

# Mapping Renewable Energy Pathways towards 2020

EU ROADMAP



EREC

European Renewable Energy Council

## Who's EREC?

**EREC**, the European Renewable Energy Council, is the umbrella organisation of the major European renewable energy industry, trade and research associations active in the field of photovoltaics, small hydropower, solar thermal, bioenergy, ocean & marine, geothermal, wind energy, and solar thermal electricity. It represents an industry with an annual turnover of more than €70 billion and with more than 550,000 employees. EREC shares its offices with its member associations in the Renewable Energy House in Brussels, a model showcase for integration of energy efficiency and renewable energy technologies in a historic building.

### EREC' members:

- AEBIOM** (European Biomass Association)
- EGEC** (European Geothermal Energy Council)
- EPIA** (European Photovoltaic Industry Association)
- EREF** (European Renewable Energies Federation)
- ESHA** (European Small Hydropower Association)
- ESTELA** (European Solar Thermal Electricity Association)
- ESTIF** (European Solar Thermal Industry Federation)
- EUBIA** (European Biomass Industry Association)
- EU-OEA** (European Ocean Energy Association)
- EUREC Agency** (European Renewable Energy Centres Agency)
- EWEA** (European Wind Energy Association)



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Published in March 2011

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The EU Renewables Directive is a unique creation which addresses two of the biggest challenges of our time – energy security and climate change. The 20% renewables target for 2020 is now firmly embedded in the psyche of Europe's decision makers.

To reach this ambitious target will call for the full mobilisation of Europe's talents, expertise and innovation. No single business can afford to miss out on the opportunities and technical advances which the shift towards a renewable energy economy will bring.

Within just a few years, we need to generate more than one third of our power from renewable sources of electricity. A significant part of our heating and transport must be based on renewable fuels. It is not enough to tinker around the edges. We need huge practical and concrete initiatives involving society as a whole. And we need to persuade our international partners to follow the same track.

The switch to renewable energy calls for investments in the order of billions of euros. Cost cutting in the public and private sectors risks reducing the flow of investments in renewable technologies, which could have serious consequences for our future security.

However, current economic conditions are not favourable to this. New energy sources also call for new networks to bring them to customers. Variable generation calls for new approaches to balancing demand and supply. Investors and financial institutions need the confidence to trust relatively new and expensive technologies. Customers must be convinced that their future prosperity lies in renewable energy.

The National Renewable Energy Action Plans make the bridge between ambition and reality. The Commission is determined that these plans should be coherent, comprehensive and effective. Done well, these plans will take us towards a new era of energy security. If we fail, we will be paying the price for generations to come.

The REPAP project has been providing essential support for Member States to prepare, and deliver, high quality and effective National Renewable Energy Action Plans. Within REPAP, the EU Industry Roadmap provides a vital insight into how policy and practice connect from the industry's point of view. It provides a crucial guide to policy makers and technology developers on the impact of EU renewables legislation on industry.

Europe's industry and particularly its renewable energy industry, including many small and medium companies, are major players in our policies. We would never have got this far without them. They will ultimately deliver the renewables targets. Close collaboration between the EU, Member States and business is key to generating the low-carbon revolution and creating the jobs, skills and prosperity Europe needs.

**Philip Lowe**

*Director General for Energy  
European Commission*

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Back in 2004, EREC launched the call for a binding renewable energy target of at least 20% by 2020 for the EU. Already then, the European Renewable Energy Industry was convinced that such a target is not only achievable but that it is imperative to secure Europe's energy supply, to abate climate change as well as to ensure the competitiveness of our economy.

The Renewable Energy Directive, the legislative framework ensuring the implementation of this target, called upon Member States to draw up renewable energy strategies in the form of National Renewable Energy Action Plans. The Renewable Energy Industry firmly believes in this approach, as a stable policy framework together with proactive regulatory measures as well as a clear timeline, is absolutely crucial for the emerging renewable energy sector.

The fact that nearly all Member States intend to achieve their national targets within their national territory and that more than half of them foresee to overshoot their targets sends a strong signal showing that Member States consider renewable energy as the energy source of the future.

The renewable energy market developments we have seen in the last years justify this confidence. In 2010, more renewable electricity capacity was installed in the EU than ever before. While 13.3 GW were installed in 2008, and 17.3 GW in 2009, a record 22.6 GW was installed last year. Market development clearly surpassed expectations and I am confident that the same will happen in the years to come given that the right framework conditions are put in place.

The Member States of the European Union need to advance in agreeing upon an integrated energy infrastructure both for electricity as well as for heating & cooling, upon increased support for R&D for renewables, upon securing a stable investment climate to attract the needed capital into the market, as well as upon debating a policy framework for renewable energy looking beyond 2020.

The private sector is largely responsible for making the required investments, but governments hold the responsibility to change the mix of energy investment. Policy and regulatory frameworks at local, regional, national and EU level will determine how quickly investment and consumption decisions are steered towards an energy efficient, renewable energy based economy.

The EU roadmap confirms the EU Member States ambition to generate a significant share of their energy supply with renewable energy sources. It compares the vision of governments with those of the renewable energy industry. Both private and public sector need to work closely together to make the agreed targets become reality over the next ten years. EREC and its members will continue to collaborate with national associations, governments as well as the EU institutions to support this target implementation process.

**Prof. Arthouros Zervos**

*President*

*European Renewable Energy Council (EREC)*

# Key Figures



16 Member States expect to exceed their 2020 binding targets:

Austria, Bulgaria, the Czech Republic, Denmark, France, Germany, Greece, Hungary, Latvia, Malta, the Netherlands, Poland, Slovenia, Slovakia, Spain, Sweden.



25 out of the 27 countries expect to reach or exceed their 2020 targets domestically.



EU Member States foresee that the share of renewables in transport will amount to 11.27% of diesel and petrol consumption in 2020. The RES industry believes that 12.2% could be feasible.



EU Member States expect the share of renewable energy to reach 20.7% of gross final energy consumption by 2020. The RES industry believes that **24.4% renewable energy** can be reached in the same year.

## 23.5%

The renewable energy industry expects **23.5% of heating and cooling consumption to come from renewable energy sources** while according to Member States, renewable heating and cooling will reach 21.3% in 2020.



Only Italy and Luxembourg plan to resort to cooperation mechanisms to achieve their 2020 goals.

## 34.3%

According to the National Renewable Energy Action Plans, the share of renewable energy sources in electricity consumption is predicted to increase to **34.3% in 2020** compared to 42.3% as forecast by the RES Industry.

# Project Description

## Renewable Energy Policy Action Paving the Way towards 2020



Renewable Energy Policy Action Paving  
the Way towards 2020

The objective of REPAP2020 is to facilitate the implementation process at national level of the Directive on the promotion of the use of energy from renewable sources (2009/28/EC), referred to as the RES Directive. REPAP2020 aims to support the political work at national level in the field of renewable energy, mainly through the National Renewable Energy National Plans (NREAPs), as defined in the RES Directive.

In a first phase and before the notification of the NREAPs to the European Commission (by 30 June 2010), REPAP accompanied the development of the NREAPs by offering professional advice to the relevant authorities on the design of the NREAPs. Furthermore, REPAP2020 empowered national industry associations to come up with their own individual renewable energy roadmaps which then served as an important tool to influence the drafting phase of the NREAPs.

In a second phase, the project evaluated the NREAPs in order to facilitate constant feedback between the partners in different Member States and establish a learning process. REPAP2020 showed good policy practice examples and highlight missing items in the individual NREAPs.

The European Renewable Energy Council (EREC) is the project coordinator.

Partners in the projects are:

**EUFORES** – The European Forum for Renewable Energy Sources

**Kuhbier Law Firm**

**EEG** – Vienna University of Technology, Energy Economics Group

**Fraunhofer Institute Systems and Innovation Research**

**BEE** – Bundesverband Erneuerbare Energie, Germany

**APER** – Associazione Produttori Energia da Fonti Rinnovabili, Italy

**EDORA** – Fédération de l'Énergie d'origine renouvelable et alternative, Belgium

**REA** – Renewable Energy Association, United-Kingdom

**SERO** – Sveriges Energiföreningars Riksorganisation, Sweden

**PIGEO** – Polish Economic Chamber of Renewable Energy, Poland

**APREN** – Associação de energias renováveis, Portugal

**SER** – Syndicat des Energies Renouvelables, France

Visit the project website to learn more:

**[www.repap2020.eu/](http://www.repap2020.eu/)**

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Source : Leeming, EWEA

## Introduction

The 2009/28/EC Directive on the promotion of the use of energy from renewable sources (referred to in this publication as the “RES Directive”) sets the objective of reaching at least 20% of the EU’s final energy consumption through renewable energy sources by 2020. It sets for each Member State mandatory national targets for the overall share of renewable energy sources (RES) in gross final energy consumption as well as a mandatory share of 10% RES in transport. In Article 4, each Member State is requested to provide a National Renewable Energy Action Plan (NREAP) by 30 June 2010. The NREAPs set out how each Member State aims to achieve its national target in the three sectors (electricity, heating and cooling, transport – see Annex I of the RES Directive). In order to draft this plan, a template was published by the Commission. Finally, in January 2011, all 27 Member States had submitted their NREAPs.

The 27 Action Plans can be found in their original languages and in English on the Transparency Platform (as stipulated in Article 24): [http://ec.europa.eu/energy/renewables/transparency\\_platform/action\\_plan\\_en.htm](http://ec.europa.eu/energy/renewables/transparency_platform/action_plan_en.htm)).

This **EU Roadmap** publication is drafted in the framework of the REPAP2020 project co-funded by the Intelligent Energy Agency.

The goals of this publication are:

- to give a European overview of the submitted NREAPs
- to compare for each country the 2020 projections of the NREAPs with the renewable energy industry projections
- to give a short preliminary evaluation of the measures indicated in the NREAPs and some key recommendations from the RES industry

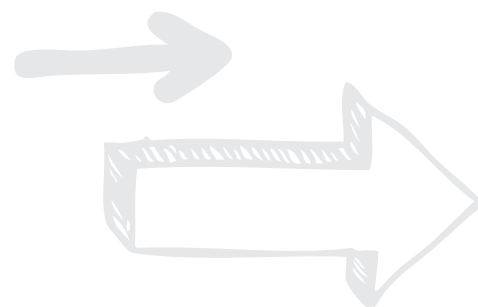


# Methodology

For a comprehensive analysis of future renewable energy sources (RES) developments, it is of crucial importance to build on a detailed investigation into the country-specific situation, taking due account of the potential of RES technologies and the realisation constraints arising from the design and structure of the overall regional energy markets as well as specific non-economic barriers.

## Supply Side Assumptions

The scenarios presented in this publication are based on the national RES Industry Roadmaps developed in the framework of the REPAP2020 project. In order to compare and assess assumptions given in EU Member States' NREAPs and to achieve the overall aim of providing guidance to policy makers and market actors, a set of scenarios has been developed for the national RES Industry Roadmaps by EEG (Energy Economics Group of the Vienna University of Technology) in collaboration with the Fraunhofer Institute under application of the Green-X model.<sup>1</sup> The model forms a common basis on RES deployment as well as associated costs and benefits for the development of the national RES industry roadmaps. Two scenarios were hereby in focus: a case of national target fulfilment (NAT case) in line with the target of at least 20% RES by 2020, and a case of proactive RES support (ACT case) illustrating consequences of an ambitious RES policy (beyond 20%). The main objective of this modelling exercise was not to discriminate between the various technologies, but to have a clear and EU-wide consistent view of the future renewable energy development up to 2020. The ACT case has been chosen for the purpose of this **EU Roadmap** as a tool for comparison with the various NREAPs scenarios in order to highlight promising policy measures. Additionally, for some EU Member States more specific scenarios based on projections by national renewable energy associations in the national RES Industry Roadmaps were applied. These calculations were conducted by the national partners themselves taking into account country-specific issues. Complementary to that, expertise from several European renewable energy technology associations was provided, as shown in the country-specific tables. However, in the countries where there was no national RES industry roadmap, only the NREAP scenario will be presented in this publication.<sup>2</sup>



## Demand Side Assumptions

The scenarios presented in the national RES Industry Roadmaps were drafted on the basis of specific demand assumptions. To a certain extent, the projected renewable energy production was determined by the industry on specific energy demand assumptions. To have a look at these energy demand scenarios presented by the national RES associations, please consult the National RES Industry Roadmaps on the REPAP website.

<sup>1</sup> Energy Economic Group (EEG) & Fraunhofer Institute Systems and Innovation Research: Future Pathways for renewable energy- scenarios background information. 2009

<sup>2</sup> Denmark, Estonia, Ireland and Romania.

In the **EU Roadmap**, EREC aims to compare the 2020 projections for the share of renewable energy in gross final energy consumption expected by the renewable energy industry and by the NREAPs. For this purpose, energy demand assumptions should be the same. It was therefore decided - for the sake of comparability - to apply in this publication the energy demand assumptions of the NREAPs (based on table 1 of the NREAP template) to the national RES Industry Scenarios. This should not be interpreted as EREC or the national RES associations supporting these energy demand assumptions. It is clear, from the evaluations of the NREAPs presented in this publication, that this is not the case. However, this choice enables us to compare on the same basis the projected renewable energy production for 2020.

Hence, the energy demand assumptions of the NREAPs were applied in this publication to the European overview of the national RES industry scenarios (see the “EU Overview”) as well as to each 27 national RES Industry Scenario (see the “Overview by Member State”).

### Precisions regarding the “Overview by Member States”

Regarding the “Overview by Member States” presenting the situation in each Member State, the TABLE 1 on renewable electricity refers - for the NREAP scenario - to tables 10a and 10b of the NREAP template<sup>3</sup>. The TABLE 2 on renewable heating and cooling for the NREAP scenario refers to table 11 of the NREAP template, and the TABLE 3 on renewable energy in transport to table 12. TABLES 1, 2 and 3 in this publication refer - for the calculations of their percentages- to the energy demand assumptions used in table 1 of the NREAP template.

TABLE 4, which gives an overview of the sectoral and overall, refers - for the NREAPs - to tables 4a and 4b of the NREAP template as well as to table 1 for the overall energy demand assumptions. Taking both into account table 4a/4b against table 1 enables to precisely calculate the shares of the various RES sectors by 2020.

TABLE 4 – regarding the NREAPs and the RES Industry Scenarios- make sure that renewable electricity used in transport is not counted twice (in the electricity and in the transport sectors). However, TABLE 4 does not take into account –for the RES Industry Scenarios - Article 21(2) and 3(4c) of the RES Directive, except for Austria, Bulgaria and Portugal. Article 21(2) stipulates - for the calculation of the RES target in transport - that the contribution of biofuels from wastes, residues, non-food cellulosic material, and ligno-cellulosic material is considered to be twice that made by other biofuels. Article 3(4c) of the RES Directive requires that the input of electricity from renewable energy sources consumed in electric road vehicles is considered 2,5 times its actual energy content.

TABLE 5, which presents the background energy demand assumptions for 2020 used in this publication, is based on table 1 of the NREAP template.

The evaluation of the NREAPs in the « Overview by Member State » section has sometimes been drafted by the respective national RES association. The Belgian association EDORA, the British association REA, the Dutch Renewable Energy Council DE KOEPEL, the French association SER, the German association BEE, the Italian RES Association APER, the Maltese association MEEREA, the Polish association PIGEO, the Portuguese association APREN, the Spanish association APPA, the Swedish association SERO have drafted the evaluation of the NREAPs of their respective countries.

<sup>3</sup> European Commission (2009) 5174-1 : Commission Decision of 30.6.2009 establishing a template for National Renewable Energy Action Plans under Directive 2009/28/EC, 2009

# EU Overview

## RES Status in the EU

### RES Becoming a Mainstream Energy Source

According to the latest Eurostat, RES represented 10.23% of final energy consumption in 2008.

Renewables produced 19.9% of Europe's electricity consumption in 2009<sup>4</sup>. Hydropower contributed the largest share with 11.6%, followed by wind with 4.2%, biomass with 3.5%, and solar power with 0.4%. Renewable electricity's share of newly installed capacity increased from 57% in 2008 to 62% in 2010<sup>5</sup>.

According to Eurostat, the share of RES in heating and cooling reached about 11.9% in 2008 with biomass representing 11.4% of heat consumption, geothermal 0.3% and solar thermal 0.2%.

The share of renewables in transport amounted to 3.5% of the gross final energy demand in the transport sector in 2008 according to Eurostat. Biodiesel represented 2.7%, bioethanol 0.6% and other liquid biofuels 0.2%.

### 2010: Surpassing the White Paper Targets

What was thought of in the 1990s as ambitious targets for 2010 were already achieved or even exceeded by some renewable energy technologies in 2009. In 1997, the European Commission made projections for 2010 for individual renewable energy technologies in its *White Paper for a Community Strategy and Action Plan*<sup>6</sup>:

- With a cumulative installed capacity of 84 GW at the end of 2010, wind energy largely exceeded the White Paper 40 GW target.
- The 2010 target for PV was 3 GW of installed capacity while reality shows nine times this figure in Europe with an estimated installed capacity of above 27 GW.
- Geothermal heat has, already exceeded three times the installed capacity projected in the White Paper 13 GWth instead of just 5 GWth.

These figures show the rapid progress of some technologies, whereas some others are lagging behind. Progress in the field of heating and cooling was much slower than in the field of electricity, which can be explained by the lack of dedicated legislation. With the RES Directive, this gap was closed. However, a strong effort will be required in the next decade to bring the heating sector up to the same speed as the electricity sector where progress over the last years has been impressive.



<sup>4</sup> & <sup>5</sup> Eurostat: Electricity Statistics- Provisional Data for 2009, (2010)

<sup>6</sup> European Commission (COM(1997)599 Final): Communication for the Commission. Energy for the future: Renewable sources of energy. White Paper for a Community Strategy and Action Plan. 1997

## European overview of the Member States' NREAPs

The European Renewable Energy Council takes stock of the 2020 picture presented by the 27 NREAPs submitted to the European Commission.

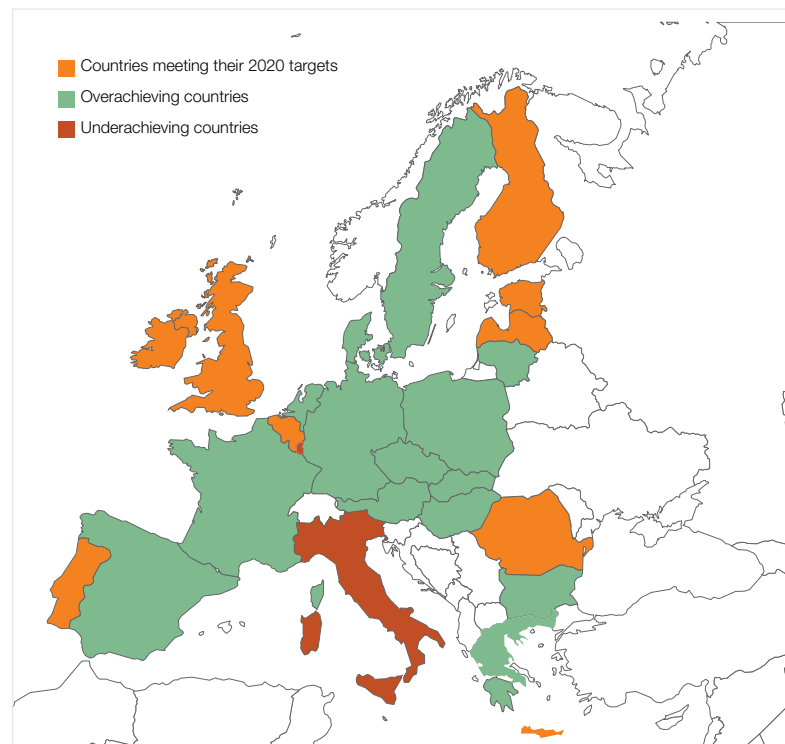
### 20% by 2020 – Europe can do more!

The EU forecasts to surpass its 20% target. With 1,179.5 Mtoe in 2020 as overall energy consumption and 244.5 Mtoe as RES consumption, the share of RES will amount to 20.73%. This is rather low compared to the national RES industry roadmaps, which estimate a share of 24.4% renewable energy by 2020 to be feasible.

25 out of the 27 EU countries expect to reach or exceed their 2020 targets domestically. Calculations based on tables 1 and 4a of the Commission template show that 16 Member States expect to exceed their 2020 binding targets (Austria, Bulgaria, the Czech Republic, Denmark, France, Germany, Greece, Hungary, Latvia, Malta, the Netherlands, Poland, Slovenia, Slovakia, Spain, Sweden) (see table 1 overleaf). Only Italy and Luxembourg plan to resort to cooperation mechanisms to achieve their binding 2020 goals.



MAP 1: European Map showing NREAP Projections for 2020



Source: EREC

TABLE 1: Comparing the Binding Targets with Member State Forecasts in the NREAPs &amp; Forecasts by the RES Industry

	National Binding Target established by the 2009/28/EC Directive (Annex I)	Renewable Energy Share in Final Energy Consumption forecast in the NREAPs (based on Tables 1 & 4a)	Renewable Energy Share in Final Energy Consumption forecast by the RES Industry (based on demand assumptions from the NREAPs)
AT	34%	34.2%	46.4%
BE	13%	13%	14.5%
BG	16%	18.8%	20.8%
CY	13%	13%	14.5%
CZ	13%	13.5%	13.7%
DK	30%	30.5%	30.5% <sup>(1)</sup>
DE	18%	19.6%	26.7%
EE	25%	25%	25% <sup>(1)</sup>
EL	18%	20.2%	25.2%
ES	20%	22.7%	28.3%
FI	38%	38%	42.3%
FR	23%	23.26%	23.6%
HU	13%	14.7%	18.3%
IE	16%	16%	16% <sup>(1)</sup>
IT	17%	16.2%	19.1%
LT	23%	24.2%	31.7%
LU	11%	8.9%	10.4%
LV	40%	40%	46.4%
MT	10%	10.2%	16.6%
NL	14%	14.5%	16.8%
PL	15%	15.5%	18.4%
PT	31%	31%	35.3%
RO	24%	24%	24% <sup>(1)</sup>
SL	25%	25.25%	34.1%
SK	14%	15.3%	26%
SE	49%	50.2%	57.1%
UK	15%	15%	17%
<b>Total EU</b>	<b>20%</b>	<b>20.7%</b>	<b>24.4%</b>

Source : EREC

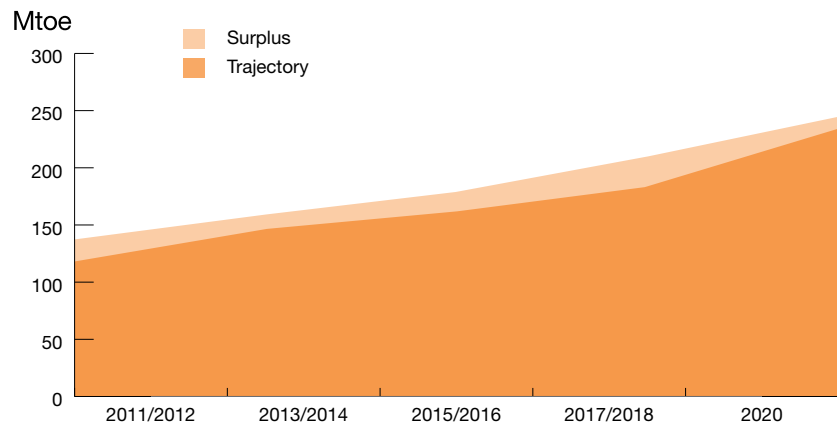
(1) As no RES Industry Roadmap was published, the NREAP data were taken into account in this table.



## Surplus

According to the NREAPs, there will be a surplus of RES compared to the target throughout the 2010-2020 period. The graph below illustrates how the surplus will develop over the trajectory. This surplus will thin out as Member States approach 2020.

GRAPH 1: EU 27 RES Surplus



Source: EREC based on the NREAPs

## Imports

The sum of RES imports planned by the Member States (under the Cooperation Mechanisms) in the NREAPs amounts to 2.5 Mtoe over the period 2010-2020. This compares to 957.3 Mtoe overall RES produced over the whole period. Hence, imports represent only 0.26% of overall RES production.

## Cooperation mechanisms

Cooperation mechanisms are a new feature of the RES Directive. The objective is to provide more flexibility to Member States for meeting their targets. Hence, the RES Directive lays down rules on statistical transfers, joint support schemes, and joint projects between Member States and with third countries. Only Italy and Luxembourg plan to resort to cooperation mechanisms to meet their binding 2020 targets. Italy intends to import 1,127 ktoe in 2020 which amounts to 5.2% of its forecast RES production for that year. Luxembourg intends to import 92.5 ktoe in 2020 which means 23.7% of its total RES production in 2020.

Very few countries intend to make use of cooperation mechanisms before 2020. It is clear that cooperation mechanisms will mainly be used in relation to meeting the binding target in 2020, for that specific year.



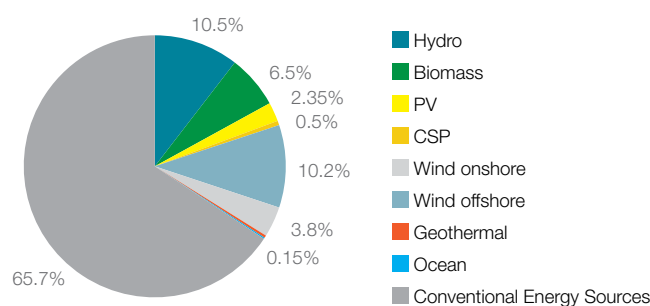
## RES Sectors in the NREAPs

### Renewable Electricity

According to the NREAPs, more than one third of our electricity consumption will come from renewable energy sources in 2020. The share of renewable energy sources in electricity is forecast to increase from 14.9% in 2005 to 34.3% in 2020. According to the national RES industry roadmaps, renewable electricity (RES-E) can reach a higher share of 42.3% electricity consumption in 2020.

According to the NREAPs, wind energy will represent 14.1% of the electricity consumptions in 2020, hydropower 10.5%, biomass 6.5%, photovoltaics 2.35%, concentrated solar power 0.5%, geothermal energy 0.3% and ocean energy 0.15% (see graph 2 below).

GRAPH 2: Renewable Energy Sources in the Electricity Mix in 2020



Source: EREC based on the NREAPs

All EU Member States have introduced or are planning to introduce dedicated support mechanisms for RES-E. Most Member States appropriately differentiate between the different technologies. All four main types of support mechanisms (feed-in tariffs – FITs, premium tariffs, green certificates – GC, and tenders) can be found in the various NREAPs.

However, certain NREAPs create instabilities in their support mechanisms by announcing cuts or changes without giving details as to the future shape or duration of the mechanism (such as in Italy) or by announcing the end of the mechanism in the near future (such as in Bulgaria) without explaining how RES deployment will subsequently be supported.

The simplification of authorisation and permitting procedures, an important bottleneck in many Member States, is tackled in diverging levels of detail in the various action plans. It is unclear how certain new measures, such as in France, will simplify administrative procedures or how Member States, that have identified bottlenecks such as Italy, actually intend to tackle them. Overcoming administrative barriers to RES deployment will require continued attention up until 2020.

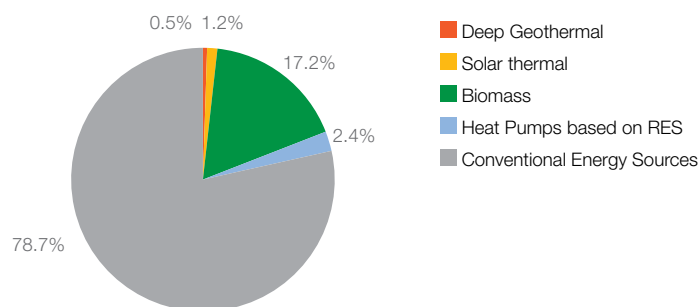
Grids are a significant part of most NREAPs. Both procedures for connecting to and managing the grid, as well as grid extensions are key in ensuring that renewables develop at the required speed to meet the EU's 2020 targets. The issue is tackled to a varying level of detail by the 27 Member States. Whereas most NREAPs take interconnections and grid development plans into consideration to some degree, grid connections procedures are not consistently analysed to the degree of importance that they deserve. To reach the ambitioned levels of RES-E penetration, electricity grids will be the main element of success or the main show-stoppers.



## Renewable Heating & Cooling

More than one fifth of our heating consumption is expected to come from RES in 2020. The share of RES in heating and cooling will increase from 10.2% in 2005 to 21.3% in 2020. Biomass should represent 17.2% of heating and cooling consumption, heat pumps from aerothermal and hydrothermal energy 1.6%, solar thermal energy 1.2% and geothermal energy 1.3% (see graph 3 below).<sup>7</sup>

GRAPH3: Renewable Energy Sources in the Heating and Cooling Mix in 2020



Source: EREC based on the NREAPs

According to the national RES industry roadmaps, renewable heating and cooling can reach the share of 23.5% of heating and cooling consumption in 2020.

According to the NREAPs, mature RES heating and cooling markets (such as Austria, Sweden, Germany, and France) will see further developments but there will be few emerging markets. One of these emerging markets will most likely be the United-Kingdom which confirmed in October 2010 the Renewable Heat Incentive (RHI), a support scheme for renewable heating and cooling in buildings.

