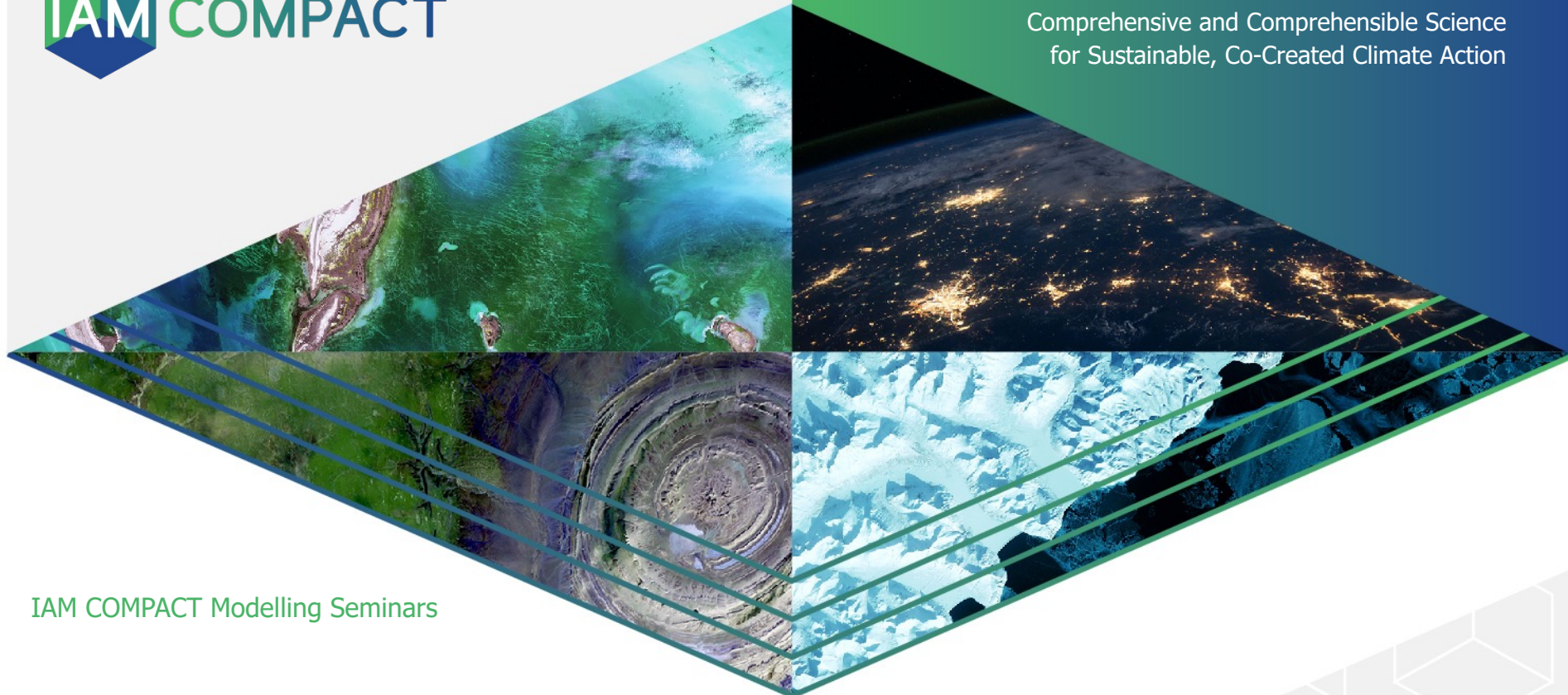




Expanding Integrated Assessment Modelling:
Comprehensive and Comprehensible Science
for Sustainable, Co-Created Climate Action



