

World Energy Outlook 2014

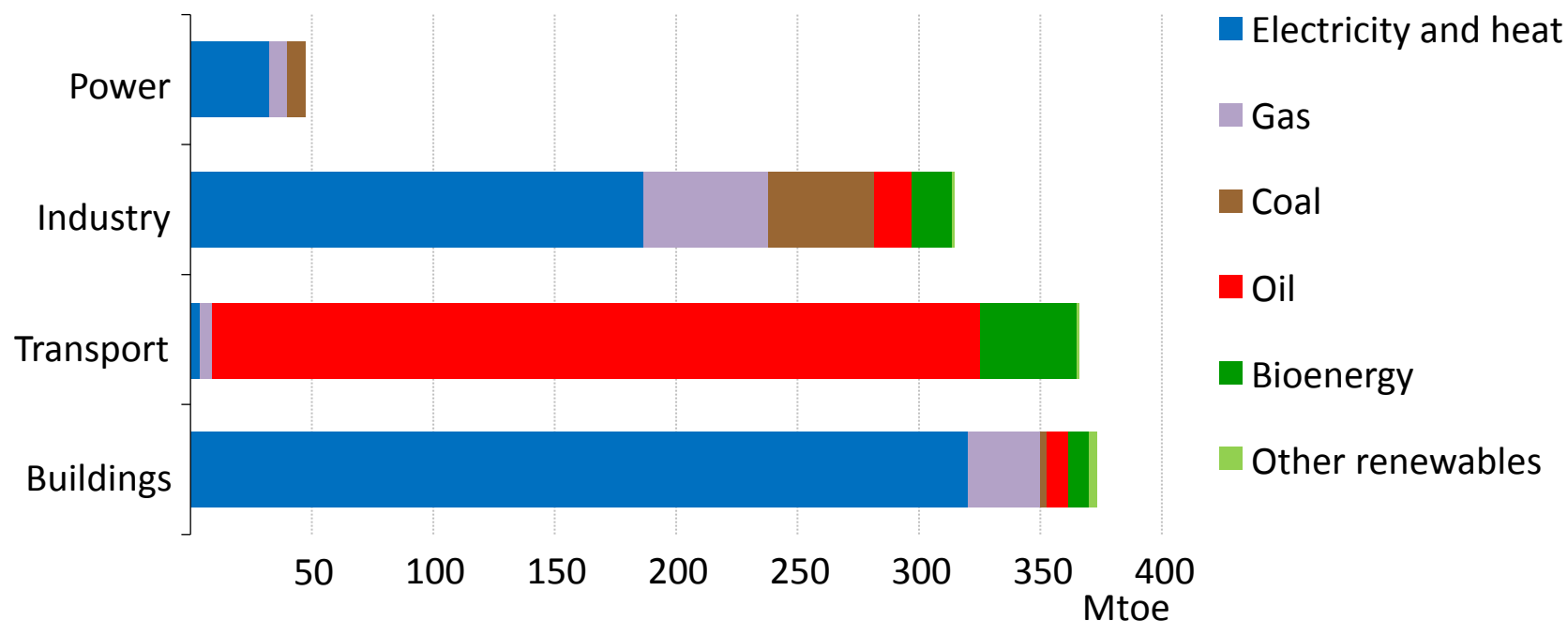
**Importance of investment
projections and cost
assumptions for the WEO**

Dr Stéphanie Bouckaert
Directorate of Global Energy Economics, IEA
Paris, 12 November 2014

Buildings leads savings from energy efficiency

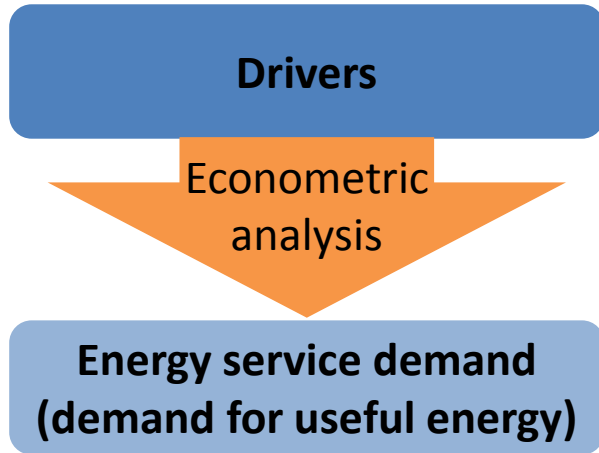
World
Energy
Outlook
2014

Global primary energy savings from energy efficiency in the New Policies Scenario relative to the Current Policies Scenario, 2040



Buildings has the highest savings from energy efficiency, but only one fifth of the economic potential is used.

