

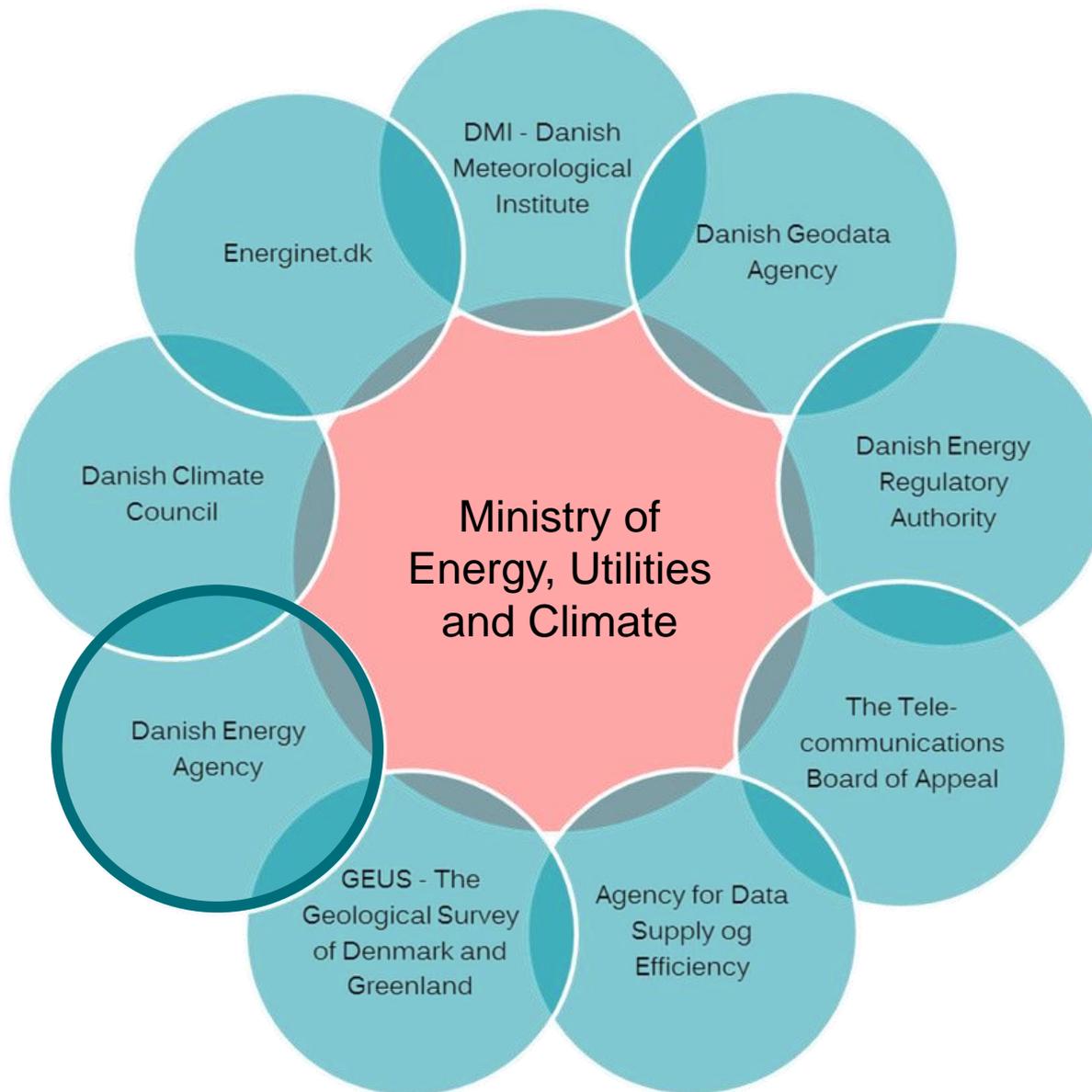
How Denmark built cooperation across government, academia and technical institutions

