

PAUL SCHERRER INSTITUT



Modelling the water-energy-nexus

ETSAP topic workshop
ETH Zürich, 13 December 2017

supported by:



SWISS COMPETENCE CENTER for ENERGY RESEARCH
SUPPLY of ELECTRICITY



- The SCCER SoE has the objective to carry out innovative and sustainable research in the areas of geo-energy and hydropower. SCCER SoE leads the Joint Activity Scenarios and Modelling, which aims at establishing an SCCER-wide modelling environment and to join forces across all SCCERs on future long-term energy scenario analysis.

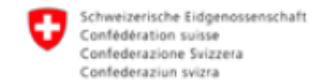
Academic Research Partners



Cooperation Partners



In cooperation with the CTI



Swiss Confederation

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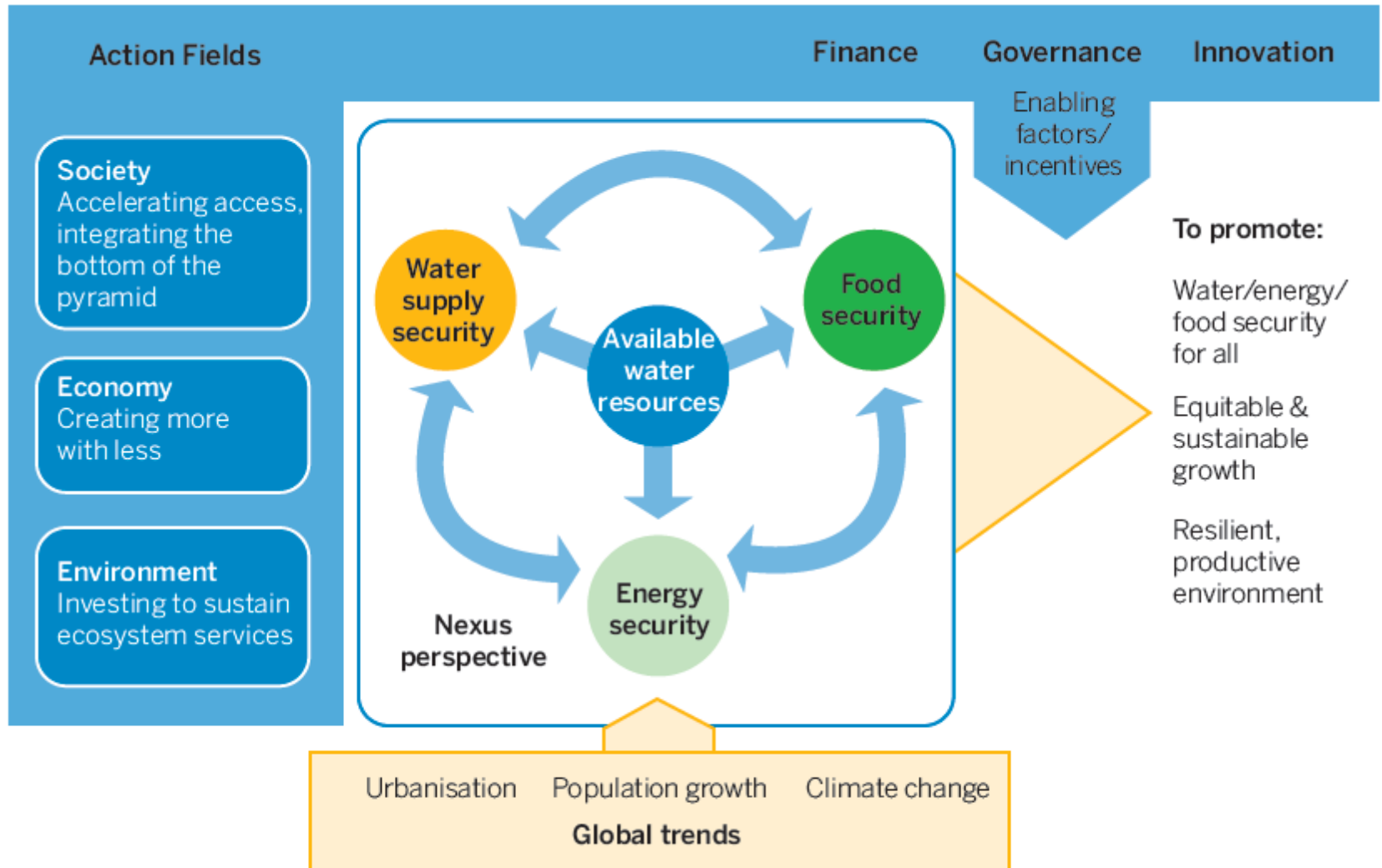
- The Energy Technology Systems Analysis Program (ETSAP) is the Technology Collaboration Programme of the International Energy Agency (IEA)
- IEA-ETSAP leads a major initiative for solutions for energy scenario modelling, i.e. MARKAL/TIMES modelling frameworks
- 20 countries are contracting parties, plus the European Commission and two private sector sponsors
- ETSAP tool users in more than 60 countries
- **One topic of the 2015-2022 ETSAP strategic plan in particular: «The extension of the analysis ... to include water, land and ultimately food... «**
- www.etsap.org



