

# CURRENT STATE OF LONG-TERM MODELLING IN LITHUANIA

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# General state

- Lithuanian Energy Institute
  - National Energy Strategy
  - Evaluation of social and macroeconomic impacts
  - Guidelines for emission forecasting
- Kaunas University of Technology
- Vilnius Gediminas Technical University
- ...



# National Energy Strategy

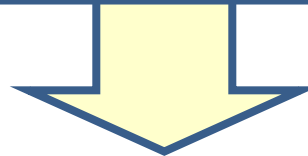
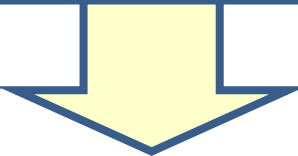
**Scenario analysis of energy sector development and operation**



**Evaluation of energy security for energy sector development scenarios**



**Analysis of macroeconomic impact of energy sector development scenarios**

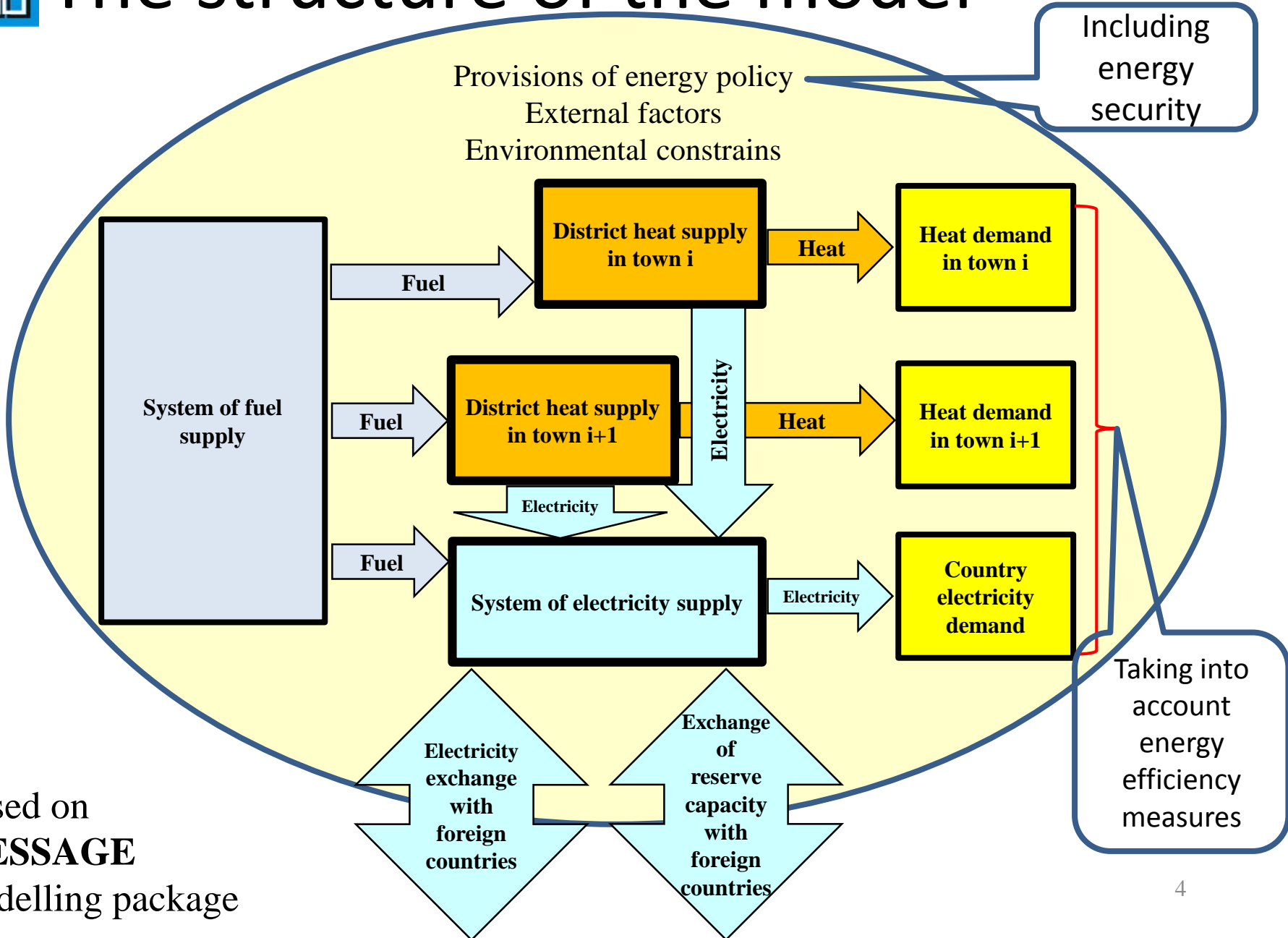


**Preparation of the National energy strategy project**





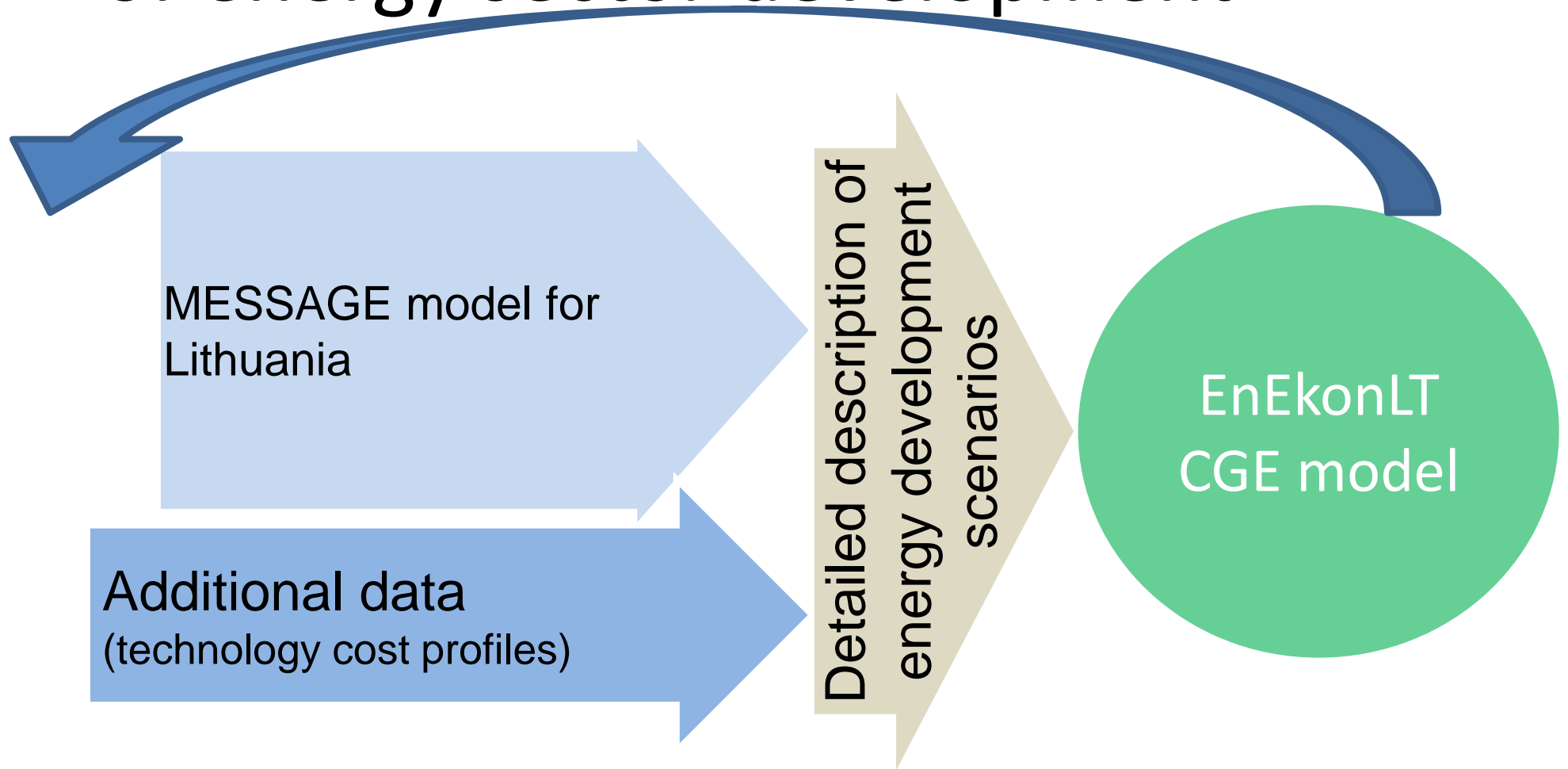
# The structure of the model



Based on  
**MESSAGE**  
modelling package



# Analysis of macroeconomic impacts of energy sector development





# Guidelines and tools for emission forecasting

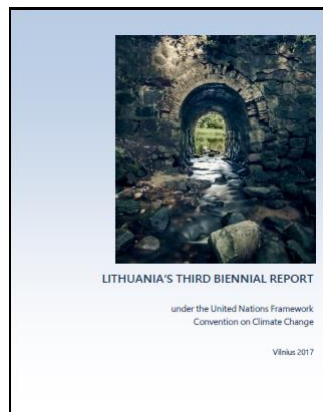
LULUCFeat\_03.14.0m (Tš 2014) - Microsoft Excel

