The environmental cost of security

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1. conflicting interests

- standard conflict:
  - private profit *vs.* social welfare
  - if market mechanisms are not feasible, create an independent regulator
- the regulation entity represents
  - savers and shareholders in financial regulation
  - consumers in economic regulation
  - future generations in environmental regulation
  - etc.

regulation stalemate

- the problem:
  - environmental protection is a public good
  - power security also is a public good
- both require internalisation
  - either through market mechanisms
  - or by public institutions
- lack of coordination results in misallocation

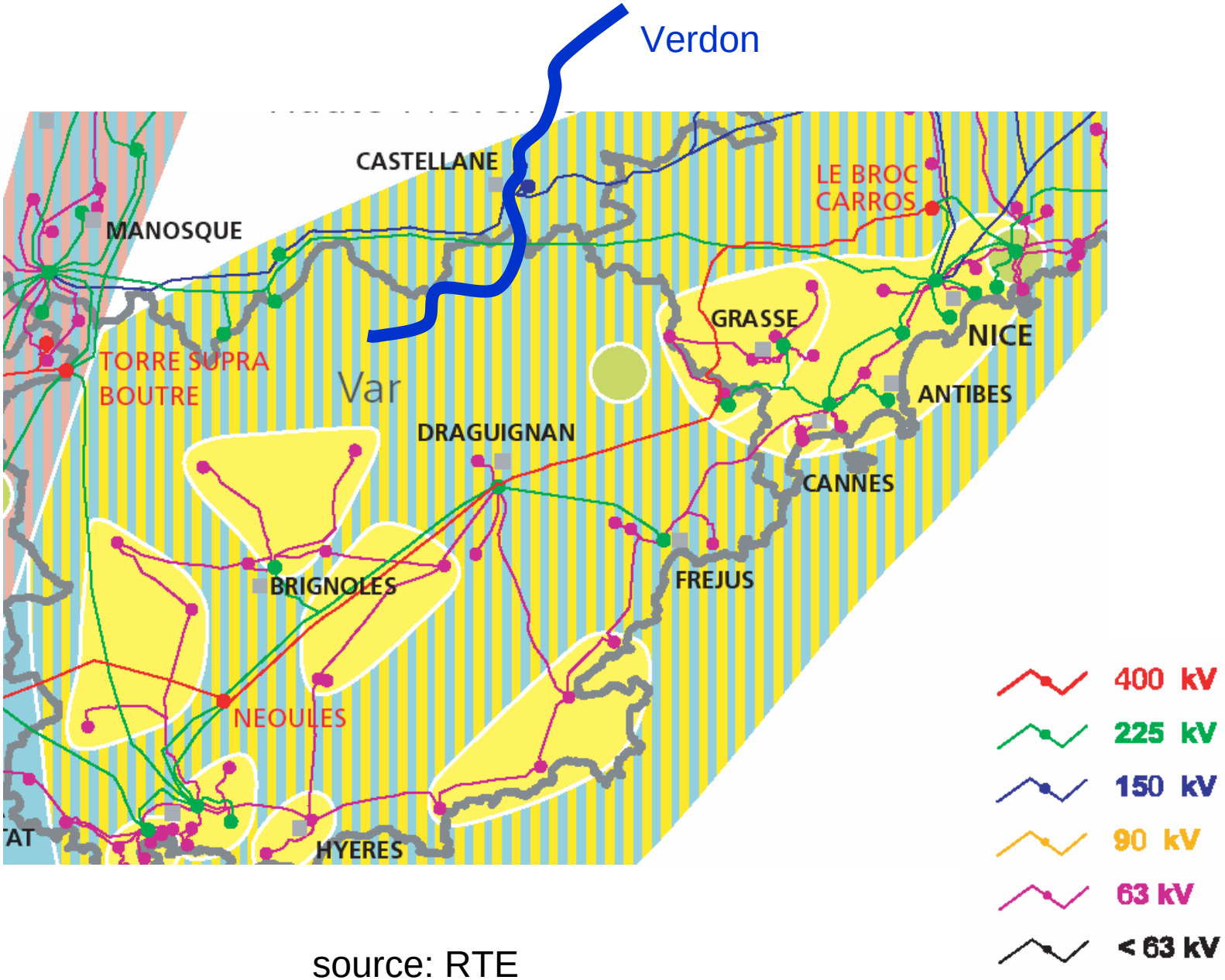
conflicting public goods

- for a given demand for electricity, power security requires
  - zonal capacity reserves
  - interzonal connections
- both are harmful for landscape amenity
- increasing reliability often means increasing environmental damages
- no problem if the economic mechanism for reliability internalizes the environmental cost. Does it?

