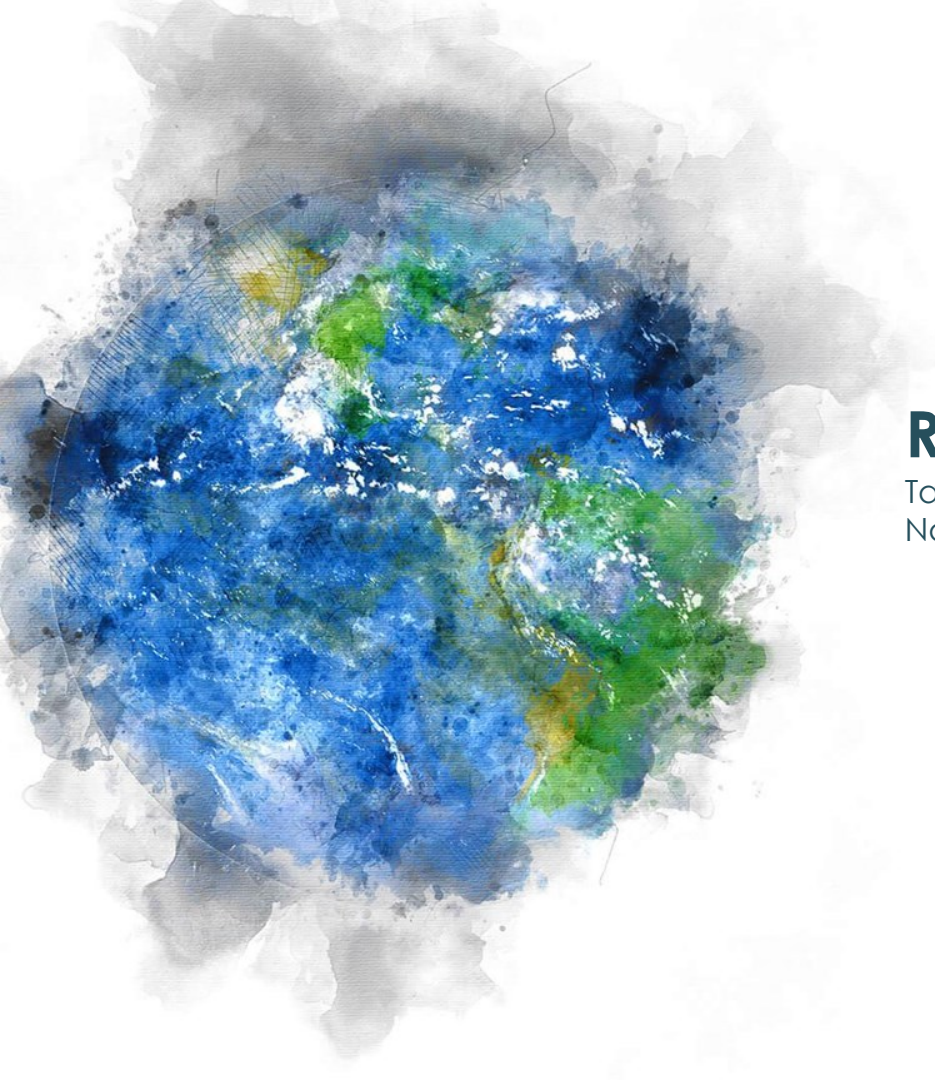

ΚΑΠΕ CRES | CENTRE FOR RENEWABLE ENERGY SOURCES AND SAVING

RES in Greece

Targets in 2020 and 2030
National Energy & Climate Plan (NECP) of Greece

Effie KORMA
Head, Market Development DPT
Division of Energy Policy & Planning

The **Centre for Renewable Energy Sources and Saving (CRES)** is the Greek national centre for Renewable Energy Sources (RES), Rational Use of Energy (RUE) and Energy Saving (ES)

Its main goal is the promotion of RES/RUE/ES applications at a national and international level, as well as the support of related activities taking into consideration the environmental impacts, in the energy supply and use

Identity of CRES: Two directions

National Energy Centre
In support of :

- Policies Formulation
- Investment programmes management
- Energy planning
- Dissemination

Energy Research Centre
Applied Research regarding :

- New and Renewable Energy Technologies
- Energy Efficiency Technologies

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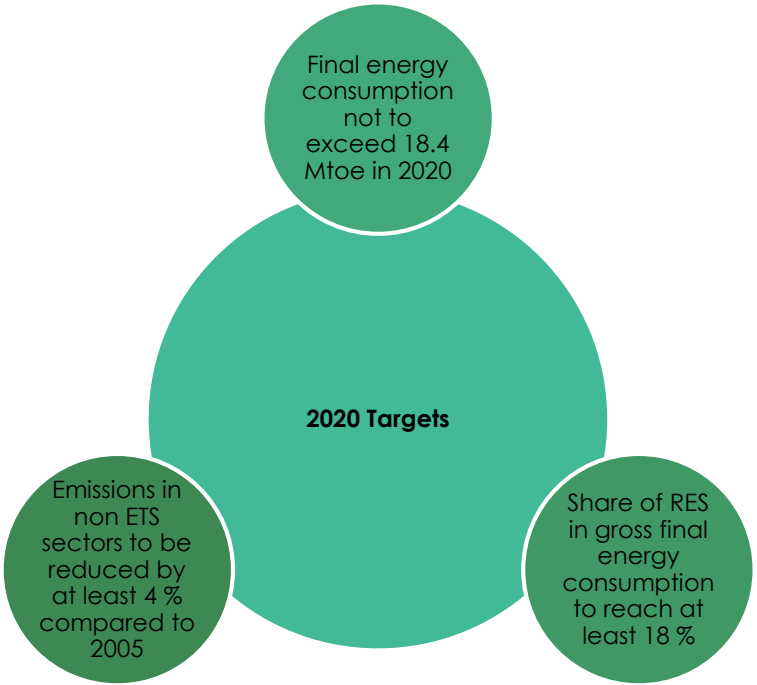
Main objectives of Greek National Energy and Climate Plan (NECP)

- Achieve specific environmental and energy targets at national level
- Enhance security of energy supply
- Improve the competitiveness of the Greek economy
- Protect the energy consumer and strength their role in the energy system
- Operate a competitive domestic energy market
- Increase domestic added value in the energy sector and create new jobs

2020 and draft 2030 environmental and energy targets



Reducing greenhouse gas emissions and environmental objectives in 2030

- Emissions in non ETS sectors to be reduced by at least 16 % compared to 2005 and not to exceed 54 Mt CO 2 eq
- Emissions in ETS sectors to be reduced by at least 43 % compared to 2005 and not to exceed 41 Mt CO 2 eq
- Attaining quantitative targets for reducing national emissions of specific air pollutants

