24*: *Crisis safeguards*: Member states may take temporary necessary measures in the event of a crisis.

*Article 25: Import monitoring*: Member states shall inform the Commission every three months of electricity imports over the previous three months, in terms of physical flows.

*Article 26: Derogations*: Member states can apply for derogations if they can show substantial problems for the operation of small isolated systems.

*Article 27*: *Review procedure*: If the report (Article 28) concludes that certain obligations are not proportionate to the objective pursued, member states may ask the Commission for an exemption.

*Article 28: Reporting*: The Commission shall monitor and review the application of the Directive and submit a progress report to the European Parliament and the Council before the end of the first year following its entry into force and then annually. The report shall cover: experience gained, and progress in establishing an internal market, including dominance issues; unbundling and tariffs; system capacity and security of supply; peak supply coverage; derogations; bilateral relations with third countries; further possible harmonization; energy labeling; and public service obligations (every two years). The Commission shall also forward a report to the EP and the Council by January 2006 on progress in: non discriminatory network access; effective regulation; development of interconnection infrastructure; benefits to SMEs and households; market openness including dominance issues; supplier switching; price developments; independence of system operators in integrated companies. It may submit proposals, especially to ensure the independence of distribution system operators, by July 2007, again with special reference to dominance problems.

**Annex 4: EU transit (cross border) Regulation**

**Regulation 1228/2003 EC on conditions for access to the network for cross border exchanges in electricity**

The Regulation, adopted in June 2003 (unlike directives which must be transposed into national laws, regulations have immediate and direct effect on member states), establishes a regulatory framework covering key issues for the efficient and reliable management of cross border electricity exchanges, notably TSO payments to each other, TSO charges to users and congestion management.

Key articles:

*Article 3: Intersystem TSO compensation*: TSOs shall receive compensation for costs incurred as a result of hosting cross border flows of electricity on their networks, to be paid by the operators of national transmission systems from which cross border flows originate and the systems where the flows end. Commission decides on amounts using Article 13 procedure (see later). Costs will be based on physical flows and calculated on the basis of long run average incremental costs.

*Article 4: Charges for access to the network*: Charges shall be transparent, reflect security needs, and reflect actual costs insofar as they correspond to those of an efficient equivalent operator. Producers and consumers may be charged for access, with the former paying proportionately less than the latter, subject to the need for efficient locational signals (including if possible at European level) and taking into account network losses, congestion and investment needs. Intersystem TSO payments shall also be taken into account.

*Article 5: Information on interconnection capacities*: TSOs shall put in place co-ordination and information exchange mechanisms to ensure network security under congestion. Safety standards to be made public and approved by the regulator. TSOs shall publish estimates of available transfer capacity for each day, and what has been reserved, as well as longer term estimates.

*Article 6: Congestion management*: Congestion shall be addressed with non discriminatory market based solutions which give efficient economic signals to the market participants and TSOs. Preferred solutions are non transaction based methods *i.e*. methods that do not involve choosing between rival contracts. Compensation mechanism for any curtailment of capacity allocation. Maximum cross border capacity must be made available, after allowing for security. Any unused capacity must be reattributed to the market in an open and non discriminatory way. Revenues from allocation shall be used to guarantee availability of allocated capacity, and/or for network interconnection investment, and/or as income for regulators to take into account in calculating network tariffs.

*Article 7*: *New interconnectors*: New direct current interconnectors may be exempted from Article 6 provisions, subject to a number of conditions including: the investment enhances competition, the risk is such that the investment would not otherwise take place, the investment is carried by an entity legally separate from the relevant TSO systems, and charges are levied on users of the interconnector. An exemption decision shall be taken after consultation with other regulators and shall be notified to the Commission and published. Withdrawal of the exemption may be requested, and if refused the Article 13 procedure applies.

*Article 8: Guidelines on the management and allocation of available transfer capacity*: Commission may adopt and amend guidelines on compensation for cross border flows, and rules aimed at a progressive harmonization of principles for producer/consumer charging, including provision for locational signals at European level, using Article 13 procedure. Guidelines shall specify procedures for determining which TSOs are liable to pay compensation, details of payment, details of methodologies etc.

*Article 9: Regulatory authorities*: Regulatory authorities (as defined in the 2003 Directive) shall ensure compliance with the regulation and guidelines.

