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Nuclear Phase-out Choose & Act

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Overview

- 1. Strong nuclear lock-in
- 2. German electricity policies
- 3. Belgian new electricity deal?
- 4. Nuclear ⇔ renewable flow power
- 5. Electricity intensity is price driven
- 6. 100% renewable power affordable?
- 7. Conclusion



Strong nuclear lock-in with French connection

Location	Capacity (upgraded)		Lifetime	
	MWe	Belgian	Start	Stop
		%		(planned)
Belgium	11	100	1962	1987
France	310	50	1967	1991
Belgium	392 (433)	100	1974	(2015)
Belgium	392 (433)	100	1975	(2015)
Belgium	931 (962)	66.4	1975	(2025)
France	915	12.5	1980	?
France	915	12.5	1980	?
France	915	12.5	1981	?
France	915	12.5	1981	?
Belgium	970 (1006)	100	1982	(2022)
Belgium	930 (1008)	100	1983	(2023)
Belgium	1001 (1039)	100	1985	(2025)
Belgium	1015	100	1986	(2025)
France	1200	2.4	1986	1998
Germany	282	15	Cancelled	-
France	1455 (1500)	25	1996	?
France	1455 (1500)	25	1997	?
	Belgium France Belgium Belgium France France France France Belgium Belgium Belgium Belgium Germany France France France	Belgium 11 France 310 Belgium 392 (433) Belgium 931 (962) France 915 France 915 France 915 France 915 Belgium 970 (1006) Belgium 930 (1008) Belgium 1001 (1039) Belgium 1015 France 1200 Germany 282 France 1455 (1500) France 1455 (1500)	MWe Belgian % Belgium 11 100 France 310 50 Belgium 392 (433) 100 Belgium 931 (962) 66.4 France 915 12.5 France 915 12.5 France 915 12.5 France 915 12.5 Belgium 970 (1006) 100 Belgium 930 (1008) 100 Belgium 1001 (1039) 100 Belgium 1015 100 France 1200 2.4 Germany 282 15 France 1455 (1500) 25 France 1455 (1500) 25	MWe Belgian % Start Belgium 11 100 1962 France 310 50 1967 Belgium 392 (433) 100 1974 Belgium 392 (433) 100 1975 Belgium 931 (962) 66.4 1975 France 915 12.5 1980 France 915 12.5 1980 France 915 12.5 1981 France 915 12.5 1981 Belgium 970 (1006) 100 1982 Belgium 930 (1008) 100 1983 Belgium 1001 (1039) 100 1985 Belgium 1015 100 1986 France 1200 2.4 1986 Germany 282 15 Cancelled France 1455 (1500) 25 1996 France 1455 (1500) 25 1997

Unive

*Since ELECTRABEL is taken over by GDF-SUEZ and SPE by EDF, all Belgian nuclear power plants are now owned by French companies



German (Danish, Austrian) Electricity Policies

Rebuilding of power systems requires:

- Democratic-political leadership
 - Disruptive societal change processes feasible
 - Societal Masterplans with stakeholder involvement
- Industrial-technological drivers
 - Progressive companies can & do deliver
 - Citizens, trade unions are engaged



Belgian New Electricity Deal?

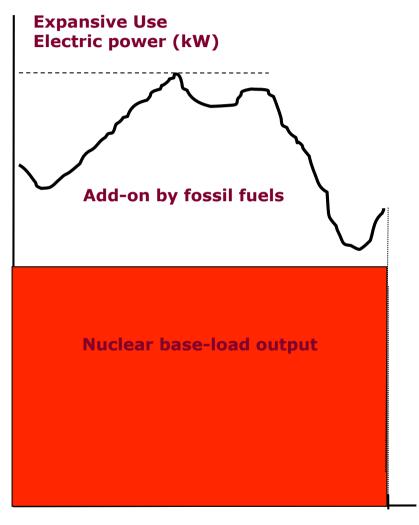
- Develop transparent market model
 - Public authorities (politics): frame steer control
 - Private parties: innovate produce serve
 - Real Competition balanced by Clear Regulation
- Choose or Lose industrial-technological future
 - Masterplan: visionary, comprehensive, consistent
 - Combine efficiency with renewable energy supplies
 - Engage the future by acts & facts, not by volatile text

New actors in shifting electric power systems Unidirectional power flows Standard Generation Bidirectional power flows Plants Power Sales **Power** companies **Exchanges Bilateral Trade Brokers High-Voltage Distribution** Grid **Networks** Large-scale **Small-scale Independent** Large **Small Independent Generators of Customers Generators of Consumers Own Power Own Power IGOP IGOP** Universiteit Antwer **Retail markets**

