

1 Year before the European Liberalization

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Thank you for inviting me here today.

I am Per Hallberg, Senior advisor for the Vattenfall company in Brussels, Belgium. I have worked for Vattenfall for more than 30 years. I have had several positions in our company, starting out in the nuclear sector during the 70's but during the last 10 years I have been foremost engaged in our merger and acquisition activities in Scandinavia and in continental Europe. For some years I was in charge of Vattenfalls network operations in Sweden. Since 1 year I have been taking care of our EU-matters in Brussels.

Vattenfall is a Swedish stately owned power company and we have grown significantly during the last 10 years and we are now present in all Scandinavian countries, Poland and Germany. We are the 5th largest power company in Europe.

In my talk I will cover the following topics:

Topics to be Covered

- Historical background
- European Commission Green Paper
- European Energy main organizations
- Stockholm example
- Wind power example
- Regulatory example
- Future network designs
- Conclusions

The European Union has this spring launched a comprehensive proposal to the MS regarding the future energy strategy for Europe. Before I get into the content of this proposal it is important to say a few words on why this strategy has been proposed. In a directive from 1996 the EU decided to open up and liberalize their national energy markets. The progress was slow.

....it all started....

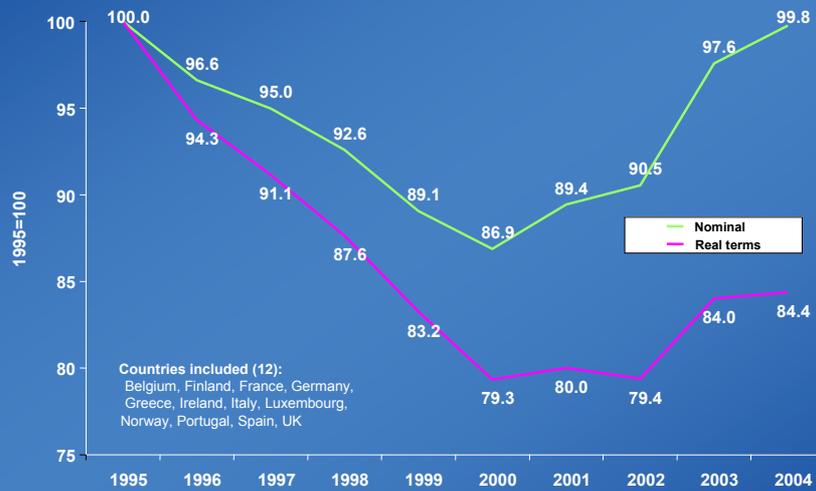
.... in Lisbon 2000/2001:

We want Europe to become the leading region in the world regarding economy and development.

A cornerstone in creating this is an Integrated Energy Market. Better competition creates lower prices to the society which creates higher employment and higher growth.....

In the year 2000 the head of states have gathered in Lisbon, Portugal, and they formulated a vision for Europe. Globalization is here to stay. Barriers of trade and competition-hindering laws are taken away. New continents and new countries are now competing with low costs and high quality. You could say that these new countries are now catching up with the advantages regarding technical solutions and market positioning that Europe has had for a long time. A lot of European companies are now moving their production to these new countries and unemployment is beginning to be a major problem in many countries. Something has to be done and in Lisbon the head of states agreed upon a vision that Europe has to fight for lower unemployment and higher growth rates. What is the tool? The answer is ONE EUROPEAN INTEGRATED ENERGY MARKET. This is a cornerstone in the build-up of a new and prosperous Europe. This vision was then followed by a directive from 2003, in which they say that a total deregulation is to be concluded in 2007. At that time all European customers in Europe are supposed to be free to choose their energy supplier. Transmission and distribution which are natural monopoly businesses are supposed to be legally separated from generation and sales in vertically integrated companies.

The Sector Inquiry....price development



The progress – as I said – has been quite slow. Meanwhile as you can see from this slide – electricity prices are boosting. The energy sector is hit by heavy criticism. Prices were supposed to fall...not rise! The EU commission recognizes this and starts a big survey on the functioning of the energy market and how companies are behaving.

More than 3000 inquiries were sent out to a wide range of stakeholders; governments, regulators, TSO's, power companies, big customers , organizations and so on. And for sure....there were answers.

The Sector Inquiry...

The report deals with both gas and electricity markets, and looks at impediments to competition under five main headings:

1. Market concentration
2. Vertical foreclosure
3. Lack of market integration
4. Lack of transparency
5. Price Issues

The Sector Inquiry was conducted during 2005 and a lot of countries were criticized which led the EU commission to warn countries and to make dawn raids against companies in order to prove that they are hindering effective and fair competition. On this slide you can see the areas in which the commission can see malfunctioning behavior. LÄS SNABBT !

In short, the Commission points out some reasons why:

- Existence of dominant integrated power companies
- Biased grid operators
- Lack of cross-border transmission links and low liquidity in the wholesale markets

Halfway....

Growth
Employment
Structural reforms
Energy prices
Deregulation of the electricity markets
The competitiveness to other regions

And...if this is not enough...on our way to this new fantastic Europe we can see that we are loosing speed; we still have a high degree of unemployment, we have low growth rates, higher energy prices than before and a generally bad speed in structural reforms needed for a better economy.