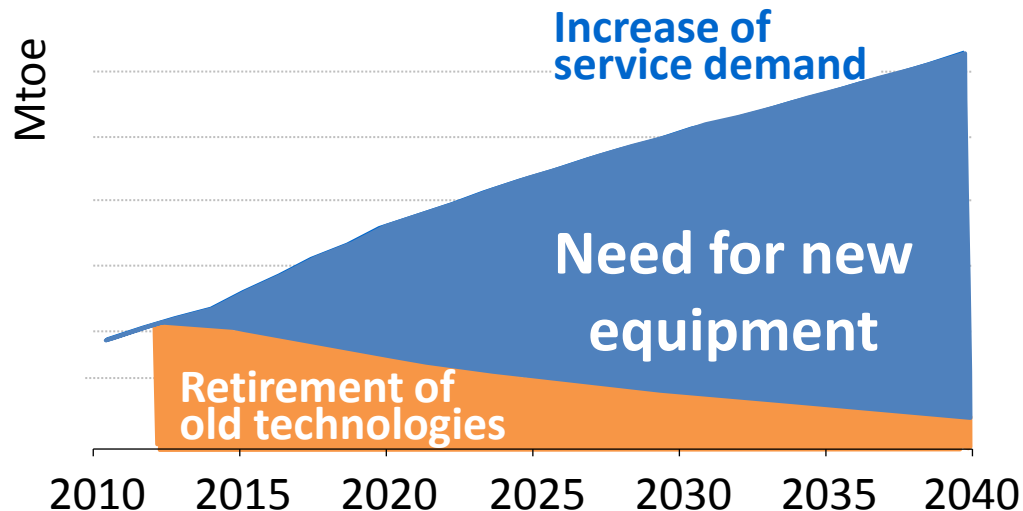
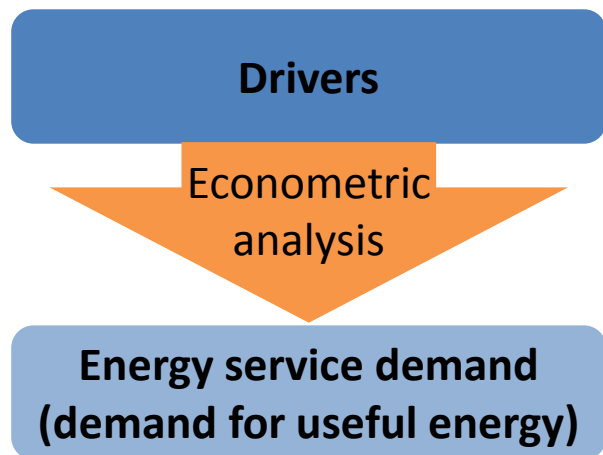
General structure of the buildings module



- **Six end-uses:** space heating, space cooling, water heating, cooking, lighting and appliances
- **Activity variables:** floorspace, people per household, appliances ownership index, value added of service sector
- **Historic energy demand** by fuel and end-uses
- **Historic and projected temperatures** (heating and cooling degree days)

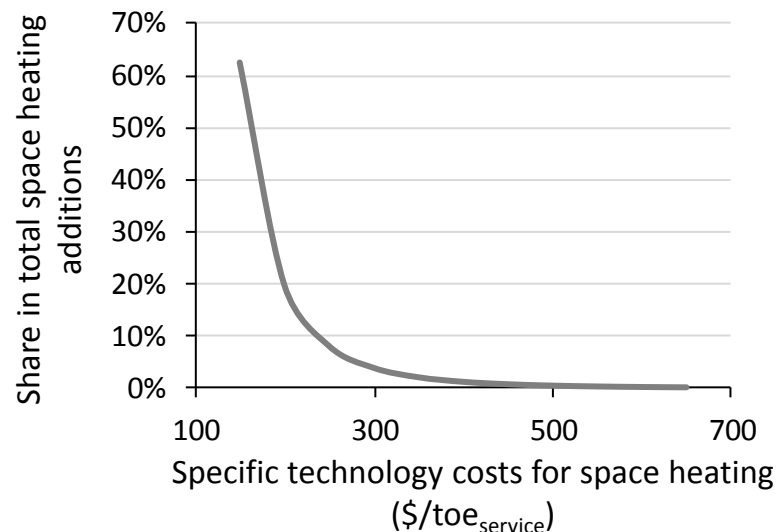
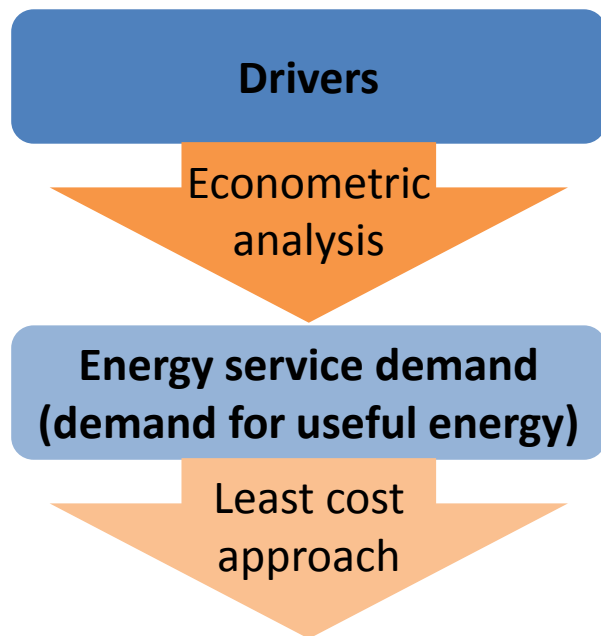
General structure of the buildings module

