



ENERGY AND GEOLOGICAL RESOURCES IN PORTUGAL



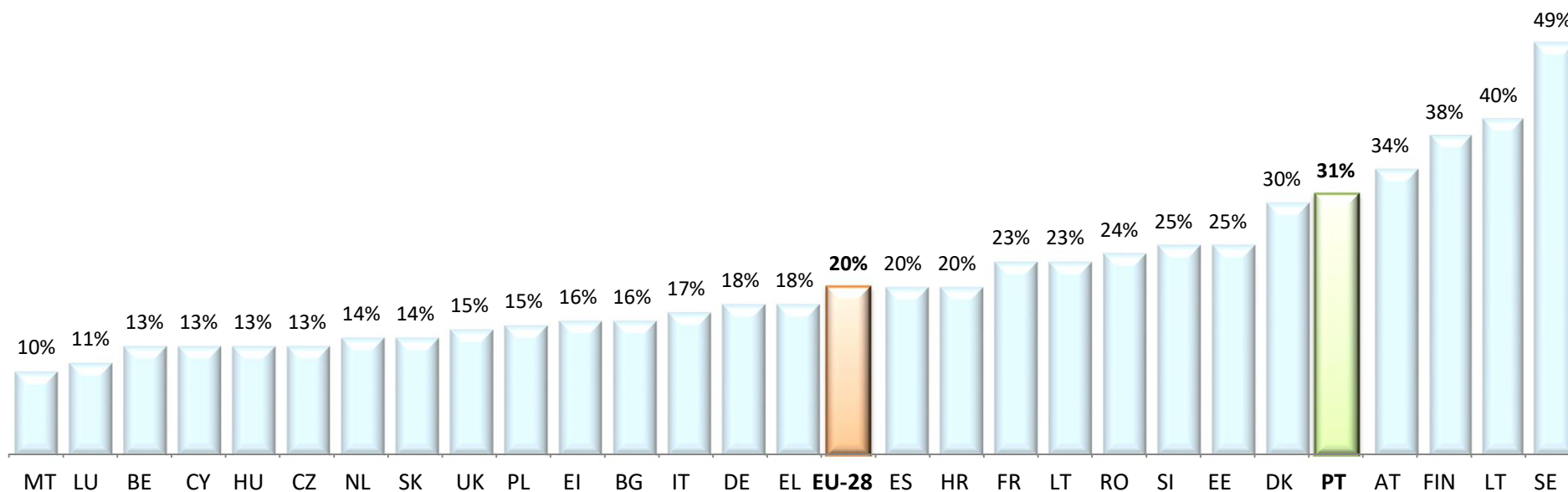
Portugal developing important endeavors in the energy sector

To ensure future sustainability, the focus should be placed:

- *Adoption of **rational economic criteria** in the development of the power supply systems;*
- *Ensure strong energy interconnections to Europe enabling the flow of renewable electricity for the European market, as a cost effective solution for achieving the European targets;*
- ***Diversification of energy sources**, namely in the gas sector, enabling imports to the EU from alternative origins (America, Africa);*
- *Promotion of **competitive markets**;*
- *Keep tracking and monitoring **adequacy and security of energy supply**.*

Renewable Energy in final energy - European Union countries

Portugal's Renewable energy target for 2020
is the **5th most ambitious** of the European Union



Source: Eurostat

Portuguese performance in international news headlines



Renewable energy generated 104% of Portugal's electricity consumption in March

Most of the energy came from wind and hydroelectric power

Lydia Smith | Thursday 5 April 2018 13:52 | [1 comment](#)



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A floating wind turbine is pictured off the coast of Agucadoura, near Porto, in Portugal (AFP/Getty Images)

Portugal generated more renewable energy than it needed in March, for the first time in at least 40 years.

Energy from **renewable sources** made up 103.6 per cent of mainland electricity consumption last month, according to data from the country's power grid operator REN, although fossil fuels were used to occasionally top up the electricity supply.

Portugal is among European Leaders in Renewable Energy!



INDUSTRY, MATERIALS AND UTILITIES | APRIL 3, 2018 / 1:31 PM / 2 MONTHS AGO

Portugal looks to renewables as March output tops mainland power demand

Reuters Staff

3 MIN READ

LISBON, April 3 (Reuters) - For the first time in at least four decades, Portugal's monthly renewable energy production in March exceeded power demand on the mainland, an industry report said on Tuesday, adding that it expected this to become a trend.

Renewable energy accounted for 103.6 percent of mainland electricity consumption last month, the report by the Portuguese Renewable Energy Association and the Sustainable Earth System Association said citing data from power grid operator REN.

While fossil fuel plants still worked for short periods to complement the electricity supply, those were fully compensated by other periods of greater renewable production.