And – on top of all this – another incident occurs during Christmas time 2005 which is a dramatic blow against Europe: Russia – the new megapower country with respect to energy – is withdrawing substantial amounts of gas from Europe by an economical fight with Ukraine. In one blow this shows the vulnerability of the energy supply to Europe. Now....imagine how all this feels for Mr. Barosso, the president of the European commission. Nothing shows at this time that the Lisbon strategy is on its way to fulfillment and on top of all this we have got a serious matter in the supply situation.



European Energy and Network Policy

European Commission – DG Energy and Transport

Challenges

Increasing energy import dependence of EU from 50% →70% (2030)

Rising global demand (+50% by 2025) and volatile energy geopolitics

Diversification of energy mix

Continuing predominance of carbon/fossil fuels for foreseeable future

Waste and inefficiencies

Heads of State and Government have recognised the need for a coherent energy policy for Europe to respond to these challenges and have asked Commission to propose concrete measures (March 2006)

EURELECTRIC WG SYSTINT Meeting, 19 May 2006, Brussels

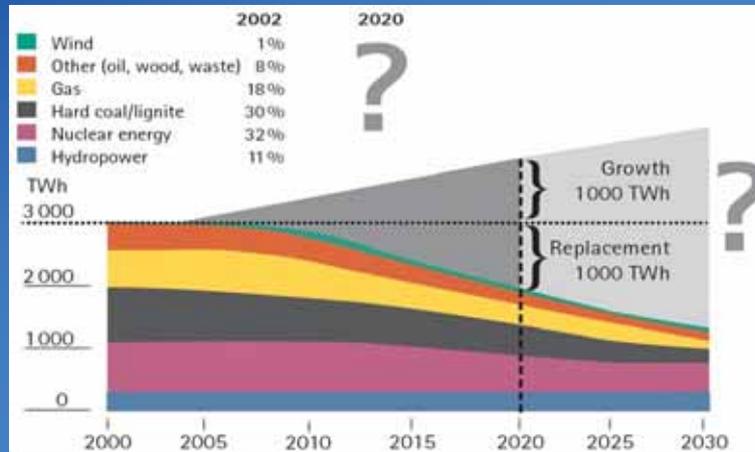
Regarding supply ... as you can see from this slide the EU import of energy, which today amounts to some 50% of our total consumption, will increase – if we don't do anything – to some 70% in 2030. Can we trust our import countries? I think that Mr. Barosso – as he sat by his Christmas tree in Brussels – sighed and said to himself: "We could have chosen an easier topic in which we could come together". Energy issues are – and may remain so – very complex and nationalistic in scope.

European Commission



The EU commission now realizes that there are a lot of things to be done and in March 2006 a "Green Paper on a European Strategy for secure, competitive and sustainable energy" was presented during the Brussels summit. This proposal is aiming at collecting all the energy issues on the agenda (renewables, internal energy market, energy efficiency, environmental issues and so on) to one coherent strategy in which all parts are linked together in a logical way. One strategy for Europe.

Electricity in the EU25...



Just to give you a picture on how much power we need up to the year 2020. We need 1000 TWh due to an overall increase in demand at about 2% per year. Furthermore there is a need for an additional amount of some 1000TWh due to the fact that old plants are shut down (nuclear, coal and so on). To give you a glimpse on how much these 2000 TWh are, I can mention that the Swedish consumption is about 150 TWh per year. Europe needs to get new capacity 14 times the Swedish consumption!!

And this has to be done in 14 years!! Quite a challenge!!

It is much too soon for me to give you my conclusions on the European future energy strategy, but one thing is quite obvious: In Europe we are - with some exceptions - reluctant to new nuclear power, we are terrified of the prospect of using more fossil fuel in our energy mixes and to make electricity of the water still running free in our rivers is out of question....so we have fallen into a gigantic trap here....we need cheap electricity in order to compete on the global marketand we don't know how to get it.

Common energy policy goals



The European energy policy should have three main objectives:

Sustainability (to meet the Kyoto protocol): Developing competitive renewable sources of energy and other low carbon energy sources and carriers (that brings us from a 6% level of renewable energy sources of today to 20% in 2020. Curbing energy demand within Europe (a 20% reduction to 2020 is mentioned) and leading global efforts to halt climate change . The ETS system –which is a price mechanism on CO₂ – has contributed to an increase in electricity prices of 20 - 25%. ...And a scary scenario; greenhouse gases have already made the globe 0.6 degrees warmer. If no action is taken there will be an increase of between 1.4 and 5.8 degrees by the end of this century. Imagine that...ladies and gentlemen.

Competitiveness: Ensuring that energy market opening brings benefits to consumers and to the economy as a whole and

Security of supply: Tackling the EU rising dependency on imported energy through diversifying the energy mix, stimulate adequate investments to meet growing demand, better equipping the EU to cope with emergencies and so on.

