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REGIONAL TRAINING ON MODEL-BASED INTEGRATED ENERGY AND CLIMATE ANALYSES

Almaty, 28-31 January 2025

ENERGY POLICY MODELLING FOR THE NECP

Mindaugas Stonkus
Expert in Integrated energy and climate planning, SECCA

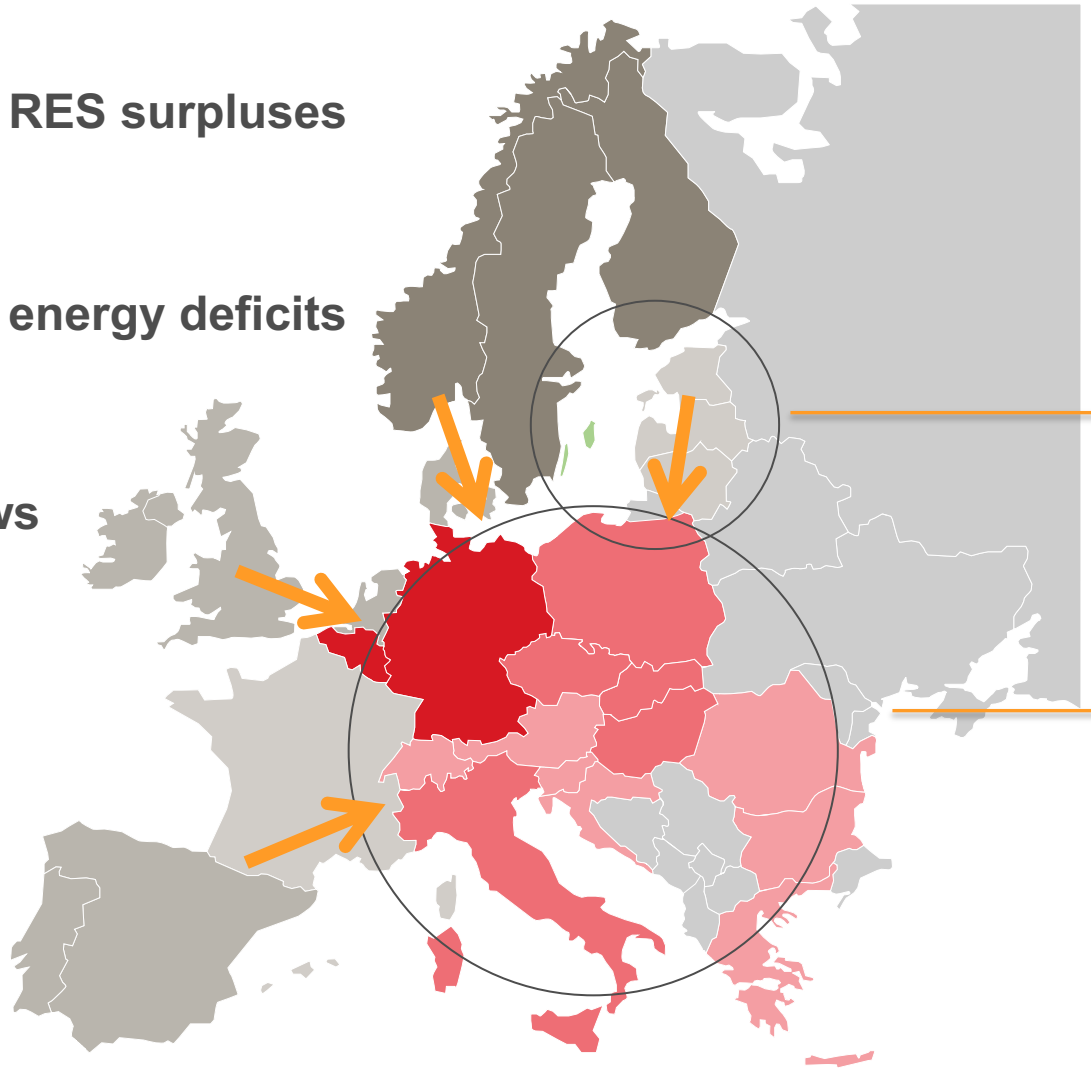
Stantec | intec | ACTED | European University Institute | Robert Schuman Centre for Advanced Studies | FSR ENERGY Florence School of Regulation

THE GREEN DEAL: NEW OPPORTUNITIES IN NORTHERN EUROPE TILL 2050

States with RES surpluses

States with energy deficits

Energy flows



Due to the relatively small economies, but the high potential of RES, the Baltic states will be among the first in the EU to reach an excess of electricity and export high value-added energy products

A significant energy deficit is planned in Central Europe in 2050
Germany alone will need about 2000-3000 TWh of energy resources per year

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Šaltinis: SEA-LNG

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OFFSHORE WIND DEVELOPMENT

2030 m.

The power of offshore wind farms installed

1,4 GW

2040 m.

The power of offshore wind farms installed

2,8 GW

2050 m.

The power of offshore wind farms installed

4,5 GW

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ONSHORE WIND AND SOLAR DEVELOPMENT

2030 m.	2040 m.	2050 m.
Onshore wind 4,5 GW	Onshore wind 6,5 GW	Onshore wind 10 GW
Solar power plants 4,1 GW	Solar power plants 7 GW	Solar power plants 9 GW

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SOURCES OF FLEXIBILITY OF ELECTRICITY

Kruonis storage power plant

Installation of the 5th flexible unit

Total power – 1,01 GW

Hydrogen production by electrolysis

Production of hydrogen and its products adapting to the peaks of RES

2030 m. – 1,3 GW
2050 m. – 8,5 GW

Battery parks

Developing battery parks

2030 m. – 1,5 GW
2050 m. – 4 GW

Heat generation from electricity (P2H)

The exploitation of cheap electricity in DH systems

2030 m. – 230 MW
2050 m. – 1118 MW

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FUNDS NEEDED FOR NECP

Sector	Additional FUNDS, EUR million.	
	TOTAL INVESTMENT	PUBLIC FUNDS
RES	3237,40	1047,40
Energy efficiency	6774,93	2038,82
Internal market	122,00	2,00
Energy security	0,00	0,00
R&I	76,30	39,70
TOTAL (mln)	10208,63	3126,92

According to preliminary estimates, a total of EUR 31.05 billion will be allocated to the implementation of the NECPs' measures. Eur (private and public funds).
The energy tranche measures amount to EUR 18.47 billion. or 59% of the total investment.