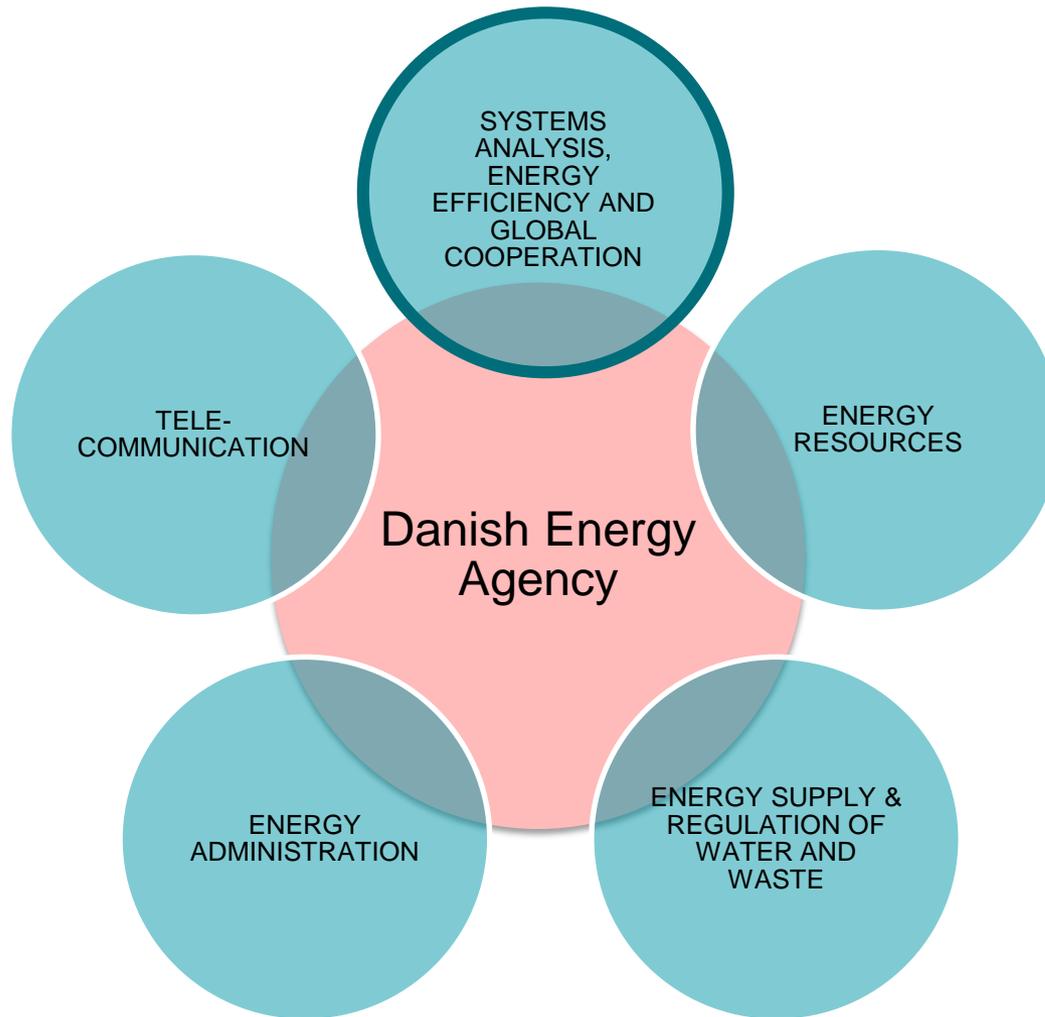
Giada Venturini

Advisor, Danish Energy Agency

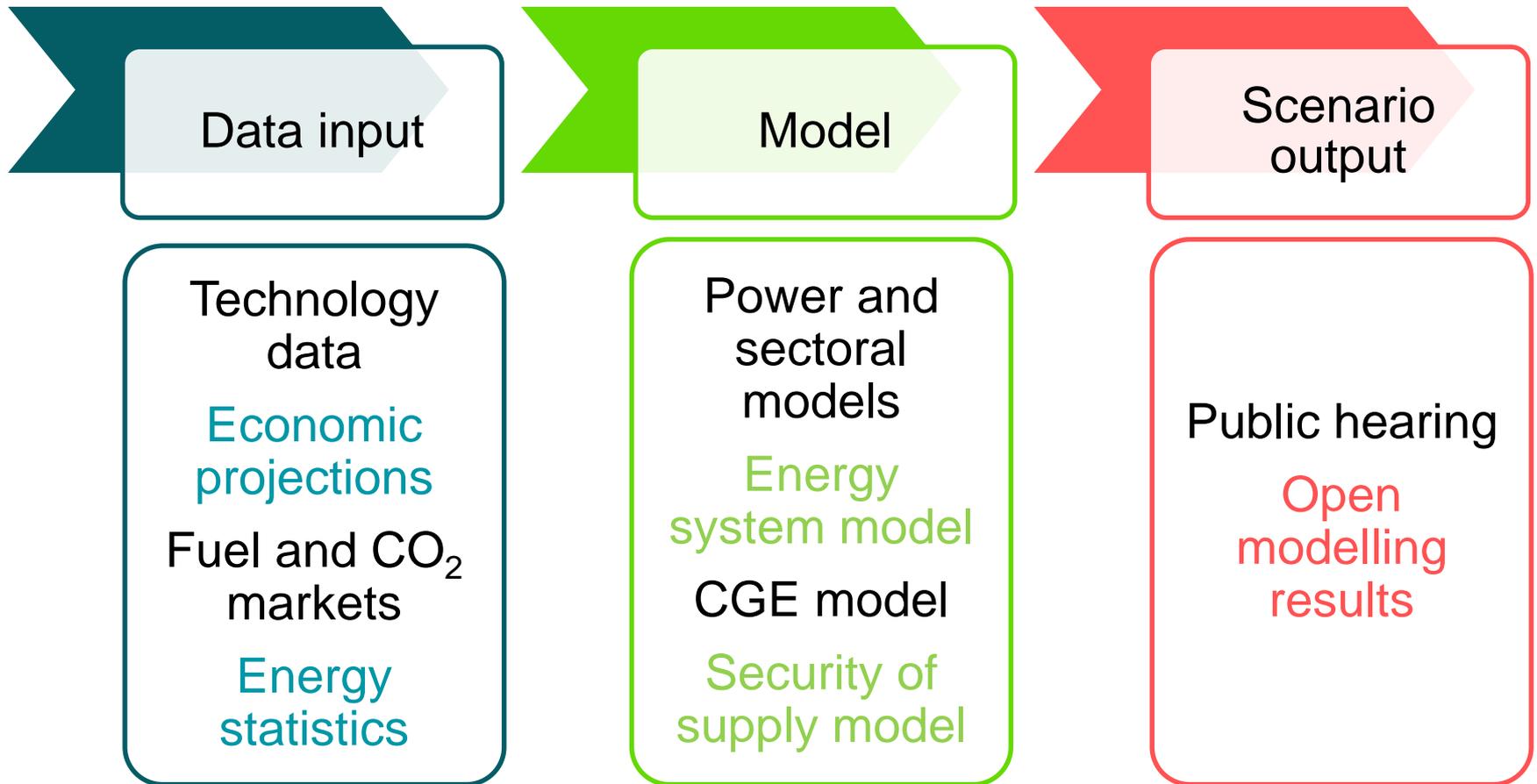
12 April, 2019

2019 International Forum on Long-term Energy Scenarios for the Clean
Energy Transition





The Framework for LTES



Technology Catalogues

What is a Technology Catalogue?

