



Energy scenarios

A review of IEA's World Energy Outlook

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Introduction

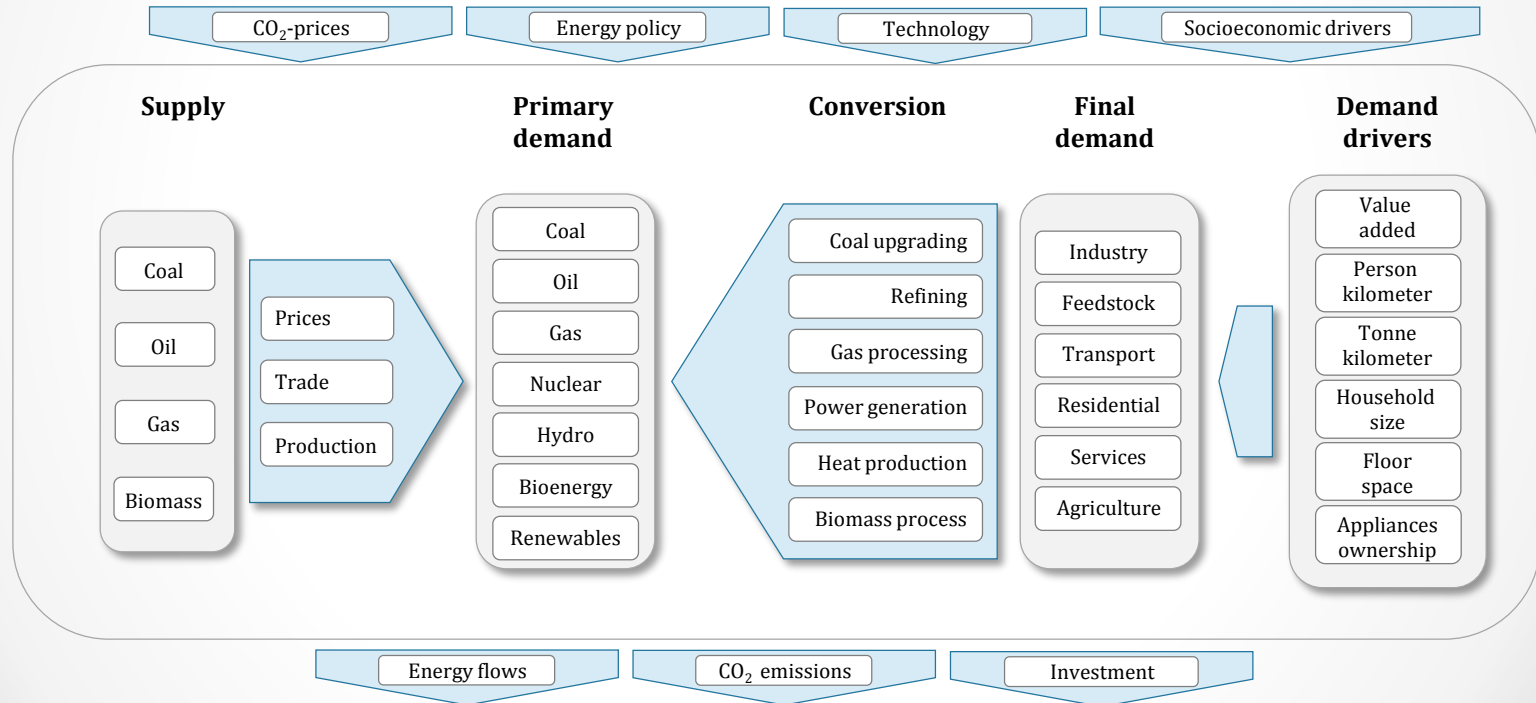
What does methodology and model

- 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



Model and methodology

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

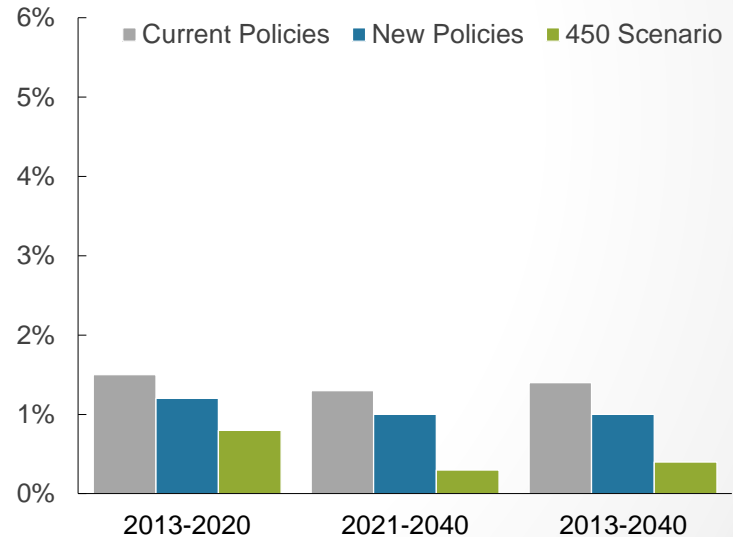


Energy and the macro economy

Energy demand allowed to diverge between scenarios,...

