



International Institute for  
Applied Systems Analysis  
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science for global insight

# IIASA's Integrated Assessment Framework

H-Holger Rogner

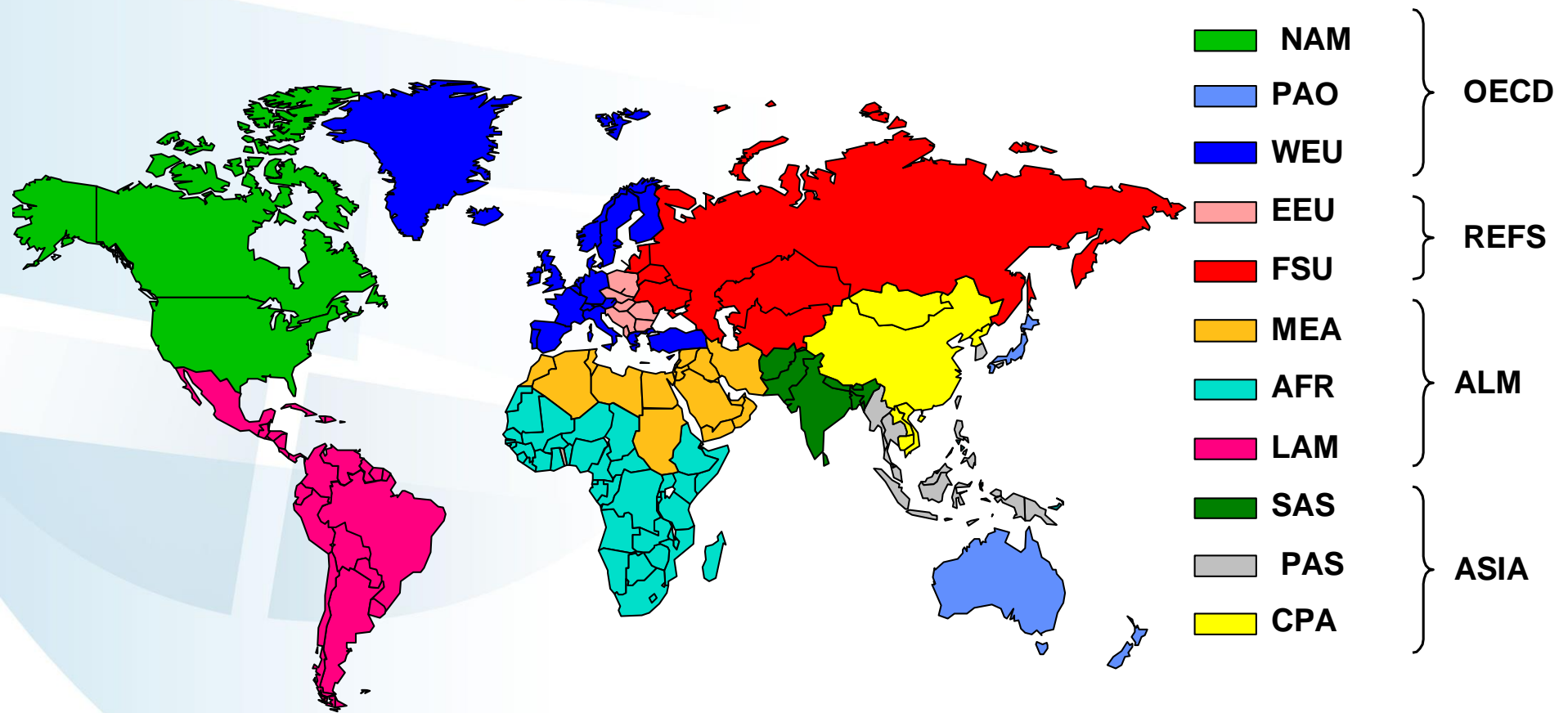


IIASA, International Institute for Applied Systems Analysis

# Modelling energy system transformation at IIASA

- Origin dates back to 1974
- Spatial focus: Global – world segregated into 11 regions
- Temporal focus: Long-term: 50 to 100 years plus
- Objectives:
  - Analysis of long-term demand & supply strategies under different technology & resource futures
  - Development of robust technology strategies and related investment portfolios to meet a range of policy objectives, and
  - Appreciation of uncertainty
- Several models – demand & economic development, supply, resources, impacts
- Primus inter pares: MESSAGE (Model of Energy Supply Systems And their General Environmental Impact)