Objective of the workshop

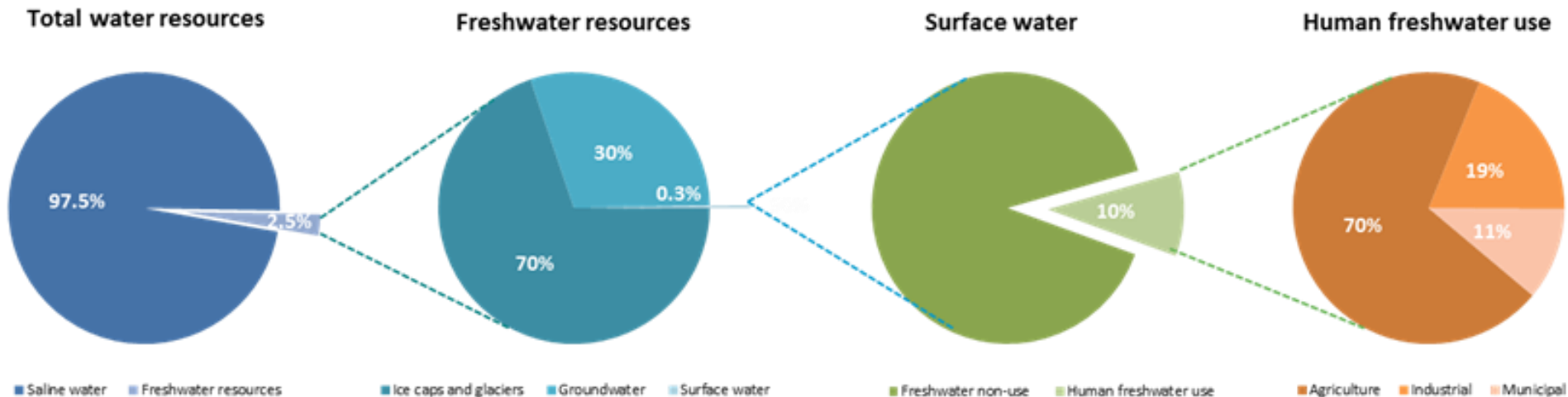
- bring together the different groups active in the field of water and energy (and food) modelling
- exchange on related **modelling methods**, experiences with **linking models**, relevant **data resources**, as well as to compare **results**
- guidance on best practice for integrated water-energy-food analysis