Green paper - 6 priority areas

- A fully competitive internal energy market
- Security of supply in the internal energy market
- A more sustainable, efficient and diverse energy mix
- An integrated approach to tackling climate change
- A strategic approach to innovation
- A coherent external energy policy

The Green Paper points at 6 priority areas:

1. In July 2007 every EU consumer will have the legal right to purchase electricity and gas from any supplier in the EU. I will come back to this point in a short while.

2. Liberalized and competitive markets help security of supply by sending the right investment signals to industry participants. But for this competition to work effectively the market needs to be transparent. How do we carry out solidarity in the energy market ?

3. Each country chooses its own energy mix. However, choices made by one member state have an impact on the security of its neighbors and on the EU as a whole. We therefore must agree on an overall strategic objective. This is indeed a hard topic and it could set the friendship on stake.

4. As I said before, effective action to address climate change is urgent and the EU must continue to lead by example and, above all, work towards the widest possible international action.

5. The development and deployment of new energy technologies is essential to deliver security of supply. We need to concentrate on research and development!!

6. The energy challenges facing Europe need a coherent external policy to enable Europe to play a more effective role in tackling common problems with energy partners worldwide. Here you can see the Ukrainian-Russian impact on Europe.

As you can see so far, the Green Paper is indeed ambitious and it needs the full commitment from all the member states. Can they cope with this challenge and where do we succeed...and where do we fail?



European Energy and Network Policy

European Commission – DG Energy and Transport

Green Paper includes ideas to improve EU networks

- **European Grid Code**
- **Priority Interconnection Plan** to stimulate investments
- **Better information exchange** between Transmission System Operators
- **Common standards** to protect key infrastructure
- **Improve framework** for use of **TEN-E funds**
- **Consider priorities** for upgrading and improving **import infrastructure**

Consultation open until 24 September 2006 on DG TREN website

http://europa.eu.int/comm/energy/green-paper-energy/index_en.htm

EURELECTRIC WG SYSTINT Meeting, 19 May 2006, Brussels

Now let's dig a little deeper into the network businesses: Massive investments in new generation capacity will subsequently be followed by a massive need in transmission and distribution lines. Yes, this is true. But there is another aspect of this ... to create one single market with electricity flowing "free" cross any border in Europe demands massive investments in cross-border lines. As we know this we also can see the difficulties; different countries have its own standards, tariffs, technical set-ups, support schemes and so on. There is no doubt that we need a strong harmonization all along Europe in these matters...I said that previously. The Green Paper recognizes this.

A priority interconnection plan is supposed to stimulate investments within the national grids that are necessary to increase the cross-border flow of power. The existing goal that says that every country should strive for a 10% export potential in their grids are not fulfilled yet ... indeed some countries are far below this goal and the EU recognizes this as a crucial success factor. The launching of a priority plan does not boost investments in themselves, but their aim is to try to get the countries to realize the importance and that way encourage the countries to speed up licensing or concession activities. As I spoke to an official within the EU some weeks ago he said that this plan will include some 40 interconnection lines which is a dramatic increase since the previous plan.

In short, we need a European Grid Code for harmonization of the rules. We need common standards.

And we do need to invest some 500 billion euros in Transmission and Distribution ... so the principles need to be decided quickly.

This is the EU Green Paper launched this spring. Now we are waiting for the outcome ... we know this by Christmas and we can expect a third directive during next year.



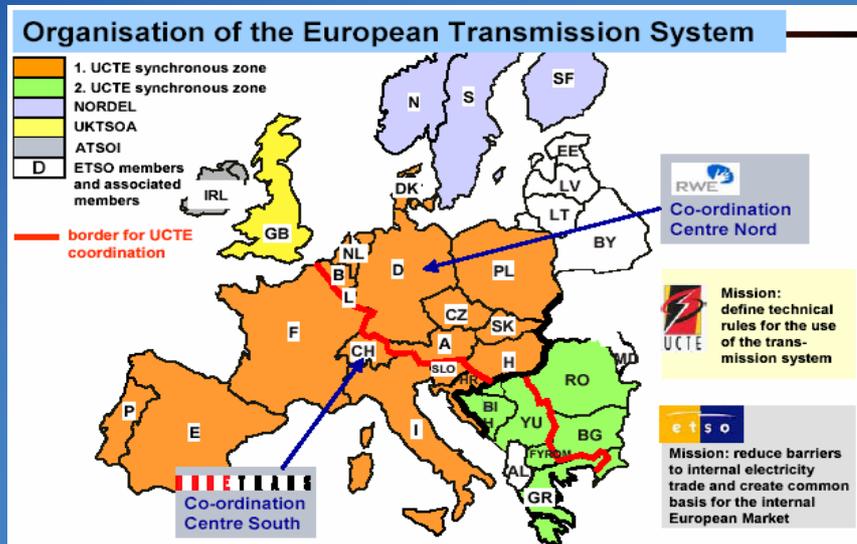
Union of the Coordination of the
Transmission Operators



