



ENERGY TECHNOLOGY SYSTEMS ANALYSIS PROGRAMME.

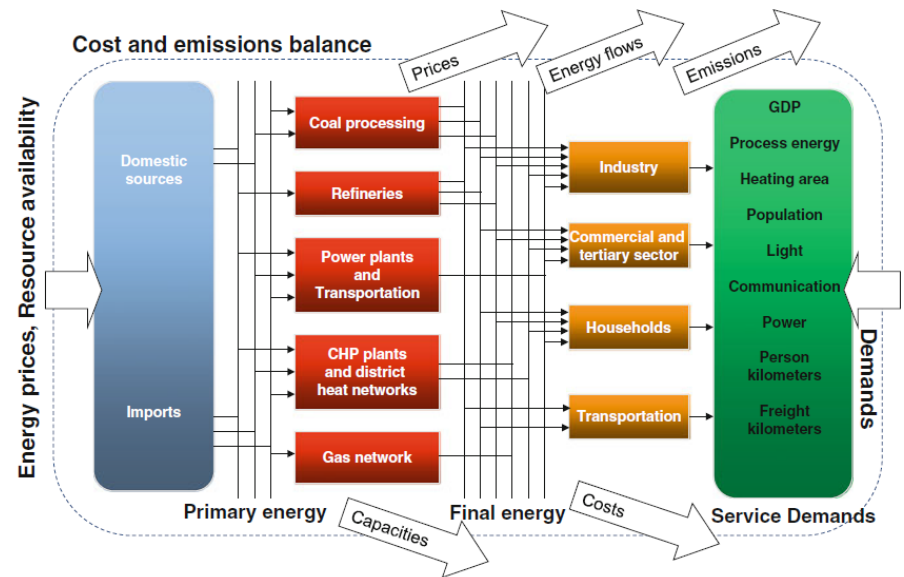
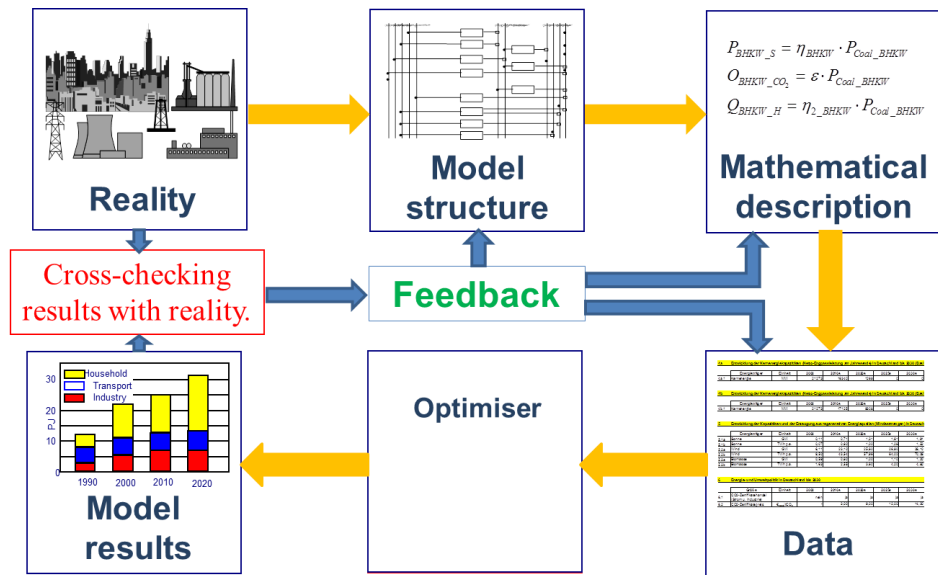
an IEA - TECHNOLOGY COOPERATION
PROGRAMME

