

**INTERNATIONAL EXPERIENCES IN  
IMPROVING THE LINKS BETWEEN POWER  
SYSTEM PLANNERS, THE GENERAL PUBLIC AND  
DECISION MAKERS IN THE ENERGY POLICY  
AREA**

**Working Group 09  
(Links between Power System Planners and Decision  
Makers in the Energy Policy Area)  
of Study Committee 37  
(Power System Planning and Development)**

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## FRANCE:

### A NEW E.H.V. LINE ACCROSS THE ALPS BETWEEN FRANCE AND ITALY

#### I IMPACT STUDY - INVESTIGATIONS TO CHOOSE THE TRIP OF LAND WITH THE LEAST IMPACT

A wide area of research has been selected in which different possible ways came into sight; after going into the environment constraints, EdF finally chose one of these routes: it was situated in the Maurienne valley, where 3 possible options appeared once more:

- a route deep down the valley, that has been given up in account of the population density.
- a route on the slope of the valley, by the left bank, then by the right bank with a crossing of the river:
  - either between Hermillon and St Jean de Maurienne.
  - or near Saint Etienne de Cumes.

The main constraints for the definition of the least impact trip of land were of two types:

- technical constraints: necessity of using the cols of the mountains, of avoiding the avalanches passages. . .
- economic and environmental constraints: tourist sites, classified sites, areas fit for skiing.

This trip of land was the basis of the discussions in all the consultations of regional authorities and the mayors of the concerned municipalities.

The timetable of the concertation meetings can be summed up as followed:

- from May to June 1987: presentation at the Prefect of the EHV line and of the trip of land of least impact.
- from June to November 1987: cantonal meetings to debate the route of the line.
- December 1987: new bringing up of the line route to the Prefect and Elected members.
- January to May 1988: meetings to take into account the municipalities projects and to examine the detailed line route; the request for the Declaration of Public Utility was finally sent to the Ministry of Industry.

In the concertation meetings; there was first a description of the project and then observations of Public and Associations; EdF tried to propose measures to reduce the damageable consequences to the environment; for instance EdF put forward removing the 150 kV network of the area, reinforcing the regional 225 kV network without adding any more lattice masts. Then arrangements were proposed to ameliorate villages electrification and special subsidies were offered to contribute to local development.

#### II CONCLUSION

At each step of presentation and concertation with general public or with legal authorities it had really been necessary to insist on the useful purpose of the project; in addition to the classical economic aspects (better use of the power means, sharing of the peak and relief power means), a new aspect of many recent projects is related to the justification of the export policy of the utility.

Getting some substantial profits by large scale energy exportation do not exempt the utility from making an effort to enlighten public mind, by explaining the aim of this policy and the positive repercussions on the electricity price for the French customer. Moreover, as almost everywhere in Europe, environmental issues become major concern for every large industrial plan; and that means more and more difficulties to carry it out.

Moreover, it can be noted an irreversible decentralization process and a rising of territorial collectivities which are often taking actions against the national projects; it must be said that these projects seldom bring back money locally in return, if no "arrangement measure" were decided in the concertation meetings.

To clear up these difficulties, EdF is managing a concertation policy with the territorial collectivities, which are considered more as partners than opponents; this policy is based on a regular dialog and a mutual information which is obviously fruitful in many affairs: new HV underground cables, new substations, new EHV lines. . . Public is more and more aware of the specificity of France (a relatively few crowded country but where unoccupied land has to be used to the best, in a concertation mind to respect environment, town planning, tourism. . .). Everyone feels that openness is often successful: the sooner informations are available the sooner bad surprises can be avoided in the reciprocal interest.

# INTERNATIONAL EXPERIENCES IN IMPROVING THE LINKS BETWEEN POWER SYSTEM PLANNERS, THE GENERAL PUBLIC AND DECISION MAKERS IN THE ENERGY POLICY AREA

by  
Working Group 37.09

## 0. Introduction

The basis of this report is the experience of members of Cigré Working Group 37.09, evaluated in a systematic way in order to find ideas and methods of common interest to Cigré members as regards improving communication with other interests during the power system planning process.

The task of the group is to map and compare the existing mechanisms for the dialogue between power system planners and decision makers on the political level in the energy (policy) areas in various Cigré countries. See appendix A for a full description of the task, and appendix B for the names and addresses of the Group members.

The group has chosen to extend this task to relate to three different communication partners: The energy (policy) decision makers, the authorities (e.g. Governmental agencies, regulatory bodies) and the general public. The reason for this is that the policy makers are closely related to both authorities and the general public, having the interest of society as a whole to consider.

In this report the group also presents some means to improve the dialogue with the categories mentioned above.

The work has been carried out in two stages, and this report covers both. In 1990, the members of the group analysed examples and cases from experience in various countries. To the report was added a special section related to the situation in developing countries, that is the special considerations when e.g. the system is being expanded rapidly. The conclusions of these discussions and analyses were then tested in a second stage, where the members sought to verify or oppose the first conclusions, relating to more recent developments in their respective countries. The resulting conclusions from this second stage are included in the report.

Parallel to this, the process of power system development was taken into consideration in a more systematic way, resulting in tables describing the power systems and the procedures of additions to the systems in countries represented in the Cigré WG 37.09.

The work of WG 37.09 has been summarized in an article written to facilitate the publication of the group's findings in various magazines etc. This article can also be read as an "Executive Summary" and is enclosed as appendix E.

## 1. Conclusions based on analysis of cases in different countries

### 1.1 Summary of general conclusions and means to improve dialogue

Due to the different conditions in the countries represented in the group, the conclusions of the group can by no means be seen as recommendations. However, there are many similar problems in the different countries represented in the group, which is why the WG 37.09 stresses on the possibility to learn from experience in other countries, taking into account the variety of conditions in different countries.

An example of varying conditions is the lack of similarity in the political processes, and the influence of authorities in the planning process. Legislators have imposed their political and legal decisions on how to organise the co-operation between various interests in very different manners. The ownership of electricity utilities and of the transmission networks varies from these systems being state monopolies to being owned by a number of private shareholders. Also the right to invest, decide the price of electricity and other aspects of electricity supply varies to a great extent. There is a problem of definition here as the term "Energy (Policy) Decision Makers" has different meanings in different countries. In this report, the term refers to decision makers on the political level. The same problem applies to the term "Authorities". In some countries there are regulatory agencies which must give the final approval for the various specific projects. In all, these differences mean that it is not possible to draw general conclusions. Some understanding of the experiences could nevertheless be reached.

The appendices C1, C2 and D, including a description of the planning processes and with concrete examples from the participating countries, might be of some help in understanding the roles and definitions of "power system planners", "energy (policy) decision makers" and "authorities".

Similar problems found by WG 37.09 can be summarized as follows:

- The scene is changing rapidly
- There is a need to find a balance between Energy, Economy and Environment
- Planning and siting is getting more and more difficult
- Different partners in the dialogue have different time perspectives:
  - long term = power system planners
  - short term = energy (policy) decision makers
- There are different interests on the national versus the local or regional level. The NIMBY (Not In My Back Yard) syndrome is obvious
- There is an increasing need for justifying new projects together with a strong tendency on the part of the authorities and the general public to promote energy conservation
- There is a need to improve the dialogue with policy decision makers, the authorities and the general public

Even if there are these similarities, the electricity sector is very different in different countries, and no general recommendations are possible.

The general conclusion of the group is that there is a need to improve the dialogue between power system planners on the one hand and the energy (policy) decision makers, as well as the authorities and the general public on the other hand. This applies regardless of how the planning system is organised in the different countries.

Having stated this, we have arrived at some conclusions as regards means to improve the dialogue in our planning process.

- Show trust and openness
- Take the initiative. Do not wait for others to act.

- We are dealing with multi-disciplinary issues, which means
  - new tasks for engineers
  - new competence is needed in our industry
- About the planning process
  - try a two-phase process
  - improve and simplify
- Establish a dialogue, not a monologue
  - Person to person, e.g. "open house"
  - Use "common language"
- Take help from
  - professional organisations, e.g. of engineers
  - power industry's organisations
  - universities
  - employees of the company/utility
 to communicate
- Education programmes (both general and specific) for
  - utilities/engineers
  - authorities
  - policy makers
  - the general public
- Contribute to local development

In order to improve the planning system and dialogue the preparedness of utilities can be facilitated if the following steps are taken by the utilities themselves. The list was originally based on the situation in developing countries, but it is valid also in the industrialised world, especially at times when utilities are expanding their system.

- Be able to identify the decision makers and how they actually arrive at their decisions.
- Develop a set of alternatives instead of one single recommendation
- Be prepared to respond quickly to changing conditions or a different set of players.
- Recognise the importance of the various political motivations that are involved.
- Establish an effective information system so as to be able to assess and communicate quickly the impacts on the need for financing and on the cost of electricity from revised plans and changed conditions.
- Recognise that, under privatisation, the funds required for the operation of the existing system and for its expansion, must be achievable.
- Develop a full comprehension of the regulatory system and the role it plays as a substitute for market forces in the country. Part of this effort should include participation in discussions on the need to change the regulatory procedures.
- Become involved in the process of establishing tariffs so that tariffs will provide proper signals to the consumers, as well as necessary funds for the functioning and expansion of the power system.
- Be able to stress not only short-term consequences but real, long-term consequences of alternative projects, tariff schedules etc.
- Recognise that at times attempts will be made to have the electric power system meet social objectives, particularly to help the poor. The possibility for having direct Government funding for these purposes should be encouraged.

## 1.2 Similar problems and factors in the dialogue

The necessity of finding a reasonable balance in the triangle Energy, Economy and Environment has been generally stressed.

On one hand, the utilities with their engineering/economic criteria for their activities must achieve an understanding with regulatory

authorities and the public opinion, with their environmental/social/political criteria. There is a need for utilities to be aware of these different backgrounds and preferences and to adapt their communication accordingly. The power system planning process is indeed a multi-disciplinary issue.

On the other hand, the utilities must provide facts on how an increased use of electricity may affect the environment in a positive way, e.g. if fossil fuel space heating with low efficiency is replaced by hydro or nuclear or "clean" fossil fuel power generation, or if the working environment is improved by using electricity in an industrial process instead of fossil fuels.

The utilities have to justify the need for power system capacity additions, also taking into account all possibilities to use electricity in an efficient way and the development of new electricity consuming technologies.

Information and dialogue during the planning process is one of the main issues as regards the possibility to anticipate the difficulties that will meet new projects.

As conflict can be damaging to all parties, there is a high inducement to arrive at harmonious solutions. The need for this is generally felt, but more strongly by some countries, most of all Japan where consensus is both desirable and necessary.

Great benefits are derived from opening dialogue with interested parties at an early stage of the planning process. Both utilities and communities can then learn from each other and a better solution for the system will ultimately be implemented. Assumptions made one-sidedly by utilities regarding the public perceptions are often inaccurate, sometimes incorrect.

Another important experience in the group is the difference between national and local interests. The general benefit for the country does not always come into the local evaluation of the system. It is easier to get a national consensus of the need for new power than local support of a single unit or line.

Power generation, transmission and distribution systems are extremely long term undertakings. Not only is the lead time long, the transmission lines and power plants also have a long economic lifetime ahead of them. Installations planned today may be in operation many decades ahead.

Policy makers and the general public, on the other hand, have short term perspectives, next year or next election. In that perspective there are always theoretical alternatives to the actual proposed project.

The conflict of national and local interests, the NIMBY (Not In My Back Yard) syndrome, could be investigated more in the course of the dialogue.

The excess capacity in many countries, the result of optimistic load forecasts, is gradually changing to a threat of actual shortage in the mid-1990-ies. One reason for this change is that the efforts of energy conservation enforced by many power utilities in some cases have had over-optimistic expectations of the potential of saving. This in turn has created further delays in reaching decisions on new additions to the power systems. In case the expectations are proved too optimistic, the process of getting new power supply must be speeded up, including the regulatory procedure. This dilemma also supports the conclusions of the group about the need for an improved dialogue.

For all these reasons, there is a profound need to improve the dialogue with both authorities/policy makers and the general public. The regulatory procedure with permits from up to 50 different local, regional and national authorities and parliaments is sometimes not sufficient. Opposition from the general public can still block future electricity supply.

### 1.3 Means of improving the dialogue

#### General

A summary and list of means to improve the dialogue is given at the beginning of this report (section 1.1).

The general conclusion is that openness and trust are necessary conditions for effective consultation with both decision makers and the general public. Openness means communicating the full implication of planning (environmental, social, economic and technical) regarding both the need/community benefit and the impact of the project or proposal.

Trust implies development of a trust relationship between the utility, the energy (policy) decision makers, the authorities and the general public. Improvement of these two aspects can provide the basis for resolution of planning issues in which there are inherent conflicts of interest between different groups in society, as well as between costs of supply versus environmental/social values.

It is equally important for the system planners to take and hold the initiative. The advantage of this is the possibility to choose when and where and how the debate and discussion is conducted.

This also gives the possibility of initiating an extended educational programme. There is a need to improve the knowledge within the utility about environmental, social and political aspects. There is also a need to improve the dialogue with policy makers in order to avoid unfavourable decisions. One way is to educate the authorities and the politicians on the special conditions of the power industry, in a way that suits their need.

In communicating with policy makers and the general public it is important to use common language. But even more important how the dialogue is conducted, where person to person dialogue can be preferable.

A well informed personnel is valuable as regards person to person dialogue. Discussions between neighbours, in the family, with friends and partners in other activities like sports, could have a great impact on how a planned renewal is accepted. It is important that different employees convey the same message in their discussions with the general public.

This implies a need to keep the employees of the utility well informed about the status of the plans and needs for more capacity, so that the messages from different levels in the organisation are consistent. The employees also have to stress the consideration of how to use the language. It should be the language of the consumers rather than the language of the producers.

It is important to note that we are dealing with multi-disciplinary issues and that this means that electric power companies might have to add new competence to their staff, e.g. economy, environment, political issues, social sciences, communication, etc., in addition to creating a new role for the engineers as regards communication with politicians and the general public.

One way of improving the dialogue is to raise the trust by help of professional organisations. It might be easier to get a trustworthy relationship when we want to establish the need for new electricity, if the whole power industry or a professional organisation can support the message.

Thus, it might be important to find "neutral grounds" on which to hold the dialogue, e.g. with professional organisations.

In this report, the need to improve the system planning process has been stressed. The tables and flow charts, appendices C1 and C2, show different procedures in different countries. However, one method which could lead to a better dialogue with both policy makers and the public, has been tried successfully in some countries. That is to have dialogue with the public in a two stage planning procedure. There are examples from France, Japan and Australia of successful projects communicated and planned in this manner.

The first stage would be an elaboration of the strategic planning, where the need for additional supply is established. When there is a (reasonable) consensus about that, the dialogue could be held as regards the actual project. In this stage early contact with the local decision makers and people is one way of improving the dialogue.

#### Dialogue with policy makers and authorities

There are different ways of working out our dialogue with policy makers and authorities.

As has been stated before, there is a difference between countries as regards the commercialisation of the electricity sector.

There is also a difference in energy policy, and in the mutual understanding between power utilities and the local or national government, even if the utilities are publicly owned or part of the state itself. Not all state owned utilities are in harmony with the authorities.

Different roles of power producers and regulation authorities have been established in different countries. The system of "consultation and dialogue" between the power generating company Electricité de France (EdF) and the French environmental authorities could serve as an example, although it is special as EDF is owned entirely by the Government.

One aspect is the degree of local versus national decisions. The group has found that it is particularly important to improve the dialogue on the local level, regardless of where the actual decisions are taken. The reason for this is that our projects are not only for the local need. In some communities there is a tax benefit from the plant, but this is not universal. Local politicians face the risk of losing elections on account of a plant or a transmission line that is meant for people living somewhere else. This conflict of interest must be recognised by the power system planners. In such cases contributions to local development could be needed.

As previously stated, a two-phase planning procedure could be introduced.

The difficulties in power system planning have many different causes. In some countries the legal system is not favourable to the power system. The tables and flow charts attached to this report illustrate the often complicated legal procedures.

The group has stressed the need to find ways to improve the competence and knowledge of policy makers on the special conditions of the electricity supply and demand.

#### **Dialogue with the general public**

Those power utilities that have developed a dialogue with the general public have found it worthwhile. The means of doing so is however important.

There is a risk that pressure groups are very clever in organizing their resistance to a fruitful dialogue. These organized campaigns sometimes are for the benefit of a very narrow interest, e.g. the land-owners, in spite of it appearing to be in the interest of the general public.

Local representatives and "open house" arrangements have been successful in establishing a way to discuss the projects person to person. This is also a way to reduce the risk of massive opposition from the start. However, it is equally important to discuss the plans openly.

In opening the dialogue "open house" is preferred to public meetings, which can easily stir opposition. On the other hand, a talk with the local public, land owners etc. one by one can lead to a backlash later when they get together. When communication is initiated early in the process the risk of land speculation should also be considered.

There are many comments on the difficulty in most countries to get nuclear power accepted. A strategy of dialogue with the public on a person to person basis could show successful in this respect. In the process there must be greater participation by the general public in the decision process. The example from Japan, with a tradition of consensus, shows one way of doing this. The Finnish experience, described in the appendix D), is also of interest.

The experience of most participants is that there is not enough dialogue with the public and that the methods must improve. In doing this, it is important to discuss the correlation between energy, economy and the environment. Also the time perspective of the power installations must be discussed, as well as - of course - the needs and preferences of the general public. In short - to listen.

#### **2. Description of the planning process in different countries, highlighting the legal process, dialogue with energy (policy) decision makers, with the authorities and with the general public. Examples.**

In order to better understand the need for dialogue at different stages and with different groups of interested parties, WG 37.09 decided to complete the first report of the group with some hard facts collected in tables and flow charts. See appendices C1 and C2. There are also concrete examples from various countries describing the experience as far as the improvement of the links between power system planners and decision makers are concerned. See appendix D.

The tables consist of some data about the system in the country, the corporate system planning and development procedure, including the legal procedure, and finally methods used in communication with the general public and with Government officials.

In some federal countries the legal procedure is different in different states. There are therefore a variety of systems even within the countries represented in the group. However, these data presented in the tables can give some "food for thought" as regards the need to consider the system planning procedures.

The main reason for collecting these data in the Cigré WG 37.09 was however to give a background to the different experiences of communication in the participating countries.

## Appendix A

The task of Working Group 37.09

### **Links Between Power System Planners and Decision Makers in the Energy (Policy) Area**

The SC 37

- noting that electricity plays an important role in a country's total energy supply, and that consequently the prospects for development of the electricity sector very much hinges upon the overall energy policy;
- noting that the state (federal and/or local) needs and has to its disposal a lot of legal, administrative and financial instruments to control the electricity sector; and
- noting that the power industry, and in particular its planning functions, has a good knowledge of the prospects for and effects of production, transmission/distribution and use of electricity, which must be made known to decision makers in the energy area, to form one of the bases for their overall judgments;
- concludes that an extended and cross-fertilizing dialogue between the two parties therefore is needed to assure on the one hand that all relevant aspects on the role of electricity in energy supply are taken into account, on the other hand that the power industry gets expedient and good information on planned changes in energy policy to enable the power system planners to take this into account at an early stage in planning;
- requests the WG 09 to map (and compare) the existing mechanism for the dialogue between power system planners and decision makers in the energy and electric (policy) area in the various CIGRÉ member countries;
- invites the WG 09 to present for discussion in the Committee, preferably at its meeting in 1988, a draft report on this issue; and
- asks the WG 09 to prepare then a report describing (and assessing) the existing situation in CIGRÉ member countries.