*Article 10: Provision of information*: Member states and regulators shall provide the Commission with relevant information on request, including information on costs incurred by TSOs.

*Article 12: Penalties*: member states shall lay down penalties for infringement of the regulation and ensure compliance. Provisions for this to be notified to the Commission. Commission may impose fines not exceeding 1% of turnover if information supplied under Article 10 is wrong.

*Article 13: Committee*: Establishment of a "regulatory" committee to assist the Commission (see references in other Articles).[90]

*Article 14: Commission report*: The Commission shall monitor the implementation of the regulation and prepare a report no more than three years after its entry into force (*i.e*. by June 2006). The report shall examine the regulation's success and may contain further proposals.

***Guidelines on the management and allocation of available transfer capacity of interconnections between national systems*:**

*General*: Congestion management methods shall deal with short run congestion in a market based, economically efficient manner and at the same time provide signals for efficient network and generation investment in the right places. TSOs shall set up and explain publicly their standards for congestion management. Different treatments for congestion management shall be kept to a minimum. Price signals shall be directional. TSOs shall offer the market "firm" capacity as far as possible. Regulators shall ensure that no unilateral procedure is deployed that adversely affects power flows.

*Long term contracts*: Existing long term contracts shall have no preemption rights when they come up for renewal.

*Information*: TSOs shall implement co-ordination and information exchange mechanisms to guarantee security. They shall publish all relevant data relating to cross border transfer capacities, with estimates daily as well as week ahead and month ahead forecasts. They shall publish a scheme for calculation of total transfer capacity and the transmission reliability margin, approved by their regulator.

*Principles for congestion management*: Network congestion problems shall be solved preferably with non transaction based methods. Cross border co-ordinated redispatching or counter trading may be used jointly by TSOs concerned, so long as costs are efficient. The possible merits of a combination of market splitting or other market based mechanisms for solving permanent congestion and counter trading for solving temporary congestion shall be immediately explored as a more enduring approach to congestion management.

*Auction guidelines*: Auction systems must be designed so as to ensure that all available capacity is offered, via a composite auction in which capacities are auctioned for differing durations and with different characteristics (*e.g*. reliability of the capacity). Total capacity shall be offered in a series of auctions. Explicit auction procedures shall be prepared in close collaboration between the regulator and the TSO and designed so as to allow bidders to participate as well in daily sessions of any organized market (i.e. power exchange). Power flows in both directions over congested tie lines shall be netted so as to maximize the transport capacity in the direction of the congestion. Financial risks related to netting shall be attributed to the parties causing the risks. Any auction procedure shall be capable of sending directional price signals. In order to minimize potential problems of market power, regulators should seriously consider capping the amount of capacity that can be acquired by a single market participant. To promote the creation of liquid electricity markets, capacity bought at an auction shall be freely tradeable until the TSO is notified that the capacity will be used.

Notes

1. Vaterlaus, Stephan, Worm, Heike, Wild, Jörg, Telser, Harald (2003) Liberalisierung und Performance in Netzsektoren. Vergleich der Libaralisierungsart von einzelnen Netzsektoren und deren Preis-Leistungsentwicklung in ausgewählten Ländern Strukturberichterstattung Nr. 22, State Secretariat for Economic Affairs (SECO), 2003, Bern. Summarised in La Vie Economique, July 2003, Bern.

2. This contrasts with some other European countries that had a pre reform starting point of a single vertically integrated monopoly utility. The Swiss industry structure is one of the most fragmented in the OECD. It has a high density of companies relative to its size, both geographically and in population terms.

3. A precise number does not seem to exist. Nor is there any wholly satisfactory description of the sector's admittedly complicated structure.

4. Axpo is a holding company. There are seven companies if Axpo's three main shareholders- CKW, EGL and NOK- are counted individually.

5. They are not among the largest European generators in terms of generation. The two largest Swiss companies (Atel and Axpo) are not much more than half the size of EnBW, and considerably smaller still than RWE, E.On, ENEL and EdF (the largest of them all by far). They are larger in terms of sales (but still not the largest).

6. A form of co ownership established to share the costs and risks of long term investment in these plants.

7 Which totals some CHF 5.6 billion.

8. There are no legal restrictions on foreign ownership of Swiss electricity assets, except for a provision in the draft Electricity Supply Law (Article 18) that the TSO must be majority Swiss owned. Foreign ownership of nuclear power plants, through a Swiss-registered subsidiary, is permitted (Article 13.2. of the Nuclear Energy Law).