In general, support for the RES heating and cooling (RES-H&C) sector is underdeveloped in the EU. Comprehensive measures need to be taken to fully realise the possible contribution of RES in this sector. Many NREAPs do not detail flanking measures aimed at developing RES-H&C.

A streamlining of authorisation procedures is not always proposed in the NREAPs. Greece is one of the positive examples in this regard as it refers to several pieces of law streamlining licensing procedures such as the Ministerial Decree for the exploitation of geothermal resources.

Nearly all the NREAPs propose financial incentive schemes, but many are not detailed and/or are limited in time.

Only a few countries, such as Germany, Spain or Greece, propose a RES-Heat obligation in buildings in the NREAPs. Many countries, such as Romania for instance, do not, Bulgaria plans to introduce such a requirement, however, this obligation has not been elaborated in detail and no timetable has been fixed. Some countries, such as Bulgaria, mention in their action plans the Energy Performance of Building's Directive (EPBD) requirements for "nearly zero energy buildings". New construction, enlargement and refurbishing of district heating (DH) infrastructure is of crucial importance for RES used in DH networks. It is not sufficiently underlined in the NREAPs.

<sup>7</sup> This covers deep geothermal and geothermal heat pumps.

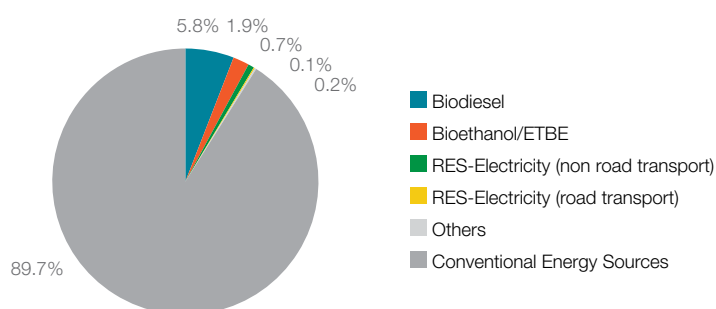


Schemes for the certification of installers of RES in buildings already exist in some countries such as France, Spain, Portugal, the Netherlands, Italy, Ireland, Germany and Austria. A comprehensive overview of existing schemes as well as key success criteria for the design of such schemes is provided in the context of the IEE QualiCert project, of which EREC is co-coordinator<sup>8</sup>. Article 14 of the RES Directive obliges Member States to develop and mutually recognise accreditation and certification schemes for installers of small-scale renewable energy installations by December 2012. However, no proposal for certifying installers could be found in the Estonian or Finnish NREAPs, for instance.

## Renewable Transport

The share of renewables in transport is projected to reach 11.27% of diesel and gasoline consumption in 2020, overtaking the binding transport target of 10%, up from 3.1% in 2005. Looking at the transport sector, biodiesel is the first contributor to the target for RES in transport in 2020, followed by bioethanol. Renewable electricity in transport will contribute to achieving the target while almost no contribution of hydrogen is expected so far. Taking into account the national RES industry roadmaps, renewable energy in transport would amount to 12.2% by 2020 (see graph 4 below).

GRAPH 4: Renewable energy sources in the transport mix in 2020



Source: EREC based on the NREAPs

NB: The figures on this graph indicating the individual shares of RES technologies in transport are based on table 12 of the NREAP. For that reason, they do not take into account Article 21(2) and 3(4c) of the Directive. When added up, they amount to about 8.7 per cent of diesel and gasoline consumption. However, when taking into account Article 21(2) and 3(4c), the overall number amounts to 11.27 per cent.



<sup>8</sup> [www.qualicert-project.eu](http://www.qualicert-project.eu)

## RES Technologies in the NREAPs

### Biomass



Source : CropEnergies

Biomass is planned to represent 17.2% of the planned EU heating and cooling mix and 6.5% of electricity consumption in 2020. According to the NREAPs, the main bioenergy markets in 2020 will be Germany, Sweden, Spain, Italy, United Kingdom, Finland and France, Poland and the Netherlands. However, projected growth rates in Austria, the Czech Republic, Germany, Denmark, and Sweden are disappointing when compared to the growth in previous years. This is due to the fact that the targets for these countries are not ambitious enough. Furthermore, the existing controversy regarding the use of biomass for food or energy production did not encourage policy-makers to propose ambitious targets.

#### Biomass for Heat

The biggest heat markets will be Germany, Italy, the United Kingdom (UK) and Sweden. According to the NREAPs, biomass heat production will reach 88.8 Mtoe in the EU in 2020 (compared to 63.8 Mtoe in 2008) instead of 124 Mtoe as the European Biomass Association AEBIOM had projected. The heat sector is underestimated in almost all the NREAPs, despite its high degree of efficiency.

#### Biomass for Electricity

Most NREAPs focus on electricity using biomass rather than the use of biomass for heating and cooling and for transport. The new main bioelectricity markets will be Germany, the UK, Italy, Poland and the Netherlands. According to the NREAPs, the EU power production using biomass will increase from 9.2 Mtoe in 2008 to 19 Mtoe in 2020.

#### Biomass for Transport

The new biofuels markets will be the UK, Germany, Spain and Italy. According to the NREAPs, energy from ethanol, biodiesel and biogas will reach around 29 Mtoe by 2020, up from 11 Mtoe in 2008.

In certain NREAPs (e.g. Poland, Bulgaria, Spain and the Czech Republic), Member States do not foresee enough biomass supply to meet their biomass targets. And furthermore do not specify the quantity of biomass to be imported.

### Geothermal Energy



Source : EGEC

Geothermal is expected to represent 0.3% of EU electricity consumption in 2020 and 1.3%<sup>9</sup> of EU heating and cooling consumption. The European Geothermal Energy Council (EGEC) considers these targets to be very conservative. According to EGEC, the geothermal contribution in the NREAPs is underestimated. Increasing awareness on this technology is of crucial importance.

Geothermal electricity is planned to increase from 816 MW and 5,977 GWh in 2010 to 1,618 MW and 10,928 GWh by 2020. However, the good news is that countries like Spain, Ireland, Hungary and Portugal take into account the construction of Enhanced Geothermal Systems (EGS) plants in the next 10 years.

Heat generation from deep geothermal heating and cooling is expected to increase from 663 ktoe in 2010 to 2,550 ktoe in 2020. The Netherlands, France and Germany plan ambitious developments the field.

<sup>9</sup> This covers deep geothermal and geothermal heat pumps.

RES from heat pumps represent 2.6% of the planned EU heating and cooling mix and geothermal heat pumps (GHP) represent at least 0.8% of the planned heating and cooling mix. However, not all Member States make a distinction between various types of heat pumps; therefore the share of GHP can be higher. An increased production of GHP is planned in nearly all Member States. The United Kingdom and Sweden plan important developments. However, growth rates for 2010-2020 in some countries are below a business-as-usual scenario. Bulgaria, Malta, Estonia and Portugal foresee no development. Only few Member States propose measures such as a regulatory framework, training activities and a certification scheme.

New construction, enlargement and refurbishment of district heating infrastructure is crucial for renewable heating. The importance of this is not sufficiently underlined in the NREAPs of the following countries: Belgium, Denmark, the Netherlands, Austria, Bulgaria, Ireland, Lithuania, Slovenia, Italy, Germany, France, Romania, Slovakia, Poland, and Hungary.

Some Member States identify risk mitigation as an important barrier. To address this barrier, EGEC suggests the idea of a Geothermal Risk Insurance Scheme at a European level in the NREAPs.

## Hydro Power

Hydropower is expected to represent 10.5% of electricity consumption in 2020. Around 90% of Small Hydro Power (SHP) installed capacity will be concentrated in six countries in 2020, namely Italy, France, Spain, Germany, Austria and Sweden. However, a high potential for the development of SHP also exists in Bulgaria, the Czech Republic, Poland and Romania.

According to the NREAPs, growth in SHP capacities in the EU was 0.5% from 2005 to 2010 and will reach 1.4% from 2010 to 2020. Hydropower will play an increasingly important role in stabilising the electricity grid.

Looking at the measures promoting SHP, the Greek and Portuguese NREAPs foresee positive steps such as a simplification in administrative procedures, efficient and transparent licensing procedures and priority grid access for SHP. The Bulgarian and Czech NREAP foresee attractive incentive regimes encouraging SHP energy production.

Some NREAPs draw attention to problems caused by the implementation of the Water Framework Directive into national legislation. In France, Estonia, Latvia and Lithuania, river classification measures result in limited possibilities for new SHP development.



Source : Andritz, ESHA.



Source : SeaGen, Courtesy MCT Ltd

## Ocean Energy

Ocean energy is planned to represent 0.15% of electricity consumption in 2020. Installed capacity is expected to increase from 245 MW in 2010 to 2,543 MW in 2020. The main markets in 2020 will be France, Ireland, Portugal, Spain, and the United Kingdom, in other words, the Member States of the Atlantic Arc. The average annual growth rate of ocean energy technologies between 2005 and 2020 is estimated to be 101.72 MW installed, with the growth rate significantly skewed towards the end of the period.

The NREAPs are, on the whole, rather satisfying as regards ocean energy, considering that the main Member States active in the industry have set firm targets and thus reaffirmed their willingness to invest in and develop these new technologies. Denmark is the only exception: while it has significant wave resources and is a pioneer in wave energy (with projects such as Wave Dragon, Wave Star, etc.), it did not set a target for the sector.

Being very much in line with what has been projected in the European Ocean Energy Association EU-OEA Roadmap for Ocean Energy development<sup>10</sup>, all the national action plans provide a realistic target for ocean energy. EU-OEA believes that whilst the targets are realistic, a stimulating policy framework and sufficient financial support could even ensure going beyond the target. Being a mainly off-shore renewable energy source, ocean energy will also need significant grid extension and improvement to reach frontier regions where the resource is located.



Source : Bataille, EPIA

## Photovoltaics

Photovoltaics (PV) is planned to represent 2.35% of electricity consumption in 2020. According to the NREAPs, most of the PV installed capacity in 2020 will be located in Germany, Spain, Italy, France, the United Kingdom, Greece, the Czech Republic, Belgium and Portugal. By 2020, these countries intend to pass the landmark figure of 1 GWp of PV power installed.

Germany will clearly remain leader in the EU with over 51 GW of planned installed capacities, reaching over 7% of the electricity demand. It sets the path for PV development and remains an example. Greece plans to overpass 4% of the electricity demand with PV by 2020 which is also very encouraging for the PV industry.

Spain aims to reach nearly 4% of the demand. However, current measures being adopted (retroactive measures on existing plants) are worrying and send wrong signals to the investor community. The potential identified by the sector foresees that Spain could easily surpass 7% of the power demand with PV.

Italy does not plan to install more than 8 GW PV (representing about 2.6% of the electricity consumption) despite being one of the sunniest countries in the EU. This is even more surprising knowing that Italy does not plan to reach its national binding target with indigenous production while it has the potential to do so with existing resources. Moreover at the current market development speed, those 8 GW could be reached much faster.

Portugal, the UK, the Czech Republic and Belgium show a moderate PV penetration, which is still below industry estimations. In these countries, as in many others which benefit from good solar irradiation levels (e.g. Bulgaria and Romania), the



<sup>10</sup> European Ocean Energy Association (EU-OEA) : Oceans of Energy - European Ocean Energy Roadmap 2010-2050. 2010.

true potential of PV has not yet been fully perceived by policy makers. Generally this is due to a lack of awareness on the long term potential of solar PV; this will be a clear challenge to take up in the coming decade.

## Solar Thermal

According to the 27 NREAPs, energy from solar thermal should account for 1.2% of the total heating and cooling energy demand in 2020. It seems that renewable heat in general and solar heat in particular is not considered for its real economic potential contribution to the 2020 target. More political focus and awareness raising are needed in this field.

The solar thermal share is forecast to grow in most European countries, even if this growth is very uneven. The positive examples set by Sweden, Denmark and Poland do not seem to have found echo in other northern European countries such as the Baltic states and Finland.

The strong solar thermal markets in Europe fall under two categories: Austria and Germany on the one hand, where forced circulation combi-systems (domestic hot water and space heating) are well established, and, on the other hand, Greece, Cyprus, and to a lesser extent Malta, where solar thermal systems traditionally provide hot water with termo-syphon systems.

Austria and Germany foresee reasonable growth but are not very ambitious considering the favourable energy policy framework already in place. Greece, Cyprus and Malta will consolidate their strong markets with measures aimed at maintaining the current solar thermal major share.

The promising French, Italian and Spanish markets offer contrasted but encouraging objectives with an expected share of renewable heat respectively of 4.7%, 15.7% and 11.4%. The solar thermal industry is also confident about future developments in Poland and the UK. These two countries are currently small markets but they have set reasonable objectives and put in place what can be considered to be favourable policies.

On average in Europe, solar thermal is expected to grow by 10 to 15% per annum between 2010 and 2020.

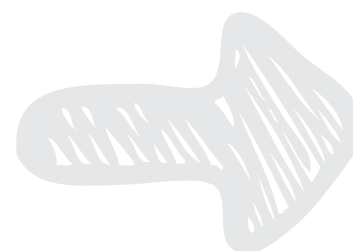
## Solar Thermal Electricity

Solar Thermal Electricity (STE) should represent 0.5% of electricity consumption in 2020. Following the latest developments, mainly in Spain, all Member States with potential have included STE in their NREAPs: Spain (5,079 MW), Italy (600 MW), France (540 MW), Portugal (500 MW) and Cyprus (75 MW). Member States' forecasts are very modest compared to the real potential in the South of Europe. By developing this potential, STE could largely contribute to meeting the EU's 2020 targets and go beyond.

STE will play an important role especially in view of the Mediterranean Solar Plan (MSP), and in joint projects with third countries. In their NREAPs, countries such as Spain and France state their commitment to the MSP to put in place joint projects with third countries. However, as a prerequisite, new electricity interconnectors need to be built. Regulatory provisions enabling these cooperation mechanisms should soon be put in place favouring a coordinated implementation of the RES Directive's provisions on cooperation mechanisms.



Source : Wagner & Co, ESTIF



Source: ESTELA (central receiver technology)

Feed in tariffs for solar thermal electricity have been recently introduced in countries such as Greece, Portugal, Cyprus, Italy and Spain – as emphasized in the NREAPs – and prove to be the most effective tool to boost STE. However, they need to be properly designed and ensured over a long period of time to guarantee a sufficient share in return.

## Wind Energy



Source: Lecoeur, EWEA

Wind energy is expected to produce 495 TWh to reach over 14% of total electricity consumption in 2020. Wind power installations will grow from around 85 GW in 2010 to over 213 GW in 2020, with a compound annual growth rate of 9.7%. This is very close to the European Wind Energy Association's (EWEA) 230 GW forecast<sup>11</sup>.

The action plans give offshore wind a prominent role. There will be 43 GW of cumulative capacity in 2020<sup>12</sup>, 3 GW more than EWEA's forecast. Delivering 43 GW of offshore wind power by 2020 is challenging but feasible. However, overall on-shore wind capacity is underestimated in the NREAPs when compared to the same industry forecast.

In most Member States, wind energy will play a key role in meeting RES-E targets and most countries' NREAP targets are not dissimilar to industry forecasts. Noteworthy are, nonetheless, Austria, Belgium, Bulgaria, the Czech Republic, Italy, Poland and Sweden, whose objectives for wind are significantly below industry forecasts. On the other hand, Finland, France, Greece and Romania exceed EWEA's expectations.

Attention should, nevertheless, be given to Member States who have high wind targets, such as France, but which still lack appropriate legislative frameworks or, indeed, make more complex, rather than simplify, authorisation and licensing procedures. Appropriate legislation and grid access and operation will remain a challenge in many Member States in the coming years.

## Next Steps: Following up on the RES Directive

### The European Commission's Role

The Commission will play an essential role in ensuring that Member States fully stay on track and in line with their indicative trajectories and with their 2020 binding targets.

According to Article 4(5) of the RES Directive, the European Commission will evaluate the NREAPs, notably the adequacy of the measures in relation to reaching the 2020 target. The European Commission may issue a recommendation in response to a NREAP.

According to Article 4(4), a Member State which did not meet its indicative target, has to submit an amended national action plan to the Commission by 30 June of the following year. This action plan should set measures to rejoin the indicative trajectory.

<sup>11</sup> European Wind Energy Association (EWEA): Pure Power – Wind energy targets for 2020 and 2030. 2009.

<sup>12</sup> assuming 2 GW in Belgium for offshore wind where the NREAP only gives an overall wind figure

The RES Directive indicates that the deadline for legal transposition of the Renewable Energy Directive is 5 December 2010, date by which Member States are supposed to have implemented all primary and secondary legislation to transpose the Renewable Energy Directive into national law (cf. Article 27).

Infringement proceedings before the European Court of Justice can be launched from 2010 onwards for:

- failure to produce a credible national action plan
- failure to implement all aspects of the Directive
- significant deviation from plan or trajectory
- valid complaints from any EU citizen regarding incorrect implementation or enforcement by Member States

## Following the RES Directive

In order to carry out the requirements of the RES Directive, a number of documents have subsequently to be issued, either by the European Commission or by the Member States themselves.

A selection of these documents which pertain to all renewable energy technologies and which are directly linked to the implementation of the RES Directive are listed below:

TABLE 2: Important Dates following the RES Directive

5 December 2010	Member States have to transpose the Directive's provisions into national law & communicate to the Commission how the Directive has been transposed
31 December 2011	Member States start to report every 2 years (December 2011, 2013, 2015, 2017, 2019, 2021) on progress in reaching national objectives.
2012	The European Commission start to report every two years (2012, 2014, 2016, 2018, 2020, 2022) on progress made in reaching the RES Directive's objectives. It may propose corrective actions.
30 June 2013	Member States who are below the biannual milestones of the indicative trajectory have to submit an amended action plan by June of the following year.
31 December 2014	The European Commission has to report on the evaluation of implementation of the Directive (notably on the cooperation mechanisms & review the greenhouse gas emissions threshold in article 17(2)).
2018	Report by the European Commission proposing a Renewable Energy Roadmap for the post-2020 period. It may be accompanied by legislative proposals
2021	Report by the European Commission reviewing the application of this Directive: NREAPs, forecasts, cooperation mechanisms, support schemes, etc.

## The Concerted Actions Process

The Concerted Action on the Renewable Energy Sources Directive (CA-RES) is a structure for the confidential dialogue of representatives of national authorities responsible for the implementation of the Directive. The goal is to ensure a good transposition and implementation of the RES Directive. The CA-RES started in July 2010 for a period of three years. In the CA-RES, Member States exchange experiences and best practices and develop common approaches. The Austrian Energy Agency coordinates the CA-RES. Partners and participants are nominated organisations from the 27 EU Member States as well as from Norway and Croatia.



Further information is available on [www.ca-res.eu](http://www.ca-res.eu)

## Repealing Directives 2001/77/EC on Renewable Electricity and Directive 2003/30/EC RES in Transport

In Directive 2001/77/EC, Article 2 (definitions), Article 3(2) (reporting by the Member States), and Articles 4 to 8 (Support Schemes, Guarantees of Origin, Administrative Procedures, Grid, Summary report) were deleted on 1 April 2010.

Only Article 3 on national indicative targets and Articles 9 & 10 on transposition & entry into force until 1 January 2012 remain, date by which the Directive will be completely repealed. In Directive 2003/30/EC, Article 2, Article 3(2), (3) and (5), and Articles 5 and 6 are deleted since April 2010.

## 2020 as a Sound Basis for a Sustainable Energy Future for Europe

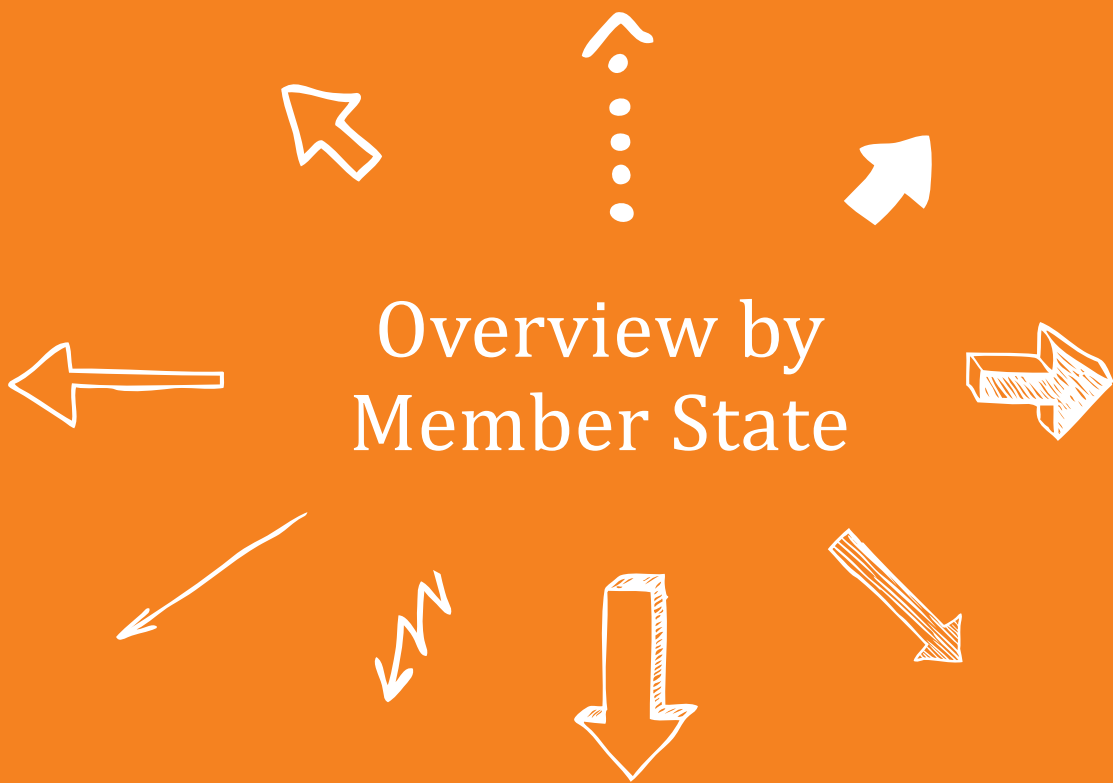
With the binding renewable energy target of at least 20% of final energy consumption by 2020 laid down in the RES Directive and translated into binding national renewable energy targets, Europe has embarked on a sustainable pathway. The NREAPs give a good indication on each country's ambition in terms of renewable energy. Although facing the largest economic crisis since its creation, EU Member States are committed not only to meet their binding targets by 2020, but also to exceed the EU's overall target of at least 20% renewable energy.

However, Europe needs to continue on its pathway and speed-up the transformation of its energy system. This will only happen through stable commitments and favourable policy frameworks, especially in economically challenging times. A successful programme for sustainable economic recovery lies in the promotion of energy savings, energy efficiency and renewable energy.

Europe should lead the way with a clear long-term commitment to renewable energy as well as targets beyond 2020. Certainly, this is challenging, but it is the only true sustainable alternative to the energy system Europe currently has, in environmental, social and economic terms.







## AUSTRIA

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

*“Ambitious renewable energy targets and clear measures will benefit SMEs.”*

Paul Rübiger, MEP (EPP)

The Austrian NREAP splits the overall 34% renewable energy target into 70.6% renewable electricity (RES-E), 32.6% renewable energy in heating and cooling (RES-H&C) and 11.4% renewable energy in transport (RES-T). The Austrian government does not show any ambition in its drafting of the NREAP, remaining close to the 34% target in 2020, as required by the RES Directive, and expecting only to exceed it by a minimal amount. However, as the authors of the NREAP have increased the 2005 baseline by over 1 percentage point, it is significantly easier to follow the established indicative trajectory. A share of 31% overall RES is already expected for 2010.

The estimates provided in the official NREAP remain far below the 46% renewable energy in final energy consumption, which the Austrian renewable energy associations involved in the REPAP project have calculated as being feasible by 2020 in the Austrian REPAP roadmap<sup>13</sup>. This tendency is also valid for the sectoral targets: in the electricity sector, the government expects 70.6%, starting from the high level of 69.1% in 2010, whereas the Austrian renewable energy associations assume 93% to be feasible. For heating and cooling, the target is 32.6% instead of 46%, starting from a level of 30.5% in 2010. As for the transport sector, the NREAP assumes 11.4% instead of 13%, starting from a level of 6.8% in 2010. More generally, there is a need to place more emphasis on education, training and information on RES.

#### Support Schemes

As a result of the non-ambitious targets, there is no need for ambitious measures. Most of the measures mentioned in the NREAP for fulfilling the RES target are already in place. Nearly all additional measures have a regulatory character or count on investments by conventional utilities. Furthermore, critical analyses of the weaknesses of existing support schemes are missing from the NREAP, as are proposals for improvements.

### Renewable Energy Industry Policy Recommendations

The renewable energy industry has demonstrated that, with adequate measures, 46% of renewable energy in final energy consumption could easily be achieved in Austria by 2020. Some general measures which should be implemented are a CO<sub>2</sub> tax as well as taxes on fossil fuel resources.

#### Electricity sector

The electricity feed-in tariff has been relaunched to an adequate level, but the amount is determined again every year, which creates a certain degree of investor uncertainty. The tariffs should be fixed for a longer period of time and not redetermined every year.

Moreover, a new and consistent Green Electricity Act is required, as are measures to support biogas feeding into the grid, as well as to improve licensing procedures and grid connection.

As far as specific technologies are concerned, constant investment subsidies should be in place for PV-plants.

<sup>13</sup> Österreichischer Biomasse-Verband, IG Windkraft Österreich, Kleinwasserkraft Österreich, Photovoltaic Austria, Austria Solar, ARGE Kompost & Biogas Österreich, proPellets Austria: Nationaler Aktionsplan für erneuerbare Energie für Österreich, 2010

This scenario was provided by the Österreichischer Biomasse-Verband, IG Windkraft, Kleinwasserkraft Österreich, Photovoltaic Austria, Austria Solar, Arge Kompost & Biogas, and Pro-pellets Austria. It is based on the Austrian REPAP Roadmap.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	NA	39,590	53	7,707	36,071	48.6
Hydro (below or equal to 10 MW)	1,600	8,000	11	1,291	6,041	8.1
Pumping	NA	NA	NA	4,285	2,732	3.7
Geothermal	NA <sup>(1)</sup>	200 <sup>(1)</sup>	0	1	2	0
Photovoltaic	6,819	6,819	9	322	306	0.4
Wind Onshore	3,473	7,300	10	2,578	4,811	6.5
Biomass (solid, biowaste, bioliquid)	765	4,900	7	1,179	4,566	6.2
Biogas	250	2,000	3	102	581	0.8
<b>Total RES-E</b>	<b>12,907</b>	<b>68,809</b>	<b>93</b>	<b>13,180<sup>(2)</sup></b>	<b>52,378<sup>(2)</sup></b>	<b>70.6<sup>(2)</sup></b>

(1) EGEC foresees that 50 MW of geothermal power could be installed by 2020 producing about 386 GWh.

(2) This excludes pumping indicated above.

### Heating and cooling sector

As far as specific technologies are concerned, constant investment subsidies should be in place for biomass boilers, pellets boilers and solar thermal plants. Subsidies in the field of residential construction works should be linked with the exclusive usage of RES for heating and hot water preparation.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	4,633	36.2	3,591	28.1
Biogas	96	0.7	16	0.1
<b>RE from Heat Pumps:</b>	<b>250</b>	<b>2</b>	<b>262</b>	<b>2</b>
<i>Geothermal Heat Pumps</i>	NA	NA	26	0.2
<i>Aerothermal Heat Pumps</i>	NA	NA	105	0.8
<i>Hydrothermal Heat Pumps</i>	NA	NA	131	1
Solar Thermal	912	7.1	269	2.1
Geothermal	36	0.3	40	0.3
<b>Total RES-H</b>	<b>5,927</b>	<b>46.3</b>	<b>4,178</b>	<b>32.6</b>

NB: EGEC foresees that geothermal heat pumps can produce 655 ktoe by 2020 in Austria.

### Transport sector

In the transport sector, tax incentives should be instigated for biofuel blending, and support programmes put in place for e-mobility and biomethane-mobility.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	180	80
Biodiesel	390	410
Renewable electricity	298	272
Others	160	94
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>1,028</b>	<b>856</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	5,911	93	4,503	70.6
Total RES-H&C Consumption	5,927	46.3	4,179	32.6
Total RES-T Consumption (as in line J of Table 4a of the NREAP )	1,074	13	958	11.4
<b>Total RES share</b>	<b>12,568</b>	<b>46.4</b>	<b>9,266</b>	<b>34.18</b>

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	6,377
Gross Final H&C Consumption	12,802
Gross Final Transport Consumption	8,414
Gross Final Energy Consumption	27,109

## BELGIUM

*“Investments in renewable energy will ensure the creation of sustainable green jobs.”*

Kathleen van Brempt  
MEP (S&D)

Contact Person:  
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### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Belgian NREAP splits the overall 13% renewable energy target into 20.9% RES-E, 11.9% in RES-H&C and 10.1% RES-T. The NREAP plans to reach its mandatory 13% renewable energy target, with RES technologies producing about 5,374.4 ktoe in 2020. The Belgian renewable energy federation EDORA estimates that a target of 5,985 ktoe (i.e. 10% higher than the NREAP target) is socio-economically feasible. Using the NREAP energy demand scenario, EDORA plans a RES consumption target of 14.5% by 2020.<sup>14</sup>

The Belgian NREAP does not propose any burden sharing scheme between the regions and the federal state, although such an agreement would be essential for the implementation of the action plan.