European Transmission
System Operators

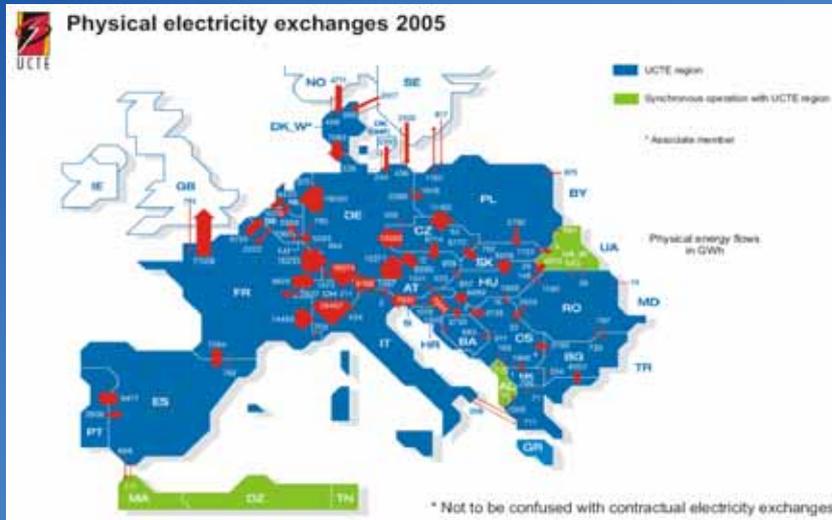
Now let's look a while on some important European energy organizations: Union of the Coordination of Transmission of Electricity coordinates the operation and development of the electricity transmission grid from Portugal to Poland and from the Netherlands to Romania and Greece. They operate in 23 countries and they provide a reliable technical platform to all participants of the new market. Over more than 50 years UCTE has been issuing all technical standards indispensable for a coordination of the international operation of high voltage grids which are working at one "heart beat" – 50 Hz UCTE frequency related to the nominal balance between offer and demand.

The European grid



The ETSO is a cooperation body which aims at being the lobby organization for the TSO's in political and economical matters. ETSO works closely with the EU departments in Brussels and they are very active in trying to set the principles for the TSO's in a future integrated and free energy market within Europe.

The European grid



The transmission of power between the countries in Europe is extensive. In the year 2005 we exported some 290 TWh between one country to another. We can see an annual increase in these volumes but according to the EU the levels are too low and the pace in the increase is too low. From a Green Paper perspective you can note that in order to create ONE single energy market in Europe, the export volumes have to increase significantly. If you can establish this you do not only contribute to the dream of one single market but you also create trust to the price settings for the different power exchanges. Today, trust is lacking from the European industry side to the price setting mechanisms

Conclusions regarding transmission

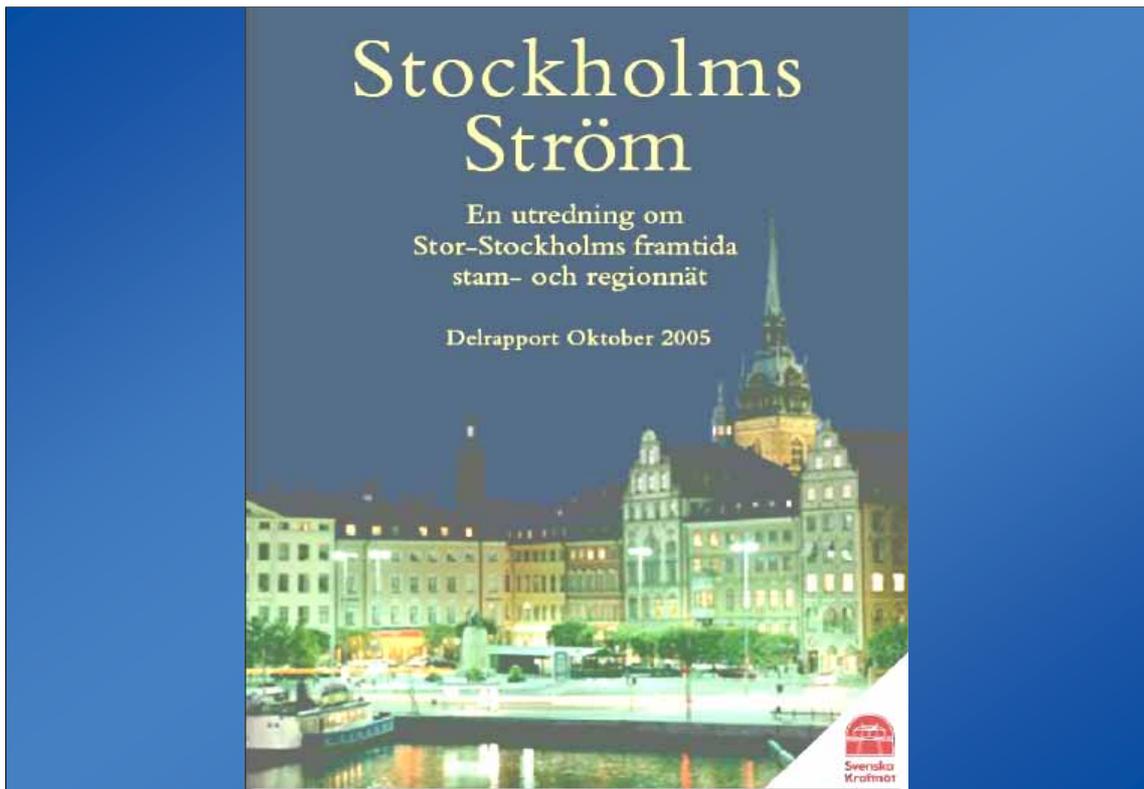
1. A dramatic increase in cross-border investments
2. Harmonization is crucial
3. Transparency is needed
4. Ownership unbundling could become reality