# Geographical resolution – the “Regions”

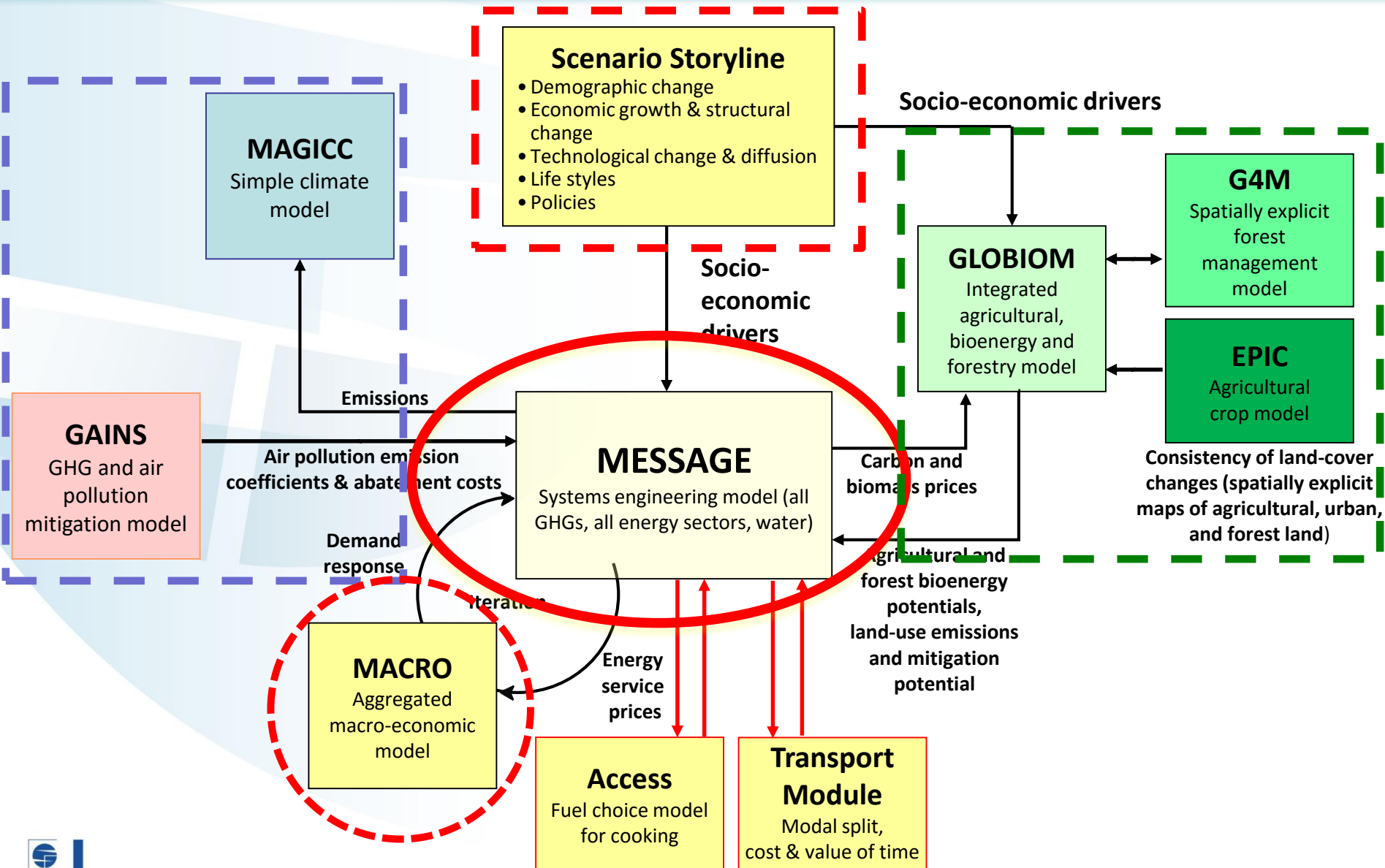


1 NAM North America  
 2 LAM Latin America & The Caribbean  
 3 WEU Western Europe  
 4 EEU Central & Eastern Europe