*Portugal generated more renewable energy than it needed in **March 2018**, for the first time in at least 40 years.*

NREAP 2020

National Renewable Energy Action Plan 2013-2020

Global goals:

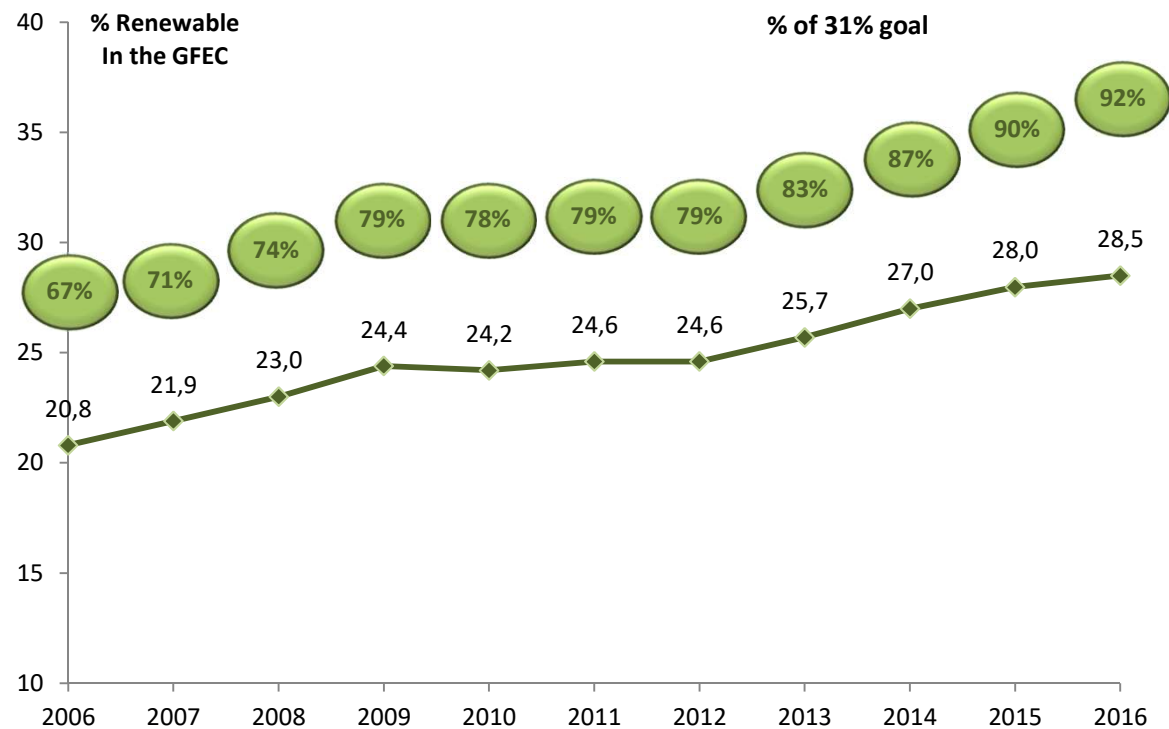
- 31% gross final energy consumption (GFEC) from renewable energy sources (RES)
- External energy dependence reduced to 70%

Sectoral goals:

- 60% of electricity produced from RES
- 10% of energy used in the transport sector from RES