1 A dramatic increase in cross-border investments, transmission and distribution

2 A clear harmonization of rules and standards is crucial. It is not the technical rules, I mean here, but issues like tariffs, cross-border fees, support incentives for renewables, investment priorities, congestion management and so on.

3 A much higher degree of transparency between the countries are needed. This means openness in volumes and figures, capacity, load factors, long-term contracts and so on. Information needed for a trustworthy power exchange.

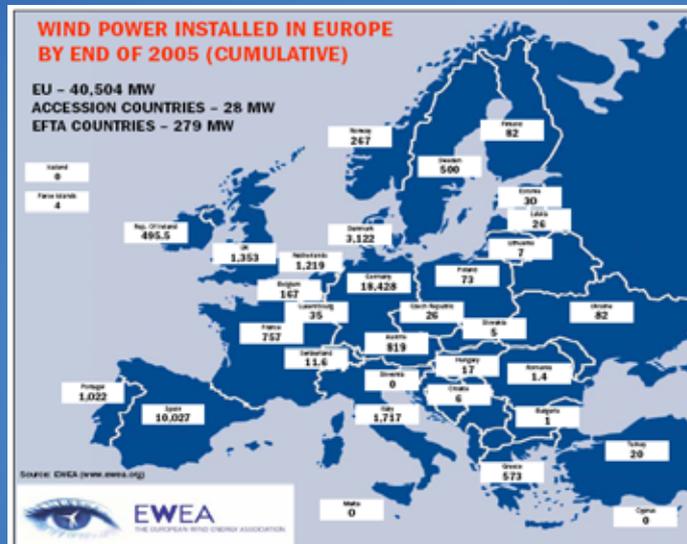
4 The Commissioner for Competition – Neeli Kroes – speaks more and more loud about the necessity of separating the national transmission organizations from the power companies. She speaks warmly about an "ownership unbundling" solution for Europe which means a huge asset transfer from companies to other independent bodies. Take Germany as an example; there are 4 TSO's in Germany all owned by the big power companies.



As I said we will see a dramatic increase in investments in cross-border connections in the future. Will this mean that the cable manufacturers can foresee a golden age ? Maybe but I cannot be sure. As I see it these big high voltage lines will be built airborne and with a high degree of free space from falling trees. This is the cheapest way. But there are exceptions. Let me give you one example from my country: In Stockholm, Sweden, the TSO decided to clean up in a very dense and complicated line system in the central part of the city. They made a big investigation on how to act and one of the alternatives was to shift from air to ground cable. The costs for this alternative were estimated to some 400 million Euros. What about the revenues for this alternative and who is going to pay ? Well ... it is absolutely clear that you will get a better quality with a ground-cable solution. Lower costs for operation, lower maintenance costs, lower losses and so on ... and on top of this ... you get free space that can be exploited for other purposes. If you put a theoretical but fair value on this – in this case 50 euros per square meter, then this alternative will be favorable. Now the question comes ... who will pay for this and who will get the money. 2/3 of the revenues of this alternative are society benefits and depending on that the grid owner is fully paid for these benefits. At this stage I am a little bit reluctant to the realization of this alternative in a full scale ... but certainly we will see more of cable in highly dense areas.

Wind power in Europe

3% in 2001
12% in 2020
20% in 2030



Wind energy can be a significant part of the answer to European supply if sufficient support and increased political will are applied to its development. Installed wind power world wide, mainly based on European technology, stands at some 47,000 MW. This is just the beginning. The Global Wind Energy Council scenario “Windforce 12” demonstrates that there are no technical, economical or resource barriers to the supply of 12% of the worlds electricity needs by wind power in 2020. This would mean an annual business worth some 80 billion euros! I can assure you that here you can find business opportunities for the cable industry.

Background Baltic Wind Link

Vattenfall bought the rights for Swedish site of Kriegers Flak 2 in spring 2005

Vattenfall investigates to acquire the rights for the German site of Kriegers Flak 1 and Baltic 1

Existing plans foresee AC sea cable connections from the sites to "Homeland"