Energy systems modelling for decision making



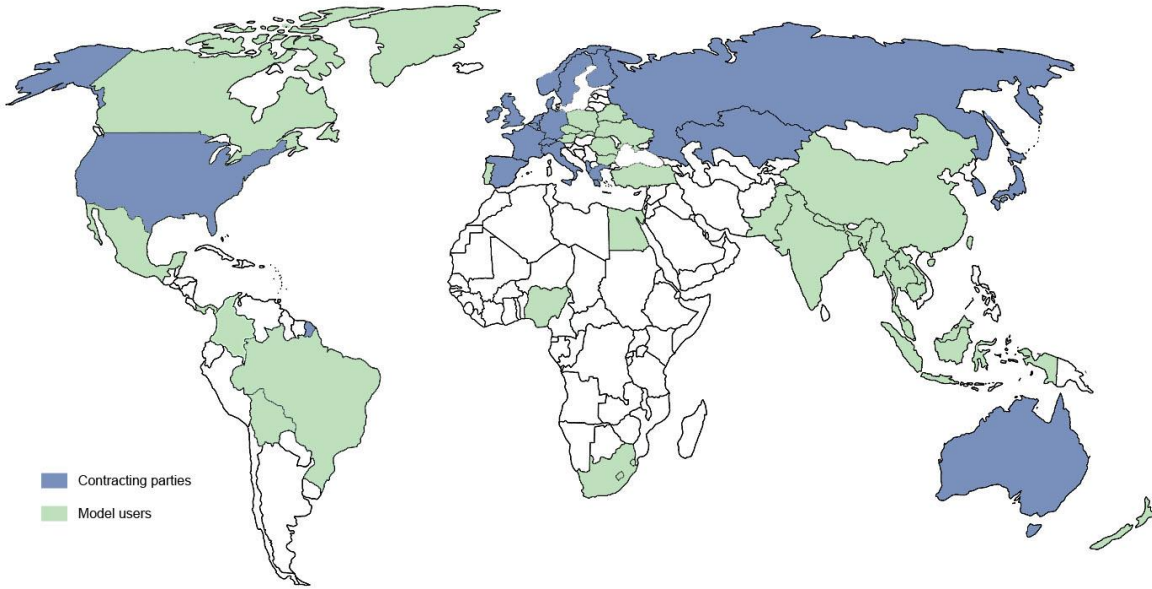
- Energy policy and planning is more and more complex and uncertain (availability of primary energy sources, environmental protection issues, security of supply, risk, effect on economy).
- Vision of a low carbon (or even a carbon-free) energy system.

Energy Systems Approach to optimise use of resources and prioritise actions in technology development and deployment.



Source: Remme U. 2007 *Overview of TIMES*. Proc. ETSAP Workshop November 2007 Brazil.

Energy Technology Systems Analysis Programme (ETSAP) Technology Collaboration Programme of the IEA



A multilateral international agreement. The contracting parties are the governments of twenty countries, the European Commission and two sponsor foundations.



Unique network of Energy Modelling teams from almost seventy countries use the MARKAL/TIMES family of models to support decision making in energy policy and analyse energy systems development.

What is IEA ETSAP?



