

The gravity of status quo

A review of IEA's World Energy Outlook

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Introduction

What does methodology and model

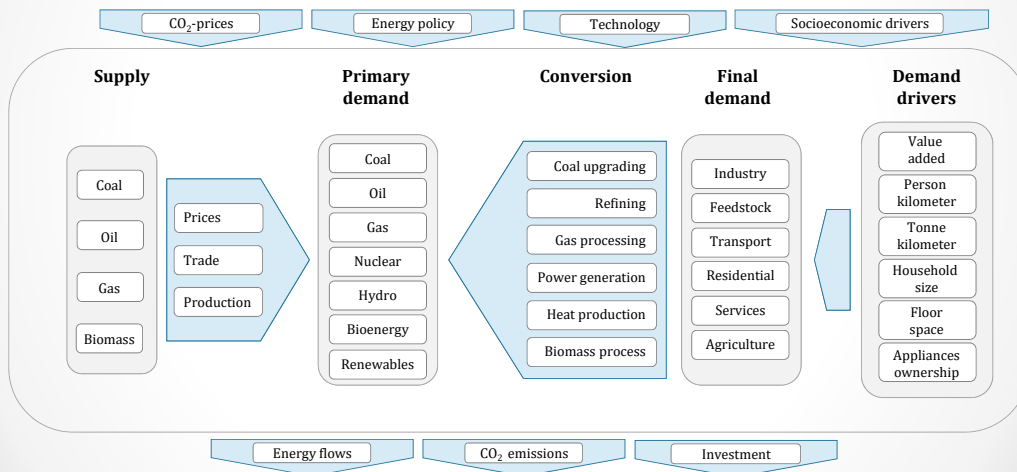
- Authoritative reference document
 - Van de Graaf (2012)
 - Heubaum and Bierman (2015)
- Scenario approach to energy
 - Nielsen and Karlsson (2007)
- Debate and dispute
 - Midttun and Baumgartner (1986)
 - Gaede and Meadowcraft (2016)
 - Metayer et al (2015)
- Methodology and model



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Model and methodology

IEA's World Energy Model (WEM): General overview



Source: International Energy Agency. 2015. *World Energy Model Documentation*. 2015 version. OECD/IEA 2015.

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From economic activity to energy demand

Stylised illustration of demand modelling in WEM



$$E = E(p, y; x)$$

$$\pi_i = \frac{\exp(V_{it})}{\sum_i \exp(V_{it})}$$

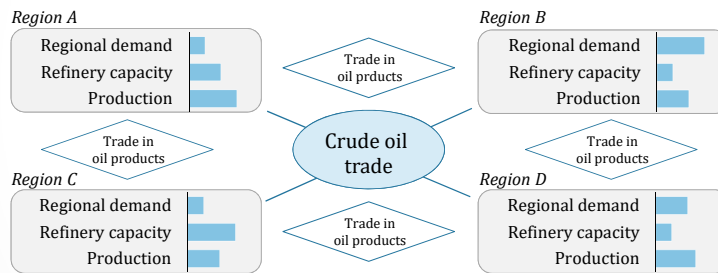
$$V_{it} = \alpha_i \left(\frac{p_{it}}{p_i} \right) + \beta t + \gamma_i$$



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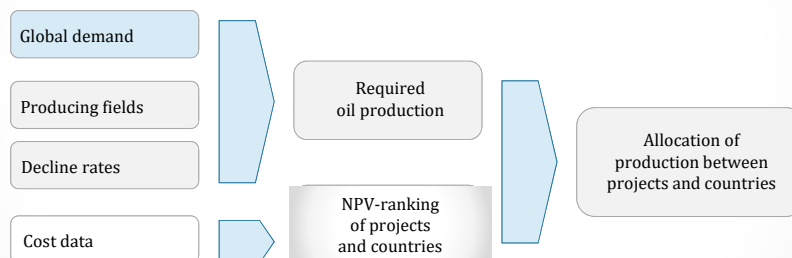
Crude flows

Trade in crude and oil products in WEM: Stylised overview



Oil demand, cost-ranking, and oil supply

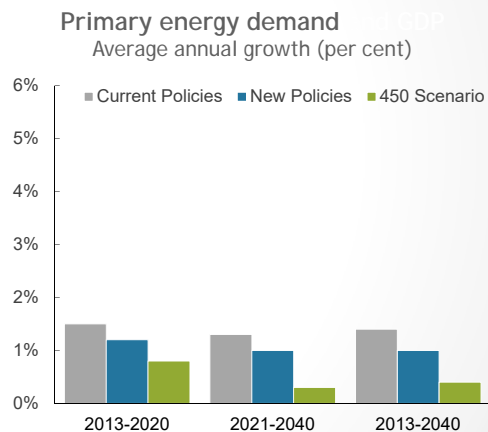
Crude oil supply in the World Energy Model



Energy and the macro economy

Energy demand allowed to diverge between scenarios, ...