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PROJECTS ONGOING

BUDGET: 76,207 mln. EUR, RRF

TARGET: 170,38 MW of additional electricity generation capacity

IMPLEMENTATION PERIOD: 2023-Q1 2026

APPLICANTS: Companies, Farmers, Renewable energy communities, Citizens' energy communities, Legal entities pursuing community status

SUPPORTED ACTIVITIES: installation of solar power plants with a capacity of up to 500 kW (increasing the capacity of existing

ESTABLISHMENT OF EV PRIVATE CHARGING POINTS

BUDGET- 44,9 mln. EUR, RRF

TARGET – 53 200 charging points in households, near multiapartment residential buildings, on poles of lighting networks and in workplaces

IMPLEMENTATION PERIOD: 2022-2026

APPLICANTS – private and legal persons

INSTALLATION OF ELECTRICITY STORAGE CAPACITY POWERED BY RES:

BUDGET: 4,6 mln. EUR, RRF

TARGET: 15,2 MWh storage capacity

IMPLEMENTATION PERIOD: 2023-2026

APPLICANTS: Companies, Farmers, Renewable energy communities, Citizens' energy communities, Legal entities pursuing community status

REPLACING INEFFICIENT BIOFUEL OR FOSSIL FUEL BOILERS BY MORE EFFICIENT HEAT GENERATION TECHNOLOGIES USING RES:

BUDGET: 120,2 mln. EUR, 2021-2027 investment programme

TARGET: 20 504 dwellings with more efficient heat generation technologies, 166,3 MW generation from RES

IMPLEMENTATION PERIOD: 2023-2030

APPLICANTS: households

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NEW GENERATION LITHUANIA

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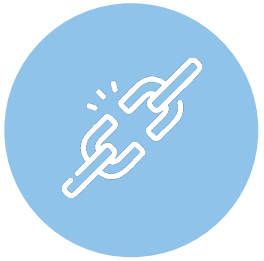
SOCIO-ECONOMIC BENEFITS TILL 2050



Energy independence

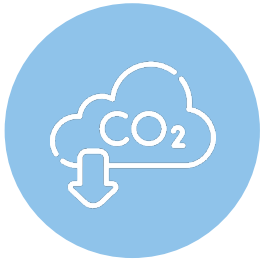
100%

Electricity generation in Lithuania

Energy resources Exports

1.4 TWh

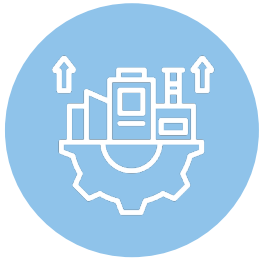
Hydrogen exports



100% decarbonization

0 MT

GHG emissions in the energy sector



Industrial growth

4-11%

GDP growth

44,000-140,000

new jobs

Availability of energy prices

-6,3 BN. EUR

Reduced costs for imports of energy resources

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Šaltinis: Lietuvos energetikos vizijos iki 2050 m. studija

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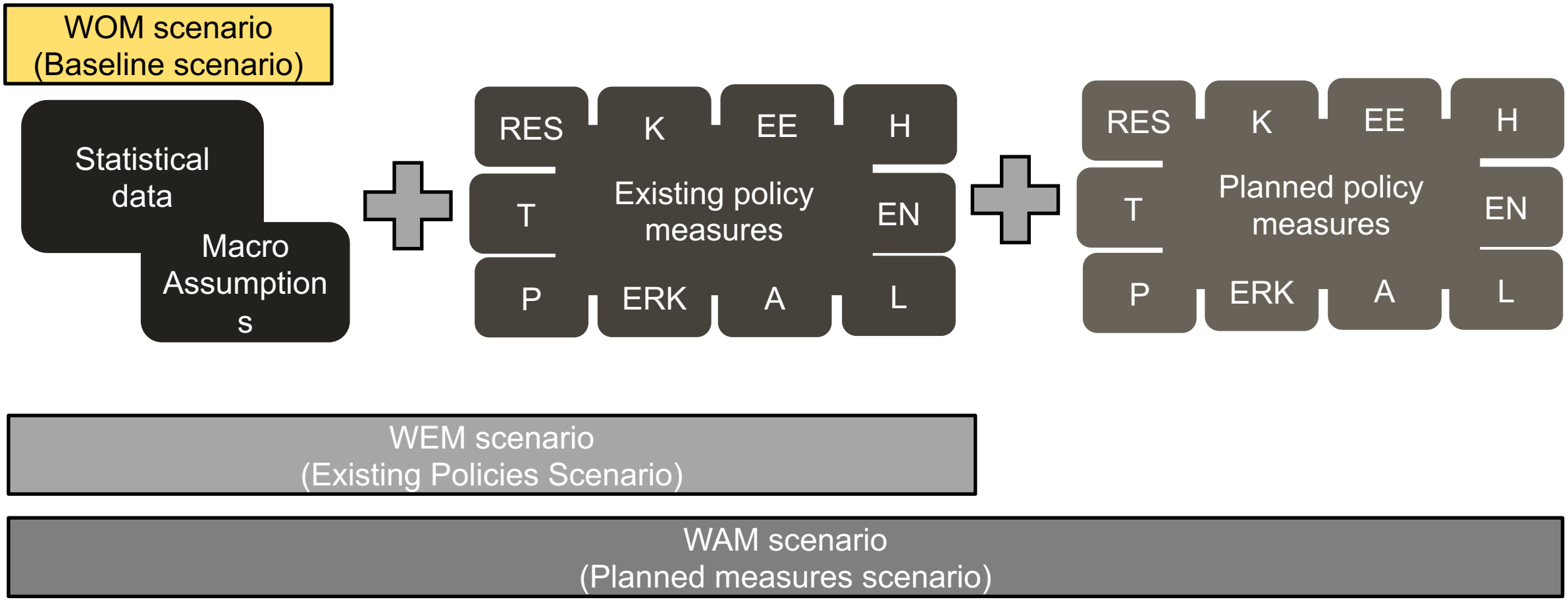
NECP MODELLING PRINCIPLES



