



Impacts of energy choices examples of research approaches with quantitative data collection and analysis

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Towards a Consumer-Driven Energy System: Understanding Human Behaviour

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Overview

- Motivation and background
- Lessons learnt
- Examples of Finnish scenario studies





Social dimension lacking ...

	EU 2030	ETS	non- ETS	Rene- wables	LULUCF	Air emissions	Costs	EU 2050
Austria*	(x)							x
Belgium**	(x)							x
Bulgaria								
Croatia								
Cypros								
Czech								
Denmark								x
Estonia								
Finland	x	x	x	x	x		x	x
France								x
Germany	x	x	х	x				x
Greece								x
Hungary	x		x					
Ireland	x	x	x	x				x
Italy	x			х			x	x
Latvia								
Lithuania								
Luxemburg								
Malta								
Netherlands	x		x					x
Portugal	x							x
Poland	x							
Romania								
Slovakia								
Slovenia								
Spain	x	x		x			x	x
Sweden	x		x		x		x	x
UK	x		x	x		x	x	x
Commission	x	x	x	x	x	x	x	x

- Especially for the short (2020) and medium (2030) term policy analysis focus mainly on technical systems and costs
- Long term (2050) analysis more "research oriented"

Source: Tiina Koljonen (VTT), Patxi Hernandez (Tecnalia), Klaus Kubeczko (AIT), Erik Laes (Vito), Yolanda Lechon (CIEMAT), Asgeir Tomasgard (NTNU), Daniela Velte (Tecnalia), Maria Rosa Virdis (ENEA). IST 2016 Conference, 8th September, Wuppertal.

Analysing Transition Planning and Systemic Energy Planning Tools for the implementation of the Energy Technology Information System (2009-2012)

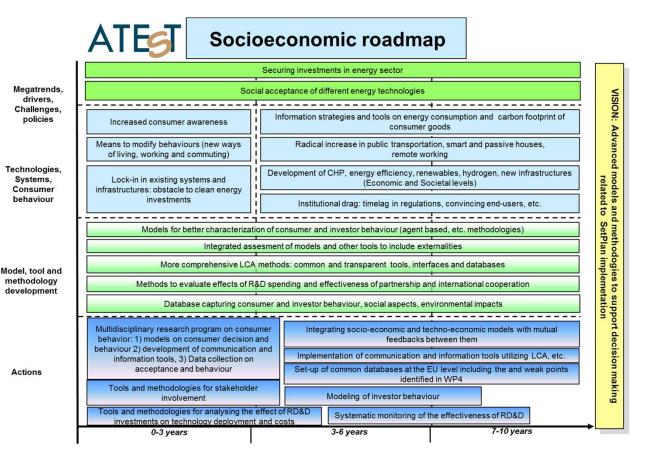
ATEGT	Well cover Several to	Ν	No tools			
		Energy	Behaviour	Institutional factors		
		infrastructure		R&D policy	Sector	
	Goal formulation	Energy System Models, Macroeconomic Models	Energy Behaviour Tools Public Awareness and Acceptability Tools	SET Plan Steering Group	Sector Level Models	
	System analysis	Energy System Models Sector Level Models Disaggregated Models	Impacts Modelling for Policy and Strategic Analysis	Learning curves		
	Strategy implementation	Macroeconomic Models	Energy Behaviour Tools No tools for informing public	Technology platforms, Industrial Initiatives, EU Programs EERA	Energy Behaviour Tools Institutional changes e.g. in market design	

Source: Koljonen et al. 2012. <u>http://www.cres.gr/atest/pdf/D.6.1-Tools-and-Methodologies-Development.pdf</u> 19/10/2017

Recommendations from the EU ATEsT analysis

"Tools and methods focused on analysing consumer and/or investor behaviour and the effectiveness of RD&D policies and institutional factors are *nearby missing*. On the other hand, *energy* system modelling barely takes these issues into account"

- Research on system analysis of actor (consumer, institutional, investor) behavior, awareness and public acceptability
- Research on the analysis of the effect of RD&D policies



Source: Koljonen et al 2012.

