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To tax or to turn off: that is the question

Some insights in power sector emissions reduction measures' effectiveness
in a small, open economy



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plan.be

Context



- The Federal Planning Bureau (FPB) is an **independent** public agency that makes forecasts, carries out research and analyses public policy measures. Its main mission is to support the political decision-making process.
- Its **modus operandi** consists of 3 manners
 Legal assignments + **own** initiative + research **consortia**
 House brand: **quantitative** analyses, energy demand and supply



Energy outlook

Go towards a low-carbon economy?



News announcements



Coal generation in Europe down 19% in 2019 as phase-outs take effect

 13/08/2019  08:42 Coal

1270 in Italy, 1470 in Germany should be adopted by the end of the year.

23% of total EU coal-fired generation. According to the draft, Germany will organise tenders for coal closure compensation payments: the operators of coal-fired *power plants* will bid a price for the closure of their plant and those offering the lowest cost per CO₂ emission will be awarded compensation.

The remaining count

However, Germany plans to set a timeline for exiting coal-fired power generation (currently expected between 2035 and 2038).

Brussels launches petition on minimum, import-proof carbon pricing

Published 18:17 on July 3, 2019 / Last updated at 20:21 on July 3, 2019 / EMEA, EU ETS / No Comments

"The current standstill of unit S at the Lippendorf power plant is exclusively market-driven. Current framework conditions do not permit economic operation," EnBW said.



HERMAN
MOESTUE
Oslo

20 Aug 2019
14:40 CET

(Montel) The Netherlands' power mix has been close to being coal free over the last two weeks as only one coal plant – RWE's Amer 9 (643 MW) – has been operating.

And this plant has been running on 40-50% biomass of an output of around 400 MW, while the remainder on coal, RWE spokesman Adriaan Van der Maarel told Montel.

Four out of five Dutch coal plants have been idle since 7 August, according to TSO group Entso-E, and coal output has sunk to less than 2% of the country's power mix, Montel calculations showed.

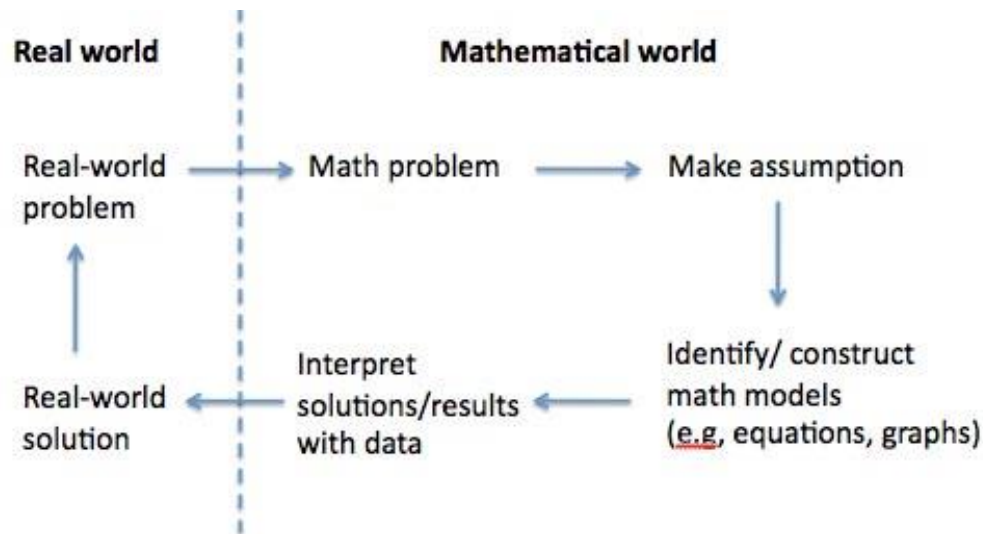
2017

Jul

2018

2019

Methods-assumptions-technology choices



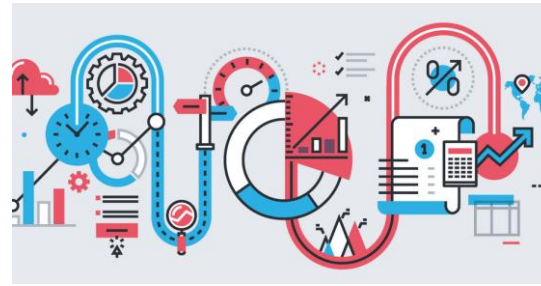
Federal Planning Bureau: Energy

Tools

- PRIMES
- Crystal SG
- METIS
- Econometric analyses
- Indicator based assessments
- ...