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# **APPENDIX C1**

## **TABLES**

## Key characteristics of utility systems

	Production of electricity, TWh, 1990 (if not otherwise stated)	Consumption of electric energy per capita, kWh	Total generation capacity					
			MW	of which in %				
				hydro	nuclear	coal	oil	others
<b>Australia</b>	143	8 400	34 435	21	0	65	1	13
<b>Finland</b>	59,7 <sup>1)</sup>	12 000	12 706 <sup>2)</sup>	20,4	18,5	27,9	8,3	24,9
<b>France</b>	385	5 900	95 000	24	53	12	7	4
<b>England, Wales</b>	261	4 745	58 780 <sup>3)</sup>	3,6	15	59	17	5,4 <sup>4)</sup>
<b>Italy</b>	240 <sup>5)</sup>	3 800	43 200	31(+ gas)	-	16	16	14 gas
<b>Japan</b>	705	6 150	167 976	22	17	7	34	20 LNG
<b>Portugal</b>	26,5	2 400	6 624 <sup>7)</sup>	46	-	21	33	-
<b>Romania</b>	64 <sup>6)</sup>	3 200	21 535 <sup>7)</sup>	25,5	-	38,9	34,9 <sup>8)</sup>	1
<b>South Africa</b>	143 sent out	4 300	32 403	1,7	5,7	87,1	1,2	4,3 <sup>9)</sup>
<b>Sweden</b>	139	16 300	33 900	48	29	23 <sup>10)</sup>		
<b>U.S.A.</b>	2 900	11 600	681 000	10	15	43	29	3

1) includes net imports: 8,9 TWh

2) 31.12.1989 Maximum power (15 h) of power stations capacity. Simultaneously available capacity of power stations was 11 330 MW. Figures don't include imports: 1 600 MW

3) excludes interconnections with Scotland and France

4) open cycle and combined cycle gas turbine

5) Demand 1991; Italy: 240 TWh, ENEL: 210 TWh. Production: ENEL 168, Purchases 42 (35 from abroad)

6) +import 9,478 TWh

7) as of 31/12 1990

8) oil and gas

9) pumped storage

10) oil, coal & others

**Key characteristics of utility systems (continued)**

	<b>Utility systems ownership</b>	<b>Number of utility systems</b>	<b>Production</b>
<b>Australia</b>	100% Public Ownership - owned by state and local government.	8 state owned power authorities generate about 93% of the electricity.	370 power plants owned by 130 firms and utilities
<b>Finland</b>	Generating capacity: National Government 41%, Municipalities 18%, Industrial firms - investors or others 41%. Transmission lines (110 kV): National Government 71%, Municipalities 7%, Industrial firms - investors or others 22%. Distribution: National Government - Municipalities 75%, Industrial firms - investors or others 25%.		EDF: Thermal (nuclear, oil, coal) 310 TWh, Hydro 45 TWh Non EDF: Thermal 25 TWh, Hydro 4 TWh
<b>France</b>	91% EDF (National company), 9% National utilities ("Charbonnages de France", Ironworks, S.N.C.F.), Municipalities, Industrial power producers (oil, chemical, mechanical...)		3 plus independent generators. (Scottish electricity companies and Electricité de France also have access to the Grid system and the Pool). Also National Grid Company owns pumped storage generation.
<b>England, Wales</b>	The generation and transmission system in England and Wales consists of three generators (National Power, Power Gen and Nuclear Electric) and one company responsible for the operation and development of the transmission system - the National Grid Company. National Grid Company has been privatised - It is owned by 12 Regional Electricity Companies which were sold by Government. 60% of National Power and Power Gen have been sold by the Government, which retains 40%. Nuclear Electric remains in the public sector. In addition, the new legislation allows new generators (independent) to build and operate power stations and to sell their electricity to the Pool (the market place for trading) which is operated by the National Grid company.		
<b>Italy</b>	"ENEL is a state owned utility since 1963; ENEL is vertically integrated and until July 11 was subjected to the control of the Ministry of Industry. In January 1991 two laws deregulated the production by NUGs and in April 1992 the Interministerial Committee for Prices (CIP) fixed incentivized selling prices for NUGs' production to ENEL. On July 11, a decree of the Government transformed ENEL in a Spa (Joint Stock Company), under the ownership of the Ministry of the Treasury in the framework of the reduction of the State Indebtement. The modalities of the sale of the stocks on the market are presently (July 1992) under discussion."		ENEL 82%, NUGs 13.3%, Municipalities 4.7%, Total net 210.5 TWh = 100%
<b>Japan</b>	General Power Utilities: investor owned. Wholesale Power Utilities. EPDC: invested by the government and 9 general power utilities. JAPCO: invested by 8 general power utilities and EPDC and other enterprises. Municipal Power Utilities: owned and operated by local governments. Joint-ventured Power Utilities: established jointly by 9 EPCs and large electricity consumers.		General Power Utilities: 10 x 142 617 MW EPDC 1 x 10 741 JAPCO 1 x 1 160 Municipal Power Utilities: 34 x 2 326 Joint-Ventured: 21 x 12 292 Total: 167 976
<b>Portugal</b>	State ownership: 90% generation (EDP - Electricidade de Portugal), 100% transmission (>60 kV), 100% distribution. Independent (Private): 10% generation. Independent producers are refinery, chemical industries and paper industries. Normally, generation is for internal consumption and excess energy is sold to the grid. Independent power producers (mainly small hydro < 10 MVA) are under development.		EDP system 26.5 TWh, system simultaneous maximum demand 4.9 MW (in 1990)
<b>Romania</b>	100% State Ownership of the National Electricity Authority (RENEL). One single National System covering the whole country.		One system with production in 37 generation subsidiaries of RENEL.
<b>South Africa</b>	ESKOM is South Africa's national electricity supply utility. It is not a government corporation but an independent self financing undertaking funded from borrowed money and revenue from the sale of electricity. ESKOM represents approximately 95% of South Africa electricity generated.		ESKOM (national public utility): System simultaneous maximum demand 22 000 MW.
<b>Sweden</b>	State owned: 50% of production capacity, Industries: 25%, Municipalities: 19%, Others: 6%		Swedish power pool = 11 companies; 64 TWh Valtenfall: 65 TWh
<b>U.S.A.</b>	80% investor-owned, 8% Federal government owned, 5% state government owned, 3% municipal, 5% owned by cooperatives, 6% by independent power producers.		3 000 Total systems selling electricity, 300 significant systems producing and transmitting electricity.

### Key characteristics of utility systems (continued)

	Transmission (>100 kV)	Distribution																					
<b>Australia</b>	8 state owned transmission authorities (1 in each state). Overhead: 500 kV - 2 248 km, 330 kV - 5 954 km, 275 kV - 6 795 km, 220 kV - 6 795 km, 132 kV - 21 898 km, 110 kV - 3 810 km Underground: 330 kV - 20 km, 275 kV - 8 km, 220 kV - 6 km, 132 kV - 477 km, 110 kV - 177 km																						
<b>Finland</b>	53 utility systems	130 utility systems																					
<b>France</b>	400 kV, 225 kV, 150 kV (18 800 km, 24 900 km, 2 400 km)	27 million customers (domestic), 250 000 industrial or commercial customers, Municipals and municipal associations.																					
<b>England, Wales</b>	National Grid Company - 275 kV and 400 kV, 12 Regional Electricity companies up to 132 kV.	12 Regional Electricity Companies.																					
<b>Italy</b>	132-150 kV - 9 950 km, 220 kV - 11 250 km, 380 kV - 8 250 km	AT, 132 kV, 150 kV - 21 450 km, MT, 40-30 kV - 5 350 km, overhead - 210 000 km, cables 1-30 kV - 70 000 km, Total - 280 000 km <u>580 000 km (120 000 km cables)</u>																					
<b>Japan</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">km</td> <td style="text-align: center;">500 kV</td> <td style="text-align: center;">275 kV</td> <td style="text-align: center;">220 kV</td> <td style="text-align: center;">187 kV</td> <td style="text-align: center;">154-77 kV</td> <td style="text-align: center;">DC 250 kV</td> </tr> <tr> <td>Route length</td> <td style="text-align: right;">4 564</td> <td style="text-align: right;">7 765</td> <td style="text-align: right;">2 788</td> <td style="text-align: right;">3 497</td> <td style="text-align: right;">65 887</td> <td style="text-align: right;">167</td> </tr> <tr> <td>Circuit length</td> <td style="text-align: right;">8 794</td> <td style="text-align: right;">15 048</td> <td style="text-align: right;">5 199</td> <td style="text-align: right;">6 262</td> <td style="text-align: right;">110 380</td> <td style="text-align: right;">167</td> </tr> </table>	km	500 kV	275 kV	220 kV	187 kV	154-77 kV	DC 250 kV	Route length	4 564	7 765	2 788	3 497	65 887	167	Circuit length	8 794	15 048	5 199	6 262	110 380	167	Route length - 796 000 km, circuit length - 4 173 000 km
km	500 kV	275 kV	220 kV	187 kV	154-77 kV	DC 250 kV																	
Route length	4 564	7 765	2 788	3 497	65 887	167																	
Circuit length	8 794	15 048	5 199	6 262	110 380	167																	
<b>Portugal</b>	State ownership 100%. 400 kV - 1 072 km, 220 kV - 2 155 km, 150 kV - 2 238 km	State ownership 100%. 60-130 kV - 5 270 km, 6-60 kV - 40 866 km, low voltage - 77 138 km overhead lines and 12 211 km underground lines. Number of clients: MV ≈ 14.000, LV ≈ 4,2 million.																					
<b>Romania</b>	In 42 transmission and distribution subsidiaries of RENEL; 26,139 km lines of 110, 220, 400 and 750 kV.	1-60 kV - 143 000 km, <1 kV - 417 100 km, Total - <u>560 100 km</u>																					
<b>South Africa</b>	765 kV - 871 km, 533 kV DC - 1 030 km, 400 kV - 11 789 km, 275 kV - 6 944 km, 220 kV - 1 239 km, 132 kV - 16 107 km, cables - 67 km	88 kV and 33 kV - 20 824 km, 22 kV and below - 153 310 km, cables - 4 602 km																					
<b>Sweden</b>	400 kV - 10 000 km, 220 kV - 3 500 km, 130 kV - 7 000 km	7 000 customers at high voltage of which 50% are industries and 50% are large housing complexes. 4,9 million low voltage customers.																					
<b>U.S.A.</b>	765 kV - 5 800 km, 500 kV - 38 700 km, 345 kV - 72 900 km, 230 kV - 104 300 km, <230 kV, >100 kV - 298 000 km	>22 kV - 490 100 km																					

## System development procedures

### A. Responsibilities of utility systems

		1. Generation additions	2. Transmission additions
<b>Australia</b>	State utilities have the responsibility to prepare planning proposals for generation to meet forecast demands. Generally planning decision making is by a separate authority but some utilities are the licensing body.	State utilities have the responsibility to prepare planning proposals for transmission to meet forecast demands. Generally planning decision making is by a separate authority but some utilities are the licensing body.	
<b>Finland</b>	Full technical and economic responsibility of investments for each utility.	Full technical and economic responsibility of investments for each utility.	
<b>France</b>	Planification, providing needed funds, construction.	Planification, providing needed funds, construction.	
<b>England, Wales</b>	Each generator is responsible for its own additions of generation.	Development of transmission (275 kV and 400 kV) is the responsibility of the National Grid Company.	
<b>Italy</b>	Situation before the recent transformation of ENEL in SPA (Joint Stock Company): ENEL develop and, within the framework of approvals by the Interministerial Committee on Economic Planning (CIPE), implement plans. Funds are obtained through revenues from tariffs and borrowing on the markets. Particular contributions are obtained by dedicated taxation, applied to the tariff's structure. In the past capital contributions were assigned by the Government to ENEL.	Situation before the recent transformation of ENEL in SPA (Joint Stock Company): ENEL develop and implements plans, after a "certification of public interest" by the Ministry of Public Works.	
<b>Japan</b>	Since 1958, the 9 electric power utilities and EPDC has established the widearea coordination system to ensure a reliable supply of electricity and to minimize generation and transmission costs. MITI may recommend the utilities to change or alter their long term and short term plans if they are not proper and apposite for the purpose.	Same as left.	
<b>Portugal</b>	New generating plants are studied and proposed by EDP and submitted to the approval of the Ministry of Industry & Energy. Expansion plan based on system optimization studies. Small generation (<10 MVA) can be decided autonomously subject to an existing regulatory framework. Small hydro requires approval from the Ministry of Environment.	EDP provides grid extensions not only to connect new plants but also interconnections and new lines (and substations) to feed distribution grids with required reliability and according to cost-benefit analysis.	
<b>Romania</b>	Complete responsibility for RENEL for planning, ordering and supervizing the construction, and operating the generation additions of the system.	Complete responsibility for RENEL for planning, ordering and supervizing the construction, and operating the transmission additions of the system.	
<b>South Africa</b>	ESKOM generation expansion planning.	ESKOM transmission expansion planning.	
<b>Sweden</b>	It is up to the utility to decide. When the system is getting too tight to insure proper and safe delivery because of increased demand of electricity, the marginal cost of electricity gets higher than the cost of producing more electricity and that triggers investments in new generation capacity.	The Swedish government has assigned to Svenska Kraftnat, the state owned utility, to provide for necessary transmission in the so called "national grid". It is operated under a fixed rate of return to the owner. Svenska Kraftnat thereby has an obligation to make sure there is sufficient capacity in the main transmission system.	
<b>U.S.A.</b>	Utilities develop and implement plans. Provide needed funds.	Utilities develop and implement plans. Provide needed funds.	

## System development procedures (continued)

### B. Governmental approval procedures

#### I. Generation additions

	Most important authorities	Need for project	Environmental impact	Permits	Safety
<b>Australia</b>	Energy planning is a State responsibility (not Federal) and different procedures apply in each state. Generally a public inquiry process is used by an independent panel or a quasi legal licensing board. Environmental and Planning Departments, Energy Department, Utility.	Energy Department, Ministerial approval, Utility, Public consultation on options.	Environmental Department assessment, EIS prepared by utility generally with independent expert input, Extensive public consultation.	Planning Departments (in some cases utility is licensing authority).	Environmental Department, Utility.
<b>Finland</b>	Electricity Act, Nuclear Act, Hydro Act. Ministry of Trade and Industry.	See flow charts.	Review of environmental impacts on general level must be included in the application.	Permits according to about 15 different acts are required before construction.	The Finnish Centre for Radiation and Nuclear Safety controls safety of nuclear plants in licencing, construction and operation stages.
<b>France</b>	Minister of Industry and Research.	Ministry approve plans. Legal procedure of public utility declaration.	Impact study: with public enquires, for thermal, nuclear or hydro power stations.	Classified establishment permit, public utility declaration.	EDF must prepare preventive measures in case of accident, especially for nuclear plants.
<b>England, Wales</b>	Secretary of State for Energy and Local Authorities (local Government).	Justified by generator - but new legislation which led to privatisation encourages competition. CIPE approve ENEL plants.	Responsibility of generator (applicant for planning permission).  A complex procedure is needed. A law prescribes the setting up of the "Evaluation of the Environmental Impact" (VIA) for any thermal plant exceeding 300 MW thermal. Another law establishes the steps to be followed for the implementation of the VIA.	Planning Consent from Secretary of State for Energy, but there are also various other permits.  A Decree of the Prime Minister, having the power of a law, establishes the siting procedure. A public enquiry is foreseen and any citizen can present his considerations. The Ministry of Industry sign a Decree for the "Construction and Operation" of each plant. Before arriving at such decree, the Regions and Local Municipalities are compulsory consulted.	(consents) e. g. Her Majesty's Inspectorate of Pollution.  Presently no nuclear unit is in operation or planned.
<b>Japan</b>	Ministry of International Trade and Industry (MITI)	MITI, Economic Planning Agency	Local Government Environment Agency, MITI	Electric Power Development Coordination Council, MITI	MITI, Nuclear Safety Commission.
<b>Portugal</b>	Ministry of Industry and Energy (MIE), Secretary of State for Energy, Directorate General of Energy. Legal procedures for private ownership to be approved by MIE.	EDP decides, according to expansion plans and demand projections when to start a new project.	Must be in accordance with EEC Directive on large combustion installations; Environmental impact study required, permit of Ministry of Environment is required.	From Directorate General of Energy and from municipal authorities.	Not a major problem. Dams submitted to a detailed Regulation.

## System development procedures

### B. Governmental approval procedures

#### 1. Generation additions (continued)

<b>continued</b>					
	Most important authorities	Need for project	Environmental impact	Permits	Safety
<b>Romania</b>	Ministry of Industry	Compulsory	Impact on the environment of the projected generation addition is necessarily included in the project.	Permits from about 10 different authorities are required. Local authorities, environment impact, water sources, defense HQ, civil aviation, transportation, historical monuments, agriculture, forestry.	National Committee for Nuclear Activities control gives permits referring NPP's safety in the licensing, siting, construction and operation stages.
<b>South Africa</b>	National Electricity Control Board.	ESKOM Management Board and ESKOM Electricity Council must approve.	ESKOM Environmental Investigations and Government Environmental Pollution Officer.	Statutory Governmental and Provincial Authorities.	Machinery and Occupational Safety Act/Regulations and for nuclear the Atomic Energy Board.
<b>Sweden</b>	To Vattenfall; Ministry of Industry, National Energy Administration, National Environment Protection Administration.	The individual company decides when it is suitable to start a power project according to the individual planning situation.	Permit in accordance with the Natural Resources Act and concession in accordance with the Environment Protection Act.	See "Environmental Impact". At present there is a ban on building major new hydropower stations and nuclear power stations. Only regulations for thermal power plants are therefore of interest. (There would otherwise be several more procedures to be considered in the case of new hydro or nuclear power.)	Refers mainly to regulations concerning nuclear power and the construction of dams. They have some relevance for upgrading of existing stations, but they are not viable for new generation capacity.
<b>U.S.A.</b>	State utility commissions. State environmental authorities. Federal Energy Regulatory Commission. Federal Environmental Authorities.	States approve plans and give certificates of necessity.	Federal, state and local governments review and approve environmental impact statements.	As many as 50 permits from different government organizations required before construction can begin.	Federal government (Nuclear Regulatory Commission) certifies that nuclear plants meet all requirements - grants approval in two stages: construction license and operating licence.

