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Balearic Islands' decarbonisation

Case study: the role of the batteries

6/11/2020

Los Territorios No Peninsulares 100%
descarbonizados en 2040: la vanguardia
de la transición energética en España

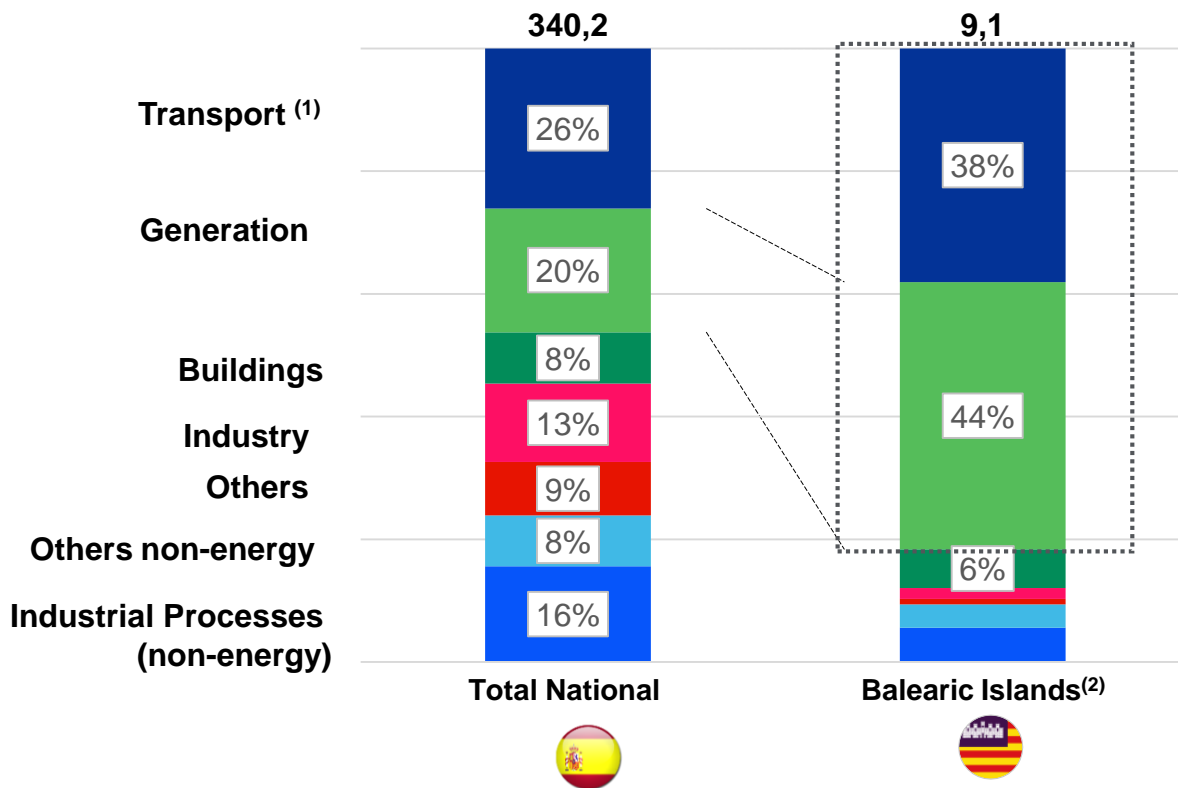
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Reducing emissions: challenges and opportunities



GEI Emissions (MtCO₂eq; 2017)



Main Opportunities of Energy Transition

Lower barriers compared to mainland

- Higher weight of emissions in transport and electricity generation, where decarbonized solutions are competitive
- Suitable renewable potential

Boost economic and employment activity and reduce energy costs:

- Enhancing job and wealth creation
- Reducing electricity costs and creating savings
- Aligning tourism with a sustainable and decarbonized energy model