A. Data sheets

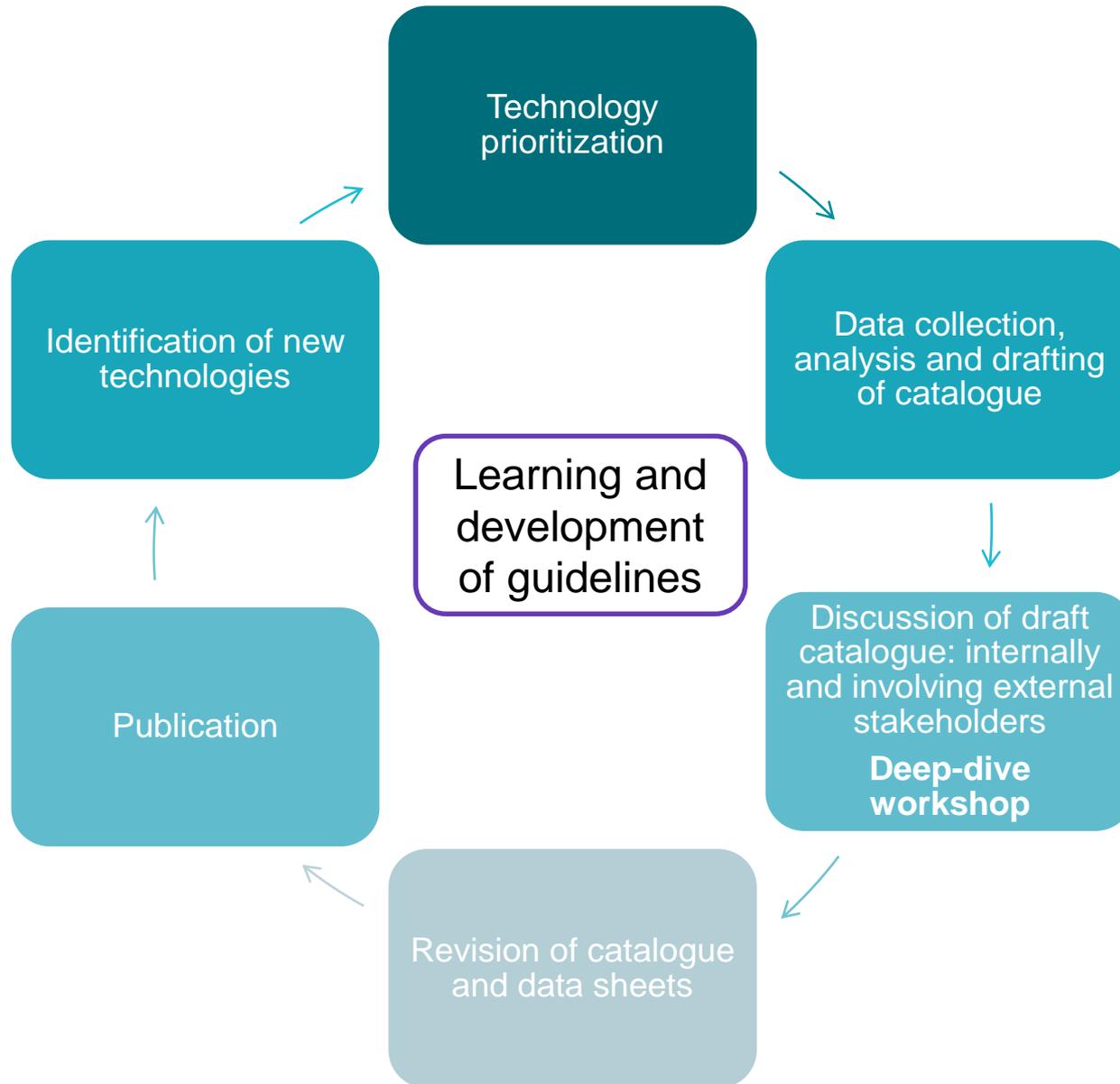
- Technical data (efficiency, lifetime, availability, start-up time)
- Economic data (investment cost, O&M cost)
- Environmental data (emissions factors)