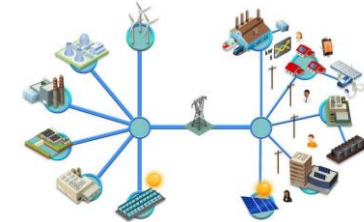


Methodology



- **Soft link** between PRIMES and Crystal Super Grid

- Energy system model **PRIMES**
- Capacity expansion calculations
- Integration of results in power sector model **Crystal Super Grid**
- Performance of a number of **sensitivity analyses** in Crystal Super Grid



PRIMES

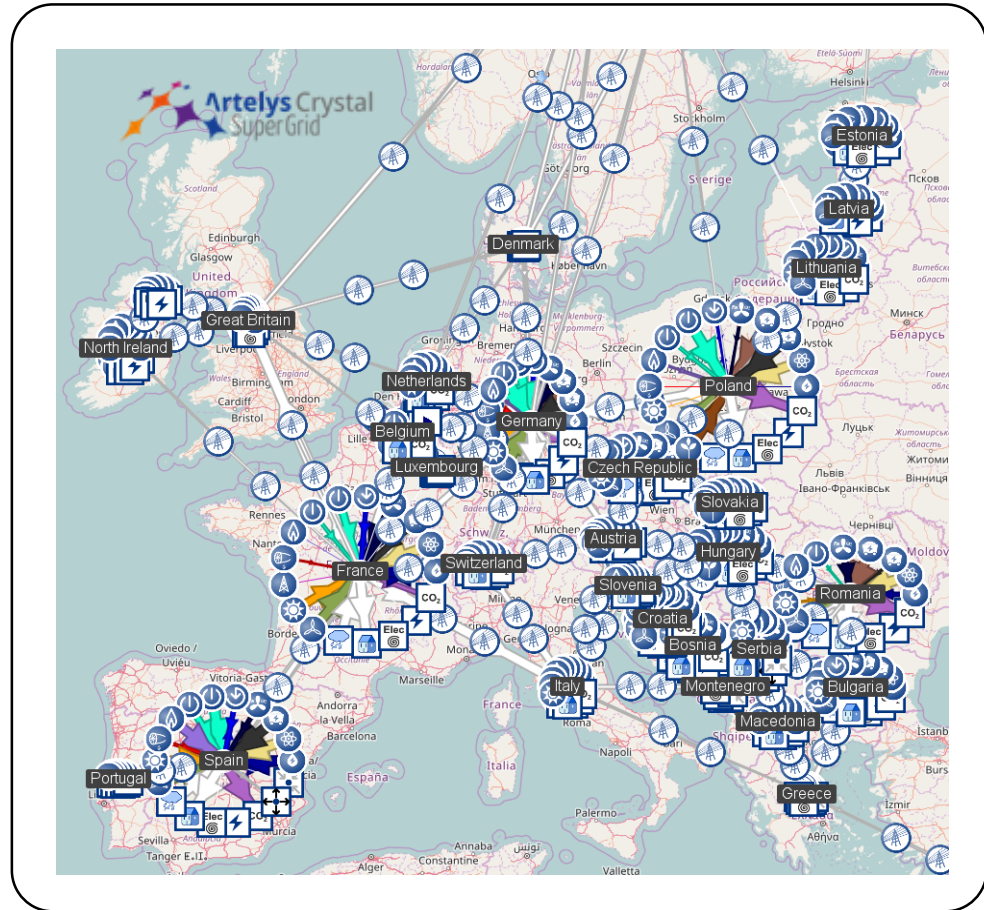
Power and
steam module

Crystal SG

- 'EUCO30' scenario
- Sensitivities

Methodology: Crystal Super Grid

- Unit commitment, optimal dispatch
- Hourly load profile
- Rolling horizon
- Horizon 2030
- Especially suited to investigate interconnected future power systems with large penetration of vRES
- CO₂ emissions



Source: Crystal Super Grid.