Islands as a test bed for new technology R&D&I projects

(1) Includes national road, sea and air transport

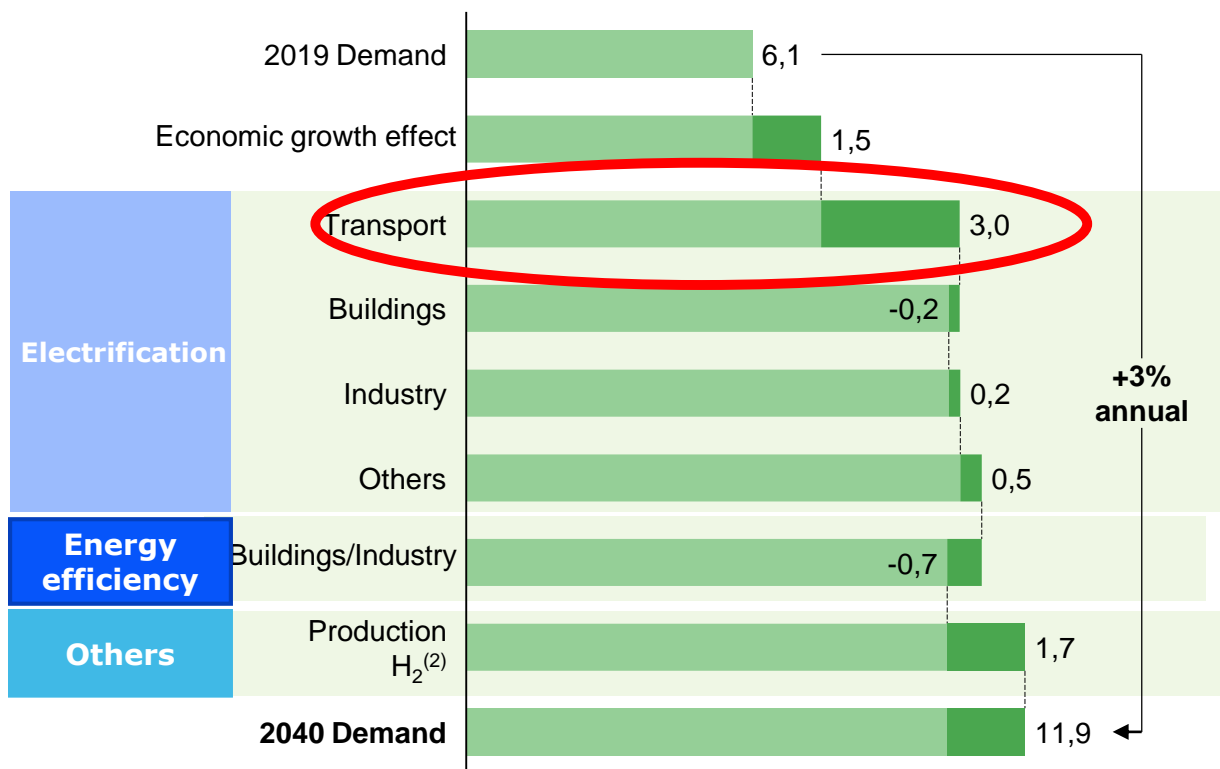
(2) Includes emissions from the Alcudia plant (2.5 MtCO₂), in process of being shut down

Source: MITECO; INE; Conselleria de Transició Energètica i Sectors Productius; Monitor Deloitte

Total electrification could reach up to 10 TWh by 2040



Electricity Demand in Balearic Islands (TWh)



Main Hypotheses

Average Evolution of Real GDP: ~2%

Fleet of private cars and lightweight goods 100% electric

Energetic consumption 100% electrified. Increase penetration of heat pump¹⁾ (more efficient than current equipment) in residential (50%) and services (70%)

Electrification of 10-15% in industrial consumption (electrifiable industrial processes)

Electrification of 100% of energy consumption

Increased efficiency of electric equipment in residential (electric appliances, lighting), as well as in industry and others sectors