- Drivers of energy demand
 - Economic growth
 - Technological change
 - Structural change
 - Prices and policies



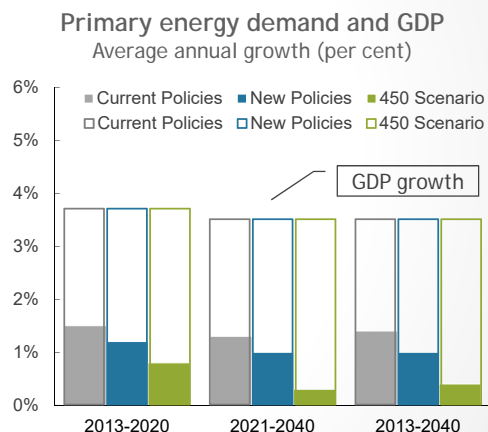
Source: International Energy Agency. 2015. *World Energy Outlook 2015*. IEA, Paris.

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Energy and the macro economy

... but economic growth is the same across scenarios

- Drivers of energy demand
 - Economic growth
 - Technological change
 - Structural change
 - Prices and policies
- Exogenous economic growth
 - No variation across scenarios

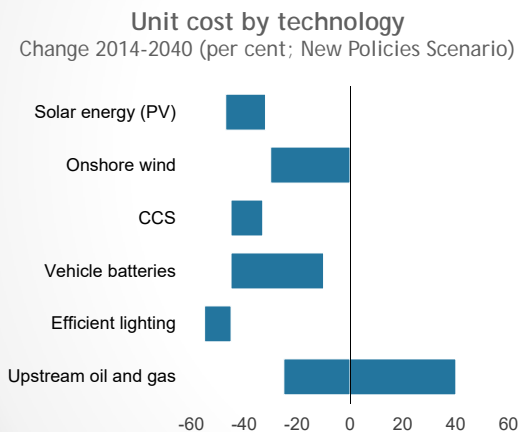


Source: International Energy Agency. 2015. *World Energy Outlook 2015*. IEA, Paris.

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Energy technology

“Black swan” - or “Slow train coming”?



- Means to an end
- Modelling strategy
- Prices and policies
- Economic behaviour
- Role of uncertainty

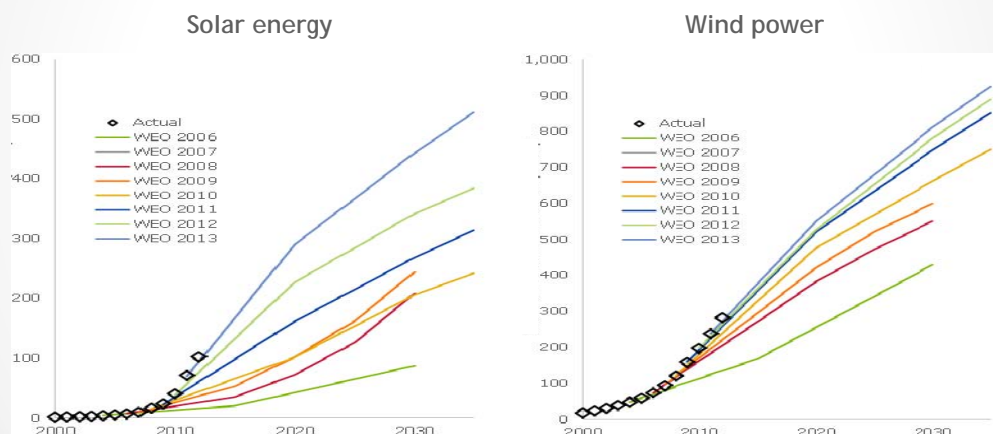


Source: International Energy Agency. 2015. *World Energy Outlook 2015*. IEA, Paris.

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New renewable energy

Installed capacity (GW), New Policies Scenario



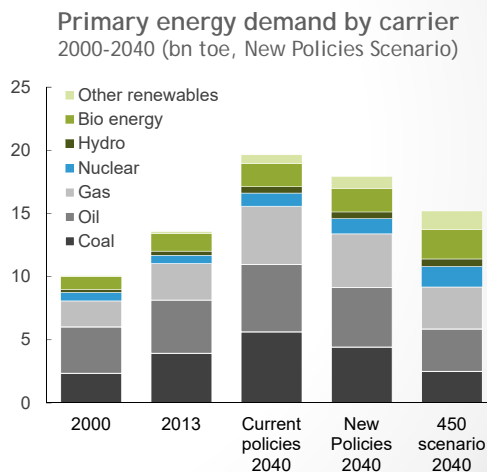
Source: de Vos og de Jager (2014). Blog-article. Energy Post (<http://www.energypost.eu>). 14 March.

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The gravity of status quo

Potential bias in data generation, modelling, and application

- Broadness & detail have a cost
- Model short on flexibility
- Assumptions are crucial
- Stakeholder interests
- Transparency is key



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Source: International Energy Agency. 2015. *World Energy Outlook 2015*. IEA, Paris.

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