IAM COMPACT Modelling Seminars

Model Presentation: MENA-EDS

E3 Modelling



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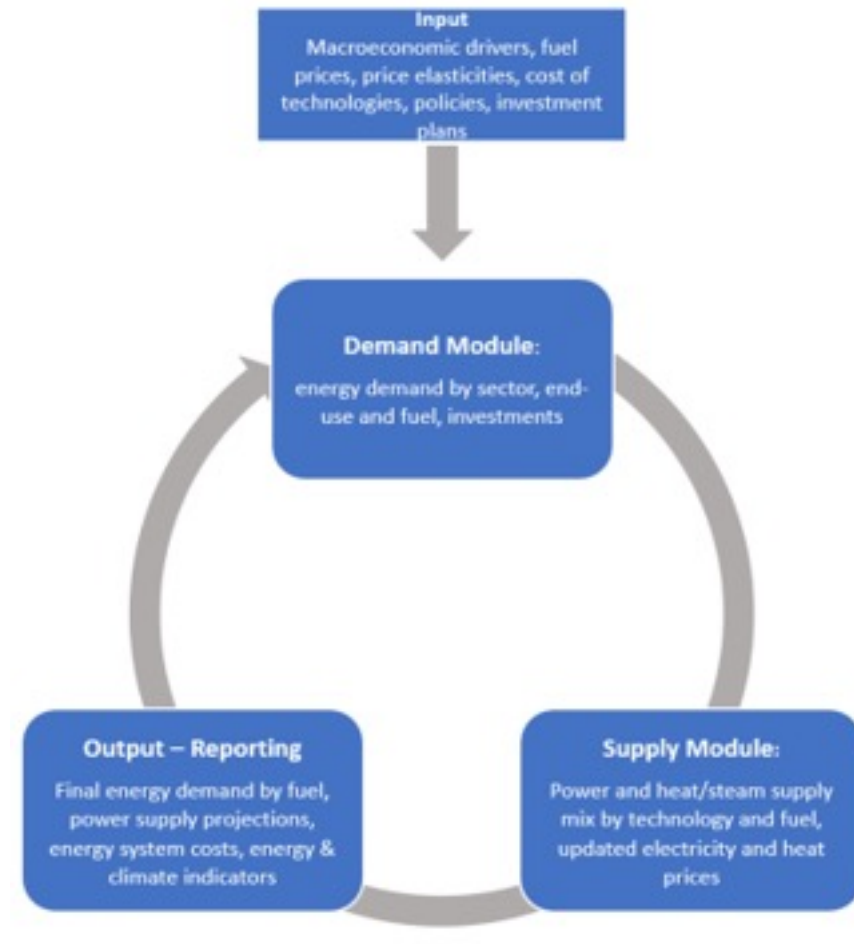
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- Developed and maintained by E3Modelling
- The origins are from similar global energy system simulation models and especially from the PROMETHEUS model (the models share the same logic and have similar approaches)
- It is a single-country energy system model designed to explore the interactions of energy demand and supply and the links with emission outcomes covering the 2015-2050 period
- It is currently applied to 10 MENA countries, BUT the methodology and modelling is generic and can be applied to other countries (e.g. in NDC ASPECTS will be used for S. Arabia, Nigeria, Japan and other countries)
- The model has been widely used for climate policy analysis in specific countries and for the assessment of their NDCs and low-emission strategies



- Single-country model
- 5 main end-use sectors. Each one is split into specific sub-sectors and uses
 - Industry (covering up to 10 sectors depending on data availability)
 - Commercial
 - Residential
 - Transport (covering 6 different passenger and freight modes)
 - Agriculture
- Energy supply sectors:
 - Fossil fuel extraction
 - Fuel transformation
 - Electricity production
 - Hydrogen production
 - Heat, co-generation
- Inter-regional trade is only captured exogenously (as the model is single country)





Input

Population, GDP and economic growth per sector
World prices of fossil fuels
Taxes and subsidies for energy products
Interest rates, risk premiums, etc.
Environmental policies and constraints
Technical and economic characteristics of future energy technologies (both for energy supply and demand)
Energy consumption habits, comfort, efficiency potential
Potential supply curves for primary energy by resource type, etc.