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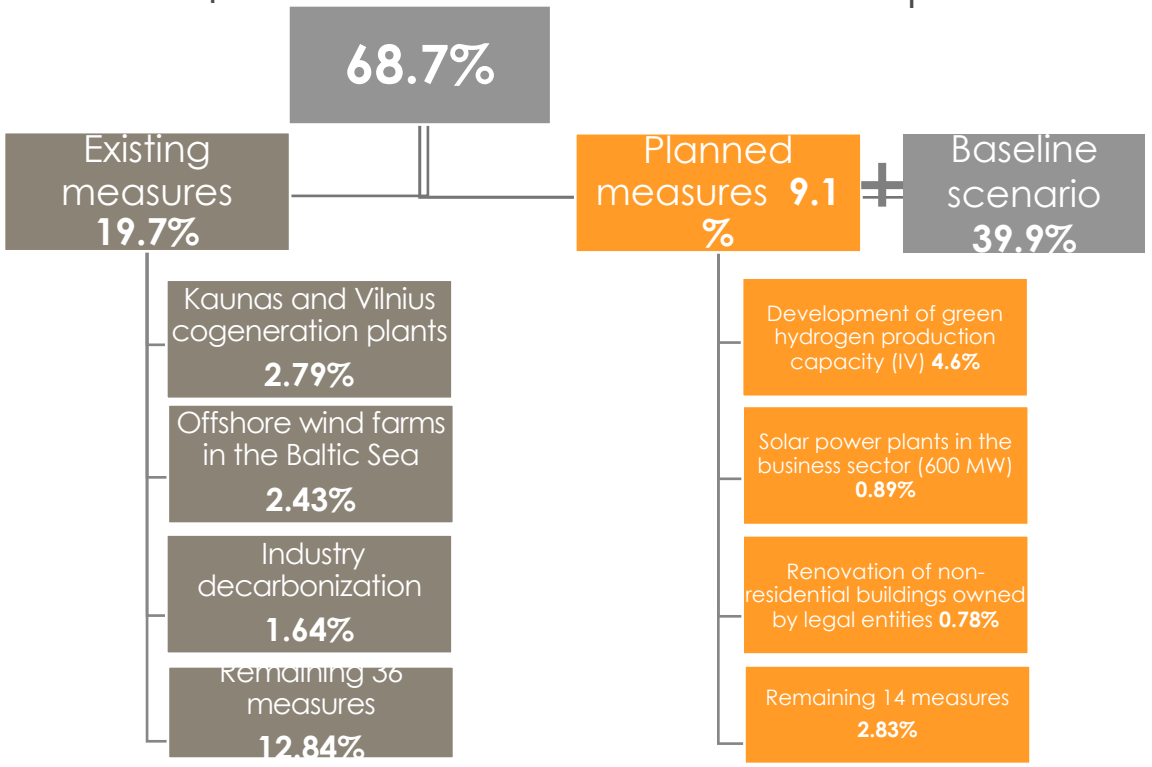
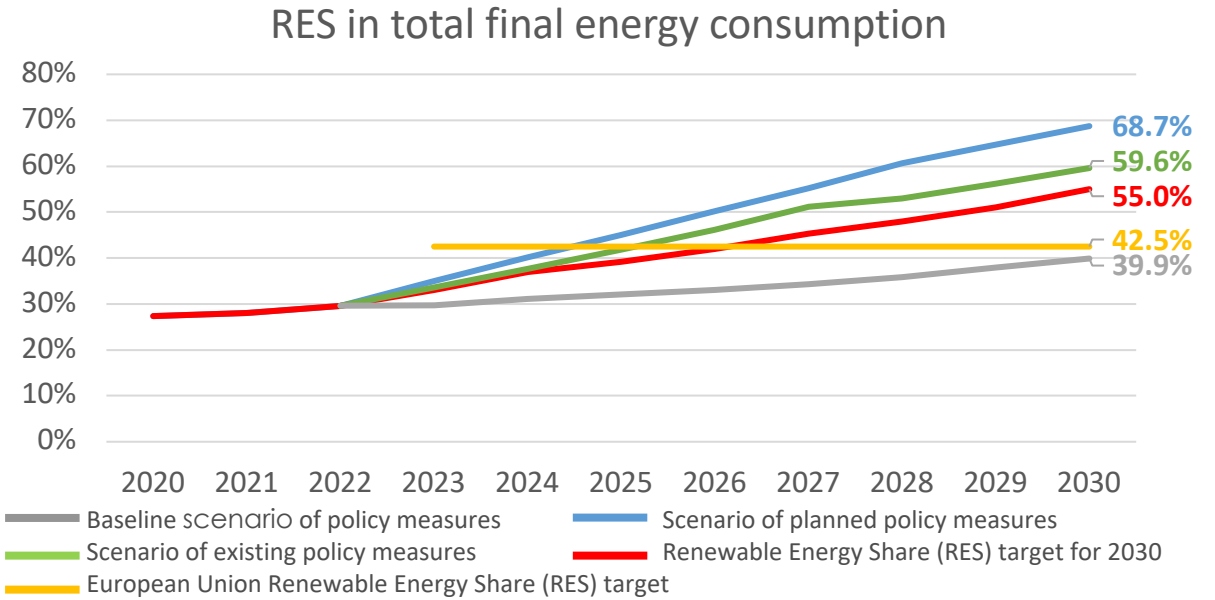
RENEWABLE ENERGY SECTOR (RES)

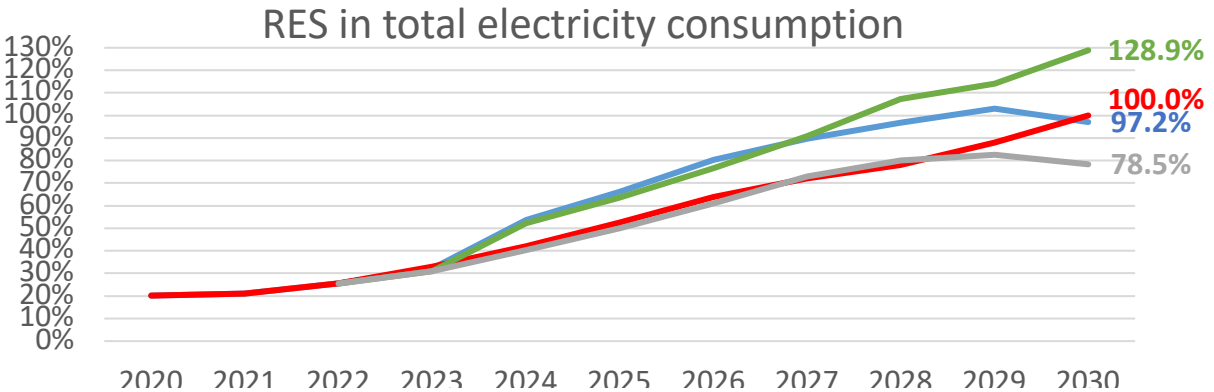
55% **RES TARGETS 2030** **100%**

In total final energy consumption

In total electricity consumption







- **Reaching of the RES target for total electricity consumption depends on the estimated electricity consumption – if it will be at least slightly less than expected – the 100% target will be reached.**