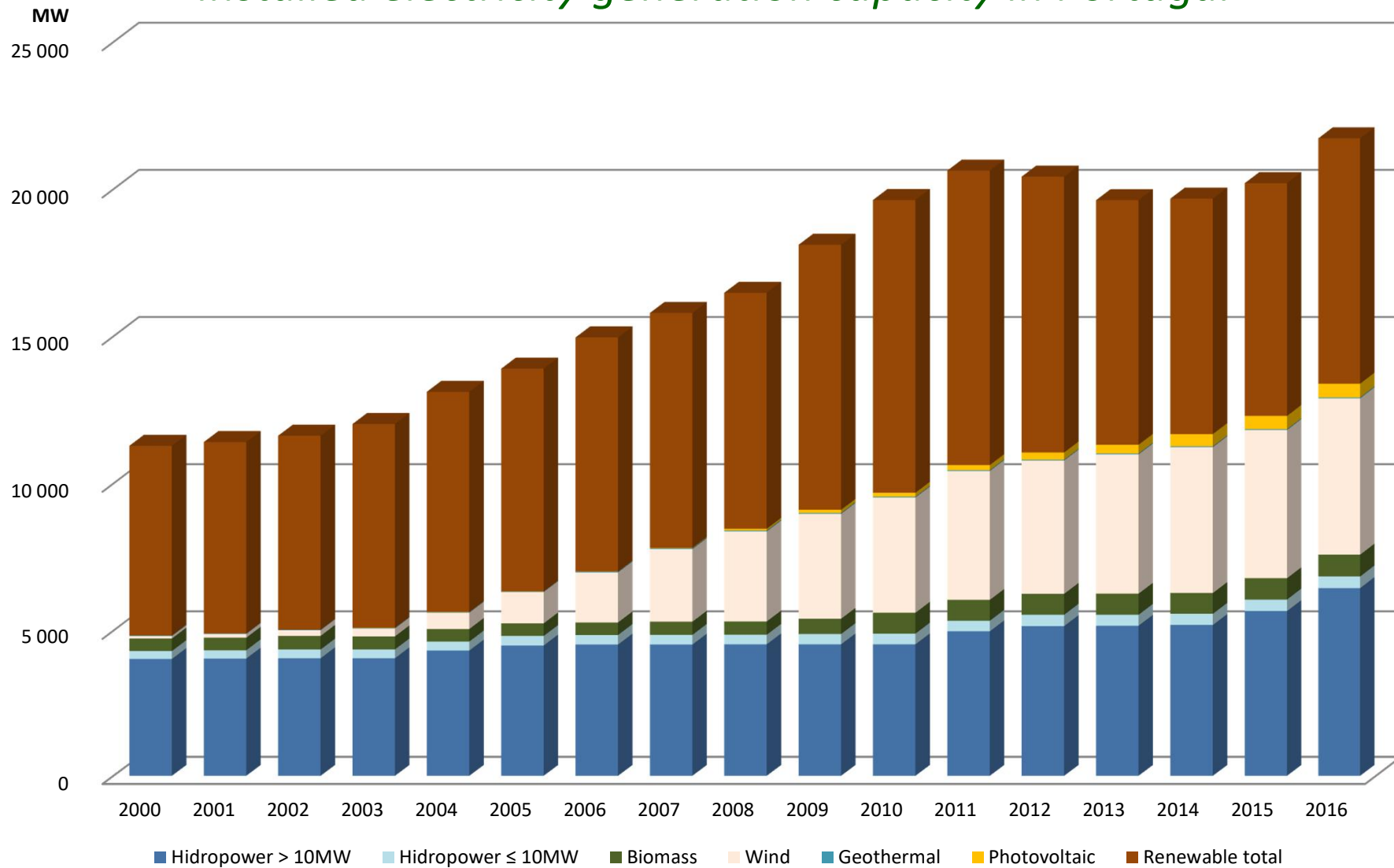


Global goal evolution regarding RES in the gross final energy consumption in Portugal



Source: DGEG, April 2018

Installed electricity generation capacity in Portugal



Highlights of 2020 projections

- Hydropower – new 270 MW to a total of 7108 MW
- Biomass – new 172 MW to a total of 914 MW
- Wind – new 145 MW to a total of 5458 MW (+*repowering* of existing power plants)
- Photovoltaic – new 695 MW to a total of 1162 MW



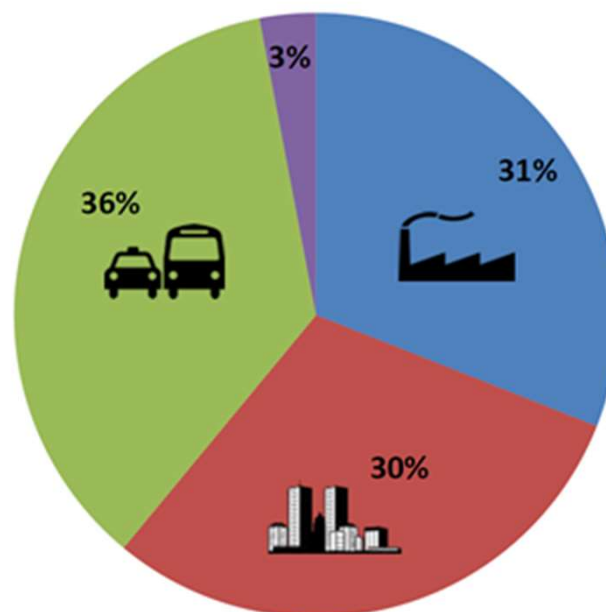
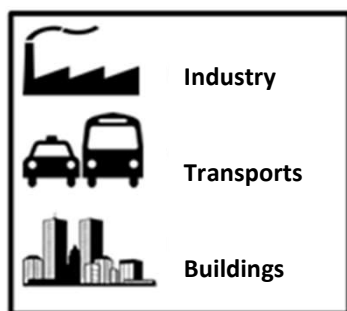
Energy Efficiency Regulations in Portugal

Energy audits and assessments included in existing mandatory regulation systems cover sectors of activity that represent 97% of final energy consumption.

