

# ADVANCE Wiki Outline – June 30<sup>th</sup>, 2015

The main documentation wiki page consists of two documentation types, i.e. a 30-page model documentation and 2-page reference cards. Under these choices will be the following various levels of subpages and options (see Flow Chart to view the Wiki page structure).

The model documentation has a total length of about 30 pages plus optional appendices. Therefore the model documentation text will be completed mainly at the lowest subpage level e.g. population, GDP, etc. with between 1 to 3 pages of text as necessary, although a more general description may be given on other parent levels.

## MODELS

### 1. Model name list (click on page for each of the 10 models)

#### 1.1. Model Reference Card

#### 1.2. Model documentation

##### 1.2.1. Model scope and methods

- ⇒ Model concept, solver and details
  - Is it a general equilibrium model solved by optimization, for example, or a bottom up integrated assessment simulation model covering energy, land use and water? How is uncertainty treated in the model?
- ⇒ Temporal process
  - What is the base year, time horizon, time step and does the model have foresight?
- ⇒ Spatial process
  - Is it a global model and how many regions? Are downscaling tools integrated to the model? How do regions interact, e.g. trade (if yes, which goods), technology spillovers?
- ⇒ Policy
  - How policies are modelled e.g. renewables subsidies or air pollution policies?

##### 1.2.2. Economy and demand drivers

- ⇒ Population and GDP
  - How is the model driven by population data and growth of GDP?
- ⇒ Demand
  - How are the demand equations structured? Are income distributions and access issues considered? Is there a spatial and/or urban/rural dimension to the demands? Which demand types are represented (energy services, agricultural products, timber, other ecosystem services)?
- ⇒ Technological change

- Does the model include technological change and if so how is it incorporated e.g. learning-by-doing (exogenous, endogenous), is R&D included (exogenous, endogenous)? Representation of inertias and path-dependencies, e.g. via capacity stocks, knowledges stocks (cf. technological change), constraints of the expansion and decline of technology deployment, early retirements of fossil capacities
- ⇒ **Macro-economy**
  - How is the economy represented? How many markets and sectors? How are prices determined? Are labour, capital and trade included?
- ⇒ **Behavioural change**
  - Price and non-price mechanisms

### 1.2.3. Energy

- ⇒ **Energy resource endowments**
  - Fossils
  - Uranium and other fissile resources
  - Biomass
  - Non-Biomass Renewables
  - Extraction technologies
- ⇒ **Energy conversion**
  - Electricity
  - Heat
  - Other conversion technologies
  - Grid, pipelines and other infrastructure (including systems integration of variable renewable energy sources)
- ⇒ **Transport**
  - Extent of the representation of different modes, technologies and costs of transport, modal shifts
- ⇒ **Residential and commercial sectors**
  - How much detail is there for end use technologies? Are buildings represented within the model (e.g. different building ages and types? Are explicit efficiency options included (e.g. increased wall insulation, insulated glazing etc)?
- ⇒ **Industrial sector**
  - How are the industrial sectors aggregated? How much detail is available for specific industrial processes and technologies?
- ⇒ **Other**
  - Are there any other any industries explicitly modelled?

Energy technology conversion matrix (add to energy documentation if useful)

	Coal	Oil	Gas	Coal w/ CCS	Oil w/ CCS	Gas w/ CCS	Biomass	Bio w/ CCS	Non-Biomass	Nuclear	Other
Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liquids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrogen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 1.2.4. Land-use

- ⇒ Agriculture
  - How is the land use of the agricultural sector modelled?
- ⇒ Forestry
  - Is the forestry sector included? How is its land use modelled?
- ⇒ Biofuels
  - How is the land use of biofuels represented in the model?
- ⇒ Other
  - Any other land uses?

#### 1.2.5. Climate

- ⇒ GHGs
  - What gases are included in the model and how are they linked to technologies and economy?
- ⇒ Pollutants and non-GHG forcing agents
  - What other emissions are included in the model (e.g. NO<sub>x</sub>, SO<sub>x</sub>, black and organic carbon, VOCs etc)? Are they endogenous to the model (and if yes, how are they modelled) or projected exogenously?
- ⇒ Modelling of climate indicators
  - Climate damages, temperature changes, description of module

#### 1.2.6. Other Commodities/Resources

- How are other commodities and resources such as water, materials and CCS storage treated? Future technologies

#### 1.2.7. Optional appendices

- ⇒ Appendix 1
  - Mathematical appendix on model equations
- ⇒ Appendix 2
- Data used in the models

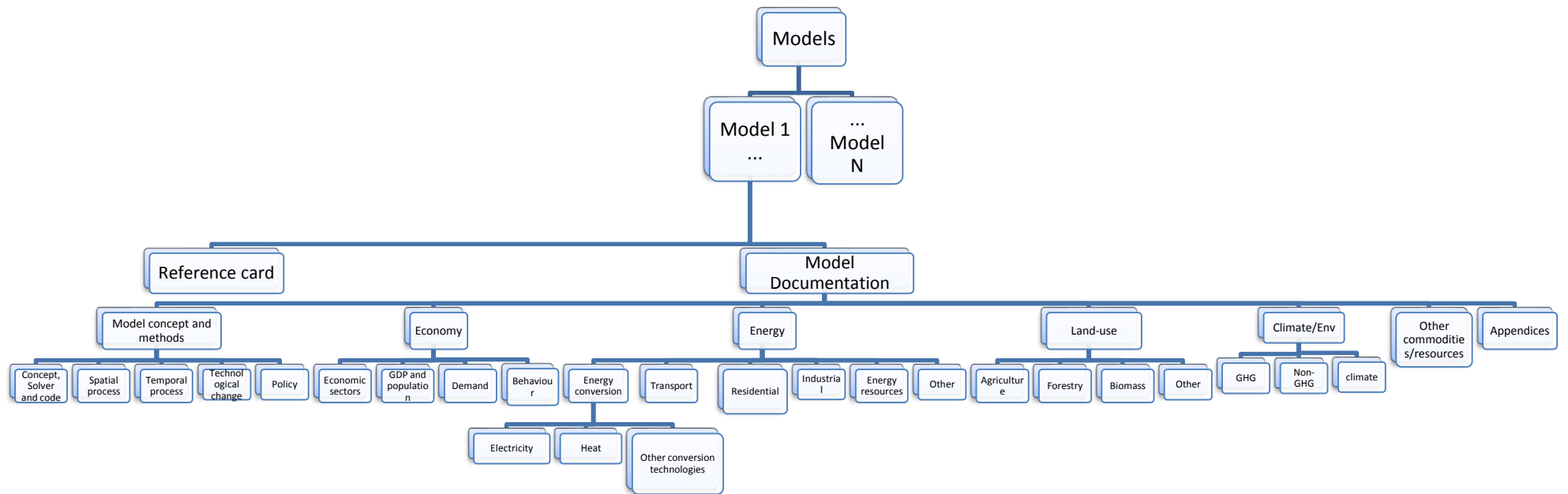


Figure 1: Layout of ADVANCE model documentation Wiki (<https://wiki.ucl.ac.uk/display/ADVIAM/Models>)