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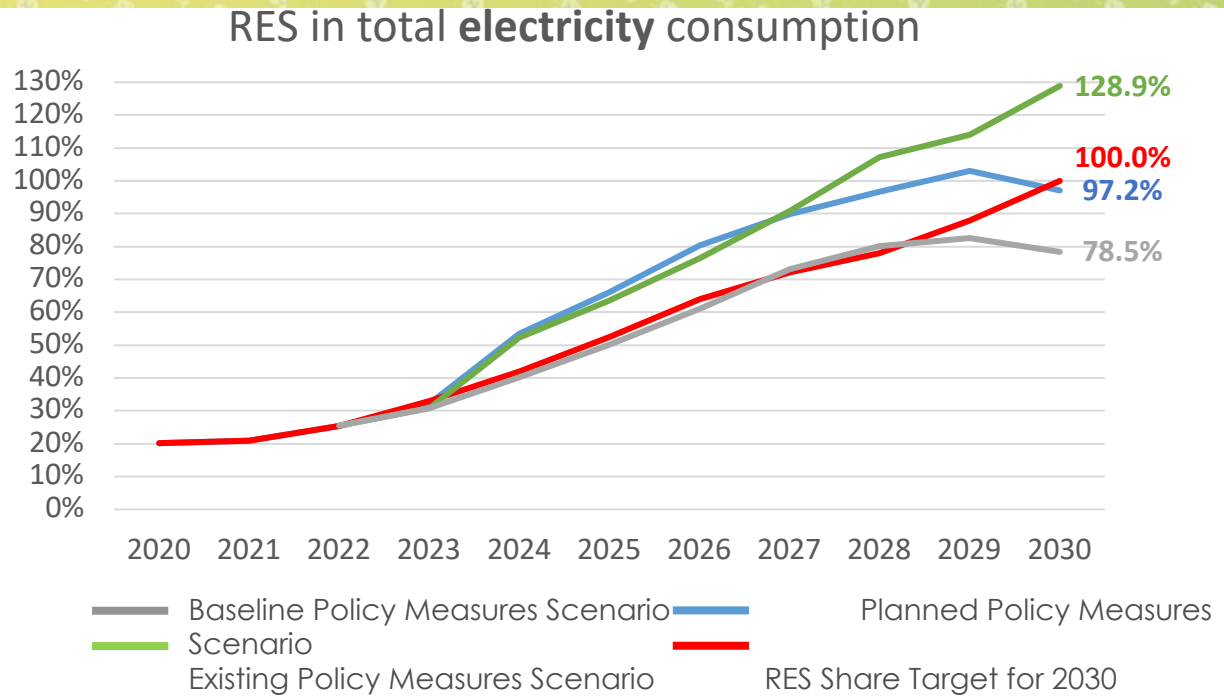
SHARE OF RES IN TOTAL ELECTRICITY CONSUMPTION



	2030
Share of RES:	97.15 %
Total electricity generation from RES	**20.33 TWh**
Normalized hydropower	0.45 TWh
Normalized wind energy	15.12 TWh
Energy from other sources:	4.76 TWh
Biogas power plants	0.16 TWh
Solar power plants	4.02 TWh
Municipal RES waste power plants	0.23 TWh
Biofuel power plants	0.35 TWh
Total electricity consumption	**20.93 TWh**
Difference	**0.6 TWh (596.5 GWh)**

- **Electricity produced in pumped storage hydropower plants is not included in electricity generation from renewable energy sources (RES)**
- **Electricity generated in hydropower and wind power plants is normalized (recalculated by reducing the impact of climatic conditions). The amount of electricity produced is approximately 15% lower**
- **Lower overall electricity consumption would increase the percentage share of RES**
- **By 2030, hydrogen production will be the largest electricity consumer in the Planned Policy Measures (PPM) scenario. In the Existing Policy Measures (EPM) scenario, electricity generation is very similar to the PPM scenario; however, electricity consumption is about 5.2 TWh lower (the majority of hydrogen production is included in the PPM scenario)**