Nexus framework



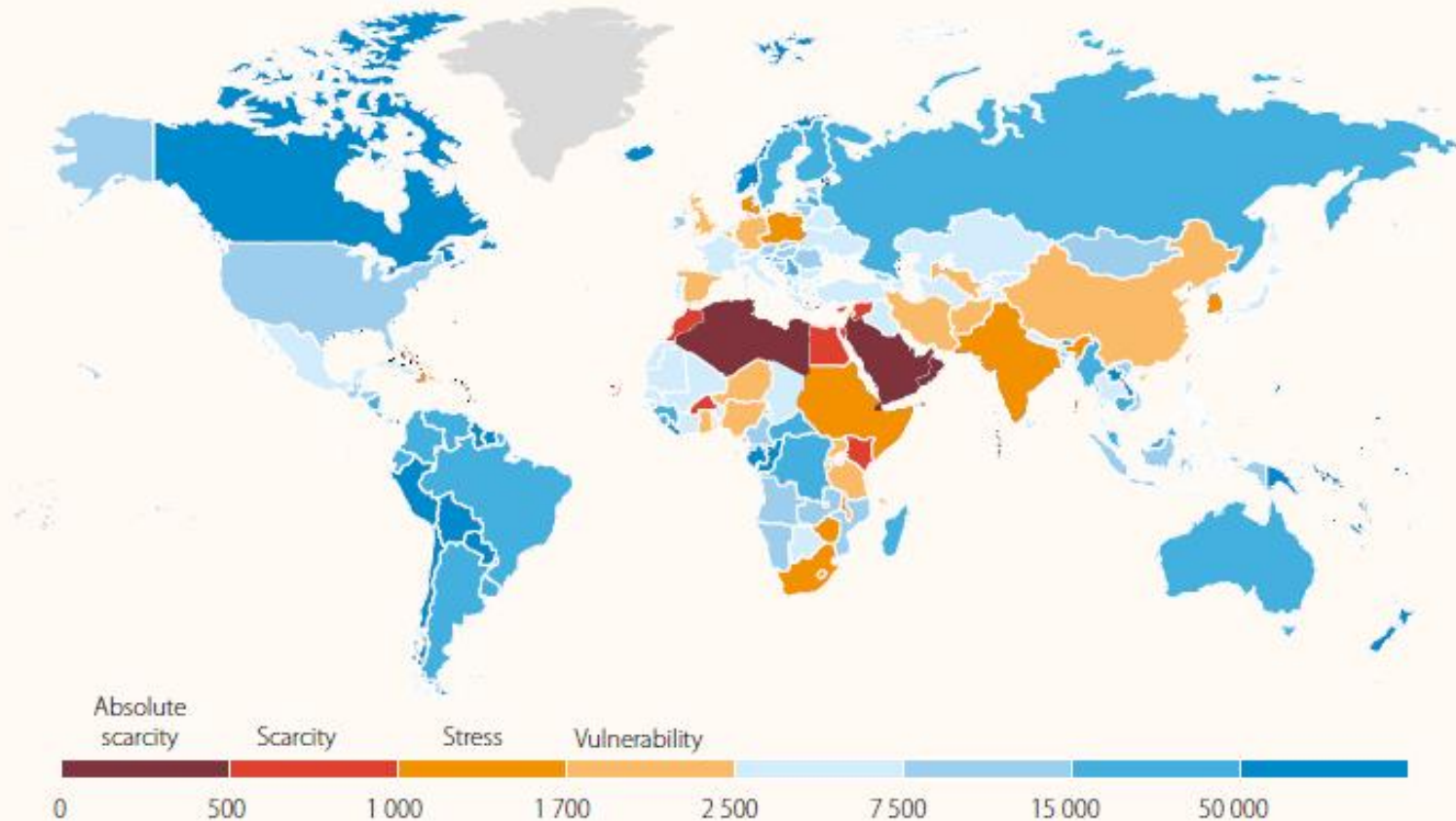
Total water resources and human fresh water use

- total water resources (fresh and saline) on Earth are around 10,000 times all directly usable fresh water, which is roughly comparable to the fact that solar energy irradiated on Earth is about 10,000 times what we consume globally