An illustration: the Boutre-Broc Carros project

- Provence-Alpes-Côte d'Azur (PACA) meets substantial difficulties during a large part of the year due to
  - network structural problems;
  - structural excess demand, yearly increasing
  - forest fires: in 2005, lines had to be de-energised for 22 days to facilitate the intervention of fire-fighters; on May 6, a load of 1,200 MW was disconnected (40% of the consumption of PACA).
  - need for maintaining a balance with Italy.
- one solution:
  - to ensure the security of the region in case of a line or generation outage, RTE plans to build a new 400 kV line between Boutre and Broc Carros substations.


400kV lines
VILLEJUST
CIROLLIERS
WEPPES
AVELIN
GAVRELLE
CHEVALET
MASTAING
PENLY
ARGOEUVES
MAZURES
LONNY
BARNABOS
LATENA
TOLLEVAST
MENUEL
HAVRE (LE)
VAUPALIERE (LA)
ROUGEMONTIER
SEUIL
MOULAINE
TERRETTE
TOURBE
TILLEUL
VESLE
VIGY
ST-AVOLD
REVIGNY
BEZAUMONT
MARLENHEIM
MARTYRE (LA)
PLAINE HAUTE
LAUNAY
MERY-SUR-SEINE
HOUDREVILLE
BOCTOIS
CHESNOY (LE)
CRENEY
VINCEY
DOMLOUP
DAMBRON
GATINAIS
VILLECHETIVE
LOGELBACH
MUHLBACH
QUINTES (LES)
CHAINGY
SEREIN
LOUISFERT
TABARDERIE
SIERENTZ
VILLERBON
VERGER
CHANCEAUX
PICOCHERIE (LA)
GAUGLIN
MAMBELIN
CORDEMAIS-POSTE
LARCAY
DISTRE
VINE
VELMOULIN
MARMAGNE
ST-ELOI
JUMEAUX (LES)
GROSNE
VALDIVIENNE
EGUZON
BOIS-TOLLOT
GRANZAY
BAYET
CORNIER
GREPILLES
GENISSIAT-POSTE
PLAUD
BOSSE (LA)
RULHAT
CHARPENAY
ST-VULBAS-OUEST
PREGUILLAC
CREYS
ALBERTVILLE
MIONS
COCHE (LA)
ECHALAS
CHAFFARD (LE)
GRANDE-ILE
BRAUD
BREUIL (LE)
PIVOZ-CORDIER
PRAZ-ST-ANDRE
CUBNEZAIS
VAUJANY
VILLARODIN
BEAUMONT-MONTEUX
CHAMPAGNIER
RUEYRES
SAUCATS
COULANGE
TRICASTIN-POSTE (LE)
CANTEGRIT
DONZAC
TAVEL
BROC-CARROS (LE)
LESQUIVE
JONQUIERES
AGASSES (LES)
BOUTRE
VERFEIL
TAMAREAU
ARGIA
MARSILLON
ISSEL
REALTOR
NEGOLES
CAZARIL
GAUDIERE (LA)
BAIXAS
0
50
100
Km


