

Integrated Water Modelling in TIMES

Moving towards best practice

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Scope

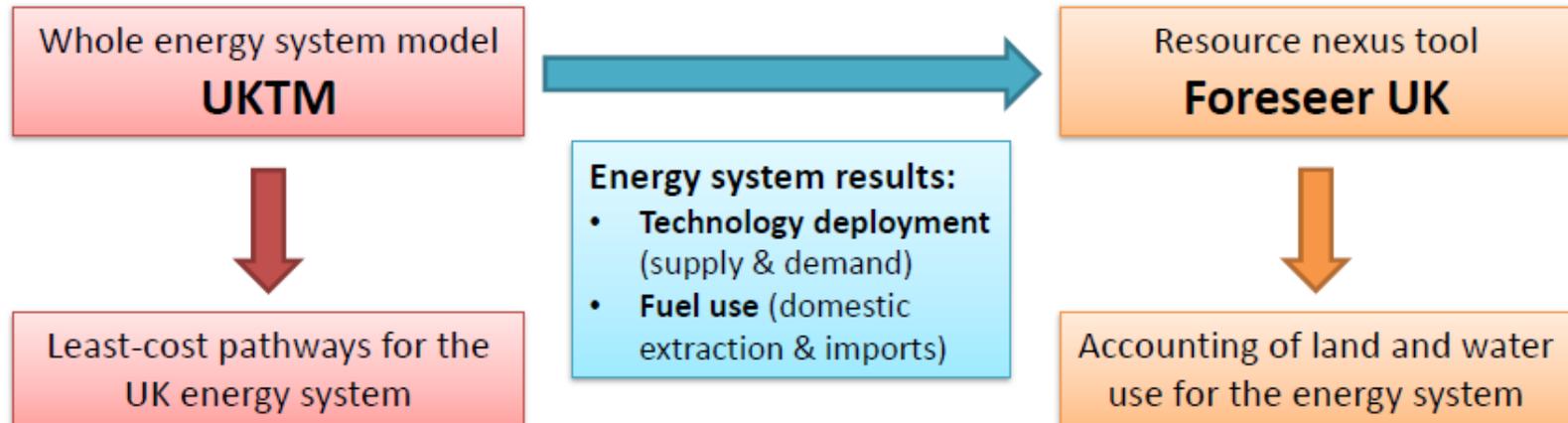
- Energy and water resource systems are fundamentally interrelated.
- Water-energy-nexus represents an important topic in the field of energy analysis
- Modelling tools need to be prepared to incorporate water issues
- Different TIMES research teams have been working on topics around the water-energy nexus over the past:

United Kingdom: UCL

- Softlinking UKTM and Foreseer

The analysis is triggered by UKTM

→ One-directional link of UKTM energy system results to Foreseer UK

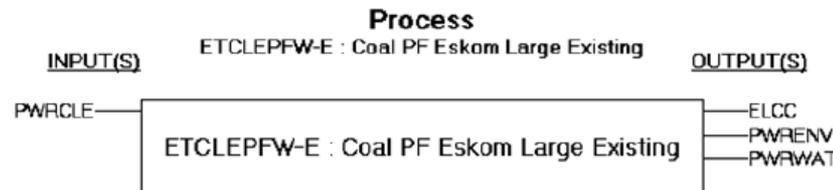
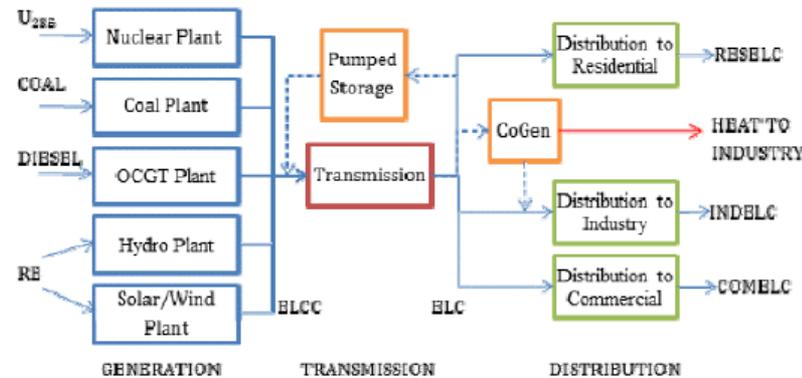