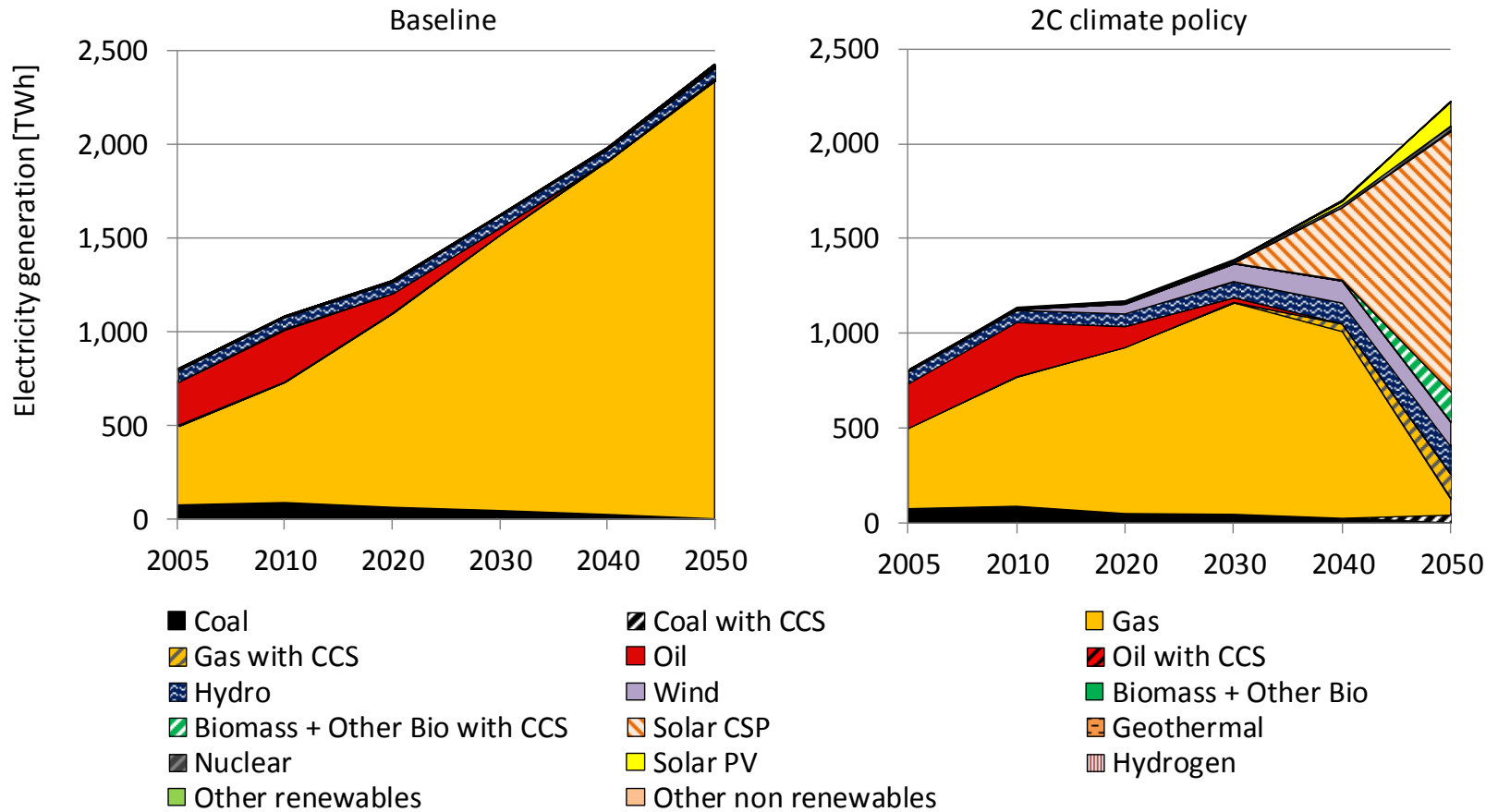
Renewable water resources by region

Total renewable water resources, 2011 (m³ per capita per year)