In terms of sectoral targets, while the targets for both heating and cooling and transport sectors are roughly similar between the NREAP and EDORA predictions, EDORA’s renewable electricity target is significantly more ambitious than the NREAP’s. Concretely, using the NREAP energy demand scenario, EDORA expects 26.6% renewable electricity in electricity consumption for 2020.<sup>15</sup>

14 Using its own energy consumption scenario, EDORA expect to reach a target ranging from 16 to 18% RES in final energy consumption by 2020.

15 Using its own energy demand scenario, EDORA plans a share of renewable electricity of 27 to 28% in 2020.

The Belgian NREAP requires a revision of the technology-specific targets. With the current market growth and measures, certain technologies could reach their targets as early as 2014. Furthermore, the Belgian NREAP fails to provide details on certain technology-specific targets that are bundled together (for wind and hydro).

## Support Schemes

### Electricity sector

The Belgian NREAP broadly describes the current support regime in the different regions and mentions different studies already planned to assess the regional support systems. However, no review or optimisation of the current system is proposed.

The national RES industry roadmap was provided by the Belgian RES association "Fédération de l'Energie d'origine renouvelable et alternative" (EDORA).

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	55	163.8	0.1			
Hydro (below or equal to 10 MW)	101.8	316.2	0.3	140	440	0.4
Geothermal	59.5	493.9	0.4	3.5	29.1	0
Photovoltaic	3,439.9	2,923.9	2.6	1,340	1,139	1
Tidal, Wave, Ocean	0.1	0.4	0	0	0	0
Wind Onshore	3,500.0	7,700.0	7	4,320	10,474	9.5
Wind Offshore	2,824.6	9,060.6	8.2			0
Biomass (solid, biowaste, bioliquid)	1,112.5	5,683.3	5.1	2,024.5	9,599.4	8.7
Biogas	590.1	3,189.5	2.9	427	1,439.1	1.3
<b>Total RES-E</b>	<b>11,683.5</b>	<b>29,531.6</b>	<b>26.6</b>	<b>8,255</b>	<b>23,120.6</b>	<b>20.9</b>

NB: The Belgian NREAP does not make a distinction between large and small hydro and onshore and offshore wind.

### Heating and cooling sector

The Belgian NREAP describes the current support regime for heating and cooling. It comprises investment aids, tax relief systems and a green certificate system for cogeneration. These existing regimes are not, however, sufficient to support an ambitious longer term vision. Moreover, no holistic system based on clear sectoral targets (building, industries and utilities) is proposed to support the heating and cooling targets of the Belgian NREAP. In addition, no original support system is proposed in order to facilitate and support the necessary development of district heating systems.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	1,942.5	8.9	1,979	9.1
Biogas	45.5	0.2	55	0.3
RE from Heat Pumps	342.1	1.6	350 <sup>(1)</sup>	1.6
Solar Thermal	241	1.1	198.7	0.9
Geothermal	31.7	0.1	5.7	0
<b>Total RES-H</b>	<b>2,602.8</b>	<b>11.9</b>	<b>2,588.4</b>	<b>11.9</b>

(1) EGEC foresees that half of the heat coming from heat pumps by 2020 will be provided by geothermal heat pumps.

Both the Belgian NREAP and the industry roadmap do not make any distinction between the different kinds of heat pumps in the target.

### Transport sector

The Belgian NREAP describes the current system based on a quota system (a mandatory volumetric proportion of biofuels in the fuel mix of any oil company), the exemption for biofuels from excise duty and tax cuts for electric vehicles. The NREAP plans to continue to rely on the quota system by raising biofuel shares in order to reach the mandatory transport target, while taking into account the impact of biofuels in terms of sustainability. The NREAP further mentions regional willingness to promote second generation biofuels without developing a strategy or specific measures.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	144.1	91
Biodiesel	614.3	698
Renewable electricity	0	97
Biofuels Article 21(2)	84.3	0
<b>Total RES-T in ktoe</b>	<b>842.7</b>	<b>886</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	2,539.3	26.6	1,988	20.9
Total RES-H&C Consumption	2,602.8	11.9	2,588.4	11.9
Total RES-T Consumption	842.7	9.6	886 <sup>(1)</sup>	10.1 <sup>(1)</sup>
<b>Total RES share</b>	<b>5,984.7</b>	<b>14.5</b>	<b>5,374.4</b>	<b>13.01</b>

As in line J of Table 4a of the NREAP Template

## Renewable Energy Industry Policy Recommendations

With some exceptions, the measures mentioned in the Belgian NREAP are already implemented or are included in the political programmes of the Federal and the Regional governments. Innovative strategies and measures together with a review and optimisation proposal for the current systems are lacking in the Belgian NREAP, though these would help to, at least, reach the proposed target. It is likely that the proposed measures are not adequate to reach the proposed renewable targets for 2020.

For both the electricity and heating and cooling sectors, it is necessary to optimise budget independent support systems by adapting the existing support level of each technology. The green certificate system for electricity production must be maintained but optimised and periodically reviewed while remaining predictable in the long term. A specific support mechanism for the heating and cooling sector (incl. a support mechanism for the construction of DH) should be developed and reinforced together with, at a later stage, a mandatory regulation scheme for new and existing buildings. Other means of support could come from the recuperation of windfall profits or stranded benefits from depreciated power plants.

In order to reach and even overshoot the 13% renewable target in 2020, EDORA thinks that it is of crucial importance to reinforce the electricity grid in order to allow the necessary deployment of renewable production plants without delaying their installation. This reinforcement strategy must be developed together with the regional and federal authorities and be based on a renewable energy spatial planning system, in which urgent decisions on the review (or removal) of current constraints should also be tackled (e.g. by watering down unnecessary aviation, military or environment constraints for renewable plant installations). In any case, the impact of a renewable energy plant should be balanced with its positive externalities compared to a traditional power plant.

In order to maximise renewable electricity production and to prevent future curtailments, it is of crucial importance to adapt the current legislation and technical regulations in order to guarantee unconditional priority dispatching for electricity from RES without any discriminatory measure (e.g. the grid injection tariff for decentralised installations must therefore be abolished).

For the heating and cooling sector, spatial planning must be adapted regarding, for example, DH development and the development of heat plants in zones with high density in terms of energy demand. These developments must allow an optimal mix of renewable energy technologies and sources, and maximise heat recovery. A special emphasis must be set on designing specific zones for “Ecozoning” development, with the adequate infrastructure to allow the dynamic development of economic activities.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	9,526
Gross Final H&C Consumption	21,804
Gross Final Transport Consumption	8,740
Gross Final Energy Consumption	41,301

## BULGARIA

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Bulgarian NREAP splits the overall 16% renewable energy target into 21% RES-E, 24% RES-H&C and 7.8% RES-T. Bulgaria intends to overachieve its 2020 target by 2.79%. Bulgaria’s binding 2020 RES target is up from 9.4% in 2005.

#### Support Schemes

##### Electricity sector

The main support mechanism for RES-E in Bulgaria is a feed-in tariff whose level is set annually by the State Energy and Water Regulatory Commission. RES-E technologies obtain the feed-in tariff for 15 years and the scheme ends in 2015. The NREAP gives no indication of what scheme, if any, will succeed it. Hence, there is no clear view on support schemes after 2015.

The New Renewable Energy Act Law (amending the Renewable and Alternative Energy Sources and Bio-fuels Act), whose objective is to implement the 2009/28/EC Directive, is still being discussed in Bulgaria (at the date of drafting of this report, in February 2011). The amendments were supposed to be adopted in December 2010, in time for the legal transposition deadline of the Renewable Energy Directive. However, Bulgaria will be late as the law will be voted on in 2011. The new Renewable Energy Act will include a revision of the current feed-in tariff as well as a revision/simplification of grid connection procedures.

The RES industry scenario is provided by the Bulgarian RES association - “Association of Producers of Ecological Energy” (APEE).

*“Most European countries are endowed with vast natural renewable energy resources and should exploit them accordingly.”*

Ivan Nikolaev Ivanov  
(MP)

Contact Person:  
Velizar Kiriakov  
APEE – Association  
of Producers of  
Ecological Energy  
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TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydropower	2,548 <sup>(1)</sup>	3,273 <sup>(2)</sup>	8.9	2,549	3,951	10.8
Photovoltaic	1,510	2,536	6.9	303	454	1.2
Wind Onshore	3,170	7,774	21.2	1,256	2,260	6.2
Biomass (solid, biowaste, bioliquid)	152	820	2.2	93	514	1.4
Biogas	100	482	1.3	65	357	1
<b>Total RES-E</b>	<b>7,480</b>	<b>14,885</b>	<b>40.5</b>	<b>4,266</b>	<b>7,536</b>	<b>20.6</b>

NB: EGEC foresees projections for geothermal electricity of 1,560 GWh with 200 MW installed.

NB: APEE foresees a production from wind offshore of 67 MW installed and 175 GWh.

(1) Of which 400 MW small hydro and 2,148 MW large hydro.

(2) Of which 667 GWh of small hydro, and 2,606 GWh of large hydro.

There are many pending projects in Bulgaria that have a preliminary grid connection agreement (under the old Renewable Energy Act). Under the old act, grid connection procedures lasted for approximately 11 months.

Problems regarding the grid connection procedures are:

- There are too many authorities involved (5 different authorities).
- Investors are not informed about the information flows between the different authorities.
- There is a connection fee per MW regardless of where the installation is being built.
- At the end, there is a selection process for which investors will be allowed to construct their plants. For this selection process, however, no criteria are defined.
- Regarding the grid, grid owners often deny access to the grid for projects that are licensed and already built.
- Bulgaria is making no investments in smart grids and therefore the grid may have difficulties in integrating large quantities of RES.

Many of the current problems faced by RES developers are not addressed by the NREAP. Permitting procedures, for instance, lack a satisfying legal framework. Many of the acts and ordinances were not created specifically for renewables. Permitting procedures differ from one municipality to another despite a common framework. As a result developers are faced with contradictory rules.

### Heating and cooling sector

Currently, there is no support scheme for RES-H&C. Both the NREAP and the upcoming Renewable Energy Law (proposal amending the Renewable and Alternative Energy Sources and Biofuels Act) contain an array of good ideas but their implementation is yet unclear and more wishful thinking than mandatory.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	605	13	1,053	22.7
Biogas	16	0.3	20	0.4
RE from Heat Pumps	18	0.4	0	0
Solar Thermal	40	0.9	21	0.5
Geothermal	116 <sup>(1)</sup>	2.5	9	0.2
<b>Total RES-H</b>	<b>795</b>	<b>17.1</b>	<b>1,103</b>	<b>23.8</b>

(1) Source: EGEC

Currently, all energy efficient buildings have some minimum tax benefits (e.g. tax relief for up to 7 years in the case where renewable energy sources are integrated in buildings). This is included in the law on local tax.



The proposal amending the Renewable and Alternative Energy Sources and Biofuels Act contains minimum requirements for the RES share in new and newly refurbished buildings. This would require minimum levels of renewable energy to be integrated in new and newly refurbished buildings. In the final version of the proposal, the feasibility of connecting RES producers to DH networks or natural gas networks should be estimated. Some flanking measures have been proposed: the implementation of the Energy Performance of Buildings Directive (EPBD) recast, the promotion of the RES heating and cooling technologies, and the certification of installers.

With the NREAP and the amendments to the Renewable and Alternative Energy Sources and Biofuels Act, it is considered that support schemes for renewable heating and cooling have to be developed but there are no concrete steps so far. Therefore, it would be a matter of developing new regulations.

### Transport sector

Bulgaria is lagging behind in terms of the European target for renewable energy in transport. As of January 2008, diesel on the market was supposed to be blended with 5.75% of biodiesel. This did not occur in practice, with no specific institution to control the process. Fuel companies started blending 2% in May 2010 which is to increase to 4% in May 2011 at the latest. At the same time, gasoline will also have to be blended with 2% bioethanol as of March 2011. The current situation means that this blending is restricted by law and cannot exceed 5%, which is inconsistent with the Biofuels Directive. According to the NREAP, Bulgaria is committed to reaching the European target of 10% RES in the transport sector by 2020, but the industry has doubts as to whether this will materialise.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Biofuels	82	196 <sup>(1)</sup>
Renewable electricity	0	5
Others	4.5	4
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>86.5</b>	<b>205</b>

(1) 42 ktoe come from Bioethanol/bioETBE and 154 ktoe come from biodiesel.

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	1,280	40.5	648	20.6
Total RES-H&C Consumption	795	17.1	1,103	23.8
Total RES-T Consumption (as in line J of Table 4a of the NREAP )	131	5	217	8.3 <sup>(1)</sup>
<b>Total RES share</b>	<b>2,162</b>	<b>20.8</b>	<b>1,956</b>	<b>18.79</b>

NB: The Bulgarian RES Industry Roadmap provided by APEE takes into account Article 21(2).

(1) This figure of 8.3% is based on data from table 4b line J together with table 1 of the Bulgarian NREAP. It differs from the figure of 7.8% indicated in table 3 of the Bulgarian NREAP.

## Renewable Energy Industry Policy Recommendations

Up to now, there has been no significant distinction in the permitting procedure for different actors (e.g. for small scale energy producers, households, etc.). This distinction should be one of the most important achievements of the amended Renewable and Alternative Energy Sources and Biofuels Act.

### Electricity sector

For the electricity sector, simplified procedures are called for, and one-stop-shops would be necessary. The existing grid has to be extended and modernised and smart grids have to be introduced in order to allow a higher penetration of RES.

## Heating and cooling sector

In the heating and cooling sector, there is a need to develop support schemes and minimum requirements for the RES share in buildings. A proper enforcement, monitoring and control system should be ensured. One way to finance this obligation could be via low interest credits for the construction and refurbishment of public buildings. The construction, the development and refurbishment of DH infrastructure is of crucial importance.

## Transport sector

In terms of transport, it is recommended that the government introduce incentives or support measures for the use of electric vehicles and their additional use as a regulator of the electricity consumption in periods with energy production surplus (for instance during the night).

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	3,148
Gross Final H&C Consumption	4,638
Gross Final Transport Consumption	2,625
Gross Final Energy Consumption	10,411

# CYPRUS

## The NREAP as seen by the Renewable Energy Industry

### 2020 Renewable Energy Targets

*“Renewable energy development makes islands less dependent on energy imports and creates local jobs and income.”*

George Perdikis (MP)

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The Cypriot NREAP splits the overall 13% renewable energy target into 16% RES-E, 23.5% RES-H&C and 5% RES-T. The Cypriot government’s estimations, provided in the NREAP, show that they expect the share of renewables to be that required by the RES Directive. SEAPEK (Cyprus Association of Renewable Energy Enterprises), however, is pessimistic about reaching the 2020 target. In the electricity sector, the government expects RES to represent only 4.3% of the final electricity consumption in 2010.

### Support Schemes

#### Electricity sector

There is an indication that future amendments to the renewable energy law (feed-in tariff law) may re-establish investment security for the major part of the renewable energy industry and especially for PV technology. The cuts in the PV tariffs (there is a suggestion to decrease the tariffs from 0.34 Euro to 0.28 Euro), and the discussion that will take place in the House of Parliament, has led to increasing concerns about the long-term stability and reliability of support policies. SEAPEK is preparing a study on this topic. Already now, it is worth noting that a tariff of 0.28 Euro will discourage future PV investment and prevent the take-off of the sector in Cyprus, as 12 years may be needed to pay off the initial investment. This is regrettable as the sector’s market share has been increasing rapidly over the last couple of years.

The industry scenario is provided by the Vienna University of Technology, Energy Economics Group, Vienna, Austria in cooperation with Fraunhofer Institute Systems and Innovation Research, Karlsruhe.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydro small scale	2 <sup>(1)</sup>	2 <sup>(1)</sup>	0	0	0	0
Geothermal	15	117	1.6	0	0	0
Photovoltaic	87	101	1.4	192	309	4
Solar Thermal Electricity	75 <sup>(2)</sup>	224 <sup>(2)</sup>	3	75	224	3
Wind Onshore	300	600	8.2	300	499	7
Wind Offshore	0	0	0	0	0	0
Biomass	17 <sup>(3)</sup>	143 <sup>(3)</sup>	1.9	17	143	2
<b>Total RES-E</b>	<b>496</b>	<b>1,187</b>	<b>16.1</b>	<b>584</b>	<b>1,175</b>	<b>16</b>

(1) Source: ESHA

(2) This figure has been taken from the NREAP. However, ESTELA estimates that 2,200 GWh could be produced in 2020 with an installed capacity of 826 MW.

(3) EREC Breakdown based on AEBIOM's projections

### Heating and cooling sector

For RES-H&C, the target is unlikely to be achieved, as currently there are a very limited number of applicants interested in installing RES space heating systems due to the lack of encouraging incentives and proper promotion of the support scheme (this includes information campaigns on the technologies).

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	13	2.5	30.16	5.7
Biogas	1	0.2	0	0
RE from Heat Pumps	3	0.6	2.97	0.6
Solar Thermal	96	18.2	90.47	17.2
Geothermal	6	1.1	0	0
<b>Total RES-H</b>	<b>119</b>	<b>22.6</b>	<b>123.60</b>	<b>23.5</b>

The main positive development is that, with the passing of a new Regulatory Administrative Act, the installation of a solar water heater is required by law since 1 January 2010 for any new residential building. It was observed that building developers in 2010 chose the option of geothermal energy for heating (on limited occasions) in new buildings.

### Transport sector

For the transport sector, the NREAP estimation translates a very conservative approach from the government for the next decade. The government target is very conservative, as it does not meet the binding target of 10%, and is only set at 5%.

In the case of Cyprus, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	0
Biodiesel	0.9
Renewable electricity	0
Net Biofuels Imports	71.6
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>72.5</b>

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>14.7</b>
<i>Of which Article 21(2)</i>	14.7
<i>of which imported</i>	14.7
<b>Biodiesel:</b>	<b>23.2</b>
<i>Of which Article 21(2)</i>	23.1
<i>of which imported</i>	22.6
Renewable electricity	0.6
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>38.5</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	102.1	16.1	101	16
Total RES-H&C Consumption	119	22.6	124	23.5
Total RES-T Consumption	72.5	9.4	38.5 <sup>(1)</sup>	5 <sup>(1)</sup>
<b>Total RES share</b>	<b>293.6</b>	<b>14.5</b>	<b>263.5</b>	<b>13</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

SEAPEK believes that Cyprus can achieve much more than the binding target of 13% of renewable energy by 2020, as foreseen in the RES Directive.

To that intent, the following actions should be taken:

- Considering the fact that the heating and cooling sector has the highest share (23.5%) in terms of meeting the national RES target, measures need to be put in place in order to integrate all RES-H&C technologies in the housing sector to ensure that this target can be reached (e.g. by encouraging existing house owners to apply for RES installations). The promotion of zero or nearly zero energy houses would also be a solution.
- Basic elements of the feed-in law must be maintained - as they are - at least for a period of two years (at 0.34 Euro<sup>16</sup> for PV and 0.15 Euro for wind) in order to foster stability and to encourage the take-off of the promising but yet underdeveloped RES market in Cyprus.
- Simplification of procedures for obtaining permits (it can take 1.5 years to obtain permits for a 150kw PV park)
- Establishment of a one-shop-stop for RES licensing (especially for small RES-E installations)
- Continuation of the support scheme without intervals. More precisely, stop-and-go policies should be avoided (during the first 8 months of 2010, for example, the support scheme was closed creating uncertainty on the market).
- The government should find ways to increase the funds available for grants and/or subsidy investments in RES and energy efficiency.
- The government should promote the use of biofuels in public transport and reduce the administrative (licensing) burden for local production.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	633
Gross Final H&C Consumption	527
Gross Final Transport Consumption	768
Gross Final Energy Consumption	2,023

## THE CZECH REPUBLIC

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Czech NREAP splits the overall 13% renewable energy target into 14% RES-E, 14% RES-H&C and 10.4% RES-T. The NREAP was drafted by the Ministry of Industry and Trade and approved by the Czech Government on 25 August 2010. The NREAP does not include measures that would ensure the Czech Republic reaches its binding target. Furthermore, Czech officials prepare other limitations.

The target is set at 13% of RES in gross final energy consumption by 2020. Despite a governmental declaration that the Czech Republic will achieve a more ambitious target of 13.5%, the present version of the action plan will not ensure the needed development of RES.

#### Support Schemes

##### Electricity sector

Support schemes for renewable energy are based on Act 180/2005 on the promotion of electricity production from renewable energy sources. This act serves its purpose well and gives producers a choice between feed-in tariffs and sale on the market with green bonus as well as guaranteeing a return on investment of 15 years. Unfortunately, the act has recently been amended. As a consequence, all renewable off-grid systems are excluded from the support.

As recommended by the RES association in the Czech Republic CZREA, the national RES industry road-map presented in this publication has been drafted by the Czech Energy Regulatory Office.

*“A stable legal framework is essential to the development of renewable energy sources.”*

Jiri Havel, MEP (S&D)

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro						
Hydro (below or equal to 10 MW)	1,145	2,314	3	1,125	2274 <sup>(1)</sup>	3 <sup>(1)</sup>
Geothermal	20	80	0	4.4	18	0
Photovoltaic	2,400	2,400	3	1,695	1,726	2
Wind Onshore	1,200	2,400	3	743	1,496	2
Biomass (solid, biowaste, bioliquid)	NA	3,294	4	NA	3,294	4
Biogas	417	2,871	3	417	2,871	3
<b>Total RES-E</b>	<b>5,182</b>	<b>13,359</b>	<b>16</b>	<b>3,984.4</b>	<b>11,679</b>	<b>14</b>

(1) This figure reflects both small and large hydro electricity generation.

The NREAP anticipates abolishing the present support scheme. As a result, the Czech government prepared a new act (which would replace Act 180/2005) to limit the development of particular RES. The government's proposed new legislation, which will most likely be approved in 2011 (to start in 2012), limits feed-in tariffs for installations up to 100 kW. For installations of higher capacity, the new legislation imposes the so-called "Hour Green Bonus" which would react on the market price of electricity hour by hour. Most decentralised RES currently use feed-in tariffs or long term contracts for green bonus schemes at present. This proposed legislation would hardly attract investors. This could also change the legally binding targets in the NREAP into caps. The production of energy from RES above this limit should then not be subject to support schemes. This legislation has been officially proposed by the government. If it is approved by the Parliament next year, the Czech renewable energy action plan would gain new importance. According to targets indicated for each technology in the Czech action plan, the regulatory office will decide which source will be subject to support. As a consequence, independent investors will not be able to predict the returns of their projects and banks will perceive investments as high-risk, and obtaining credit will prove increasingly difficult.

The attitude of the state-owned grid operator ČEPS a.s. and of the operators of regional distribution networks remains a considerable obstacle to the development of renewable energy sources. In spring 2010, for instance, they stopped accepting requests for connection of all wind and solar photovoltaic power plants. The Czech renewable energy action plan is not ambitious when it comes to smart grid development. The plan does not develop the smart grid issue.

The support scheme proposes a specific tariff for geothermal: 17.7 € ct/kWh and a green bonus of 13.3 € ct/kWh. It will stimulate the first geothermal power projects in the Czech Republic.

### Heating and cooling sector

The Czech government does not aim to develop any support scheme for efficient heat production from renewable energy sources. That is why support for RES-H&C has no place in the action plan. Heat production from renewable energy sources is only supported by investment subsidies from the Operational Programme Environment (municipal projects) and from the Green Savings Programme (residential houses) financed by Czech gains from Kyoto Protocol emission trading. Comprehensive measures need to be taken to tap the potential of RES-H&C in the Czech Republic.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	2,059	11	2,350	12.6
Biogas	180	1	167	0.9
RE from Heat Pumps:	156	0.9	118	0.6
<i>Geothermal Heat Pumps</i>	62 <sup>(1)</sup>	0.3	NA	NA
Solar Thermal	55	0.3	22	0.1
Geothermal	96	0.5	15	0.1
<b>Total RES-H</b>	<b>2,608</b>	<b>14</b>	<b>2,672</b>	<b>14.3</b>

(1) Source: EGEC

### Transport sector

The action plan specifies that 28% of the biofuels to be used by 2020 will be imported. Electromobility as an alternative mainly for city transport and an integral part of smart grids is not mentioned.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	386	128
Biodiesel	299	495
Renewable electricity	0	19
Others (pure vegetable oils...)	0	49
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>685</b>	<b>691</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	1,152	15.9	1,037.8	14.4 <sup>(1)</sup>
Total RES-H&C Consumption	2,608	14	2,672.2	14.3 <sup>(1)</sup>
Total RES-T Consumption	685	10.3	691 <sup>(2)</sup>	10.4 <sup>(2)</sup>
<b>Total RES share</b>	<b>4,444</b>	<b>13.7</b>	<b>4,383</b>	<b>13.5</b>

(1) This figure differs slightly from the figure indicated in table 3 of the Czech NREAP.

(2) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

The NREAP should propose a communication/public awareness campaign focused on State administrations, municipalities and the general public to improve understanding and decision making on renewable energy sources. It is a fact that low public opinion remains a barrier to the development of RES.

### Electricity sector

The government should develop plans on smart grids to integrate a large amount of decentralised renewable energy sources onto the grid. The NREAP includes a proposal for accelerating the licensing process for high voltage power lines. A legislative proposal focusing on high voltage power lines is currently being discussed in the Parliament. The remuneration of RES electricity can be revised annually but without retroactivity.

### Heating and cooling sector

The action plan does not include conceptual support for renewable heat production while the achievement of the national target will hardly be possible without any support scheme in the H&C sector. A support scheme for installations over 200 kWt should be developed similar to the green bonus system which is applied to electricity generation.

Other flanking measures should also be adopted: introduce a regulatory framework, simplify licensing procedures, promote RES-H&C technologies and establish a certification scheme for small scale RES installers.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	7,232
Gross Final H&C Consumption	18,680
Gross Final Transport Consumption	6,618
Gross Final Energy Consumption	32,531

## DENMARK

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

*“Denmark has been a pioneer in RES development & should continue to show the way forward.”*

Britta Thomsen,  
MEP (S&D)

The Danish NREAP splits the overall 30% renewable energy target into 51.9% RES-E, 39.6% RES-H&C and 10% RES-T.

The Danish Government based its 2020 projections for renewable energy on a “frozen policy” scenario, meaning on the existing framework and legislation. The NREAP states that the target of 30% renewable energy will be met in 2020. This projection is based on the assumption of a political framework that gives the needed incentives to invest in RES. However, for the moment, the financial incentives are in general not high enough to encourage the investment needed to reach the 30% target. Moreover, revenues from coal taxes will diminish when coal is substituted with biomass. This is currently a concern for the Danish Ministry of Finance in light of the financial crisis.

The Danish Climate Commission published in September 2010 a roadmap for Denmark to be independent of fossil fuels in 2050. Several of their ideas are in line with the energy associations in Denmark. The Danish government may well suggest new measures in the near future as a result of the Danish Climate Commission report.

#### Support Schemes

##### Electricity sector

Wind – onshore: The financial incentive for private investors is adequate, and onshore wind will be developed at a pace higher than expected by the authorities. The expectation is remarkably low for onshore wind, which has been questioned by the Danish Wind Turbine Owners Association and the Danish Wind Industry Association.

As a REPAP workshop has not been organised in Denmark, no RES industry roadmap has been published. For this reason, only the NREAP scenario is presented in this publication.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydro (below or equal to 10 MW)	10	31	0.1
Photovoltaic	6	4	0
Wind Onshore	2,621	6,391	16.9
Wind Offshore	1,339	5,322	14.1
Biomass (solid,biowaste,bioliquid)	2,430	6,353	16.8
Biogas	349	2,493	6.6
<b>Total RES-E</b>	<b>6,755</b>	<b>20,594</b>	<b>54.5<sup>(1)</sup></b>

(1) This figure differs from the percentage indicated in table 3 of the Danish NREAP, based on the calculation from table 1 with table 10b.

Wind – offshore: No more offshore wind farms than those already agreed are taken into account, which means that the Djursland-Anholt wind farm is the last included in the 2020-scenario.

Geothermal: A potential for electricity production exists mainly with Enhanced Geothermal Systems (EGS) but Denmark does not provide any measures to develop these technologies.

Furthermore, biomass in the form of imported wood chips and wood pellets is estimated to make up a very large part of the fuel combustion in Danish Combined Heat and Power (CHP) plants by 2020. However, the issue of revenue gathering from coal taxes still has to be addressed by the government.



Biogas is stipulated to increase significantly by 2020 and the official government target is that 50% of all husbandry manure be fermented in biogas plants by 2020. However, adequate means to achieving this target are not in place at the moment and Danish agriculture suffers from diminishing land prices due to the financial crisis combined with a very high level of debt. This means that the expansion of biogas capacity is stalled for the time being.