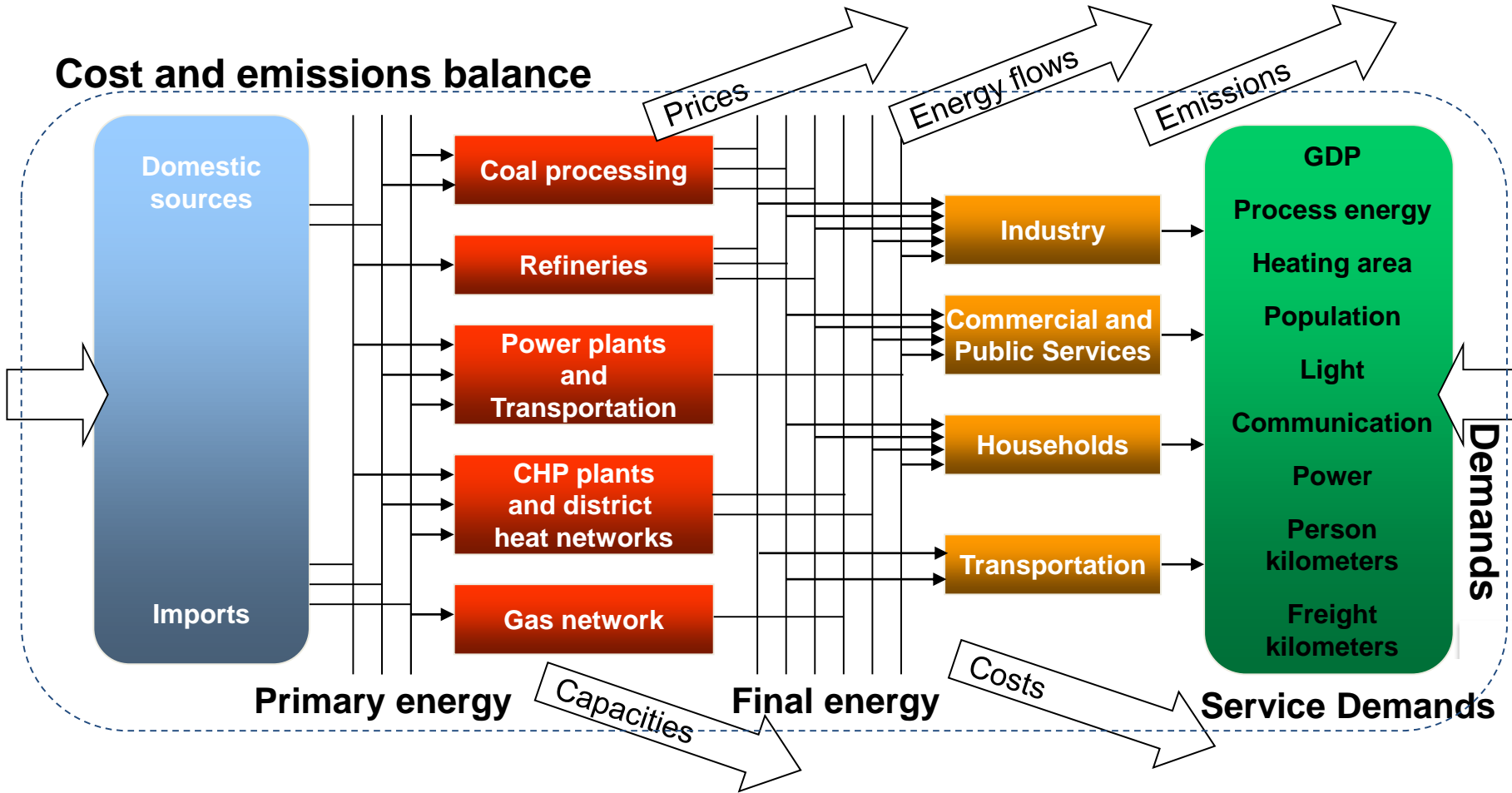
- One of 39 **IEA Technology Collaboration Programmes**
www.iea.org/tcp/
- 40 years international **cooperation** on energy **systems** modelling (since first oil crisis)
- **Developing and maintaining** (MARKAL and TIMES) tools
- **Assisting policy decisions** by modelling possible future **energy pathways**
- Focus on key role of **technology** to meet goals
- Biannual **workshops** and **training**