9. At present, the main equity holdings are: EdF indirectly (through Motor Columbus) owns 11.7% of Atel; E.On holds 20% of BKW; EnBW fully owns Swiss-based EnAlpin (300 MW hydropower, former autoproducer of Swiss aluminium and chemical industries).

10. Atel has acquired generation capacity in Italy (20% of Edipower's 7000 MW), Hungary (505 MW), Czech Republic (344 MW) and is building 150 MW of new capacity in Italy. EGL has three CCGT projects totalling 2300 MW in Italy (construction of the first one began in November 2004, two others have been approved) and is a junior partner in a fourth, 760 MW CCGT project. It acquired 35% of Norwegian windpower developer Norsk Miljøkraft in 2004, and is studying IPP projects in Spain. The other large companies have opened trading subsidiaries in European countries. Rätia Energie, a small company in eastern Switzerland, acquired a 90% stake in Milan based SET to build a 400 MW CCGT plant in southern Italy. BKW is considering acquiring stakes in Italian production capacity.

11. Preliminary agreement has been reached which could lead to a Atel-EOS merger, with BKW staying on the sidelines (August 2005).

12. The Swiss Electricity Suppliers Association (VSE) estimates that a further 300 mergers might take place in the coming 5-10 years, because many remaining small companies do not have the critical mass to survive.

13. Axpo was formed as a holding company for three large utilities.

14. The Swisspower partnership brings together entities that between them own grid and generation assets, so that the partners can extend their sales beyond traditional areas. The sales pitch is aimed especially at SMEs and multisite service companies such as banks and supermarkets; the market for large industrial

clients is considered to have been captured by the *Uberlandwerke*. Swisspower claims that it now covers some 20% of the Swiss market (in terms of KWh).

15. Between 1990 and 2001 its share varied between 51% and 60% of annual total generation.

16. A hydro plant which can "store" electricity, or rather, the potential for generating electricity at some later time. During periods of low electricity consumption, water is pumped from a low lying reservoir to a higher one. The water from the higher reservoir is then used to generate electricity during peak consumption periods.

18. Production from new renewables (ie excluding large hydro) accounts for just 1.64% of total production, of which solar accounts for 0.03% and wind 0.01% (2004 figures).

19. Atel 18.81%, BKW 11.54%, CKW 5.05%, EGL 13.18%, EWZ 12.85%, EOS 14.47%, NOK 24.1%.

20. "Comptabilité analytique".

21. "Membres du Conseil d'Administration et de la Direction".

22. 700 MW were added in 2002.

23. In 2003, a second 380 kV line between the Gosgen and Mettlen substations went into service, alleviating an important north-south line which had been chronically overloaded. Other projects have failed to materialise: the planned Verbois-Galmiz 380 kV line connecting western and central Switzerland was abandoned because of environmental opposition.

24. Congestion is especially likely in periods of high load across the UCTE area which creates strong east-west loop flows. This illustrates the extent to which Switzerland is meshed in with the European grid system and cannot avoid the consequences that arise from the physical flows of electricity, which always takes the path of least resistance.

25. Transit is where the nominated path for an export transaction involves a country in which neither the dispatch (export) nor the corresponding uptake (import) of the electricity will take place. Export means the dispatch of electricity in one country on the basis of a contractual arrangement to the effect that the import takes place in another country.

26. Italian imports cover some 15% of Italian consumption, and half of these imports come from Switzerland.

27. The deficit has been slowly growing over the years. In 1960/61 winter consumption accounted for 49.5% of annual total consumption, and this had risen to 54% by 2002/03.

28. Rising demand and reduced hydropower production during the hydrological year 2004 (1 October 2003-30 September 2004) made Switzerland a (small) net importer for the first time since 1971/72.

29. Cross border flows are physical flows of electricity on a country's transmission network that result from the activities of producers and/or consumers outside that country.

30. Congestion is a situation in which an interconnection linking national transmission networks cannot accommodate all physical flows resulting from international trade requested by market participants, because of a lack of capacity of the interconnectors and/or the national transmission systems. Congestion management is the process of managing the use of the transmission system so that transmission capacity constraints are not violated.