### Heating and cooling sector

Building Regulation (BR08) sets up an energy framework, which is the maximum required, for energy supplied to a building for all new buildings and extensive renovations. Energy requirements were tightened by 25%, according to the NREAP, while two low-energy classes were introduced. Experience shows that many buildings not supplied with DH will use RES heating (mainly solar) thanks to this regulation.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	NREAP	
	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	2,478	32.4
Biogas	165	2.2
<b>RE from Heat Pumps:</b>		
<i>Geothermal Heat Pumps</i>	199	2.6
<i>Aerothermal Heat Pumps</i>	170	2.2
Solar Thermal	16	0.2
<b>Total RES-H</b>	<b>3,028</b>	<b>39.6</b>

The government is planning new initiatives to reduce energy consumption in new and existing buildings:

- Energy consumption in new buildings must be reduced by at least 50% in 2015 and at least 75% in 2020 in relation to current standards;
- A factor of 0.8 for DH will be introduced in connection with the tightening in 2015 (so that a considerable portion of DH comes from RES & co-generation);
- Buildings that are not supplied with DH will have better opportunities for including common RES installations in the energy framework;
- Provided that it is economically viable, each time a roof is refurbished, solar heating will be installed in existing buildings which consume more than 200 litres of hot water per day.

### Transport sector

The NREAP almost fully relies on the present quota legislation for biofuels. According to the NREAP, the increase in biofuels consumption will be met by imports from abroad. The Act on Sustainable Biofuels (Act No. 468 of 12 June 2009) aims at promoting the use of sustainable biofuels in land transport. There are, however, no regulations governing the process of transforming biomass into biofuels. Electric vehicles are included in the forecasts, but are not considered to be an influential contributor to the Danish renewable transport target.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>94</b>
<i>Of which Biofuels Article 21(2)</i>	94
<i>of which imported</i>	94
<b>Biodiesel:</b>	<b>167</b>
<i>Of which Biofuels Article 21(2)</i>	167
<i>Of which imported</i>	167
Renewable electricity	29
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>290</b>

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	1,685	51.9
Total RES-H&C Consumption	3,042	39.7
Total RES-T Consumption (as in line J of Table 4a of the NREAP)	439	10
<b>Total RES share</b>	<b>4,989</b>	<b>30.5</b>

## Renewable Energy Industry Policy Recommendations

If Denmark is to live up to the Danish Climate Change Commission roadmap and be “fossil fuel independent by 2050”, the framework for renewable energy must be improved, as the Danish 2020 targets are lagging behind compared to the country’s 2050 ambitions.

### Electricity sector

Long term planning and targets for renewable energy production combined with an efficient subsidy schemes and/or higher taxation on pollution or the use of fossil fuels would seem favourable to Denmark reaching its targets and ensuring investment security for RES projects.

In the electricity sector, a reform of the tax system to utilise mechanisms such as flexible demand, flexible production and smart grids, would be useful. Such a reform should include both production and consumption taxes and financing renewable energy deployment.

In cooperation with the transmission operators, the Danish Energy Agency estimates that there is a need for amended authorisation procedures for network reinforcement.

### Heating and cooling sector

There is also a need for policy initiatives for solar heating to become more widespread. The continuation of the initiative, which launched the Action Plan for heat pumps, should be ensured, as it will expire soon.

For geothermal energy, the establishment of a risk insurance scheme will help to remove the barrier of the geological risk. Moreover, the procedures must be simplified for deep geothermal.

### Transport sector

It would be important to ensure the incentives for the rapid deployment of electric vehicles and the needed infrastructure. A proposal to develop second generation biofuels would also be needed in the transport sector. Financing could come from a denominator green car tax at EU level, to promote certain energy and environmentally efficient technologies.

TABLE 5: Energy Demand Assumptions used in the scenario (source: NREAP in ktoe)

Gross Final Electricity Consumption	7,232
Gross Final H&C Consumption	18,680
Gross Final Transport Consumption	6,618
Gross Final Energy Consumption	32,531

## ESTONIA

## The NREAP as seen by the Renewable Energy Industry

## 2020 Renewable Energy Targets

The Estonian NREAP splits the overall 25% renewable energy target into 17.6% RES-E, 38.4% RES-H&C and 9.9% RES-T. The NREAP submitted to the European Commission is a complete document, which answers all issues requested in the Commission's template. Estonia currently has three different documents defining the national energy strategy for 2020: the NREAP, the National Energy Strategy 2020 and the National Electricity Strategy 2018. All these strategies are in line with Estonia's obligation under the renewable energy Directive, but are considerably below the actual potential which could be achieved by 2020. The NREAP states that Estonia will meet its overall binding target for 2020.

## Support Schemes

## Electricity sector

Currently, as described in the NREAP, producers of renewable electricity (except for electricity from biomass) are today remunerated on the basis of FIT premiums. Certain limitations exist, for instance, for wind electricity, support is paid only up to 600 GWh per year and up to 12 years in total. Concerning biomass, only electricity produced using CHP technology receives support. In addition a lower feed-in tariff (3,19 cents/kWh) is foreseen for electricity produced from waste using CHP technology. Furthermore, if the level of support remains insufficient, those renewable electricity producers that use CHP technology can claim different remuneration subject to a decision of the Competition Authority.<sup>17</sup> All the measures described above act as a premium to the market price (market price + premium).

The Ministry of Economic Affairs has drafted a law which calls for a reduction of the premium in accordance with the changes in the market price (Danish system). This would automatically reduce the FIT if the market price increases or vice versa. The draft law would retroactively change the support scheme for all actors, including for those who have already made their investments and operate the power plants, which is very problematic for investors. Currently the draft law has been put on hold and with today's investment climate being extremely unstable, investments into new capacities have stalled.

As a REPAP workshop has not been organised in Estonia, no RES industry roadmap has been published. For this reason, only the NREAP scenario is presented in this publication.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydro (below or equal to 10 MW)	7.8	30	0.3
Wind Onshore	400	974	8.9
Wind Offshore	250	563	5.2
Biomass	NA	346	3.2
<b>Total RES-E</b>	<b>657.8</b>	<b>1,913</b>	<b>17.6</b>

## Heating and cooling sector

Specific measures to promote renewable heating and cooling are limited to investment support for small CHP facilities (below 4 MWe) and for the modernisation and reconstruction of DH systems. The scheme is financed through structural funds the European Regional Development Fund (ERDF).

*“The rapid development of renewable energy sources is crucial to strengthening security of energy supply.”*

Kalle Palling (MP)

<sup>17</sup> Estonia does not have a separate Energy Market regulator due to the fact that it merged with the Competition Authority.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	NREAP	
	RES Heat Consumption	% in Heat Consumption
Biomass	607	38.4
<b>Total RES-H</b>	<b>607</b>	<b>38.4</b>

### Transport sector

Support measures for the transport sector are limited to the excise duty exemption applicable to biofuels.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
Bioethanol/bioETBE	38
Biodiesel	51
Renewable electricity	1
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>90</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	165	17.6
Total RES-H&C Consumption	607	38.4
Total RES-T Consumption (as in line J of Table 4a of the NREAP)	92	9.9
<b>Total RES share</b>	<b>863</b>	<b>25</b>

## Renewable Energy Industry Policy Recommendations

### Electricity sector

The biggest problem today is the draft law mentioned above and proposed by the Ministry of Economic Affairs which would retroactively change the support scheme for all actors. In addition, the current support scheme does not take into account differences between technologies, because the same premium is paid for all the technologies, thus making investments into solar, biogas and offshore wind uneconomical. Further problems arise in relation to the fact that FIT is also given to cogeneration from non-renewable fuels such as peat, waste, shale gas, natural gas, but to the consumers, all this is presented as support for 'renewable fuels'. The rapidly rising FIT has received public criticism, but the separation of accounts which clearly states the support given to renewable and fossil fuels has not been published.

Furthermore, barriers to the promotion of RES-E are the licensing procedures and access to the grid. Regarding licensing procedures, there is an urgent need for streamlining and simplification both at the local and national level. Furthermore, the health impact of new developments needs regulation at the national level. Regarding grid access, Elering Oy, the fully unbundled grid operator, which is at the same time responsible for FIT administration, enforces a controversial grid code, which often discriminates against new players in the market. Due to this discrimination, in 2010, 100 GWh (roughly 36% of RES-E) did not receive the feed-in support. Furthermore, although Elering Oy is fully unbundled, the former mother company, Eesti Energia Ltd., still enjoys preferential treatment regarding the grid code.

Finally, Estonia could consider the application of cooperation mechanisms in order to realise its effective potential in RES-E.

## Heating and cooling sector

A reassessment of the existing measures as well as the adoption of additional measures is needed to ensure that the targets are met. Estonia did not answer the points in the NREAP regarding the establishment of a certification scheme for installers. A solid support scheme covering all RES-H&C technologies should be adopted, avoiding stop-and-go policies. The licensing procedure must be simplified (with a one-stop-shop) and the rules on integration of RES in buildings of the recast of the Energy Performance of Building's Directive (EPBD) must be transposed.

## Transport sector

A reassessment of the existing measures as well as the adoption of additional measures is needed to ensure that the target is met. The mandatory blending targets for biofuels, investments into the infrastructure for electromobility together with the promotion of electric vehicles should be considered.

TABLE 5: Energy Demand Assumptions used in used in the scenario (source: NREAP in ktoe)

Gross Final Electricity Consumption	938
Gross Final H&C Consumption	1,579
Gross Final Transport Consumption	934
Gross Final Energy Consumption	3,451

# FINLAND

## The Renewable Energy Industry Feedback on the NREAP

### 2020 Renewable Energy Targets

The Finnish NREAP splits the overall 38% renewable energy target into 32.9% RES-E, 47.5% RES-H&C and 20% RES-T. The action plan indicates that Finland intends to be above its indicative trajectory throughout the period and meet its 2020 target without exceeding it. The overall target as well as the sectoral targets appear challenging, considering the existing incentives. This indicates the need for new support and incentive mechanisms. However, the Finnish NREAP template has not been appropriately filled in. It does not answer many questions of the template. Finland should present a more complete version of the NREAP to comply with the RES Directive and give visibility to the industry.

### Support Schemes

#### Electricity sector

Feed-in tariffs for wind energy, biogas, small wood-fired CHP, and forest chip-CHP are currently being prepared. A FIT should also be established for geothermal in the future. The level of the tariff can be adjusted at a later stage if the targets are not met. No offshore wind specific FIT is foreseen. Consequently, no offshore wind capacity is programmed in the NREAP. Without offshore deployment, reaching 2.5 GW of wind energy onshore is feasible yet ambitious.

The RES scenario was provided by the Fraunhofer Institute Systems and Innovation Research, Karlsruhe in cooperation with Vienna University of Technology, Energy Economics Group, Vienna

*“Public support to conventional energy sources are manifold compared to what is directed to renewable energy sources: only 10% is not enough, we have to change this!”*

Sirpa Pietikäinen,  
MEP (EPP)

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	2,962.9	13,481	13.3	2,790	12,960	12.8
Hydro (below or equal to 10 MW)	1,102 <sup>(1)</sup>	1,192 <sup>(1)</sup>	1.2	310	1,460	1.4
Geothermal	5 <sup>(2)</sup>	39 <sup>(2)</sup>	0	0	0	0
Photovoltaic	3,374	2,241	2.2	10	0	0
<b>Wind</b>	<b>1,900</b>	<b>5,200</b>	<b>5.1</b>	<b>2,500</b>	<b>6,090</b>	<b>6</b>
<i>Wind Onshore</i>	1,500 <sup>(3)</sup>	3,700 <sup>(3)</sup>	3.6	NA	NA	NA
<i>Wind Offshore</i>	400 <sup>(3)</sup>	1,500 <sup>(3)</sup>	1.5	NA	NA	NA
Biomass (solid, biowaste, bioliquid)	2,920 <sup>(4)</sup>	12,640 <sup>(4)</sup>	12.4	2,920	12,640	12.4
Biogas	54 <sup>(4)</sup>	270 <sup>(4)</sup>	0.3	NA	270	0.3
<b>Total RES-E</b>	<b>12,317.9</b>	<b>35,063</b>	<b>34.5</b>	<b>8,530</b>	<b>33,420</b>	<b>32.9</b>

(1) Source: ESHA

(2) Source: EGEC

(3) Source: EWEA Baseline scenario.

(4) EREC Breakdown based on AEBIOM's projections. The biogas installed capacity is an EREC assumption based on 5,000 running hours.

NB : The Finnish NREAP plans 10 MW installed capacity for ocean energy by 2020 without any GWh produced.

### Heating and cooling sector

Present and planned incentives for heating and cooling in Finland are quite modest, and the targets cannot be reached with present price levels of fossil fuels. These incentives include the increase of energy taxes, small investment subsidies for renewable heating systems, as well as a subsidy for the harvesting of small trees.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	7,739	50.6	2,670	17.5
Biogas	43	0.3	3,940	25.7
<b>RE from Heat Pumps:</b>	<b>556</b>	<b>3.6</b>	<b>660</b>	<b>4.3</b>
<i>Geothermal Heat Pumps</i>	333 <sup>(1)</sup>	2.2	NA	NA
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	223	1.4	NA	NA
Solar Thermal	142	0.9		0
<b>Total RES-H</b>	<b>8,480</b>	<b>55.4</b>	<b>7,270</b>	<b>47.5</b>

(1) Source: EGEC

### Transport sector

Legislation requiring the use of a certain percentage of biofuels in gasoline and diesel was adopted at the end of 2010. Several demonstrations plants to produce second generation biofuels are currently in planning, and proposals for a NER300 call and national investment subsidies will be prepared. Furthermore, incentives for electric vehicles are in preparation, mainly concerning the demonstration of several concepts.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	123.1	130 <sup>(1)</sup>
Biodiesel	0	430 <sup>(2)</sup>
Renewable electricity	0	40
Net Biofuels Imports	302.1	0
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>425.2</b>	<b>600</b>

(1) Of which 40 ktoe are biofuels Article 21(2)

(2) Of which 140 ktoe are biofuels Article 21(2)

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	3,015.4	34.5	2,870	32.9
Total RES-H&C Consumption	8,480	55.4	7,270	47.5
Total RES-T Consumption	425	10	800 <sup>(1)</sup>	20 <sup>(1)</sup>
<b>Total RES share</b>	<b>11,921</b>	<b>42.3</b>	<b>10,700</b>	<b>38</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

### Electricity sector

FIT for offshore wind would be of great aid in reaching the target, as well as incentives to use straw, energy crops and other biomass. There is also a need to increase support levels notably for geothermal energy if an ambitious and accelerated RES deployment is targeted. To achieve the target of 10 MW of non-grid connected ocean energy prototypes, the Finnish government must set up a positive framework of policies to promote research such as grants and scholarships.

### Heating and cooling sector

Policy instruments should be introduced that provide incentives for integrating a RES-H&C device into the heating/cooling system.

Furthermore, incentives to replace the use of fuel oil and electricity for heating with bioenergy, solar, geothermal energy and heat pumps would be welcome.

### Transport sector

The implementation of planned legislation (RES obligations, mandatory %-share) is required if Finland is to reach its target, and investment subsidies for demonstration of 2<sup>nd</sup> generation biofuel production and use would also be useful tools. There is currently the plan of implementing a national target for biofuels of 20% by 2020. Furthermore, the renewable energy potential should be taken into account in transportation planning as it could have a great impact on the utilisation of renewable energy potentials.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	8,740
Gross Final H&C Consumption	15,300
Gross Final Transport Consumption	4,080
Gross Final Energy Consumption	28,170

## FRANCE

## The Renewable Energy Industry Feedback on the NREAP

## 2020 Renewable Energy Targets

The French NREAP splits the overall 23% renewable energy target into 27% RES-E, 33% RES-H&C and 10.5% RES-T. The national action plan reflects the work carried out on potential by the operational committee n°10 of the “Grenelle de l’Environnement”.

The overall RES target of 23% was enacted in the Grenelle law of 3 August 2009. Each technology target (wind energy, solar, etc.) is enshrined in statutory texts (PPI: “Programmations pluriannuelles des investissements”). It is, however, regrettable that these objectives resulting from the work of the “Grenelle de l’Environnement” in March 2008 were not reviewed as a result of the price reduction that has occurred for certain raw materials in some sectors.

## Support Schemes

## Electricity sector

The RES industry scenario is provided by the French RES Association, the “Syndicat des Énergies Renouvelables” (SER).

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity generation (GWh)	% in Electricity Consumption
Large Hydro	27,500	60,000	11	21,206 <sup>(1)</sup>	63,953 <sup>(1)</sup>	11.7
Hydro (below or equal to 10 MW)	NA	7,300	1.3	2,290	7,749	1.4
Geothermal	190 <sup>(2)</sup>	1,000	0.2	80	475	0.1
Photovoltaic	5400	5,200	1	4,860	5,913	1.1
Solar Thermal Electricity	540	972	0.2	540	972	0.2
Tidal, Wave, Ocean	0	0	0	380	1,150	0.2
Wind Onshore	19,000	42,300	7.8	19,000	39,900	7.3
Wind Offshore	6,000	16,200	3	6,000	18,000	3.3
Biomass (solid, biowaste, bioliquid)	2,400	16,700	3.1	2,382	13,470	2.5
Biogas	0	0	0	625	3,701	0.7
Others		300	0.1	0	0	0
<b>Total RES-E</b>	<b>61,030</b>	<b>149,972</b>	<b>27.7</b>	<b>57,363</b>	<b>155,283</b>	<b>28.5<sup>(3)</sup></b>

(1) This does not include pumping (6,800 MW and 7,268 GWh)

(2) Source: EGEC

(3) The calculation based on table 10 & 1 of the NREAP template shows a figure which differs from the percentage indicated in table 3 of the template.

The feed-in tariffs are on the whole, fairly satisfying. However, renewable energy professionals suffer, for some technologies, from a lack of visibility. It should be pointed out that a support policy should be stable in order to spark industrial investments. On 2 December 2010, the FIT for PV was suspended for a period of 3 months. The government has opened a consultation process to find the best way to develop PV technology while at the same time controlling both volume and costs. Concerning the wind energy

*“The Grenelle de l’Environnement has set the framework and objectives for RES policy. But so far the policy and fiscal decisions have not met these objectives. This political vision needs to be reinforced and properly implemented.”*

Corinne Lepage,  
MEP (ALDE)

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sector, some new rules could disturb the market. Today, 1,000 MW are connected per year (the national plan requires 1,300.00 MW/year) but new rules could slow down the development of wind energy. The wind industry is therefore very concerned. On the other hand, the geothermal sector now benefits from very interesting tariffs to develop notably EGS plants.

### Heating and cooling sector

SER ("Syndicat des Energies Renouvelables") estimates that the measures taken in the building sector are globally very positive for renewable energy technologies (tax credits, thermal regulation, etc.). The Heating Fund ("Fonds Chaleur"), set up to support the uptake of renewables in heating is a proven success. Due to the current economical crisis, however, the renewable energy industry is concerned for the years to come. It is regrettable that some measures to remove administrative barriers and simplify the procedures were not proposed.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	15,900	26.5	15,900	26.5
Biogas	555	0.9	555	0.9
Geothermal & aerothermal Heat pumps	1,600	2.7	1,850	3.1
Solar Thermal	927	1.6	927	1.6
Geothermal	750	1.3	500	0.9
<b>Total RES-H</b>	<b>19,732</b>	<b>33</b>	<b>19,732</b>	<b>33</b>

### Transport sector

In terms of the compliance of biofuels and other bioliquids to sustainability criteria, under the Renewable Energy Directive, Member states are obliged to elaborate a national scheme which the economic operators could use to prove the sustainability of their biofuel or bioliquid. At this stage, there is no such scheme in France.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	1,000	650
Biodiesel	3,000	2,850
Renewable electricity	0	402
Biofuels Article 21(2)	0	50
Others	0	110
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>4,000</b>	<b>4,062</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario (ktoe)	Industry Scenario in %	NREAP Scenario (ktoe)	NREAP Scenario in %
Total RES-Electricity Consumption	12,898	27.7	12,729	27
Total RES-H&C Consumption	19,732	33	19,732	33
Total RES-T Consumption	4,000	9.5	4,427 <sup>(1)</sup>	10.5 <sup>(1)</sup>
<b>Total RES share</b>	<b>36,630</b>	<b>23.6</b>	<b>36,121</b>	<b>23.26</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

### Electricity sector

There have been frequent changes in regulations on authorisation for renewable energy over the past years. It appears necessary to stabilise regulations so that operators can work in better conditions. There is no one-stop-shop for obtaining authorisations for RES-E projects, and this is a weak point in the existing system. The distribution grid needs urgent modernisation and RES need to be favoured on the grid. Furthermore, it is also essential to develop and strengthen grid infrastructure and grid lines in certain zones, especially where problems arise at the present time and in areas where RES projects are likely to be developed in the future.

### Heating and cooling sector

It would seem crucial to introduce a minimum level of RES in the overall consumption of buildings (e.g. by introducing a minimum consumption threshold of 5 kWh/m<sup>2</sup>.year). For public buildings to fulfil an exemplary role by 2012, all constructions or major renovations of public buildings should incorporate a minimum level of RES. The budget of the "Fonds Chaleur" may be reviewed yearly and is therefore unstable. Another system of financing should be preferred. Finally, administrative procedures to install RES-H&C systems must be simplified.

### Transport sector

Due to the current absence of a national scheme on the compliance of biofuels and other bioliquids to sustainability criteria, economic operators could favour the voluntary scheme in France. Indeed, economic operators are entitled to use the voluntary scheme that they have elaborated, provided this voluntary scheme has first been recognised by the European Commission and been through the comitology process. In terms of measures to ensure that economic operators submit reliable information and show that the sustainability criteria has been fulfilled, it would seem advisable for the main checking point to be at the custom level when fuels are put on the market, as there are already various control systems at this level. As far as voluntary certification schemes for the sustainability of biofuel and bioliquids are concerned, all options should be authorised, a national system or a voluntary scheme. However, in the latter, the economic operator may have more flexibility to design a system that is adapted to its economic constraints. SER estimates that public authorities could, via a FiT system or via subsidies, give premiums for installations using biomass coming from arable land, degraded land, etc., which would encourage their use for energy purposes.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	46,913
Gross Final H&C Consumption	60,000
Gross Final Transport Consumption	42,100
Gross Final Energy Consumption	155,268

## GERMANY

## The NREAP as seen by the Renewable Energy Industry

## 2020 Renewable Energy Targets

The German NREAP splits the overall 18% Renewable Energy target into 38.6% RES-E, 15.5% RES-H&C and 13.2% RES-T. The German government estimations provided in the NREAP remain far below the 28%, which the German Renewable Energy Association BEE (Bundesverband Erneuerbare Energie) has calculated to be feasible in 2020 in its REPAP roadmap. Although the government expects the share of renewables to be 19.6% of gross final energy consumption in 2020, the official target remains at 18% as required by the RES Directive. In all sectors, the NREAP remains below the BEE estimations. In the electricity sector, BEE assumes 47% to be possible, for heating and cooling, 25% and for the transport sector, 19%.

## Support Schemes

## Electricity sector

There is no indication in the NREAP that future amendments to the German Renewable Energy Act (Feed-in tariff law EEG) will fully re-establish investment security for the major part of the renewable energy industry. The deep cuts in the PV tariffs, which have just entered into force, together with proposals to phase out technology specific support by 2020, have led to increasing concerns about long-term stability and reliability of support policies.

The RES industry scenario was provided by the German RES Association Bundesverband Erneuerbare Energie (BEE). For information, we have added to these tables a column showing the results taking into account the energy demand assumptions of the German industry roadmap.

*“The stable political RES framework created in Germany has already created more than 350.000 jobs.”*

Jo Leinen, MEP (S&D)

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TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap				NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption-BEE Demand Assumptions	% in Electricity Consumption-NREAP Demand Assumptions	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydropower	6,500 <sup>(1)</sup>	31,850	5.4	5.7	4,309	20,000 <sup>(2)</sup>	3.6
Geothermal	625	3,750	0.6	0.7	298	1,654	0.3
Photovoltaic	39,500	39,500	6.7	7	51,753	41,389	7.4
Wind Onshore	45,000	112,050	18.9	19.9	35,750	72,664	12.9
Wind Offshore	10,000	37,000	6.2	6.6	10,000	31,771	5.7
Biomass (solid, biowaste, bioliquid)	4,263	21,032	3.6	3.8	5,029	26,019	4.6
Biogas	5,075	33,263	5.6	5.9	3,796	23,438	4.2
<b>Total RES-E</b>	<b>110,963</b>	<b>278,445</b>	<b>47</b>	<b>49.6</b>	<b>110,935</b>	<b>216,935</b>	<b>38.6</b>

NB: The German industry roadmap excludes the pumped storage but not totally. The hydro power capacity and generation includes the natural inflow of the pumped-storage power plants. These hydro figures of 2007 are based on data from the German Environment Ministry and the Working Group of Renewable Energy – Statistics (AGEE-Stat). But there are many uncertainties regarding the hydro power capacity (and generation).

(1) Of which 2,702 MW and 1,607 MW small scale. Pumped storage of 7,900 MW is excluded.

(2) Of which large-scale hydro represents 12,950 GWh, small scale hydro represents 7,050 GWh. Pumped storage of 8,395 GWh is excluded.

## Heating and cooling sector

The NREAP lacks a stable and reliable instrument to trigger ambitious growth rates in the building stock, only planning minor amendments to the existing legislation. Although the Market Incentive Programme has

proven to be insufficient due to its dependence on regular budget decisions, the NREAP does not even consider a budget independent support mechanism or building obligations for existing buildings. No satisfactory ideas for implementing the exemplary role of public buildings can be found in the NREAP.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap			NREAP	
	RES Heat Consumption	% in Heat Consumption-BEE Demand Assumptions	% in Heat Consumption-NREAP Demand Assumptions	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	11,556	15.2	12	9,663	10.4
Biogas	1,363.7	1.8	1	1,692	1.8
RE from Heat Pumps	2,303	3	2	1,144 <sup>(1)</sup>	1.2
Solar Thermal	2,592	3.4	3	1,245	1.3
Geothermal	1,225	1.6	1	686	0.8
<b>Total RES-H</b>	<b>19,039.7</b>	<b>25</b>	<b>19</b>	<b>14,430</b>	<b>15.5</b>

(1) Of which 521 ktoe from geothermal heat pumps (HPs), 547 ktoe from aerothermal HPs and 77 ktoe from hydrothermal HPs.

### Transport sector

The NREAP fully relies on the present quota legislation for biofuels, which was the main reason why in the last few years the development of a promising market for sustainable and domestically grown pure biofuels came to an abrupt stop. There is no indication that the government has any plans to revitalize policies for sustainable domestic biofuels. Instead they rely on a stable quota until 2016 and abruptly rising biofuels shares in 2017 and 2020 to fulfil the 10% target. According to the NREAP, the increase in biofuels consumption will only be met by imports from abroad, with not only negative impacts on the environment, but particularly on the domestic industry.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	1,308.2	857
Biodiesel	7,379.7	4,443
<i>Of which Biofuels Article 21(2)</i>	<i>0</i>	<i>130</i>
Renewable electricity	1,363.7	667
Others (pure vegetable oils...)	880.3	173
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>10,931.9</b>	<b>6,140</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in % - BEE Demand Assumptions	Industry Scenario in % - NREAP Demand Assumptions	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	23,942	47	49.6	18,653	38.6
Total RES-H&C Consumption	19,039.7	25	19	14,430	15.5
Total RES-T Consumption	10,932	19	23	6,390 <sup>(1)</sup>	13.2 <sup>(1)</sup>
<b>Total RES share</b>	<b>52,549.7</b>	<b>28</b>	<b>26.7</b>	<b>38,557</b>	<b>19.6</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

BEE in its roadmap shows that Germany can achieve much more than the binding minimum target of 18% renewables by 2020 as foreseen in the RES Directive.

### Electricity sector

In order to achieve this higher RES target, the basic elements of the feed-in law must be maintained, which includes regular revision of the different tariffs and degression rates to trigger sustainable growth of the different technologies. Incentives for market integration and combined renewable power production should be introduced. Administrative barriers like arbitrary height and distance regulations for wind turbines have to be removed. Administrative and financial barriers for grid optimisation and enhancement have to be tackled.

### Heating and cooling sector

To reach high shares of renewables, the existing renewables heating law is not sufficient, because it only covers new buildings and allows for various exceptions. The potential of existing buildings needs to be tapped, with only 12% of installed heating systems being technically state-of-the-art today. A budget independent instrument should be established to trigger growth of renewable energies in the building stock.

### Transport sector

The transport sector, however, is the one with the most need for adjustment in the support framework. A restart of support for pure biofuels is needed to re-vitalise sustainable biodiesel and bio-ethanol produced from domestic sources. Blending quota and admixture regulations need to be improved to allow for higher shares of blending. In addition, incentives for electric vehicles using renewable energy should be introduced.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	938
Gross Final H&C Consumption	1,579
Gross Final Transport Consumption	934
Gross Final Energy Consumption	3,451

## GREECE

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Greek NREAP splits the overall 18% renewable energy target into 39.8% RES-E, 19.7% RES-H&C and 10.1% RES-T. The Greek authorities have planned to overshoot the target by over 2% percentage points. According to the Greek RES industry, achieving the renewable electricity target will not prove difficult with the measures provided in the NREAP. However, the plan lacks measures to help fulfil the target for renewable heating and cooling.