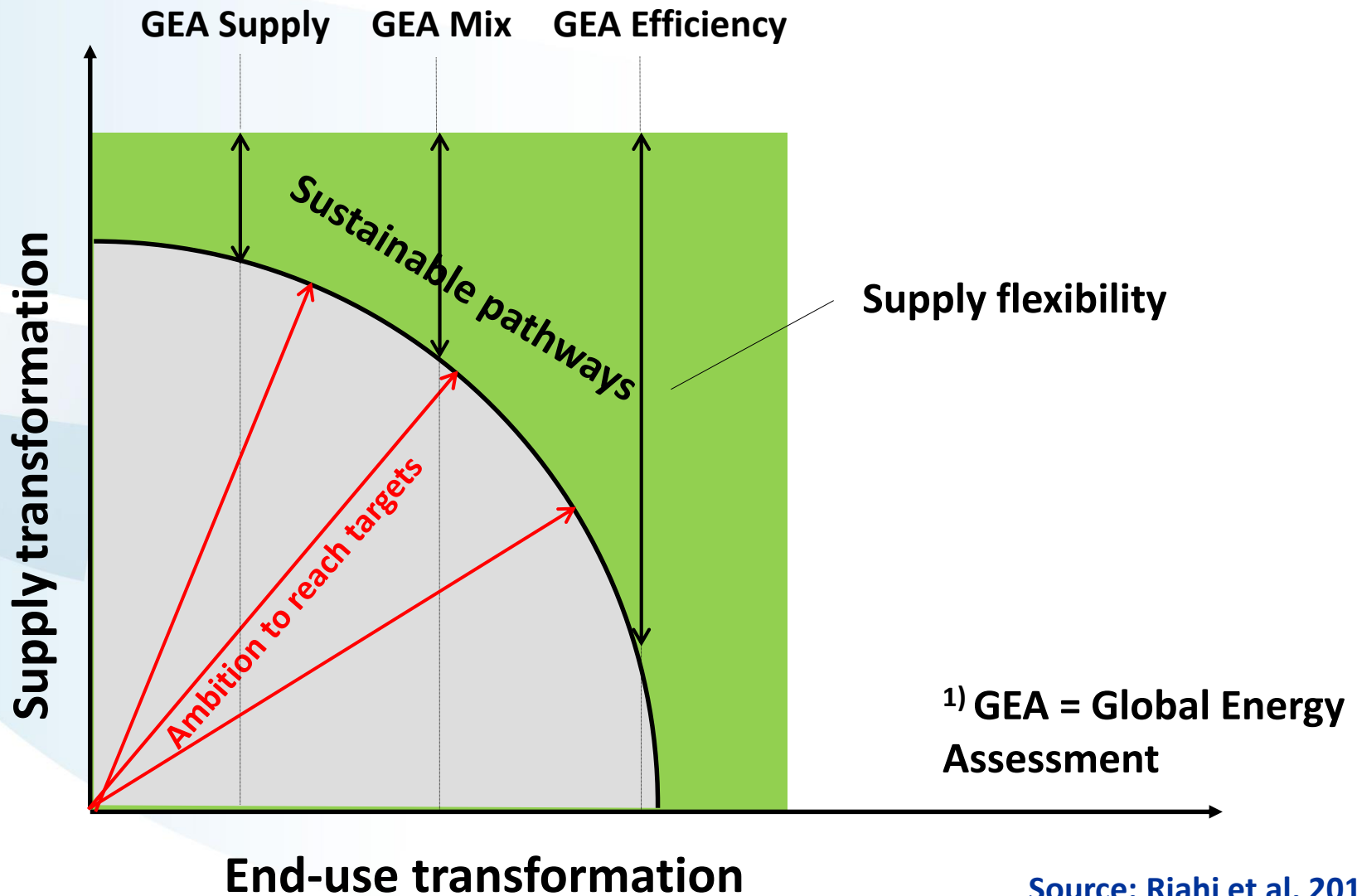
5 FSU Former Soviet Union  
 6 MEA Middle East & North Africa  
 7 AFR Sub-Saharan Africa  
 8 CPA Centrally Planned Asia & China