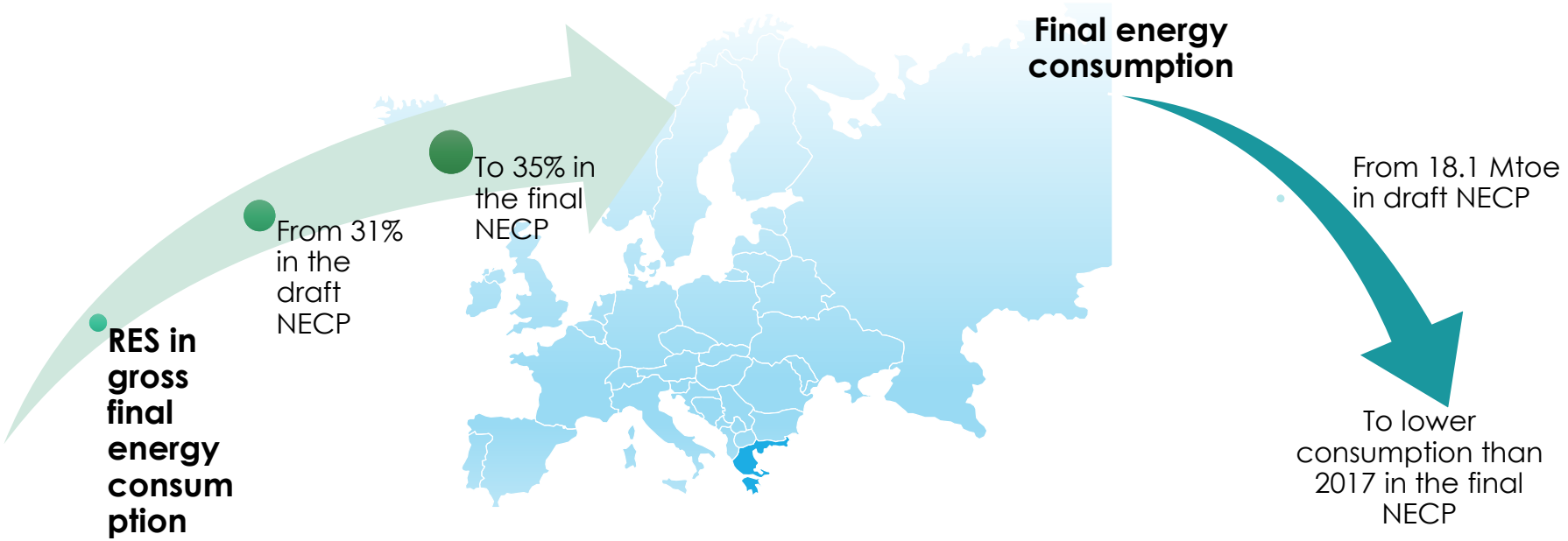
Increasing the share of RES in energy consumption in 2030

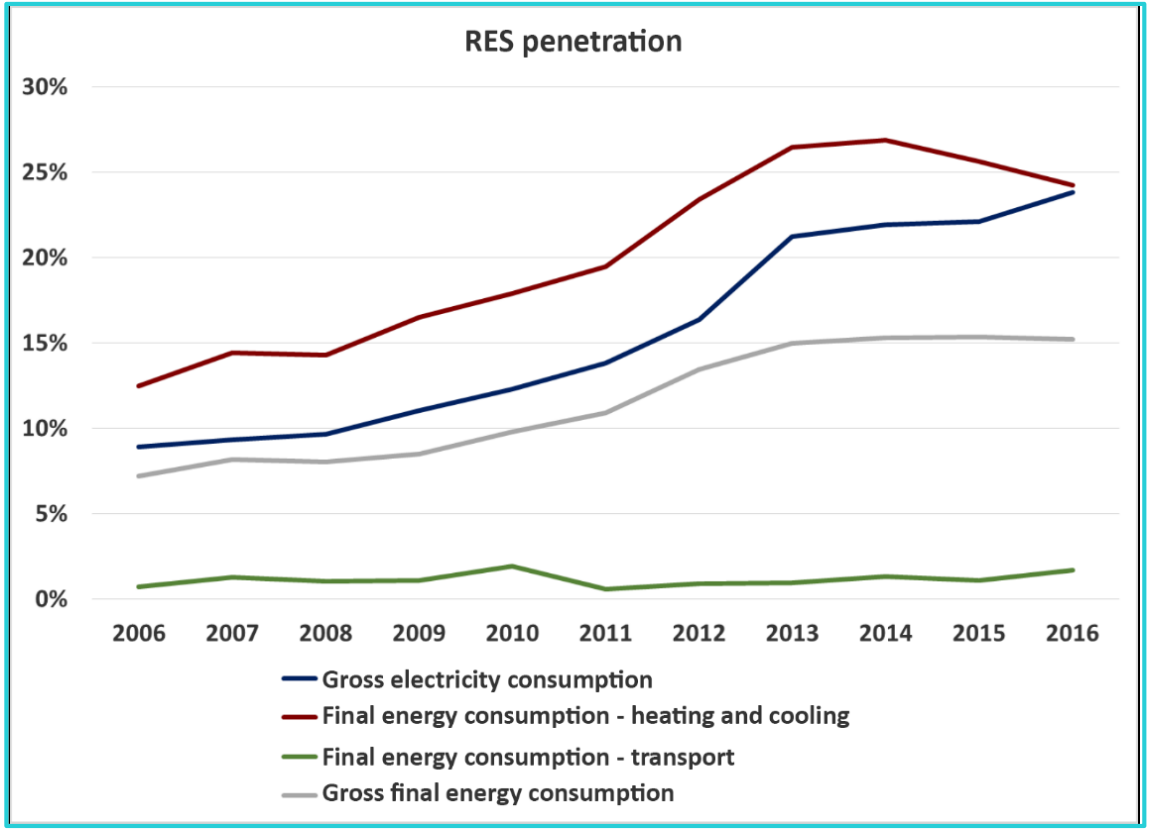
- **Share of RES in gross final energy consumption to reach at least 31%**
- **Share of RES in gross final electricity consumption to reach 56%**
- **Share of RES in covering heating and cooling need to reach 32%**
- **Share of RES in the transport sector to reach 20%, using the relevant EU calculation method**