The NREAP will be the basis for a Ministerial Decree that will allocate to the different RES sectors their installed capacity targets up to 2020. It is necessary to ensure that the indicative trajectories per technology do not represent annual caps.

#### Support Schemes

##### Electricity sector

The Greek NREAP does not foresee a change in the support mechanism, which will remain a fixed feed-in tariff. The NREAP highlights that the Greek authorities are considering generalising smart meters, however no substantial progress has been made so far, nor have any particular plans been foreseen.

*“In times of crisis, the development of renewable energy goes hand in hand with the creation of sustainable jobs and economic prosperity.”*

Anni Podimata, MEP  
(S&D)

The RES industry scenario is provided by the Fraunhofer Institute Systems and Innovation Research, Karlsruhe in cooperation with Vienna University of Technology, Energy Economics Group, Vienna.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	2,654	4,278	6.2	4,276	3,890 <sup>(2)</sup>	5.7
Hydro (below or equal to 10 MW)	89 <sup>(1)</sup>	255 <sup>(1)</sup>	0.4	255	983 <sup>(2)</sup>	1.4
Geothermal	450	3,510 <sup>(3)</sup>	5.1	120	736	1.1
Photovoltaic	3,000 <sup>(4)</sup>	5,000 <sup>(4)</sup>	7.3	2,200	2,891	4.2
Solar Thermal Electricity	383 <sup>(5)</sup>	1,000 <sup>(5)</sup>	1.5	250	714	1
Tidal, Wave, Ocean	37	180	0.3	0	0	0
Wind Onshore	6,500 <sup>(6)</sup>	17,500 <sup>(6)</sup>	25.6	7,200	16,125	23.6
Wind Offshore	0 <sup>(6)</sup>	0 <sup>(6)</sup>	0	300	672	1
Biomass (solid, biowaste, bioliquid)	40 <sup>(7)</sup>	364 <sup>(7)</sup>	1.3	40	364	0.5
Biogas	210 <sup>(7)</sup>	895 <sup>(7)</sup>	1	210	895	1.3
<b>Total RES-E</b>	<b>13,363</b>	<b>32,982</b>	<b>48.2</b>	<b>14,851</b>	<b>27,270</b>	<b>39.8</b>

(1) Source: ESHA

(2) This does not include 1,703 GWh pumping

(3) Source: EGEC

(4) Source: EPIA

(5) ESTELA estimates that a production of 5000 GWh can be reached by 2020 with an installed capacity of 1,653MW

(6) Source: EWEA

(7) EREC Breakdown based on AEBIOM's projections

The Law on the “Acceleration of RES Development”, which came into force recently, streamlines administrative procedures and tackles local barriers to RES deployment. Furthermore, the new government has merged several administrations into the Ministry of Environment Energy and Climate Change (MEECC) that now functions as a one-stop-shop for RES licensing. With the newly adopted Physical Planning law (2008), the MEECC prioritises RES projects over other land uses and determines restricted as well as priority areas.

### Heating and cooling sector

The only actual measure to support renewable heat is the Law 3851/2010. The law L3851/2010 sets new requirements that stipulate that 60% of the need of new buildings for hot water should be covered by solar thermal systems as of 1 January 2011. Furthermore, L3851/2010 stipulates that by 31 December 2019, all new buildings will have to cover the total of their primary energy consumption needs with RES, CHP, district heating on a large area scale/block scale, as well as heat pumps. This requirement is extended to all new public buildings by 31 December 2014 at the latest. Specific incentives are required (financial, tax, and legal) for this target to be met, as well as development of market mechanisms (Energy Service Companies – ESCOs and Third Party Financing – TPF) and credit/loan schemes towards building owners. However, the planned obligatory installation of RES in every new building is not implemented yet.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	1,610	17	1,222	12.6
Biogas	10.2	0	0	0
<b>RE from Heat Pumps:</b>	<b>159</b>	<b>2</b>	<b>279</b>	<b>2.9</b>
<i>Geothermal Heat pumps</i>	62 <sup>(1)</sup>	1	50	0.5
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	97	1	229	2.4
Solar Thermal	582	6	355	3.7
Geothermal	174 <sup>(1)</sup>	2	51	0.5
<b>Total RES-H</b>	<b>2,535.2</b>	<b>27</b>	<b>1,907</b>	<b>19.7</b>

(1) Source: EGEC

It is foreseen to develop specific national energy policies and to establish new financial incentives for the support of the heat production from biomass and geothermal energy, along with the implementation of the Energy Performance of Buildings Directive (EPBD). Solar thermal technologies should have a new fiscal framework. Furthermore, specific measures and actions that ensure that public buildings fulfill an exemplary role by 2012 are foreseen. Certification of installers does not exist for the moment. However, specific measures at regional/local levels are taken.

### Transport sector

There is no proper legislation for sustainability criteria for biofuels and bioliquids in Greece at the present time. The government plans regulatory actions to promote the domestic production of biodiesel. Emphasis will be put on the exploitation of local potential and the development of supply chains.

In the case of Greece, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	189
Biodiesel	11
Renewable electricity	0
Biofuels Article 21(2)	6
Net Biofuels Imports	496
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>702</b>

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>414</b>
<i>Of which imported</i>	414
Biodiesel	203
Renewable electricity	16.5
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>633.5</b>

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	<b>Industry Scenario in ktoe</b>	<b>Industry Scenario in %</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	2,836	48.2	2,345	39.8
Total RES-H&C Consumption	2,535	27	1,908	19.7
Total RES-T Consumption	702	11.08	641 <sup>(1)</sup>	10 <sup>(1)</sup>
<b>Total RES share</b>	<b>6,073</b>	<b>25.2</b>	<b>4,870</b>	<b>20.20</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

### Electricity

FITs and incentives should be adjusted regularly. A market control mechanism such as a market corridor, allowing the market to grow along a pre-defined path, could help to avoid over-heating the market. This mechanism would adjust feed-in levels according to the rhythm of development of the market. The share of various technologies should also be adjusted to be more balanced mainly between wind, PV, geothermal, and small hydro power. The infrastructure to allow the interconnection of new RES capacity must be put in place.

### Heating & Cooling

Heating and cooling targets will not be met if no additional measures are adopted. Proper Technical Requirements promoting especially the use of geothermal energy and of active solar systems should be enforced in practice. The large potential for RES-H&C in existing buildings needs to be tackled by incentives and administrative initiatives.

Favourable legislation for conventional energy sources should be removed (i.e. increase VAT to electricity and gas, remove tax credits and obligatory installation of gas in new buildings).

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

<b>Energy Demand Assumptions used in both Scenarios. (source: NREAP)</b>	
Gross Final Electricity Consumption	5,887
Gross Final H&C Consumption	9,674
Gross Final Transport Consumption	6,336
Gross Final Energy Consumption	24,114

## HUNGARY

*“Renewable energy development strengthens social cohesion in rural areas and brings with it new opportunities.”*

Csaba Sándor Tabajdi,  
MEP (S&D)

As the Hungarian NREAP was submitted to the European Commission at the beginning of 2011, the authors of this publication did not have the time to perform an evaluation of the Hungarian NREAP.

### 2020 Renewable Energy Targets

The Hungarian NREAP splits the overall 13% renewable energy target into 10.9% RES-E, 19.2% RES-H and 11.2% RES-T. Hungary expects to exceed its indicative trajectory throughout the period. The country’s binding target would be met between 2018 and 2019, thus exceeding the 2020 target by about 1.7 percentage points.

The RES industry scenario was provided by the Vienna University of Technology, Energy Economics Group, Vienna in cooperation with Fraunhofer Institute Systems and Innovation Research, Karlsruhe and Hungarian Environmental Economics Centre (MAKK).



TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	272	1142	2.2	39	158	0.3
Hydro (below or equal to 10 MW)	49 <sup>(1)</sup>	90 <sup>(1)</sup>	0.2	28	79	0.2
Geothermal	380 <sup>(2)</sup>	2,964 <sup>(2)</sup>	5.8	57	410	0.8
Photovoltaic	162	167	0.3	63	81	0.2
Wind Onshore	900 <sup>(3)</sup>	2,100 <sup>(3)</sup>	4.1	750	1,545	3
Biomass (solid, biowaste, bioliquid)	500 <sup>(4)</sup>	2,688 <sup>(4)</sup>	5.2	500	2,688	5.2
Biogas	100 <sup>(4)</sup>	636 <sup>(4)</sup>	1.2	100	636	1.2
<b>Total RES-E</b>	<b>2,363</b>	<b>9,787</b>	<b>19</b>	<b>1,537</b>	<b>5,597</b>	<b>10.9</b>

(1) Source: ESHA

(2) Source: European Geothermal Energy Council

(3) Source: EWEA

(4) EREC Breakdown based on AEBIOM's projections

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	1,331	13.7	1,225	12.6
Biogas	11	0.1	56	0.6
<b>RE from Heat Pumps:</b>	<b>168</b>	<b>1.7</b>	<b>143</b>	<b>1.5</b>
<i>Geothermal Heat pumps</i>	146 <sup>(1)</sup>	1.5	107	1.1
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	22	0.2	36	0.4
Solar Thermal	55	0.6	82	0.8
Geothermal	696 <sup>(1)</sup>	7.2	357	3.7
<b>Total RES-H</b>	<b>2,261</b>	<b>23.3</b>	<b>1,863</b>	<b>19.2</b>

(1) Source: EGEC

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	280.4	189
Biodiesel	213.7	295
Renewable electricity	0	24
Biofuels Article 21(2)	11.2	22
Others	0	5
Net Biofuels Imports	-7.2 <sup>(1)</sup>	0
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>498.1</b>	<b>535</b>

(1) A negative figure means an export to other (EU) countries.

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	<b>Industry Scenario in ktoe</b>	<b>Industry Scenario in %</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	842	19	481	10.9
Total RES-H&C Consumption	2,261	23.3	1,863	19.2
Total RES-T Consumption	498	9.3	598 <sup>(1)</sup>	11.2 <sup>(1)</sup>
<b>Total RES share</b>	<b>3,601</b>	<b>18.3</b>	<b>2,879</b>	<b>14.66</b>

(1) As in line J of Table 4a of the NREAP

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	4,418
Gross Final H&C Consumption	9,719
Gross Final Transport Consumption	5,349
Gross Final Energy Consumption	19,644

## IRELAND

### The Renewable Energy Industry Feedback on the NREAP

#### 2020 Renewable Energy Targets

The Irish NREAP splits the overall 16% renewable energy target into 42.5% RES-E, 12% RES-H&C and 10% RES-T. The action plan indicates that Ireland expects to significantly exceed its indicative trajectory throughout the period and attain its binding target in 2020 without exceeding it. The NREAP also presents an export scenario. The recognition of Ireland’s potential to become an exporter of RES-E to other EU Member States between now and 2020 and the inclusion of an export scenario is welcomed by the RES industry.

#### Support Schemes

##### Electricity sector

To date, the REFIT Support system has been successful in delivering investment in the Irish renewable energy sector. Currently, Ireland has an application with the European Commission seeking State Aid clearance for the support system to reach the 2020 targets. This support is expected to be similar to the one already in place. It will cover additional technologies such as geothermal energy.

An interconnection grid with Great Britain and cross-border connections with Northern Ireland are in the planning stage. Planning legislation to facilitate the installation of onshore wind farms is currently being reviewed.

The Irish NREAP presents two scenarios: the modelled scenario and the non-modelled “Export scenario”. The non-modelled “Export Scenario” illustrates Ireland’s potential to become an exporter of RES-E to other EU Member States between now and 2020 provided the appropriate conditions (economic, technical and environmental) are put in place.

As a REPAP workshop was not organised in Ireland, no RES industry roadmap was published. For this reason, only the NREAP scenario is presented in this publication.

*“The huge potential of the Irish renewable energy sector will pay off once the right framework conditions are in place.”*

Nessa Childers,

MEP (S&D)

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	NREAP - Modelled Scenario			NREAP - Non-Modelled Export Scenario		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydro	234	701	2.1	284 <sup>(1)</sup>	923	2.8
Geothermal	0	NA	0	5	35	0.1
Photovoltaic	0	0	0	5	13	0
Tidal, Wave, Ocean	75	230	0.7	500	1,533	4.7
Wind Onshore	4,094	10,228	31.3	4,737	12,449	38.1
Wind Offshore	555	1,742	5.3	2,408	7,383	22.6
Biomass	153	1,006	3.1	400	2,453	7.5
<b>Total RES-E</b>	<b>5,111</b>	<b>13,907</b>	<b>42.5</b>	<b>8,339</b>	<b>24,789</b>	<b>75.8</b>

(1) This includes a pumping capacity of 50 MW.

### Heating and cooling sector

Ireland only forecasts a small increase of RES-H&C. According to the NREAP, a series of support programmes have been put in place to deliver the 12% RES-H&C target both on the demand and supply sides. A new framework is almost completed, with an initial focus on biomass but also including geothermal resources in due course.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	NREAP	
	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	453	9.2
Biogas	33	0.7
RE from Heat Pumps	84	1.7
Solar Thermal	20	0.4
Geothermal	0	0.0
<b>Total RES-H</b>	<b>590</b>	<b>12</b>

The “Greener Homes” scheme provides a grant to domestic property owners to contribute to the capital cost of installing a renewable heating technology in an existing home. Meanwhile, the “ReHeat” scheme provides support for similar renewable heating systems for larger scale entities in the commercial, industrial, community and public sectors. The NREAP notes that achieving the RES-H&C target could also be assisted by the promotion of heating from renewable sources in public buildings.

A Roadmap for the development of the bioenergy sector in Ireland is currently being finalised.

Ireland did not include figures on deep geothermal heating and cooling in the NREAP, nor support measures. The support measures for geothermal heat pumps are not clear, and the NREAP does not plan a real certification scheme.

### Transport sector

The NREAP states that a two-pronged strategy has been put in place which combines significant increases in the use of biofuels with the accelerated development and use of electric vehicles in Ireland.

The national Biofuel Obligation Scheme 2010 obliges all road transport fuel suppliers to use biofuel in the fuel mix. The initial penetration rate will be 4% per annum, to be increased over time.

The government has set a target of 10% electric vehicles by 2020.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	NREAP	
	RES in Transport Consumption	
<b>Bioethanol/bioETBE:</b>	139	
<i>Of which imported</i>	99	
<b>Biodiesel:</b>	342	
<i>Of which imported</i>	240	
<b>Others:</b>	1	
<i>Of which Biofuels Article 21(2)</i>	1	
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>482</b>	

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Modelled NREAP Scenario in ktoe	Modelled NREAP Scenario in %	NREAP Scenario-Non Modelled Export Scenario in %
Total RES-Electricity Consumption	1,196	42.5	75.8
Total RES-H&C Consumption	591	12	12
Total RES-T Consumption (line J.Table 4a of the NREAP)	575	10	10
<b>Total RES share</b>	<b>2,269</b>	<b>16</b>	<b>22.6</b>

## Renewable Energy Industry Policy Recommendations

### Electricity sector

The NREAP must be supported by an effective implementation framework. The plan must reflect legal obligations in particular priority dispatch. A stable market for investments must be put in place. The interaction between EU directives needs to be clarified. Ireland should ensure that a robust framework for exports is developed. Robust mechanisms to ensure the timely delivery of infrastructure must be introduced.

There are currently significant risks affecting renewable investments with respect to non dispatch, constraints, volatile Transmission Loss Adjustment Factor, changes in Transmission Use of System charges and other market rules. There is an interaction between these elements and REFIT. REFIT support levels can be minimised where risk uncertainty in the market for renewable generation investments have been addressed as a package. However if those uncertainties are not addressed, it will be necessary to increase the base support level in REFIT to deliver the intended investment signal.

There needs to be flexibility in the REFIT scheme so that changes in the market conditions can be taken into account in the REFIT price being paid to ensure that projects remain financially viable.

### Heating and cooling sector

A key driver of EE and utilisation of bioheat on a large scale is DH. Planning for district heating infrastructure needs to be integrated into local authority development plans, and backed at national level as a strategic priority in urban areas. DH infrastructure should be part-financed by the tax-payer and have measures to allow it to be more easily financed over a long time horizon. New multi-unit housing developments should be obliged to be ready for DH, as this will future-proof them in terms of energy supply options. Furthermore, county development plans must include DH infrastructure in urban areas in their planning guidelines, and steer development towards an energy-efficient integrated heating network based on RES.

Legislation on geothermal energy is in preparation and a new bill should be published soon. Such a bill will clarify the situation, especially for deep geothermal, by simplifying the licensing procedure, establishing support measures and presenting a development roadmap.

## Transport sector

To facilitate the achievement of 10% RES-T, an amendment will be needed to the relevant standards (e.g. EN590, EN224) to permit the use of 10% blends in unmodified engines.

Substantial amounts of renewable energy could also be produced from municipal and industrial waste. Urgent waste disposal problems could also be resolved by the use of these types of waste for energy production and the disposal of waste digestate on energy crops.

TABLE 5: Energy Demand Assumptions used in the scenario (source: NREAP in ktoe)

Gross Final Electricity Consumption	2,813
Gross Final H&C Consumption	4,931
Gross Final Transport Consumption	5,747
Gross Final Energy Consumption	14,142

## ITALY

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Italian NREAP splits the overall 17% renewable energy target into 26.4% RES-E, 17.1% RES-H&C and 10.1% RES-T. The official target is the one set by the RES Directive. The Italian renewable energy association APER (“Associazione Produttori di Energia da fonti Rinnovabili”) advocates in its REPAP Roadmap that, in a more ambitious but just as achievable scenario, Italy could go beyond the binding target, achieving, according to the REPAP estimation, a penetration level of 18% of final energy consumption from renewables. Such a scenario is based on the development of a more renewable-driven energy policy.

The Italian government’s estimates provided in the NREAP remain below APER’s forecasts, setting a national target of 16.15%, calculated on the basis of a very efficient gross final energy consumption scenario where final energy consumption remains almost unchanged between now and 2020. The plan does not explain the rules or the hypothesis behind the calculations on the expected gross final energy consumption and the share of each RES. The remaining 0.8% percentage point needed to meet the mandatory target will be covered by energy imports.

#### Support Schemes

##### Electricity sector

The support mechanism has undergone important restructuring over the last two years, and the ‘new’ system (based on the Tradable Green Certificates (TGC) mechanism and FIT) has only just started, as the foreseen decrees, necessary to implement the new rules, were only published recently. Meanwhile, the TGC mechanism has suffered over the last 2-3 years, as the supply of certificates was greater than the demand, which led to a collapse in prices. The NREAP does not explain these problems; however it foresees a revision of the current mechanism so as to solve existing problems.

*“More efforts in renewable energy research and innovation are needed to ensure the European industry’s pole position on the world market.”*

Vittorio Prodi, MEP  
(S&D)

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Regarding electricity, the RES industry scenario has been provided by APER based on the work by the the Vienna University of Technology, Energy Economics Group, Vienna, Austria in cooperation with Fraunhofer Institute. Regarding heating and cooling, the information provided come only from the Fraunhofer institute and the EEG.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	16,199	40,157	10.7	13,900 <sup>(1)</sup>	29,923 <sup>(1)</sup>	8
Hydro (below or equal to 10 MW)	7,616 <sup>(2)</sup>	12,077 <sup>(2)</sup>	3.2	3,900 <sup>(1)</sup>	12,077 <sup>(1)</sup>	3.2
Geothermal	1,965 <sup>(3)</sup>	15,600 <sup>(3)</sup>	4.2	920	6,750	1.8
Photovoltaic	26,091	24,908	6.6	8,000	9,650	2.6
Solar Thermal Electricity	641 <sup>(4)</sup>	1,588 <sup>(4)</sup>	0.4	600	1,700	0.5
Tidal, Wave, Ocean	9	39	0	3	5	0
Wind Onshore	15,000 <sup>(5)</sup>	33,500 <sup>(5)</sup>	8.9	12,000	18,000	4.8
Wind Offshore	500 <sup>(5)</sup>	1,800 <sup>(5)</sup>	0.5	680	2,000	0.5
Biomass (solid, biowaste, bioliquid)	2,620 <sup>(6)</sup>	12,760 <sup>(6)</sup>	3.4	2,620	12,760	3.4
Biogas	1,200 <sup>(6)</sup>	6,020 <sup>(6)</sup>	1.6	1,200	6,020	1.6
<b>Total RES-E</b>	<b>71,841</b>	<b>148,449</b>	<b>39.5</b>	<b>43,823</b>	<b>98,885</b>	<b>26.4</b>

- (1) Pumping is excluded. It amounts to 2,600 MW installed and 2,730GWh. Both pure and mixed pumping schemes are considered in pumping.
- (2) Source: ESHA
- (3) Source: EGEC
- (4) ESTELA estimates that 9,900 GWh can be produced in 2020 with an installed capacity of 3,311 MW.
- (5) EWEA Baseline scenario
- (6) EREC Breakdown based on AEBIOM's projections. APER believes more is feasible.

### Heating and cooling sector

The NREAP does not expressly explain that in Italy there are no specific incentives for RES-H&C (there are only incentives and tax deductions for EE and *some RES plants are included among the instruments to reduce energy consumption*). Nevertheless the NREAP underlines the fact that a revision and strengthening of the existing and inadequate support schemes (tax deductions and EE certificates), is necessary to promote large-scale development of RES-H&C.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	5,117	8.4	5,404	8.8
Biogas	75	0.1	266	0.4
<b>RE from Heat Pumps:</b>	<b>1,131</b>	<b>1.8</b>	<b>2,900</b>	<b>4.8</b>
<i>Geothermal Heat Pumps</i>	531 <sup>(1)</sup>	0.9	522	0.9
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	600	0.9	2,378	3.9
Solar Thermal	1,455	2.4	1,586	2.6
Geothermal	1,161 <sup>(1)</sup>	1.9	300	0.5
<b>Total RES-H</b>	<b>8,939</b>	<b>14.6</b>	<b>10,456</b>	<b>17.1</b>

- (1) Source: EGEC

## Transport sector

RES-T projections were not exactly comparable. Hence, the tables present on one side the RES-T projections from the industry and the on the other side projections from the NREAPs.

The diffusion of RES in the transport sector in Italy is based on a mandatory minimum share of biofuel, 3.5% of total fossil fuel put on the market in 2010. There is no specific incentive for RES in transport; the existing promotion system is based on excise deduction reserved only to a small amount of the total biofuel produced (18,000 tonnes in 2010). These deductions are set year by year and belong to a programme which will finish in 2011. No incentives are foreseen for the moment from 2011 onwards. This provides no stability to the future development of the sector.

The NREAP foresees maintaining and increasing the mandatory minimum share of biofuel to be placed on the market in the future (only for “sustainable biofuels”), as well as to extend this obligation to biogas, as well as to evaluate applying incentives for electric vehicles. Regarding biofuels consumption, the NREAP foresees to meet the target also through imports from abroad, which would not be beneficial to the environment nor to the domestic industry.

In the case of Italy, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	323.6
Biodiesel	162.5
Renewable electricity	0
Biofuels Article 21(2)	47
Net Biofuels Imports	3,198.8
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>3,731.9</b>

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
Bioethanol/bioETBE	600
<i>Of which Article 21(2)</i>	100
<i>Of which imported</i>	200
Biodiesel	1,880
<i>Of which Article 21(2)</i>	250
<i>Of which imported</i>	800
Renewable electricity	369
Others	50
<i>Of which Article 21(2)</i>	50
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>2,899</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	12,767	39.5	8,504	26.4
Total RES-H&C Consumption	8,939	14.6	10,456	17.1
Total RES-T Consumption	3,732	11	3,445 <sup>(1)</sup>	10.1 <sup>(1)</sup>
<b>Total RES share</b>	<b>25,438</b>	<b>19.1</b>	<b>21,490</b>	<b>16.15</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

The Italian NREAP is a very detailed and descriptive document, describing all existing policies and foreseen measures; however it fails to underline the non negligible gap between rules and practice, as well as dysfunctions and delays. In its roadmap, APER underlines that the crucial element to achieve (or go beyond) the binding target is the abatement of the many existing barriers. The current legal framework is a complex mix of measures arising from laws which often are not related to renewables and does not therefore provide a holistic approach. Furthermore, the already unclear and unstable norms often lack common references so that different rules can be found from one regional territory to another.

The grid is currently incapable of supporting the many requests for the connection of RES, especially in isolated areas where it would be possible to exploit RES. In addition to the infrastructural deficiencies, the procedural ones create considerable delays for all the connection requests.

The incentives system, recognised in the past as one of the most favourable in Europe, has suffered a drastic restructuring during the last two years, mainly due to an excess of green certificates in relation to demand and a number of important pending changes to the incentive mechanism, caused by still not fully completed implementing measures and those still expected.

The impossibility of long-term expectations and the lack of certainty on the value of the incentive do not provide banks with the required guarantee and, as a consequence, make it almost impossible to obtain funding for power plant implementation at the present time. All of this greatly hinders RES investments in Italy. The implementation of a RES development policy overcoming the inefficiencies that affect the sector today, accompanied by public awareness policies, would allow Italy to achieve its binding target and thereby gain environmental and energy related jobs, bringing with it economic benefits (e.g. saved costs, energy independence, etc.) and the development of the sector.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	32,227
Gross Final H&C Consumption	61,185
Gross Final Transport Consumption	33,972
Gross Final Energy Consumption	133,042

## LATVIA

*“The NREAPs called for in the RES Directive will mobilise national stakeholders to work together to reach the targets and decrease overall dependence on foreign energy imports.”*

Arturs Krišjānis Kariņš,  
MEP (EPP)

## The Renewable Energy Industry Feedback on the NREAP

### 2020 Renewable Energy Targets

The Latvian NREAP splits the overall 40% renewable energy target into 59,8% RES-E, 53,4% RES-H&C, and 10% RES-T. The Latvian NREAP indicates that Latvia expects to follow its indicative trajectory throughout the period and reach the binding 2020 target without exceeding it.

### Support Schemes

#### Electricity sector

Latvia has a feed-in tariff system. The FIT is capped: electricity producers have the right to sell their electricity at a fixed price until a certain share of RES-E in the total electricity consumption is reached. The FIT will be reduced after 10 years of plant operation. RES-E projects in Latvia can further receive support from the EU structural fund, Environment Protection Fund, Environment investment fund for soft loans, EEA Financial Mechanisms and a Green Investment Scheme.



The RES industry scenario was provided by the Fraunhofer Institute Systems and Innovation Research, Karlsruhe in cooperation with Vienna University of Technology, Energy Economics Group, Vienna.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	1,731.3	3,266	37.7	1,522	2,981	34.4
Hydro (below or equal to 10 MW)	62 <sup>(1)</sup>	70 <sup>(1)</sup>	0.8	28	70	0.8
Geothermal	5 <sup>(2)</sup>	39 <sup>(2)</sup>	0.4	0	0	0
Photovoltaic	47.6	35	0.4	2	4	0
Wind Onshore	200	500	5.8	236	519	6
Wind Offshore	0	0	0	180	391	4.5
Biomass (solid, biowaste, bioliquid)	108 <sup>(3)</sup>	642 <sup>(3)</sup>	7.4	108	642	7.4
Biogas	92 <sup>(3)</sup>	584 <sup>(3)</sup>	6.7	92	584	6.7
<b>Total RES-E</b>	<b>2,245.9</b>	<b>5,136</b>	<b>59.2</b>	<b>2,168</b>	<b>5,191</b>	<b>59.8</b>

(1) Source: ESHA

(2) Source: EGEC

(3) EREC Breakdown based on AEBIOM's projections

RES-E has no priority access to the grid. Connection is carried at the expense of RES developers. Grid access is thus considered as one of the main barriers for the development of new RES-E plants in Latvia. The grid access procedure is currently either too expensive or too bureaucratic for RES plants, taking a considerable amount of time as well as resources.

The RES quota system in the electricity sector means that quotas and RES production licences are used to sell the RES project to another actor, but as it is difficult to get the necessary support from financial institutions or any knowledge on how to implement the RES project, the State often ends up having to take the quota back via court decisions, and then giving the quota to someone else, who then has to start everything all over again. There is no policy supporting geothermal, offshore wind and only very little on onshore wind. There is a "RES Law" in the development stage, but it is yet to be finalised. Lastly, there are too many ministries in charge of RES-E administration, which causes bureaucracy issues.

### Heating and cooling sector

Latvia supports renewable heat through few fiscal measures, but not with direct support mechanisms. Projects are financed through EU structural funds in the form of direct funds, which will contribute at least to 25% to the total eligible costs.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	1,609	61.6	1,343	51.4
Biogas	6	0.2	49	1.9
<b>RE from Heat Pumps:</b>	<b>22</b>	<b>0.9</b>	<b>4</b>	<b>0.1</b>
<i>Geothermal Heat Pumps</i>	17 <sup>(1)</sup>	0.7 <sup>(1)</sup>	NA	NA
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	5	0.2	NA	NA
Solar Thermal	11	0.4	2	0.1
Geothermal	6 <sup>(1)</sup>	0.2	0	0
<b>Total RES-H</b>	<b>1,654</b>	<b>63.3</b>	<b>1,398</b>	<b>53.5</b>

(1) Source: EGEC

### Transport sector

Latvia promotes biofuels through direct support and fiscal measures. In order to be supported, the applicants have to fulfill the requirements of Rules No. 290 on Financially Eligible Quotas for Biofuels. Producers of biofuels from rapeseed grains, rapeseed oil and grains are eligible for the support. Biodiesel produced from rapeseed oil has a reduced excise tax, which is regulated in the Law on Excise tax. If biodiesel is exclusively derived from rapeseed oil, there is no tax to be paid.