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Net CO2 emissions/removals (kt)	4813.55	4253.1	4295.74	3384.12	4284.82	3838.17	2653.63	701.236	794.23	383.84	527.14
Total land emissions (kt)	2029.35	2002.03	2032.32	2032.03	2032.03	2032.03	2032.03	2032.03	2032.03	2032.03	2032.03
Land use change emissions (kt)	0	0	0	0	0	0	0	0	0	0	0
Land use change removals (kt)	0	0	0	0	0	0	0	0	0	0	0

Category (L3)	Sectoral (WEM, WAM, WOM)	CO2 (kt)	CH4 (kt)	N2O (kt)	CO2e (kt)	CO2 (kt)	CH4 (kt)	N2O (kt)	CO2e (kt)	CO2 (kt)	CH4 (kt)	N2O (kt)	CO2e (kt)	CO2 (kt)	CH4 (kt)	N2O (kt)	CO2e (kt)	CO2 (kt)	CH4 (kt)	N2O (kt)	CO2e (kt)
2. Industrial processes	WEM					2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2.A. Mineral industry	WEM	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32	477.32
2.A.1. Cement production	WEM	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14	410.14
2.A.2. Other non-cement production	WEM	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18	67.18
2.B. Chemical industry	WEM	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67	2149.67
2.C. Metal industry	WEM																				
2.C.1. Iron and steel production	WEM																				
2.C.2. Other non-iron and steel production	WEM																				
2.D. Non-ferrous products from fuels and solvent use	WEM	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60	62.60
2.E. Electronics industry	WEM																				
2.F. Products used as substitutes for CO2e	WEM																				
2.G. Other product manufacture and use	WEM																				
2.H. Other (please specify)	WEM	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
3. Agriculture	WEM																				
3.A. Enteric fermentation	WEM																				
3.B. Manure management	WEM																				
3.C. Rice cultivation	WEM																				
3.D. Agricultural soils	WEM																				
3.E. Prescribed burning of savannahs	WEM																				
3.F. Field burning of agricultural residues	WEM																				
3.G. Liming	WEM	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71	24.71
3.H. Urea application	WEM	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72	15.72
3.I. Other carbon-containing fertilizers	WEM																				
3.J. Other (please specify)	WEM																				
4. Land Use, Land-Use Change and Forestry	WEM																				