World
Energy
Outlook
2014



General structure of the buildings module

World
Energy
Outlook
2014



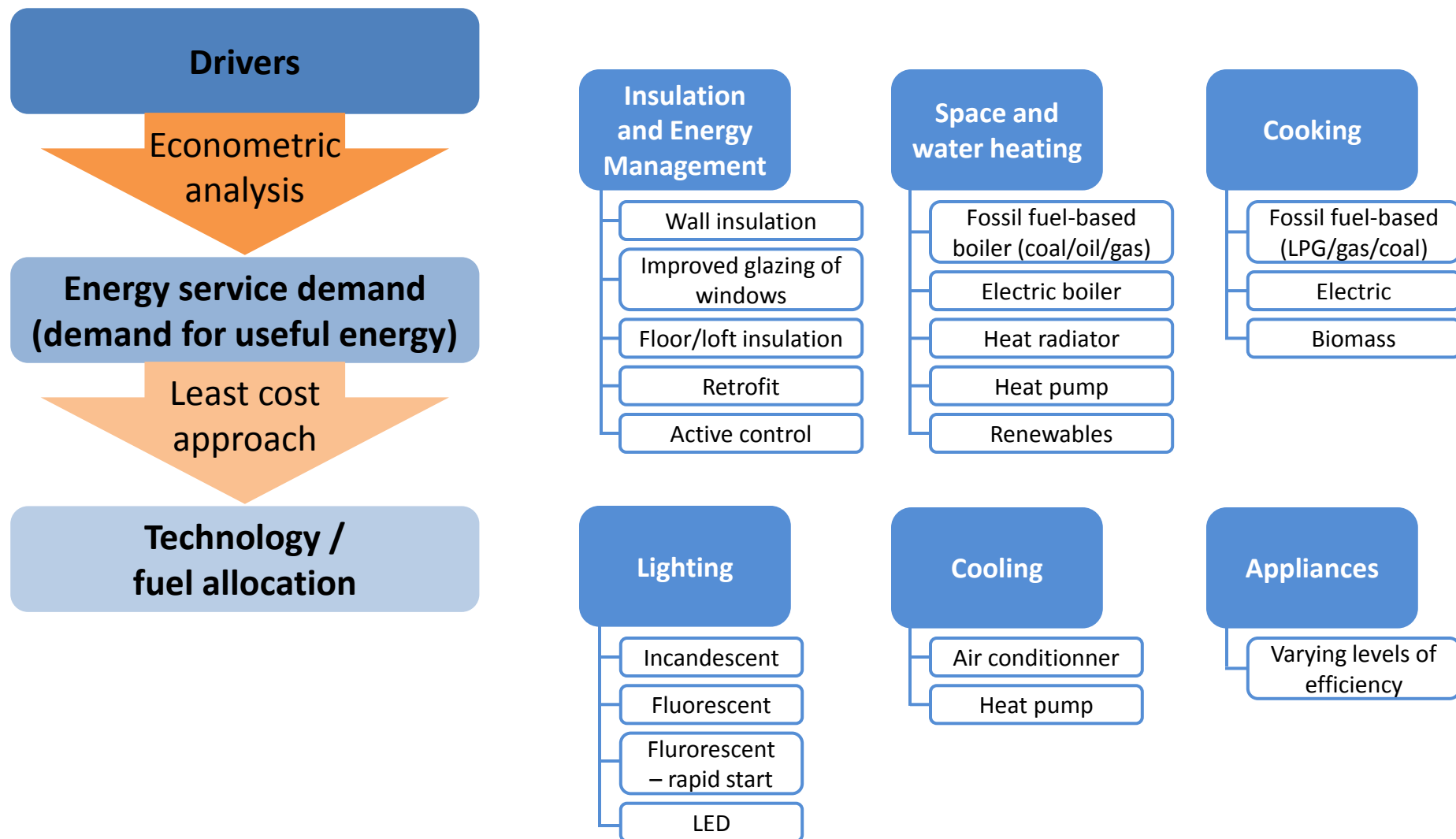
$$\text{Specific costs}_{\$/\text{toe}} = \frac{1}{\eta} (\text{Annuity of investment}_{\$/\text{toe}} + \text{end-use energy price}_{\$/\text{toe}})$$