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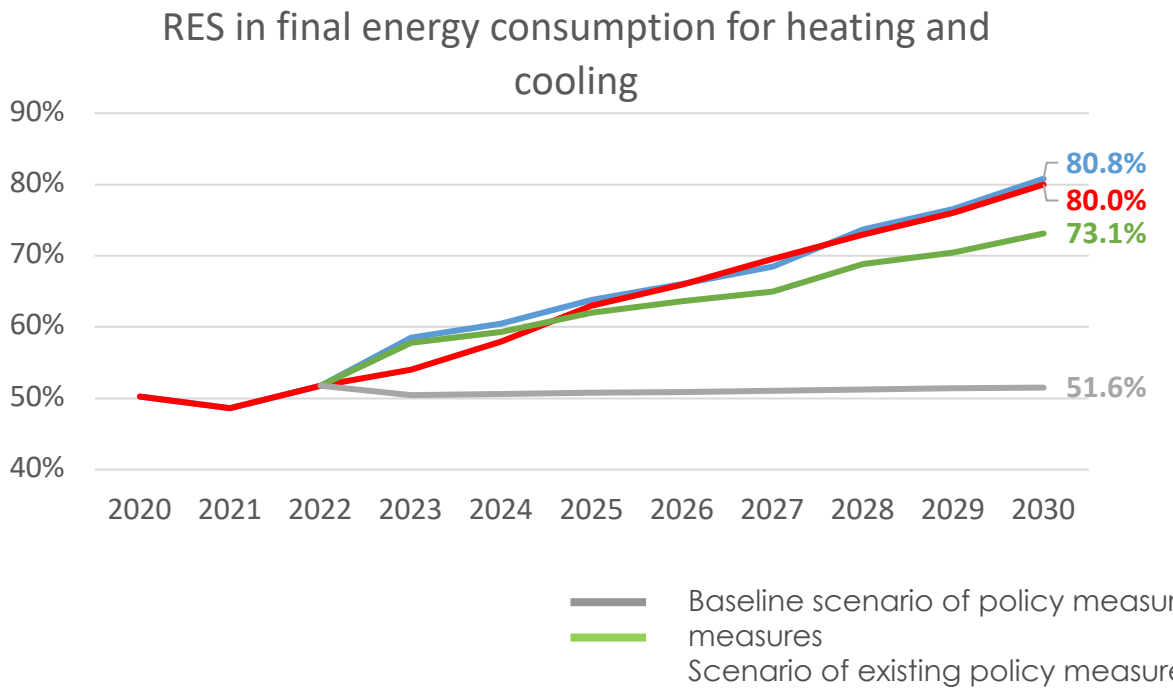
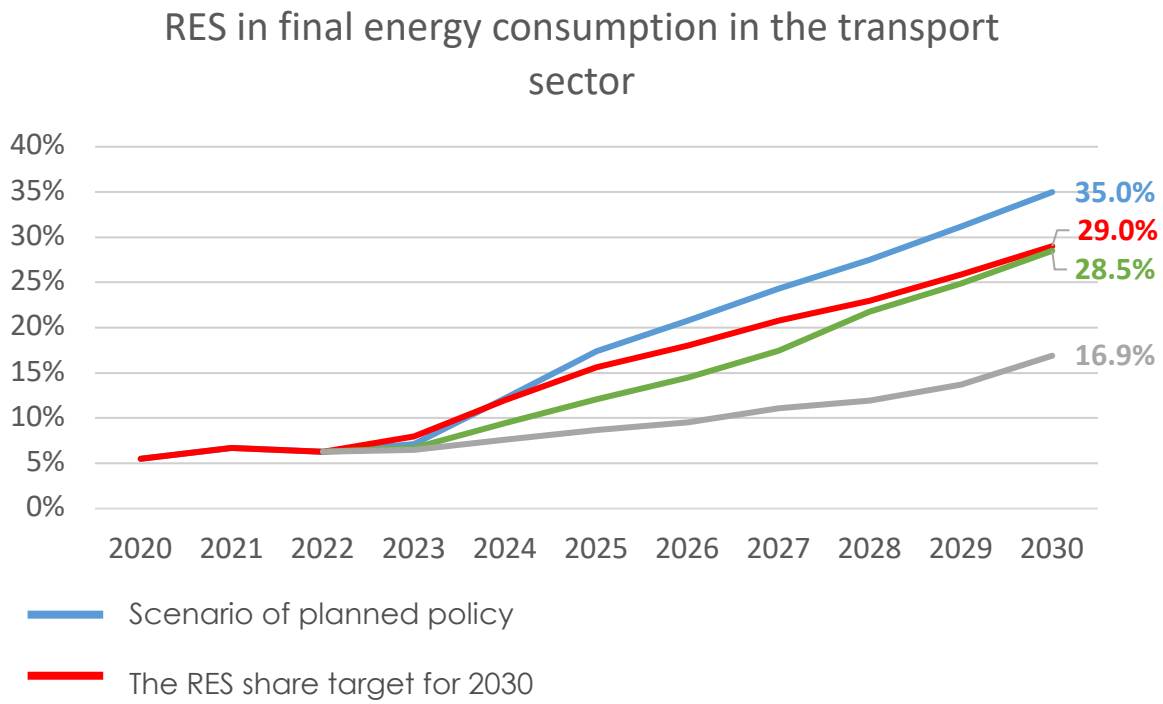
RENEWABLE ENERGY SECTOR (RES) TARGETS 2030

80% of the final energy consumption is used for heating and cooling



29% of the final energy consumption in the transport sector



The 80% RES target in heating and cooling by 2030 will be achieved with existing and planned policy measures

The 29% RES target in transport by 2030 will be achieved (calculated with multipliers applied to alternative and advanced biofuels)

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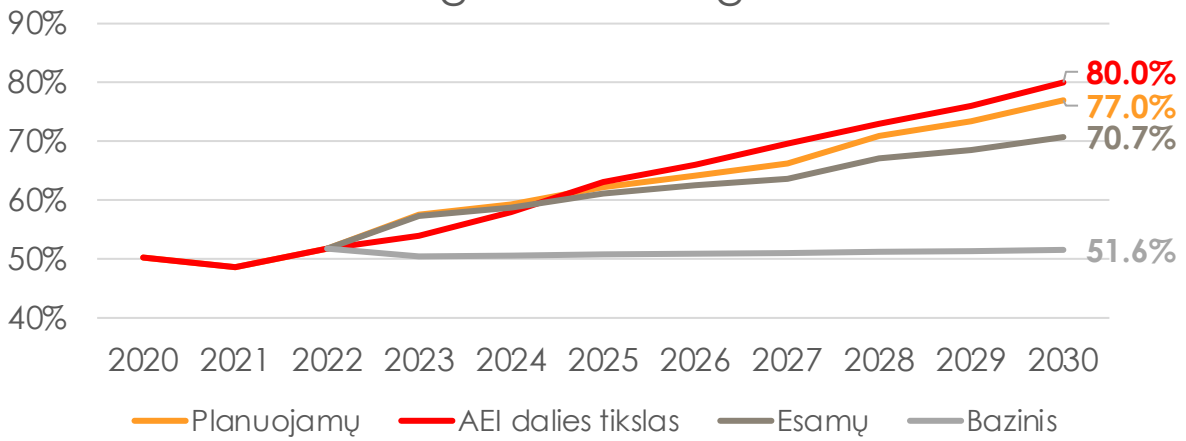
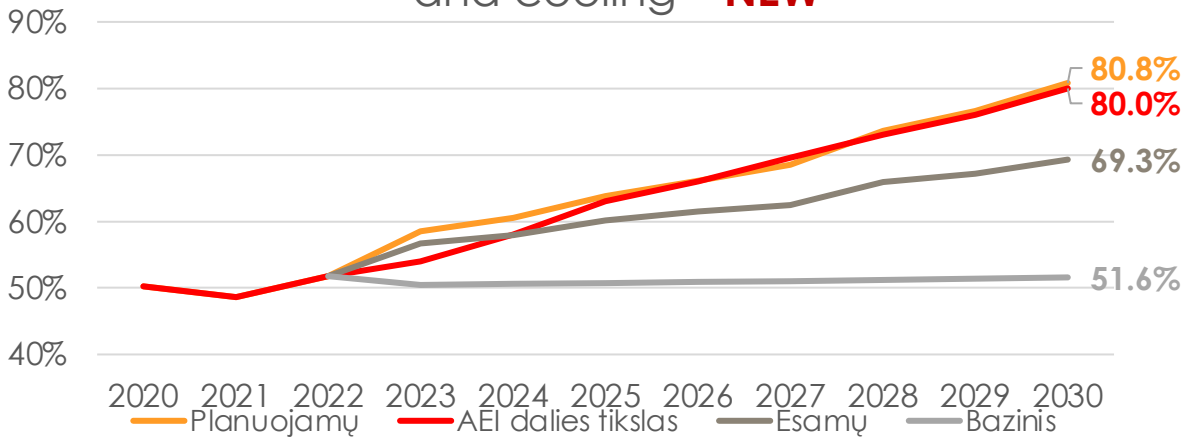
PRACTICAL EXAMPLE -RES TARGET IN HEATING AND COOLING BY 2030