Mandatory Regulation Systems

Regulation for Managing Energy Consumption in Transport Sector (RGCE)

Ordinance n.º 228/90, March 27th



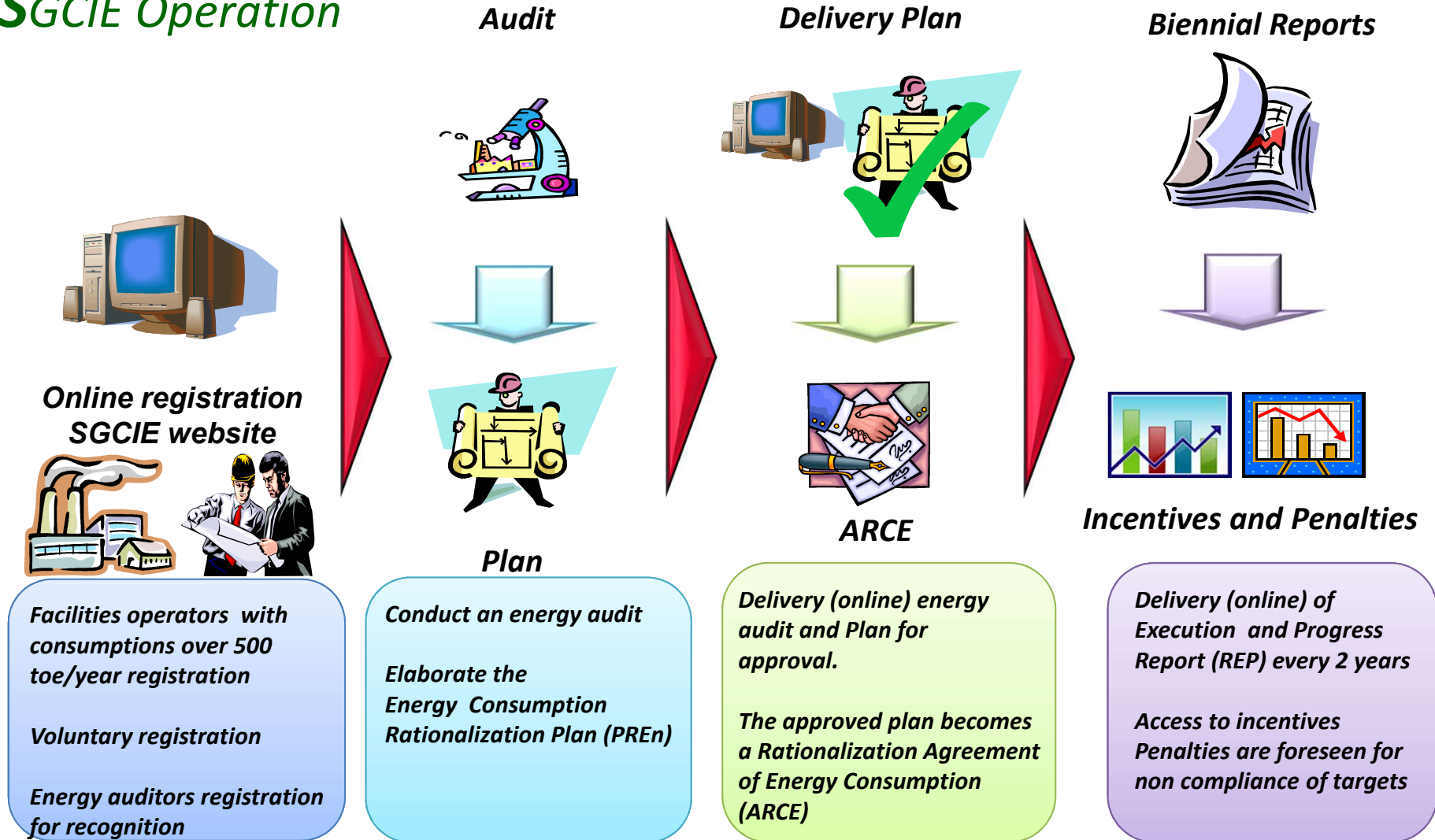
Intensive Energy Consumption Management System (SGCIE)

Decree-Law n.º 71/2008, April 15th

Energy Certification System (SCE)

Decree-Law n.º 118/2013, August 20th

SGCIE Operation



The 1202 Rationalization Plans approved will reduce energy consumption by 135.669 toe and emissions by 539.863 tCO₂

Energy Efficiency in Transport (RGCE)

Mobility solutions

Smart choice of transport means



More efficient fuels

Or not...