Achieving energy savings in final consumption in 2030

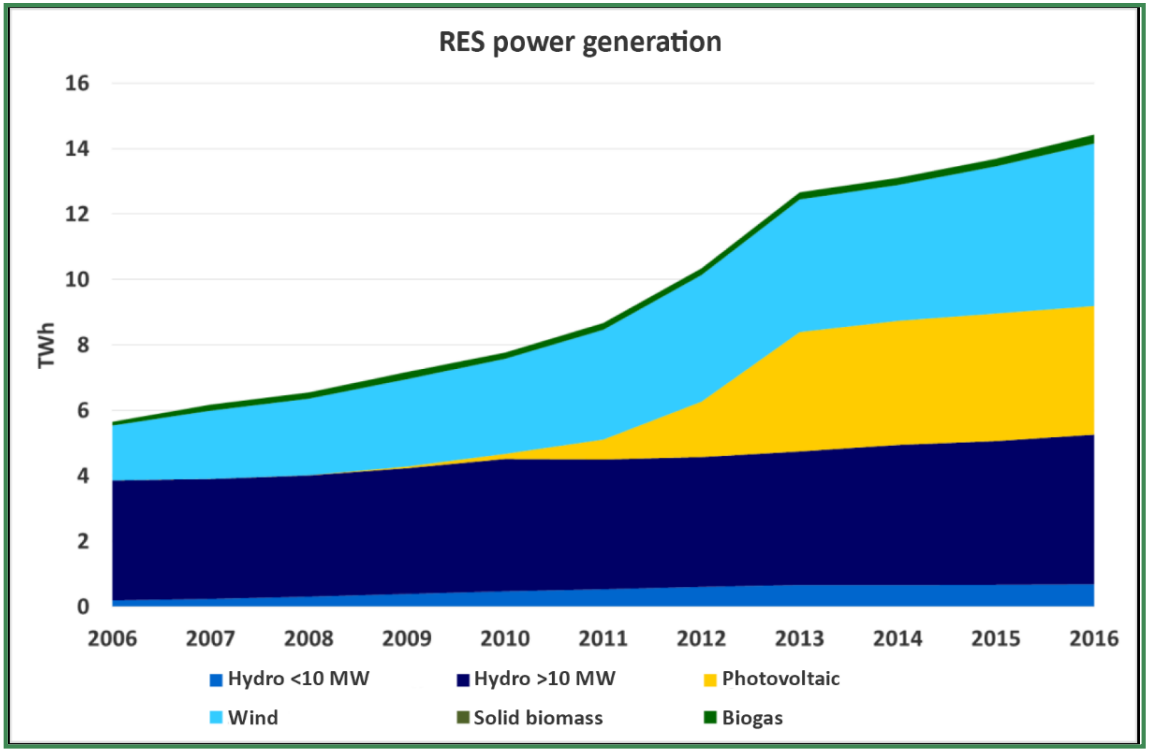
- Final energy consumption not to exceed 18.1 Mtoe in 2030
- Primary energy consumption not to exceed 25 Mtoe in 2030
- Achieving cumulative energy savings of at least 7 Mtoe in the 2021 2030 period
- Energy renovation to cover, on an annual basis, 3 % of the total surface area of the heated parts of central government buildings by 2030