## System development procedures

### B. Governmental approval procedures

#### I. Generation additions (continued)

	For financial arrangements	For tariffs
<b>Australia</b>	Large projects such as power station are subject to State government approval. Utilities are basically self financing with new capital works now being funded primarily from revenue with only limited new capital borrowings to prevent further capital indebtedness of the power industry.	Tariff proposals are prepared by utilities and they are subject to State Government approval.
<b>Finland</b>	None	None. Authorities can interfere in a matter if some utility takes unfair advantage of its dominant position.
<b>France</b>	Agreements between EDF and Ministry of Finance about reducing the dept in the future.	Legal agreement between EDF and Government about tariffs and tariffs increases policy.
<b>England, Wales</b>	Generator Finances	Prices for electricity are governed by the Pool (managed by National Grid Company) - the market place. Despatch of electricity determined by price of electricity bid into the Pool by generators. (This can be supplemented by bilateral generators/distributor contracts). Also statutory bodies with responsibility for the environment. Also Department.
<b>Italy</b>	Interministerial Committee for Credit and Savings (CIRC) approve the ENEL request of emission of bonds; the State guarantees the amount put on the market (subjected to the approval of the Bank of Italy).	
<b>Japan</b>	For financing /Internal funds / Foreign bonds / Convertible bonds / Borrowing through treasury investments and loans.	The electric utility has to establish a rate schedule in which are set forth the rates for supplying electricity and supply conditions, and has to file it with MITI for approval. The same procedure will be taken in the case of revising the rate schedule. MITI can give the approval when the rate for the supplying electricity is calculated on the basis of the fair and proper cost under efficiency utility management, and plus the fair and proper profits.
<b>Portugal</b>	Government and stock exchange commission approval is required for bond emissions or foreign borrowing. (Ministry of Industry and Energy and Ministry of Finance).	Proposal made by EDP. Negotiated with Ministry of Trade (Directorate General of Competition and Prices. Approval by this Directorate. Rules are no longer published in the Official Journal but merely published in newspapers.
<b>Romania</b>	Ministry of Finance and Economy	In the transition to a market economy the Government still authorises the tariffs.
<b>South Africa</b>	ESKOM financing	ESKOM proposals, National Electricity Control Board reviewed, promulgated in Government Gazette.
<b>Sweden</b>	Generator finances by raising fundings from the money market.	Vattenfall sets prices free and the level is affected by the rate of return requested by the state. Prices are negotiated with representatives from the industry, the government antitrust agency and representatives from local distributors. Vattenfall has so far set the general price level in accordance with its dominant position in the market for electric power. Prices are even published for the 130 kV system. Due to deregulation of the electricity market the pricing procedures are going to change. All customers can appeal to a special court if they feel that prices are unreasonable. Its decision cannot be appealed.
<b>U.S.A.</b>	Federal Government (Securities and Exchange Commission) controls issuance of stock and bonds by utilities.	States approve for local consumers. Federal Government for interstate transactions between utilities. (See Transmission additions.)

**System development procedures (continued)**  
**B. Governmental approval procedures**  
**2. Transmission additions**

	<b>Most important authorities</b>	<b>Need for project</b>	<b>Environmental impact</b>	<b>Permits</b>
<b>Australia</b>	Generally a public inquiry process is used by an independent panel or a quasi legal licensing board. Environmental and Planning Departments, Energy Department, Utility.	Energy Dept. Ministerial approval, Utility, Public consultation on options.	Environmental Dept assessment, EIS prepared by utility generally with independent expert input, Extensive public consultation.	Planning Depts (in some cases utility is licensing authority).
<b>Finland</b>	Ministry of Trade and Industry, Regional planning authorities.	See flow chart.	Review of environmental impacts on general level must be included in the application.	Permits according to about 5 different acts are required before construction.
<b>France</b>	Minister of Industry and Research.	Ministry approve plans. Legal procedure of public utility declaration.	Impact study, specific to EHV lines.	Approval of the layout of lines.
<b>England, Wales</b>	Department of Energy. Local authorities (local government).	Has to be justified by National Grid Company - but is required by generator/Distributor.	Prepared by National Grid company.	Consent for line needed from Secretary of State for Energy. (Local authority must be consulted). For substations by local authority - and, on appeal if local authority objects, by Secretary of State for Environment.
<b>Italy</b>			A general law constitutes a framework aiming at enforcing the respect of the landscape in all the country. In this framework, respect of regional plans is required. Particular constraints can stem from the obligation to preserve the artistic heritage.	Various permits (almost 20) are necessary by various Ministries. Regional and local bodies for the territories concerned.
<b>Japan</b>	MITI	MITI	Local governments, Environment Agency, MITI	MITI
<b>Portugal</b>	Ministry of Industry and Energy (MIE), Secretary of State for Energy, Directorate-General of Energy.	DP decides, according to expansion plans and demand projections when to start a new line or substation. Proposal is included in annual Investment Programme.	Only required for 220 kV and 400 kV overhead lines (requires study on environmental impact).	Layout of lines must be approved by Directorate General of Energy and Municipal authorities.
<b>Romania</b>		Compulsory	Studied following the method proposed by CIGRE WG 23-04.	Permits from about 10 different authorities are required.
<b>South Africa</b>	National Electricity Control Board.	ESKOM Management Board and ESKOM Electricity Council must approve.	ESKOM Transmission Environmental Investigations.	Statutory bodies e.g. Roads Department, Department Post and Telegraph etc. as well as land owners.
<b>Sweden</b>	Ministry of Industry, Ministry of the Environment, National Energy Administration, National Environment Protection Administration.	A strong power balance in combination with recent strengthening of the existing grid, reduces the need for new transmission capacity to a minimum. Present work is focused on upgrading of transmission lines and maintenance.		
<b>U.S.A.</b>	State Utility Commissions, State Environmental Authorities.	States approve plans and gives certificates of necessity.	Federal, state and local governments review and approve environmental impact statements.	Building permits needed from local government.

## System development procedures

### B. Governmental approval procedures

#### 2. Transmission additions (continued)

	For financial arrangements	For tariffs
<b>Australia</b>	As for power stations.	As for power stations.
<b>Finland</b>	None.	None. Authorities can interfere in a matter if some utility takes unfair advantage of its dominant position.
<b>France</b>	Agreements between EDF and Ministry of Finance about reducing the debt in the future.	Legal agreement between EDF and Government about tariffs and tariffs increases policy.
<b>England, Wales</b>	National Grid Company finances, and is responsible for raising the finances.	National Grid Company has a system of charging users (generators and distributors) for the items of new connections most closely associated with the new reason for developing the system, for example the more immediate lines in the case of a new power station. "Infrastructure" costs are carried by National Grid Company as a whole, rather than the client (Infrastructure here refers to more remote development caused by the new power station or substation).
<b>Italy</b>	No specific procedure.	They are identical all around the country. They have a twofold structure: - the tariff itself, - a portion related to the fuel price. No automatic fuel adjustment clause exists; both components need the political intermediation in the past. Often slow updating of the two component was recorded. Particular selling prices for renewables (wind, solar, geothermal, hydro ...) and CHP production by NUGs to ENEL have been recently (14.1.90) approved by CIP (Interministerial Committee for Prices: CIP 34.1.990). Other actions incentivating the NUGs production, mainly by Combined Cycles, and corresponding to a partial "deregulation" of the generation, have been approved by the Parliament just at the end of December 1990, in the framework of the National Energy Plan. (laws 9/81-10/91) For generating plants having energy saving goals, financial incentives (L. 2 600 bn) are available over the next three years (10/91). Incentives up to 30% (CHP) of the capital cost can be given (Art 11).
<b>Japan</b>	Same as Generation Additions.	Same as Generation Additions.
<b>Portugal</b>	Government and stock exchange commission approval is required for bond emissions or foreign borrowing. (Ministry of Industry and Energy and Ministry of Finance).	Proposal made by EDP. Negotiated with Ministry of Trade (Directorate General of Competition and Prices. Approval by this Directorate. Rates to buy electricity from independent producers are defined by law and are based on selling rates to clients.
<b>Romania</b>	Same as Generation Additions.	Same as Generation Additions.
<b>South Africa</b>	ESKOM financing.	ESKOM proposals, National Electricity Control board reviewed, promulgate in Government Gazette and negotiated tariffs with Neighbouring States for tie line power.
<b>Sweden</b>	Svenska Kraftnät can request for investment funding from the state.	So far tariffs have been cost related according to the rate of return of investment. Each power station pays a fee to be connected and a fee for the amount of power and distance it is transmitted. This tariff structure is going to be changed, but it is at present unclear how it will be in the future.
<b>U.S.A.</b>	Federal government approves, where more than one utility is involved, with the exception of Texas.	Federal government approves for interstate transactions. All transmission transactions, except in "isolated" states, are considered interstate.

System development procedures (continued)		
B. Governmental approval procedures		
3. Types of installations submitted to special legislation		
	Generation	Transmission
Australia	All large projects.	All large projects.
Finland	Nuclear, hydro.	A distributor, which has a franchised territory, can construct distribution network $\leq 20$ kV without any permit (Electricity Act).
France	Conventional thermal and nuclear power station. Hydraulic generation structures with a power of over 500 MW.	Transmission (non underground) structures with a voltage greater than or equal to 225 kV.
England, Wales	Various health and safety legislation and emissions. Special licence required for nuclear stations.	Overhead Power Lines require the consent of the Secretary of State for Energy.
Italy	The selling prices of NUGs production has been fixed by the Interministerial Committee for Prices (CIP), April 1992. They are based on the avoided cost plus incentives differentiated according to the nature of the fuel used. A "Framework agreement" among all the interested parties was also signed at the beginning of June (and should be in force within 60 days) after negotiations carried out under the supervision of the Ministry of Industry.	
Japan	Nuclear	None.
Portugal	Large plants; Decree-law 100/91 dated March 1991. Special legislation for small independent producers.	Decree-law 99/91 dated March 1991, but further regulation on organization, ownership and operation still under preparation.
Romania *)	None is forbidden, but they are subjected to special legislation.	None.
South Africa	Nuclear to Atomic Energy Board - Thermal location to Government Pollution Officer - Hydro to Water Affairs and Environmental Impact.	High voltage to Department Agriculture and Health effects assurance.
Sweden	Nuclear power: SSI Radiation Protection Institute. The government agency with responsibility for everything to do with radiology. They are authorized to stop production if necessary. KSI, Nuclear Power Inspection agency. They issue permission for production and sets rules for allowed production levels when certain components fail and for how long production can run according to the law for nuclear activities.	"Erlagen", The law on electric power, which states that authorized distributor is obliged to deliver electricity within its authorisation area. The distributor also has the right to receive all of its needs for electricity from the authorised transmission part within that part of the country for fulfillment of the distributors undertakings. This legislation is also to be revised.
U.S.A. *)	None are "forbidden" by law. Nuclear and Hydro have special requirements.	None.

\*) Types of installations that are forbidden by law

## System development procedures (continued)

### B. Governmental approval procedures

#### 4. Overall balancing of economic, environmental and energy policy

<b>Australia</b>	<p>Generally the integration is the weakest link in the planning process and can lead to confusion in the process. The integration generally takes place by consultation between the relevant Government Departments for Conservation, Environment, Planning, Energy and Finance with the utility taking the lead role for coordination. This area definitely justifies further study to investigate effective methods.</p>
<b>Finland</b>	<p>Authorities aren't responsible. Authorities deciding on licencing may consider the overall balancing, but mainly on subjective basis. There are no given forms for checking the balance. The project must not be in contradiction with energy policy program. Environmental impacts on general level are included in the application. The most difficult part of this "triangle problem" is the relation to the national economy. Energy forecasts are based on certain assumptions of economic growth which may not be in harmony with goals of governmental policy.</p> <p>We have to learn the language of economists and show how our alternatives affect on balance of payment, unemployment etc.</p>
<b>France</b>	<p>Unofficial dialogue at high level between Economic, Environmental and Energy Ministry members.</p> <p>Contractual links established between EDF and several ministries (Environment, Finance, Industry)</p>
<b>England, Wales</b>	<p>As regards electricity, the generating companies determine whether they wish to bring new stations on to the system. The National Grid company must offer a new connection, with terms such as costs. The determining authority (Secretary of State for Energy or local authority/Secretary of State for Environment) decides whether a consent is given, after a public inquiry if necessary. Major issues of "need" can be an issue at an Inquiry. It needs to be stressed that the whole "need" case in this country has changed.</p>
<b>Italy</b>	<p>The National Energy Plan (PEN), approved by the Government in August 1988, constitutes a general framework for the Energy actions. Two dedicated Decrees, aimed to put into actions the PEN Directives, have been approved by the Parliament just on December 21st, 1990 and are now laws, respectively concerning the Energy Savings and the Development of Renewables (10/91) and various Institutional Aspects (9/91) amongst which the above said partial deregulation of NUCs production. Such laws also foresee the resources necessary to funding the PEN. A PEN revision is being prepared by the Ministry of Industry, just to take into account the modification in the mentioned and international framework from August 1988 up to now.</p>
<b>Japan</b>	-
<b>Portugal</b>	<p>Major goals of energy policy: - Diversify dependence (both geographical and by fuel); introduction of natural gas in 1996, increase of coal share, reduction of oil. - Promote energy conservation, co-generation, small hydro and use of biomass. Use financial incentives and regulations. - New regulatory frame work. Promotion of market forces and privatization of refineries and gas supplies; new regulatory framework for the power sector with possibility of vertically separated utility industry (under consideration). - National Energy planning process as a tool to identify potential constraints and to study alternative policies. - No strong environmental constraints until now.</p>
<b>Romania</b>	<p>Balancing is not directly and specifically required. The subject is subjacent and more and more apparently present nowadays. Anyway a definite recipe for such an overall balancing is being unobtainable for the moment.</p>
<b>South Africa</b>	<p>Depending on a countries energy needs and natural resources an appropriate energy policy will be evolved. This policy will have a direct influence on what is economic and to what amount an impact on the natural environment will be tolerated. This will then be measured against the subsequent economic upliftment and improved man made living environment.</p>
<b>Sweden</b>	<p>The balance is set by environmental standards that sets the cost for new power plants on one hand and the economics for new power in the system. Energy policy has for the last 15 years had a considerable impact on the planning on new power production in Sweden because of oil price shocks in both directions, nuclear accidents, in other countries reluctance to use the remaining rivers for hydropower, and the greenhouse effect. Conditions for longterm planning are gradually improving, due to a more stable parliament majority behind the present energy policy.</p>
<b>U.S.A.</b>	<p>No organized governmental procedures for obtaining such balance. Utilities attempt to make reasonable compromises.</p>

## System development procedures (continued)

### B. Governmental approval procedures

#### 5. Insuring full consideration of long term costs and effects as well as short term

	Economic evaluation procedures	Environmental evaluations
<b>Australia</b>	Utilities use discounted cash flow techniques for comparison along with questions of the ability to finance projects within overall budget contracts and national global borrowings. The discount rate is often set higher than current market discount rates to reflect the short term requirements.	Environmental evaluations are carried out by Government environment departments in accordance with State and Federal legislation. This usually does not allow cost to bias environmental considerations.
<b>Finland</b>	No procedure. Utilities bear full economic responsibility for taking into account all short and long term costs in their sales tariffs.	Emission limits are defined by authorities. Investments of the cleaning devices are included in the costs of the project. Emission charges and taxes are included in the cost calculations.
<b>France</b>	Technical and Economical studies take into account "long term costs" based on the past and simulations of the future.	No economic criteria using explicit or implicit cost approach of the damages made on environment. Projects are classified according to difficulties for construction, which depend on the environmental constraints.
<b>England, Wales</b>	Same as under 4. the page before.	Same as under 4. the page before.
<b>Italy</b>	-	-
<b>Japan</b>	Long-term Electric Power Facilities Development Plan (by Central Electric Power Council: 9 EPCs and EPDC). The plan emphasizes (1) power source diversification with a balance between economic efficiency and security of supply, (2) flexible configuration of facilities able to cope with changes, (3) cost reduction.	Environmental Survey and Impact Estimation.
<b>Portugal</b>	Base on real costs and benefits for the next 25 years. Discounted Investments (discount rate fixed by law equal to them used in the National Energy Plan: 10%).	Fulfilling of existing regulations (thermal power plants). No economic criteria using explicit or implicit quantification of externalities. Investments in cleaning devices in power plants are included in the cost of the plant and reflected in tariffs.
<b>Romania</b>	No procedure. Utilities bear full economic responsibility for taking into account all short and long term costs in their sales tariffs.	Emission limits are defined by authorities. Investments of the cleaning devices are included in the costs of the project. There is a general tendency to emission charges and taxes. They are included in the cost calculations.
<b>South Africa</b>	Ensure a full phasing cost structure understanding to provide adequate project benefits and motivation.	Comprehensively done gives a wider scope and understanding of the project and its impact and enables project adjustment before making irreversible costly mistakes.
<b>Sweden</b>	They are based on real interest evaluation of the economics and based on assumptions on economic growth and marginal values of new power production for the near future and up to 25 years from now.	Through the permit processing and restrictions on emissions from fuels used for power generation.
<b>U.S.A.</b>	Long range consideration frequently ignored through use of "avoided cost" approach for economic evaluations.	Evaluation made against criteria established by government, Federal, state or local.

