Annex XVI Aligning energy security with zero emissions energy systems

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What is IEA-ETSAP?

• One of 38 IEA Technology Collaboration Programmes
• 46 years international cooperation on energy systems modelling
• Develop and maintain (MARKAL and TIMES) tools (model generators)
• Build national, regional and global energy systems models
• Assist policy makers to model future energy pathways (~70 countries)
• Focus on key role of technology to meet goals (‘000s of technologies)
• Biannual workshops and training – capacity building (75 trainees p.a.)
• Collaborative research & analyses (100 publications incl. 50 journal p.a.)
Why energy systems modelling for decision making?

• Energy policy and planning is more and more complex and uncertain (urgency of climate action, security of supply, impacts on economy and society).

• Energy systems optimisation modelling seeks least cost evolution of whole energy system using TIMES – technology rich (i.e. > 1,000 technologies).

Global Energy Use

TIMES reference energy system
Who is IEA-ETSAP?

Unique network of Energy Modelling teams from almost 70 countries use MARKAL & TIMES models analyse energy systems and support decision making in energy policy.
Strategic Work Plan (2020 -2025)

1. **Collaborative Analysis Informing Policy**
   
   aligns with objective 1, namely enhancing and expanding analysis to inform policy makers decisions, **taking a whole-system perspective**

2. **Collaborative Research and Innovation**

   aligns with objective 1, support continued collaboration efforts for research, development and innovation, ... for long-term solutions.

3. **Capacity and Engagement**

   contributes to the mission, namely to enhance the IEA’s authoritative technology analysis and policy recommendations

**IEA Medium Term Strategy for Energy Research and Technology 2018-2022**

**Vision**

Energy technology research and innovation ... pursued through effective multi-lateral collaboration, will ... serve as key enablers of a global energy transition
Strategic Work Plan (2020 -2025)

1. Collaborative Analysis Informing Policy
   • collaborate with TCP Bioenergy, TCP GHG, TCP Hydrogen, TCP ECES, TCP Wind, ...
   • collaborate with IEA, IRENA, Clean Energy Ministerial, World Bank, etc.

2. Collaborative Research and Innovation
   • interactions between energy systems and materials & land use, water & agriculture
   • interactions between energy system and social systems, structural change, circular economy and SDGs

3. Capacity and Engagement
   • extend capabilities in ETSAP tools across low and middle income countries
   • increase transparency, openness and affordability of TIMES
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Key Learnings Net Zero Scenarios

- immediate mitigation action is absolutely required.
- demand reduction, efficiency, renewables, electrification, nuclear, CCS
- negative emissions technologies (NETs / CDR) have a crucial role
- delaying action makes pursuing the 1.5 °C goals unachievable without extremely high levels of NETs
- greater focus on emission reductions in the demand sectors is essential
- focusing only on technological development is likely not to be sufficient
- reducing energy-service demands is also essential
What policy questions can we address?

• How do we meet our future energy needs at least cost?
  – how will the energy system evolve (technologies and fuels)?
  – what are the infrastructure requirements?

• Implications of different future emissions reduction goals?
  – what will the costs be (investment, fuel, O&M) in different sectors?
  – role of energy efficiency, renewables, nuclear and CCS at different times?

• How can we ensure we maintain energy security?
  – which countries will import energy and from where?
  – implications of supply restrictions of individual fuels on energy supply?
Annex XVI Aligning energy security with zero emissions energy systems - Objectives

1. maintain, update and improve TIMES and VEDA;
2. increase the transparency, openness and affordability of the TIMES model generator, associated software and data sets;
3. maintain, extend and improve international and national capabilities on the use of ETSAP’ tools, across developed and developing countries;
4. increase availability of online user’s support systems including tutorials, user’s forums, manuals and reference material.
5. build capacity through training courses (including online training options)
6. support research and development in order to advance state of the art in ...
Annex XVI Aligning energy security with zero emissions energy systems – Research topics (non-exhaustive)

1. Interaction of energy systems with materials use, with a particular focus on critical minerals and agriculture;
2. Integrate issues of sustainability of biomass in the analyses (e.g. biomass GHG overshoot problem);
3. Improved modelling of the consumption side of energy systems, demand side flexibility, integrating societal aspects into energy systems modelling;
4. Improved modelling of the interactions between the energy system and social systems, structural changes and circular economy;
5. New approaches to energy security and energy resilience;
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