Demand for the heavyweight transport, maritime and non-electrifiable industry

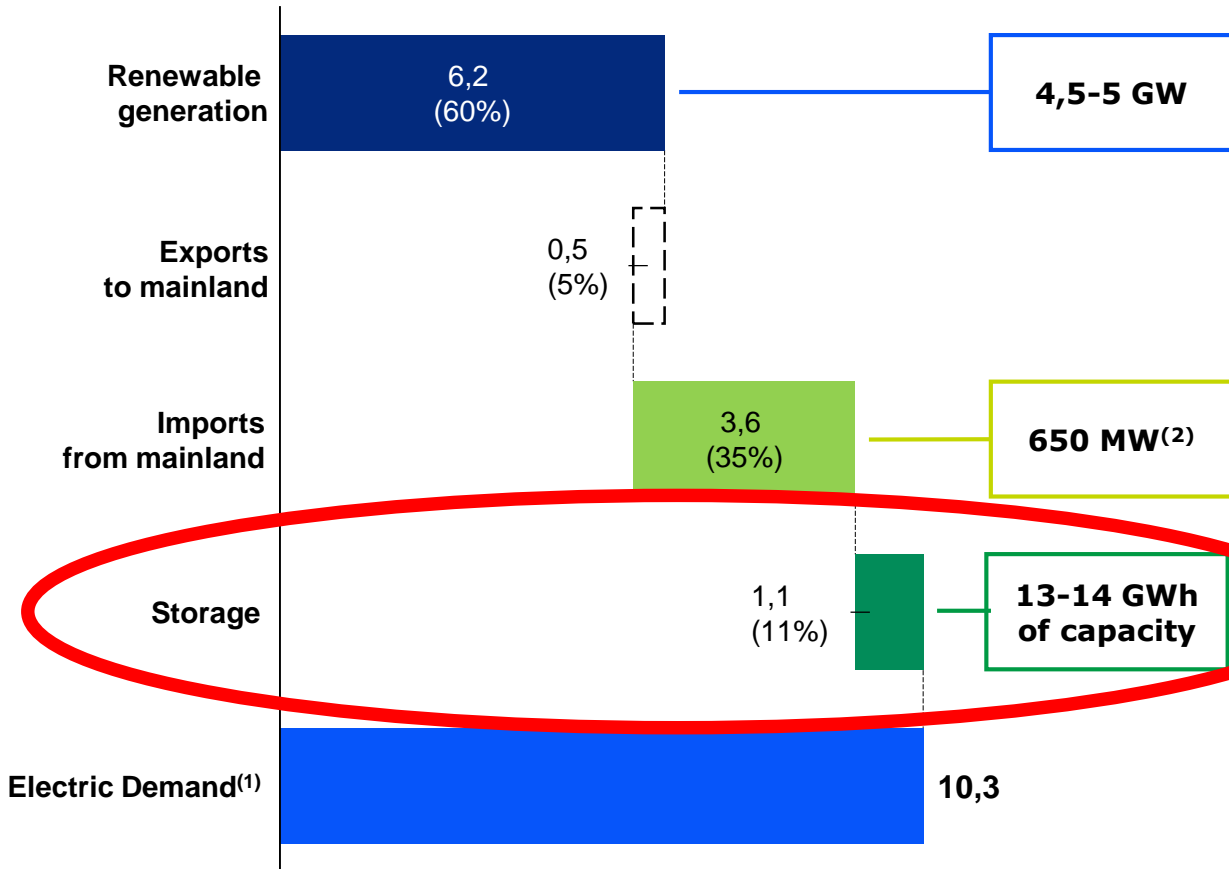
Electrification of transport, energy efficiency, economic growth and hydrogen will be the main drivers of demand trends

(1) Replacement of electric thermostats for heat pumps
 (2) Demand in case of hydrogen generation in the own territory
 Source: Monitor Deloitte

4.5-5 GW of RES, 13-14 GWh of storage and interconnection would require in a decarbonized system



Coverage of the Demand in 2040 (TWh)



Main tools to reach a 100% decarbonized electricity system

- Local Administration aims to increase **energy independence and the deployment of renewables**

- Balearic Islands **are already interconnected with the mainland**. In this analysis, it includes the hypothesis of 2x250 MW second interconnection. **Complemented with RES deployment** (mostly solar FV, because it fits better) **and storage**

- Demand side towards the middle of the day reduces the need for storage**

- Emergency back-up capacity must be in place** to ensure supply in the event of interconnection failure
- The proposed system would **cover 1% of the territory**

(1) Not include the electricity generation required for the H2 in industry and transport (this fuel can be produced in the Balearic or imported, depending on the evolution of the production and transport costs of the technology)

(2) Effective interconnection capacity, assuming an interconnection of 2x200MW (current) and 2x250MW (new interconnection scenario)

Link between EV batteries and stationary storage.



Which should the final image be in 2040 on the Balearic Islands if our hypotheses hold true?



EV batteries
48 GWh
800.000 EV's x 60 kWh



10 years Lifecycle

3,6 GWh
4,8 GWh x 75% loss of capacity

same order of magnitude



3,5 GWh



14 GWh



4 years Lifecycle

Are we facing the opportunity to create a local industry that can give a second life to electric vehicle batteries?

Some “inputs” on the future regulatory framework: revision of the batteries’ directive



- **Need to modernize the EU’s batteries legislation:** current Batteries Directive is outdated and today does not consider collection nor recycling of EV batteries and stationary batteries (EV batteries and stationary batteries fall under the category of ‘industrial batteries’).
- **Need to embed Circular Economy model for large Li-ion batteries** used in e-mobility and energy storage applications.
- **A circular economy model for the EU lithium-based battery market could bring multiple benefits** for EU citizens, enhancing decarbonization, resources efficiency, flexibility, competitiveness and demand-side response: **second life batteries could boost storage and further renewables deployment.**
- **Batteries recycling can mitigate to a large extent the use of raw materials,** and Li-ion recycling technologies show a significant potential to increase recovery efficiency and reduce costs.

Non-Peninsular Territories 100% decarbonized in 2040: the vanguard of the energy transition in Spain



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Report available on:

<https://www.endesa.com/content/dam/endesa-com/home/prensa/noticias/documentos/2020/07/descarbonizacion-territorios-no-peninsulares.pdf>

Thank you!
Muchas gracias!

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