Projections for RES-T were not exactly comparable. Hence, the tables present on one side the RES-T projections from the industry and the on the other side projections from the NREAPs.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	22.1
Biodiesel	10.3
Biofuels Article 21(2)	8.5
Net Biofuels Imports	91.6
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>132.5</b>

However, since 1 January 2011, there is hardly any policy to promote RES in transport in Latvia. Only the 5% biofuel mandatory mix stays. The biofuels financial support scheme ended on 31 December 2010, as did the quotas and the excise duty tax reduction for fossil fuel and biofuels mix (5% by volume). There are talks about continuing the biofuels financial support and developing biofuels consumption in public transport, but no concrete steps have so far been taken.

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>18</b>
<i>Of which Article 21(2)</i>	18
<i>Of which imported</i>	9
<b>Biodiesel:</b>	<b>28</b>
<i>Of which Article 21(2)</i>	15
<i>Of which imported</i>	8
Renewable electricity	6
<b>Others</b>	<b>31</b>
<i>Of which Article 21(2)</i>	7
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>83</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	442	59.2	446	59.8
Total RES-H&C Consumption	1,654	63.3	1,395	53.4
Total RES-T Consumption	132	10	130 <sup>(1)</sup>	10 <sup>(1)</sup>
<b>Total RES share</b>	<b>2,228</b>	<b>46.4</b>	<b>1,918</b>	<b>40</b>

(1) As in line J of Table 4a of the NREAP

# Renewable Energy Industry Policy Recommendations

## Electricity sector

In order to ensure that Transmission System Operators (TSOs), when dispatching electricity generating installations, give priority access to those using RES, clear statutory regulations and consistent enforcement are required. For small grid connected projects, a very simple application form should be elaborated for connection to the grid. The grid and metering system in Latvia should be further modernised. For bigger projects, the authorisation procedure should be facilitated and reorganised with easier access to information for investors and developers (e.g. via a platform).

The quota system itself creates a 'virtual queue', whereby investors find themselves waiting for an electricity actor to lose the quota (as explained above). These 'quota wars' take too much time which is necessary for the project implementation itself. The Latvian State should analyse RES-E FITs in terms of competitiveness and cost effectiveness.

## Heating and cooling sector

Multifamily residential buildings are connected to DH networks for heat supply. In this case RES-H&C (eventually cogeneration) should be addressed at DH level and a clearer regulation and/or energy plan should be worked out.

The starting point for an obligation for minimum levels of renewable energy in new and newly refurbished buildings should target buildings that are not connected to DH. This obligation could be extended to buildings connected to DH systems that are either not using RES or have a low share of RES.

The use of natural gas in heat-only boilers in residential and tertiary sector buildings should be penalised by policy measures to incentivise the introduction of mini/micro CHP or the use of RES heat.

## Transport sector

There is at the moment no vision for biofuels in Latvia. As stated above, everything ended on 31 December 2010. Therefore, new and detailed programmes for 1st and 2nd generation biofuels, for biogas and for electric vehicles should be developed. A policy for public vehicles should be developed, by amending Public Procurement law. Programmes for rebuilding old cars to make them suitable for B100, for instance, should be implemented. The promotion of biofuels in public transport (biodiesel and biogas from waste) should be part of the Latvian RES strategy for the transport sector.

The former RES law should be taken as basis for generating the new RES legal framework in Latvia. The new law on RES is moving forward. It should be adopted as soon as possible.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	746
Gross Final H&C Consumption	2,612
Gross Final Transport Consumption	1,299
Gross Final Energy Consumption	4,796

## LITHUANIA

### 2020 Renewable Energy Targets

*“The RES Directive will ensure RES development in all Member States.”*

Algirdas Saudargas,  
MEP (EPP)

The Lithuanian NREAP splits the overall 24% renewable energy target into 21.3% renewable electricity, 39.2% renewable energy in heating and cooling, 10% renewable energy in transport.

### Support Schemes

#### Electricity sector

Lithuania has a Feed-in tariff system. The NREAP indicates that Lithuania plans to introduce incentives to boost wind power installed capacity, solar power installations and bio-cogeneration in 2014. The Lithuanian government indicated in the plan that they were preparing draft laws that would oblige TSOs and DSOs to provide access for renewables producers. An upgrade of the grid as well as improved management of the grid is also on the agenda, so as to allow an increasing amount of renewable energy onto the grid. A smart network in 2011-15 is to be put in place using EU structural funds and a new financial support scheme. Lithuania is also planning to pass legislation as soon as possible to encourage local authorities to promote renewable energy sources<sup>18</sup>.

Lithuania does not provide any 2020 target for geothermal power production, and no feed-in tariff scheme for geothermal energy.

#### Heating and cooling sector

The Lithuanian NREAP does not include any direct support measures for the bioenergy sector. It only provides a list of laws, rules and other legal acts that have to be enacted, where all specific measures will be included.

The Heat Law of the Republic of Lithuania provides that the State shall promote procurement of heat supply systems based on renewable sources of energy. This procurement shall be a public service obligation. EU structural assistance also provides financing until 2013 in Lithuania for RES eg. for the modernisation of boiler houses and CHP plants providing heat to the DH systems or for the construction of DH systems.<sup>19</sup>

Lithuania proposes support measures for geothermal heat. However, the support measures for ground source heat pumps are not detailed enough in the NREAP.

Lithuania is amending its legislation to ensure new property developments can be heated and cooled with renewables<sup>20</sup>.

The RES scenario was provided by the Fraunhofer Institute Systems and Innovation Research, Karlsruhe in cooperation with Vienna University of Technology, Energy Economics Group, Vienna.

18 ENDS EUROPE (2010), Renewable Energy Europe – A special report on the National Renewable Energy Action Plans outlining goals and measures to boost renewable energy use

19 EREC Renewable Energy Policy Reviews (2004) [http://www.erec-renewables.org/fileadmin/erec\\_docs/Projcet\\_Documents/RES\\_in\\_EU\\_and\\_CC/Belgium.pdf](http://www.erec-renewables.org/fileadmin/erec_docs/Projcet_Documents/RES_in_EU_and_CC/Belgium.pdf)

20 ENDS Report

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	108	400	2.9	100.8	353	2.5
Hydro (below or equal to 10 MW)	66 <sup>(1)</sup>	117 <sup>(1)</sup>	0.8	40	117	0.9
Geothermal	15 <sup>(2)</sup>	117 <sup>(2)</sup>	0.8	0	0	0
Photovoltaic	53	42	0.3	10	15	0.1
Wind Onshore	1,000 <sup>(3)</sup>	2,400 <sup>(3)</sup>	17.3	500	1,250	9
Biomass (solid, biowaste, bioliquid)	162 <sup>(4)</sup>	810 <sup>(4)</sup>	5.8	162	810	5.8
Biogas	62 <sup>(4)</sup>	413 <sup>(4)</sup>	3	62	413	3
<b>Total RES-E</b>	<b>1,466</b>	<b>4,299</b>	<b>30.9</b>	<b>874.8</b>	<b>2,958</b>	<b>21.3</b>

(1) Source: ESHA

(2) Source: EGEC

(3) Source: EWEA

(4) EREC Breakdown based on AEBIOM's projections

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	1,322	49.3	973	36.3
Biogas	6	0.2	50	1.9
<b>RE from Heat Pumps:</b>	<b>38<sup>(1)</sup></b>	<b>1.4</b>	<b>14</b>	<b>0.5</b>
<i>Geothermal Heat Pumps</i>	21	0.8	NA	NA
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	17 <sup>(2)</sup>	0.6	NA	NA
Solar Thermal	20	0.7	9	0.3
Geothermal	19 <sup>(2)</sup>	0.7	5	0.2
<b>Total RES-H</b>	<b>1,405</b>	<b>52.3</b>	<b>1,051</b>	<b>39.2</b>

(1) EGEC foresees a projection for geothermal heat pumps of 21 ktoe.

(2) Source: EGEC

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	134.8	36
Biodiesel	17.3	131
Renewable electricity	0	3
Biofuels Article 21(2)	46.5	0
Net Biofuels Imports	-42.3 <sup>(1)</sup>	0
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>156.3</b>	<b>170</b>

(1) A negative figure means an export to other (EU) countries.

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	<b>Industry Scenario in ktoe</b>	<b>Industry Scenario in %</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	370	30.9	254	21.3
Total RES-H&C Consumption	1,405	52.3	1,051	39.2
Total RES-T Consumption	156	9	173 <sup>(1)</sup>	10 <sup>(1)</sup>
<b>Total RES share</b>	<b>1,931</b>	<b>31.7</b>	<b>1,474</b>	<b>24.23</b>

(1) As in line J of Table 4a of the NREAP

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	1,193
Gross Final H&C Consumption	2,684
Gross Final Transport Consumption	1,734
Gross Final Energy Consumption	6,084

## LUXEMBOURG

### The NREAP as seen by the Renewable Energy Industry

*“Through the request for National Renewable Energy Action Plans (NREAPs), the European Parliament wanted to ensure that comprehensive & ambitious national strategies for renewables are developed and also concretely put in place in the Member States.”*

Claude Turmes  
MEP (Greens/EFA)

#### 2020 Renewable Energy Targets

The Luxembourgish NREAP splits the overall 11% renewable energy target into 11.8% RES-E, 8.5% RES-H&C and 10% RES-T.<sup>21</sup> According to the NREAP, nearly two thirds of the country’s renewable energy target will be fulfilled through biofuel imports and cooperation mechanisms: 47% of the target will be covered through biofuel credits and 19% through cooperation mechanisms. Only 36% of the target will thus be covered by national measures, both in the heating and cooling sector and in the electricity sector.

RES-E and RES-H&C targets in the NREAP remain behind the RES potential indicated in a study commissioned by Luxembourg’s government and published in 2007<sup>22</sup>. This study indicates “feasible potentials by 2020” as well as “technical” and “theoretical” potentials. For RES-E, the NREAP target covers 74-83% of the feasible 2020 target and 5.3% of the technical potential. For RES-H&C, the NREAP target covers 67-69% of the feasible 2020 target and 7.8% of the technical potential.

In order to reach the indicated targets in the NREAP, national renewable energy production will have to increase substantially over the next 10 years – by a factor 3 compared to 2005 figures. However, despite well designed support schemes, RES-E deployment in the period 2005-2009 only increased by a factor of 1.3. It therefore remains questionable whether the indicated objectives for RES-E and RES-H&C can be delivered without a comprehensive policy shift.

#### Support Schemes

##### Electricity sector

The NREAP lists a broad collection of possible policy instruments. However, according to the NREAP, most policy measures are “under examination” and therefore do not contain any specified stable and reliable policy instruments to trigger ambitious growth rates.

The RES industry scenario is provided by the Fraunhofer Institute Systems and Innovation Research in cooperation with Vienna University of Technology, Energy Economics Group.

<sup>21</sup> Fraunhofer Institut für System- und Innovationsforschung, Energy Economics Group TU Wien: Bestimmung der Potentiale und Ausarbeitung von Strategien zur verstärkten Nutzung von erneuerbaren Energien in Luxemburg, BSR Sustainability, 2007

<sup>22</sup> Regarding the use of cooperation mechanisms: Luxembourg intends to achieve by 2020 a RES consumption of 8.89% within its own borders. The rest will be covered by cooperation mechanisms. (This calculation does not take into account biofuels imports).

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydro (below or equal to 10 MW)	38	107	1.6	44 <sup>(1)</sup>	124 <sup>(1)</sup>	1.9
Geothermal	5 <sup>(2)</sup>	39 <sup>(2)</sup>	0.6	0	0	0
Photovoltaic	362.6	266	4	113	84	1.3
Wind Onshore	300	600	9.1	131	239	3.6
Biomass (solid, biowaste, bioliquid)	30 <sup>(3)</sup>	190 <sup>(3)</sup>	2.9	30	190	2.8
Biogas	29 <sup>(3)</sup>	144 <sup>(3)</sup>	2.2	29	144	2.2
<b>Total RES-E</b>	<b>764.6</b>	<b>1,346</b>	<b>20.4</b>	<b>347</b>	<b>781</b>	<b>11.8</b>

(1) This does not include the pumping capacity of 1,300 MW and production of 928 GWh by 2020.

(2) Source: EGEC

(3) EREC Breakdown based on AEBIOM's projections.

### Heating and cooling sector

The NREAP lists a broad collection of possible policy instruments. However, according to the NREAP, most policy measures are “under examination” and therefore do not contain any specified stable and reliable policy instruments to trigger ambitious growth rates. No satisfactory ideas for putting forward the exemplary role of public buildings can be found in the NREAP.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	99	7.8	69.5	5.5
Biogas	4	0.3	13.4	1.1
RE from Heat Pumps	28 <sup>(1)</sup>	2.2	16.9	1.3
Solar Thermal	14	1.1	8.1	0.6
Geothermal	0	0	0	0
<b>Total RES-H</b>	<b>145</b>	<b>11.4</b>	<b>107.9</b>	<b>8.5</b>

(1) EGEC foresees that geothermal heat pumps could produce 10 ktoe by 2020.

### Transport sector

According to the NREAP, nearly half of the Luxembourg RES target will be met through the use of biofuels. The NREAP indicates an increase of the RES percentage in the transport sector from 2.1% in 2010 to 10% in 2020. In order to fulfil the target, the NREAP relies to 95% on imported biofuels (mainly biodiesel) and 5% on RES-E.

In the case of Luxembourg, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

<b>RES-T 2020 Projections (ktoe)</b>	National RES Industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	0
Biodiesel	0
Renewable electricity	0
Net Biofuels imports	196.6
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>196.6</b>

<b>RES-T 2020 Projections (ktoe)</b>	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>23</b>
<i>Of which Article 21(2)</i>	0
<i>Of which imported</i>	23.1
<b>Biodiesel:</b>	<b>193</b>
<i>Of which Article 21(2)</i>	0
<i>Of which imported</i>	192.7
Renewable electricity	10
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>226</b>

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	116	20.4	67.1	11.8
Total RES-H&C Consumption	145	11.4	107.8	8.5
Total RES-T Consumption	197	8	233.7 <sup>(1)</sup>	10 <sup>(1)</sup>
<b>Total RES share</b>	<b>458</b>	<b>10.4</b>	<b>390.7</b>	<b>8.89</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

In the NREAP, the government projects an increase in energy consumption by 2020 in all sectors and especially in the transport sector. However, the government gives no explanations concerning either the projected energy increase or the measures foreseen to increase energy efficiency. Therefore, strong incentives for energy efficiency measures are urgently required in order to lower energy consumption. Given slow RES deployment in the country in recent years, this would benefit not only the country's energy efficiency target but also the RES target.

### Electricity sector

Generally speaking, the existing financial support schemes for RES-E (FiT, investment subsidies) are quite well designed. However, despite good financial incentives, RES deployment is only developing very slowly in Luxembourg. In order to achieve the necessary growth in RES-E, the basic elements of the feed-in law must be maintained, whereas the different tariffs need to be adjusted on a regular basis to trigger growth of various technologies. Priority access for RES-E to the grid needs to be legally established.

Legislation in Luxembourg currently prohibiting municipalities from becoming an active player in energy issues needs to be removed. This would be very important for the development of RES-based CHP grids or other RES projects on a communal level. Solutions to several barriers which are hindering the development of RES (e.g. administrative barriers, authorisation procedures, missing spatial planning, public acceptance for RES, lack of consultancy services) need to be developed.



## Heating and cooling sector

There are investment subsidies for RES-H&C technologies. However, in spite of this, the support for the sector is under-developed. RES-H&C deployment is only developing very slowly in Luxembourg. Legislative obligations for RES, e.g. in new or existing buildings, need to be strongly considered. Luxembourg mentioned in the NREAP that “a possible obligation to use renewable energies in buildings is to be revised”, starting in January 2011.

## Transport sector

Luxembourg’s high reliance on biofuels to cover its RES target is caused by the country’s high energy consumption in the transport sector, mainly due to fuel tourism from neighbouring countries. A reduction of the fuel exports would benefit the country’s poor CO<sub>2</sub> balance and its EE target.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	569
Gross Final H&C Consumption	1,268
Gross Final Transport Consumption	2,334
Gross Final Energy Consumption	4,396

# MALTA

## The NREAP as seen by the Renewable Energy Industry

### 2020 Renewable Energy Targets

The Maltese NREAP splits the overall 10% renewable energy target into 13.8% RES-E, 6.2% RES-H&C and 10.7% RES-T. The Maltese NREAP has shown considerable improvement when compared to the Forecast Document, which was 0.8% below the binding target for Malta. The most impressive upgrade was achieved in the transport sector, where the forecasted 2020 contribution of 5% was raised to 12.8%.

### Support Schemes

#### Electricity sector

Malta introduced FiTs after July 2010 for different sectors (25 Euro cents per kilowatt-hour for RES-E generated by Maltese Residents, 28 Euro cents for residents living in the Island of Gozo and 20 Euro cents for industrial and commercial entities), however, this is not reported in the NREAP. What’s more, these FiTs are only valid for 8 years and there is no indication on what will happen afterwards. There are also tenders for large-scale wind farms.

The industry scenario has been provided by the Fraunhofer Institute Systems and Innovation Research, Karlsruhe in cooperation with Vienna University of Technology, Energy Economics Group.

*“Given Malta’s geographical position, the nation can only benefit from exploiting its existing natural resources, and in so doing, become one of the first EU Member States to reach its envisaged target.”*

Joe Mizzi (MP)

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TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Photovoltaic	24.9	32.1	1	27.8	42.7	1.4
Wind Onshore	50	116.2	3.7	14.58	38	1.2
Wind Offshore	95	283.3	9	95	216	6.9
Biomass (solid, biowaste, bioliquid)	15.2 <sup>(1)</sup>	85.5 <sup>(1)</sup>	2.7	15.18	86	2.7
Biogas	7.3 <sup>(1)</sup>	50 <sup>(1)</sup>	1.6	7.34	50	1.6
Geothermal	5	35	1.1	0	0	0
<b>Total RES-E</b>	<b>197.4</b>	<b>602.1</b>	<b>19.1</b>	<b>159.9</b>	<b>432.7</b>	<b>13.8</b>

(1) EREC Breakdown based on AEBIOM's projections

### Heating and cooling sector

The NREAP does not commit itself to introducing a binding minimum RES contribution in new buildings and seems to expect a slow implementation of the EPBD, leaving the sole responsibility for abiding by the Law to the discretion of the contracting architects. On the positive side, government buildings are leading by example and a number of initiatives have been taken to introduce renewable energy systems and to incentivise employees through different schemes and the appointment of “Green Leaders” in every Ministry. The NREAP wrongly assumes that the RES Directive only considers renewable heating to contribute towards meeting the target (and not renewable cooling).

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	0	0	0	0
Biogas	0.1	0.14	1.72	2.4
RE from Heat Pumps	0.3	0.41	0	0
Solar Thermal	9.8	13.47	2.76	3.8
<b>Total RES-H</b>	<b>10.2</b>	<b>14.02</b>	<b>4.48</b>	<b>6.2</b>

### Transport sector

Perhaps the most challenging part of the NREAP is to achieve the binding transport target. It is worth noting that the contribution of biofuels in the transport sector has seen a significant drop in the last two years. The NREAP also mentions bio-ETBE but so far, only studies are being carried out to evaluate the feasibility of introducing such fuels. Electric and gas-fuelled cars are quite uncommon but the NREAP is planning to encourage their use in the long term. No solid plans have been drafted so far.

In the case of Malta, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	0
Biodiesel	0.2
Renewable electricity	0
Net Biofuels Imports	29.6
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>29.8</b>

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>5.79</b>
<i>Of which Article 21(2)</i>	5.79
<i>Of which imported</i>	5.79
<b>Biodiesel:</b>	<b>7.03</b>
<i>Of which Article 21(2)</i>	7.03
<i>Of which imported</i>	3.88
Renewable electricity	0.7
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>13.52</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	49	19.1	37.2	13.8
Total RES-H&C Consumption	10.2	14.02	4.50	6.2
Total RES-T Consumption	30	18	17.70 <sup>(1)</sup>	10.7 <sup>(1)</sup>
<b>Total RES share</b>	<b>89.2</b>	<b>16.6</b>	<b>54.50</b>	<b>10.2</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

It is encouraging to see that Malta's NREAP has made a positive move from a relatively dubious forecast to a forward-looking plan. However, a number of measures need to be defined and a roadmap would have to be devised in order to reach the indicative trajectory and monitor progress.

### Electricity sector

In order to achieve the 13.8% RES-E target, the basic elements of the FiT must be consolidated. There is an urgent need to provide a long term vision in this respect.

### Heating and cooling sector

The mandatory integration of renewable energy in new and renovated buildings must be assured and energy performance in buildings regulations should also be enforced. A number of support schemes that were introduced in the past should be revised and improved.

### Transport sector

Transport will remain a major challenge unless specific regulatory measures are introduced. The availability of ready-mixed bio-diesel fuels at filling stations would help to avoid errors and shorten filling-up time. The decision for the elimination of lead replacement fuels from Malta by next year is to be commended. A more aggressive plan is needed to promote the use of electric vehicles. It is imperative that serious plans be set up for Malta to be able to reach the RES-T target during the remaining 10 years.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	270.12
Gross Final H&C Consumption	72.73
Gross Final Transport Consumption	164.91
Gross Final Energy Consumption	534.49

## THE NETHERLANDS

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

*“Locally produced energy (microgeneration) empowers the citizen to embrace the use of renewables, not as a consumer but as a producer and decision maker.”*

Judith Merkies,  
MEP (S&D)

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The Dutch NREAP splits the overall 14% renewable energy target into 37% RES-E, 8.7% RES-H&C and 10.3% RES-T. The action plan indicates that the Netherlands expect to be above their indicative trajectory throughout the period and slightly exceed their 2020 target. However, the Dutch Renewable Energy Council is uncertain as to whether the 14% target will be reached with current measures in place. The Netherlands might have to resort to the use of cooperation mechanisms.

The Dutch NREAP was submitted to the European Commission just following the elections of May 2010. Therefore, as indicated in the NREAP, the new Dutch government, put in place in autumn 2010, might rewrite it in the second half of 2011. However, the 14% renewable energy target will be maintained by the Dutch government.

#### Support scheme

##### Electricity sector

In December 2010, Minister of Economic Affairs, Verhagen indicated that the system SDE+ will probably be open for applications from July 2011. The SDE (Stimuleren Duurzame Energieproductie, Encouraging Sustainable Energy) is a feed-in (tariff) premium subsidy scheme which supports the production of renewable gas and electricity. This new system SDE+ (which excludes small PV) means that mature renewable energy solutions have a better chance of receiving a subsidy. So far, the innovative options seem to have less chance. In January, the Dutch Renewable Energy Council initiated an online enquiry amongst companies to investigate the implications of this scheme. Investors cannot predict which technologies will receive support up to which installed capacity. Therefore, the market experiences major insecurity on mid -to long term planning for investments.

The government is planning to provide input in the coming months on the following topics:

- The SDE+ will be financed by an extra fee from the energy bill asked from consumers and from some companies;
- An industry/innovation document will be published in spring 2011 on PV and offshore wind and on the bio-based economy;
- A document on a “Green Deal” will be published in winter 2011. The Green Deal intends to stimulate the government and households to take measures to develop RES. The Dutch Renewable Energy Council expects little public money to be involved.

The national RES industry scenario is provided by the Fraunhofer Institute Systems and Innovation Research, Karlsruhe in cooperation with Vienna University of Technology, Energy Economics Group, with the contribution of Max Rathmann, ECOFYS Netherlands.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES Industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
HYDROPOWER	40.9	106	0.08	203	714	1
Photovoltaic	7,103	5,209	3.84	722	570	0
Wind Onshore	5,495	12,052	8.87	6,000	13,372	10
Wind Offshore	7,947	26,102	19.22	5,178	19,036	14
Biomass (solid, biowaste, bioliquid)	1,354	6,014	4.43	2,253	11,975	9
Biogas	774	4,326	3.18	639	4,664	3
<b>Total RES-E</b>	<b>22,713.9</b>	<b>53,809</b>	<b>39.62</b>	<b>14,995</b>	<b>50,331</b>	<b>37</b>

NB: EGEC foresees that 10 MW of geothermal electricity could be installed by 2020 producing 78 GWh.

### Heating and cooling sector

Currently, the support for RES H&C is less developed than for RES-E. RES-H&C will receive more attention in the coming years. The recently planned document on the Built Environment and heating and cooling has been cancelled. It might be replaced by a chapter in the Green Deal.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES Industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	1,179	4.7	650	2.6
Biogas	88	0.4	870 <sup>(1)</sup>	3.5
RE from Heat Pumps:	1,138	4.6	377	1.5
<i>Of which Geothermal Heat Pumps</i>	250 <sup>(2)</sup>	NA	242	1
Solar Thermal	361	1.4	23	0.1
Geothermal	259 <sup>(2)</sup>	1	259	1
<b>Total RES-H</b>	<b>3,025</b>	<b>12.1</b>	<b>2,179</b>	<b>8.7</b>

(1) This includes biogas and green gas referred to in the NREAP.

(2) Source: EGEC

### Transport sector

Since 2007, a blend of biofuels in transport fuels is mandatory. The blending obligation was 5.75% in 2010.

In the case of the Netherlands, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES Industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	138.2
Biodiesel	3.9
Renewable electricity	0
Biofuels Article 21(2)	5.1
Biofuels Imports	950.1
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>1,097.3</b>

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>282</b>
<i>Of which Article 21(2)</i>	34
<i>Of which imported</i>	240
<b>Biodiesel:</b>	<b>552</b>
<i>Of which Article 21(2)</i>	121
<i>Of which imported</i>	276
Renewable electricity	71
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>905</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	4,628	39.6	4,326	37
Total RES-H&C Consumption	3,025	12.1	2,179	8.7
Total RES-T Consumption	1,097	10.3	1,097 <sup>(1)</sup>	10.3 <sup>(1)</sup>
<b>Total RES share</b>	<b>8,750</b>	<b>17.3</b>	<b>7,340</b>	<b>14.5</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

### Electricity sector

What is needed in the RES-E sector is stability and certainty over a long period. A FIT is most wanted as well, as is the prolongation of the Dutch Geothermal Risk Insurance Scheme. The ‘gambling situation’ leads to too much insecurity for investors.

### Heating and cooling sector

What is needed in the RES-H&C sector is also stability and certainty over a long period. Policy instruments should be introduced to better promote RES-H&C. The Dutch Renewable Energy Council is in favour of an obligation for building owners to utilise a minimum percentage of renewable energy generation in buildings, gradually increasing this percentage over time. This should also apply to existing buildings when it is economically justifiable to take on major renovations and, in any case, when replacing the heating system. To develop RES-H&C, flanking measures will be needed, especially a simplification of the authorisation procedures and the building of new DH infrastructures.

### Transport sector

In the transport sector, the establishment of a distribution network for the use of biogas should be supported.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	11,681
Gross Final H&C Consumption	24,989
Gross Final Transport Consumption	10,634
Gross Final Energy Consumption	50,532

## POLAND

## The NREAP as seen by the Renewable Energy Industry

## 2020 Renewable Energy Targets

The Polish NREAP splits the overall 15% renewable energy target into 19.1% RES-E, 17.1% RES-H&C 11.7% RES-T. The Polish NREAP estimates that Poland will exceed its target by 0.5 percentage points. However, it assumes relatively low gross final energy consumption. Furthermore, the Polish NREAP takes into account the diesel and gasoline consumption in meeting the overall RES target (instead of the total consumption in transport) while diesel and gasoline consumption should only be considered in meeting the transport target. These findings may lead to not achieving the Polish binding target.

The scenario provided by PIGEO (The Polish Economic Chamber of Renewable Energy) in its REPAP Roadmap gives a much more global approach developing all technologies.

## Support Schemes

## Electricity sector

There is no indication in the NREAP on improving the stability of the support mechanism for RES-E. The stability of the green certificate (GC) system is only guaranteed until 2017 for producers of electricity from RES connected to the grid. To ensure stability of the mechanism, a new regulation should be adopted (including for new technologies).

The RES industry scenario is provided by the Vienna University of Technology, Energy Economics Group, Vienna, Austria in cooperation with Fraunhofer Institute Systems and Innovation Research, Karlsruhe.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	689.1	1,400	0.8	772	1,758	1
Hydro (below or equal to 10 MW)	889 <sup>(1)</sup>	1,211 <sup>(1)</sup>	0.7	380	1,211	0.7
Geothermal	110 <sup>(2)</sup>	858 <sup>(2)</sup>	0.5	0	0	0
Photovoltaic	786	650	0.4	3	3	0
Tidal, Wave, Ocean	0	0	0	0	0	0
Wind Onshore	10,000	23,600	13.9	6,150	13,710	8.1
Wind Offshore	500	1,800	1.1	500	1,500	0.9
Biomass (solid, biowaste, bioliquid)	1,550 <sup>(3)</sup>	10,200 <sup>(3)</sup>	6	1,550	10,200	6
Biogas	980 <sup>(3)</sup>	4,018 <sup>(3)</sup>	2.4	980	4,018	2.4
<b>Total RES-E</b>	<b>15,504.1</b>	<b>43,737</b>	<b>25.8</b>	<b>10,335</b>	<b>32,400</b>	<b>19.1</b>

NB: MW installed in 2020 in biomass cofired with coal are excluded from those scenarios.