http://www.cres.gr/atest/pdf/D.6.1-Tools-and-Methodologies-Development.pdf

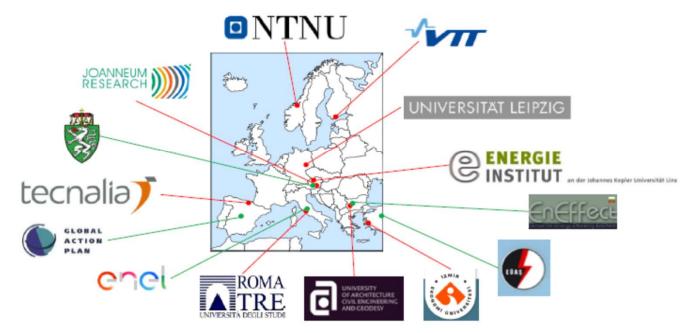
The ECHOES project



http://echoes-project.eu/

The primary ambition of ECHOES is to:

- identify the factors driving individual and collective choices and energy-related behaviour,
- · estimate the magnitude of the factors' potential impact,
- and derive policy-ready recommendations for policymakers to exploit the new knowledge for the advancement of the Energy Union and the SET-Plan.

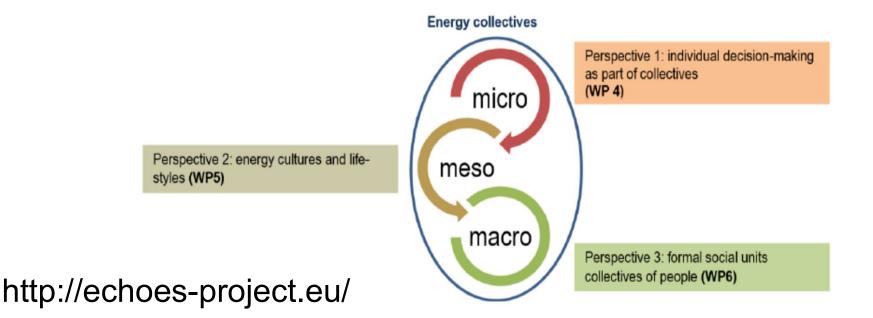


ECHOES' approach



Innovative "energy collectives" concept that integrates:

- · Individual decision-making as part of collectives,
- · the perspective of collectives constituting energy cultures and life-styles, and
- the perspective of formal social units such as municipalities, states, energy providers, or NGOs as collectives of people.



 Analysis of existing data & data needs and to formulate social science and humanities related indicators on energy system transition = > creation of open access database (VTT)



Formulation of SSH database and SSH indicators

- Overview of existing quantitative & qualitative SSH data related to low carbon energy transition
 - Two (small) surveys carried out
 - Public literature analysed
- Definition of the SSH indicators
 - Support for the Set-Plan Action 3.1 on Energy Consumers
- Open access SSH database to collect relevant SSH data
 - · From literature etc.
 - Data created dusing the ECHOES project

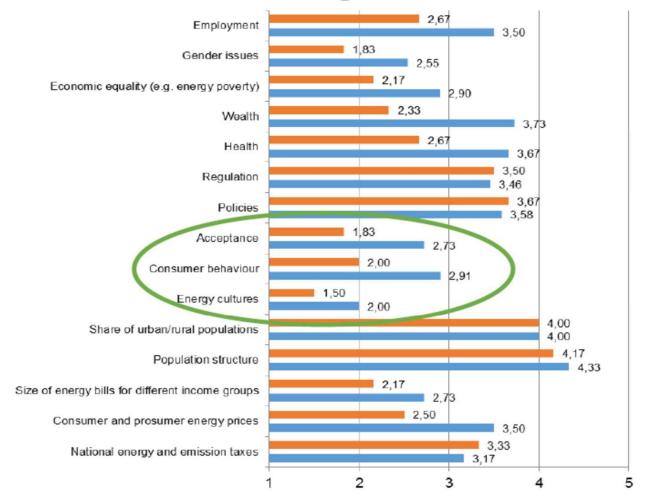
Expert workshop on 26th October 2017 in Brussels

http://echoes-project.eu/

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The ECHOES consortium and IEA ETSAP researchers' assessment on data availability in different areas in general