<b>System development procedures (continued)</b>	
<b>B. Governmental approval procedures</b>	
<b>6. Stability of decisions</b>	
	<b>Possibility of changes in requirements while projects are under construction</b>
	This would require in general a full re-opening of the justification and environmental impact process.
<b>Australia</b>	<p>Appeal processes exist in some states. Generally the public appeal process is embodied in the consultation for the decision with no formal appeal process, except for the process not being correctly followed.</p> <p>Appeals are possible but quite seldom. Land-use procedures are most critical. Decisions of approval procedures are final.</p>
<b>Finland</b>	<p>Possibilities before the D.P.U. (Unofficial dialogue between EDF and regional Authorities, MP's, conciliators, majors); even after the D.P.U. (in the construction permit procedure.)</p> <p>A local authority can object which makes a public inquiry or appeal mandatory. An inquiry/appeal can also be called at the discretion of Secretary of State for Energy (for overhead lines) or Environment (substations) at their discretion.</p>
<b>France</b>	<p>All changes in the regulations must be incorporated in a project, even if it is under construction.</p> <p>Conditions are normally set at the time planning permission (substations) or consent (lines) are granted.</p>
<b>England, Wales</b>	<p>Law suit.</p> <p>Changes in regulations must be incorporated a project even if already under construction (e.g. environmental constraints).</p>
<b>Italy</b>	<p>Minor changes of requirements may be possible, but have been unusual. Nuclear safety requirements are tried to be decided as far as possible before construction.</p> <p>Should not be tolerated with correctly investigated and approved projects unless very well reasoned, and the objector understands can be held liable for delay costs.</p>
<b>Japan</b>	<p>Very rare but can apply for example for safety regulations on nuclear power.</p>
<b>Portugal</b>	<p>Government regulations that have changed while a project is under construction must be incorporated in the project, often requiring great extra cost. (A good example is nuclear plant construction.)</p>
<b>Romania</b>	
<b>South Africa</b>	
<b>Sweden</b>	
<b>U.S.A.</b>	

## Approaches used to influence government policy in key electric power areas

### Methods used to inform public

	Full and honest disclosure of plans and consequences at public meetings	Publicity issued by utilities	Television, radio, and press interviews	Joint projects with universities	Activities of professional societies
<b>Australia</b>	A very wide range of methods are used. Generally comprehensive information is provided, and utility representatives are open at meetings with the public, and published materials are directed to facts rather than opinion. Media interviews are given on the same basis but the media approach is generally biased against the utility and new projects. There has been little activity with universities and professional society apart from technical papers.	Utilities are not always trusted.	Success requires simplified and popular information, when opponents can easily go into details. Good at creating images.	Very useful when neutral and independent information is needed.	Professional societies have not been active in Finland. They are not widely known. Good experiences on the activities of the associations of utilities.
<b>Finland</b>	Honest information is always necessary.	Utilities are not always trusted.	Success requires simplified and popular information, when opponents can easily go into details. Good at creating images.	Very useful when neutral and independent information is needed.	Professional societies have not been active in Finland. They are not widely known. Good experiences on the activities of the associations of utilities.
<b>France</b>	Public meetings have to be carefully prepared, so that every choice of the project may be explained and justified.	Maybe suspect of showing too much favour to utility side.	Explanation of the project to non specialist is a difficult but necessary task.	Probably the best way to deeply influence public attitude towards energetic, environmental and technical problems; but obviously a long term action.	A sometimes good and impartial way to develop dialogue with the public.
<b>England, Wales</b>	Early availability of information is important. "Open house" evenings are better than public meetings (to avoid "them and us").	Yes. NGC is expanding the type of information it has available to address different audiences.	Yes. Mostly in reaction to requests, but we are trying to adopt a more proactive response.	Not as yet.	Not as yet.
<b>Italy</b>	Yes.	Yes.	Yes.	Yes.	Yes.
<b>Japan</b>	Plans and consequences will be disclosed in the Public Hearing and Committee Meetings of both local and national government.	Utilities issue many kinds of document to get better understanding of the public on plans and consequences.	Some programs in mass-media are supported by the utility to publicize the necessity of energy, utilities' effort for environment protection and nuclear safety, etc.	In Japan the academic field is thought to be kept neutral. There is some limit for utility to approach universities for particular purposes.	The activity of professional societies in Japan is not necessarily positive in the promotion of particular policy. Some association are organized to support the policy in favour of utility.
<b>Portugal</b>	Yes. Useful to prepare authorities and population.	Yes.	Yes. Sometimes the utility takes the initiative.	Not yet. Benefit seems doubtful.	Yes. Reaches a small number of professionals.
<b>Romania</b>	Starting now.	Seldom.	Sometimes, in crisis periods.	Occasionally.	Starting now.
<b>South Africa</b>	Can be of considerable value in facilitating servitude negotiations.	Can contribute effectively to reduction in fatal contacts in rural areas.	Much better to give the public the true story up front in stead of keeping quiet and then attempting to correct distorted media messages.	Very little benefit experienced to date.	Creating an understanding with non-electricity related professionals can provide better understood information due to a non-specialists more general explanation.
<b>Sweden</b>	Yes.	Yes.	Yes.	Not yet.	Sometimes.
<b>U.S.A.</b>	Can sometimes be helpful, depending on the individuals and manner of presentation.	Information from utility often viewed with suspicion	Helps offset some public comments by those lacking technical knowledge. May have adverse results when interviewer is hostile.	Education of faculty and students is a long-term program showing only limited short-term benefits.	Can be valuable since members are individuals with knowledge and do not represent any vested business or political interest.

## Approaches used to influence government policy in key electric power areas (continued)

### Methods used to dialogue with government officials

	Advance discussion with appropriate government officials	Testimony at public hearings and before various regulatory bodies	Private discussions with key government officials	Education of government officials
<b>Australia</b>	Yes. Generally the process is carefully considered before a project, in consultation with the Government bodies. It is always needed.	There have been Public Hearings for various major lines. The approach is to use well informed officers responsible for the project implementation. Public hearings are a part of nuclear licensing process only. The public hearings are arranged to gather comments from people living in the neighbourhood of the site. Certainly valuable.	Yes. These are recorded and are used to keep the dialogue active. It is always needed.	Information is provided on all aspects of projects to enable the responsible Government authorities, and the public, to have a full understanding for an informed discussion. Instead of "education" I would rather say discussions for better mutual understanding. They are valuable. (In bigger countries the only possibility may be the organized education of officials or common seminars.)
<b>France</b>	-	Certainly valuable.	Mutual understanding of project justification by key Government officials is always efficient and fruitful.	We feel certain it is useful: initiation courses on transmission techniques and network planning have been organized for regional authorities of the Ministry of Industry, to make the dialogue easier.
<b>England, Wales</b>	Consultation with local authorities at an early stage and throughout is important. The process does not cater for consultation with Departments of Energy or Environment until final stages.	Public inquiries are called in certain circumstances, some mandatory (if local planning authority objects), some at the discretion of Secretaries of State. Inquiries are quasi-judicial and adversarial in nature.	These are not part of the official process.	It is important that the Government officials are aware of the challenge that the new organisation of the industry poses for transmission development and NGCs responsibilities, and the importance of the efficient and timely operation of those parts of the process in their hands.
<b>Italy</b>	Yes.	Yes.	Yes.	-
<b>Japan</b>	Day to day contact between Government officials and utility staffs are positively promoted for information exchange and better mutual understanding, which is quite important to establish sound consensus.	The chance and occasion of testimony is not necessarily frequent and effective. But careful preparation will be made for every testimony.	For fair and open decision making the private discussion with key government official is thought to be kept refrained from.	Advance discussion mentioned above is promoted as a good chance for both of them to be educated.
<b>Portugal</b>	Yes, specially with local authorities at an early stage.	No experience until now.	Yes, but it not part of the official procedures.	It is important that government officials and advisors are aware of full implications of new projects and chief of new regulatory framework.
<b>Romania</b>	Could be.	Not used.	Occasionally.	Progressively required.
<b>South Africa</b>	Good for major projects which can have an effect on the National economy.	Only advisable if required by regulatory procedures.	Can have isolated benefits in specific areas such as pollution.	If interest is shown can be very supportive as most political persons do not have an engineering understanding.
<b>Sweden</b>	Yes. Important to have good informal exchange of information with government officials in order to avoid misunderstanding and finding out each others preferences.	Yes.	Yes.	No courses, but discussions.
<b>U.S.A.</b>	Can provide an "early warning" of problems which may be overcome by appropriate adjustments in plans.	Can be valuable, but too often these become adversary procedures with all parties in entrenched positions.	A good way to arrive at necessary compromises.	Can be very valuable since many are political appointees, have little back ground.

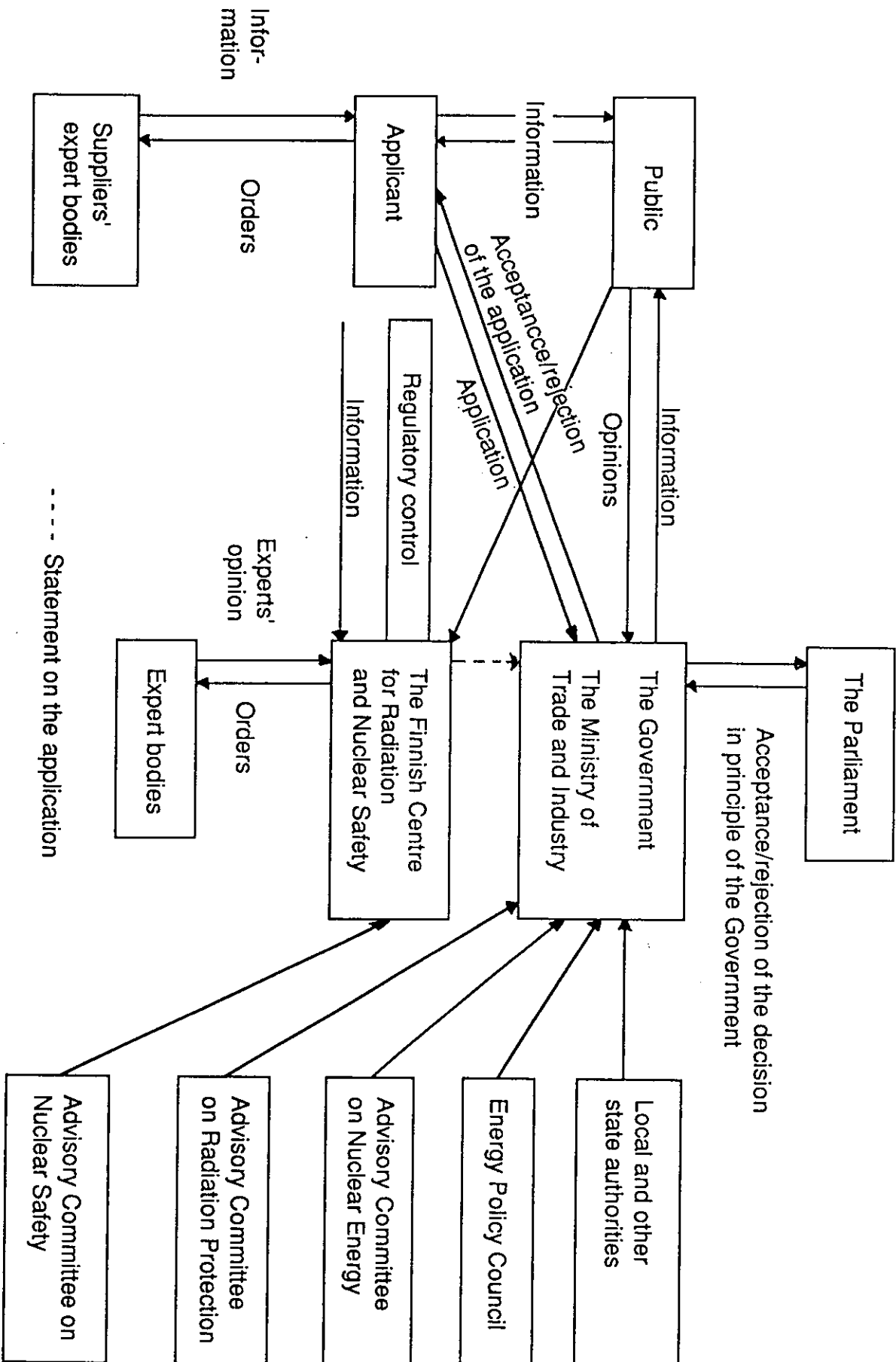
**APPENDIX C2**

**FLOW CHARTS**

# FLOW CHART AUSTRALIA

PHASE	CONSULTATION	DOCUMENTATION	ACTIONS
<b>ENVIRONMENTAL ASSESSMENT AND PLANNING PROCESS</b>	municipal councils regional authorities government departments community groups affected landowners	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>INFORMATION BROCHURE</b> </div>	
		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>NEWSLETTERS</b> </div>	
		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>ENVIRONMENTAL ASSESSMENT DOCUMENTATION</b> </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 5px;"> <b>DETAILED CONSULTATION</b> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <b>PUBLIC DISPLAY</b> </div>
		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>ASSESSMENT REPORT</b> </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 5px;"> <b>DECISION ON ROUTE</b> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <b>GOVERNMENT DECISION</b> </div>
		<hr style="border: 0.5px solid black;"/>	
<b>CONSTRUCTION</b>	municipal councils regional authorities government departments community groups affected landowners	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>NEWSLETTER</b> </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>CONSTRUCT LINES AND STATIONS</b> </div>

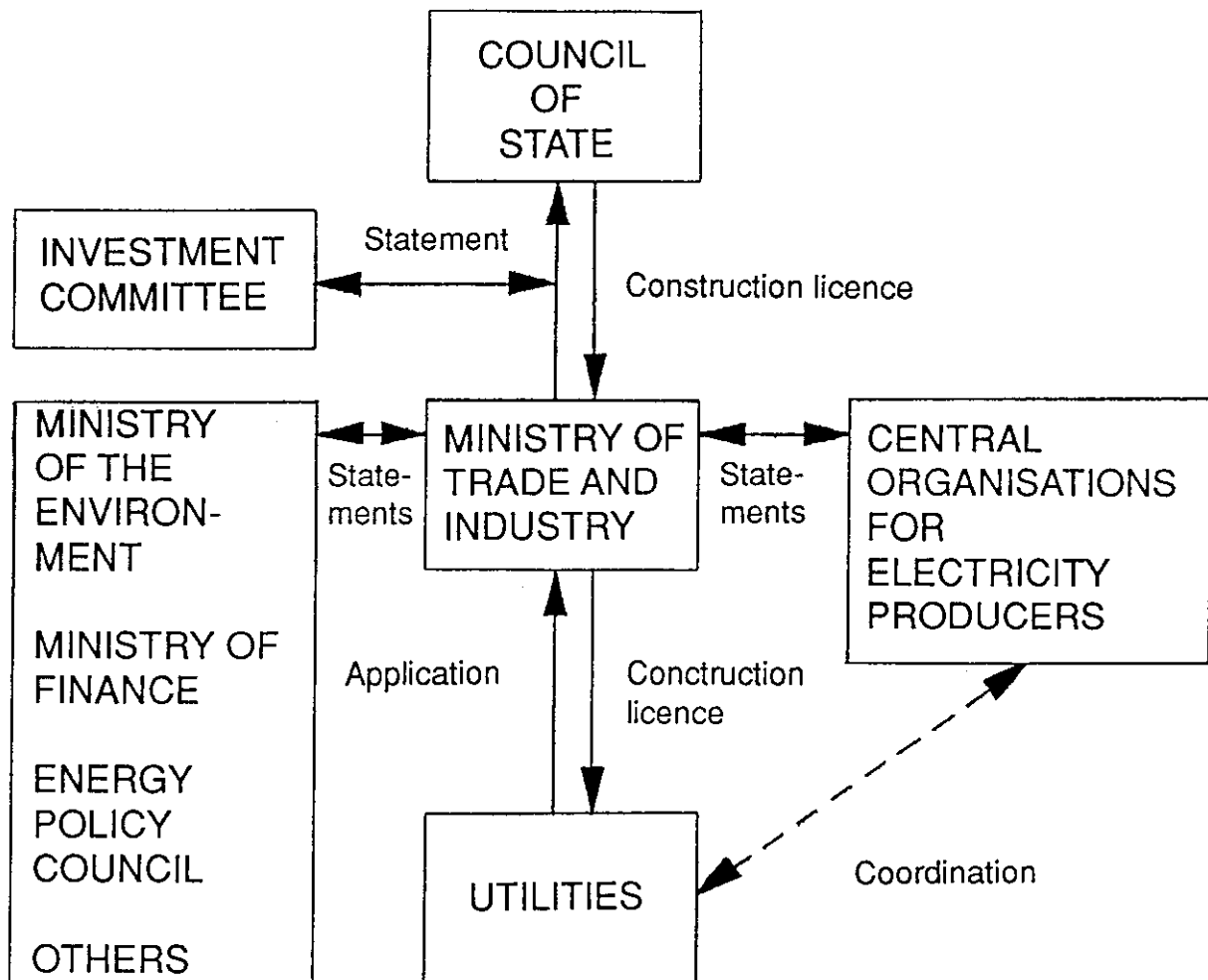
# FLOW CHART FINLAND



Licensing of nuclear power plants in Finland

# FLOW CHART FINLAND

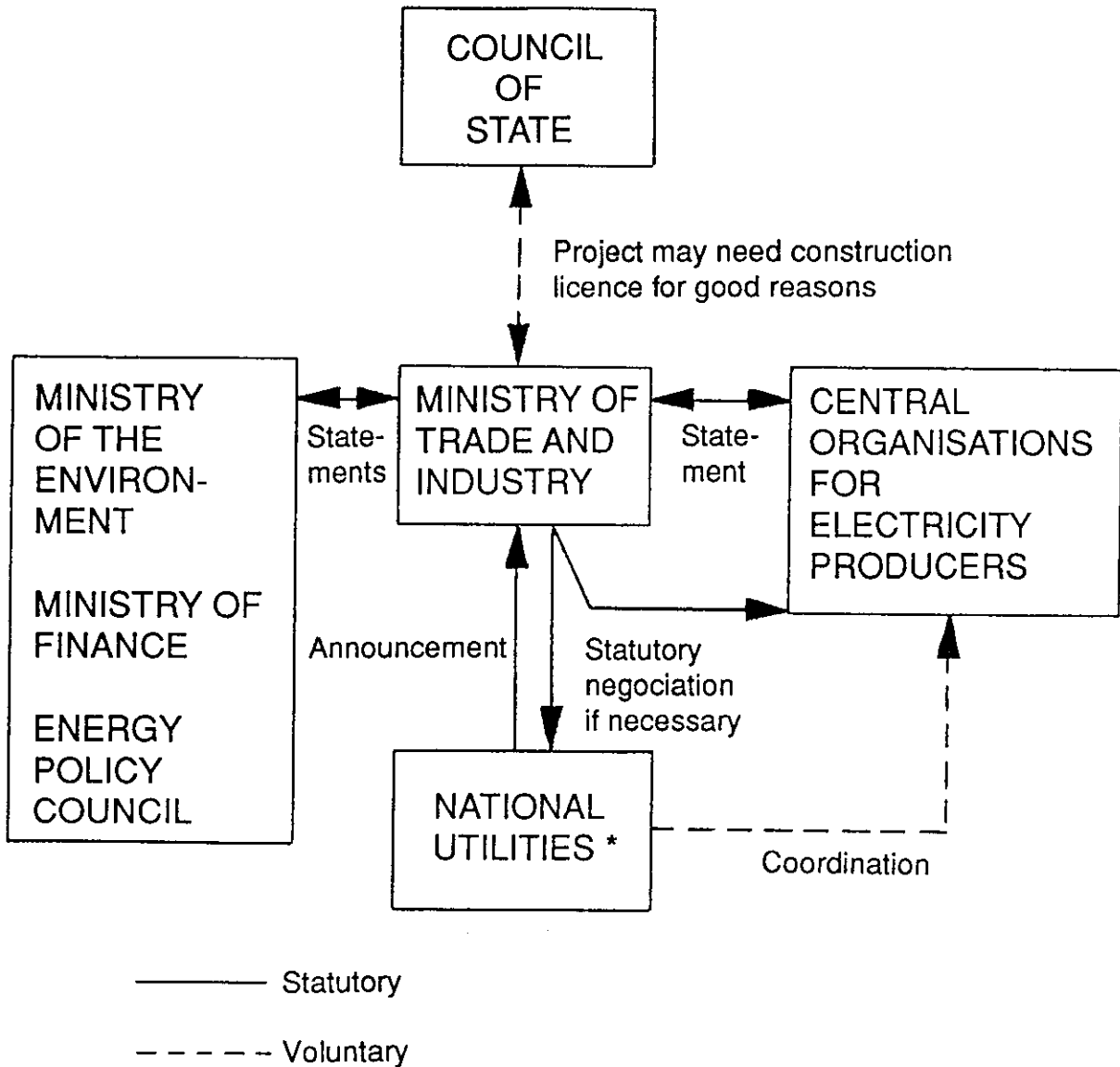
## NATIONAL PROJECT LICENSING SYSTEM (MIN. 250 MW POWER PLANT PROJECTS)