Energy Certification System (SCE)



Energy certification is currently required in the advertising of properties and in the conclusion of real estate sale or lease contracts and in new buildings.

The service classifies the energy performance of a property on a scale from A+ to F, and recommends a set of improvement measures.

1,4 MILLION ENERGY CERTIFICATES ISSUED



Energetically more energy-efficient homes lead to **energy bill savings** and **improvements in comfort and health**.

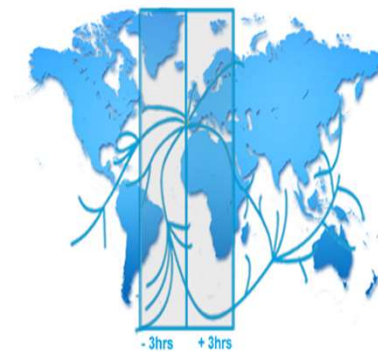
PORTUGAL – A SAFE MINING DESTINATION IN EUROPE

Mainland Portugal, along with its semi-autonomous island regions of the Azores and Madeira, offer a market of approximately 11 million people

As with all EU countries, Portugal's borders and ports are completely open to the free flow of trade with other EU member countries

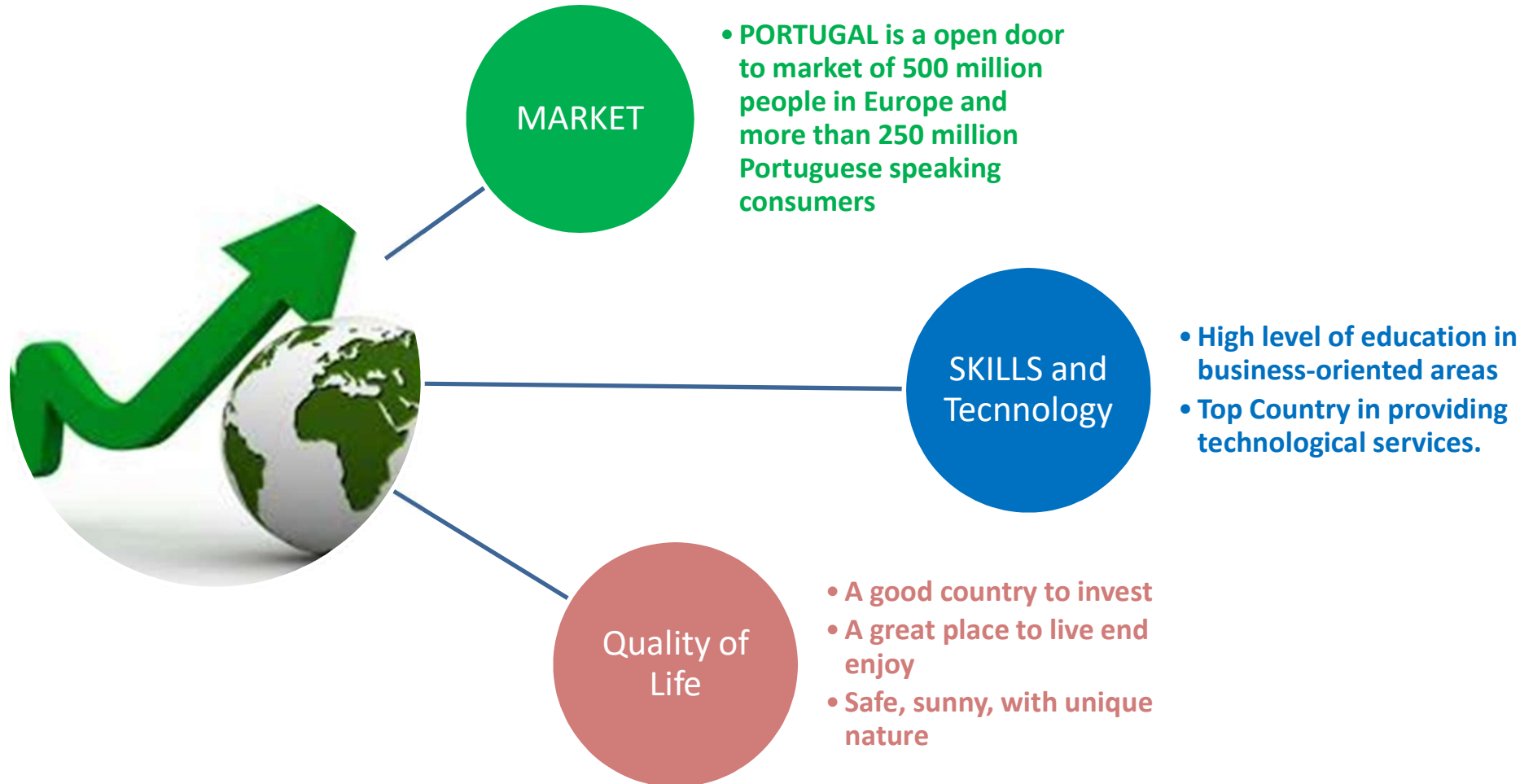
Portugal has a politically stable environment with a democratically elected parliamentary government and is welcoming of foreign business and investment