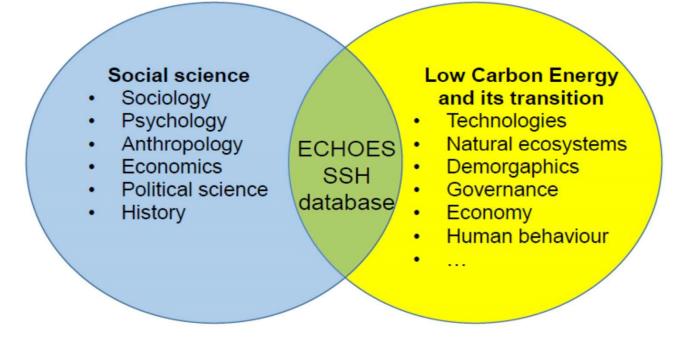


http://echoes-project.eu/



Challenge: what we mean by SSH database?

- Definition of data (e.g. quantitative & qualitative)
- Definition of SSH and low carbon energy databases
- Definition of SSH database for low carbon energy transition





Scenario Examples of Finland





Three low carbon storylines – Tonni, Inno, Onni*

Different assumptions on Finland's economic and community structures as well as on new technology RD&D

No significant changes in industrial, regional or urban forms, moderate new technology RD&D



Fast technical RD&D, new industrial products and processes, centralized urban structure, "smart-economy" Less energy-intensive industries and more service enterprises, decentralized regional structure



*The names "Tonni", "Inno", "Onni" are words in the Finnish language. "Tonni" means tonne (ton), "Inno" is derived from innovation, whereas "Onni" means happiness

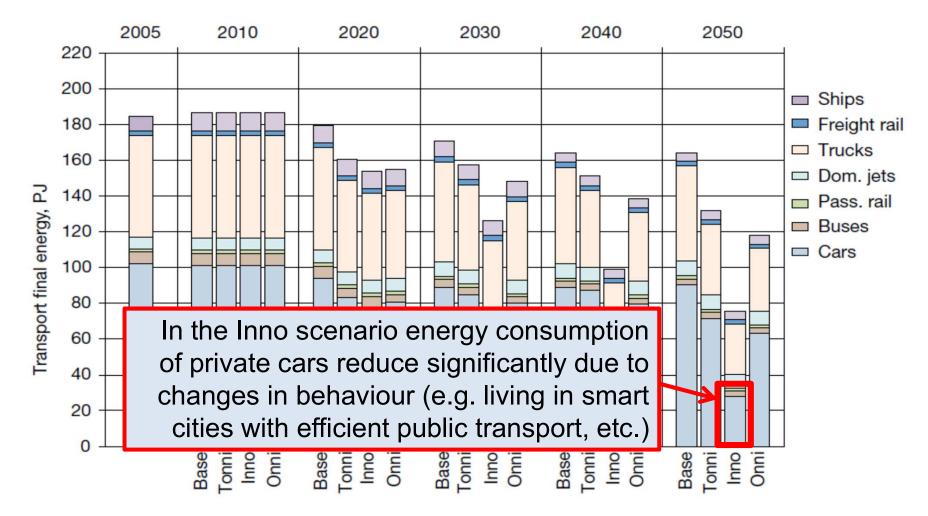
INNO

Figures Jutta Suksi

Source: Koljonen, T. & Similä, L. (eds.). Low Carbon Finland 2050. VTT Visions 2. Espoo, 2012. http://www.vtt.fi/inf/pdf/visions/2012/V2.pdf



Transport final energy consumption could be halved by 2050

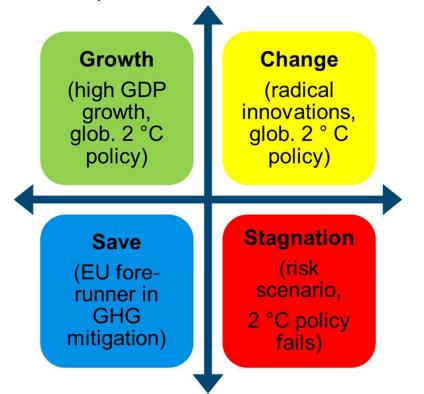


Source: Koljonen, T. & Similä, L. (eds.). Low Carbon Finland 2050. VTT Visions 2. Espoo, 2012. http://www.vtt.fi/inf/pdf/visions/2012/V2.pdf