———— Statutory  
- - - - Voluntary

## FLOW CHART FINLAND

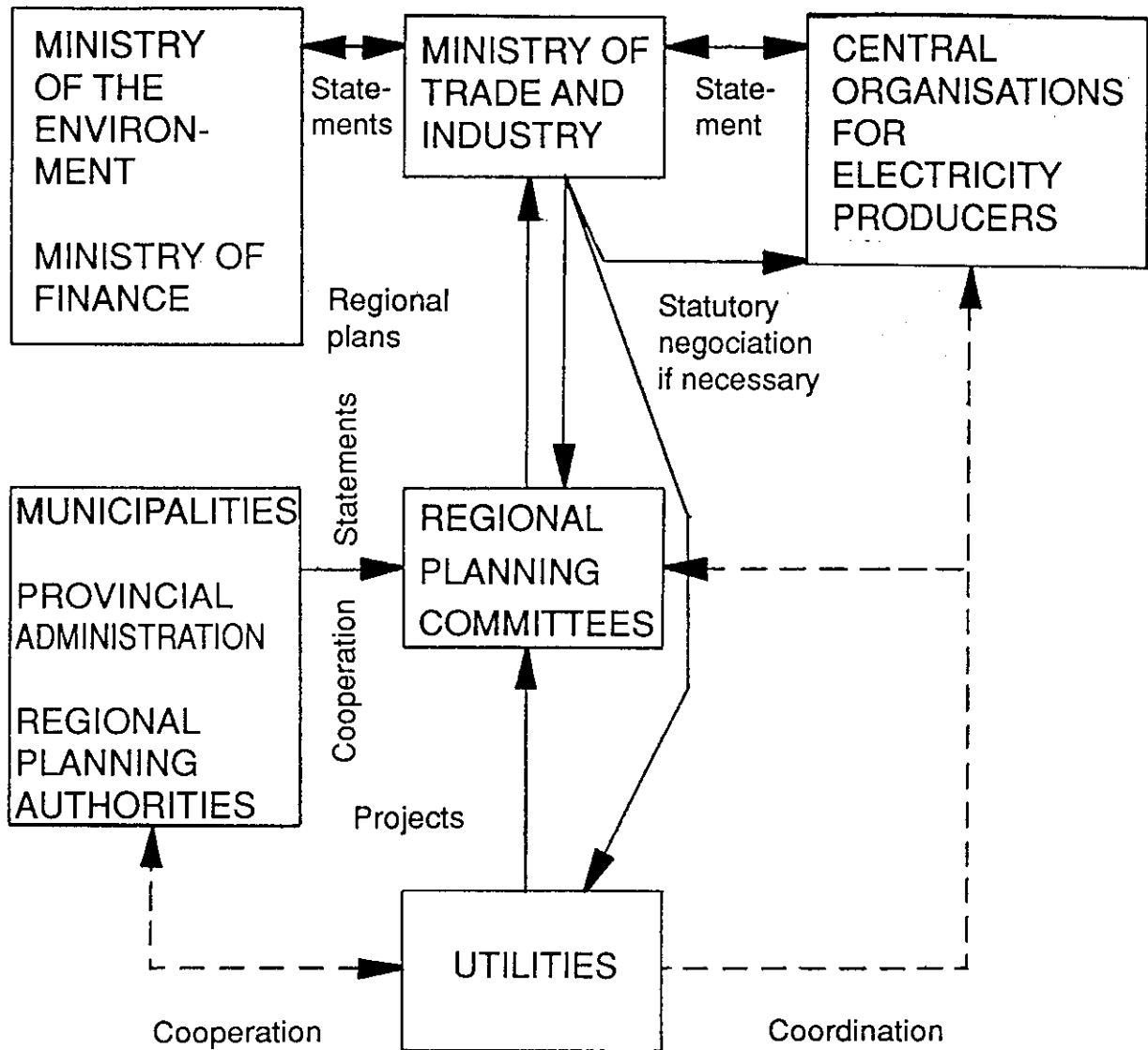
### ANNOUNCEMENT AND NEGOTIATION SYSTEM (MAXIMUM 250 MW NATIONAL POWER PLANT PROJECTS AND NATIONAL TRANSMISSION PROJECTS)



\* The Ministry of Trade and Industry defines on the basis of application

# FLOW CHART FINLAND

## REGIONAL PLANNING SYSTEM POWER PLANTS AND TRANSMISSION EQUIPMENT

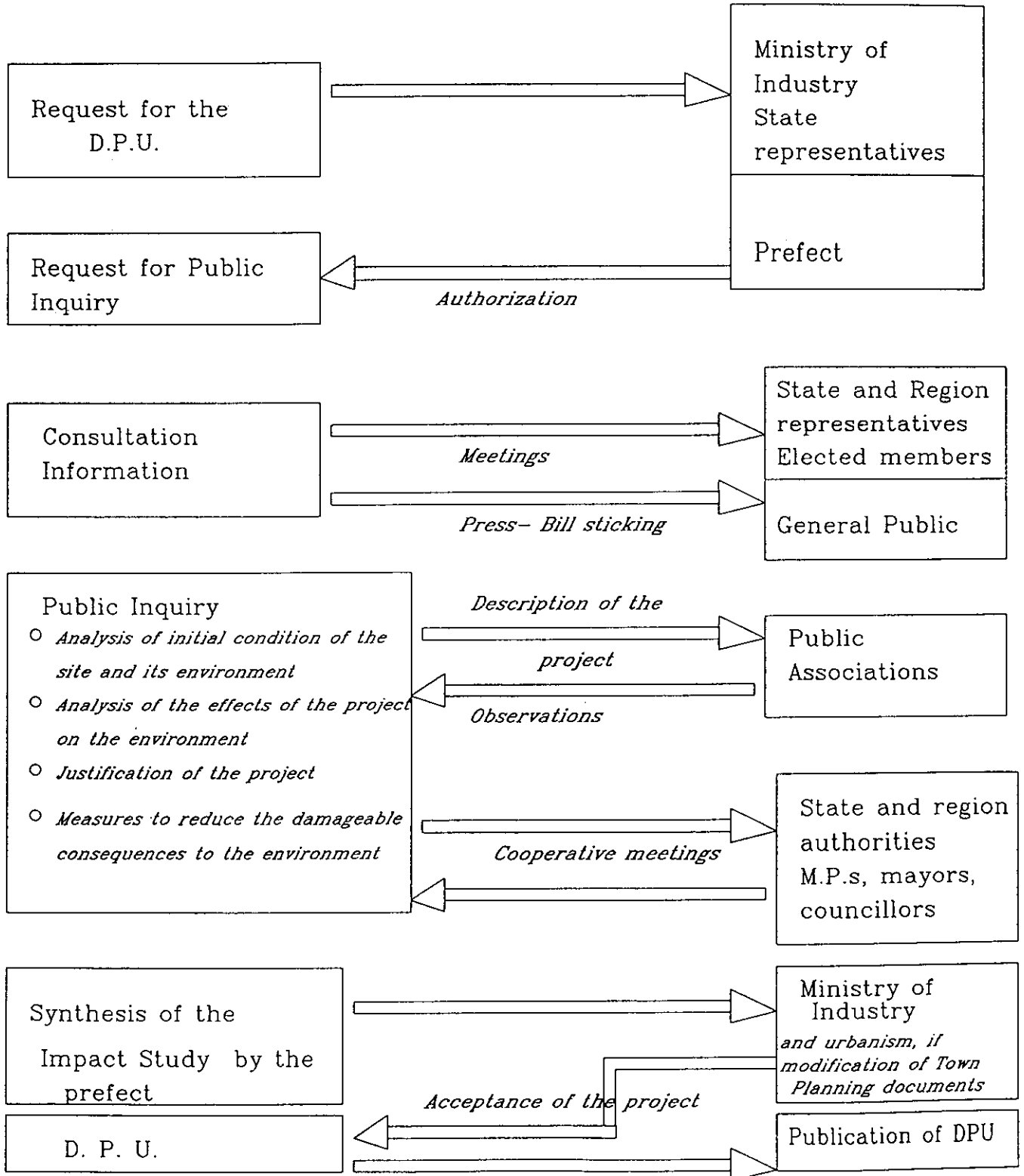


———— Statutory  
 - - - - Voluntary

# FLOW CHART FRANCE

## DECLARATION of PUBLIC UTILITY

*This processing concerns: Conventional and nuclear power station  
 Hydraulic generation structures (power > 500kW)  
 Non underground transmission structures (voltage > 225kV)*



## FLOW CHART FRANCE

SUMMARY OF THE COMPLETE PROCESSING  
Example of a EHV line.

### IMPACT STUDY

Investigations to choose the trip of land with the least impact.  
Consultations of regional authorities, prefect, M.Ps, mayors of the concerned municipalities

*Definition of a route on a 1/25000 scale with an analysis of the residual constraints*

DECLARATION OF PUBLIC UTILITY (See details in annex)

Public inquiry, information, official consultation...

### DETAILED STUDIES

Topographic surveys

Meetings with landowners, mayors, agricultural associations

Request for the BUILDING PERMIT

Consultation of mayors and regional authorities

Request for Authorisation of EXECUTION PROJECT

Consultation of mayors and regional authorities

Acceptance of landowners

Non acceptance of landowners

Convention

Request of the right of way for the line Inquiry

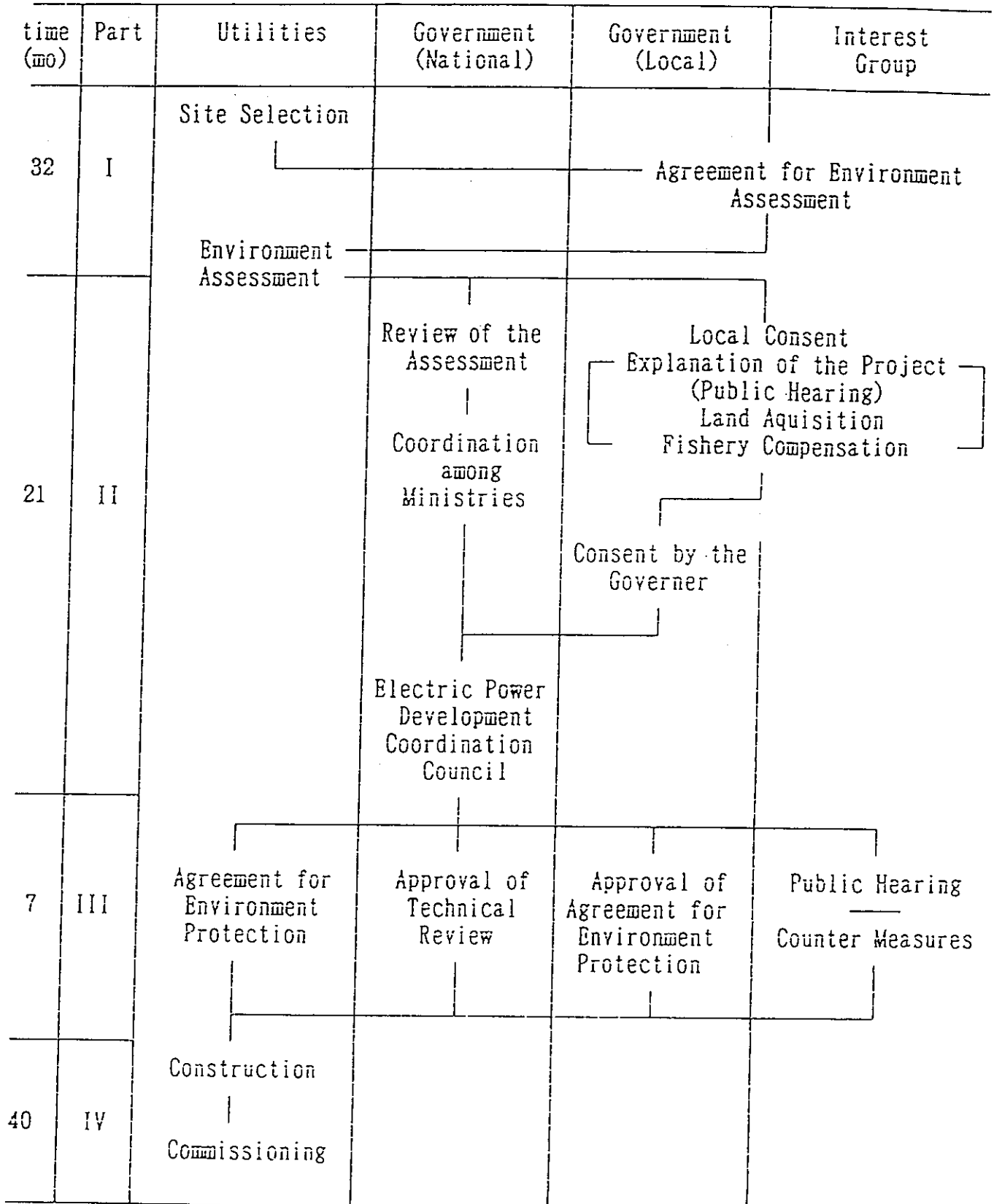
*Decree of the prefect*

CONSTRUCTION OF THE LINE

# FLOW CHART JAPAN

## From siting to commissioning

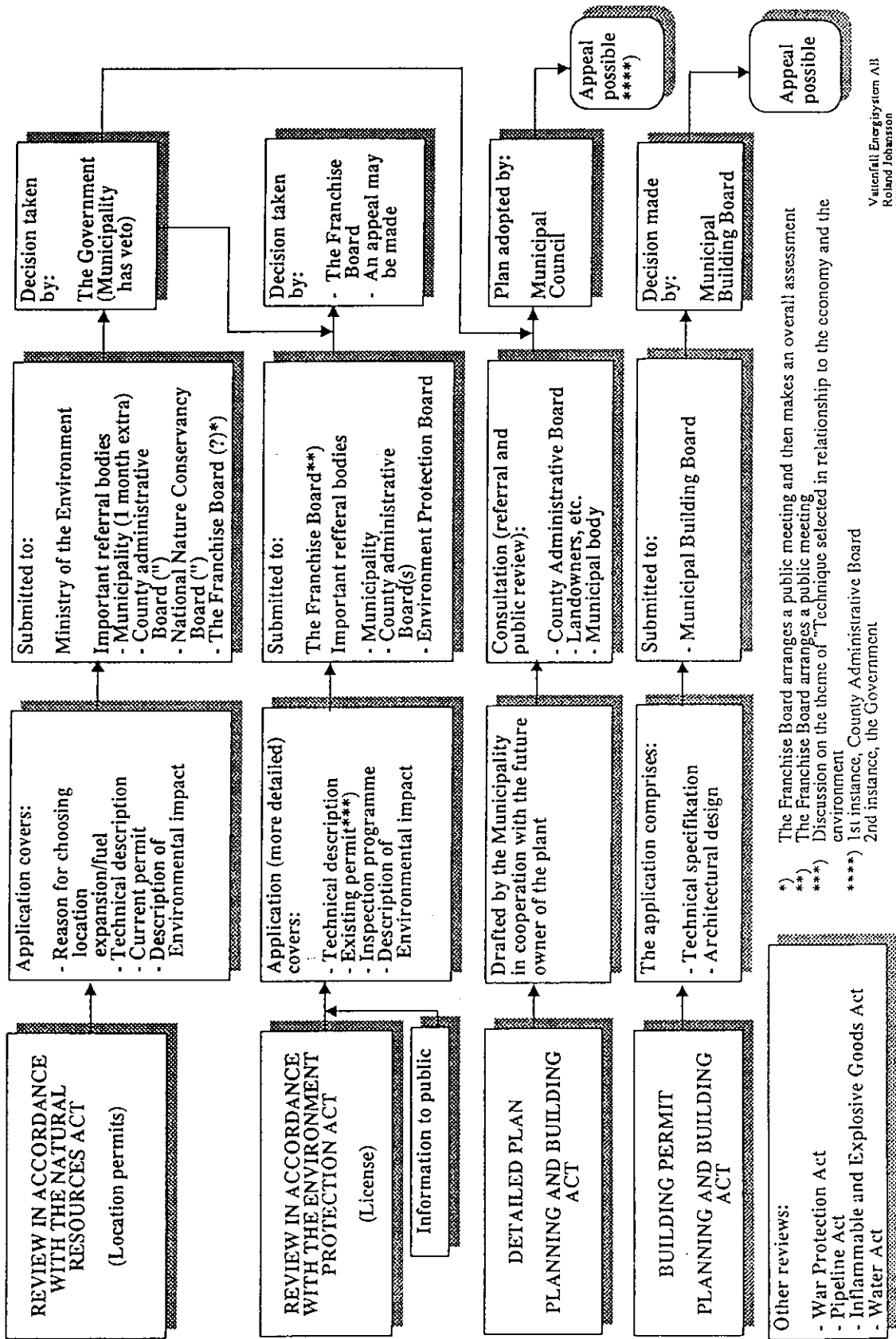
Figure 3 Overall Flow



NB: The numbers of month show minimum requirement(100 month in total).