More ambitious targets will be set for 2030 in the final NECP

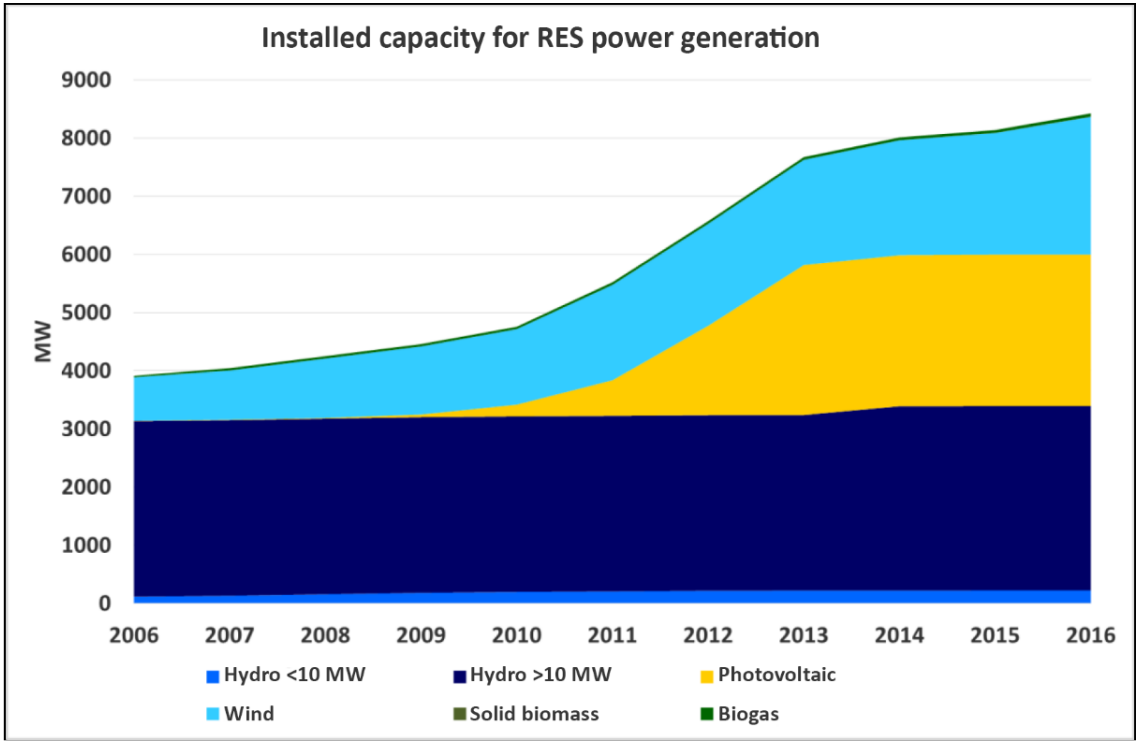




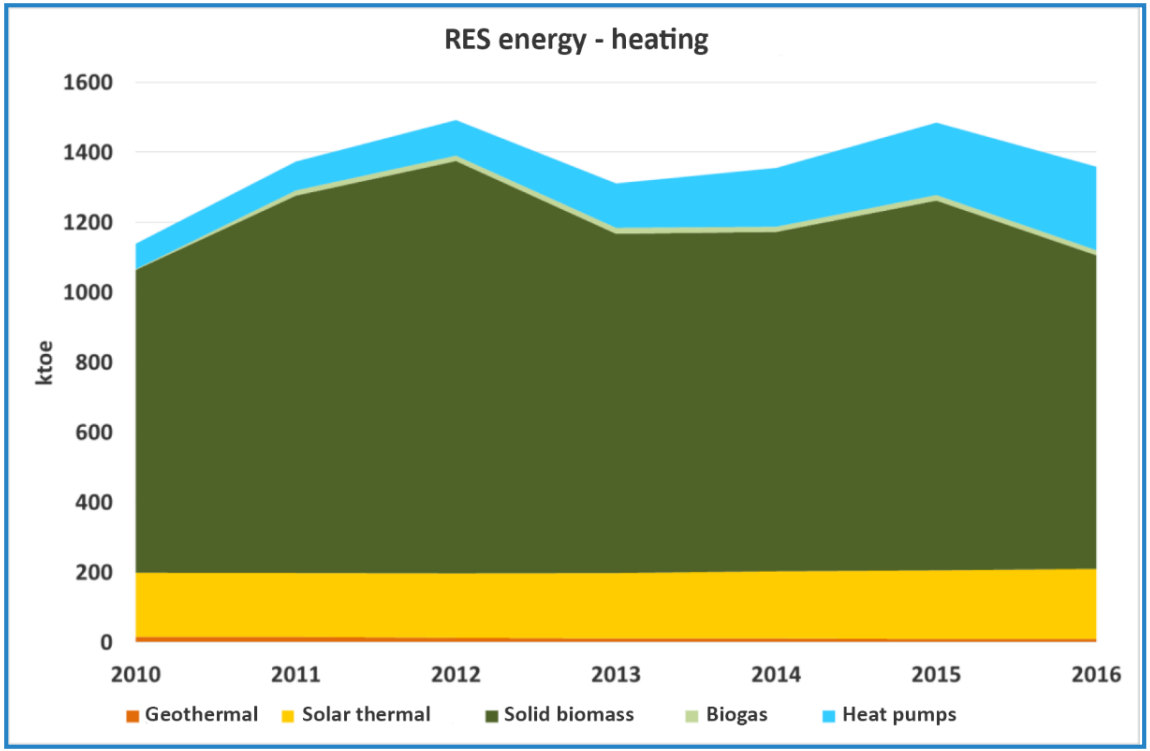
Total and specific RES shares in the domestic energy system on the basis of EU methodology



RES electricity generation in the period 2006-2016



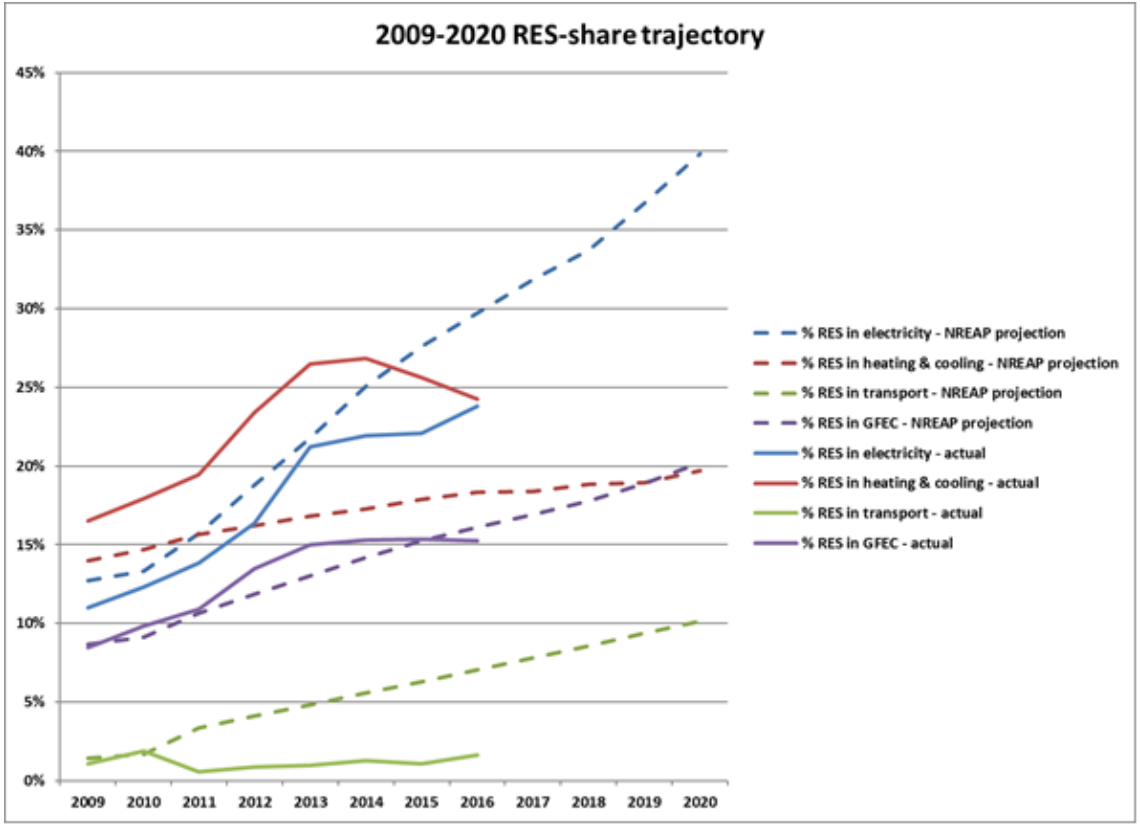
Installed capacity for RES electricity generation in the period 2006-2016.