RES in final energy consumption for heating and cooling – **OLD**



RES in final energy consumption for heating and cooling – **NEW**



	OLD SCENARIO	NEW SCENARIO	
RES	77,0 %	**80,8 %**	
The amount of ambient heat produced in 2030	3,19 TWh	**4,27 TWh**	**Difference +1,08 TWh**
Number of heat pumps to be installed annually		**+2 270 vnt. kasmet**	**Total +11,305 new heat pumps from 2025 to 2030.**
The average power of the heat pump	**11,74 kW**	According to the data on the support administered by the AGENCY	
The average cost of a heat pump	**7 100 EUR**	According to the data on the support administered by the AGENCY	
Funds for additional new heat pumps	TOTAL **80 265 500 EUR**	**Public investment (50% intensity) 40 132 750 EUR**	**Private funds 40 132 750 EUR**

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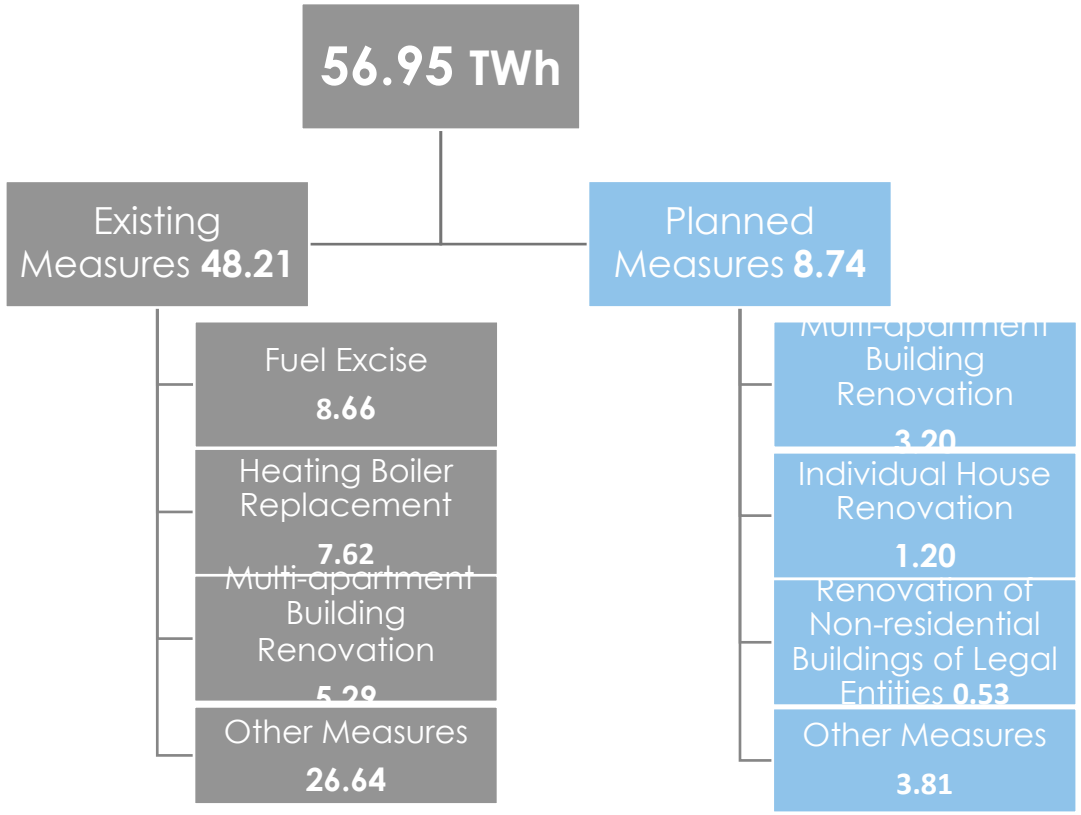
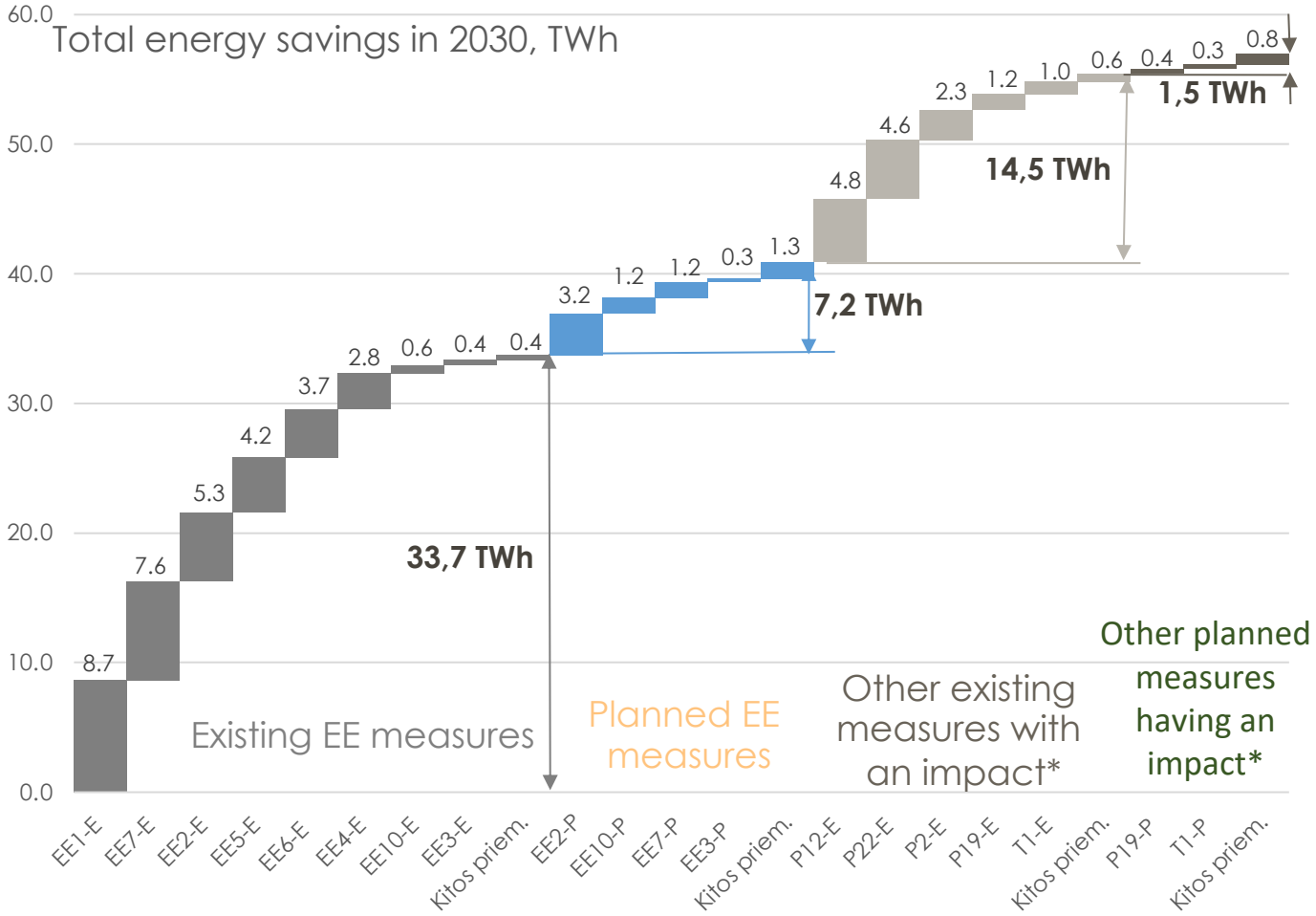
ENERGY EFFICIENCY (EE) SECTOR