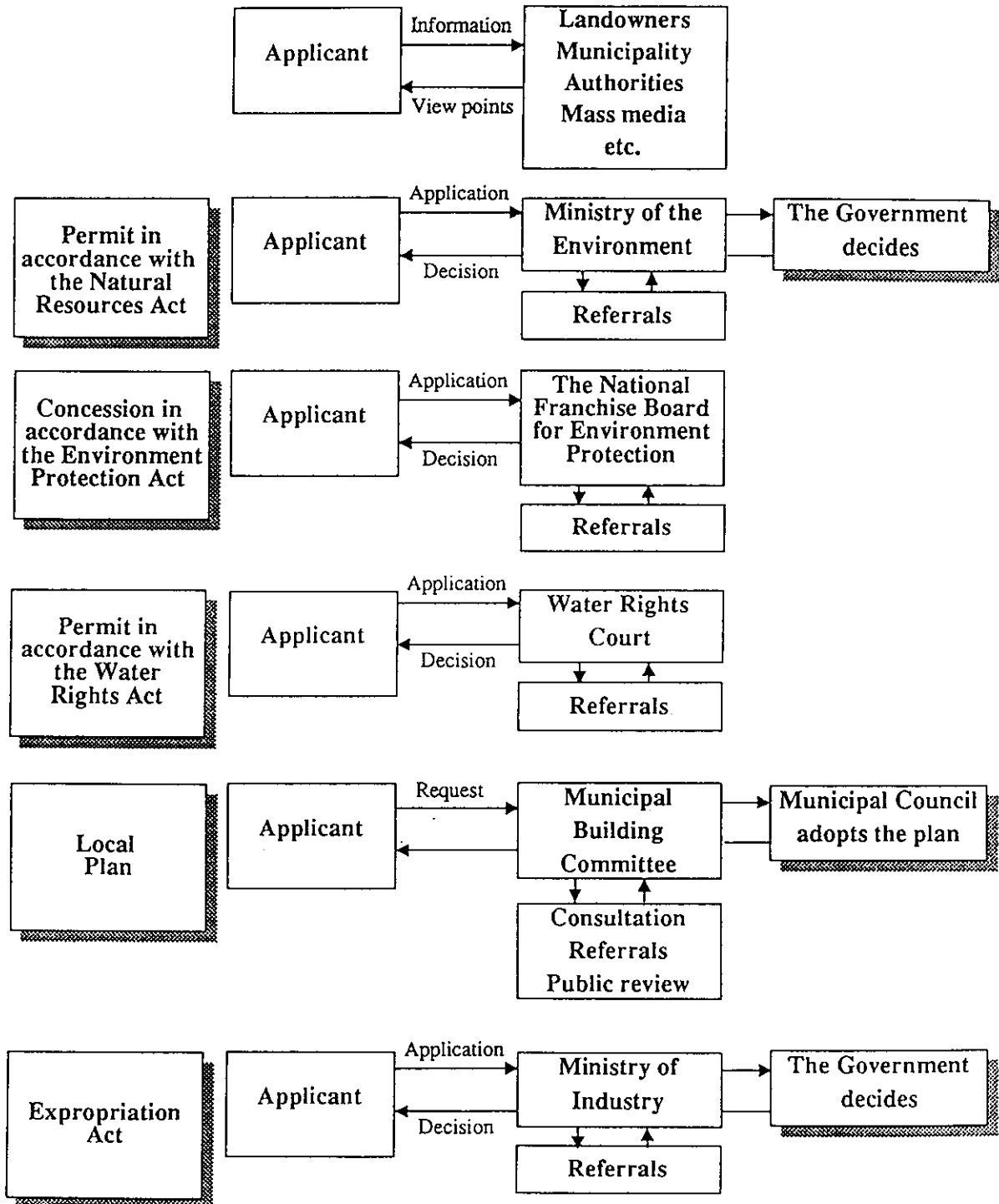
# FLOW CHART SWEDEN

## PROCESSING OF PERMIT APPLICATIONS FOR MAJOR THERMAL POWER PROJECTS



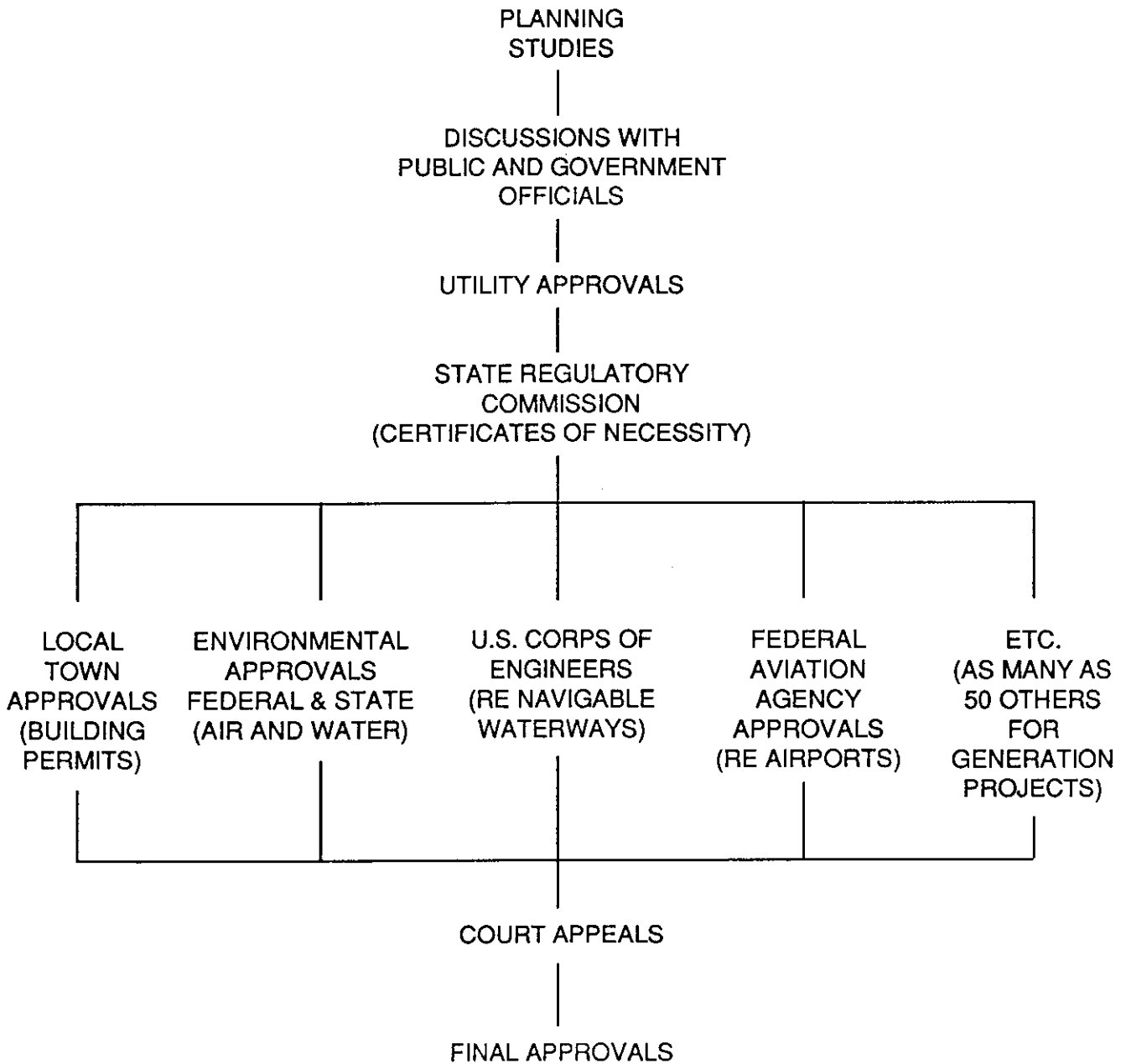
# FLOW CHART SWEDEN

## EXAMINATION OF PERMIT APPLICATIONS FOR THERMAL POWER PLANTS



# FLOW CHART USA

## TYPICAL USA PLANNING APPROVAL PROCEDURE



**APPENDIX D**

**CASE STUDIES**

## USA:

### CASE EXAMPLE: PROPOSED NEW 500 kV TRANSMISSION LINE

#### Description of Project

A U.S. electric power system of about 7,000 MW in size, operating in two states, was faced with the need for additional generating capacity starting in the mid-1990's. The utility worked out an arrangement with another remotely located utility located in a third state to:

- share in major expenditures to reactivate an older power plant which had not been operating for more than eight years and was already more than 50 years old to provide an additional 150 MW of generating capacity.
- obtain from this remote utility an additional 350 MW of "system capacity" to be provided continuously with the associated energy.
- construct a new 500 kV transmission line from the remote utility to one of their substations in the middle of their system for the delivery of the 500 MW.

The utility met frequently and often with governmental agencies to keep them informed of its plans. The utility did not make any joint planning studies with the other utilities that would be affected by its plans, preferring to conduct the various transmission studies on its own for competitive reasons. Their plan for the new line included a phase shifter which they claimed would be adequate to control flow on the new line to the scheduled deliveries.

The utilities conducted discussions with various citizen's group that would be affected by the proposed transmission line and believed that it had achieved a significant measure of approval from all groups since the project would mean additional jobs for people and would mean additional work for coal miners.

The utility made filings with the State Commissions in each of the two states in which it operated requesting a preliminary approval of the plans. The object was to obtain preliminary approval of the plans and costs so that later on when rates had to be adjusted and the new costs included, the proposed plan would not be questioned. The utility compiled quite a number of reports using outside consultants, made unilateral studies of the effects of the plans on other adjacent systems and prepared a number of reports for submission to the utility commissions in both states.

The state commissions involved ordered public hearings and the various bodies having interest hired organizations or individuals to review the need for the proposed project, its economics, and the alternates available.

A hearing was first conducted in one state. A preliminary and conditional approval was obtained as a result of a public hearing. However, citizen's groups have been organized to oppose the proposed transmission line. To date, more than 10,000 signatures have been obtained in petitions opposing the line. A state senator has indicated that he will oppose all aspects of the project except the rehabilitation and reactivation of the old power plant.

In the other state, similar hearings followed by about six months. These hearings lasted several weeks and involved presentations by the utility managers and engineers and by the various experts. Almost all of the experts opposed the proposed plan for various reasons, and in some cases, for differing reasons. The other utilities

which were affected by the proposed plan also participated in the hearings through the questioning of the various witnesses to ensure that the key points that they wanted brought out were being brought out for consideration by the State Commission in its deliberations. The key reasons for the opposition by the various experts to the various plants were as follows:

1. The economics of the plan had not been justified. The costs and assumptions for the alternates considered by the utility were not considered acceptable. Also, other transmission and generation alternatives appeared to be available which had not been considered in arriving at the decision to proceed with the power purchase and the new transmission line.
2. The cost allocations were based on negotiations. The allocation of benefits were mainly to the operating subsidiary of the utility in one state while most of the capital funds were being provided by its operating subsidiary in another state. This made the project attractive to one state but far less attractive to the other.
3. There was general agreement that a new transmission line was desirable. The general viewpoint, however, was that the line that had been selected by the utility had not been selected based on review of overall long-range regional needs. Rather, it had been selected by them based on competitive considerations. The other utilities affected had not been able to analyze the economic and reliability effects on them of the proposed plan.

At the present time, the other utilities which would be affected by the plan and the contractual arrangements are now analyzing the proposed plan and expect to have formed their views in the Summer of 1992. The second state has not as yet rendered its decision as to whether it will give a preliminary approval to the plan at this point.

#### Significant Lessons from Example

1. The construction of new transmission lines in a complex network with systems having different owners who are affected by the new line or the proposed use of the new line requires early coordination and communication with these other systems. A proposal of a plan to public authorities prior to having reached agreement with the other systems which will be affected by the plan is a poor procedure. The major problem is how to achieve such coordination in a competitive situation.
2. Because of public concern over many effects of transmission lines, particularly possible health concerns, the construction of new transmission lines will present an arduous and difficult task. Only if the utility can show that the line is the best on an overall long-term regional basis can the utility convince the various parties that the project is a good one and in the overall public interest.
3. Only through coordination of the development of plans can the minimum number of transmission lines be added in the future and the maximum use of existing transmission lines be achieved. In the desire to obtain a competitive edge over other utilities, this fact should not be forgotten.

## FINLAND:

### INFORMATION CAMPAIGNS FOR A FIFTH NUCLEAR POWER UNIT

Energy policy came up as question of public interest after the first oil crisis in 1973. A legislative national planning procedure controlled by authorities was established in 1980 after many years preparing time.

The associations of the power sector have, besides the power companies, had a very important role in discussions with authorities and political decision makers. The Power Producers Coordinating Council (STYV), by doing for example overall plans for the power system, pooling arrangements and power transmission principles, has succeeded in inspiring close relations between authorities and the power sector. Trust in the electricity industry was increased and the legislative national planning procedure was abolished in 1989.

The power sector has regularly nominated experts in Government committees on energy policy questions. This has led to relatively good knowledge on the technical and economic problems of the power supply system among energy policy makers.

The Finnish experience shows that people's perceptions are based more on images than technical facts. This is especially the case when one cannot assess the things by own experience or observations. On public occasions the factual information is easily set aside by excellent performance or good credibility of those who oppose the goals of power industry.

Examples of the dialogue between system planners, decision makers and general public are the information campaigns arranged in preparing the decision of the fifth nuclear power unit in Finland.

The aim of these campaigns has been to convince decision makers that it would be unwise to exclude any form of power from future energy supply, and nuclear power, thus remains as an alternative which could be tolerated.

An information campaign with the theme "Finland, energy and electricity", was launched to three groups:

- directors of power industry
- experts in the energy sector and industry
- "public opinion" level: by activating the personnel of utilities and industrial firms to discussions (person to person contacts).

Special video tapes (15 000) were produced with famous show artists dealing with energy problems in an entertaining way.

An energy exhibition toured in 50 towns. The opening of the exhibition was successfully noticed by the local press.

The same themes were discussed in the in-house magazines published by utilities and industrial firms. The discussion themes were concentrated on topics like national economy, energy economy and environment.

With these campaigns the power sector tried to take an active role in spreading information one step before others.

During the general elections in spring 1991 nuclear power became not a topic and energy subjects were not widely discussed.

In May, 1991 state-owned power company IVO and industry-owned power company TVO submitted to the Government of Finland a joint application for the next nuclear plant unit in Finland. Both these companies today own nuclear units at two sites and the power plant unit of the joint project is to be located at one of these two sites. Municipalities of both sites have adopted a positive attitude to receiving a new nuclear plant unit.

In the licensing procedure the Ministry of Trade and Industry gathered statements on the application from 40 different other authorities and arranged public hearings on the alternative site locations.

Power companies have arranged voluntary discussions in the municipalities. The local authorities are well informed in advance.

Open house-days were arranged at the existing power plants.

During the procedure people have had many possibilities to influence on the decision making without any referendum.

The authorities are now preparing the Decision in Principle. The decision is expected latest in autumn 1992 including the ratification by the Parliament of Finland.

### Conclusions

Person to person contacts planned in advance are preferred to public occasions. Experts of the power industry and utility personnel can reach many people with their contacts.

Well planned procedures containing different information activities ensure that the power industry can walk one step ahead.

## FRANCE:

### A NEW E.H.V. LINE ACCROSS THE ALPS BETWEEN FRANCE AND ITALY

#### I IMPACT STUDY - INVESTIGATIONS TO CHOOSE THE TRIP OF LAND WITH THE LEAST IMPACT

A wide area of research has been selected in which different possible ways came into sight; after going into the environment constraints, EdF finally chose one of these routes: it was situated in the Maurienne valley, where 3 possible options appeared once more:

- a route deep down the valley, that has been given up in account of the population density.
- a route on the slope of the valley, by the left bank, then by the right bank with a crossing of the river:
  - either between Hermillon and St Jean de Maurienne.
  - or near Saint Etienne de Cumes.

The main constraints for the definition of the least impact trip of land were of two types:

- technical constraints: necessity of using the cols of the mountains, of avoiding the avalanches passages. . .
- economic and environmental constraints: tourist sites, classified sites, areas fit for skiing.

This trip of land was the basis of the discussions in all the consultations of regional authorities and the mayors of the concerned municipalities.

The timetable of the concertation meetings can be summed up as followed:

- from May to June 1987: presentation at the Prefect of the EHV line and of the trip of land of least impact.
- from June to November 1987: cantonal meetings to debate the route of the line.
- December 1987: new bringing up of the line route to the Prefect and Elected members.
- January to May 1988: meetings to take into account the municipalities projects and to examine the detailed line route; the request for the Declaration of Public Utility was finally sent to the Ministry of Industry.

In the concertation meetings; there was first a description of the project and then observations of Public and Associations; EdF tried to propose measures to reduce the damageable consequences to the environment; for instance EdF put forward removing the 150 kV network of the area, reinforcing the regional 225 kV network without adding any more lattice masts. Then arrangements were proposed to ameliorate villages electrification and special subsidies were offered to contribute to local development.

#### II CONCLUSION

At each step of presentation and concertation with general public or with legal authorities it had really been necessary to insist on the useful purpose of the project; in addition to the classical economic aspects (better use of the power means, sharing of the peak and relief power means), a new aspect of many recent projects is related to the justification of the export policy of the utility.

Getting some substantial profits by large scale energy exportation do not exempt the utility from making an effort to enlighten public mind, by explaining the aim of this policy and the positive repercussions on the electricity price for the French customer. Moreover, as almost everywhere in Europe, environmental issues become major concern for every large industrial plan; and that means more and more difficulties to carry it out.

Moreover, it can be noted an irreversible decentralization process and a rising of territorial collectivities which are often taking actions against the national projects; it must be said that these projects seldom bring back money locally in return, if no "arrangement measure" were decided in the concertation meetings.

To clear up these difficulties, EdF is managing a concertation policy with the territorial collectivities, which are considered more as partners than opponents; this policy is based on a regular dialog and a mutual information which is obviously fruitful in many affairs: new HV underground cables, new substations, new EHV lines. . . Public is more and more aware of the specificity of France (a relatively few crowded country but where unoccupied land has to be used to the best, in a concertation mind to respect environment, town planning, tourism. . .). Everyone feels that openness is often successful: the sooner informations are available the sooner bad surprises can be avoided in the reciprocal interest.

## ITALY:

### THE IMPACT OF THE ENVIRONMENT IN PLANNING. FURTHER EXAMPLE OF SITING DIFFICULTIES

After the phasing out of the nuclear source decided by the Government in 1988, the former nuclear Montalto di Castro station (2 x 2000 MW) was substituted by a dual fuel (gas, oil) 4 x 627 units, each repowered by 200 MW heavy duty combustion turbines.

At the time, the National Energy Plan issued in the August 1988 forecasted a considerable recourse to coal, desulphurized. Standardized multifuel plants, having the same environmental impact in term of SO<sub>2</sub> and NO<sub>x</sub> emissions thanks to the introduction of FGD and SCR systems, should in principle burn coal. This will allow to profit of the stable prices and safe market of such fuel also in perspective, against the more volatile price of oil (as well of the natural gas, ever more linked to the low sulphur oil prices) and to avoid the danger of disruption of supply.

The total amount of coal foreseen in 1988 PEN for the end of the century was 21 Mtoe, 28.3 % of the total consumption (74 Mtoe) of the electric sector. The corresponding foreseen consumption should be about 33 Mton (metric) at 2000. The total capacity of new multifuel, coal fired, plants should be some 18 GW.

Ten out of the 33 Mton, should be burned in the two 4 x 627 MW base duty plants of Brindisi Sud and Gioia Tauro.

Since then, the environmental pressure in favour of the gas fired plants increased. This caused a reshaping of the ENEL plans, which presently instead of the said 18 GW of coal fired plants foresee a mix of 10 GW coal fired and 7.4 GW utilizing natural gas in combined cycles and in repowering.

In particular, a strong opposition to the utilization of such large amount of coal rised firstly in Brindisi and then in Gioia Tauro areas. The coal was considered, notwithstanding the recourse to Flue Gas Desulphurization just to respect the SO<sub>2</sub> emission standards, still "black".

Various debates, strikes and popular movements occurred in the Brindisi area, until August 1990 when an agreement was signed in Rome between the Ministry of Industry and the local Regional, Provincial and Municipal authorities. Accordingly, out of the four

new units in the Brindisi Sud Plant one unit should be kept in cold reserve and one should burn gas. Furthermore, since in the same area is sited an existing 4 x 300 MW station already burning coal (Brindisi Nord), it was agreed that such plant should be supplied by gas (brought there by a new pipeline) starting from 1995 and decommissioned in 10 years, that is around the end of the century. Consequently, from the potential 7.5 Mton of coal, only 2.5-4 Mton could be burned in the Brindisi area at the end of the century. The idea in the background is an opposition to the creation of bulk energy supplying poles, especially where the generation is exported to other regions. Only in this way it was possible for ENEL to have ensured the possibility of using coal for its new plant, even with the above mentioned restrictions.