## LULUCFeat

LULUCFeat has been employed in the preparation of Lithuania's Third Biennial Report under the United Nations Framework Convention on Climate Change



## InAgreat

Tool for forecasting GHG and other air pollutant emissions in residential sector

Based on Results of 2011 and 2012 population and housing census of the Republic of Lithuania


emissions@inagreat.lt

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Population	3093200	3074244	3072000	3069215	3066244	3063244	3060244	3057244	3054244	3051244	3048244	3045244	3042244	3039244	3036244	3033244	3030244	3027244	3024244	3021244	3018244
Population change 2010-2030		-0.49%	-0.51%	-0.54%	-0.57%	-0.59%	-0.61%	-0.63%	-0.65%	-0.67%	-0.69%	-0.71%	-0.73%	-0.75%	-0.77%	-0.79%	-0.81%	-0.83%	-0.85%	-0.87%	-0.89%
Number of dwellings	424247	406461	412222	424444	436666	448888	461111	473333	485555	497777	510000	522222	534444	546666	558888	571111	583333	595555	607777	620000	632222
Number of dwellings	118887	112444	147777	183333	218888	254444	290000	325555	361111	396666	432222	467777	503333	538888	574444	610000	645555	681111	716666	752222	787777
Number of dwellings by sector area																					
One-dwelling building	424247	406461	412222	424444	436666	448888	461111	473333	485555	497777	510000	522222	534444	546666	558888	571111	583333	595555	607777	620000	632222
Dwelling in a one-dwelling building	61123	55444	61888	67222	72666	78000	83333	88666	94000	99333	104666	110000	115333	120666	126000	131333	136666	142000	147333	152666	158000
Dwelling in a two-dwelling building	78789	81444	83111	84888	86555	88222	89889	91556	93223	94890	96557	98224	99891	101558	103225	104892	106559	108226	109893	111560	113227
Dwelling in a three-dwelling building	3535	2789	362	529	1076	1723	2370	3017	3664	4311	4958	5605	6252	6899	7546	8193	8840	9487	10134	10781	11428
Average value of sector area																					
One-dwelling building	424247	406461	412222	424444	436666	448888	461111	473333	485555	497777	510000	522222	534444	546666	558888	571111	583333	595555	607777	620000	632222
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# REEEM (H2020 RIA Project)

- Baltic energy security case study (Finland, Estonia, Latvia, Lithuania)
- District heating case study (Helsinki, Kaunas, Warsaw)
- Ecosystem services case study (Lithuania)
- Carbon leakage and competitiveness
- Distributional impacts of energy transition
- Etc.



# BRILLIANT (H2020 CSA Project)

- Trainings and guidance for Estonian, Latvian, and Polish energy modelers
- Long-term energy development models for Estonia, Latvia, Lithuania, and Poland connected to the multi-regional model
- BRImpacts model





# Modelling tools

- **MESSAGE** (Model for Energy Supply Strategy Alternatives and their General Environmental Impact) is the main tool used for long-term energy development modelling
  - Additional in-house developed tools for energy planning
- EnEkonLT – CGE model to evaluate macroeconomic impacts of energy development pathways (recursive dynamics up to 2050)
- In-house developed emission forecasting tools
- Other tools



# Links between policymaking and modelling

- Deep involvement in some stages of preparation of National Energy Strategy
- Occasional projects
- Different means of stakeholder engagement
- Other involvements in different stages of policy-making



# International linkages

- MESSAGE tool is developed by International Atomic Energy Agency
  - Participation in development and spread of the model
- International projects
- Knowledge exchange
  - Conferences
  - Trainings in Sweden, Philippines, Rwanda, etc.
- Review and evaluation activities (H2020 projects, emission inventories, etc.)



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