31. The supply of electricity to customers off the low voltage distribution grid. This mainly means households, and small to medium sized industry and service companies.

32. From some 28.9 TWh in 1975 to 56.2 TWh in 2004.

33. These projections are currently being updated.

34. The reason for higher demand with a CO2 tax is the expectation that the latter would encourage "electrification" of activities currently powered directly by fossil fuels, such as a move from oil heating to electric heat pumps.

35. The cantons are closely associated with the legislative process. There is an intensive and permanent dialogue with the Federal government. The cantons have seats in the second chamber of Parliament and participate in expert groups for law preparation. They are also important partners in the consultation process which precedes the adoption of a new law.

36. Electricity is included in the Schedule of Commitments to the GATT 1994 of most of the major trading partners (including the US, Canada and the EU, but not Japan or Mexico). But these rules have received little attention until recently, and are complicated by the fact that electricity may be considered to be either a good or a service, depending on the issue. Discussions of trade in electricity have recently been revived in the framework of the WTO services negotiations. This started with the GATS 2000 negotiations and has continued in the ongoing Doha round. The discussions address the services aspects of electricity trade, such as the definition of the scope and classification of energy services and network access, as well as give and take negotiations on specific commitments for market access and National Treatment (NT), but not the treatment of the import and export of electricity, which remains under the GATT and other goods agreements of the WTO.

37. Article 7(3) of the Treaty covers transit and requires National Treatment (NT). It therefore goes beyond GATT Art. V, which only requires Most Favoured Nation treatment (MFN). NT implies that the electricity of other Charter signatories in transit through Switzerland must be treated at least as favourably as Swiss electricity in domestic transport; and that Swiss electricity must, likewise, be treated at least as favourably as domestic electricity when transiting through the territory of other Charter signatories.

38. To put this into perspective in the context of market reforms elsewhere in Europe, the first EU market opening Directive was adopted in 1996, two years before the Swiss Energy Law. However it is not quite true that there is no market opening legislation across the Swiss energy sector as a whole. The 1963 Law on Oil and Gas pipelines mandates third party access to the pipelines. But, as its name implies, it is not directly relevant to electricity.

39. See also Chapter 3 on competition policy.

40. It would have to be brought as a business case and no domestic Swiss company appears willing to do so. It would be interesting to have the case brought by a foreign company, as this would test whether the law treats foreign companies the same as domestic companies.

41. The latest development is the suspension by the constitutional court of the canton of Vaud of the canton's decree setting up a legal monopoly.

42. No aggregate study or source of information appears to be available on cantonal and municipal regulations and taxes.

43. The market price is calculated as follows. It is the power tariff of the supplier who buys the electricity from the independent power producers, or the average power tariff in the canton if a power tariff does not exist. Adjustments are made for system prices (13% reduction) and time of year is taken into account. The price

reflects the average price for the whole year (avoided costs) rather than marginal costs as applied to renewables.

44. Swiss Departments have a very broad range of responsibilities compared to many other OECD countries and the system of Offices within a Department partly reflects the need to delegate and distribute responsibilities.

45. This contrasts with virtually all other OECD countries.

46. A regulator can certainly expect to be challenged in the courts, but once the latter have settled an important test case, it is likely that later cases will be simpler to handle. Under the competition law every case risks being a complicated one.

47. The study referred to in footnote one compared Swiss prices with those of selected other European countries. It shows that overall, both industry and households have been paying well above the average of the other countries in the period since 1990 (some 50-70% above the average for industry, and 25-30% for households). *Vie economique*, July 2003.

48. The anticipated adoption of the first electricity reform law led to a spate of price discounts, as companies sought to retain the loyalty of their customers and in some cases, win over new customers (testing the feasibility of third party access to the grid in the process). Some of the new supply contracts were subject to adoption of the law, and some are currently being renegotiated. Some 20-25% of the market may be covered by these contracts.

49. EOS was an exception: it could not afford discounts, because it had contracted a large debt for its 1200MW Cleuson-Dixence/Bieudron project.

50. No aggregate picture of these taxes and charges appears to have been compiled.

51. The cantons that decide not to exploit their hydro power capacity for environmental protection reasons are paid CHF 1 per KW by the confederation annually (to finance these payments the Federal government is entitled to a quota of the water royalties from the cantons).