$$\text{Technology share}_i \sim 1/(\text{Specific costs}_i)^4$$

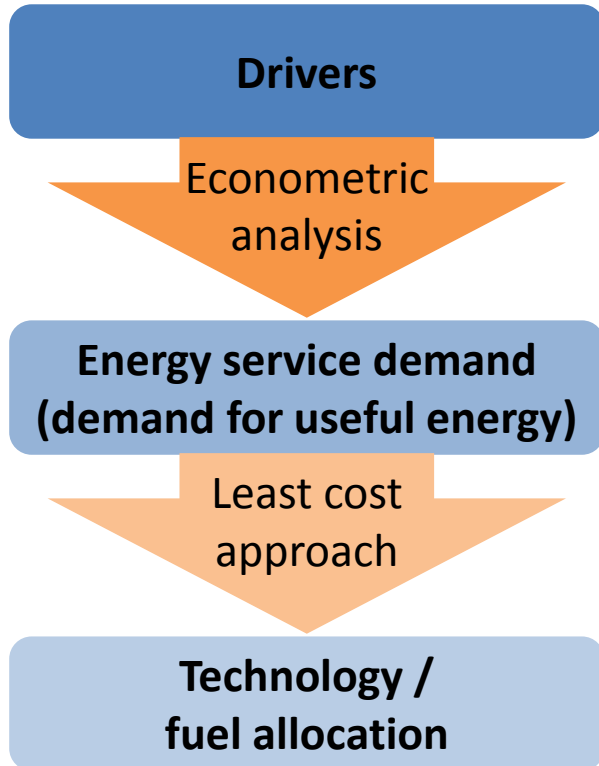
<http://www.worldenergyoutlook.org/weomodel/investmentcosts/>

General structure of the buildings module

World
Energy
Outlook
2014



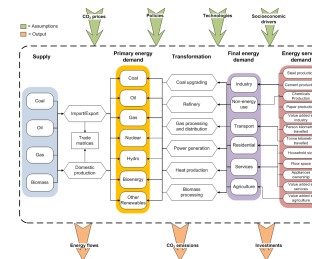
General structure of the buildings module



Investment costs varies by region (\$/toe)

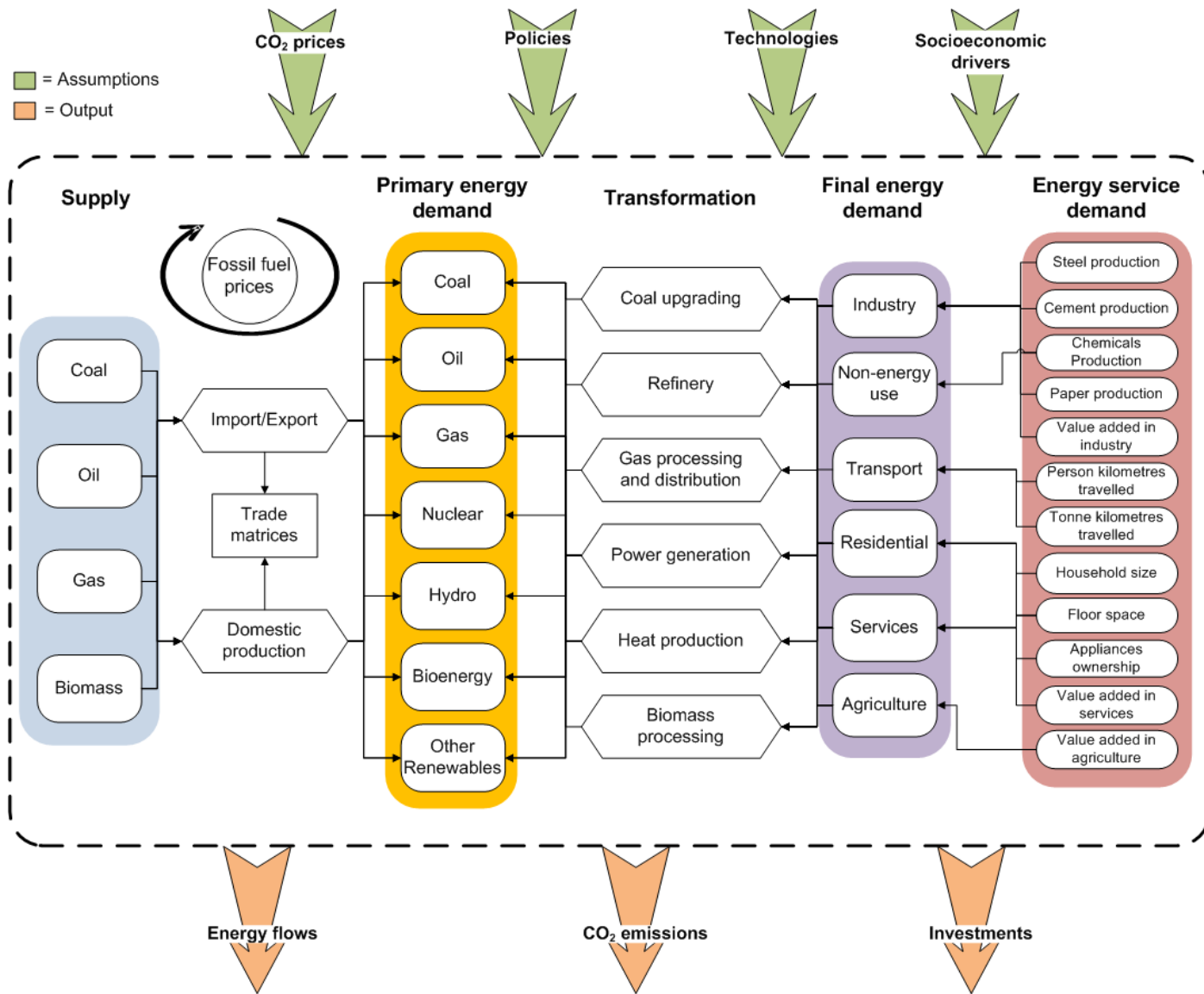
- *US/Europe assumed as the reference*
- *Full load hours vary among regions*
- *Investments (material and labor costs) are different*
- *Equipment sizes are different*
- *Availability of technologies are different*

