



**Brussels  
Greenpeace & KAW  
July 10, 2012**

# **Nuclear Phase-out Choose & Act**

**Aviel Verbruggen  
University of Antwerp  
[www.avielverbruggen.be](http://www.avielverbruggen.be)**



## 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

Name	Location	Capacity (upgraded)		Lifetime	
		MWe	Belgian %	Start	Stop (planned)
BR3	Belgium	11	100	1962	1987
CHOOZ A	France	310	50	1967	1991
DOEL I	Belgium	392 (433)	100	1974	(2015)
DOEL II	Belgium	392 (433)	100	1975	(2015)
TIHANGE I	Belgium	931 (962)	66.4	1975	(2025)
TRICASTIN I	France	915	12.5	1980	?
TRICASTIN II	France	915	12.5	1980	?
TRICASTIN III	France	915	12.5	1981	?
TRICASTIN IV	France	915	12.5	1981	?
DOEL III	Belgium	970 (1006)	100	1982	(2022)
TIHANGE II	Belgium	930 (1008)	100	1983	(2023)
DOEL IV	Belgium	1001 (1039)	100	1985	(2025)
TIHANGE III	Belgium	1015	100	1986	(2025)
SUPERPHENIX	France	1200	2.4	1986	1998
KALKAR	Germany	282	15	Cancelled	-
CHOOZ B1	France	1455 (1500)	25	1996	?
CHOOZ B2	France	1455 (1500)	25	1997	?
*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**