The target for the total energy saved by 2030 – 39.35 TWh, will be achieved





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- Measures in the transport and industrial sectors that impact energy efficiency

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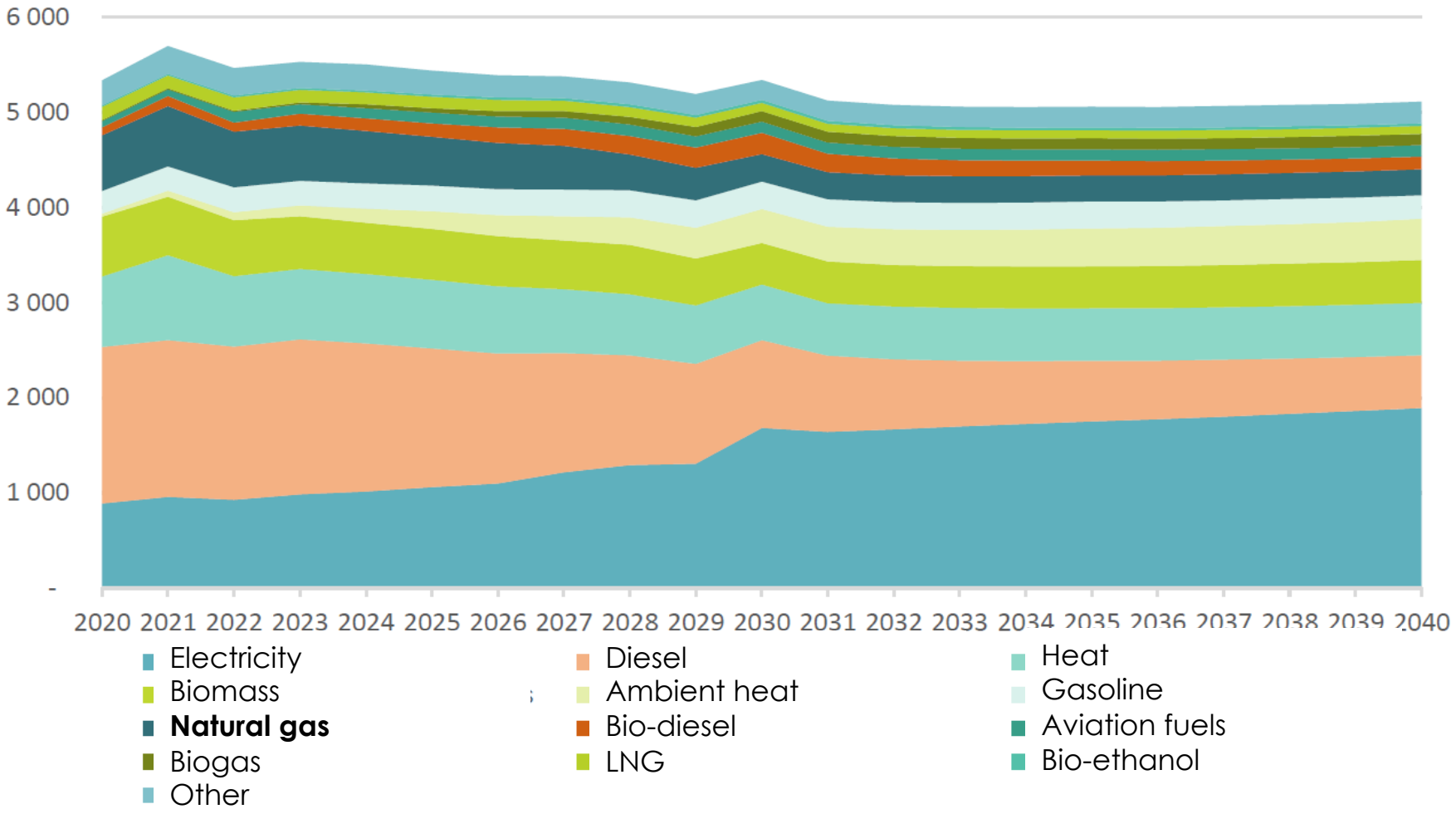
MODELING RESULTS FOR FINAL ENERGY CONSUMPTION IN 2030



Natural gas final consumption will decrease from 583 ktoe in 2020 to 286 in 2030 decrease of about 50%