52. The Swiss definition (Federal Council message to Parliament accompanying the draft electricity reform package) is the “desired quantity of energy is available in the entire network at the desired quality and at acceptable prices”. This is both a more general definition, and a tighter one in that it covers prices.

53. The Swiss capacity reserve margin (generation capacity above peak load) is over 40%, due largely to the significant hydro power element of its generation mix. It is not therefore an issue.

54. See also part two on the European dimension which considers the Italian blackout and system reliability from a broader European perspective.

55. Not a complete exclusion however: the report later notes that the Swiss authorities have been almost entirely excluded from the allocation procedure, but that “the proprietors of Switzerland’s transmission network have been included in the negotiation process to date”.

56. See ETSO (*http://etso-net.org/*) and EFET (*www.efet.org/*) papers on their websites..

57. For example the German TSOs have been carrying out capacity auctions at the Swiss border which have sent unplanned power flows into the Swiss system, possibly in retaliation at unfriendly Swiss proposals for capacity allocation.

58. Additional generation – but not actually new capacity – is expected in the coming years when repairs of the 1200 MW Cleuson-Dixence-Bieudron hydropower plant will be completed.

59. A Directive sets out provisions which must then be transposed into the national laws of EU member states. A Regulation has direct legal application in member states.

60. Congestion management is covered under market opening, partly because the main thrust of EU legislation so far has been to improve the commercial conditions for increased trade. But its effective management is also essential for the maintenance of system reliability.

61. The interdependence of different infrastructures was also brought to the fore by the crisis. The report notes that the outage of a telecoms network in Italy at the same time as the blackout meant that "parts of the system lost visibility" and data was lost. This slowed restoration time.

62. Market liberalisation is not the problem. Institutional and regulatory frameworks have failed to keep up with the new market conditions.

63. National grid codes started to emerge following the first EU market opening Directive in 1996: a set of rules, usually legally enforceable, which sets out the rights and obligations of grid users vis a vis system operators.

64. UCTE Italian blackout report.

65. The committee of experts was appointed by the Department of Environment, Transport, Energy and Communications (DETEC) and tasked to redefine the legislation governing the sector, on which it worked for well over a year. Membership included companies (representing consumers as well as the supply side), associations of different interest groups, and government authorities at both federal and local level, as well as the competition authority among others. Between June and September 2004 the draft package which emerged from this process was submitted to cantons, political parties and associations, and 209 statements of position were received.

66. The right of third party access (and remuneration for network use) under the draft law would take precedence over the Cartel Law.

67. Germany provides an example of full market opening without any specific supporting institutional and regulatory framework (no sector specific regulator, and no regulated TPA). The experiment has been controversial- although prices fell immediately after market opening, subsequent industry mergers consolidated *de facto* monopolies- and Germany is currently in the process of establishing a regulator and regulated TPA. The EU itself is a different example of a process in which full consumer choice is being achieved in stages. The preamble to the 2003 Directive notes that " Electricity customers should be able to choose their supplier freely. Nonetheless a phased approach should be taken to completing the internal market for electricity to enable industry to adjust and ensure that adequate measures and systems are in place to protect the interests of customers and ensure they have a real and effective right to choose their supplier".

68. The fact that there are a large number of companies should not necessarily be a deterrent to the implementation of a stronger form of separation such as management separation. For both types of separation to be effective, effort and resources are needed. In the Swiss case, a further argument for a stronger form of separation is that cross shareholdings are complex and management or legal separation would put greater pressure on utilities to disaggregate what needs to be disaggregated. This will become all the more important if households do not acquire freedom of choice after five years.

69. A report on experience with the Recommendation will be available shortly.

70. As well as the fact that domestic system reliability is dependent on the goodwill of the grid owners in following Etrans instructions. There is the- admittedly remote- possibility for example that an urgent request by Etrans to a grid owner for permission to shut down its system in the interests of national system security (and hence create a blackout in that area), may be refused in the hope that the request will have to be picked up by another grid owner.

71. Switzerland may, for example be excluded along with other countries with an uncertain status in the EU club for these issues, such as Slovenia.