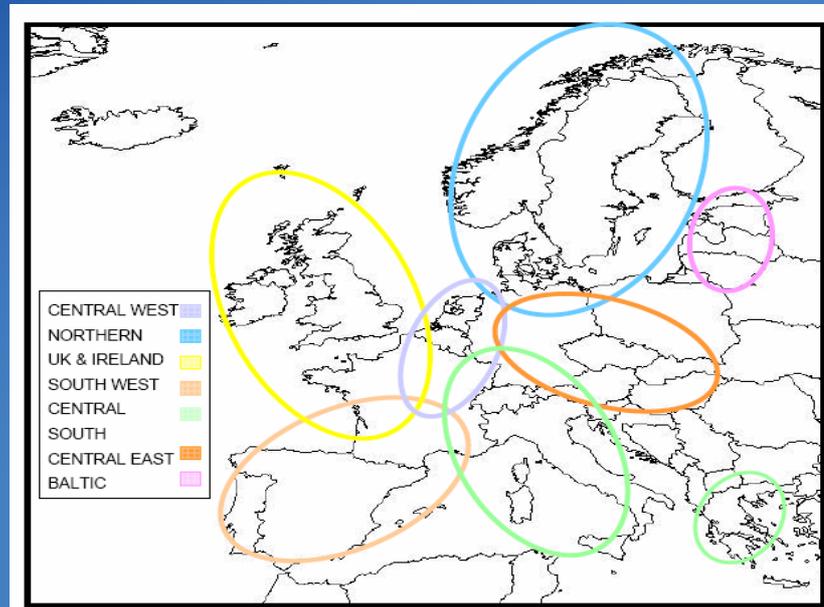
Vattenfall will continue with a feasibility study "Baltic Wind Link"



I want to give you an example. In the borderline between Denmark, Germany and Sweden we are now planning a wind power park with a capacity of some 1000 MW. The work is still in the planning phase but the EU Commission has applauded loudly regarding our plans. Here you have solutions both for the climate issue and the issue of more cross-border traffic of power which both are in line with the EU ambitions. We have here a good example on how three countries, three TSO's and three regulator bodies can work together. Actually this is a hard case. To get the regulators to cooperate and to find a common view on this issue is difficult. The countries agree, the TSO's agree but the regulators cannot agree on the economical terms. Imagine that the costs for the project will show up in one country and the revenues in another country. How to deal with the tariffs ? And what support scheme is to be adapted: The German system, the Swedish system or the Danish one? Take another example on this. The BelPex-line between France-Belgium-Holland. The same thing here ... everybody agrees but the regulators cannot decide on the economical principles. So here we have a topic for the Green Paper once again. If you want a quick start on the integrated European market it is essential that the European regulators can find harmonized rules to work by, if not we need a European regulator with a mandate which is heavier than the national regulators.

I am rather pessimistic on this regulator issue, it is truly nationalistic even if...

The regional regulators proposal



...the council of the regional regulators – ERGEG – proposed a concentration which means that you start with regional principles of harmonization and then you can move over to a pan-European attack. Their belief is that you cannot take too giant steps at one time, so they speak about a step-wise solution for Europe.



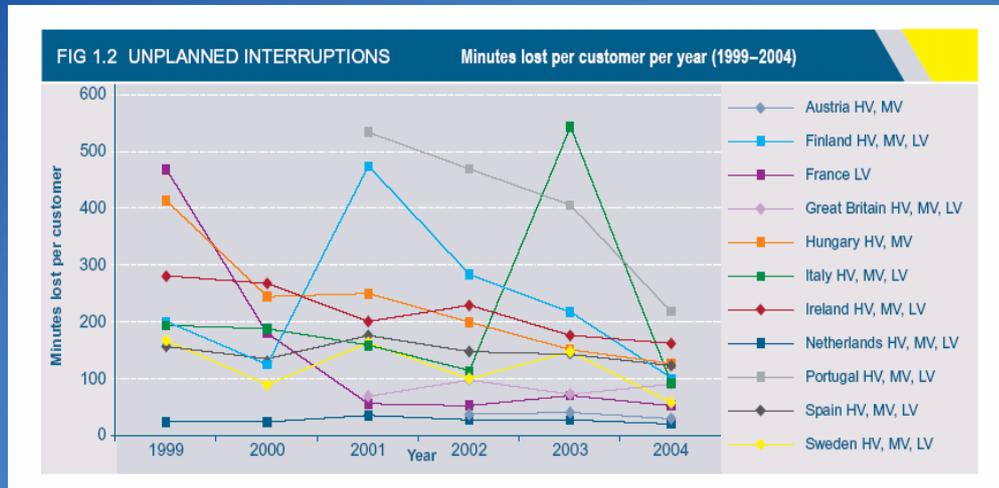
- Focus on Generation and Distribution networks
- 40 countries and 10 associated countries
- Investigations on progress in unbundling

I will now touch upon the distribution issues that of course are interesting for the cable industry. Within Europe we do not have a joint organization for the distribution companies like we have for transmission. But we do have Eurelectric which – like ETSO – is a common organization for lobby matters. Eurelectric comprises some 40 countries and 10 associated countries. They work with all parts of the value chain, generation, distribution and sales issues and Eurelectric aims at being a lobby organization and an organization where the European power industry can gather around important political or economical issues.