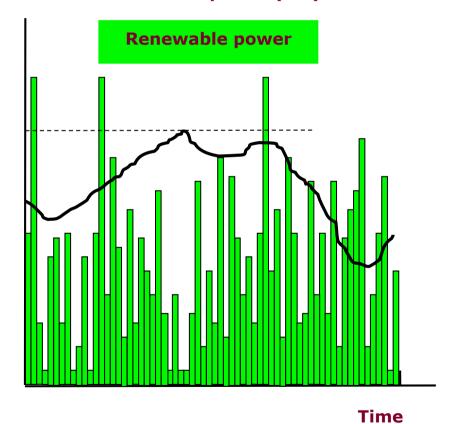
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Nuclear ⇔ **flow** renewable power



Efficient Use Electric power (kW)

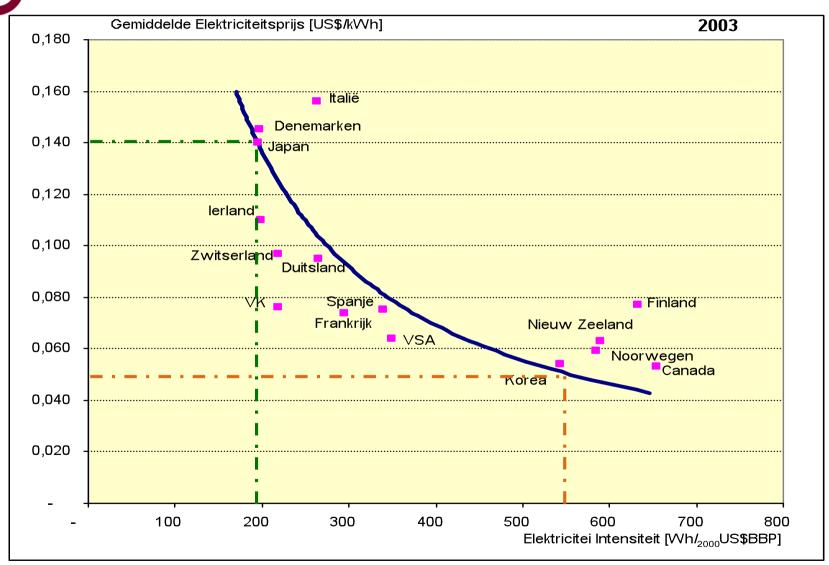


Time

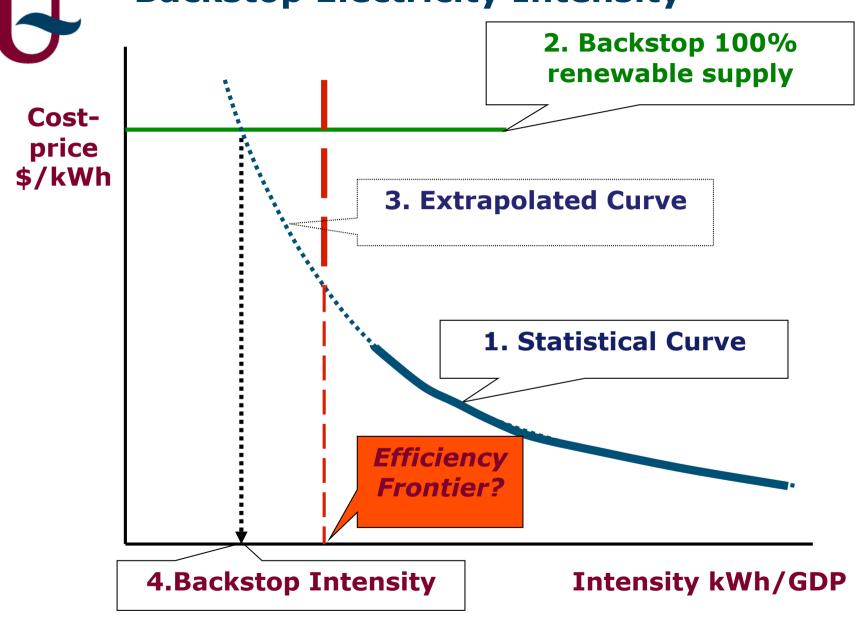
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Intensity x **Price** = constant % of **GDP**



Backstop Electricity Intensity





Belgium

Strong nuclear lock-in with French ties

Few democratic masterplanning experience, capability

4/7/12 government decision sidelines 2003 phase-out law

Expected repetition after 2017 due to missing actions now

Necessary for sustainable power future:

Proper vantage point = future targeted systems

≠ adverse systems in place, inherited from the past

Focus on IGOP (Independent Generators of Own Power)

Transparent electricity market model

Substitute efficiency and renewable power for nuclear