Verdon
CASTELLANE
MANOSQUE
LE BROC
CARROS
GRASSE
NICE
TORRE SUPRA
BOUTRE
Var
ANTIBES
DRAGUIGNAN
CANNES
FREJUS
BRIGNOLES
NEOULES
HYERES
400 kV
225 kV
150 kV
90 kV
63 kV
< 63 kV

source: RTE

Obstacles

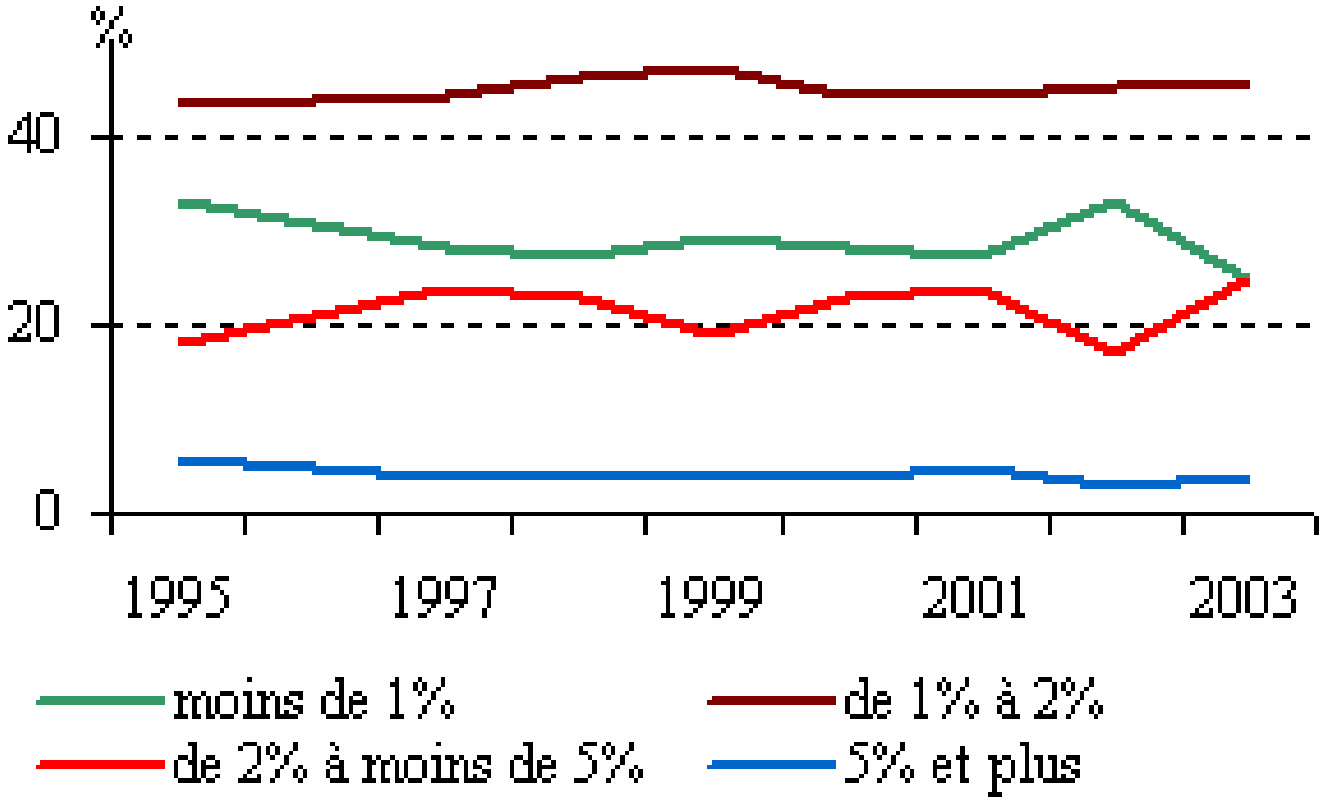
- In 2005, the project is declared of "public interest" by the government.
- But the high voltage line would pass through the Verdon Gorge, a site of exceptional natural interest, of which a part contains protected animal and plant species.
- Public groups and associations of environmental defense have been fighting against the project, from its very beginning 23 years ago, and more recently against the government agreement. They want to preserve the site.
- On the 10th July 2006, the Conseil d'État (the French highest court) annulled the declaration of public interest of the RTE's project as well as the derogation to the obligation of burying lines in national parks.
- RTE has no alternative solution in the short run.