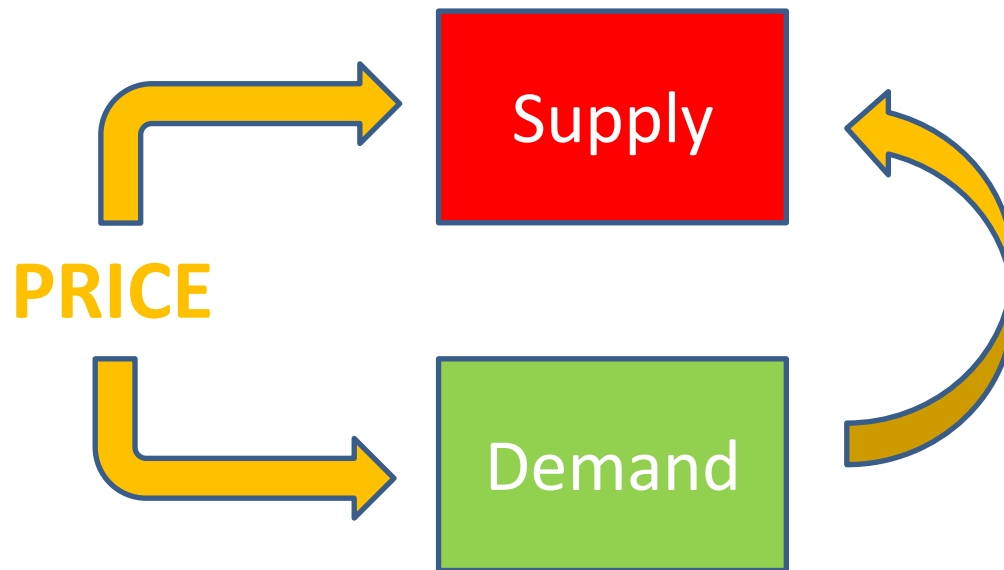
End-user prices are determined endogenously