(1) Source: ESHA

(2) Source: EGEC

(3) EREC Breakdown based on AEBIOM's projections

*“The European Parliament has been one of the driving forces behind RES development in the EU and will remain so in the years to come.”*

Jerzy Buzek, MEP  
(EPP)

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### Heating and cooling sector

There are no support measures for RES-H&C except for the guarantee mechanism of purchasing heat if a RES unit is connected to the heat network. The NREAP does not give any answer as to how and by which measures the Directive should be implemented in the RES-H&C sector.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	6,677	19.2	4,636	13.4
Biogas	92.4	0.3	453	1.3
<b>RE from Heat Pumps:</b>	<b>239</b>	<b>0.7</b>	<b>148</b>	<b>0.4</b>
<i>Geothermal Heat Pumps</i>	104 <sup>(1)</sup>	0.3	NA	NA
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	135	0.4	NA	NA
Solar Thermal	319	0.9	506	1.5
Geothermal	330 <sup>(1)</sup>	1	178	0.5
<b>Total RES-H</b>	<b>7,657.4</b>	<b>22.1</b>	<b>5,921</b>	<b>17.1</b>

(1) Source: EGEC

### Transport sector

Biofuels are currently promoted through a system of exemptions and tax reductions. It is planned to increase the demand for liquid biofuels by developing exemptions from parking fees for vehicles powered by biofuels and imposing an obligation of using biofuel-powered cars in the public sector. It is also planned to provide an exemption from charges on air pollutants for vehicles using liquid biofuels.

In the case of Poland, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	1281.2
Biodiesel	474.8
Renewable electricity	0
Biofuels Article 21(2)	162.8
Net Biofuels imports	-622.8 <sup>(1)</sup>
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>1,296</b>

(1) A negative figure means exports to other EU Member States.

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	<b>451</b>
<i>Of which Article 21(2)</i>	44
<i>Of which imported</i>	0
<b>Biodiesel:</b>	<b>1,451</b>
<i>Of which Article 21(2)</i>	132
<i>Of which imported</i>	0
<b>Renewable electricity</b>	<b>50</b>
<b>Others:</b>	<b>66</b>
<i>Of which Article 21(2)</i>	66
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>2,018</b>



TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	<b>Industry Scenario in ktoe</b>	<b>Industry Scenario in %</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	3,761	25.8	2,736 <sup>(1)</sup>	18.7 <sup>(1)</sup>
Total RES-H&C Consumption	7,657	22.1	5,921	17.1
Total RES-T Consumption	1,296	6.5	2,335 <sup>(2)</sup>	11.7 <sup>(2)</sup>
<b>Total RES share</b>	<b>12,714</b>	<b>18.4</b>	<b>10,675</b>	<b>15.43<sup>(3)</sup></b>

(1) PIGEO has removed from the results of the renewable electricity sector the renewable electricity used in the transport sector so that it is not counted twice. This explains the difference with the Polish NREAP table 4a.

(2) The Polish NREAP did not take into account for the calculation of the share of renewables in transport indicated in table 3 (10.14%), the methodology specified in the Article 21(2) and the Article 3(4c) of the RES Directive. If ones takes into account Article 21(2) and 3(4c), this would amount to 11.7%.

(3) This figure is slightly below the figure of 15.5% indicated in table 3 of the Polish NREAP as renewable electricity used in transport had been counted in the NREAP both in the electricity and in the transport sectors.

## Renewable Energy Industry Policy Recommendations

The scenario suggested by PIGEO requires an active support and streamlining of the development of the RES sector from the very start of the Directive's implementation in Poland.

### Electricity sector

The Polish renewable energy industry calls for:

- A sustainable use of biomass for energy purposes.
- Improvements in administrative procedures (Environmental Impact Assessments, construction permits, spatial planning, shorter deadlines of receiving certifications). Discussions on these issues are excluded from the NREAP.
- Better access to the grid: priority grid access for large units (>5 MW) and guaranteed access for small units should be ensured. A transparent mechanism for connection requirements and for the sharing of the cost of connection (between RES producer and operator) should be implemented.
- The introduction of a stable and long-term support mechanism (at least 15 years from the start of operation, which in terms of achieving the objective for 2020 corresponds to its operation until 2035). In order to ensure that all RES technologies are promoted, a well designed FIT system should be implemented.

### Heating and cooling sector

To reach the sectoral target on heating and cooling, the following actions are required in the next two years:

- Widening the group of beneficiaries of environmental fund subsidies (especially to individual households);
- An urgent launch of legal and general support for individual households putting in place hot water and space heating and cooling systems, through tax relief;
- The introduction of a provisional 0% VAT rate on solar collectors and geothermal systems sold in Poland;
- The introduction of an adequate support mechanism to finance RES operation;
- The introduction reasonable incentives for electricity produced in cogeneration;
- The construction, enlargement and refurbishment of district heating infrastructures;
- Establishing a regulatory framework to simplify procedures;
- Developing training activities and adopting a certification scheme for installers.

### Transport sector

The Polish Renewable Energy Industry would like to see reasonable goals for RES in transport. The industry favours a technology-specific support. This will allow all RES in transport to be developed, also those that are currently at an early development phase.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	14,600
Gross Final H&C Consumption	34,700
Gross Final Transport Consumption	19,900
Gross Final Energy Consumption	69,200

## PORTUGAL

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

*“Europe should maintain its technological leadership in renewables & progress on this energy path of the future.”*

Maria da Graça Carvalho,  
MEP (EPP)

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The Portuguese NREAP splits the overall 31% renewable energy target into 55.2% RES-E, 30.6% RES-H&C and 10% RES-T.

APREN draws attention to the high projection figures for energy consumption up to 2020 in the NREAP. APREN finds the Additional Energy Efficiency scenario not ambitious enough and believes that the promotion of EE is not taken as seriously as the promotion of RES technologies.

The NREAP states that Portugal will meet its overall binding target. However, APREN predicts –using different energy demand assumptions- that a higher overall target of 34.8% could be met in Portugal. The lack of ambition of the NREAP targets is easily supported by facts:

- For the electricity sector, although the installed power figures set out in the NREAP are in line with those proposed by APREN, except for photovoltaics, the respective electricity production is below expectations, due to too low average annual production hours.
- The second proof of the NREAP’s lack of ambition lies in the fact that the RES contribution in H&C decreases between 2005 and 2020 from 31.9% to 30.6%. APREN fears that the NREAP trajectory for the H&C sector does not emanate from a strategy outlined for the sector, but is merely an accounting consequence of the goals set out for the other sectors.
- At the same time the overall energy consumption forecast in the Portuguese transport sector was reviewed at lower levels than those estimated by the industry, thus leading to a smaller amount of biofuel production. Despite ambitious plans for electric vehicles, the main share in RES-T is from biofuels, as they are already a solution in place, yet with several drawbacks.

#### Support Schemes

##### Electricity sector

As described in the NREAP, producers of renewable electricity, except for large hydro power plants, will keep on being remunerated according to FITs. FITs are limited to an overall quantity of electricity of total production or a fixed number of years, whichever the sooner. Once these limits are reached, renewable energy power plants will start selling their production in the open market. The remuneration of the power plants under these conditions is yet to be defined. Crucial information lacking in the NREAP is whether there are intentions of introducing a different support scheme for new power to be licensed until 2020, namely wind power (for example market price + premium).

The national RES industry roadmap is provided by the Portuguese RES Association “Associação de energias renováveis” (APREN).

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	9,072	16,642 <sup>(1)</sup>	25.8	8,798	12,562	19.5
Hydro (below or equal to 10 MW)	750	1,907 <sup>(1)</sup>	3	750	1,511	2.3
Geothermal	120	936	1.4	75	488	0.8
Photovoltaic	2,000	3,160	4.9	1,000	1,475	2.3
Solar Thermal Electricity	500 <sup>(2)</sup>	1,000 <sup>(2)</sup>	1.5	500	1,000	1.5
Tidal, Wave, Ocean	300	750	1.2	250	437	0.7
Wind Onshore	7,300	16,559 <sup>(3)</sup>	25.7	6,800	14,416	22.4
Wind Offshore	200	563 <sup>(3)</sup>	0.9	75	180	0.3
Biomass (solid, biowaste, bioliquid)	670	3,836	5.9	802	2,991	4.6
Biogas	150	1,050	1.6	150	525	0.8
<b>Total RES-E</b>	<b>21,062</b>	<b>46,403</b>	<b>71.9</b>	<b>19,200</b>	<b>35,585</b>	<b>55.2</b>

(1) Normalised values according to the Directive's Annex.

(2) ESTELA estimates that 16,000 GWh can be produced in 2020 with an installed capacity of 5,317 MW.

(3) Normalized values according to the Directive's Annex.

### Heating and cooling sector

Financial support for the installation of solar thermal collectors was in place in 2009 and 2010. No new specific measures to promote this technology are forecast, besides the ones already included in the Energy Efficiency Action Plan, and a revision of building regulations. Surprisingly, biomass contribution is expected to decrease due to the introduction of more efficient burners. The promotion of the use of biogas for H&C purposes is also foreseen. The possibility of a regulated tariff for the selling of biomethane to the natural gas network in line with what already happens with electricity from renewable sources is considered in the NREAP.

Portuguese statistics do not, so far, account the use of heat pumps. They are expected to collect this data soon, as it is required in the 2009/28/EC Directive.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	1,807	22	2,285	27.9
Biogas	0	0	37	0.4
Solar Thermal	236	2.5	160	2
Geothermal	39	0.5	25	0.3
<b>Total RES-H</b>	<b>2,082</b>	<b>25</b>	<b>2,507</b>	<b>30.6</b>

### Transport sector

The electrification of transport is incentivised through subsidies for the purchase of electric vehicles, however other type of vehicles, such as hybrid and plug-in hybrid are not considered in the plan. At the same time, the promotion of biofuels is achieved by introducing mandatory incorporation targets. A new scheme will be in place to promote biofuels, through the emission of certificates for biofuels that meet the sustainability criteria of the 2009/28/EC Directive. The exemption of the Mineral Oil Tax was withdrawn recently. There are still some aspects to be clarified, namely the regime for imports both from EU and non- EU countries.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	35	27
Biodiesel	651	450
Renewable electricity	93	58
Biofuels Article 21(2)	0	8
Others	21	0
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>800</b>	<b>543</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	3,990	71.9	3,060	55.2
Total RES-H&C Consumption	2,082	25	2,507	30.6
Total RES-T Consumption (as in line J of Table 4a of the NREAP)	863	15	574	10
<b>Total RES share</b>	<b>6,871</b>	<b>35.3</b>	<b>6,044</b>	<b>31.05</b>

## Renewable Energy Industry Policy Recommendations

### Electricity sector

The main barriers for the promotion of RES-E are the power granting schemes and the licensing procedures. APREN strongly recommends that the RES industry take part in the choice of criteria and administrative procedures to be adopted in the allocation of new power for each RES technology. The recent trend of adopting tender procedures with awarding criteria based on the highest financial compensation paid to the State, is an incongruous solution, which moreover violates fundamental principles of tax law.

Regarding licensing procedures, APREN highlights the proposal in the NREAP of creating a one-stop-shop which, if adopted correctly and in a timely manner, will contribute to improving licensing procedures. However other issues must be addressed such as compatibility with land-use management instruments, both at local and national level, and the constitution and scope of Environmental Impact Assessment Committees.

### Heating and cooling sector

APREN asks for a reassessment of the targets and existing measures to promote RES for H&C as well as the adoption of additional measures, to ensure at least that the renewable energy contribution from 2005 to 2020 will not decrease. APREN highlights the need for support mechanisms for DH and co-generation, and the maintenance and development of the support program for solar and geothermal heating, which could be extended to other applications such as hot water for industrial processes or air conditioning.

### Transport sector

It is of utmost importance to ensure the sustainability of biofuels and that the scheme in place is aligned with the mechanisms to be defined at a European level. It is also important to guarantee the transparency of the functioning of the biofuel industry by setting up a rigorous and fail-proof control system. The mandatory incorporation targets imply that from 2015 onwards it will be necessary to introduce a new generation of biofuels, meaning that significant investments will be necessary. The mechanisms to support and facilitate these investments need to be defined in advance.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	5,547
Gross Final H&C Consumption	8,197
Gross Final Transport Consumption	5,743
Gross Final Energy Consumption	19,467

## ROMANIA

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Romanian NREAP splits the overall 24% renewable energy target into 42.1% RES-E, 22% RES-H&C, and 10% RES-T. The NREAP, which was prepared by the Ministry of Economy, accurately describes the RES legal framework and shows the interest of the Romanian authorities to comply with the 2009/28/EC Directive, which is positive. However, it sometimes lacks accuracy.

#### Support Schemes

##### Electricity sector

Romania has adopted a GC system for encouraging RES production in the electricity sector. The country's Renewable Promotion Law (220/2008) is going through a process of notification to the European Commission. The new version of Law 220 was published in the Official Gazette in July 2010. Romania is in correspondence with the EU on the promotion scheme regarding state aid clearance. The notification process is ongoing, and it is not yet possible to foresee when it will come to an end, but it is expected during 2011.

The new support scheme is attractive. For each MWh produced today, only 1 GC is offered, while the new law will provide 2 GC/MWh to wind to 6 GC/MWh to solar, 3 GC/MWh to geothermal electricity. The promotion scheme lasts 15 years for any technology.

As the REPAP scenario was not agreed upon in the framework of the REPAP project, only the NREAP scenario is presented in this publication.

*“The deployment of renewables in the building sector combined with ambitious energy efficiency measures and adequate financial support will ensure that Europe reaches its 2020 targets.”*

Silvia-Adriana Țicău,  
MEP (S&D)

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	7,000	18,410	25
Hydro (below or equal to 10 MW)	729	1,359	1.9
Photovoltaic	260	320	0.4
Wind Onshore	4,000	8,400	11.4
Biomass (solid,biowaste,bioliquid)	405	1,950	2.6
Biogas	195	950	1.3
<b>Total RES-E</b>	<b>12,589</b>	<b>31,389</b>	<b>42.6</b>

However, there are some disputes over the new provisions between the Parliament and the energy regulator (ANRE). It seems ANRE, the Romanian energy regulator, would like to change the promotion scheme in 2017 to reduce either the number of GCs per technology or the scheme's duration. At the same time ANRE would like to exclude the overlapping of the EU grants for green energy with the promotion scheme.

### Heating and cooling sector

As pointed out in the NREAP, the heating sector is *the most neglected of the energy subsectors and RES based heating received the least attention at legislative level*. However, the NREAP does not include Table 11 which gives details over the projections of RES-H&C technologies in 2020.

There is currently no specific legislative framework for RES-H&C in Romania. However, this is expected to change with the announced changes in the new renewable energy law associated with the establishment of the national renewable energy roadmap.

### Transport sector

In terms of RES in transport, the promotion of use of biofuels and other renewable fuels for transport constituted the subject of GD 1844/2005 supplemented by GD 456/2007. The Decision stipulates that there must be a minimum of 5.75% based on the energy content of all types of gasoline and diesel fuel sold on the market, and this was introduced on 31 December 2010.

What's more, the purpose of the "Stimulation of regional development by investing in agricultural and forestry product processing in order to obtain non-agricultural products" scheme is the regional development of Romania by supporting enterprises developing biofuels. A follow-up system exists for the quantity of biofuels used for transport based on manufacturers' reports. The NREAP puts forward that biofuels will particularly (but not exclusively) be used for public transport.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
Biofuels	489
Renewable electricity	14
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>503</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	2,666	42.1
Total RES-H&C Consumption	4,038	22
Total RES-T Consumption (as in line J of Table 4a of the NREAP)	564	10
<b>Total RES share</b>	<b>7,268</b>	<b>24</b>

## Renewable Energy Industry Policy Recommendations

### Electricity sector

In order for Romania to reach its RES-E target, a number of issues need to be settled, namely the transparency of the grid connection approval process, and mainly the predictability of the legal system. A regulatory framework for geothermal energy is in place but the procedures for licensing must be simplified.

### Heating and cooling sector

As mentioned above, table 11 of the EC template for NREAP has not so far been provided by Romania. Romania should provide these projections for RES-H&C technologies as soon as possible. As there are no targets and no growth rate, it is difficult to evaluate the support measures. Romania must provide more information on its support measures for H&C technologies and their consistency should be verified, in order to comply with the RES Directive. The NREAP should give details on various policies on RES (structural funds, etc.).

A certification of installers is mentioned but without much more detail on its establishment. For the RES-H&C market to develop, more details are needed. Geothermal Heat Pumps (GHP) should be considered as renewable energy technologies and they should be included in the NREAP.

TABLE 5: Energy Demand Assumptions used in the scenario (source: NREAP in ktoe)

Gross Final Electricity Consumption	6,334
Gross Final H&C Consumption	18,316
Gross Final Transport Consumption	5,628
Gross final energy consumption in ktoe	30,278

## SLOVAKIA

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

The Slovak NREAP splits the overall 14% renewable energy target into 24% RES-E, 14.6% RES-H&C, and 10% RES-T. The NREAP forecasts an excess of 1.3% over the 2020 binding target.

#### Support Schemes

##### Electricity sector

Currently, the key support instrument for RES-E in Slovakia is a feed-in tariff. The Regulatory Office for Network Industries sets the FIT rates annually. This annual revision brings uncertainty to the RES-E market.

The RES industry scenario is provided by the Vienna University of Technology, Energy Economics Group in cooperation with the Fraunhofer Institute Systems and Innovation Research, Karlsruhe.

*“New Member States have to accelerate RES deployment to tap their RES potential.”*

Maros Kondrot (MP)

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	1,693	4,700	14	1,630	4,857	14.6
Hydro (below or equal to 10 MW)	250 <sup>(1)</sup>	600 <sup>(1)</sup>	2	182	543	1.6
Geothermal	100 <sup>(2)</sup>	780 <sup>(2)</sup>	2	4	30	0
Photovoltaic	1,040 <sup>(3)</sup>	1,000 <sup>(3)</sup>	3	300	300	0.9
Wind Onshore	800 <sup>(4)</sup>	1,800 <sup>(4)</sup>	5	350	560	1.7
Biomass (solid, biowaste, bioliquid)	170 <sup>(5)</sup>	850 <sup>(5)</sup>	3	170	850	2.6
Biogas	110 <sup>(5)</sup>	860 <sup>(5)</sup>	3	110	860	2.6
<b>Total RES-E</b>	<b>4,163</b>	<b>10,590</b>	<b>32</b>	<b>2,746</b>	<b>8,000</b>	<b>24</b>

(1) Source: ESHA

(2) Source: EGEC

(3) Source: EPIA Baseline scenario

(4) Source: EWEA Baseline Scenario

(5) EREC Breakdown based on AEBIOM's projections.

On 15 December 2010, the Slovak Parliament adopted amendments to the Act on the promotion of alternative energies Nr 309/2009. These are valid of 1 February 2011.

Slovakia changed its RES law, as well as the FIT for PV several times over the last year, which made it difficult for PV investors to secure their future investments. In the latest RES Act (309/2009) amendments, it was established, that only installations under 100 kW would get State support. The FITs will not be set up for the whole year, but there will be more changes made in the middle of the year. With this legislation, Slovakia risks stopping the development of PV.

The NREAP plans quite a large number of wind power plants. So far in the last few years, it was impossible for investors in this industry to get permissions for operation. This might represent a hurdle to the building of wind farms amounting to 300 MW of installed capacity.

The NREAP describes only negative aspects of smart grids and fails to recognise that the Slovak electricity transmission system operator (TSO) has already drawn up a network development plan for 2020, which, unfortunately, does not take into account investments in smart grids. If Slovakia invests in the renewal of networks without taking into account future needs, future costs will be very high, since the transition to a smart grid will be necessary for the development of RES-E.

### Heating and cooling sector

The NREAP lacks concrete measures aimed at promoting the use of energy from sources other than biomass.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	1,198	21.3	630	11.2
Biogas	13	0.2	60	1.1
<b>RE from Heat Pumps:</b>				
<i>Geothermal Heat pumps</i>	52 <sup>(1)</sup>	0.9	4	0.1
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	12	0.2	6	0.1
Solar Thermal	42	0.7	30	0.5
Geothermal	464 <sup>(1)</sup>	8.3	90	1.6
<b>Total RES-H</b>	<b>1,781</b>	<b>31.6</b>	<b>820</b>	<b>14.6</b>

(1) Source: EGEC

### Transport

Since May 2004, pure biofuels used for transport purposes are fully exempt from excise tax. In July 2007, a scheme for offering reduced excise tax on biofuel blends was introduced. Diesel blends with esters and gasoline blends with a bioethanol derivate, ETBE, receive excise tax exemptions proportional to the content of biofuel in the blend. The exemptions are limited to 7.2% for gasoline blended with ETBE and to 5% for diesel blended with esters.

In the case of Slovakia, projections from the industry and from the NREAP for the share of renewables in transport were not exactly comparable. Hence, the tables present first the RES-T projections from the industry, and then the projections from the NREAP.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap
	RES in Transport Consumption
Bioethanol/bioETBE	108
Biodiesel	32
Renewable electricity	0
Biofuels Article 21(2)	4
Others	0
Net Biofuels Imports	87
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>231</b>



RES-T 2020 Projections (ktoe)	NREAP
	RES in Transport Consumption
<b>Bioethanol/bioETBE:</b>	75
Of which Article 21(2)	25
Of which imported	0
<b>Biodiesel:</b>	110
Of which Article 21(2)	30
Of which imported	0
Renewable electricity	17
<b>Others:</b>	5
Of which Article 21(2)	5
<b>Total RES-T in ktoe (as in line C of Table 4a)</b>	<b>207</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	911	32	688	24
Total RES-H&C Consumption	1,781	31.6	820	14.6
Total RES-T Consumption	231	8	275 <sup>(1)</sup>	10 <sup>(1)</sup>
<b>Total RES share</b>	<b>2,923</b>	<b>26</b>	<b>1,715</b>	<b>15.3</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

### Electricity sector

Constant legislative changes, as well as changes in the FIT system have a negative impact on potential investors. It appears crucial to increase investor confidence. This can be achieved by guaranteeing not only the duration of eligibility to receive support but also the level of remuneration.

Priority access to the grid is currently provided for in Act 309/2009 on RES-E support. However, this priority is associated to several conditions such as taking into account the security of supply and grid stability.

The NREAP plans the construction of the first geothermal power plants. In order to develop more projects, a better regulatory framework on deep geothermal, simplified procedures and a risk insurance scheme would help.

### Heating and cooling sector

In the building sector, a very helpful measure could be either to change the current civil code or to prepare a new law (e.g. a Renewable Energy Heating Act) where RES utilisation is required in all new buildings. In addition to imposing regulations, it is just as essential to create reliable, state budget independent incentives. Although there are currently several mechanisms in place to encourage the use of RES in Slovakia, it would be necessary to allocate more funds to the use of renewable energy in households, as well as State administration and industry. One solution would be to include the promotion of RES in the management of funds derived from sales of Assigned Amount Units under the Kyoto Protocol.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	2,866.0
Gross Final H&C Consumption	5,613
Gross Final Transport Consumption	2,747
Gross Final Energy Consumption	11,226

## SLOVENIA

## The NREAP as seen by the Renewable Energy Industry

## 2020 Renewable Energy Targets

*“Developing all available renewable energy sources will lead to greater diversification of the energy mix.”*

Silva Crnugelj (MP)

The Slovenian NREAP splits the overall 25% renewable energy target into 39.3% RES-E, 30.8% RES-H&C and 10.5% RES-T.

Generally, the NREAP identifies well the key obstacles and problems regarding RES in Slovenia and includes a comprehensive planning and implementation of the measures. The targets are clearly defined and are in line with the RES Directive. Slovenia declares a minimum 25% share of RES in 2020 from 16.2 % in 2005.

Slovenia will reach its target with difficulty, if at all. The NREAP itself states that the targets are reachable only with an intensive EE policy and an eye to reducing energy consumption.

## Support Schemes

## Electricity sector

The target for the electricity sector is set at 39.3%. With the existing support scheme a much higher target than the one stated in the NREAP could be reached. FiTs have proved to be appropriate and efficient in Slovenia. However, in the past six years, the support system changed far too often and hopefully the current one will, as is planned, remain valid for a longer period of time.

The RES industry scenario is provided by the Vienna University of Technology, Energy Economics Group, Vienna, Austria in cooperation with Fraunhofer Institute Systems and Innovation Research, Karlsruhe.

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	1,070	4,461	28.6	1,176	4,581	29.4
Hydro (below or equal to 10 MW)	383 <sup>(1)</sup>	540 <sup>(1)</sup>	3.5	177	540	3.5
Geothermal	30 <sup>(2)</sup>	234 <sup>(2)</sup>	1.5	0	0	0
Photovoltaic	94	80	0.5	139	139	0.9
Wind Offshore	500 <sup>(3)</sup>	1,100 <sup>(3)</sup>	7	106	191	1.2
Biomass (solid, biowaste, bioliquid)	34 <sup>(4)</sup>	309 <sup>(4)</sup>	2	34	309	2
Biogas	61 <sup>(4)</sup>	367 <sup>(4)</sup>	2.4	61	367	2.3
<b>Total RES-E</b>	<b>2,172</b>	<b>7,091</b>	<b>45.5</b>	<b>1,693</b>	<b>6,127</b>	<b>39.3</b>

(1) Source: ESHA

(2) Source: EGEC

(3) Source: EWEA

(4) EREC Breakdown based on AEBIOM's projections

The NREAP defines the possibility of implementing a quota system in addition to the feed-in system. In that case, the obligation would fall on the electricity suppliers. However, the NREAP only obliges the Ministry of Economy to investigate the possibility of this measure rather than to implement it straight away. The penalties for not reaching the quotas should be defined in relation to the price of green electricity and thus be high enough to enforce the system.

## Heating and cooling sector

The target for the heating and cooling sector is set at 30.8%, up from 20% in 2008. As Slovenia is rich in wood and other biomass, the heating and cooling target is more easily reachable than the targets set for the other sectors.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	844	42	526	25.9
Biogas	4	0	0	0
<b>RE from heat pumps:</b>	<b>63</b>	<b>3</b>	<b>58</b>	<b>2.9</b>
<i>Geothermal Heat pumps</i>	42	2	38	1.9
<i>Aerothermal &amp; Hydrothermal Heat Pumps</i>	21	1	19	1
Solar Thermal	44	2	21	1
Geothermal	46 <sup>(1)</sup>	2	20	1
<b>Total RES-H</b>	<b>1,001</b>	<b>49</b>	<b>625</b>	<b>30.8</b>

(1) Source: EGEC

NB: The number of geothermal, aerothermal and hydrothermal heat pumps in the NREAPs do not add up to figure indicated for heat pumps based on RES.

The current support system covers solar thermal, wood biomass boilers and DH systems using wood biomass or geothermal energy. Presently, funds for investment incentives are collected through the State budget, but in the future that should change and be financed through an addition to the price of heat and fuels. (This new system is similar to a feed-in system in terms of the financing mechanisms.) 25% of the investment would that way be subsidised, with some limitations, through annual tenders. This support scheme is completed by a proposal for an obligatory share of RES in DH systems and for establishing a spatial planning of DH and CHP geothermal plants.

Slovenia aims at promoting district heating systems using geothermal energy (a tender is currently being drafted).

## Transport sector

Reaching the transport target is problematic, as it requires high growth rates from a low starting percentage (1.22% in 2008). The industry would expect several measures to improve the situation, but understands the link between cutting the transit traffic and the much needed and costly modernisation of the railway network.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	5	18.5
Biodiesel	7	173.7
Renewable electricity	0	10.5
Net Biofuels Imports	193.6	NA
<b>Total RES-T in ktoe</b>	<b>205.6</b>	<b>202.7</b>

The existing Decree plans an increase of the obligation for biofuels and other RES in transport to 7.5% (2015). The measures include exemption from excise duty and a lower tax on motorised vehicles.

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall Projections for 2020</b>	<b>Industry Scenario in ktoe</b>	<b>Industry Scenario in %</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	610	45.5	527	39.3
Total RES-H&C Consumption	1,001	49	625	30.8
Total RES-T Consumption	205.6	11	204 <sup>(1)</sup>	10.5 <sup>(1)</sup>
<b>Total RES share</b>	<b>1,816.6</b>	<b>34.1</b>	<b>1,344</b>	<b>25.25</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

The need for R&D for RES technologies is not well identified in the NREAP and therefore this should be done with the calculation of funds needed until 2020.

### Electricity sector

Some procedures should be shortened and simplified, such as the next-year price calculation, the two-year binding contract with producers and above all the incentive level and procedure for the refurbishment of old power plants (over 15 years), whose energy potential is not fully exploited.