As one of the charter members of the European Union (EU), it is fully integrated with the EU, uses the Euro currency, and follows directives from the EU Commission



Source: AICEP Portugal Global

Competitive advantages

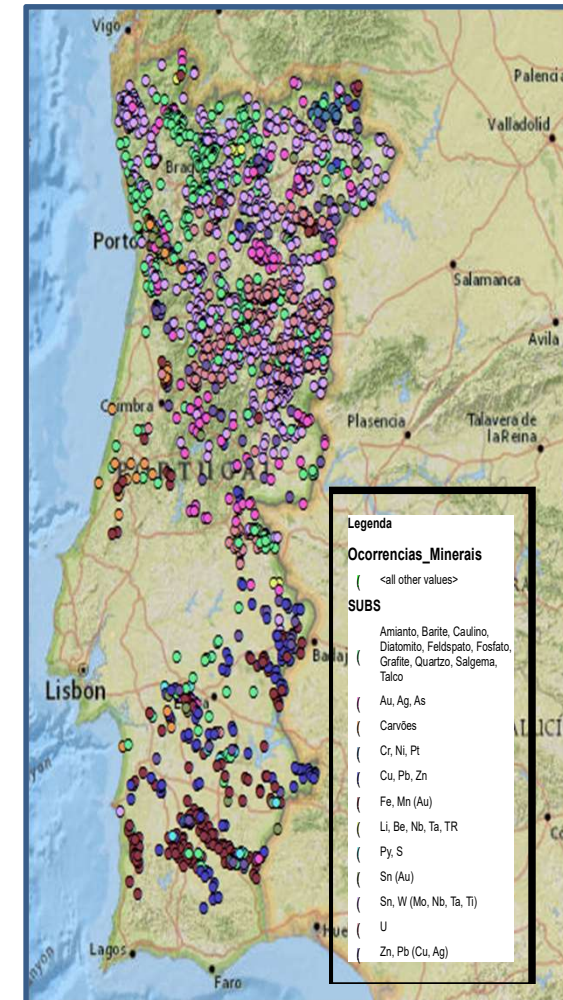


Portugal is Mining Country

In Mining

- ❖ One of the oldest mining traditions in the western world where mining started before Roman times
- ❖ Until the mid 80's Portugal had more than 30 different mines active
- ❖ There are several villages which have created and expanded around working mines
- ❖ A complex and diversified geology with a significant potential in base metals, precious metals and strategic minerals
- ❖ The Portuguese Geological has more 150 years of history
- ❖ A large number of mineral occurrences virtually unexplored
- ❖ Second producer of tungsten and third of copper in Europe

Main Metallic Occurrences



Portugal mineral highlights...

European Ranking:

- Copper – 3rd
- Tungsten – 2nd
- Ornamental stones – 4th

Metallic Active Mines

- ✓ Neves-Corvo (Cu and Zn) – Lundin Mining
- ✓ Aljustrel (Cu and Zn) – Almina
- ✓ Panasqueira (W) - Almonty

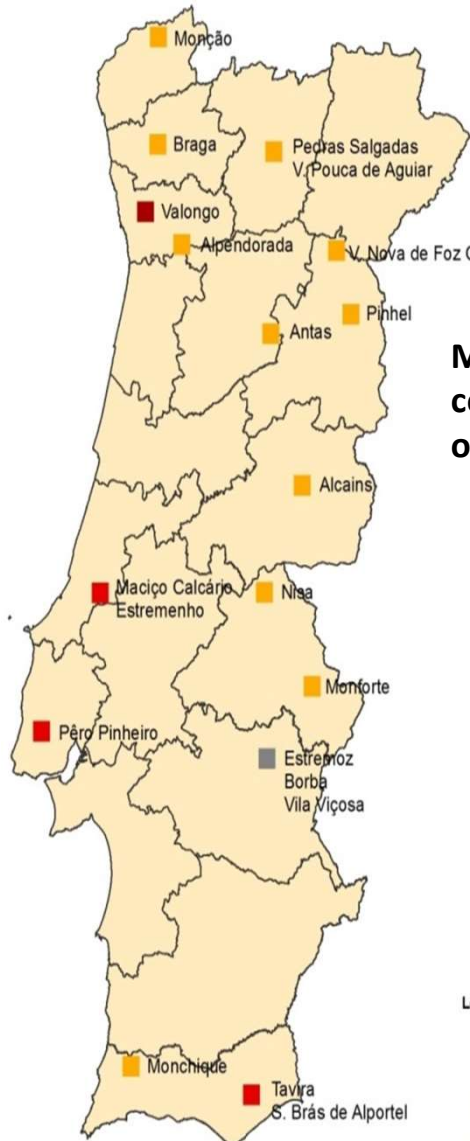
Critical Raw-Materials:

- W, Sb, In, Nb, Ta, Be, Ge

Other relevant resources:

- Fe, Zn, U, Sn, Au, Ag, Mn
- kaolin, special clays
- Quartz, feldspar
- Special sands
- Halite, gypsum
- talc
- Aggregates ...

Non-Metallic Mining



Main production centers of ornamental stones

Granite
Limestone
Marble
Slate

- World class: marbles, limestones.
- Other relevant deposits: kaolin, quartz, feldspar, special clays, special sands, halite, gypsum, talc, granites, slates, aggregates,...

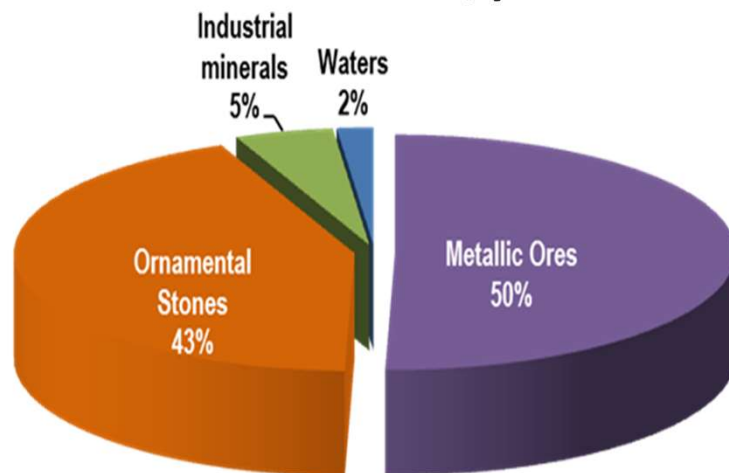


Marbles production region - Alentejo

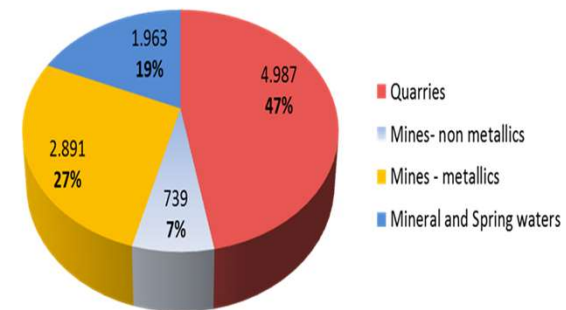
Mining in Numbers

Geological resources production

About 900 Million
€/year



Exploitation areas ≈ 63.889 ha



Exploration areas ≈ 1.055.883 ha

Lithium - An Opportunity in Portugal



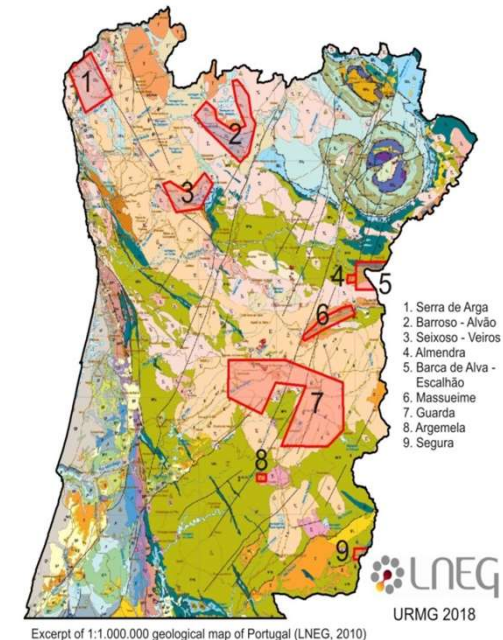
Lithium Applications - Exploration and exploitation

- ✓ **Next Steps**
- ✓ More than 800 MW of application to produce energy with photovoltaics
- ✓ There will be the need to store energy

Currently

- ✓ Has the target of 31% energy renewable by 2021
- ✓ In 2016, 28,5% of its energy was renewable
- ✓ More than 60% of the electricity is renewable

Potential areas for Lithium exploration



Excerpt of 1:1.000.000 geological map of Portugal (LNEG, 2010)

NATURAL MINERAL WATERS

Due to its geological diversity, Portugal is very rich in natural mineral waters, with different physicochemical compositions.