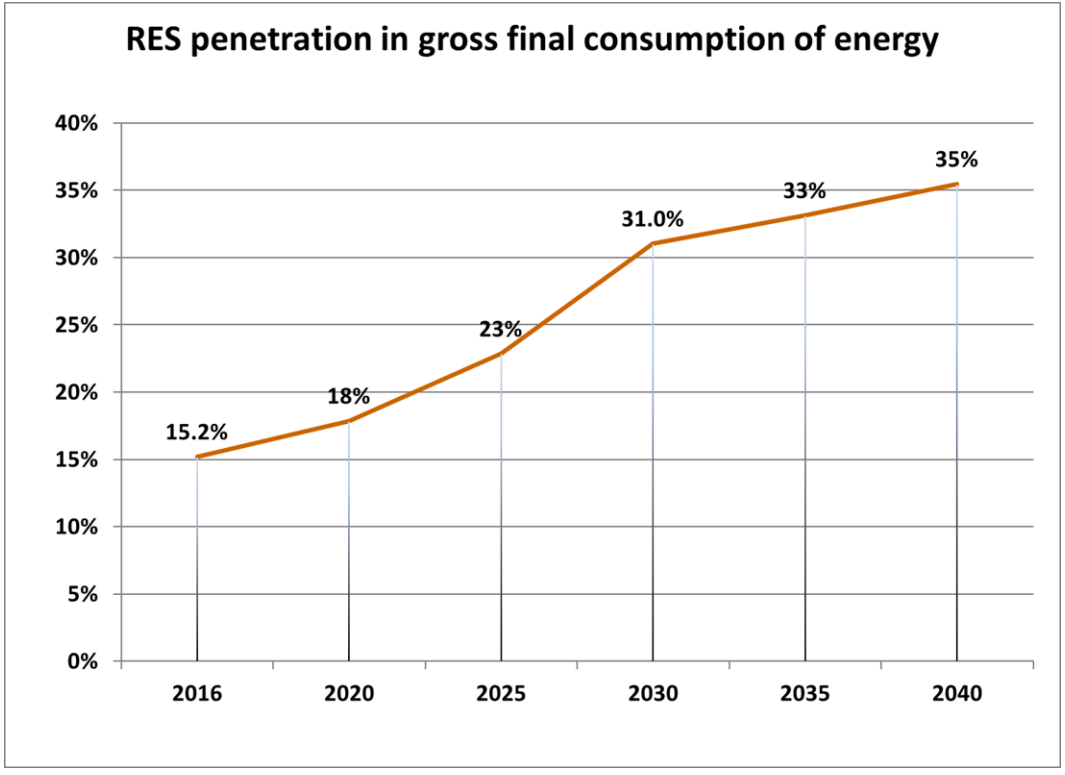


RES thermal energy production in the period 2010-2016
(for space heating& DHW production)

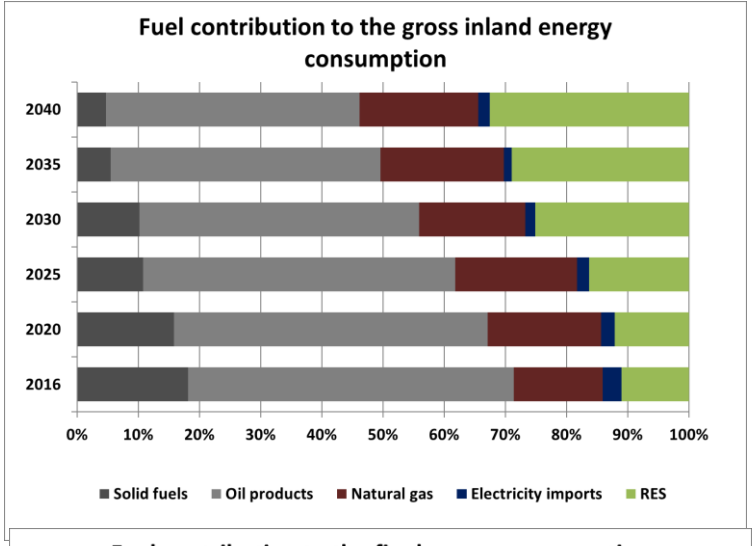
Progress toward the fulfilment of 2020 RES targets

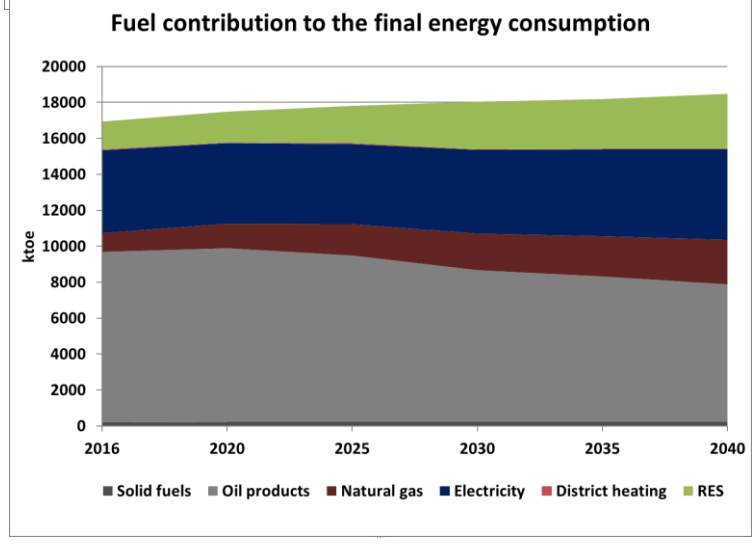
- Achievement of the targets for RES in GFEC and in heating and cooling.
- Satisfactory progress on the target for RES in electricity.
- Deviation from the target for RES in transport.