B. Qualitative technology descriptions

Examples

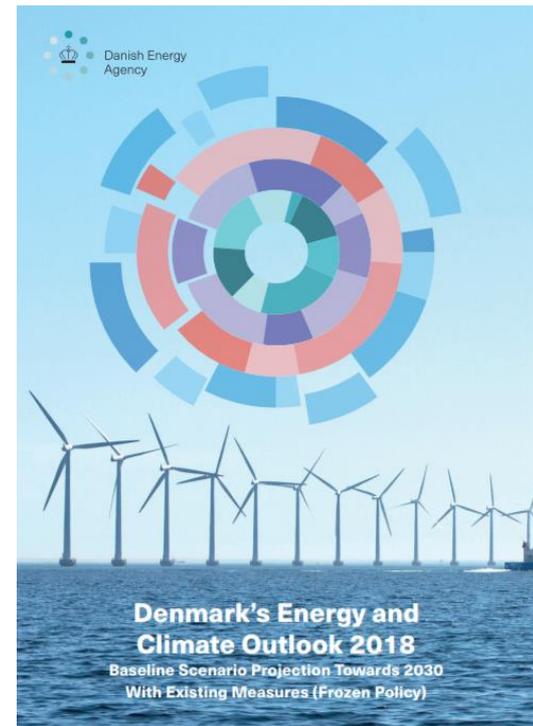
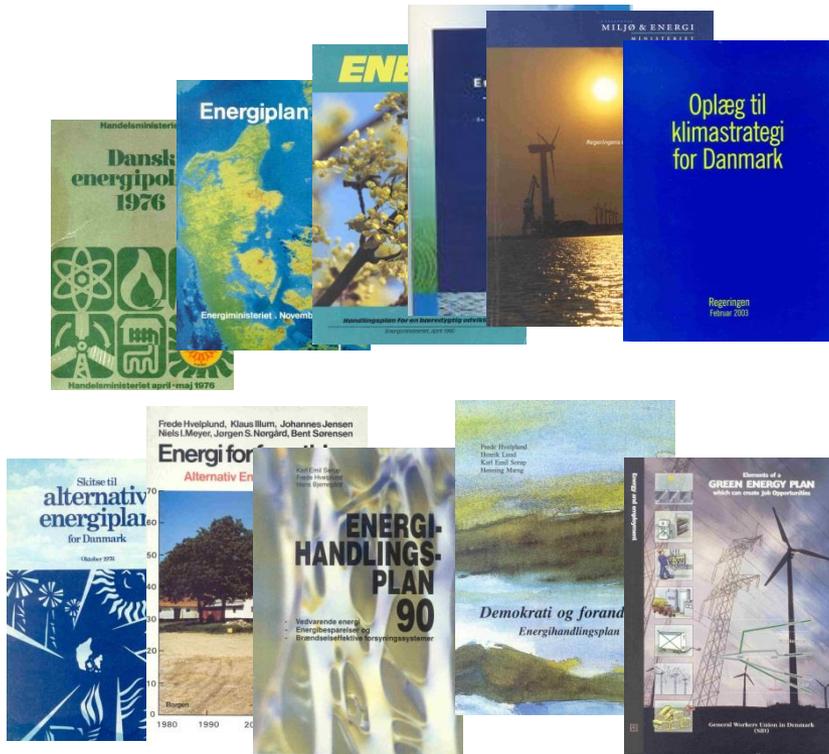
- Energy plants for Electricity and District Heating generation
- Individual Heating Plants
- Distribution and transmission of electricity, gas and heat
- Renewable fuels
- Energy storage