To tax or to turn off? Impact on BE powergen

- Announced coal phase-outs by NL, UK, FR, IT
- Looking for a matching EU CO₂ price
- Similar amount of CO₂ emission reductions in EU PG by 2030
- But... other indicators quite different

Out with the coal,
in with the new

The End of
Coal

<i>wrt EUCO30</i>	Coal Phase-out	Higher carbon price
EU CO ₂ emissions (MtCO ₂ eq.)	-32.4	-34.5
BE SMC (EUR/MWh)	+5.8	+21.5
BE CCGT production (TWh)	+2.2	+1.4

Source: FPB, 2018

To tax or to turn off? Impact on BE powergen (II)

- Significant difference in BE net imports
 - Caused mainly by import
 - Phase outs (mostly) in CWE-interconnected zones
 - Higher carbon price but **MO stays C<G**

<i>TWh (wrt EUCO30)</i>	Coal Phase-out	Higher carbon price
Import	-0.9	-0.1
Export	+1.3	+1.4
Net imports	-2.2	-1.4

Source: FPB, 2018



Carbon price on the rise?



- Towards 2030: expected **increase in carbon price** (but not by all)

- Will it suffice to trigger $G < C$?
- Should it be complemented by (more) regulatory measures?



TABLE

Below is a table of the 12 analysts' individual forecasts for average front-year EUA prices. All are reported in €/tonne, and averages and medians rounded to the nearest €0.05. To reduce instances of extreme forecasts skewing the mean estimate, the highest and lowest views for Q3 2019, H2 2019, and 2020 were excluded from the calculations.

	Q3 2019	H2 2019	2020	2021	2025	2030	Phase 4
Berenberg	30.00	45.00	65.00	50.00	30.00	30.00	32.00
BNEF	N/A	26.70	35.20	47.71	N/A	30.60	N/A
ClearBlue	27.72	29.30	35.56	41.25	61.37	74.87	61.69
Commerzbank	24.00	24.50	26.00	N/A	N/A	N/A	N/A
Energy Aspects	24.30	25.80	30.80	34.00	N/A	N/A	25.00
Engie Global Mkts*	28.00	26.00	25.00	24.00	N/A	N/A	N/A
ICIS**	26.50	28.00	29.25	28.50	45.00	20.00	N/A
JP Morgan	25.00	25.00	30.00	30.00	30.00	30.00	30.00
Refinitiv	27.00	26.00	26.00	26.00	23.00	27.00	N/A
SocGen^	26.80	29.00	32.75	N/A	N/A	N/A	N/A
Vertis	28.60	29.00	31.40	33.50	N/A	N/A	35.00
Wattsight	24.00	22.50	20.00	N/A	N/A	N/A	N/A
AVERAGE	26.45	26.95	30.20	35.00	37.85	35.40	36.75
Median	26.80	26.35	30.40	33.50	30.00	30.00	32.00
High-Low Range	6.00	22.50	45.00	26.00	38.37	54.87	36.69

Source: carbon-pulse.com



“We are in a sector that is very dependent on the regulatory framework”, C. Peeters, CEO Elia

- Major impact of
 - **fair carbon price**
 - Favours domestic production of CO₂ → higher FLH, more exports
 - Triggers higher inframarginal rents
 - **regulatory & policy decisions**
 - Price caps, technology phase-outs, ...
 - Smart policy is essential: « La classe politique actuelle sera jugée aux actions qu'elle pose aujourd'hui » (COP24)*
- **Coordinated coal phase-out** results in significantly lower average system MC than would prevail if carbon price rises to a level that engenders similar emission reductions in EU PG
- But...
 - Lower price increase -> lower inframarginal rents -> **lower investment appetite** for capital intensive and marginal capacities
 - Importance of **market design**

Thank you!

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Belgian energy outlook

- Every 3 years, the **Federal Planning Bureau** draws up LT Belgian energy projections for different sectors and energy forms

Most recent Energy Outlook (October 2017)

- Simulates a **reference** scenario for Belgium up to 2050
- Simulates the entire Belgian **energy** system (supply and demand) and evolution
- Integrates the **2020 C/E package**, but no additional PAMs or targets after 2020

Impact Assessment of the EU **2030 C/E Framework** and **2050 LCE** (May 2018)

- Analysis of a set of **policy scenarios** compatible with 2030/2050 EU objectives but differing in the assumption on BE n-ETS GHG reductions