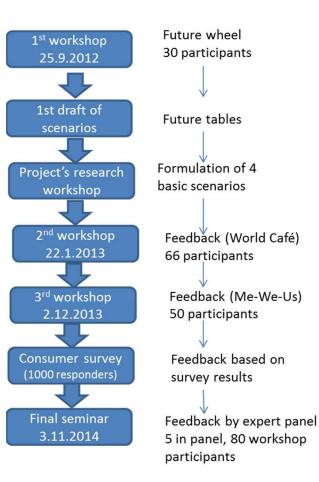
Low Carbon Finland 2050 -platform - Vähähiilinen Suomi 2050

Different assumptions on norms, acceptance, behavior, etc.

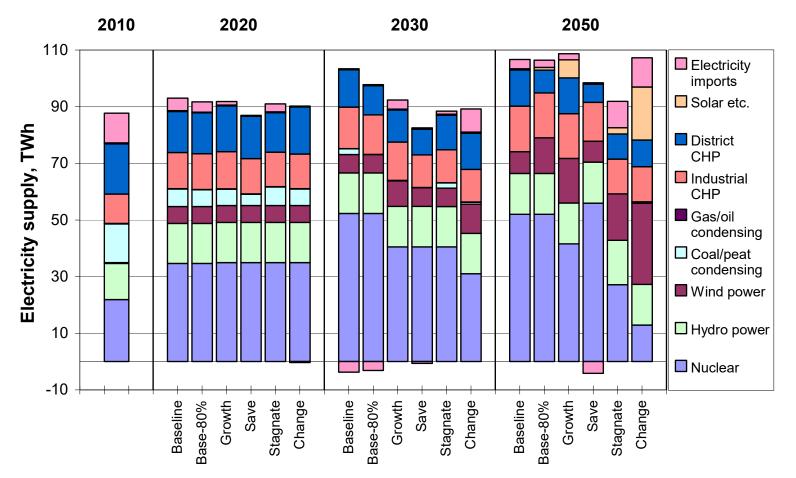
http://www.lowcarbonplatform.fi/



See: Koljonen, T. & Lehtilä A. Modelling Pathways to a Low Carbon Economy for Finland. In: Informing Energy and Climate Policies Using Energy Systems Models. Lecture Notes in Energy: Volume 30 2015.



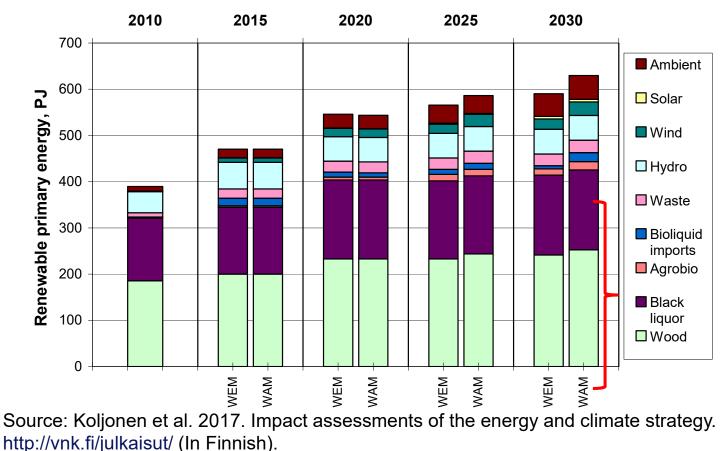
Due to new national policies, acceptance, etc. all the scenarios will fail (too much nuclear, too little RES, no coal after 2030, ...)



See: Koljonen, T. & Lehtilä A. Modelling Pathways to a Low Carbon Economy for Finland. In: Informing Energy and Climate Policies Using Energy Systems Models. Lecture Notes in Energy: Volume 30 2015.