The Process



Denmark's Energy and Climate Outlook

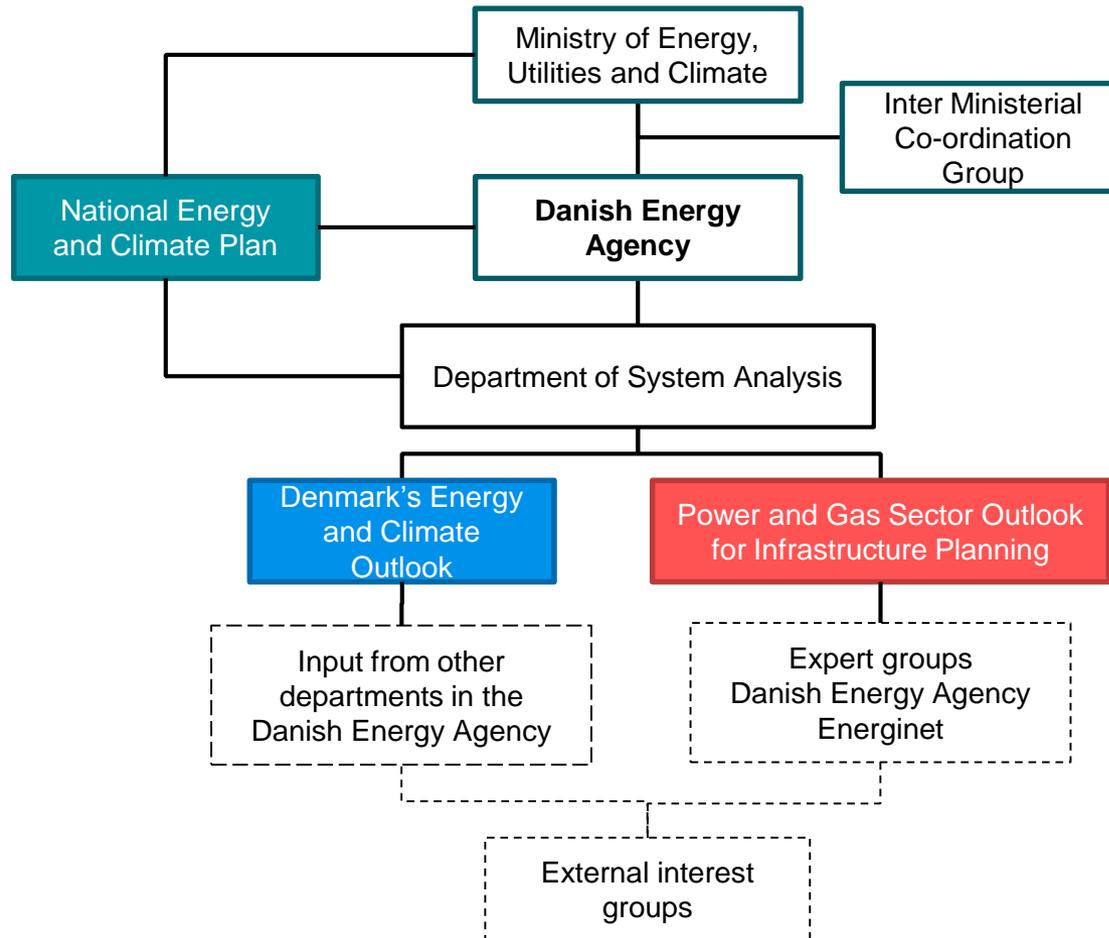
A Long Tradition of Energy Scenarios



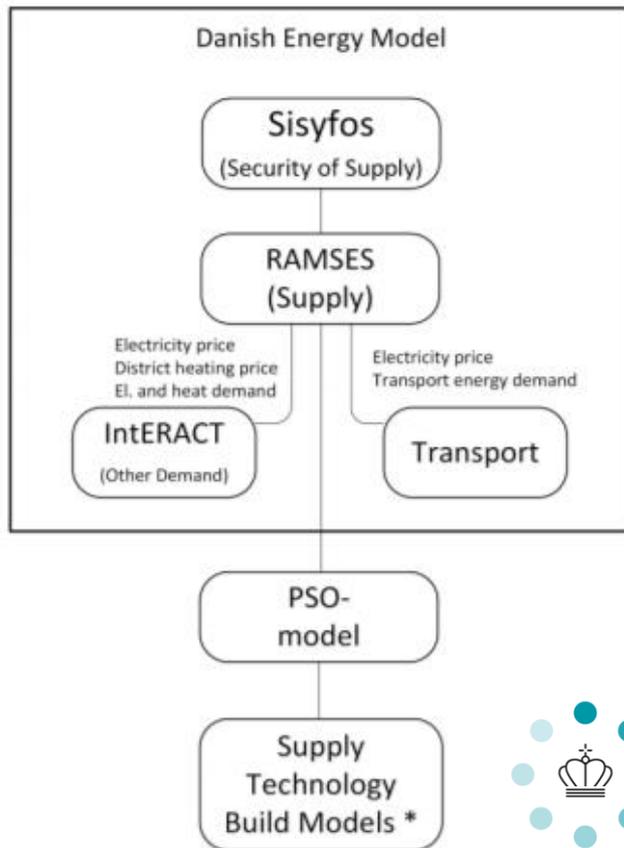
A Suite of Models and Stakeholders

Reference	Region Year	Model Name	Model Type	Focus
 Danish Energy Agency	Denmark, 2014	EnergiBalance Model	Simulation	Denmark 2050: 100% renewable energy sources
	Denmark, 2013	Expert panels Backcasting		Fossil-free road transport Focus on timings of introduction of alternative vehicles
	Nordics, 2013	MoMo soft-linked with TIMES	Spreadsheet Optimization	Nordic countries 2050: carbon neutral scenarios
	Denmark, 2012	EnergyPlan Balmorel ADAM/EMMA	Simulation Optimization Macroeconomic	Transition to 100% RE systems in Denmark before 2050
	Denmark, 2010	STREAM	Spreadsheet	Focus on transport. Scenarios based on Climate Commission report for 100% RE in Denmark in 2050
	Denmark, 2009	EnergyPLAN Expert panels Workshops	Simulation	Denmark 2050: GHG emissions reduction by 90 % compared to 1990
	Denmark, 2008	STREAM	Spreadsheet	Denmark 2050: scenarios for 60% and 80% GHG emissions compared to 1990

Organizational Set-up



In-house Modelling Capacity and Cross-institutional Collaboration



Data harmonization

Long-term projections

Model development
(TIMES)

Analysis of scenario
results



Thank you!

Giada Venturini,
Advisor

Mail: gve@ens.dk
Global Cooperation
Danish Energy Agency

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Niels Bisgaard Pedersen,
Advisor
Global Cooperation
Danish Energy Agency