World Energy Model (WEM) overview

World
Energy
Outlook
2014

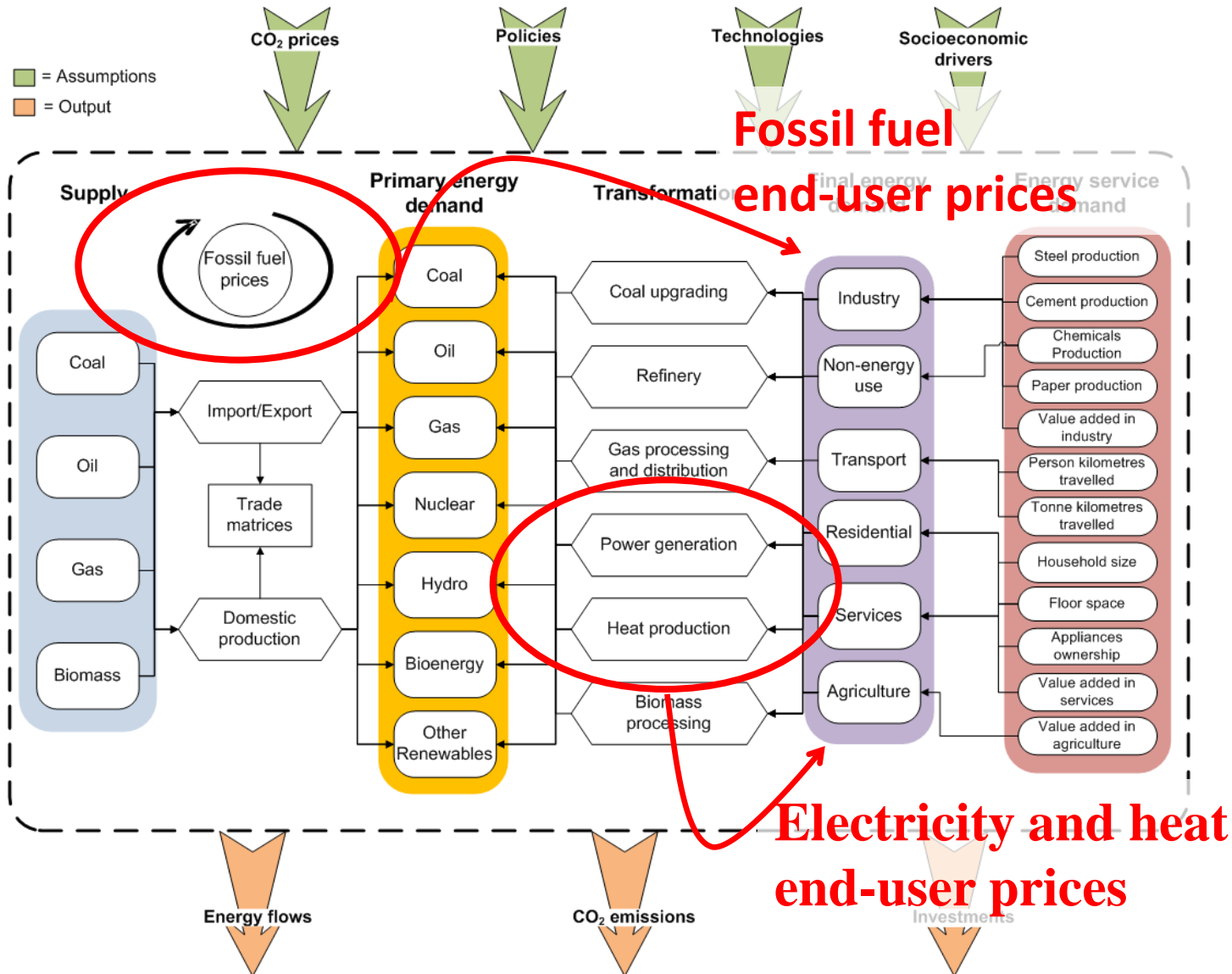




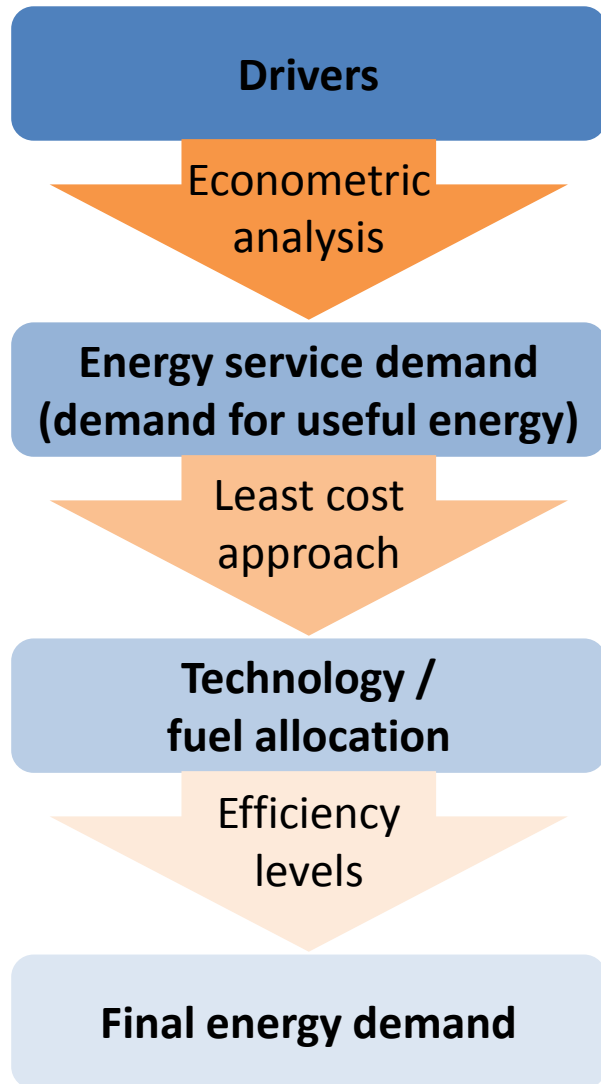
Iterations of smooth price trajectory until long term supply can match demand