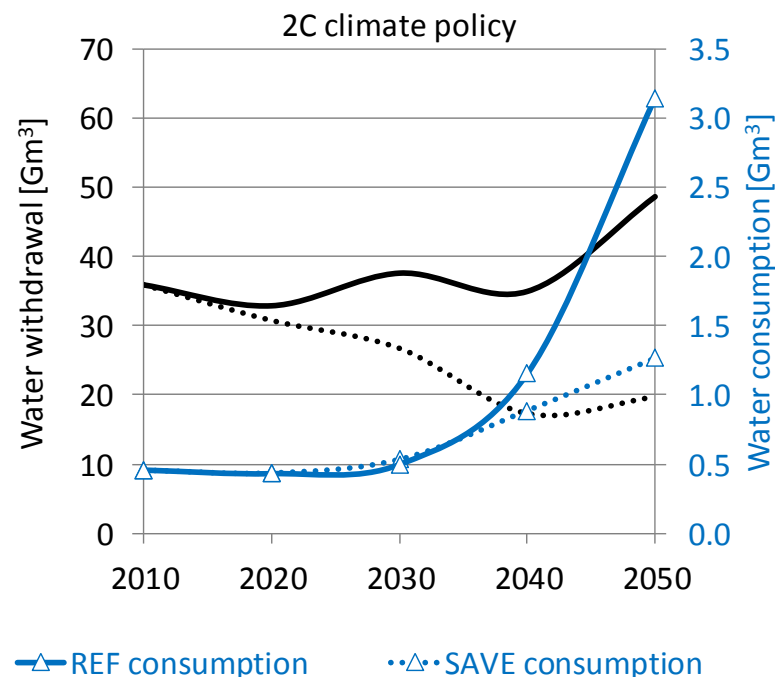
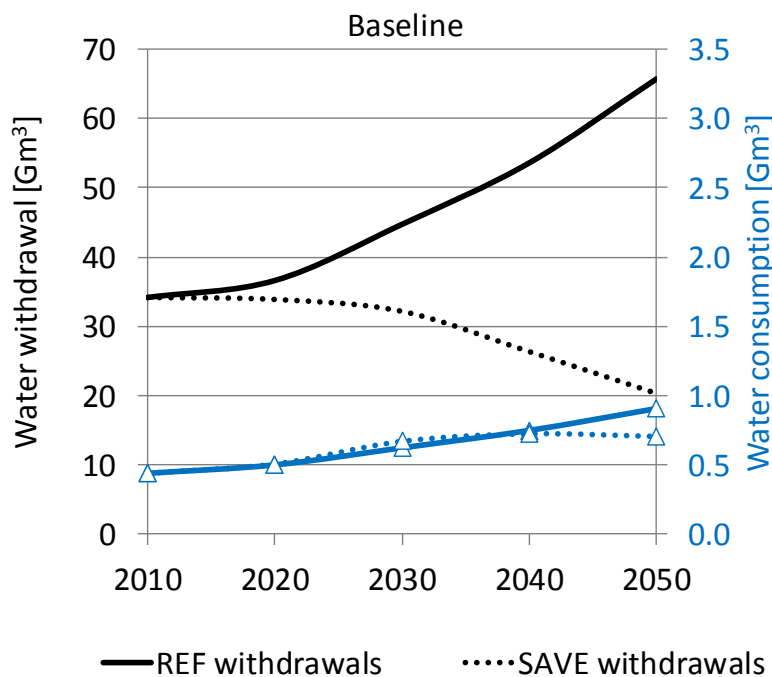


Source: WWAP, prepared with data from FAO AQUASTAT (aggregate data for all countries except Andorra and Serbia, external data) (website accessed Oct 2013), and using UN-Water category thresholds.

1st analysis focussing on the electricity sector in the Middle East / BAU scenario and 2C Scenario



Water withdrawal and consumption for two electricity sector scenarios under REF and SAVE cases in the Middle East



Current and future shares of cooling techniques for the main power production options in the Middle East in the SAVE case