One medium term solution: line burying

- "… as power ratings increase, the cost of underground cable rises more than the cost of equivalent overhead line. (…) at 400kV the estimates are around 10 times more expensive. Operating and maintenance costs for cables are estimated to be around one tenth of the cost of aerial lines." Source: ICF Consulting, 2003
- "The cost of a kilometre of 400,000 volt underground cable is equivalent to the cost of a kilometre of motorway or high speed railway track." Source: RTE, 2002
- The extra cost should be compared with the environmental benefits. But, who should pay?

Opinion poll

question: "Would you agree to pay a higher electricity bill to accelerate the burying of electric lines?"



source: http://www.industrie.gouv.fr/energie/statisti/ins-barometre2.htm

2. The European framework for power security

- Directive 2005/89/EC (18 January 2006) "concerning measures to safeguard security of electricity supply and infrastructure investment."

- deadline for the transposition: 24 February 2008.

Definitions

- ‘security of electricity supply’ means the ability of an electricity system to supply final customers with electricity, as provided for under this Directive; (~NERC's adequacy)
- ‘operational network security’ means the continuous operation of the transmission and, where appropriate, the distribution network under foreseeable circumstances;
- ‘balance between supply and demand’ means the satisfaction of foreseeable demands of consumers to use electricity without the need to enforce measures to reduce consumption. (~NERC's security)

General provisions

- Member States shall ensure a high level of security of electricity supply by taking the necessary measures to facilitate a stable investment climate and by defining the roles and responsibilities of competent authorities, including regulatory authorities where relevant, and all relevant market actors …

- In implementing the measures referred to in the former paragraph, Member States shall take account of:
  - ensuring continuity of electricity supplies
  - possibilities for cross-border cooperation
  - regular maintenance and renewal of the networks
  - ensuring sufficient transmission and generation reserve capacity for stable operation;

references to environmental concern

- Member States shall take account of:
  - ensuring the promotion of electricity produced from renewable energy sources and the promotion of cogeneration based on a useful heat, insofar as their provisions are related to security of electricity supply;
  - the importance of reducing the long-term effects of the growth of electricity demand;
  - the importance of encouraging energy efficiency and the adoption of new technologies, in particular demand management technologies, renewable energy technologies and distributed generation;

who is in charge of security?

- the TSO after articles 4 and 5 of directive 2005/89/EC
- under the supervision of the industry regulatory authority after article 4 of directive 2003/54/EC:
  - "Where Member States consider it appropriate they may delegate this task to the regulatory authorities referred to in Article 23(1). This monitoring shall (…) cover the supply/demand balance on the national market, the level of expected future demand and envisaged additional capacity being planned or under construction, and the quality and level of maintenance of the networks, as well as measures to cover peak demand and to deal with shortfalls of one or more suppliers.

who is in charge of the environmental cost of security?

- the TSOs and DSOs, but the directives apparently say nothing about the industry regulator's competency
- in France, RTE reaches direct agreements with the government ;
  - example: the "Environment and Electrical Systems" agreement for 2001-2003 provides a framework for consultation between RTE and the players involved in urban and country planning; objective: to research better ways of integrating its installations and equipment into the environment and to reduce the length of the overhead network.

The public service contract

- Similarly, the Public Service Contract, signed with the Government in October 2005, sets out the various public service commitments entrusted to EDF and its subsidiary RTE for the period 2005-2007;
- among them, public service obligations regarding the surrounding environment of planned infrastructure; the PSC provides a means of supporting:
  - aesthetic measures to improve the way the new infrastructure is integrated into its surroundings (e.g. using a specially designed pylon or installing a section of the line underground);
  - compensation measures aimed at ensuring the infrastructure is better integrated or does more to respect natural environments or ecosystems;
  - actions to promote sustainable development, by boosting the local economy or demand side energy management.

source: http://www.rte-france.com/htm/an/environnement/contrat_serv.jsp

Conclusions

- in each Member State, the TSO faces a multi-principal problem, opening opportunities for gaming;
- as long as aerial poles and lines are necessary for the security of electricity provision, more coordination is required between the environment regulators and the industry regulator;
- of course, the best coordinated solution is to decrease the demand for electricity (demand-side management, energy conservation, white certificates).