World Energy Model (WEM) overview

World
Energy
Outlook
2014



General structure of the buildings module

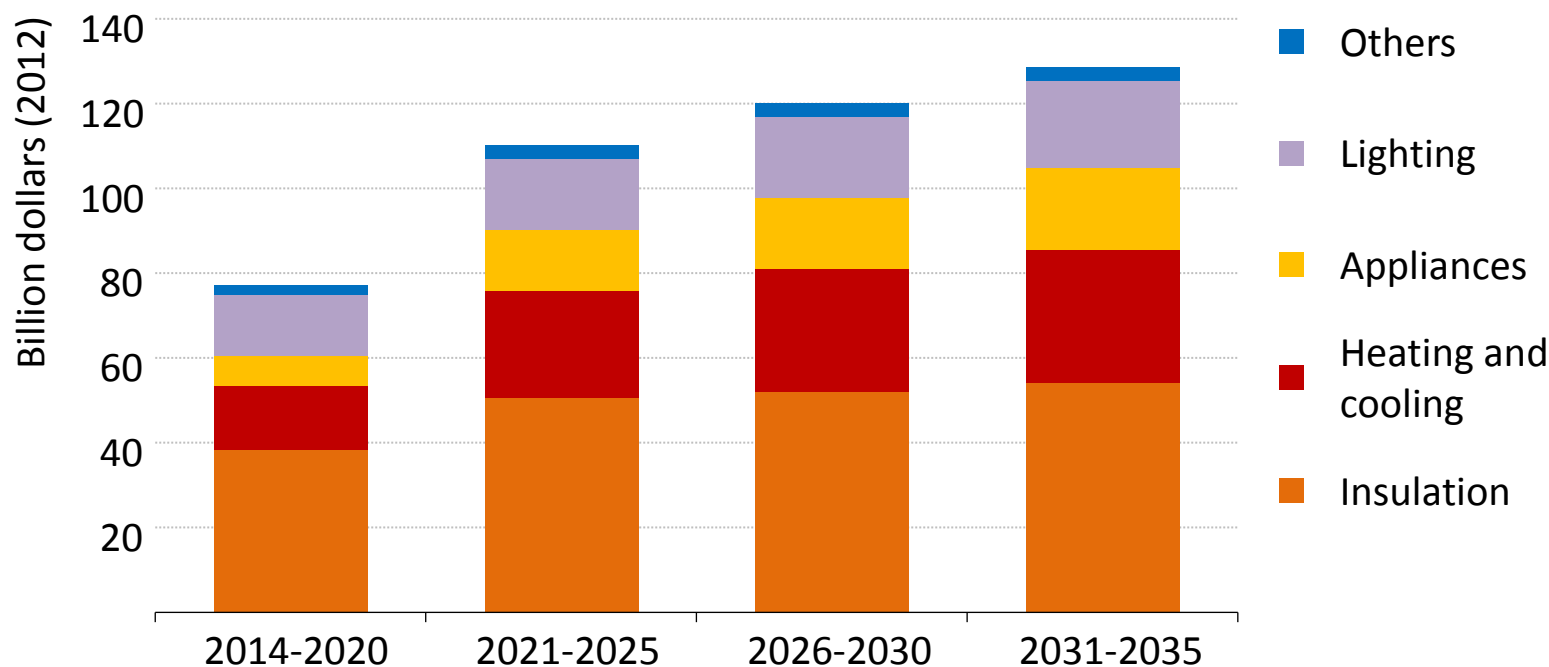


- Final energy consumption
- CO₂ emissions (direct + indirect via power sector module)
- Absolute investment for new equipment additions
- Efficiency investments: additional investments in technologies with higher efficiency than current reference technology

Investments are key for policy makers

World
Energy
Outlook
2014

Annual average investment in energy efficiency in buildings

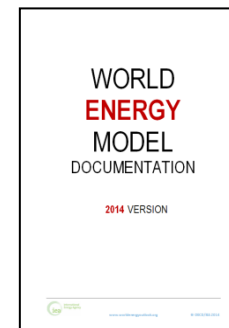
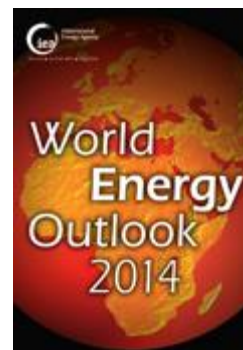