ETSAP Tools: TIMES Model Generator

The Integrated MARKAL-EFOM System

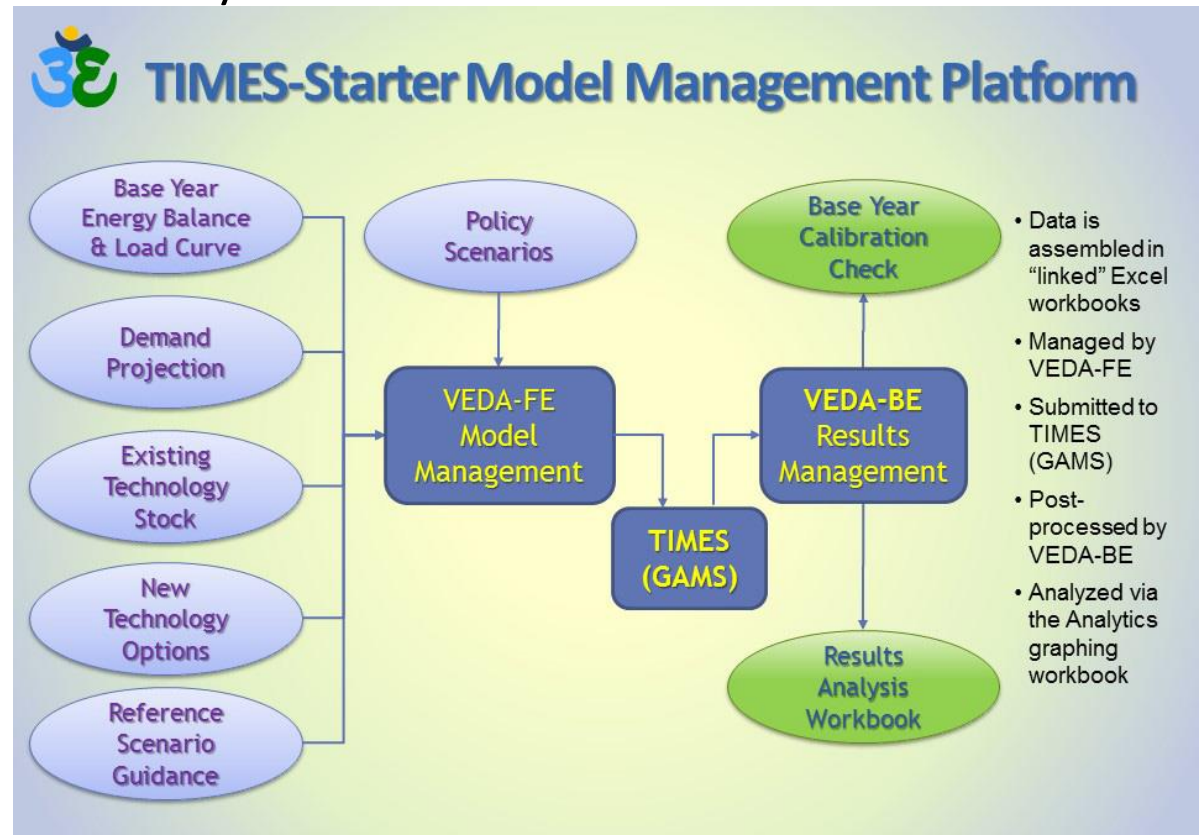


Energy prices, Resource availability



The ETSAP TIMES-Starter Platform

A comprehensive platform with a complete TIMES-Starter model that can be readily transformed for a new application has been successful applied in several countries to underpin their NDC analyses.



TIMES-Starter platform has been applied in Turkey, China, Costa Rica, Vietnam and Armenia.

The ETSAP community



- Two workshops per year, one organized together with IEW;
- 3-5 TIMES model training sessions around the world;
- More than 25 research institutions involved from the whole world;
- Access to support and discussion forums;
- New tools and analyses are shared;
- Close collaboration with IEA, IRENA, World Bank and many more....

- Documentation:
 - Annexes - <http://www.iea-etsap.org/newsfiles/AnnexXIV-Final.pdf>
 - Meetings - <http://www.iea-etsap.org/index.php/community/official-documents>
 - Projects - <http://www.iea-etsap.org/index.php/etsap-projects>
 - Model generator/interface <http://www.iea-etsap.org/index.php/etsap-tools>
<http://www.iea-etsap.org/index.php/documentation>
 - Technologies - <http://www.iea-etsap.org/index.php/energy-technology-data>



- The work of ETSAP is directly linked with policy making. ETSAP tools are currently used by:
 - EU-JRC-IET to analyse technology development
 - IEA in the ETP publication.
 - National teams informing national Governments.
 - Energy Modelling Forum (EMF) researchers examining robust transition policies towards climate sustainable systems after 2100.
 - MARKAL/TIMES is listed as one of the four selected modelling tools in the UNFCC guide for preparing the national communications for non-Annex I parties.