A similar concern and similar contrasting events took place in the Gioia di Tauro area, where the 4 x 627 MW plant was sited by the Interministerial Committee for the Economic Planning (CIPE) in mid 1984. Only recently (11.11.91) the Prime Minister signed a decree confirming the construction of the multifuel plant. The commissioning of the units shall be phased and a number of tests are foreseen on the first two units. The CIPE will give instructions for the utilization of the type of fuel, after an advise of the Minister of the Foreign Affairs and the Calabria Region, "according to the energy situation of the Country and the international political framework". The construction of the third and fourth units will start in 1995 and their operation policies will be defined only after a testing period of three years of the first and second units.

Presently the new National Energy Plan is under completion: the events in the last 3 years will probably reshuffle some of the 1988 options.

The recent (October 1991) ENEL plan up to 2000, foresees only 20-23 Mton of coal against the 33-34 Mton of 1988. In the Brindisi area only 3-4 Mton will be probably burned and 2.5 Mton in Gioia di Tauro plants.

The demand of gas in Italy for the electric sector will be (70-75 bm<sup>3</sup>) higher than the supply capability by pipe (64 bm<sup>3</sup>); import of LNG by ship (10 bm<sup>3</sup>) and erection of two regasification systems will be necessary. It is non improbable that difficulties will arise for their siting.

Rome, 5.2.92

## **SOUTH AFRICA:**

### **TRANSMISSION DEVELOPMENT**

In the early days when 88 kV and 132 kV were considered to be transmission voltages, power line servitudes followed existing property boundaries. When 275 kV was introduced in mid-1950's and 400 kV in the mid-1960's it was no longer possible to introduce all the bends necessary to follow property boundaries and servitudes were made as straight as possible with an increase in compensation paid to the landowner.

The power utility only dealt directly with the landowner and no environmental studies were undertaken. The only concern was for the potential usage of the land as it affected the compensation costs paid for the servitude. Approval had to be acquired from the various statutory bodies such as roads departments, post and telegraphs, water boards, local authorities, town lands, etc.

There was not much opposition to the development of power lines as everyone believed that the development of the transmission network was in the national interest. This attitude no longer exists. It was only with the introduction of the 765 kV in the early 1980's that the utility started with calling public meetings mainly to inform the landowner of the change in tower design from free standing to guyed structures and how this would impact on land usage. This actually gave rise to greater concerns and resulted in increasing public interest in the establishment of new power lines.

Although there are no formal commissions of enquiry to grant approval to proposed new power lines a government act based on recommendations of professional environmental groups outlines the environmental impact report requirements for any major project even though as yet the regulations are not finalised and local authorities' and various government department regulations constitute the requirements.

Eskom now undertakes environmental impact studies for every new power line to identify the correctness and whether the project will meet with public approval. One of the major problems being encountered is trying to get people to attend public meetings.

Eskom has no power of expropriation and any dispute which arises with a landowner in attempting to acquire a servitude is resolved in principle at an Electricity Control Board hearing which gives a ruling on the correctness of the right of way but not on the degree of compensation.

Two examples of recent power line routing are as follows:

#### **1. Power line integrating a power station**

A 400 kV 160 km power line from a remote power station to strengthen the infeed to a transmission substation was proposed by the transmission planners. This line is to traverse natural grass and bushlands which when burning can cause line tripping. As such faulting impacted on the stability of the power station the planners instructed that the new line should be kept distant from an existing interconnecting line. Pressure from the landowners, many of whom used the land for game farming presented estimates for high loss of income if international hunters stopped visiting the area due to the visual impact of a power line in a wilderness environment. The utility eventually relaxed its requirements and agreed to construct the new line parallel to the existing line having to technically resolve the stability problems arising from this relaxation. The

Electricity Control Board then ruled in favour of the utility to gain its right of way over those remaining farms where the landowners still expressed their opposition.

#### **2. A power line through wheat growing area**

The normal approach of the utility's negotiators to visit each individual landowner was followed in obtaining a servitude for a new 400 kV line. When the route was fairly well established the farmers realised that the utility was going to erect guyed structures in stead of free standing structures which would inhibit the use of their harvesting machinery. The farmers then approached their agricultural union to deal with the utility at highest level. The farmers then proposed an alternate longer route which could not be accepted due to the lengths and pollution, but the original route was amended to avoid centre pivot irrigation and in some instances the more expensive free standing structures were employed.

Both these examples illustrate the use of negotiation as opposed to forceful expropriation.

### **GENERATION ESTABLISHMENT**

Early generation in South Africa was small and localised being owned by municipalities or in the mining industry area by private generators. The majority of these were coal fired with the coal brought in from the coal fields area by rail. Such local generation was considered very important to the community.

The establishment of pithead power stations started in the mid-1950's and were integrated at sub-transmission voltages. The concerns at that time were that it was cheaper to transport electricity than coal, that there was adequate water, adequate coal for the life of the power station and that coal of a suitable quality could be found closer to the load centres. High chimneys were built and precipitation methods were introduced by the engineers mainly due to plant maintenance concerns.

Large pithead stations came with the introduction of large generators in the 1960's (100 MW and above sets). These power stations tended to be remote from the electrical load centres and had to be addressed with the government Department of Water Affairs. The utility sometimes had to install the dams and pipelines. The coal was a direct negotiation between the utility and the mining house.

During the 1970's a 400 kV national grid was established and this permitted an increase in the size of generators which could be connected to the grid giving the utility the economies of scale from the larger sets (500 MW to 700 MW sets). These large power stations were concentrated on the economic coal fields. They were standardised with six sets of the same size and manufactured to achieve maximum economies of scale.

Public and governmental pollution concerns have escalated over the last decade which resulted in the setting of particulate limits which will soon be extended to the setting of gaseous output limits. This will impose a restriction on the siting of future generation plant which will be coal fired. The particulate limits will be negotiated with the authorities and offers to reduce outputs of some existing generating plant in order to gain permission to establish new plant in the area. Present economics indicate that it may be better to site the new power station on more expensive coal fields that to have to fit plant to meet particulate and gaseous output limits. One of the arguments which is being used in the electrification for all programme is that the total pollution is reduced when urban areas are

fully electrified. Another measure being investigated is to build transmission to neighbouring countries to purchase their excess hydro generation.

The area where the most stringent authority is applied to power generation is the case of the single nuclear power station containing two 900 MW generators. The authority of the governmental Atomic Energy Commission exceeds that of the utility in operating the

plant whenever there is any concern regarding meeting the safety requirements.

The two hydro generation and two pumped storage installations are all combined projects between the utility and the government Department of Water Affairs. These projects were all subject to intense environmental impact investigations and natural vegetation cultivation following completion of construction.

## AUSTRALIA:

### EXAMPLES OF THE PUBLIC PLANNING PROCESS

Public involvement in planning processes for generation and transmission works is rapidly increasing in response to a growing sensitivity to environmental issues in general. For transmission lines the principle issues raised by the public are:

- Visual
- Health effects of power line fields
- Interference with land use

This public sensitivity and the issues involved are illustrated by two recent cases in the two largest utilities in Australia.

### GIBBS INQUIRY (NEW SOUTH WALES)

In May 1990 the New South Wales Minister for Minerals and Energy established an 'Inquiry into Community Needs and Transmission Lines Development' in response to community objections to proposed transmission lines in various parts of the state. Sir Harry Gibbs, a retired Chief Justice of the Supreme Court, was appointed to Chair the Inquiry.

The Inquiry was widely advertised and interested parties were invited to make submissions. Sir Harry prepared and issued a 'Statement of Possible Issues' as a basis for identifying relevant issues.

Consultants were appointed to provide expert advice on the need for high voltage transmission lines, associated technologies, and impacts of failure to meet demand.

A working party of experts in the field of epidemiology was set up to provide advice of the issue of possible health effect of electric and magnetic fields.

A valuer was appointed to report on matters related to payment of compensation for easements.

Public hearings were held in Sydney, Bathurst and Grafton (locations of proposed transmission lines) and inspections of proposed line routes were carried out in conjunction with power authority and community representatives.

Sir Harry presented his report to the Government in February 1991. The recommendations in the report covered a range of issues including the following:

- Real consultation is essential and that any supply authority proposing to construct a transmission line should take active steps to involve the public in the selection of the line route.
- It has not been scientifically established that electric fields or magnetic fields have any harmful effect on humans. However, it has not been established that such fields are not harmful.

- The EIS procedure in the Environmental Planning and Assessment Act was found to be bureaucratic and legalistic.
- The fact that the power authority was both proponent of a project and the determining authority could be considered by the community to result in biased decisions.

### STRATEGIC PLANNING FOR THE POWER GRID IN VICTORIA

The SECV is currently involved in an extensive strategic review of the long term planning for the power grid. A strategic plan is being developed with a consultative process to provide representative community input and independent expert advice.

A multi-disciplinary **Task Force**, under the direction of the Strategic Planning and Liaison Engineer, prepared a draft of the Strategic Plan.

A **Consultative Group** provided representative community input into the Plan. This Group includes representatives from:

- Government Departments and Agencies,
- Municipal Authorities,
- Trade Unions,
- Community and Interest Groups, and
- Business and Employer Groups.

An **Advisory Panel**, with expertise in social, engineering and environmental issues has been established to provide independent expert advice to the SECV on power grid planning.

The Draft Strategic Plan produced by the Task Force contained considerable detail. Response to the Draft Plan, both internally and from Consultative Group members indicated the need for a shorter document which provided an overview of the Strategic Plan and a summary of major issues.

"Power Grid Strategic Issues" was produced as a summary of the Strategic Plan. It discusses critical power grid planning issues, possible power grid projects in the next ten years, and the planning process. It has been widely distributed in the community with copies provided to municipal councils, government departments and other organisations interested in power grid planning.

The detailed material will become a two volume "Resource Document".

The next step in the planning process will involve the development of regional plans for those regions of Victoria where is a forecast need for power grid augmentation. The process will include the establishment of Regional Consultative Groups to provide local community input into the planning.

## ENGLAND & WALES:

### RECENT EXPERIENCE OF THE NATIONAL GRID COMPANY PLC

#### Background

Between 1989 and 1991 the Electricity Supply Industry in the United Kingdom was fundamentally restructured and the majority of it privatised. A new company, The National Grid Company plc (NGC) was formed, responsible for the maintenance, operation and development of the high voltage transmission system and for administering the new pooling system, a key component of the electricity market, in England and Wales. Electricity is now generated by a number of companies, including the successor generating companies National Power, PowerGen and Nuclear Electric as well as new independent generators.

A major aim of the Government in privatising the Industry was to introduce competition. One of the NGC's major responsibilities is to facilitate competition and allow access to the system for any new generation. Following reorganisation and privatisation, generators have turned to a new fuel source, gas, for burning in combined cycle gas turbine stations (CCGTs). As a result, the high voltage national grid system has to be extended and reinforced for the first time since the early-mid 1970's. A significant feature of these stations is the speed with which they can be constructed, under three years, and the consents and planning permissions for transmission reinforcements can therefore be crucial.

While the construction time for power stations has reduced, the difficulties associated with gaining permission for new lines have grown: society is more demanding in its expectations and there are formal environmental assessment requirements.

#### Recent experience with proposed new transmission lines

The largest transmission reinforcement requirement has arisen in the north-east of England. An independent power station is being constructed on Teesside (near Middlesbrough). Teesside Power Project, involving Enron (US), Regional Electricity Companies and ICI, has embarked on a new power station project, a CCGT plant of approximately 1800 MW. This has triggered the need for substantial line development in the area and also further south through north Yorkshire involving the construction of about 90 kilometres of overhead line. The expansion of the Anglo-Scottish Interconnector also depends on the reinforcement work. The power station and the immediate connection into the National Grid have received consent from the Secretary of State for Energy, together with some of the transmission reinforcement, but the rest of the transmission work still requires consent.

NGC is required to consult the local planning authorities (district and county). For major overhead line developments NGC prepares environmental assessments and, from these, environmental statements. During this process NGC also consults the statutory bodies with responsibilities for landscape and the natural environment. For this project the company also decided to embark upon an extensive public information programme involving "open-house" evenings, where members of the public in the local vicinity were given the opportunity to hear and comment on the company's proposals. There were also meetings with local members of parliament and parish councils, in addition to the normal visits to landowners, and information in the media (newspapers).

The first part of the wider information programme was held after the company had formed a view on the routing options for the first major part of the transmission development, Lackenby-Picton, about 22 kilometres of overhead line replacing a much longer section of line, but along a different route from the existing line because of development which had taken place since the line was built. Subsequently, an information programme was arranged for the final 55 km stretch of line, Picton-Shipton (north of York).

The transmission line proposals have aroused considerable and vehement opposition. The local authorities and members of Parliament, like the local communities affected by the proposals, are all opposed to the overhead line routing options unless substantial sections are placed underground. Formal consent applications for alternative overhead line route options with supporting environmental statements were made by NGC in September 1991. The local media has given considerable coverage and the press strongly opposes the work. Owing to this opposition, the Secretary of State for Energy called a public inquiry into these proposals to commence on 19 May and expected to last for about three months.

#### Main reasons for objection to the proposals

The main grounds for objections are as follows:

##### Need

Some objectors do not accept a need for the project overall. One major difference between this country and others is that the responsibility for determining the need for a power station rests with the competing generating companies, and is not directly dependent on centrally determined planning demands and forecasts. Other objectors question the need for the reinforcement to meet the power flows.

##### Visual amenity

This is the major environmental objection, and has led to demands from many groups for the major sections of the reinforcement to be placed underground rather than overhead on the grounds that an attractive area of the countryside will be damaged, in particular for the Picton-Shipton section of line where there is another line already in existence.

##### Alleged health effects of electric and magnetic fields

This is the other main area of objection, and a difficult presentational subject because of its complexity of the science.

##### Value of the information programme

In view of the extent of opposition, there are questions as to whether the public information programme was of benefit to communities or to NGC and its project. The public information programme has not convinced the public generally nor the local planning authorities of local politicians of the arguments for the project, including the need for it or the options selected. There is a fundamental problem faced by NGC in that it is now the focus of objection for those also who oppose the need for a power station which has already been granted consent. However, the information programme did result in a new option suggested by a member of the public being adopted as a routing option and to this extent it was valuable. (Even so this has been described by the opponents as an attempt by NGC to find an "easy option" in the face of opposition to its initial proposal). The general conclusion is that for such a large project, and perhaps inevitably a contentious one, an information programme

would have been expected by the public and would have been required in any case. It was therefore better to have anticipated the need rather than to have responded to it. However, public information programmes and general level of consultation for projects must be judged on the merits of each project.

The resources involved in such exercises are considerable. The staff of the company find themselves being accountable to the public for what they do, a reality of the 1990's and a reflection of a general trend in society, a society with increasing environmental expectations. However, NGC is finding that the level of opposition varies from one part of the country to another.

#### Conclusion

The new projects will set new benchmarks through decisions from public inquiries for the acceptability of overhead lines and on crucial issues such as undergrounding. (The inquiry inspectors

recommend, the Secretary of State for Energy decides). No doubt international practice will be studied at these inquiries.

The consents programme is of course prolonged further by inquiry, and during this part of the programme the timetable is in the hands of the Government Departments responsible. Given the onus on NGC to provide connections as quickly as possible, the Department of Energy has an important role to play in the timetable by expediting the inquiry, the writing of the report and the decision.

NGC has increased environmental duties under the 1989 Electricity Act, which established the new shape of the industry, including an onus for it to mitigate the effect of its proposals on the environment. Equally it has responsibilities to develop the transmission system and facilitate competition. It has therefore the difficult task of providing transmission connections more quickly than in the past in a more difficult climate.

## JAPAN:

### THE POWER SYSTEM PLANNING AND DECISION MAKING

#### 1. INTRODUCTION

This paper is to introduce Japanese procedures and their features in power system planning and decision making. Chapter 2 introduces current power system plan developed by utilities and authorized by the Government for the year 1991 to 2000 (Mono-Plan). Chapter 3 explains the procedures how to establish the mutual understanding between planners and decision makers, which is summarized in the attached flow chart (Appendix C2).

#### 2. POWER SYSTEM PLAN

The Japanese energy "Outlook" was formulated June 1990 to be referred to and to be aimed at by the nation, which sets forth three major policy agendas of effective use of energy, appropriate energy supplies or the "best mix" and active promotion of international cooperation in all energy areas.

In order to implement the national energy policy in combination with the "Outlook", a long-term electric power facilities development ("Mono-Plan") is reviewed and authorized every year as a rolling plan. The composition of installed generating capacity in the plan is developed on the basis of power demand forecast of total energy sales by the nine major companies in 2000 as 832.0 TWh compared to that of 608.9 TWh in 1989. Addition of nuclear power to the current capacity of 31.48 GW will make the nuclear capacity in 2000 as 50.56 GW or 22 % of total installation.

The Inter-regional Linkage Systems connects Hokkaido and Honshu by DC link, Tokyo and Chubu by Frequency Converter and Shikoku and Chugoku by 500 kV AC overhead lines. In terms of route length of overhead lines designed with 500 kV and higher ratings, 5303 km in 1990 will be expanded to 7249 km in 2000, an increase of 37 %, while the underground cable will be extended another 667 km, an increase of 76 %.

Technological issues for Japanese power engineers to challenge in implementing the national energy policy and long-term power development/transmission plan include establishment of nuclear safety, development of environmental protection measures and introduction of new energy like solar, geothermal, wind, alcohol, waste and biomass energy.

#### 3. DECISION MAKING PROCEDURE

During the course of cultural development of human society, the tasks of engineers seem to change, from specific items to general terms, in response to demands of society. All the power system planning, including the construction of stations and transmission lines, must be reviewed before decision making because of their critical impact on society. A reasonable and intelligent decision will apparently be made, as long as we can come to sound mutual understanding between planners and decision makers.

Even though it is not 100 % successful, there is a procedure in Japan, as shown in the Japanese flow chart in Appendix C2, to establish the sound mutual understanding for power system

development and to maintain the flexibility of planning. The procedures can be divided into four parts of Reconnaissance, Consensus Making, Legal Procedures and Construction, total of which will require minimum 100 months.

##### 3.1 Reconnaissance (Part I)

Even though the "Mono-Plan" is the result of decision making for power system development on the national level, it does not refer to any specific name, so far as there is no agreement at the possible site on the local level. Definite decision making for each specific power facility will begin with the site selection in the power utility in question.

Every power utility conducts the reconnaissance on the potential site for power facilities, which includes survey for power demand and supply, for power grids configuration and stability analysis, and for local geographic, social and political condition. The informal or formal proposal of construction will be made, sometimes through a Member of Representatives elected from the district of the potential site, to the local government.

Usually the proposal is consulted the local congress which will reflect the response of the interest groups in the district. Local government and/or interest groups at site will usually give utility their consent to the siting in the form of agreement for the environment assessment proposed by the utility.

##### 3.2 Consensus Making (Part II)

The Part II of the procedure is the stage of consensus making in all and detail items of plan in the development project. This stage proceeds on the base of results in the environment assessment on both national and local level. In order to make consensus for the construction of the facility the power utility will make the presentation of the project, the proposal to compensate the loss of property right, etc. It is quite important that the reliable and amicable relationship should be established between the utility and the interest groups in the course of the negotiation.