Heating and cooling accounts for two-thirds of the energy efficiency investments in buildings

- Methodology and assumptions available on

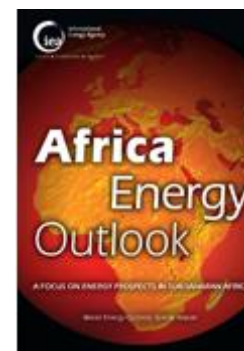
<http://www.worldenergyoutlook.org/weomodel/>

- World Energy Outlook – 2014



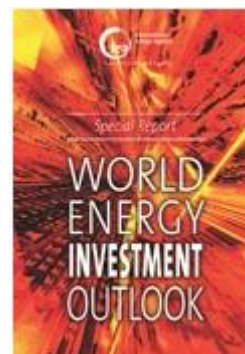
- Africa Energy Outlook

<http://www.worldenergyoutlook.org/africa/>



- World Energy Investment Outlook

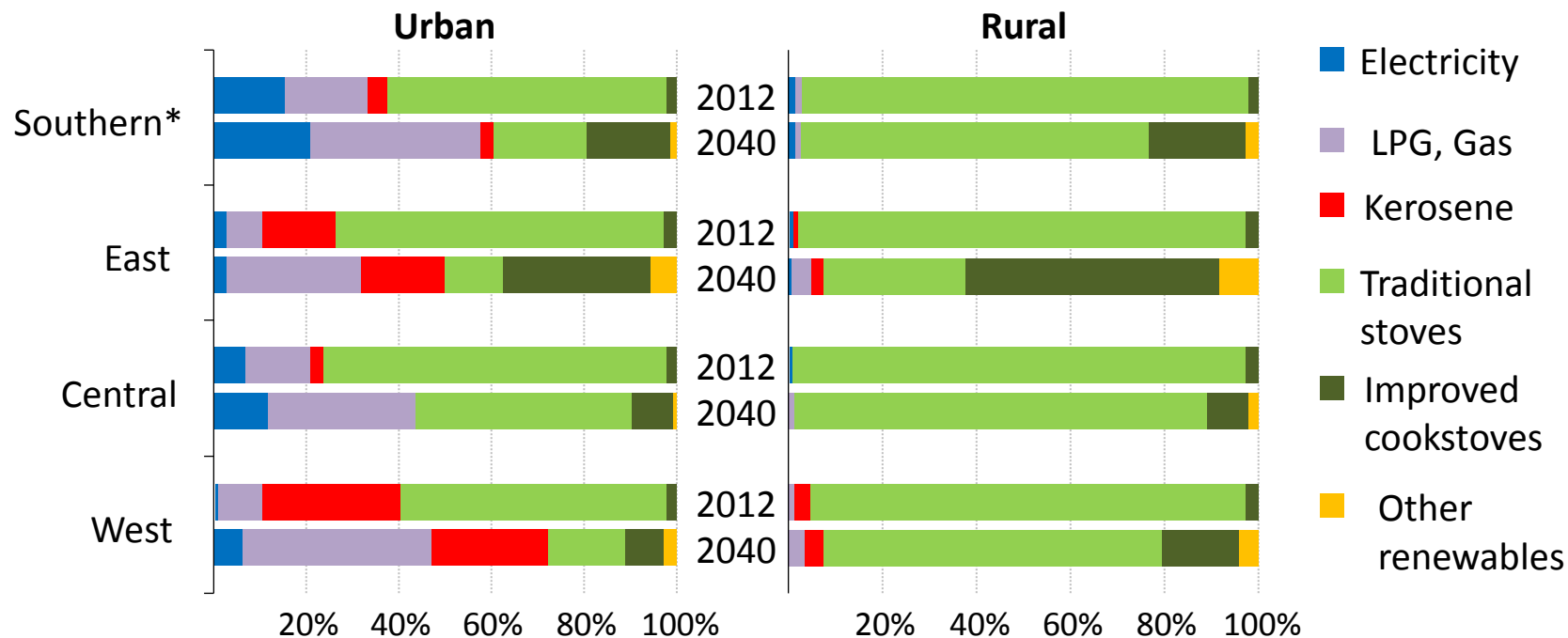
<http://www.worldenergyoutlook.org/investment/>



Traditional use of biomass needs specific modelling

World
Energy
Outlook
2014

Primary fuel/technology used for cooking in Sub-Saharan Africa



Update of the model to include prices of fuelwood and charcoal representing wood scarcity