9 SAS South Asia  
 10 PAS Other Pacific Asia  
 11 PAO Pacific OECD

# IIASA Integrated Assessment Framework

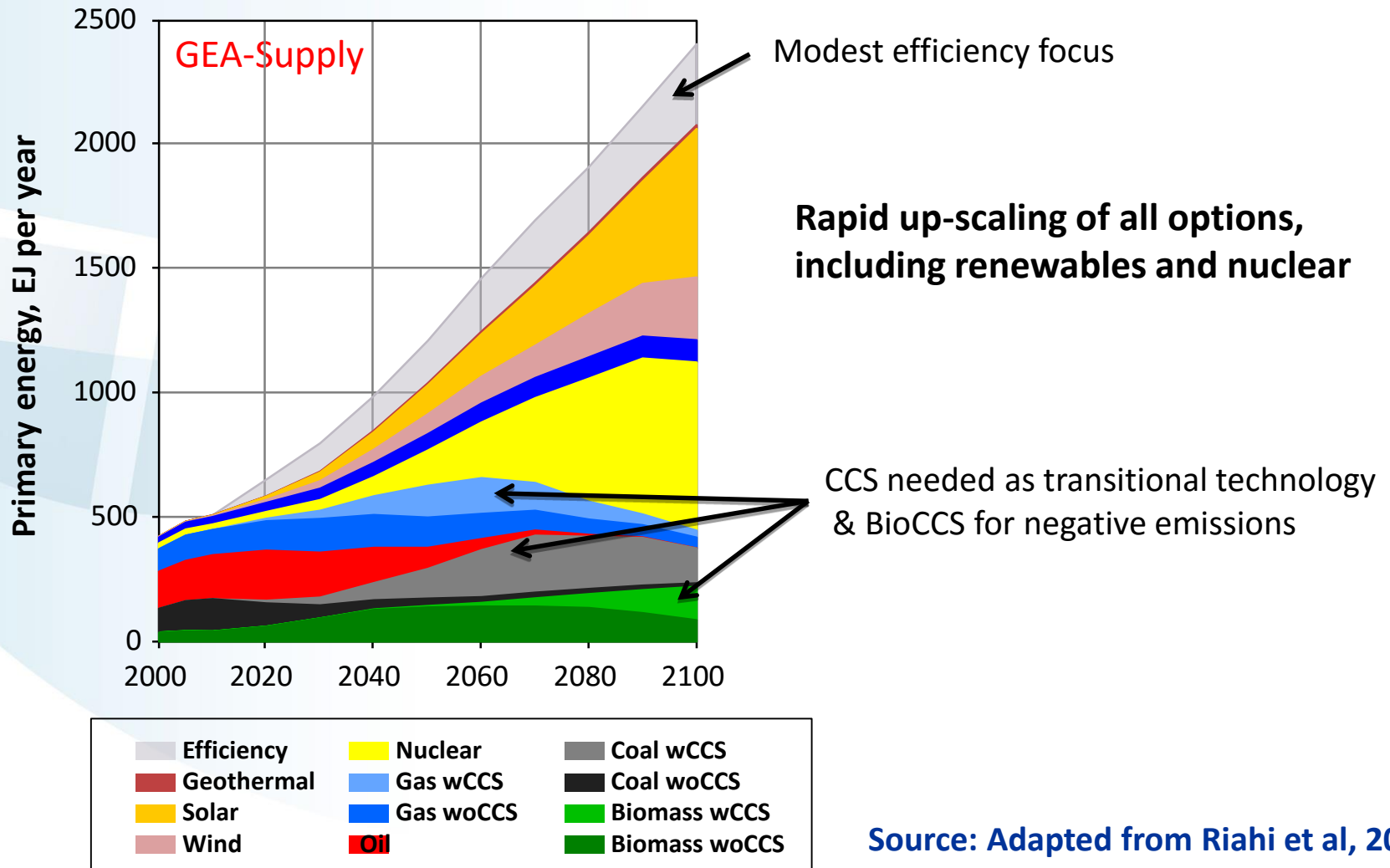


# Schematic illustration of GEA<sup>1)</sup> pathways



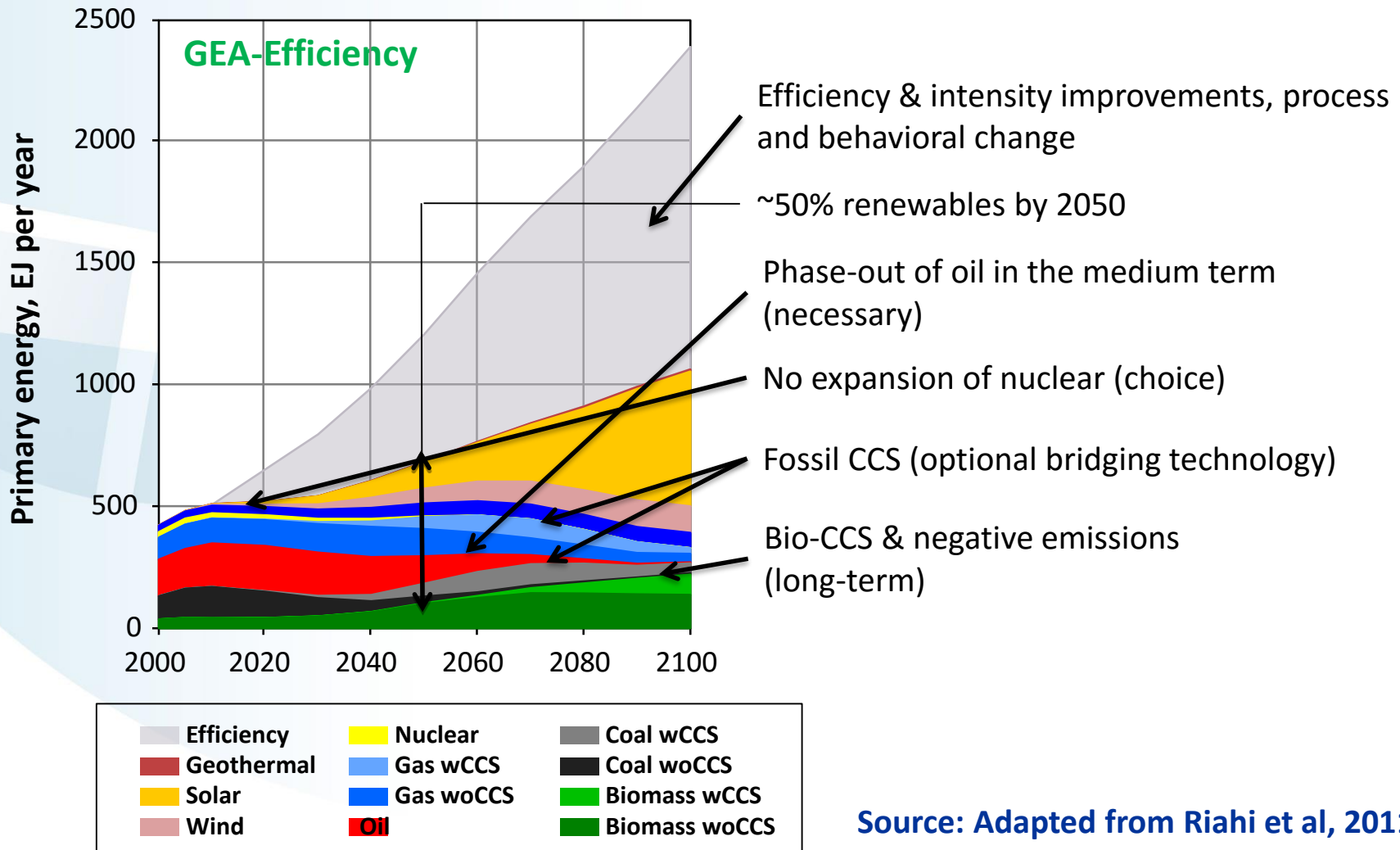
Source: Riahi et al, 2011

# Supply-side Focus (= high demand-side flexibility)



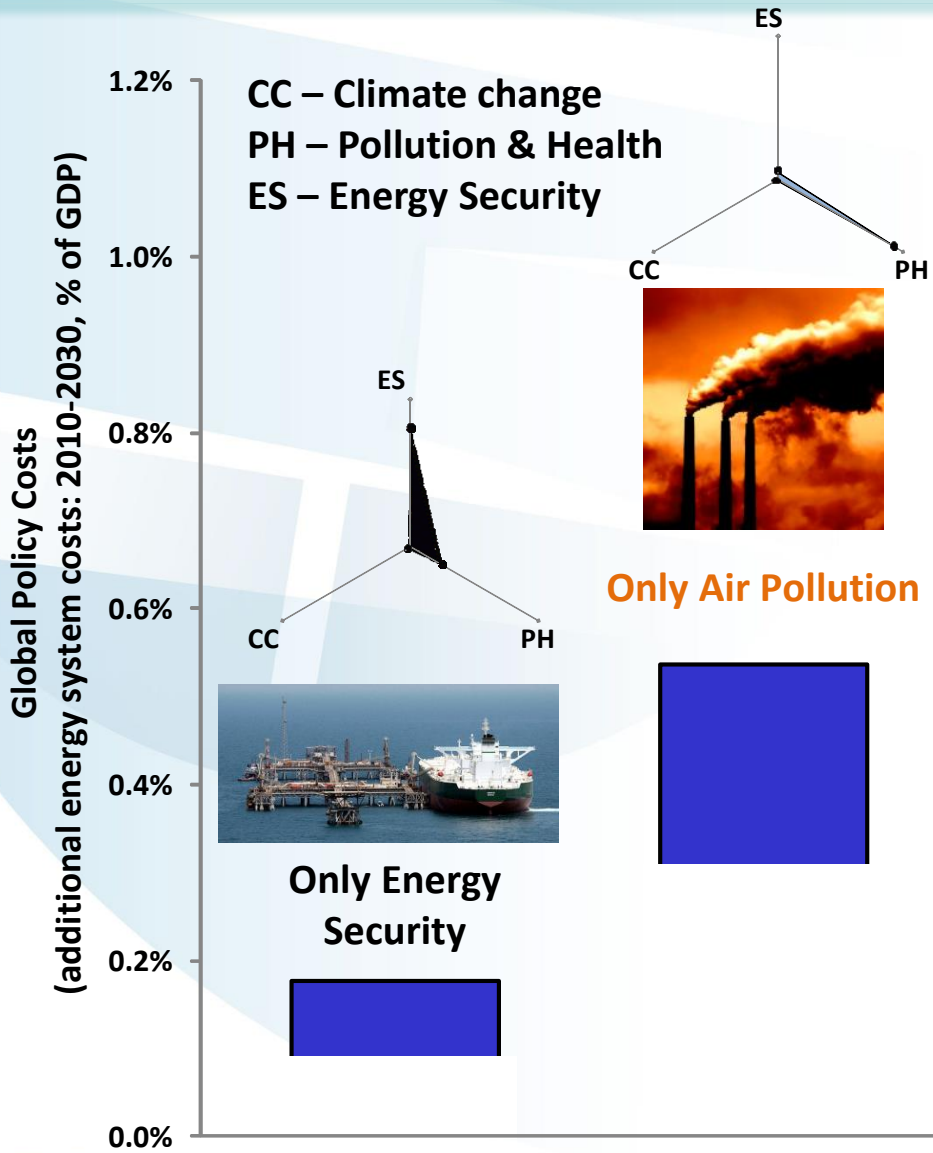
Source: Adapted from Riahi et al, 2011

# Efficiency & Demand-side Focus (= high flexibility for supply)

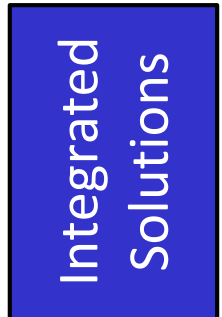