Some examples of applications can be found here:

<http://www.iea-etsap.org/index.php/applications>

<http://www.iea-etsap.org/index.php/workshops>



UNDERSTANDING AND FACILITATING THE ENERGY TRANSITION TO ACHIEVE THE 'WELL BELOW 2°C' GOAL

Research and Development

ETSAP will support research and development activities in order to advance the state-of-the-art of energy systems analysis. A non-exhaustive list of topics includes:

1. Climate mitigation responding to the policy ambition aiming for “well below 2° C”;
2. Incorporating impacts R&D in TIMES to capture the role of innovation;
3. Exploring the interplay between differences in long term and short term policy ambition;
4. Energy Technology Data Source (E-TechDS) updates;
5. Improved modelling of variable renewables and short term system operational issues in long term energy systems modelling;
6. New approaches for integrating human behaviour into energy systems modelling; and
7. Improved modelling of the interactions between the energy system and the economy



- At least two **workshops** per annum on energy systems modelling
 - <http://iea-etsap.org/index.php/workshops>
 - Sao Paulo, Brazil Jan 30 2017
 - Maryland, USA July 10-11 2017
 - Zurich, Switzerland, December 11-12 2017
 - Gothenburg, Sweden 17-21 June 2018
 - Stuttgart, Germany, 5-9 November 2018
- Joint organiser of IEW (International Energy Workshop).
- Deliver at least 2 **training courses** for ETSAP tools per year
 - Sao Paulo, Brazil Jan 31 – Feb 1 2017
 - Maryland, USA July 12-14 2017
 - Zurich, Switzerland, December 13-15 2017
 - Gothenburg, Sweden, June 19-21 2018
 - Mexico 30Jan-1 Feb 2018
 - Singapore 12-14 September 2018
 - Moscow 7-9 November 2018



Participants in the capacity building/training sessions come mainly from:

- Researchers in Institutions directly collaborating with Governments on energy planning
- University Staff and students
- Staff of energy sector companies

Most effective:

- Contacts with Institutions that are already involved in modelling/planning/policy.
- Research students using our tools in their research.

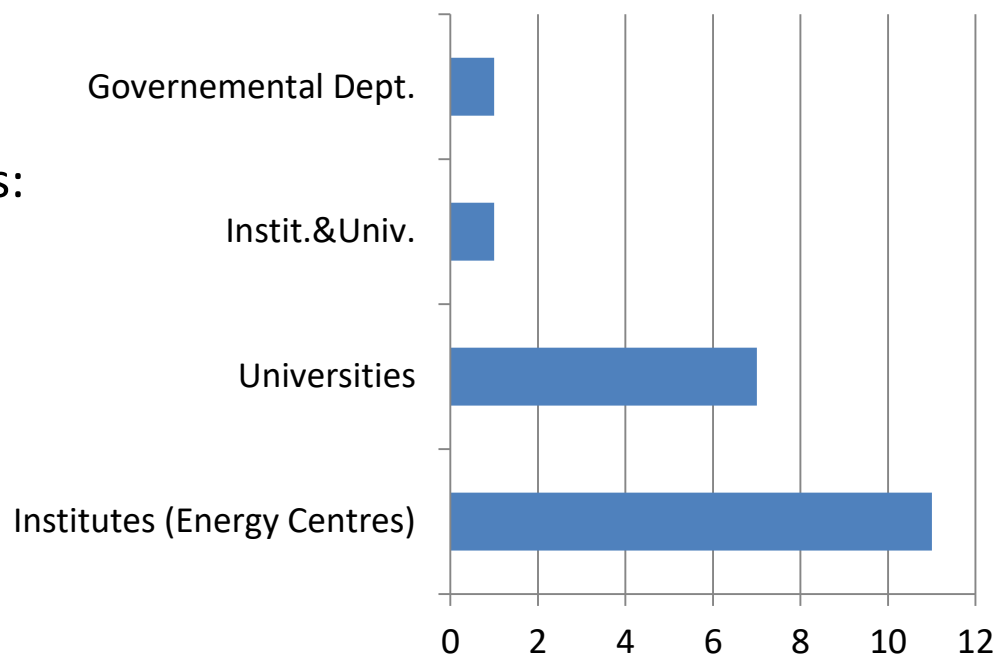
Most important success factor:

A team that is committed with available time resources working almost full time on the modelling activity during the starting period, when capacity is built.

Energy modelling capabilities and interaction with Policy makers



Within the ETSAP community
energy modelling capacity resides:



Experience shows that the dedicated institutes and universities can offer the commitment necessary to develop modelling capabilities.

BUT in all cases a clear mandate and continuous support from the Government is necessary.



More information available on ETSAP's website www.iea-etsap.org. Contacts:

ExCo Chair:

Prof. Brian O Galachoir

b.ogallachoir@ucc.ie

Operating Agent:

Dr Kenneth Karlsson

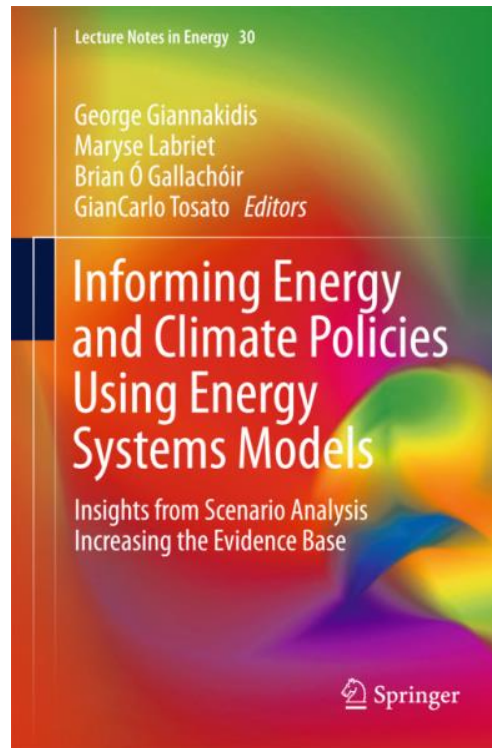
keka@dtu.dk

Project Head:

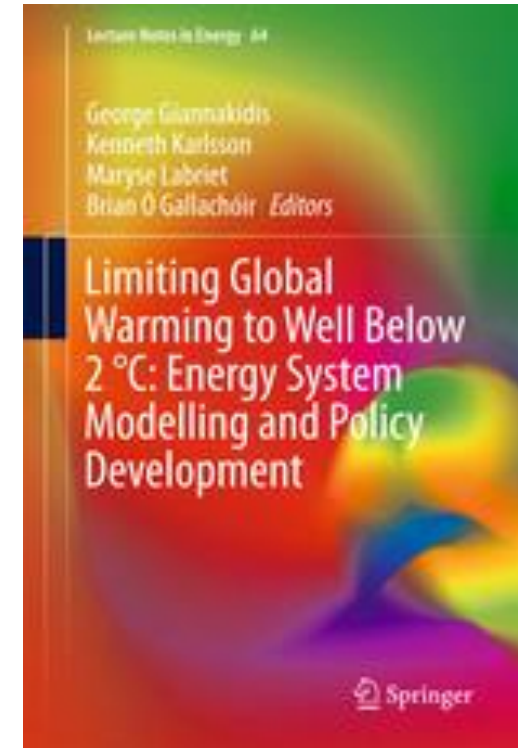
Dr George Giannakidis

ggian@etsap.org

Books on the use of ETSAP tools for Policy formulation



Available at:
www.springer.com/gp/book/9783319165394



Available at:
<https://www.springer.com/gp/book/9783319744230>