Process

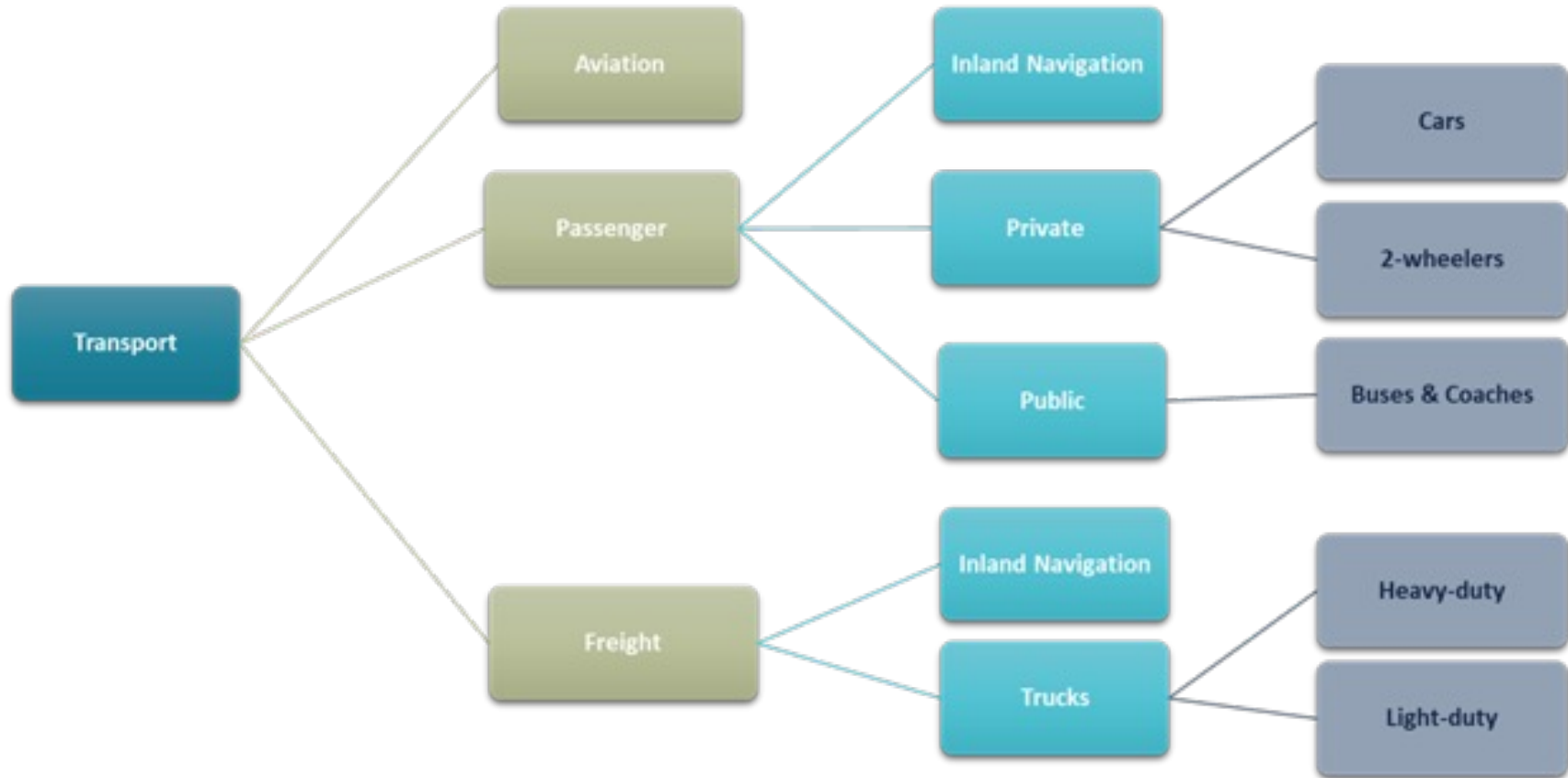
Energy
System
Model

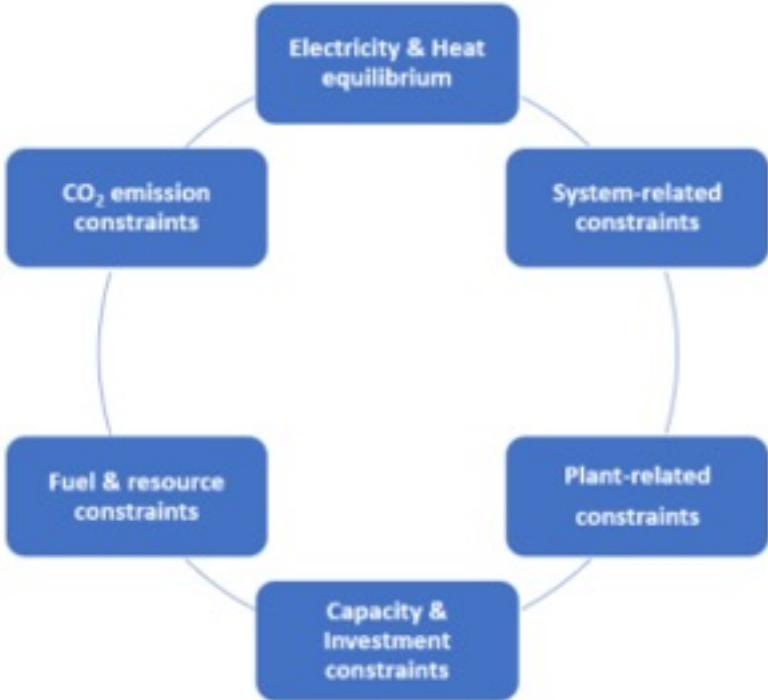
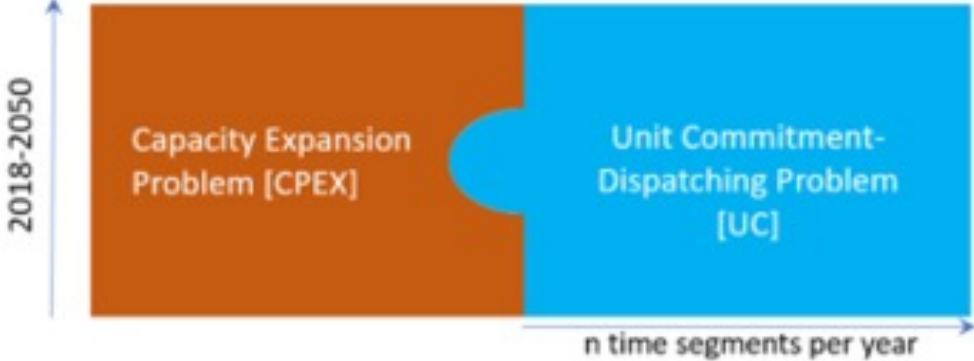
Performs iterations of demand and supply through calculated prices

Output

Detailed energy balances
Detailed demand projections by sector
Detailed balance for electricity
Production of conventional & new fuels
Investment in all sectors, demand and supply, technology developments
Transport activity, modes and vehicles
Energy costs, prices and investment
CO₂ Emissions from energy combustion and industrial processes
Policy Assessment Indicators (e.g. imports, RES shares, costs etc.)







MENA-EDS can simulate the impacts of the below policy instruments

- Carbon price or tax on CO₂ emissions
- Constraint on CO₂ emissions (by year or sector)
- Subsidies on particular technologies (through adjusting their costs) or fuels
- Constraints on the availability of particular technologies (e.g. no nuclear, no CCS);
- Energy intensity and carbon intensity standards
- Promotion of renewable energy or energy efficiency
- Limitations in bioenergy or in BECCS (and other CDR options)



- The energy system and economic impacts of NDC and low-emission strategies in Tunisia
- How ambitious is Morocco's NDC and emission reduction targets? And what it requires in terms of uptake of clean energy technologies and associated investment?
- What are the costs and benefits of developing energy infrastructure to link MENA countries with the EU?
- How can the MENA countries reduce their rapidly growing emissions?
- What are the co-benefits of ambitious energy system transformation, in terms of reduced energy import dependence or employment creation?



SDGs	Details
SDG 7. Affordable and clean energy	Availability and costs of low-carbon energy by country
SDG 8. Decent work & economic growth	Using employment multipliers by technology and fuel, combined with PROMETHEUS output on energy system structure (technology capacities, fuel supply etc) we can estimate the direct employment created in the energy sector
SDG 13: Climate action	Reduction of GHG emissions in specific countries



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Thank you!



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