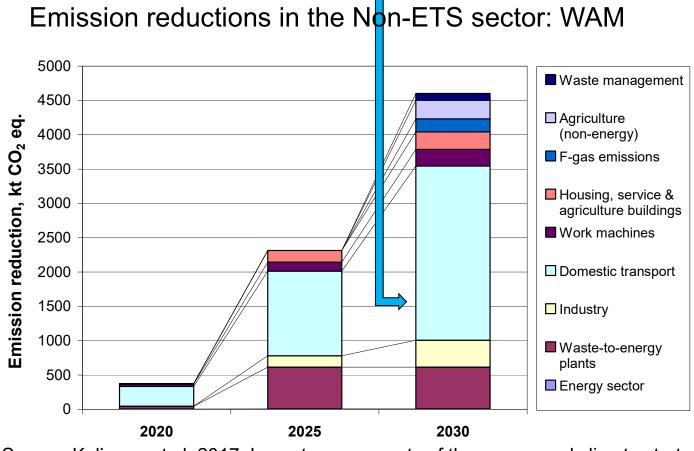
National Energy and Climate Strategy 2030 for Finland Large share of RES growth is happening without any policies due to growth of forest industries => behavior of investor matters a lot



Renewable primary energy WEM vs. WAM

19/10/2017

National Energy and Climate Strategy 2030 for Finland New parliamentary group has been established to "solve" the transport challenge => behavior of private consumer matters a lot



Source: Koljonen et al. 2017. Impact assessments of the energy and climate strategy. http://vnk.fi/julkaisut/ (In Finnish).



Scenario planning as a tool but needs improvement

Well known and well proved method, incl. huge number of methods, examples, literature, etc.
Strengthens acceptance, commitment, implementation

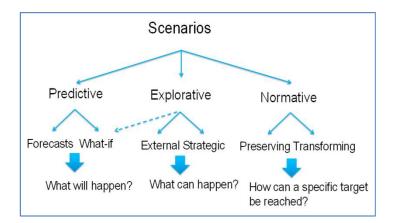
 Requires time, resources, motivation of larger (multidisciplinary) group & stakeholders

Normative (backcasting) scenarios still produce a simplistic views of future pathways even with very complex models => central question: "how normative the scenario is?"

-Transformative scenarios are usually based on qualitative assessments

-Lack of creative thinking and insight to societal processes

Scenario typology with three categories and six types (modified from Börjeson et al. (2006)).

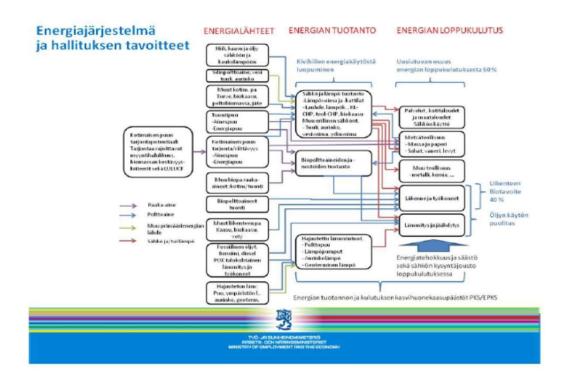


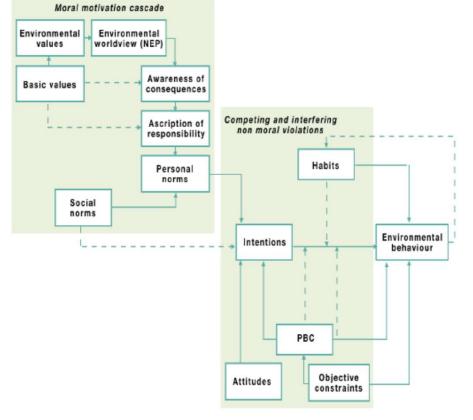
Linking social theories with energy system transition is not an easy task



The Comprehensive Action Determination Model (Klöckner, 2013)

es

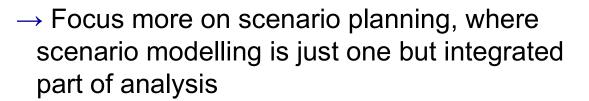






Steps forward

- Evidence based knowledge how individuals and organisations perceive energy over time
- From technology innovations (e.g. TRL thinking) to social innovations
- Improved methods, models, data, and modeling frameworks to include integrated modelling of social systems







We make it happen!

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