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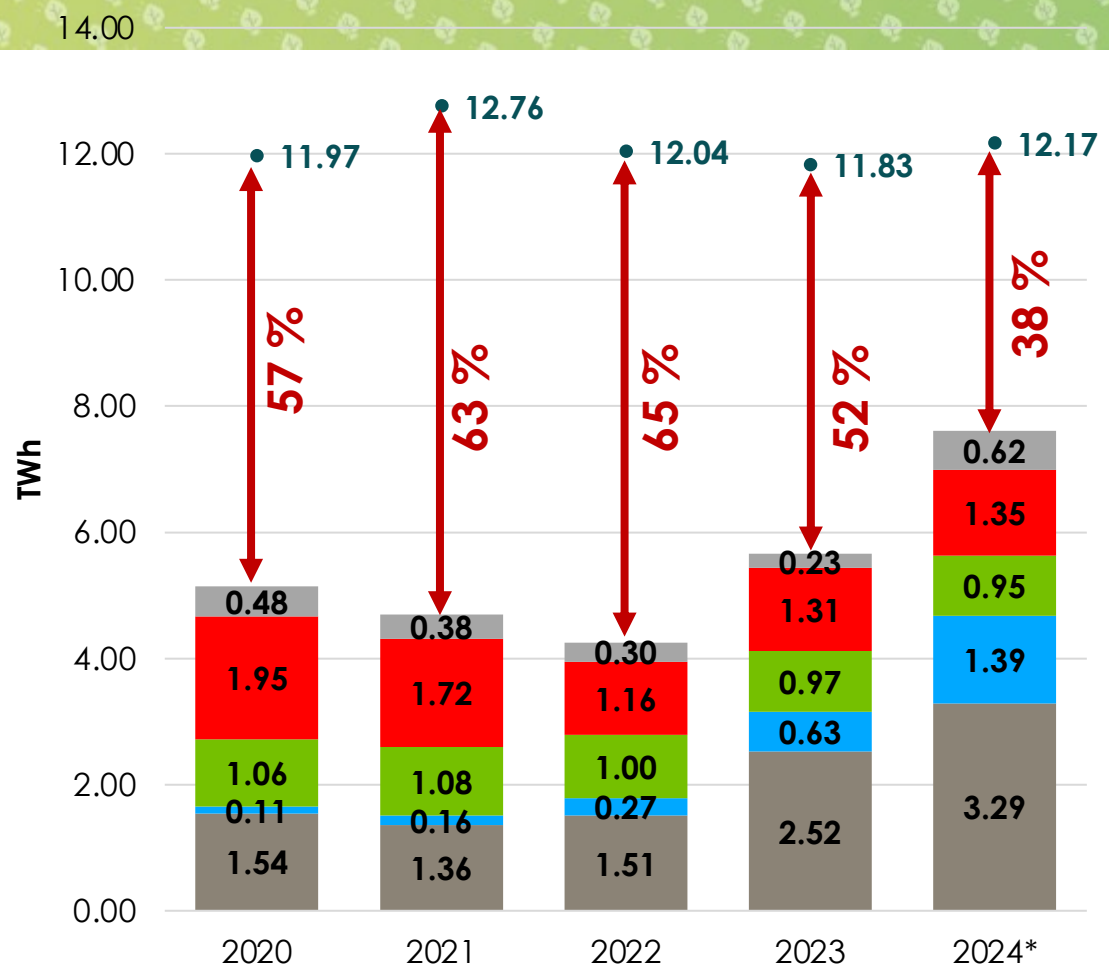
MODELING RESULTS FOR FINAL ENERGY CONSUMPTION IN 2030, KTOE

	2020	2021	2022	2023	2024	2025	2030	2035	2040
Total	5 340	5 699	5 467	5 534	5 504	5 440	5 342	5 063	5 115
Electricity	891	959	930	985	1 017	1 062	1 686	1 754	1 893
Diesel	1 647	1 647	1 610	1 631	1 558	1 461	922	637	555
Heat	737	893	741	741	729	719	583	551	551
Biomass	633	617	588	554	539	537	437	442	452
Ambient heat	30	63	84	115	147	185	360	395	432
Gasoline	238	255	263	258	265	270	288	285	250
Natural gas	583	633	582	582	550	514	286	276	272
Bio-diesel	87	106	98	125	132	141	224	155	134
Aviation fuels	64	71	112	96	107	111	119	119	119
Biogas	9	11	11	21	41	49	112	116	120
LNG	142	134	143	133	127	121	87	86	84
Bio-ethanol	16	17	20	19	19	20	29	29	26
Other	263	293	287	274	272	252	209	218	228
Heating gas-oils	105	108	105	98	99	98	80	76	71
Coal	133	159	157	152	149	114	68	66	65
Waste	2	3	4	4	4	19	33	33	33
Hydrogen	-	-	-	-	1	2	15	16	17
Peat	15	17	21	19	18	17	12	21	30

NATIONAL GENERATION AND TOTAL CONSUMPTION OF ELECTRICITY IN 2024



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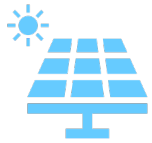
WHAT INFORMATION IS NECESSARY FOR PROJECTIONS

The main information for projections:

What changes will take place?

How much energy will we produce?



Who will be the consumers of energy?

How much energy will we consume?

Do/how much money do we have for this?

Key information on specific measures – what will be the cause of the changes?:

What is the aim of the measure?

What are the specific actions/technologies?

What is the volume of measure – how much money / time?

What are the implementation indicators?

Who will carry out the monitoring and how?

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HOW ARE PROJECTIONS MADE?

- Assumptions are being created
- Combining/refining assumptions for measures
- Harmonisation/revision of the definitions of measures
- Description of specific technologies / solutions
- Setting up an accurate budget
- Determining the lifetime/impact of the measure and the specific actions carried out
- The impact of the measure on fuel/energy consumption/GHG emissions/waste generation is assessed...
- Calculation of the impact on the achievement of RES, EE and other objectives
- The results shall be coordinated with the competent authorities
- The results are included in the strategies, reports ...

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EVALUATION OF MEASURES AND MAIN ISSUES

1

Simple

- Specific objective
- Clear definition of the measure
- Clear actions to be implemented/performed/promoted
- Allocated budget/funding
- There are implemented analogous / close projects / measures
- Easy / easy to calculate
- Ongoing/scheduled active monitoring
- competent institution

2

Complex

- A few goals
- Complex/ incomplete definition of the tool
- There may be many actions that are being implemented/performed/promoted
- Volatile budget / financing (different var.)
- Many assumptions that reduce reliability
- Few/no examples, peer review/directories
- Intricately calculated
- Insufficient/no monitoring
- insufficient competence and experience of institution

3

Difficult

- Very large and wide purpose
- There is no clear idea of what the measure will support or encourage?
- Budget/funding not clear
- Only assumptions that are extremely difficult to rely on
- New assessment methods need to be developed ...
- Institution with no experience

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THANK YOU!

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