The decentralisation of electricity production requires changes in grid infrastructure, and hence substantial funds. This part of the NREAP should be more realistically prepared. The development plan of smart grids in the NREAP requires a dynamic financial evaluation of support for RES, as RES-E production is growing continuously, and consequently an evaluation of needed investments and funding sources.

### Heating and cooling sector

An interesting field seems to be biogas heating, as Slovenia has a notable potential for the production of biogas also from biological waste that is currently exported to a neighbouring country, where it is then processed. The use of the heat should in that sense be obligatory and not only advised, as it is written in the NREAP. Support for the additional investment costs should be envisaged.

A new version of the Mining Act should allow a clarification of the regulations about deep and shallow geothermal. Slovenia indicates that 10 Mio € should be invested between 2010 and 2020 for building new geothermal district heating (GDH) systems.

In Slovenia, the electricity tariff for heat pumps is higher than the regular electricity tariff and hence hampers the GHP development. To reach the NREAP target on GHP, it is crucial to remove this barrier.

### Transport sector

It would be advisable to analyse the adequacy and possibility for the complete abolition of subsidies to fossil fuels. The other option is raising the tolls for transit traffic as this is most problematic in Slovenia and causes high environmental costs and damage to road infrastructure. Ideas such as free city public transport and cycling routes should also be more thoroughly analysed.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	1,342
Gross Final H&C Consumption	2,029
Gross Final Transport Consumption	1,953
Gross Final Energy Consumption	5,323

## SPAIN

## The Renewable Energy Industry Feedback on the NREAP

## 2020 Renewable Energy Targets

The Spanish NREAP splits the overall 20% renewable energy target into 40.2% RES-E, 18.9% RES-H&C and 13.6% RES-T. The level of ambition and commitment, regarding the overall share of RES in the national energy mix, remains quite low, according to APPA (Spanish Renewable Energy Association). Although the Spanish government expects to reach up to 22.7% of RES in gross final energy consumption by 2020 in its high efficiency scenario, this number still is considerably lower than the 28.3%<sup>23</sup> of RES share in gross final energy consumption, which APPA (together with Deloitte) has calculated to be feasible in 2020 in its optimistic scenario.

## Support Schemes

## Electricity sector

The Spanish NREAP accurately describes the existing legislation on national level as well as on regional level in the annex, without, however, proposing many new measures. The considerable tariff cuts which entered into force in December 2010 for wind power installations under the current support scheme (including existing plants) the deeper tariff cuts established in November 2010 for PV, and the still awaited tariffs for other RES-E technologies, have worsened the already difficult situation for the Spanish RES sector in general and the image of missing long-term stability and reliability of RES support policies in Spain in particular – a precondition to attract and make possible any new investments in the Spanish RES sector.

The industry scenario is provided by the Spanish RES Association “Asociación de Productores de Energías Renovables” (APPA).

*“Spain has, for a long time, been a shining example of RES development and shall continue to work towards innovative ways to better integrate renewable energy technologies in the grid.”*

Teresa Riera Madurell,  
MEP (S&D)

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TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	16,658	24,154	6.4	20,177	33,314	8.9
Hydro (below or equal to 10 MW)	3,422	8,555	2.3	2,185	6,280	1.7
Of which pumping	NA	NA	NA	5,700	8,023	1.7
Geothermal	1,000	6,000	1.6	50	300	0.1
Photovoltaic	18,625	20,487	5.5	8,367	14,316	3.8
Solar Thermal Electricity	7,613 <sup>(1)</sup>	21,318 <sup>(1)</sup>	5.7	5,079	15,353	4.1
Tidal, Wave, Ocean	1,000	2,500	0.7	100	220	0.1
Wind Onshore	41,261 <sup>(2)</sup>	83,480	22.2	35,000	70,502	18.8
Wind Offshore	3,000	8,400	2.2	3,000	7,753	2.1
Biomass (solid, biowaste, bioliquid)	3,293	23,051	6.1	1,187	7,400	2
Biogas	1,000	3,300	0.9	400	2,617	0.7
<b>Total RES-E</b>	<b>96,872</b>	<b>201,245</b>	<b>53.6</b>	<b>69,845<sup>(3)</sup></b>	<b>150,032<sup>(3)</sup></b>	<b>40.2<sup>(3)</sup></b>

(1) ESTELA estimates that 56,700 GWh can be produced in 2020 with an installed capacity of 18,893 MW.

(2) Including 1,000 MW of small wind capacity.

(3) Pumping indicated above is not included in this total figure.

<sup>23</sup> Using the NREAP energy demand assumptions, the share of RES projected by APPA amounts to 28.3% by 2020. Using their own energy demand scenario, APPA together with Deloitte find 27.8%.

### Heating and cooling sector

The NREAP lists measures that already exist, such as the Royal Decrees on the energy certification of buildings, the regulations for technical installations in buildings (RITE) as well as the Technical Building Code (CTE).

The NREAP vaguely announces the modification of the RITE and the CTE to adapt them to the corresponding regulations established in the RES Directive, but no concrete measure is proposed.

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid,biowaste,bioliquid)	4,700	15.7	4,850	16.2
Biogas	0	0	100	0.3
<b>RE from Heat Pumps:</b>	<b>0</b>	<b>0</b>	<b>51</b>	<b>0.2</b>
<i>Geothermal heat pumps</i>	0 <sup>(1)</sup>	0	41	0.1
<i>Aerothermal heat pumps</i>	0	0	10	0.1
Solar Thermal	1,298	4.3	644	2.2
Others	115	0.4	0	0
<b>Total RES-H</b>	<b>6,113</b>	<b>20.4</b>	<b>5,645</b>	<b>18.9</b>

(1) EGEC believes that geothermal heat pumps could produce 416 ktoe in Spain by 2020.

### Transport sector

The NREAP foresees a 13.6% RES-T target by 2020 (notably higher than the 10% binding target for RES-T for all Member States), based on 86.9% of total target on biofuels and 13.1% on RES electricity in transport, which can be seen as an adequate objective. Another positive point is the assumption of a clear decrease of biodiesel imports as of 2011.

However, no clarification on the transposition of the sustainability criteria for biofuels as established in the RES Directive has been made. Furthermore, no proposals are made in the NREAP regarding the stimulation of labelled mixtures of biofuels with conventional fuels.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	725.2	400
Biodiesel	3,330.3	2,900
Renewable electricity	0	380.9
Biofuels Article 21(2)	0	200
Others (biogas, pure vegetable oils, ...)	0	4
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>4,055.5</b>	<b>3,884.9</b>

TABLE 4: Projections for the Total Share of RES in 2020

<b>Overall RES Projections for 2020</b>	<b>Industry Scenario in ktoe</b>	<b>Industry Scenario in %</b>	<b>NREAP Scenario in ktoe</b>	<b>NREAP Scenario in %</b>
Total RES-Electricity Consumption	17,307	53.6	12,903	40.2
Total RES-H&C Consumption	6,113	20.4	5,645	18.9
Total RES-T Consumption	4,056	13	4,322 <sup>(1)</sup>	13.6 <sup>(1)</sup>
<b>Total RES share</b>	<b>27,476</b>	<b>28.3</b>	<b>22,057</b>	<b>22.73</b>

(1) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

In order to achieve any of these objectives, a RES Law should be adopted in the shortest delay, setting out the targets and instruments necessary for the fulfilment of the RES Directive commitments (including a precise timetable).

### Electricity sector

Measures proposed by APPA to achieve the objectives include the following: defining an action plan for the deployment of smart grids, introducing micro-grids, promoting energy storage technologies (electric cars and pumped storage), giving priority and preference to RES regarding grid access, and establishing public and transparent rules for the sharing/allocation of costs of connecting renewable facilities to the grid taking into account the related benefits.

The maintenance of the system of regulated tariffs (FITs) / premiums is crucial for the fulfilment of the national target, improved in the following aspects:

- revision of the FITs/premiums according to the evolution of the technology, the externalities, the learning curve and the course of implementation and fulfilment of the targets;
- the remuneration of RES-E should continue to be covered by the electricity tariffs including the right of the government to revise the tariff levels annually, without retroactivity;
- the introduction of tariffs/premiums for self consumption of RES-E for installations of up to 30 kW (of installed capacity);
- the right to be remunerated for the produced RES-E by the established feed-in tariffs/premiums for the lifetime of each installation or for a minimum period of 20 years.

### Heating and cooling sector

FITs and premiums for the production and consumption of RES-H&C purposes should be introduced, as should support programs based on soft loans, investment grants and fiscal measures, encouraging district heating and cooling systems.

APPA also speaks in favour of an amendment to the Technical Building Code (CTE) so that, no later than 2016 (2015 in the case of public buildings), all new buildings and up to 20% of existing buildings should produce the energy they consume with renewable energy.

### Transport sector

Increasing the binding target of using biofuels and other RES to 10% in 2012 would be an immediate measure. For electric cars, initiatives should be promoted and regulations adopted ensuring that the energy needed to cover the power demand to recharge the electric vehicles is based on RES.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	32,269
Gross Final H&C Consumption	29,849
Gross Final Transport Consumption	31,681
Gross Final Energy Consumption	97,041

## SWEDEN

### The NREAP as seen by the Renewable Energy Industry

#### 2020 Renewable Energy Targets

*“RES development provides a good opportunity for cooperation between Member States.”*

Lena Ek, MEP (ALDE)

The Swedish NREAP splits the overall 49% renewable energy target into 62.9% RES-E, 62.2% RES-H&C, and 13.8% RES-T. The Swedish overall target for renewable energy is according to the RES Directive 49%, but the Swedish Parliament has raised this target to 50%.

In general, the level of ambition of the Swedish NREAP is very low. The Swedish Energy Agency made a prediction based on existing incentives and arrived at 50.2% RES by 2020, which is not a goal that needs any kind of effort to be met. On the contrary, the 2020 target is even below the trend of RES since 1996. In fact, the share of RES was already 48% in 2009, according to the Swedish Energy Agency. The Swedish Energy Agency, in its forecast for 2020, has calculated an increase to 50.2%, with the current support policies, but no strengthened support schemes. They also calculate with a 15.5% higher energy use than 2009, which is a very unlikely development, considering the EE target of 20% by 2020.

Swedish Association for Renewable Energies (SERO) and the county Dalarna in Sweden (one of three counties which is in the frontline when it comes to RES), as well as other renewable organisations (Swedish Bioenergy Association), and the Förnybart.nu organisation (along with LRF - The Federation of Swedish Farmers, The Swedish Society for Nature Conservation -SSNC and Tällberg Foundation) believe that a goal of 70% or more is both rational and achievable.

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#### Support Schemes

##### Electricity sector

Green electricity certificates have been expanded to include cooperation with Norway on a mutual certification market. The purpose is to increase new renewable electricity production in Sweden with 25 TWh between 2003 and 2020. At the current time, it appears likely that new production will be evenly divided between bio-electricity and wind-power. The sectoral target for RES in electricity is therefore likely to be fulfilled.

The green certificates support scheme currently in place is good for some RES technologies and a hindrance to others, e.g. positive for bioenergy, less so for wind power and negative for the remaining RES, in comparison with the feed-in tariffs systems that other countries have. The system may become more positive for photovoltaics (PV) in the near future as costs are further reduced. There is a minor, short-sighted investment subsidy in place for PV until 2012, as well as R&D support for PV.

No specific support mechanism is foreseen for offshore wind. The NREAP considers that a small amount of new offshore capacity will be added during the 2010-2020 period, however how this will be financed is not clear. Furthermore, the NREAP underestimates existing offshore wind capacity.

Sweden does not have any targets for geothermal electricity by 2020 either and the NREAP does not propose any measures for geothermal electricity development in Sweden.

The industry scenario is provided by the Swedish RES Association “Sveriges Energiföreningars Riksorganisation” (SERO). A column showing the results taking into account SERO’s energy demand assumptions has been added to these tables.



TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	RES Electricity Generation (GWh)	% in Electricity Consumption-SERO Demand Assumptions	% in Electricity Consumption-NREAP Demand Assumptions	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	68,000	50.9	44 <sup>(1)</sup>	15,412	64,444 <sup>(1) (2)</sup>	41.7
Hydro (below or equal to 10 MW)	5,300	4	3.4	905 <sup>(2)</sup>	3,485 <sup>(2)</sup>	2.3
Photovoltaic	4,000	3	2.6	8	4	0
Tidal, Wave, Ocean	100	0.1	0.1	0	0	0
Wind Onshore	15,000	11.2	9.7	4,365	12,000	7.8
Wind Offshore	5,000 <sup>(3)</sup>	3.7	3.2	182	500	0.3
Biomass (solid, biowaste, bioliquid)	20,000	15	12.9	2,872	16,700	10.8
Biogas	100	0.1	0.1	42	53	0
<b>Total RES-E</b>	<b>117,500</b>	<b>88</b>	<b>76</b>	<b>23,786</b>	<b>97,186</b>	<b>62.9</b>

(1) This does not include pumping of about 43 MW and 71 GWh.

(2) Pumping is excluded from the calculation. The NREAP indicates that pumping amounts to 43 MW and 71 GWh.

(3) EWEA foresees an energy production from offshore wind of 11,000GWh.

NB: EGEN foresees 35 GWh of geothermal power in 2020.

### Heating and cooling sector

Conditions for renewable heating are quite good. Within the heating and cooling industry, bioenergy is the major source of energy and plans to use more biomass for heating are in place, but there are no policy measures to increase the use of RES in heating and cooling.

TABLE 2: Projections for Renewable Heating &amp; Cooling in 2020

RES-H 2020 Projections (ktoe)	RES Heat Consumption	% in Heat Consumption-SERO Demand Assumptions	% in Heat Consumption-NREAP Demand Assumptions	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	9,050	78.7	53.3	9,480	55.9
Biogas	100	0.9	0.6	11	0.1
<b>RE from Heat Pumps:</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>1,046<sup>(1)</sup></b>	<b>6.2</b>
<i>Geothermal HeatPumps</i>	NA	NA	NA	815	4.8
<i>Aerothermal heat Pumps</i>	NA	NA	NA	150	0.9
<i>Hydrothermal Heat Pumps</i>	NA	NA	NA	80	0.5
Solar Thermal	250	2.2	1.5	6	0
Geothermal	600	5.2	3.5	0	0
<b>Total RES-H</b>	<b>10,000</b>	<b>87</b>	<b>58.9</b>	<b>10,543</b>	<b>62.2</b>

(1) The numbers indicated in the NREAP for geothermal, aerothermal and hydrothermal heat pumps do not add up to the total number of heat pumps based on RES.

NB: The numbers indicated in the NREAP for geothermal, hydrothermal and aerothermal heat pumps do not add up to the overall figure indicated for heat pumps based on RES.

Solar and geothermal installations are insufficiently supported. There are, a range of support measures from which Combined Heat and Power (CHP) plants can benefit: tax exemptions for biomass, issuance of certificates from the RES-E quota system and the support for converting from direct-acting electricity. The investment grants are going to expire this year and no new measures are under consideration so far. Therefore future support will be limited to the green certificate scheme and tax exemptions for biomass.

The buildings code supports the use of heat pumps in new buildings. An investment subsidy for solar thermal is in place in Sweden, but that might end this year.

The NREAP also does not plan any development of deep geothermal for heating and cooling, even though the Swedish market is already mature for geothermal heat pumps.

The continued use of a carbon dioxide tax, which has proven to be very successful since its introduction in 1991 is also effective for promoting RES in the H&C sector. The tax will now be raised for industry outside the ETS sector, for agriculture and forestry, and greenhouse gases.

### Transport sector

There are some policy measures to increase RES fuels in transport, but meeting the target relies to a large extent on quota legislation. The Swedish government has decided to add only 5% ethanol to gasoline, unlike many other countries that allow 10%. The NREAP suggests continued use of the tax exemption for renewable fuels, although many details are yet to be decided on. The 10% goal can be reached far ahead of 2020. Furthermore, there is a CO<sub>2</sub>-tax on fossil fuels, which has been in place for more than a decade.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	400	465
Biodiesel	500	251
Renewable electricity	500	198
Biofuels Article 21(2)	800	NA
Others	0	94
<b>Total RES-T in ktoe (as in line C of Table 4a of the NREAP)</b>	<b>2,200</b>	<b>1,008</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall Projections for 2020	Industry Scenario in ktoe	Industry Scenario in % - SERO Demand Assumptions	Industry Scenario in % - NREAP Demand Assumptions	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	10,200	88	76	8,356	62.9
Total RES-H&C Consumption	10,000	87	58.9	10,543	62.2
Total RES-T Consumption	2,200	28	27	1,116 <sup>(1)</sup>	13.8 <sup>(1)</sup>
<b>Total RES share</b>	<b>22,400</b>	<b>72</b>	<b>57.1</b>	<b>19,709</b>	<b>50.2</b>

(1) As in line J of Table 4a of the NREAP

NB: Total RES-E Consumption and Total RES-T Consumption both include renewable electricity used in transport in SERO's scenario.

## Renewable Energy Industry Policy Recommendations

### Electricity sector

SERO is of the opinion that green certificates should, ideally, be replaced by feed-in tariffs. The quota should at least be increased with the certificate system, as this will be needed as the co-operation with Norway gets under way. Norway has quite a lot of hydropower that can be developed at relatively low cost, and will take a large share of the common market for new green electricity. To give room for more bio-electricity and wind power the quota needs to increase by a few TWh until 2020. It is also important to give guarantees for the expansion of the system after 2020.

The Swedish government should also aim for a higher target when it comes to PV. Additionally, the support scheme for building owners who want to use photovoltaics as an energy provider should be renewed. Binding regulations for solar energy installations in new buildings should be introduced into the building codes to ensure the share of renewable energy used in the building sector will increase.

On a more general note, there would also be a need to look over the total energy consumption for 2020 which the Swedish government assume will increase more in Sweden than in any other country.

## Heating and cooling sector

The measures in place are probably sufficient for reaching the sectoral RES-H&C target. The carbon tax is already high, and the proposed increase for industry and other sectors outside ETS, as mentioned above, will create a growing market. The RES industry would, however, appreciate seeing this increase of the carbon tax happen quicker.

One of the main recommendations of the Swedish RES Industry is to have a 2020 target for solar thermal.

A certification scheme exists for heat pump installers but not for shallow geothermal installers. Something must be proposed. It is required by the article 14 of the RES Directive.

## Transport sector

There should be a differentiation of the support according to fuel types and technologies. The government has proposed an “upper limit” of tax exemption for low-blend of biofuels, at 6.5% for ethanol in petrol, and at 5% for biodiesel in diesel. This is not acceptable to the industry; the low blend must be raised to 10% and 7%, in accordance with the Fuel Quality Directive. And the tax exemption should be guaranteed until at least 2020.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

	Industry Scenario	NREAP Scenario
Gross Final Electricity Consumption	11,500	13,293
Gross Final H&C Consumption	11,500	16,964
Gross Final Transport Consumption	8,000	8,111
Gross Final Energy Consumption	31,000	39,231

# UNITED KINGDOM

## The Renewable Energy Industry

### Feedback on the NREAP

The UK NREAP splits the overall 15% renewable energy target into 31% RES-E, 12% RES-H&C and 10.3% RES-T. The UK plan was published on 1 July 2010, shortly after the Parliamentary elections in May and the nomination of a new government. While the UK plan includes the new government’s commitments some decisions have not been made on key outstanding issues. On 20 October 2010, following the Comprehensive Spending Review, the Department of Energy and Climate Change announced decisions on some of these issues such as support for RES-H&C and financing of investments in green energy infrastructure. The review also reduced, and effectively capped the anticipated spend on feed-in tariffs.

The next steps to be taken by the government are:

- A coordinated delivery plan will be published in 2011, outlining how the remaining commitments in the RES and the NREAP will be implemented,
- An analysis updating the trajectory with additional policies will be published at the same time.

### 2020 Renewable Energy Targets

The previous UK government set out its Renewable Energy Strategy in 2009 for achieving the 15% target in 2020. This analysis indicated that 30% RES-E, 12% RES-H&C, and 10% RES-T would best achieve the overall target. The current government has stated it is committed to meeting the 15% target.

The government also asked the Committee on Climate Change (CCC) to review the UK RES target and provide advice on whether there is any scope for increasing it. The advice from the Committee was that the target was roughly right. However they did identify delivery risks that the government should focus on<sup>24</sup>. They will publish a detailed report in April 2011 looking at the deployment of renewables post 2020 out to 2030 and 2050.

*“It is vital for the environment and our economy that renewables become a greater part of our energy mix.”*

Fiona Hall, MEP  
(ALDE)

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<sup>24</sup> *Climate Change Committee*: Letter to Rt Hon Chris Huhne, Secretary of State, Department for Energy and Climate Change, 2010 [http://downloads.theccc.org.uk/s3.amazonaws.com/Renewables%20letter%20Sept2010/LetterDavidKennedy\\_ChrisHuhneMP\\_090910.pdf](http://downloads.theccc.org.uk/s3.amazonaws.com/Renewables%20letter%20Sept2010/LetterDavidKennedy_ChrisHuhneMP_090910.pdf)

## Support Schemes

### Electricity sector

The new government has announced its intention to look into the establishment of a full system of FITs in electricity, as well as the maintenance of banded Renewables Obligation Certificates (ROCs). The electricity market reform project is due to report by the end of the year. This will look at a carbon price floor and a new mechanism to support all low-carbon technologies. The Government is looking at replacing the Renewables Obligation with a feed-in tariff for large-scale generation.

In October 2010, the Government announced investment in green energy infrastructure through the UK-wide Green Investment Bank; £1 billion will be channelled towards the Green Investment Bank.

The RES industry scenario was provided by the Vienna University of Technology, Energy Economics Group, Vienna, Austria in cooperation with Fraunhofer Institute Systems and Innovation Research, Karlsruhe,

TABLE 1 : Projections for Renewable Electricity in 2020

RES-E 2020 Projections	National RES industry Roadmap			NREAP		
	MW Installed	RES Electricity Generation (GWh) <sup>(6)</sup>	% in Electricity Consumption	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Hydropower	1,810	5,343	1.4	2,130	6,360	1.7
Geothermal	200 <sup>(1)</sup>	1,560 <sup>(1)</sup>	0.4	0	0	0
Photovoltaic	8,000 <sup>(2)</sup>	7,000 <sup>(2)</sup>	1.9 <sup>(2)</sup>	2,680	2,240	0.6
Tidal, Wave, Ocean	1,709	5,240	1.4	1,300	3,950	1
Wind Onshore	14,890 <sup>(3)</sup>	34,150 <sup>(3)</sup>	9.1	14,890	34,150	9.1
Wind Offshore	24,030 <sup>(4)</sup>	72,422 <sup>(4)</sup>	19.2	12,990	44,120	11.7
Biomass (solid, biowaste, bioliquid)	4,240 <sup>(5)</sup>	26,160 <sup>(5)</sup>	6.9	4,240	26,160	6.9
<b>Total RES-E</b>	<b>54,879</b>	<b>151,875</b>	<b>40.3</b>	<b>38,230</b>	<b>116,980</b>	<b>31</b>

(1) Source: EGEC

(2) Source: EPIA Baseline scenario. UK industry thinks the potential of PV is higher, however due to policy uncertainty agrees with EPIA

(3) REA agrees with the NREAP projections

(4) Source: Renewable Energy Association

(5) EREC Breakdown based on AEBIOM's projections

(6) Consistent load factors were applied to industry data. The load factors can be found page 6 of the UK industry roadmap.

### Heating and cooling sector

There was uncertainty in the NREAP regarding the Renewable Heat Incentive (RHI), which would support heating and cooling. This represents a big gap in the plan. However, the new government, in its Spending Review, confirmed its commitment to the RHI setting aside £860 million for the period up to 2014. The scheme is likely to start in 2011. Furthermore, there is an obligation in the UK to have zero carbon homes come into effect from 2016 onwards for domestic buildings, and non-domestic 2018-2019 (subject to review). The government is currently looking at the definition of "zero carbon".

TABLE 2: Projections for Renewable Heating & Cooling in 2020

RES-H 2020 Projections (ktoe)	National RES industry Roadmap		NREAP	
	RES Heat Consumption	% in Heat Consumption	RES Heat Consumption	% in Heat Consumption
Biomass (solid, biowaste, bioliquid)	2,995	5.8	3,612	7
Biogas	302 <sup>(1)</sup>	0.6	302	0.6
RE from heat pumps	1,823 <sup>(1)</sup>	3.5	2,254 <sup>(2)</sup>	4.4
Solar Thermal	743	1.4	34	0.1
Geothermal	79 <sup>(1)</sup>	0.2	NA	NA
<b>Total RES-H</b>	<b>5,942<sup>(1)</sup></b>	<b>11.5</b>	<b>6,202</b>	<b>12</b>

(1) Source: REA

(2) of which 953 ktoe from geothermal heat pumps and 1,301 ktoe of aerothermal heat pumps.

## Transport sector

The government is currently reviewing the Renewable Transport Fuels Obligation (RTFO) to ensure compliance with the RES Directive. It is not clear that the percentages in the document are set by volume. The trajectory for transport is linear reaching 10% by 2020. However the RTFO is set at 5% from 2013/14 onwards, so it is not clear how this will be achieved. There will be a contribution from electric cars but still the policy and objective are not consistent. The CCC has made the recommendation that biofuel penetration should be 8% in 2020.

TABLE 3: Projections for Renewable Energy used in Transport

RES-T 2020 Projections (ktoe)	National RES industry Roadmap	NREAP
	RES in Transport Consumption	RES in Transport Consumption
Bioethanol/bioETBE	2,620	1,743
Biodiesel	1,570	2,462
Renewable electricity	0	267
<b>Total RES-T in ktoe (as in line C of Table 4a) of the NREAP</b>	<b>4,190</b>	<b>4,472</b>

TABLE 4: Projections for the Total Share of RES in 2020

Overall RES Projections for 2020	Industry Scenario in ktoe	Industry Scenario in %	NREAP Scenario in ktoe	NREAP Scenario in %
Total RES-Electricity Consumption	13,061.3	40.3	10,059	31
Total RES-H&C Consumption	5,941.7	11.5	6,199	12
Total RES-T Consumption	4,190 <sup>(1)</sup>	10	4,295 <sup>(2)</sup>	10.3 <sup>(2)</sup>
<b>Total RES share</b>	<b>23,193</b>	<b>17</b>	<b>20,510</b>	<b>15</b>

(1) Figures are peer reviewed by the REA.

(2) As in line J of Table 4a of the NREAP

## Renewable Energy Industry Policy Recommendations

### Electricity sector

The growth in the RES-E sector will depend on the continuation and confidence in the FiTs and in the Renewables Obligation. Any reviews should focus on correcting any perversities and ensuring the schemes provide an adequate level of support. The government should encourage a strategic approach to investment in the grid. Industry therefore welcomes the government's research into smarter grids.

### Heating and cooling sector

The RHI to be introduced this year must be simple for the end-user and stable to encourage long term confidence. The incentive also needs to be high enough to drive widespread deployment. A new framework that incentivises the gas distribution companies to support the injection of biomethane is also required.

### Transport sector

There should be a linear target trajectory from 2010 to 2020 covering all RES technologies which can be deployed in the transport sector. Carbon linkage (by which the use of biofuels is reward according to carbon saved) should be introduced in the implementation of the FQD. The UK lags far behind many Member States in the share of RES-E in the overall power sector. The UK should therefore use its own share to calculate the contribution from electricity produced from renewable sources and not the average share in the Community when taking into account electric vehicles.

TABLE 5: Energy Demand Assumptions used in both Scenarios (source: NREAP in ktoe)

Gross Final Electricity Consumption	32,400
Gross Final H&C Consumption	51,500
Gross Final Transport Consumption	41,779
Gross Final Energy Consumption	136,700

## Abbreviations

CCC	Committee on Climate Change (UK)
CHP	Combined Heat and Power
CTE	Technical Building Code
DH	District Heating
DSO	Distribution System Operator
EE	Energy Efficiency
EEA	European Environment Agency
EGS	Enhanced Geothermal Systems
EPBD	Energy Performance of Building's Directive
ERDF	European Regional Development Fund
ESCO	Energy Service Company
FIT	Feed-in Tariff
FQD	Fuel Quality Directive
GC	Green Certificate
GDH	Geothermal District Heating
GHP	Geothermal Heat Pump
GW	Gigawatts
GWp	Gigawatts peak
GWh	Gigawatts per hour
GWth	Gigawatts Thermal
H&C	Heating & Cooling
HP	Heat Pump
kW	Kilo Watt
MP	Member of Parliament
MEP	Member of the European Parliament
Mtoe	Million ton oil equivalent
MW	Megawatts
NREAP	National Renewable Energy Action Plan
PV	Photovoltaics
RD&D	Research, Development and Demonstration
REFIT	Renewable Energy Feed-in Tariff (IE)
RES	Renewable Energy Sources
RES-E	Renewable Electricity
RES-H&C	Renewable Heating & Cooling
RES-T	Renewable Transport
RES Directive	Renewable Energy Directive (2009/28/EC)
RHI	Renewable Heat Incentive (UK)
ROCs	Renewables Obligation Certificates (UK)
RTFO	Renewable Transport Fuels Obligation (UK)
SHP	Small Hydro Power
TGC	Tradable Green Certificates
TPF	Third Party Financing
TSO	Transmission System Operator
TWh	Terrawatt per hour

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