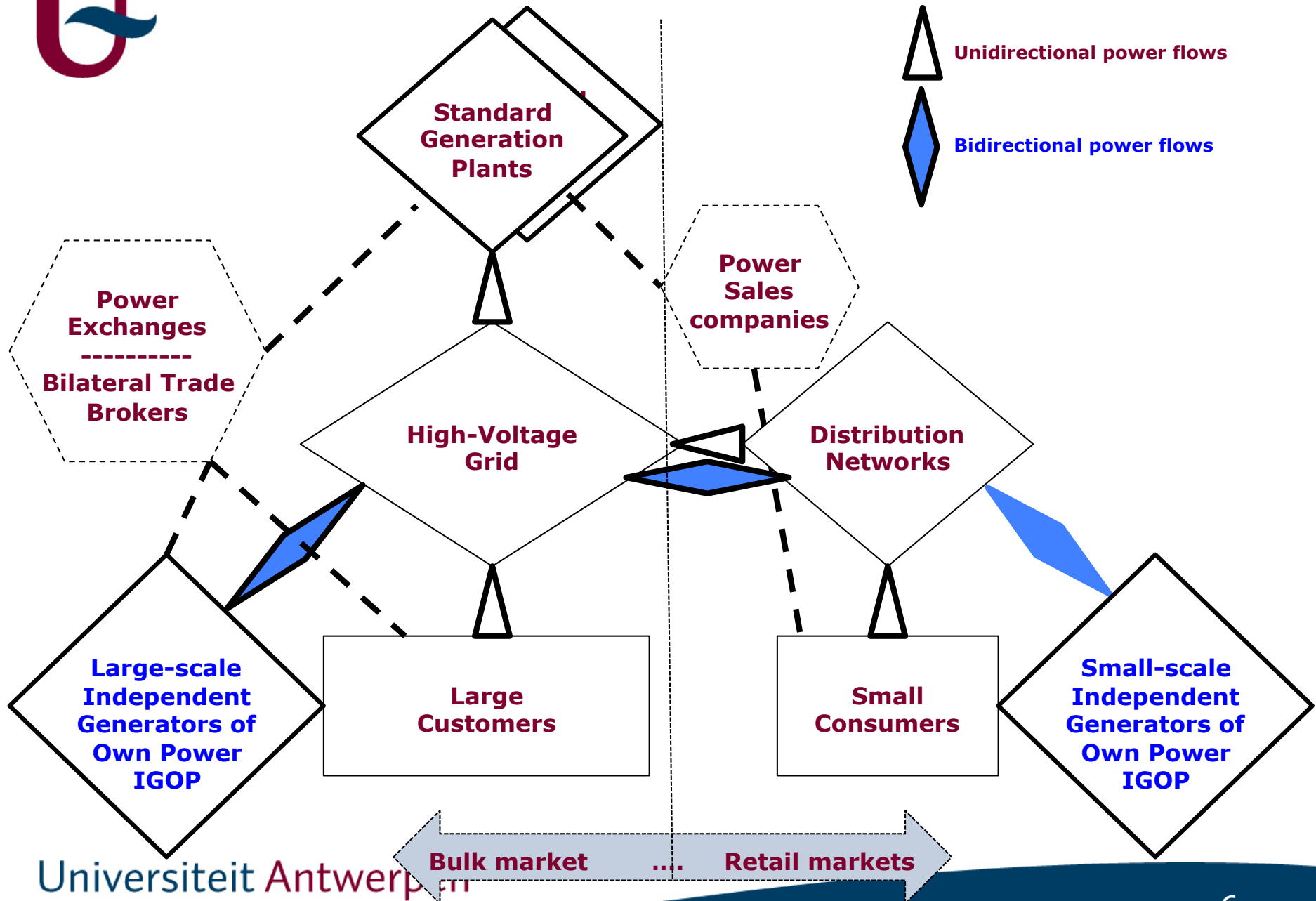


## Belgian New Electricity Deal?

- **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**

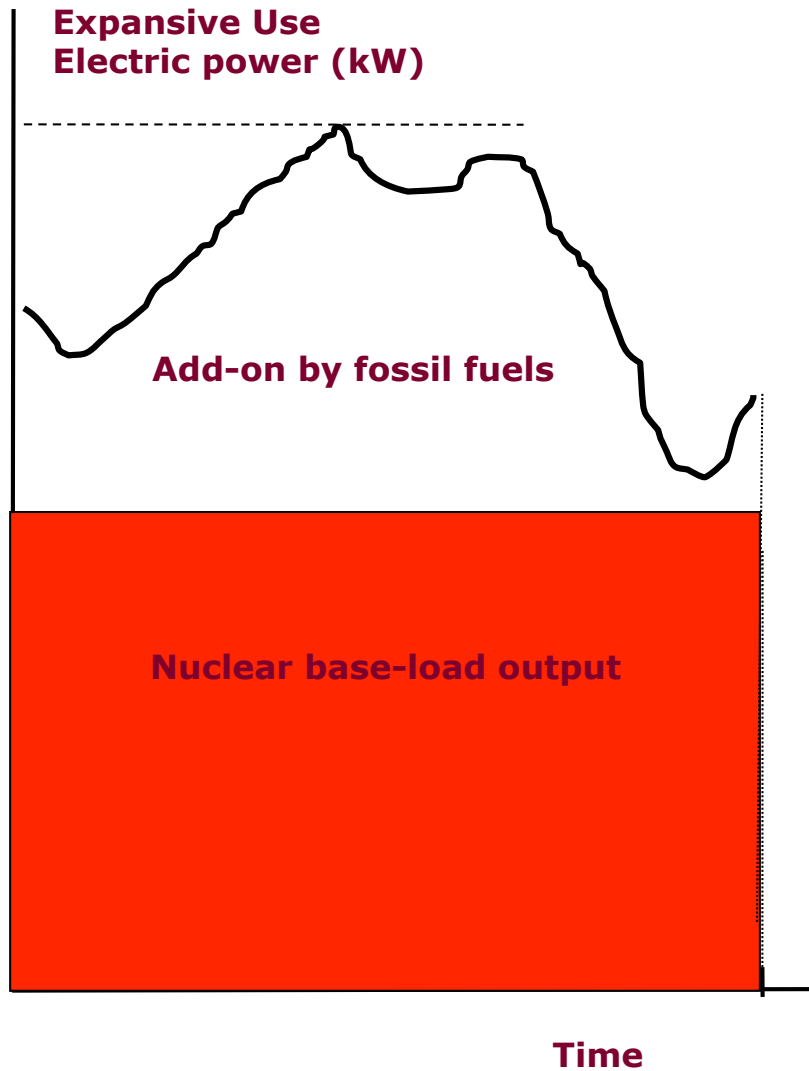