Now... if we go back to the Green Paper and ask ourselves what the EU will do about the distribution activities the answer is quite simple. The EU does not interfere in one countries internal affairs. But...and this is essential...the unbundling principles in the EU directives are of crucial interest which you also can see from the Green Paper. According to these principles all vertical integrated companies must be legally separated from 2007 on. We did a research just a year ago in Eurelectric in this matter and we asked companies throughout Europe, how far they had proceeded in this matter. You know the deadline is 2007 and we are running short of time. The situation was very different for different countries. In the UK, Scandinavia and some other countries the development was totally satisfying but in other countries the situation is quite critical. Take for example the countries from the former Soviet Union. It is hardly surprising to see that these countries are back in the time schedule and no wonder about that. Nevertheless this has made the Commissioner for Energy quite nervous and he has made some travels to these countries in order to get them on the right track. If not....and I have said this before – we can expect some harsh decisions from the EU level next year..

The quality of the distribution network systems is also a matter of interest for the EU. From their perspective high-quality networks are one important factor for bringing about higher energy efficiency and more competitive companies throughout Europe.

The Council of European Energy Regulators report on quality



In a comprehensive report on quality among European countries that the European regulators made in 2005 you can see the development during recent years. As you can see from this slide the trend is satisfactory but the level of quality can be improved. The distribution companies now face a problem; yes we will invest in better quality if we are allowed to reflect this in our tariffs. The national regulators are somewhat reluctant to this ... and the discussion goes on.

On a European level we are talking about investments of some 100 billion euros for the next long-term period. To my understanding investing in ground cables are now the major method as you reinvest your network. Yes investing in ground cables is still somewhat more expensive than investing in airborne lines but as you make a LIFE-CYCLE cost analysis the ground cable comes out as the most favorable one. This is due to new laws or due to new penalty systems that are now being introduced in many European countries.



Continuity measurement rules.

Audits on continuity data

Complete continuity indicators

Incentive/penalty regimes form continuity

Customer research

Multiple interruption standards

The European regulators also set out in this report on how they see what has to be improved – apart from making your network more safe.

In short, as you can see, the regulators want improvements on how to measure quality improvements over time on some indicators. They also want more customer power in distribution and they do want to see more action-oriented work.

Outages in Europe

Several storms have hit Europe during last years.

France, Italy, UK, Norway, Germany, Sweden etc.

Customers out of electricity for days....and weeks.

A hardening attitude from national regulators...

...brings along penalty schemes in many countries.

In Sweden the winter storm 2004 left 400,000 customers out of electricity

About penalties:

As you know we have been hit rather often by outages in Europe during recent years. Customers have been out of electricity for days and in many cases even for weeks. No wonder that the customers complain and that these outages are given a lot of attention in the media. And as it has gone that far, the politicians have to act.

In Sweden we have had a severe storm two years ago. More than 400,000 customers were hit and a lot of them were out of electricity for weeks. So a new law was implemented in my country.

Compensation fees.....

A new law in Sweden from 2006

Outage time (multiples of 800 kr. 10 kr= 1 euro)

12 – 24 hours : 800 kr

24 – 48 hours : 1600 kr

48 – 72 hours : 2400 kr

72 – 96 hours : 3200 kr

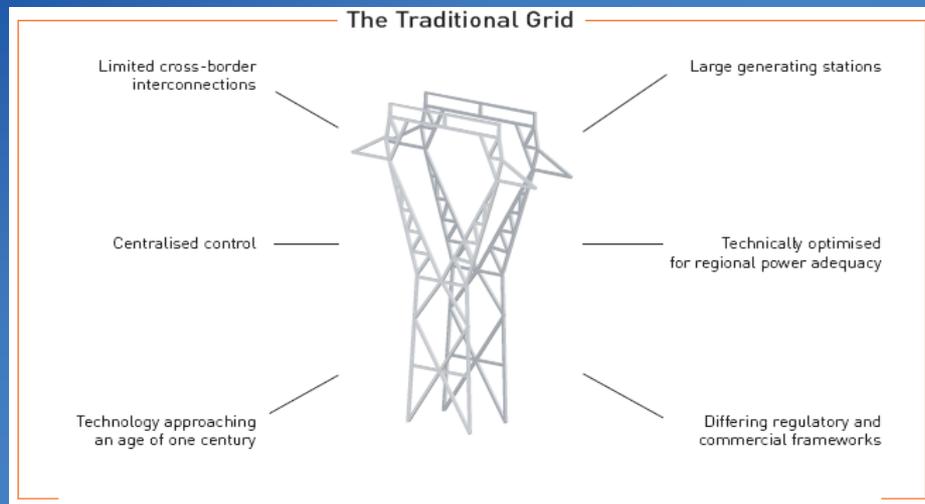
96 –120 hours: 4000 kr

My annual fee for my summer houses is about 4000 kr
(network fee). After a 4 day outage my annual fee for that year is 0.

The new law says that if you are out of electricity for more than 12 hours the distribution company is obliged to pay you a compensation fee and the longer the outage is the more money you have to pay.

I own two summerhouses in Sweden and if one of the houses or the total sum of two outages is more than 4 days then the effect is that I have my network going for nothing this year! For sure this is a driver for any distribution company to invest in higher quality.