The power utility develops and submits the environment assessment report to the Ministry of International Trade and Industry (MITI), which will be reviewed by the Environment Protection Agency and the local government. When the general consensus is established, the power utility is also supposed to develop and submit to MITI the report on the opinion of the local interest groups, which is at the same time conveyed to the local Governor.

In the national government MITI will take initiative in coordinating 12 relative Ministries for consensus making. The consensus made will be authorized as the conclusion in the meeting of "Electric Power Development Coordination Council", chaired by the Prime Minister. In the process of authorization the report from the local Governor which should include the consent of local interest groups is the most critical. The conclusion of the Council with the basic plan of the project will be made public for review in parallel with the environment assessment report.

##### 3.3 Legal Procedures (Part III)

After the plan has been authorized in the Council, it will be put into basically 66 procedures for permission from and giving notice to the national and local government. Permission needed includes such as for construction, modification of electric facilities, for cutting trees, for entrance to certain area, for right of way, etc. Notice given includes discovery of historic remains, etc.

### 3.4 Construction (Part IV)

The Part IV of the procedure is to achieve construction work in safe and sound manner. At the same time the successful achievement of this procedure is quite important in establishing the local support for the maintenance and operation of the facilities for more than twenty or fifty years.

## 4. FEATURE IN DECISION MAKING

### 4.1 Demanding but Steady

As is shown in the flow chart, Appendix C2, 100 months is the minimum requirement of procedures from siting to commissioning. Actually there will be years of preparation or sounding for consent before the utility takes action for site selection. In some case or other a project will be kept in the planning stage only without being put into the practical procedures for construction. Really it is time demanding procedure to achieve the completion of the power facility construction.

The flow of procedures in the flow chart also shows the repetition of action and reaction between utilities and interest groups, which means the fact that it needs the step by step procedure to get the consensus for the power facility construction. Japanese utilities do not hesitate to spent much time to follow this demanding procedure because the consensus reached through the process will make the decision sound and steady, that is to say, the decision will be observed to make the power system development plan reliable.

It looks as if this way of decision making is slow and sometimes less transparent and/or unreasonable. But it is worth maintained particularly in the Japanese culture to get the sound recovery of large investment for the power facilities in a long time, because mild way will bring the harmonious and amicable background of the decision. The time consumed for this demanding groundwork will be paid by the sound construction and operation of the facility.

### 4.2 No Decision without Consensus

There are two facts which feature the Japanese way of decision making.

- 1) The report from local Governor on the opinion of interest group will not be submitted to the Council until local consent is made.
- 2) The Council meeting will not be held until the coordination among ministries are successfully brought to consensus.

These two facts mean that there will be no decision making if there is no consensus made among people and body concerned. This kind of way in coordination will make the process for decision quite obscure and vague. But it should be well understood that this way of decision making makes the society and human relation mild enough to avoid unnecessary conflict among parties. This is also the way to make decision well observed and reliable. A plenty of groundwork will bring the successful enforcement of the decision in Japanese society.

K Takahashi (CRIEPI), F Arakawa (EPDC)  
January 1992

## ROMANIA:

CERTAIN ASPECTS OF THE RELATIONS BETWEEN RENEL AND THE LOCAL AUTHORITIES (PREFECT'S OFFICE) WITH RESPECT TO THE LOCATION ALTERNATIVES FOR A SECOND NUCLEAR POWER PLANT IN ROMANIA.

### 1. ORGANIZING THE STUDIES MEANT TO CHOOSE THE ALTERNATIVES FOR THE SECOND NUCLEAR POWER PLANT

Choosing nowadays the location for a nuclear power plant (NPP) is an extremely complex activity with many variable aspects which sometimes contradict each other, some of the aspects being quantifiable and other unquantifiable. In addition to that, the energy producer - RENEL - is not the only organization that takes part in the choosing, the final decision being a compromise among its options, the central and local administration options, those of the Parliament and of the collectivities.

Given this complexity, the possible working method is a step-by-step one through successive removals, three essential stages being distinguished in the organizing of the location alternatives studies:

- The preliminary (regional) stage, when the "potential" alternatives are found out and the "candidate" ones are picked out (during this stage the studies are discreetly carried on, on the basis of on site exploration and of bibliographical researches - maps, existing studies and works).
- The pre-project stage, when the "candidate" alternatives are sorted out, those implied in the study start drawing up an agreement, and the "preferred" alternatives are selected and classified (during this stage the actual on site investigations start, the approval of the local authorities being required for that).
- The project stage, when the studies required for authorizing, for obtaining the approvals and the agreements according to the legislation in force, are carried out to the location taken into account.

### 2. DIFFICULTIES WITH THE LOCAL AUTHORITIES DURING THE ACTIVITY OF CHOOSING ALTERNATIVES FOR THE NPP 2

When it was decided in RENEL to prepare the tender documents for the second Romanian NPP (the summer of 1990), two possible alternatives were considered, one located on rocky ground, in district A, and another one on unrocky ground, in district S.

Passing then to the subsequent on site studies, both districts refused the idea of having a NPP on their territory, putting forward such reasons as the following:

- District A: its nearness to the frontier (50 km) which might lead to international litigations (though the respective neighbouring country has both operating and programmed NPPs situated at relatively equivalent distances); its nearness to the city which is the district capital and has about 240 000 inhabitants with an already existing pollution; the already available agglomeration - Nuclear Power Station is to increase; as well as the influence upon certain traditional wine areas;
- District S: the already increased industrialization and pollution of the area, mention being made upon strongly polluting sites which already exist and whose share would increase by the erection of a nuclear power station; the alteration of the area from the touristic viewpoint, animal breeding, water contamination; this position is also supported by a report of the local subsidiary of Romanian Ecology Group whose main argument is represented by the data delivered by a French member of the Ecology Group of the European Parliament.

Out of the above mentioned reasons and due to some technical reason, the studies in district A have been given up.

The afore mentioned ones show that the arguments are generally subjective, the presumptive polluting character of the nuclear power stations is much amplified, what denotes a poor or biased knowledge of these issues by the local authorities, as well as the lack of a steady and effective campaign on behalf of the energy producer.

Mention should be made that the two sites have been selected on the basis of the studies drawn up previous to the changes occurred in December 1989. From that date onwards, the activity started its development in the manner shown under point 1.

Project Director  
Teodor Chirica

## SWEDEN:

### FINDING A SITE FOR A NEW POWER STATION. THE BROFJORDEN CASE

#### Background

In 1988, the Swedish Parliament decided to start phasing out nuclear power by closing down two reactors by 1995/96. It also decided to freeze CO<sub>2</sub>-emissions from the present power system based on hydro and nuclear energy. This posed a great difficulty in getting any new thermal power project accepted. There is also a Parliament decision that no more major rivers are to be harnessed.

In view of this and an increasing demand of electric energy, Vattenfall in January 1989 presented an Electricity Supply Plan. The plan comprised four thermal power projects for new and replacement electricity production.

One of these projects was Brofjorden, planned to use residual fuel oil from an existing refinery on the west coast of Sweden within the municipality of Lysekil. The planned power station, which had to be located close to the refinery, would take care of its hazardous, industrial waste and by gasifying (IGCC) the oil reduce emissions to almost zero, except for the CO<sub>2</sub>. With an output of approx 350 MW, the production of Brofjorden would exceed 2 TWh per year, at an investment cost of SEK 5.4 billion (USD 850 million).

The municipal chosen for an industrial project has a veto right under the Natural Resources Act. It is therefore necessary that a project gains acceptance with the local politicians as well as with the local inhabitants, in this case the people of Lysekil.

#### Local links

The municipality of Lysekil, with its 15.000 inhabitants, has a history of struggling to make a livelihood, mostly from fishing and fish industry. In the beginning of the 1970's a part of this area was designated by Parliament as suitable for heavy industrial use, mainly due to good harbour conditions. The refinery was built and is still the only major industry with some 530 employees.

Vattenfall started the communication aspect by establishing a close contact with the local politicians before the project was presented to the public. This was considered essential in order to gain political acceptance of the project locally. A meeting with the leading, local politicians from all parties was arranged by Vattenfall in January 1989. The leader of the social democratic party (chairman of the municipal council) was positive from the start. The leaders of the local liberal parties were somewhat guardedly positive while awaiting further details about the environmental impacts on the area. All parties agreed that the Brofjorden project would make a substantial and much needed contribution to local employment opportunities.

After several more meetings during the winter of 1989, Vattenfall arranged a public presentation of the project in Lysekil in May which brought the project into the limelight of the media and of the general public, not just locally, but also nationwide. All presentations of the project were initiated by Vattenfall and based on openness and trust, both important factors in successful communication as pointed out in the report of WG 37.09.

In September 1989, Vattenfall opened a local office, and hired a communications expert in order to be in daily contact with the

politicians, other local authorities, local media, different organizations, businesses and "the man in the street". This representative was not an engineer, and this facilitated the use of a "common language", as described in the WG 37.09 report, and person-to-person contacts were emphasized in developing credibility both for the project and for Vattenfall.

The communication strategy set forth by Vattenfall in the Brofjorden case worked well. In April 1990, the municipal authorities waved their veto right under the Natural Resources Act and voted for the project.

In June 1990, Vattenfall and Lysekil signed a frame agreement regarding the real estate exploitation of the construction area and its surroundings. In this agreement, Vattenfall offered to help finance housings, roads, bridges, water and sewage facilities and other infrastructural investments necessary for the construction of the power plant. This contribution to local development is also in line with the conclusions in the WG 37.09 report.

#### The legal process

The process of permit application for major thermal projects in Sweden is well established. The application under the Natural Resources Act, including an Environmental Impact Assessment, was followed in June 1990 by the application under the Environmental Protection Act. See the flow-chart in Appendix C2 of this Cigré-report.

So far, no strong local opposition had been established against the project. In the application process according to the Natural Resources Act, the National Conservancy Board has approved of the Brofjorden plant, stating that the advantage of taking care of the residual oil in a gasification process supersedes the increased emissions of CO<sub>2</sub>. The Franchise Board, however, is negative to the project because of the CO<sub>2</sub> emissions and the fact that the excess heat from the plant process will not be utilized, i.e. in district heating.

#### Changed conditions

Since Vattenfall's plan to replace nuclear plants was presented in January 1989, an agreement between three political parties on a new energy policy was reached in January 1991, where the phasing out of nuclear energy was postponed until there are environmentally and economically sound alternatives. Vattenfall can now go on using its nuclear power plants. After a further stage of investigation, Vattenfall has decided to postpone the Brofjorden project until need for new power is established.

#### Experience and Conclusions

The importance of establishing a local office at an early stage, staffed with employees that become part of the local scene for a person to person contact cannot be overestimated.

A project of this size is constantly subject to changes in the conditions. It is important that the changes in Vattenfall's strategy are consistently and rapidly communicated to those concerned within the company, as well as to all concerned outside the company, in order to keep Vattenfall's reputation and credibility intact. Particularly the employees assigned to the project and the local Vattenfall representatives must be informed immediately of policy changes within the company, or they may accidentally convey the wrong message to the local decision makers. The message to the world outside must always be unanimous, no matter who the spokesperson is.

To get support from the local politicians, there must be some specific advantages of the project from their point of view. In the Brofjorden case these were increased employment opportunities and the projects's contributions to the local industrial and business development. The described financial support by Vattenfall for infrastructural investments also played an important part.

The local decision makers have done more than their share of the permit application work. They have also influenced politicians on the national level. A good communications programme gained local support and political acceptance. The current communication

on changes of the project plans is now essential if we are not to reduce trust in Vattenfall as a business partner.

In summing-up, we note, that most of the findings in the WG 37.09 report on how to improve the dialogue with policy makers and with the general public are applicable to the Brofjorden case. Maybe one exception could be mentioned, and that is that organizations of different kinds have not been used to a large extent for improving the communication. Still, the communication strategy for Brofjorden has been successful and has given Vattenfall lots of experiences to be used to its advantage in future projects.

**APPENDIX E**

**EXECUTIVE SUMMARY**

## “Executive Summary”

### **International Experience in Improving the Links between Power System Planners, the General Public and Decision Makers in the Energy Policy Area**

New electric power facilities can be accepted and sited - but only if the dialogue with all those concerned is successful. There is always a risk that permissions and licenses from authorities and energy policy decision makers are revised and changed, if the proper dialogue with the general public has not taken place in advance of authority decisions. Therefore, it is essential for companies responsible for power system planning and construction to start a dialogue not only with authorities and policy decision makers, but also with the general public at a very early stage in the planning process.

This conclusion comes from an international Working group in the framework of Cigré, the International Conference on Large High - Voltage Electric Systems. The working group, which received contributions from Australia, Brazil, Canada, England, Finland, France, Italy, Japan, Portugal, Romania, Russia, South Africa, Sweden, the United States, and the World Bank, has been studying and assessing various cases in the respective countries in order to find experience from which to draw general conclusions.

The working group's task was to map and compare the existing mechanism for the dialogue between power system planners and decision makers in the energy policy area in the various Cigré member countries. The group decided to extend the task to include the dialogue with authorities and the general public, and also to suggest ways of improving the power planners' links with all parties.

The group's report is divided into three parts. The first part consists of the general conclusions and general ways of improving the dialogue. The second part is a table of 15 pages containing some key characteristics of the utility systems, describing power system development procedures and commenting on methods used to establish dialogues with all parties.

The third part of the report gives examples of successful, or less successful, ways of improving the dialogue with the general public, the authorities and the political decision makers.

The report, entitled “International Experiences in Improving the Links between Power System Planners, the General Public and Decision Makers in the Energy Policy Area”, can be ordered from Cigré, 3-5 rue de Metz, F-75010 Paris, France. The price will be approximately USD 50.

Here is a brief summary of the group's findings.

Even though the overall situation for the electricity business varies to a great extent from country to country, it is amazing how many similarities there are in the problems faced by the utilities. Here are some of them:

Examples of the fact that the scene is changing rapidly are to be found in most countries.

In Italy, the National Energy Plan has been changing over the years. The expanded plans for using gas as fuel leads to the necessity to

import LNG by ship and to erect two regasification systems. It would not be surprising if problems were to arise in connection with their siting.

In Sweden, the energy policy decisions on nuclear power have changed, resulting in subsequent changes in the timing of additions to the power system. After the general energy policy decision in 1991, nuclear phase-out will start only when there are economical and environmentally sound alternatives available.

The need for a **balance of Energy, Economy and Environment** is a generally accepted fact. Unfortunately, there is no simple solution to finding this balance.

One example of this can be seen in South Africa. There is a risk that high environmental standards for power generation will increase the electricity price and hence postpone the electrification of townships. This will prolong the burning of coal and wood for cooking and other purposes, resulting in local pollution and a bad environment in the townships.

**Planning and siting is becoming more and more difficult.** In Japan, the process of obtaining consensus has led to a minimum time requirement for the procedures that have to be followed between siting and commissioning of at least 100 months. This cautious procedure, part of Japanese culture, has the advantage of creating a harmonious and amicable background to the decision. The time consumed in advance of the final decision is paid back in terms of the construction and operation times.

In England and Wales, the new conditions for the electricity business have led to a new problem as the independent generating companies may have a very short lead time for their combined cycle gas turbine (CCGT) plants, while the national grid company may have difficulties in obtaining all the necessary approvals for new power lines in the same period.

Another issue affecting the planning situation is competition versus coordination. The US example suggests that it is only through coordination and development of plans that the minimum number of transmission lines can be added in the future and the maximum use of existing transmission lines achieved. In the desire to obtain a competitive edge over other utilities, this fact should not be forgotten.

The **different time perspectives** are obvious in most countries. For a power utility, the lead time before a new facility is finally built is from 5 to 10 years. Facilities have a long service life, perhaps as much as 30 years. The economy of the facility depends on a long service life, whereas the time perspective for policy decision makers is by comparison very short, up to five years.

**Differences between the national and the local level** are common. The various cases give examples of the NIMBY (Not in my backyard) syndrome. One example is in Romania, where two proposed locations for a possible future nuclear station were vigorously opposed by the local district authorities. On the other hand, there are examples - not lacking initial problems - given of the opposite experience. One is Finland, where two municipalities which already have two nuclear units each, are both in favour of having the fifth nuclear power unit.

There is an increasing need to justify new power plants or transmission lines. In Finland, as well as in England and Sweden, the case studies give examples of difficulties experienced in obtaining public acceptance of the need for the power plant or line at all. The reasons quoted in opposition to the need are frequently the possibility of, or plans for, energy conservation. Therefore the power companies must have a very accurate idea of the future demand for electricity and the possibilities for improving the efficiency of the energy use.

Having reviewed all this, the group concluded that there is a need to improve the dialogue with both authorities, energy policy decisionmakers and the general public. The need for an improved dialogue is underlined by the fact that in many cases the general public have changed the minds of policy decision makers and authorities at a late stage in the planning procedure. Australia, among others, has experienced this.

Having said this, the group suggests that in order to improve the dialogue, utilities should do the following:

Show openness and trust. Successful examples of this can be found in many countries. The group has stressed that absolute truth is essential. Insufficient knowledge of, for example, the health effects and environmental impact of proposed facilities must be treated seriously.

There are several examples of the advantage of initiative. There are also examples that show the effects of a lack of initiative, mainly when the general public forms an opinion that is difficult to change afterwards.

An example from England, involving a new transmission line, shows that when dealing with such a large project, an information programme would have been required in any case. It was therefore better to have anticipated the need rather than to have responded to it.

It should be recognised that electric power systems need to be treated as multi-disciplinary, not just technical, issues.

In Australia, groups are formed with expertise from various social and medical sciences in order to advise the utilities on their planning process. According to Japanese experience, the tasks of engineers seem to change, from specific items to general terms, in response to the demands of society.

One aspect that might help the planning process along is to introduce a two phase planning process, where the object of the first phase is to reach an understanding as to whether there is any need at all for supplying more electricity.

In the second phase, concrete new facilities are considered. This method has been tried with some success in Australia.

A dialogue on a person to person basis rather than public meetings is suggested by the group. This method has been tried in Finland, where experience is good for being able to keep the dialogue on a factual basis. Public meetings must also be held, but not as the only means of communication.

In Sweden, where the location of a new site for a power station was proposed by the utility Vattenfall, a communications expert was employed at a local office. Here, she could form part of the local community and keep the dialogue on a day-to-day basis, knowing the local people well, including media and politicians, as well as local inhabitants.

In every dialogue, a common language should be used and not technical jargon. This should never be forgotten.

The US example shows the benefit of involving professional societies, such as the IEEE. In order to acquire credibility in the project, independent professional organisations could be encouraged to provide an appropriate review. The advantage of this is that the general public has reason to put more trust in what is said by members of an independent professional organisation, than in the statements made by the company itself.

The group also stresses the need for training and education programmes, both for the utilities' own personnel and for representatives from authorities and political decision makers.

Finally, the group has stated that in some cases contribution to development of the local community should be emphasized in order to gain approval for a project. This is particularly interesting when the proposed installations will be to the benefit of other parts of the country, apart from the place where it is sited. Both Italy, France and Sweden have examples of this.

To conclude, the group can show real, concrete experience and examples of successful and less successful projects, where a more proper dialogue could be of great importance to the result of the licensing procedure, and the success of the planned facility.

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