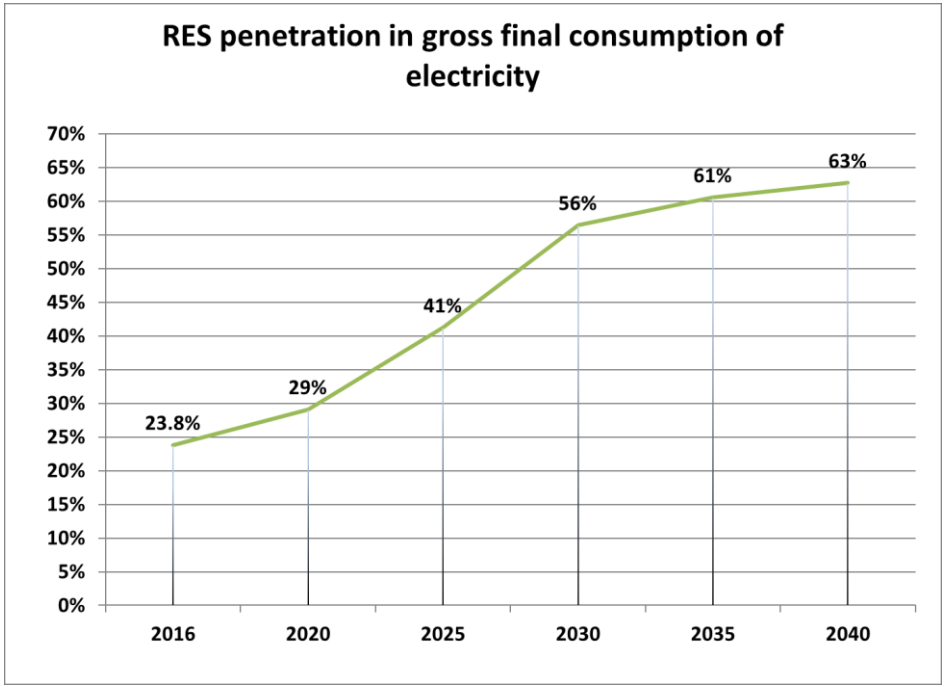


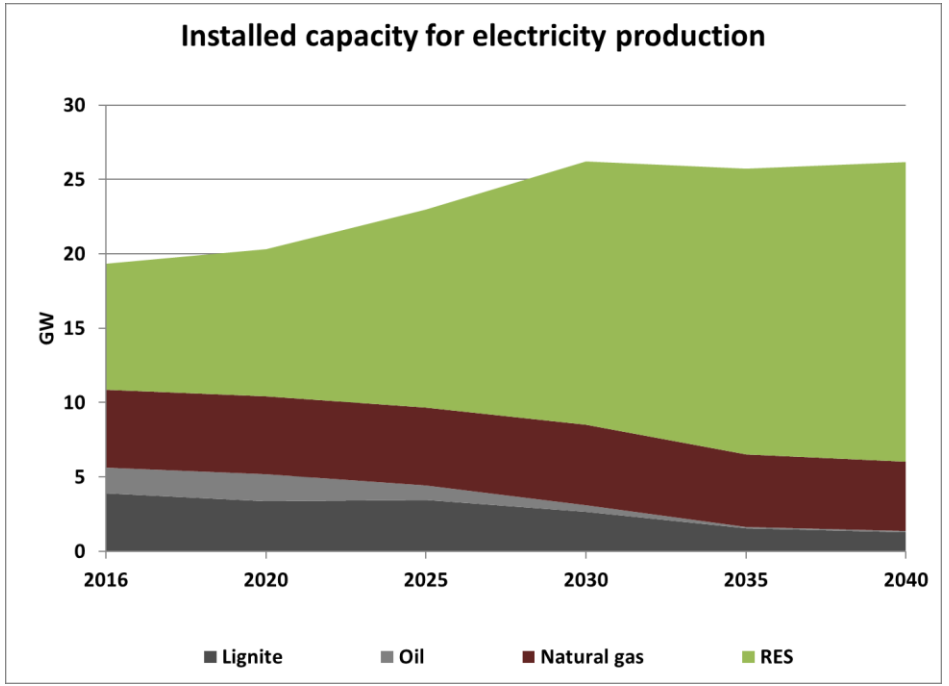


Development of market penetration of RES in gross final consumption of energy until 2040 for the scenario of additional policies and measures