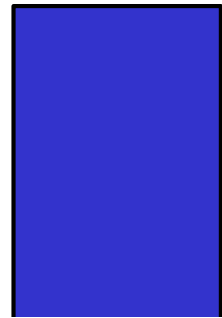


Source: Adapted from Riahi et al, 2011

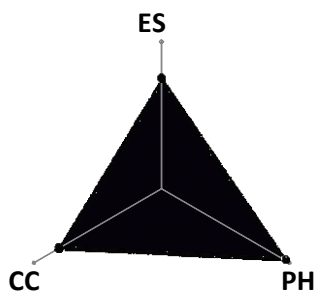
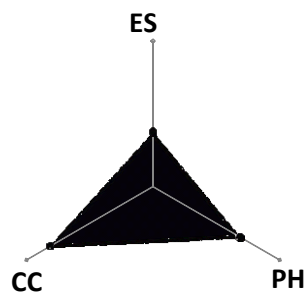
# Multiple Energy Objectives



Only Climate Change



An integrated approach saves >\$5 trillion (~0.5% of GDP)





# Sustainable energy

## ➤ Key elements include:

- energy security
- energy access
- affordable energy services
- environmental protection (including the atmosphere)
- non-fossil energy supply
- energy system efficiency
- life styles
- infrastructure and
- acceptance

## ➤ Once through or circular economy

- 3R = reduce, reuse, recycle

# Sustainable energy

- **Enabling elements include:**
  - **Investment/finance**
  - **Capacity building**
  - **Technology transfer**
  - **Institutions and governance**
  - **R&D and innovation**
  - **Policy support (level playing field)**

**These elements need to be qualitatively reflected in the story lines and quantified in the scenario assumptions**



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