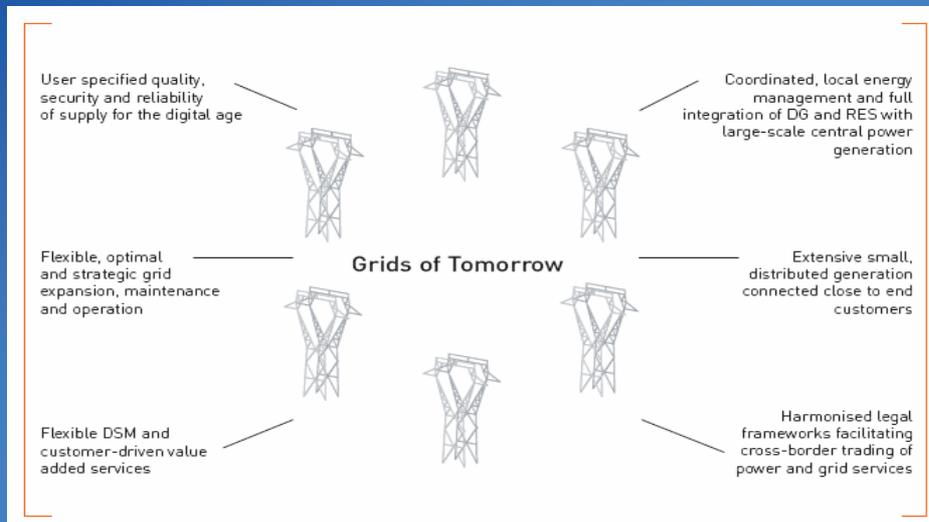
The European SmartGrids: today...



Now, maybe I have been focusing in my speech on today's problems regarding networks in a political context. Let's now be a little more future-oriented and look into the network business in itself.

Under the umbrella of the 7th frame program which is an R and D-activity within the EU there is a group of highly skilled people trying to look on the future role of a distributor. As you can see - and I think you can recognize it - today's grids are predominantly based on large central power stations connected to the high voltage systems. The overall picture is still one of power-flow in one direction from the power stations. Dispatching of power and network control is typically the responsibility of centralized facilities. So, traditional grid design has evolved through economies of scale in large centralized generation. I think you know this situation, but how about tomorrow then?

....and the future challenges



Distribution grids will become active and will have to accommodate bi-directional power flows. The European electricity systems have moved to operate under the framework of a market model in which generators are dispatched according to market forces and the grid control center undertakes an overall supervisory role. Future models for the electricity grids have to meet the changes in technology, in values in society and in commerce.

Thus security, safety, environment, power quality and cost of supply are all being examined in new ways and efficiency in the system is taken even more seriously for a variety of reasons.

The change might be better described as a revision of the traditional monopoly-based regulation of electricity supply. Liberalization is not the only challenge for how networks will evolve in the future. The organization of the network in the future will be affected by the dynamics of energy markets. Scarcity of primary energy sources on the one hand and climate change on the other is likely to affect decisions on new investments in generation. It is the case of taking advantage of a wider energy technology portfolio and the coexistence of many possible solutions from the customer side, society side and the generator side.

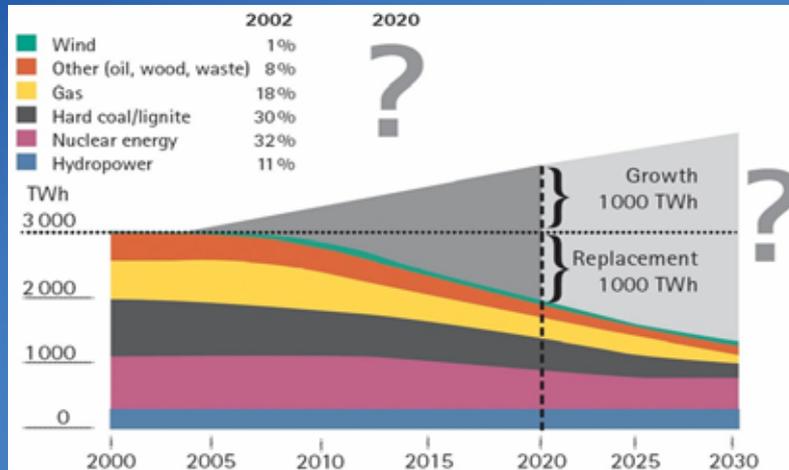
Final conclusions

- One year before liberalization many countries are behind the time schedule.
- The EU Commission is likely to propose on a 3rd directive in order to increase speed in the process.
- Massive investments in new generation and some 500 billion euros in transmission and distribution.
-but regulator regimes and unbundling of the TSO's are hard topics that need to be settled.

These are my conclusions.

Thank you for your attention.

but the question remains



But ladies and gentlemen I show you this slide again. Europe needs some 2,000 TWh's and by today we know that the alternatives are limited: Wind power could contribute, we could do some upgrading of hydro and nuclear (in some cases), biomass could contribute also and politicians believe that energy efficiency could contribute with 400 or 500 TWh in the reduction of demand. I must say that I feel somewhat uncomfortable by our future regarding this supply situation and you can imagine what this could mean to electricity prices in the future.

Thank you for your attention.