72. A striking example is noted by the SFOE in its report on the 2003 Italian blackout. The report states on page 10 (in the context of Swiss exports to Italy) that "The Swiss authorities have been almost entirely excluded from the procedure for allocating volumes of electricity exports to Italy: it is only the proprietors of Switzerland's transmission network who have been included in the negotiation process to date. One of the consequences was that regulators of Italy and France agreed on a capacity allocation in December 2001 without including Switzerland in the decision making process". The consequences were not only commercial- they were also, indirectly, part of the reason for the blackout.

73. See footnote 57.

74. This shared responsibility is not an issue in itself, as there is a significant grey zone between strategic regulation which merges into policy making on the one hand, and the more technical and implementation aspects of regulation.

75. The key specific tasks that are defined in LEPS Article 21 essentially cover network access and charges as well as security of supply. The French RTE is an example of clear oversight by the regulator: RTE's independence is "guaranteed" by the CRE.

76. RTE again provides an example of accountability which links the regulator and the TSO: RTE must account for its activities to the CRE.

77. This needs very careful handling given the market power of the grid owners, who could easily gain an advantage over competitors through the provision of reserve power. Balancing services in a competitive market should as far as possible be procured competitively.

78. Norway's Statnett is 100% state owned, as is France's RTE. England and Wales' National Grid Company is 100% privately owned. Spain's Red Eléctrica is a mix of public and private ownership.

79. The Federal Council explanations do imply the possibility of benchmarking. They mention the fact that costs will be measured in relation to the efficiency of network operations.

80. The Swiss traditionally associate two normally distinct concepts: public service (which they call basic supply) and security of supply. Basic supply is defined as the right on the part of consumers to be connected to the electricity network at appropriate prices.

81. "*Milices*" (militias) are derived from the approach taken for the military service, which relies on the contribution of each citizen (part time) in support of the wider public good. They can be likened to a form of self regulation. This approach has been more or less abandoned across the OECD for the regulation of the electricity (and gas) sectors at least. The last two OECD countries to have a form of self regulation were Germany and New Zealand. Both have now established a "proper" regulator. In the German case, industry association agreements for TPA are being replaced with an *ex ante* regulated access regime.

82. It does not have to be the lead ministry. Another option is to attach sector regulators to the Finance ministry. This can be especially helpful if a conflict of interest is likely between the government's ownership role and its regulatory oversight role, where the ownership responsibility is with the lead sectoral ministry. Countries vary in this regard.

83. Although this relates to the competition authorities and not the regulator, the German experience is instructive. The German *Lander* competition offices are active in the supervision of end user prices and implicitly transmission charges too. Given the regulatory powers of the cantons for price related issues, a bridge needs to be built between the new Federal regulator and the local level, to reinforce the effectiveness of pricing oversight.

84. The annual report of the UK's Ofgem includes a review of performance against targets.

85. If nuclear power is taken into account. This of course raises the question of the future prospects for nuclear power.

86. There are cost incentives attached to the feed in tariff approach, but not as strong as with quotas linked to trading. Under feed in tariffs, producers have a clear incentive to reduce costs below the tariff. But the incentive to reduce costs is stronger with quotas linked to trading, as a market in "green" certificates favours the most efficient suppliers *i.e.* goes further than promoting- and rewarding- individual efforts at efficiency. That said, either approach needs careful design, not just to bear down on short term costs, but also to help favour options with a long term potential which may be costly in the short term. Care also needs to be taken not to compromise existing renewables investments.

87. Under the United Nations Framework Convention on Climate Change (UNFCC), more than 180 countries have recognised the need to stabilise the concentration of greenhouse gases (GHG) in the atmosphere. In 1997, the Kyoto Protocol of the UNFCC set legally binding GHG reduction targets for a number of industrialised countries.

88. For example lessons may be learnt from the German experience which has led to the development of a large number of expensive and inefficient windmills.

89. The Federal Council message to Parliament notes "it will be possible to enter into negotiations with the EU regarding an agreement on cross border as soon as a probable date has been set for enactment of revised Act. The relevant directorates of the EU Commission (DGTREN and TRADE) do not yet have a formal negotiating mandate from the EU Council of Ministers either.

90. Under the EU comitology provisions, a committee of member states is often established to help the Commission in its tasks, notably the development of technical and other issues that are not spelt out in much detail in a directive. The regulatory form of committee puts more power in the hands of member states than other forms: if the committee fails to approve the Commission's proposals by a qualified majority, the proposals are referred to the Council.