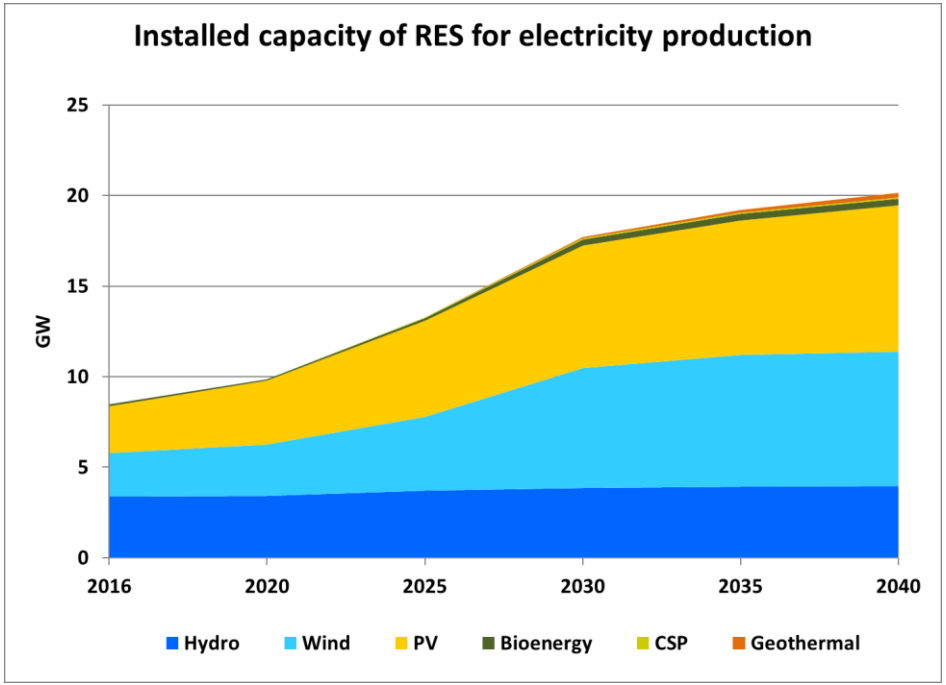


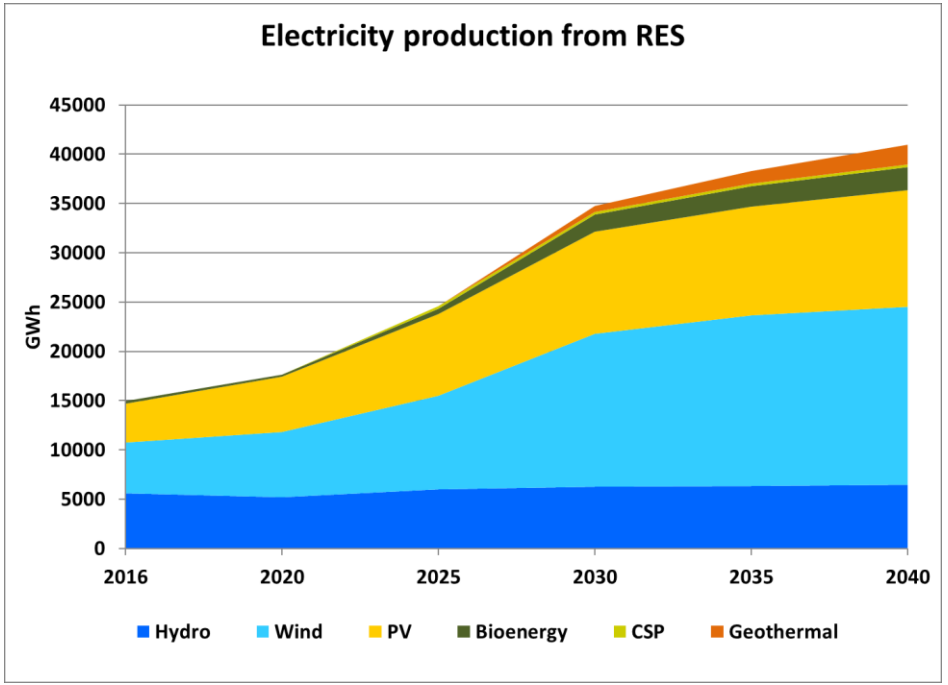


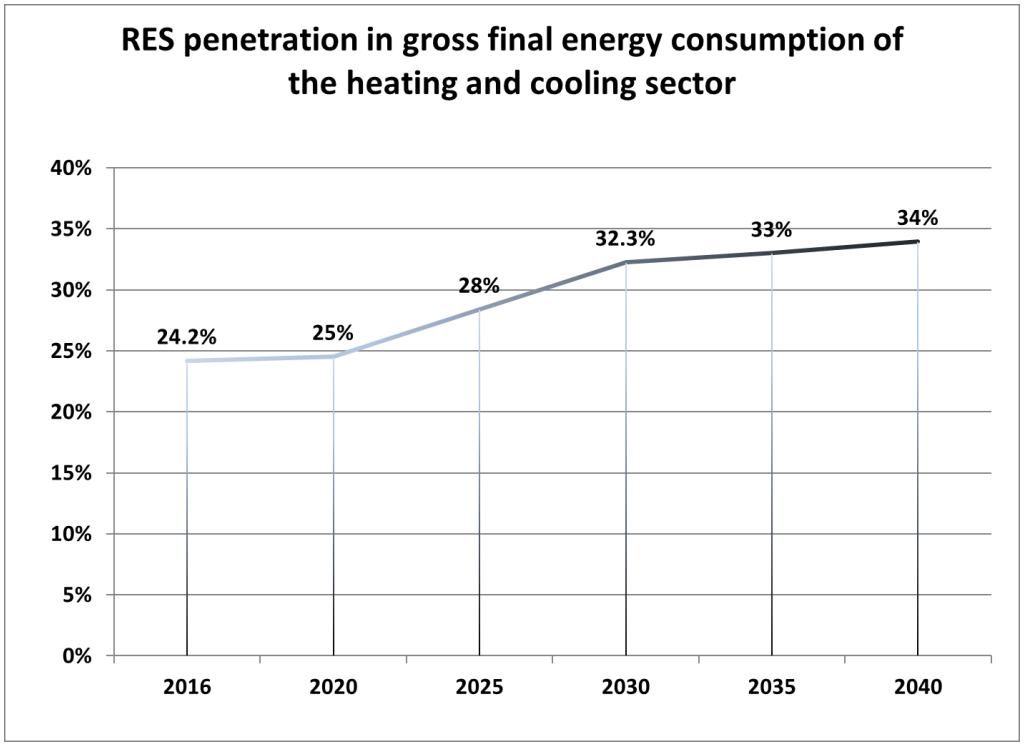


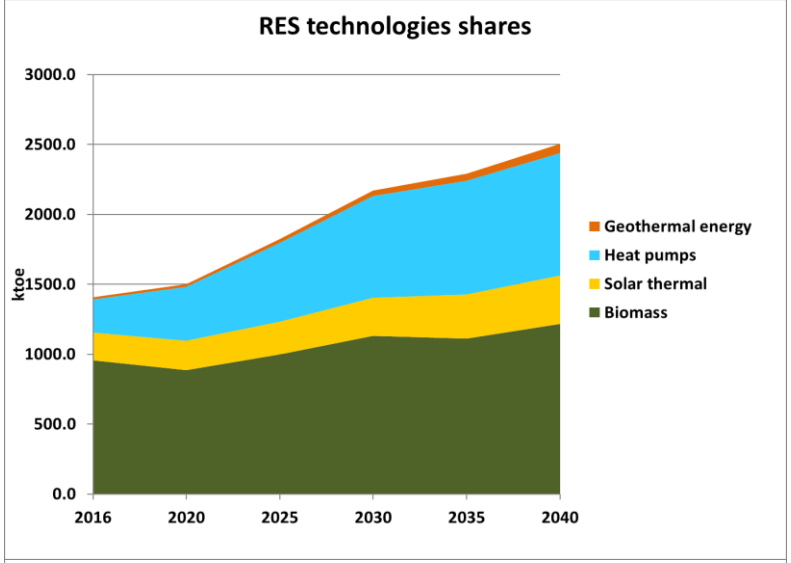


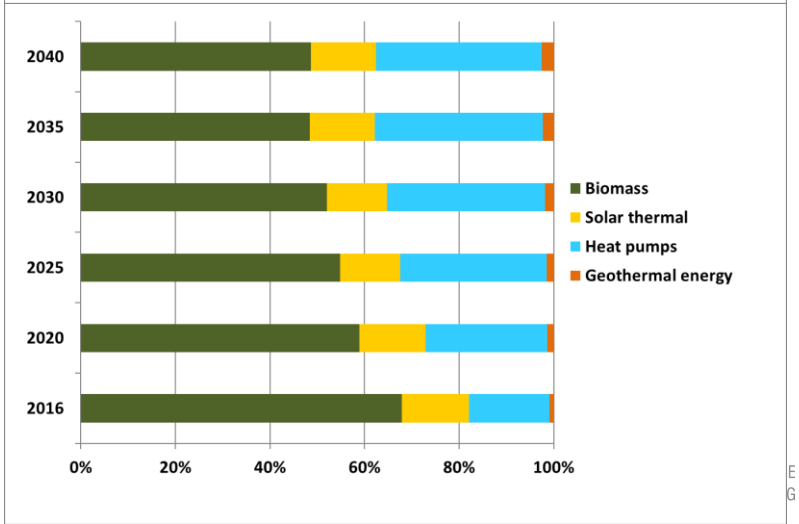
Development of market penetration of RES in gross final consumption of electricity until 2040 for the scenario of additional policies and measures


Installed capacity of RES for electricity production
GW
25
20
15
10
5
0
2016
2020
2025
2030
2035
2040
Hydro
Wind
PV
Bioenergy
CSP
Geothermal

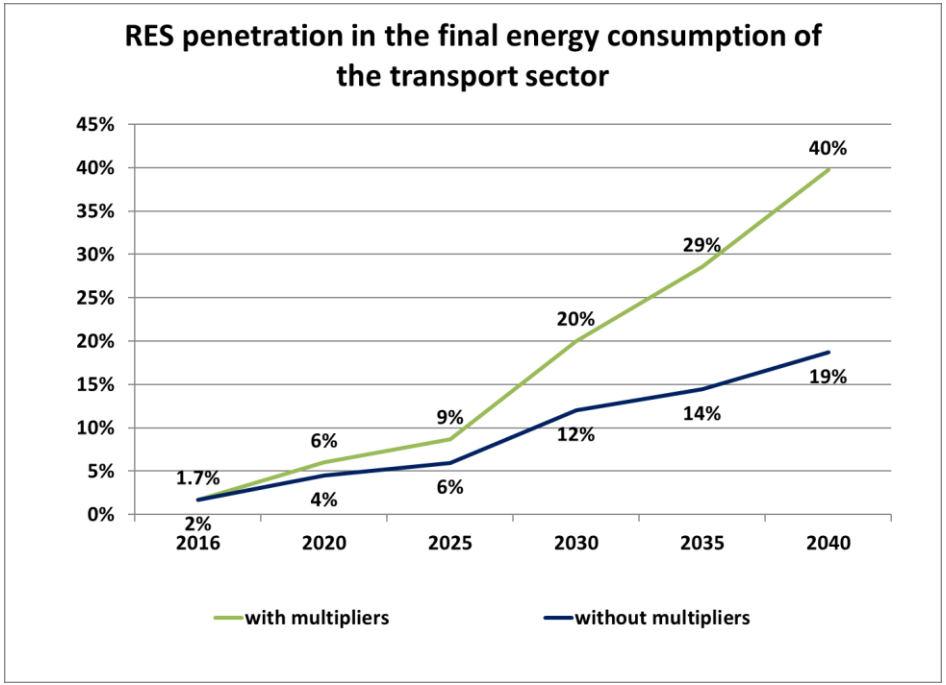

Electricity production from RES
GWh
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2016
2020
2025
2030
2035
2040
Hydro
Wind
PV
Bioenergy
CSP
Geothermal

