OSeMBE
The Open-Source energy Model Base for the European Union – an engagement model

IEW 2018, Gothenburg
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Presenter: Hauke Henke
Aim

Development of an open source engagement model
- A multi-regional engagement model
- Aligned with input data and results of more detailed tools
- Combining the key dynamics of the other tools used in the project

Description of Task 7.3 of the H2020 project REEEM

www.reeem.org
Trump administration refuses to consider that 97% of climate scientists could be right

Even though smart climate policies could save tens of trillions of dollars

Source: The Guardian, Tue 29 May 2018
What enables engagement?

Accessibility
• No license fees
• Open code
• Open data

Comprehensibility
• Simplicity, while covering the key characteristics
• Clear structure (Modelling system and model)
Approach

- Modelling System
- Modelled region
- Fuels and Technologies
- Definition of time
Model generator converting the energy system structure represented by equations into a matrix to be solved by specific solvers.

• Open source
• Deterministic
• Dynamic
• Perfect foresight
• Paradigm comparable to MESSAGE or TIMES
• Linear optimisation

• Cf: [www.osemosys.org](http://www.osemosys.org); Howells et al, 2011 - OSeMOSYS: The Open Source Energy Modelling System: An introduction to its ethos, structure and development, Energy Policy
Coverage

- All EU 28
- Switzerland
- Norway (under implementation)
Fuels and Technologies

**Fuels:**
Bio fuel, Biomass, Coal, Geothermal, Heavy fuel oil, Hydro, Natural gas, Nuclear, Ocean, Sun, Waste, and Wind

**Technologies:**
Combined cycle, CHP, Fuel cell, Gas cycle, Internal combustion engines, Photovoltaics, Steam cycle, Wave power, Wind turbine

→ In total up to 50 technology-fuel combinations per country available
Reference Energy System (example)
What’s the time?
Modelling period: 2015 – 2050
Defining a common Year split

- Splitting the year into seasons
- Defining the number of typical days per season
- Splitting the days into time slices
Consideration of variable renewable energies (VRE)
Defining a common Year split

- Splitting the year into seasons
- Defining the number of typical days per season
- Splitting the days into time slices
Defining a common Year split
While considering the variability of renewable resources

Daily average load EU28+CH+NO
Defining a common Year split

Year
- Splitting the year into seasons

Season
- Defining the number of typical days per season

Day
- Splitting the days into time slices
Defining a common Year split
While considering the variability of renewable resources

Daily load curve by day (average for the entire year)
Defining a common Year split

- Splitting the year into seasons
- Defining the number of typical days per season
- Splitting the days into time slices
Defining a common Year split (continuation)

While considering the variability of renewable resources

Daytype 1, season 1

- Actual load
- Average load
- Average solar CF
Engagement?

How to use the model
Ways to engage
Ways to engage (Continuation)

- The REEEM game
  - Game is ready, waiting for data/OSeMBE results
- Usage in teaching on MSc level
  - Already started last autumn at KTH
- Usage in workshops
  - First workshop in July
- Public webinar(s)
  - Scheduled for September
Questions?

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## Quick facts

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Engagement?
How to use the model