# New actors in shifting electric power systems

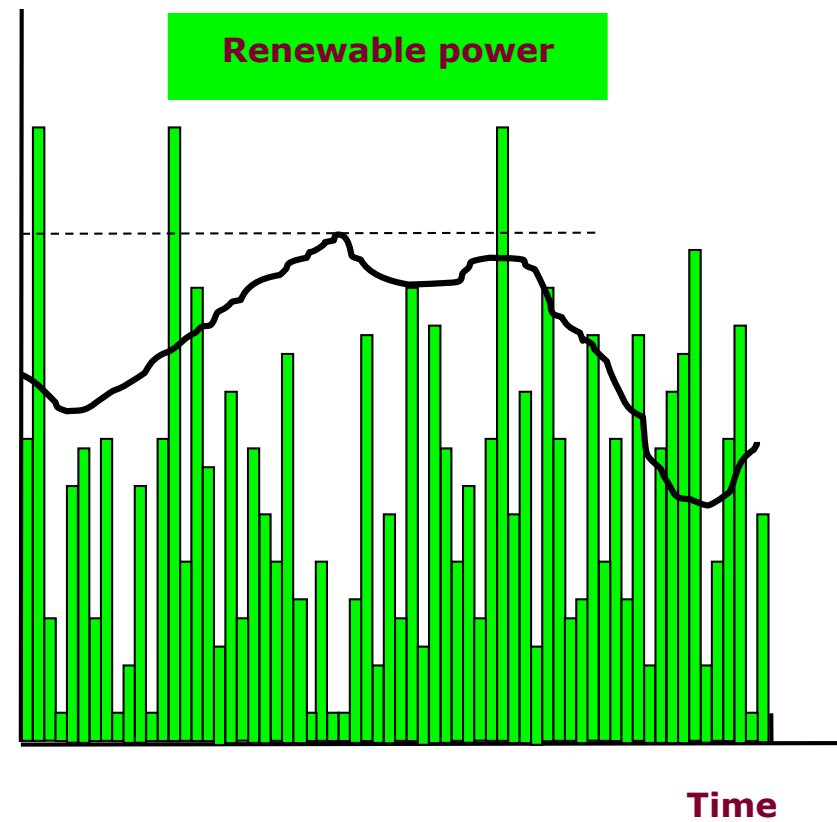




# Nuclear ↔ flow renewable power

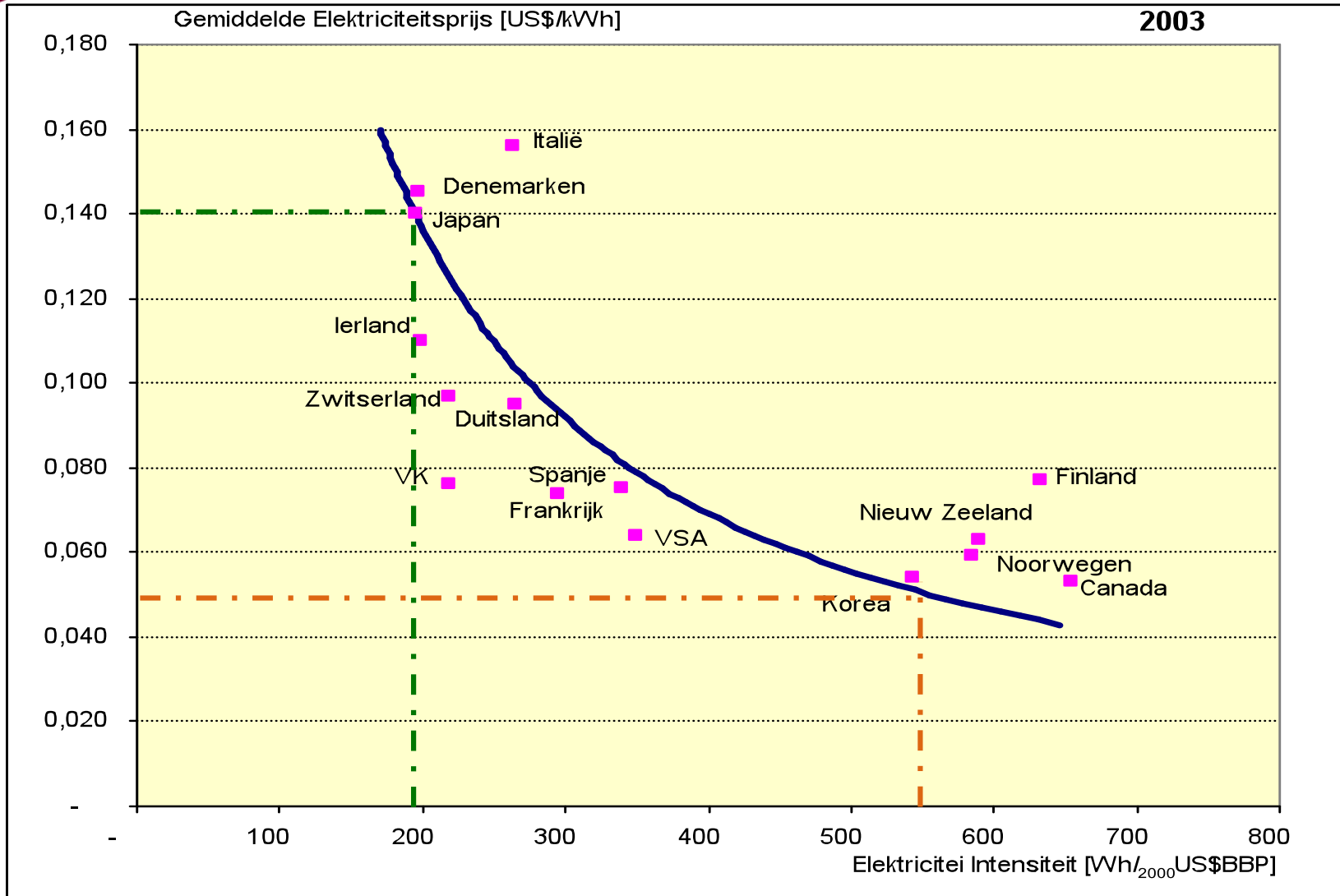


**Efficient Use Electric power (kW)**