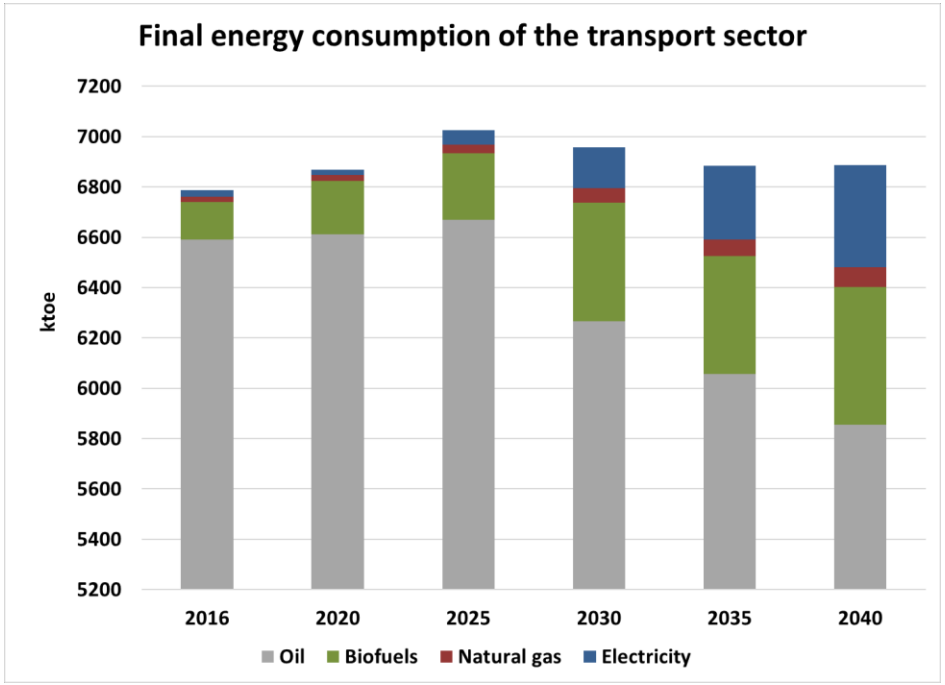






Development of market penetration of RES in the final consumption of energy for heating and cooling until 2040 for the scenario of additional policies and measures.


RES penetration in the final energy consumption of the transport sector
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
2016
2020
2025
2030
2035
2040
1.7%
6%
9%
20%
29%
40%
2%
4%
6%
12%
14%
19%
with multipliers
without multipliers


Final energy consumption of the transport sector
ktoe
7200
7000
6800
6600
6400
6200
6000
5800
5600
5400
5200
2016
2020
2025
2030
2035
2040
Oil
Biofuels
Natural gas
Electricity

Political priorities in RES

Priority I

Promotion of RES technologies for electricity production - Achieving zero operating aid for economically competitive ones

- Competitive procedures for commercially mature RES technologies
- Continuation of a support scheme for new installations of remaining RES technologies
- Supporting innovative and pilot projects with high domestic added value
- Promotion of GoOs

Priority II

Smooth operation of the licensing and spatial framework

- Update, simplify and optimize the licensing framework
- Update, simplify and optimize the spatial framework
- Development of licensing and spatial framework for offshore wind parks and storage units

Priority III

Promotion of decentralised RES systems and empowerment of participatory role of local communities/consumers

- Update and extension of net-metering and virtual net-metering schemes
- Financial support of RES units from energy communities

Political priorities in RES

Priority IV — Optimal integration of RES technologies in energy networks

- Development of the required energy infrastructure
- Forecast the optimal exploitation of RES potential
- Promotion of demand management units
- Development and optimization of licensing framework as well as technical specifications for district heating from RES, biogas injection into the natural gas network, exploitation of geothermal fields

Priority V — Minimum RES obligations in the building sector

- Adoption of new energy efficiency regulation of buildings
- Promotion of RES in public buildings

Priority VI — Fostering RES systems for heating and cooling

- Adoption of financial and tax incentives and regulatory provisions
- Synergies with the Energy Efficiency Obligation Scheme
- Development of supply chains for residual biomass/biodegradable material

Political priorities in RES

Priority VII

Conjugation of energy sectors to enhance the optimal penetration of RES

- Exploitation of excess heat for heating / cooling and transport
- Demand response framework
- Pilot actions / Smart cities

Priorities VIII-IX

Promotion of biofuels, electricity and other RES fuels in transport sector

- Regulatory framework for blending biofuels and the use of biofuels
- Biofuels support scheme and special financing tools for the production of advanced biofuels
- Regulatory framework for the promotion of biofuels in specific sectors including inland navigation and air transport
- Development of electricity charging infrastructure
- Financial instruments for the promotion of electric vehicles
- Pilot actions for the use of biomethane in transport sector

RES technologies

RES technology	Prospects
PV systems	▪ Grid integration issues due to solar output variability ▪ Storage coupled with large systems and building self consumption ▪ Smart metering and smart grids
Wind energy	▪ Small wind turbines ▪ Lack of turbine types of class appropriate for high wind profiles ▪ Offshore wind parks
Biogas	▪ CHP plants ▪ Small district heating plants ▪ Biomethane production for injection to NG grid and CNG
Solid biomass	▪ CHP plants ▪ Small district heating plants ▪ Domestic heating ▪ Combustion, and co-combustion with lignite, in PPC units – Gasification
Biofuels	▪ Advanced biofuels
Geothermal power generation	▪ Binary plants ▪ Condensing plants ▪ Enhanced Geothermal Systems

RES technologies

RES technology	Prospects
Geothermal direct uses	▪ Greenhouse heating ▪ Fish farming ▪ District heating
Ground Source Heat Pumps	▪ Closed & open loop systems ▪ High temperature GSHPs
Solar thermal energy	▪ Solar heating ▪ Solar cooling ▪ Large scale plants ▪ Concentrated solar thermal systems for direct steam production in industrial sector ▪ Solar cooling (2-stage chillers)
CSP - Solar thermal energy for power applications	▪ Base-load CSP plants with storage (3-7 hours)

Sources:

1. National Energy and Climate Plan-Greece (draft-January 2019)
2. National Energy & Climate Plan (NECP) of Greece: RES targets in 2020 and 2030, CRES, Dr Ch. Malamatenios, malam@cres.gr , Dr Christos Tourkolias ctourkolias@cres.gr

Thank you for your attention!

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