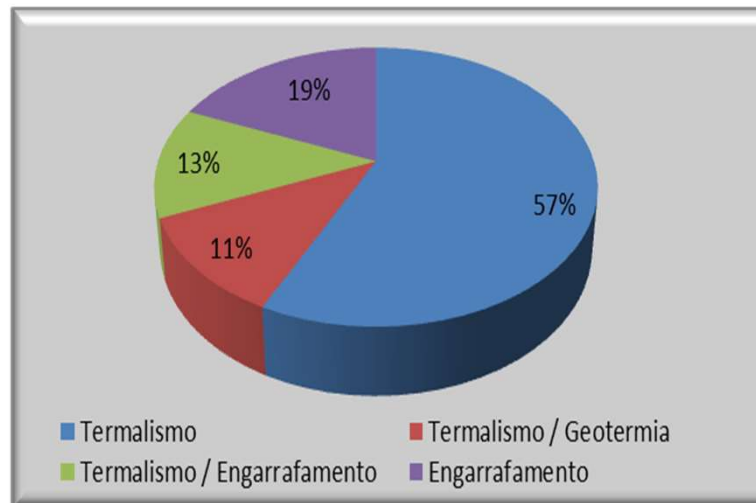
Since remote times, some of these waters have recorded very important characteristics, to which have been assigned unique properties for health purposes, namely to cure illnesses. This represents an important asset when compared to other groundwater.

Over the years, the composition of these waters has raised the interest of scholars from several scientific areas. However, these studies are focused mainly on the physical chemical characterization of the waters.

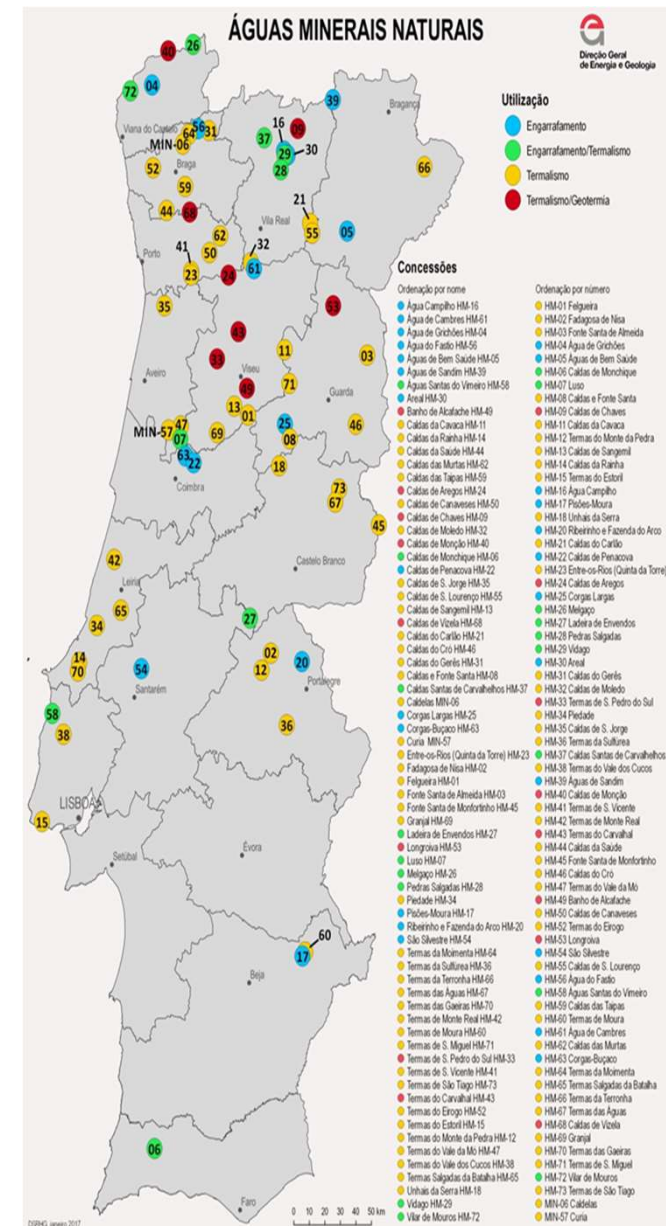


Natural Mineral Water – Type of using

Depending on its characteristics, they can be used in **spas for bottling** and as geothermal energy source.



Being, by excellence, good quality resources, natural mineral waters can constitute a considerable economic value for their region, once they are associated with “environmental friendly” activities that boost tourism.



Bilateral Cooperation

Number of institutional instruments for bilateral cooperation
signed between Portugal and third countries on energy and geological and mineral resources