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

Primary energy demand and GDP
Average annual growth (per cent)

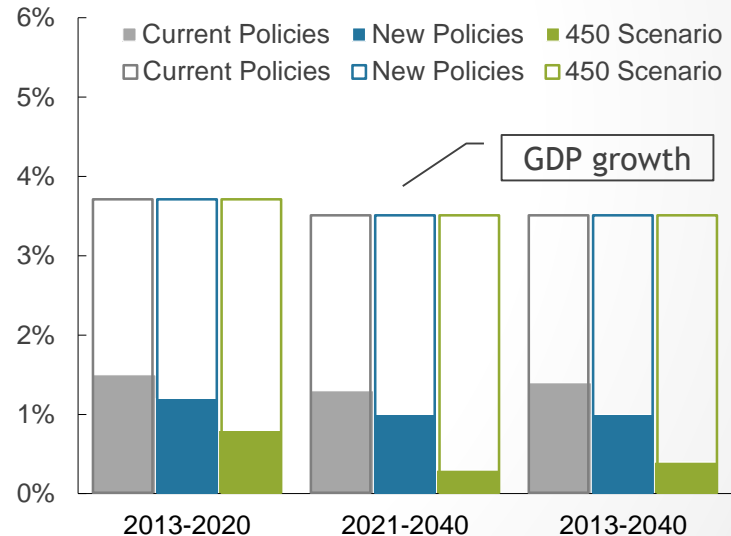


Energy and the macro economy

... 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

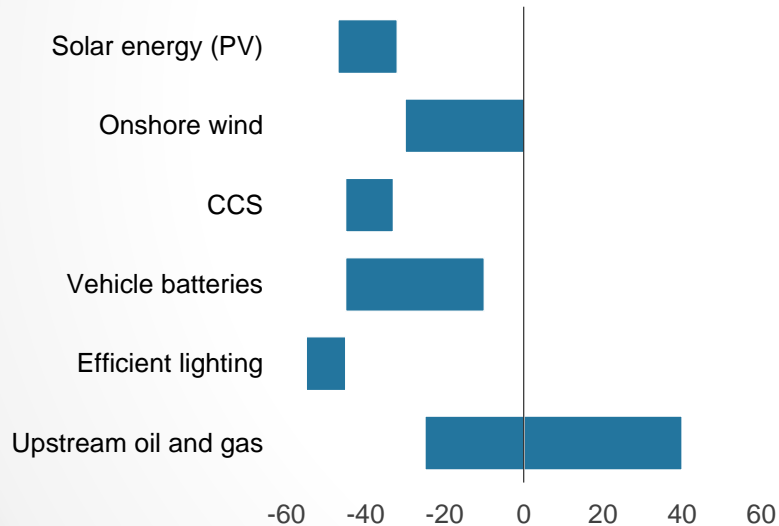
Primary energy demand and GDP
Average annual growth (per cent)



Energy technology

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

Unit cost by technology
Change 2014-2040 (per cent; New Policies Scenario)

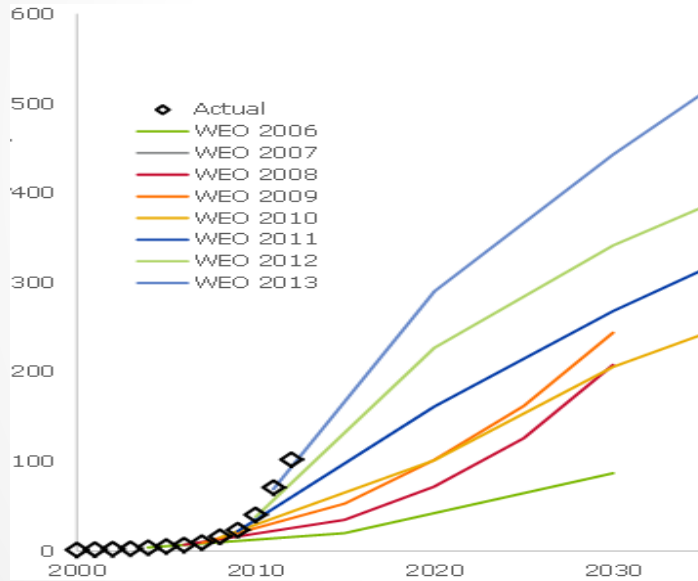


- Means to an end
- Modelling strategy
- Prices and policies
- Economic behaviour
- Role of uncertainty

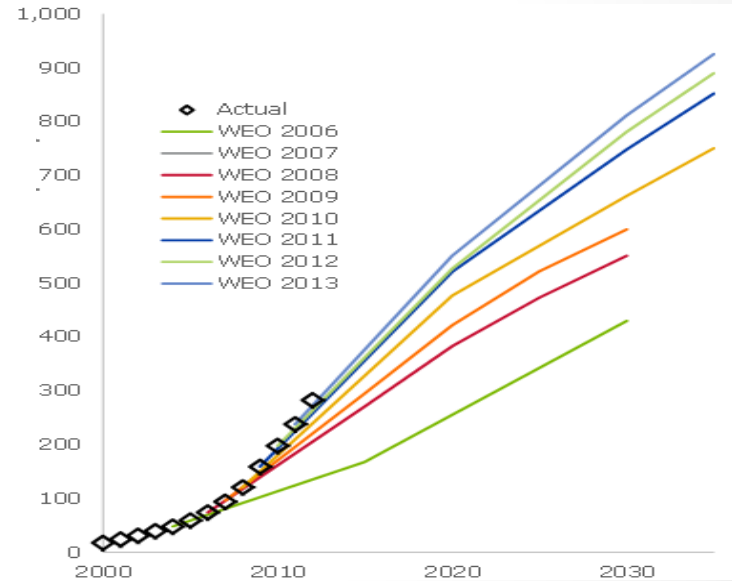
New renewable energy

Installed capacity (GW), New Policies Scenario

Solar energy



Wind power



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



Primary energy demand by carrier
2000-2040 (bn toe, New Policies Scenario)