South Africa: UCT/DWG

South African TIMES model (SATIM) Simplified Representation of Water

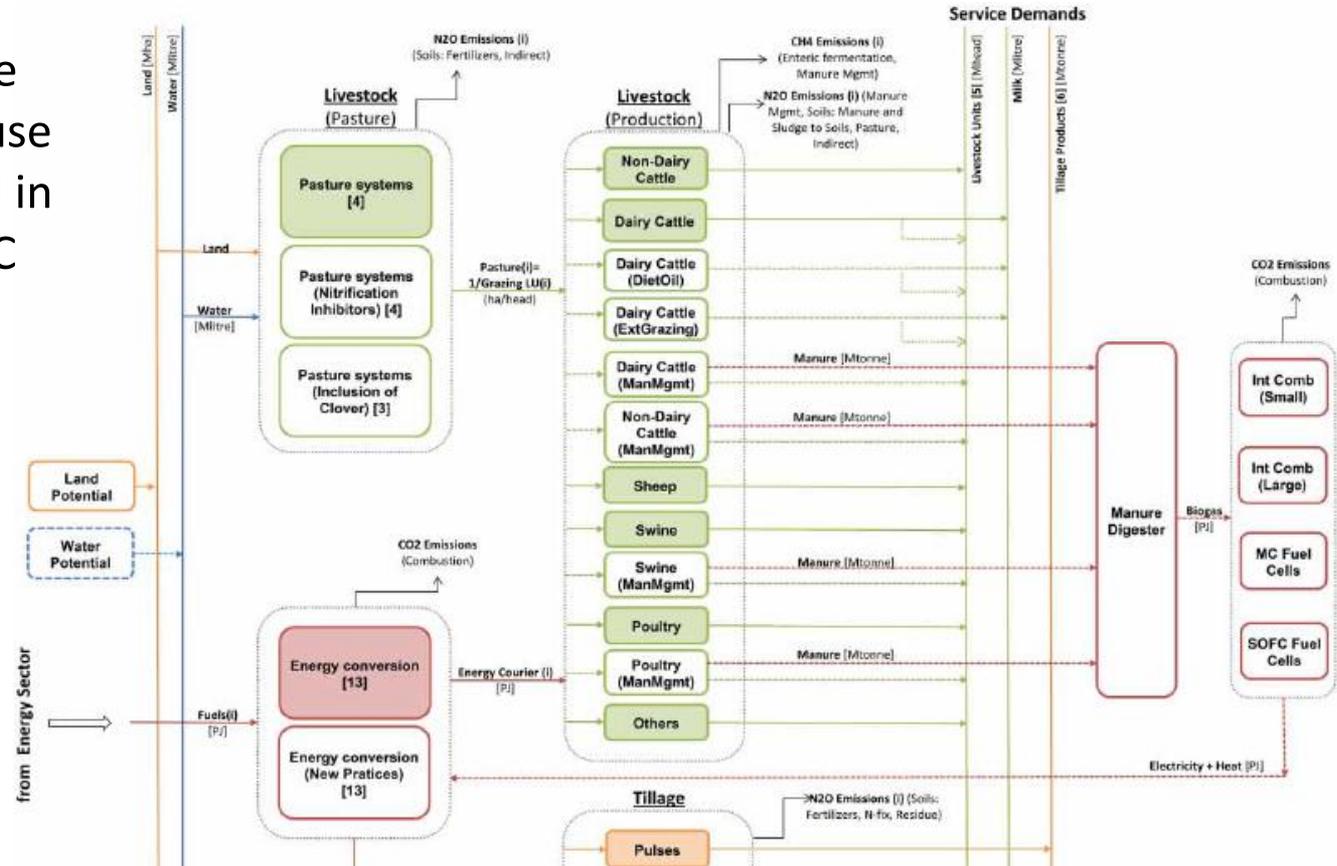
In its previous form, SATIM was a single region national representation of energy commodity flows, energy transformation technologies and the incurred costs.

In SATIM only water consumption by the Power Sector is represented by including the water use intensity of power plants. The implementation did not consider regional disparities in water supply and costs and did not include auxiliary water usage by non-electricity generation technologies such as coal mining.