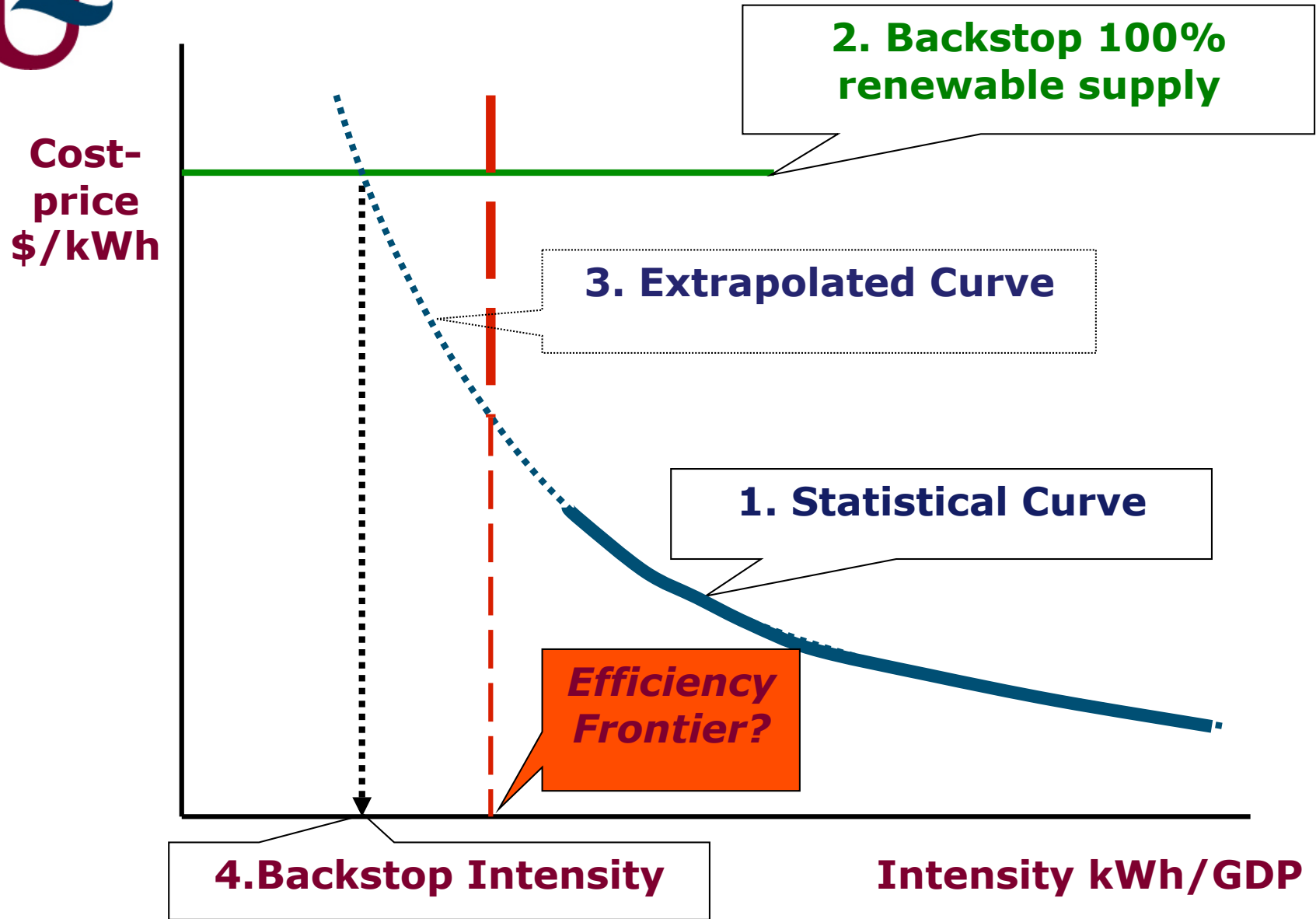
# Intensity x Price = constant % of GDP







# Backstop Electricity Intensity





## Conclusions

### 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**