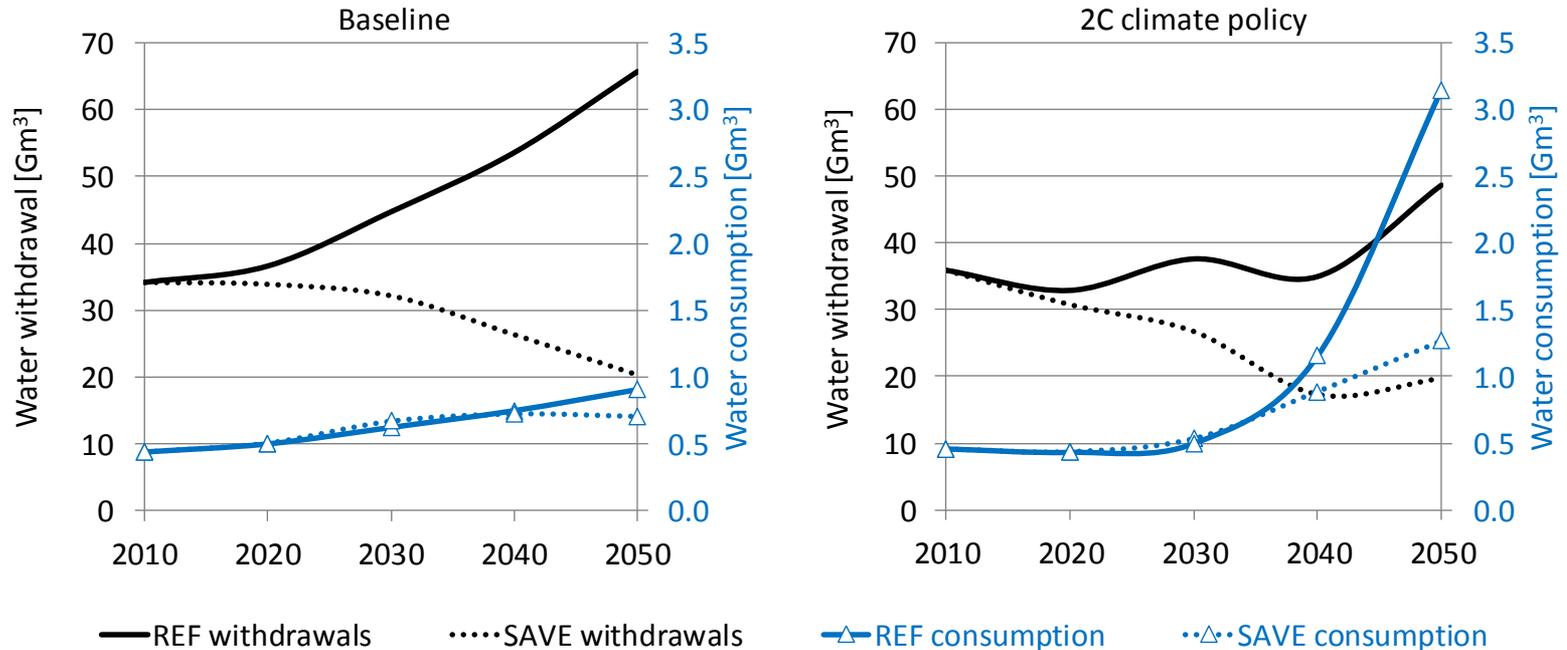
Ireland: UCC

- Agriculture and land use integrated in TIMES UCC



Middle East: ECN

- Analysis on water use in the electricity sector in the Middle East considering different climate policies and water saving measures



Project description

ETSAP workshop + Best practice guide on Integrated Water Modelling

- **Objective:**
 - bring the different groups active in this area together in order to exchange views on methodology, experiences with linking models, relevant data resources, to compare results
 - provide guidance on best practice for other researchers who may wish to work on the water-energy-nexus.
- **Potential topics of the workshop could encompass for instance:**
 - TIMES methodical enhancements to incorporate water issues
 - Water requirements of energy technologies and cropping
 - Water resources and their availability
 - Energy for water supply (water utilities as large energy consumers, desalination)
 - Linking energy and water models

3 main deliverables

- One-day workshop to be held in early Spring 2016 in Amsterdam, plus a second workshop if desired by the participants to be held in June, potentially connected to the ETSAP workshop in Cork or the IEW 2016
- Workshop proceedings
- Best practice guide as collection of scientific publications focused on particular topics, preferably as a special issue in a scientific journal (e.g. Nature Energy)

Relevance to the Annex XIII topics

- **Research and Development:** in particular this project relates to the ETSAP aim of “continually advance the state-of-the-art with respect to energy systems analyses”.
- **Capacity Building:** the workshop & the best practice guide aim to facilitate knowledge transfer on modelling issues related to water-energy-nexus.
- **2015-2022 ETSAP strategic plan:** «The extension of the analysis beyond energy and economics to include water, land and ultimately food », hence this project ties to ETSAPs long-term strategy.

Time schedule and costs

- Workshop in early Spring and June 2016 + workshop proceedings delivered shortly after the workshops
- Best practice guide: articles for the special issue submitted by the ETSAP workshop in Oct. 2016
- Estimated Costs: €70,000 (€35,000 for workshop expenses ; €35,000 for Best Practice Guide)

Expected Benefits for ETSAP

- Collaboration of at least 15 ETSAP teams on a key area of importance for the current work programme.
- ETSAP members are expected to profit from improved understanding on how to integrate water into TIMES.
- The Workshop proceedings will be available on the ETSAP website.
- Best practice guide for modelling the water-energy-nexus as scientific publication, also available on the ETSAP website.
- Enhanced perception of ETSAP and ETSAP tools among energy modellers but also in the field of water science.

15 partners who indicated their interest already:

- **Netherlands:** ECN -Tom Kober
- **Denmark:** DTU -Kenneth Karlson,
- **Ireland:** UCC - Brian Ó Gallachóir, Paul Deane
- **Italy:** E4SMA- Rocco De Miglio
- **South Africa:** University of Capetown- Bruno Merven
- **European Commission:** (JRC-IET)- Alessandra Sgobbi
- **UK:** UCL - Neil Strachan
- **Germany:** Universität Stuttgart-Ulrich Fahl
- **Portugal:** CENSE - Sofia Simões
- **Spain:** CIEMAT- Helena Cabal
- **France:** Mines-ParisTech - Nadia Maïzi
- **China:** Tsinghua University, Wenying Chen (tbc)
- **World Bank:** DWG, Gary Goldstein (representative for the Thirsty Energy project)
- **Kazakhstan:** Nazarbayev University - Aiyngul Kerimray
- **ENEL-Foundation:** ENEL-Foundation – Mariano Morazzo

Further participants from ETSAP & outside of ETSAP are very welcome!