Is there an afterlife for wind installations in Italy?

Factors shaping end-of-life decisions of ageing wind infrastructure in Italy

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Overview

- An introduction to the research
- Why the Italian context?
- Factors influencing end of life decision making
- Key findings from Italy
- Some lessons to be learnt for planning
- Next step

Research aims

- To investigate the end of life of onshore wind farms in Italy
- To understand when and why end of life decisions are being made
- To explore challenges and opportunities
- To understand lessons for the UK context

Research design

Scopus database

e.g. ‘end of life and wind’, ‘Life-extension AND wind’, ‘repowering AND wind’, ‘Lifecyle AND wind’

Wind energy in Italy

e.g. wind deployment; national and regional/ local policies; future direction

Semi-structured expert interviews

Visit to Italy October 2022; November 2023; developers, government officials, researchers, business associations

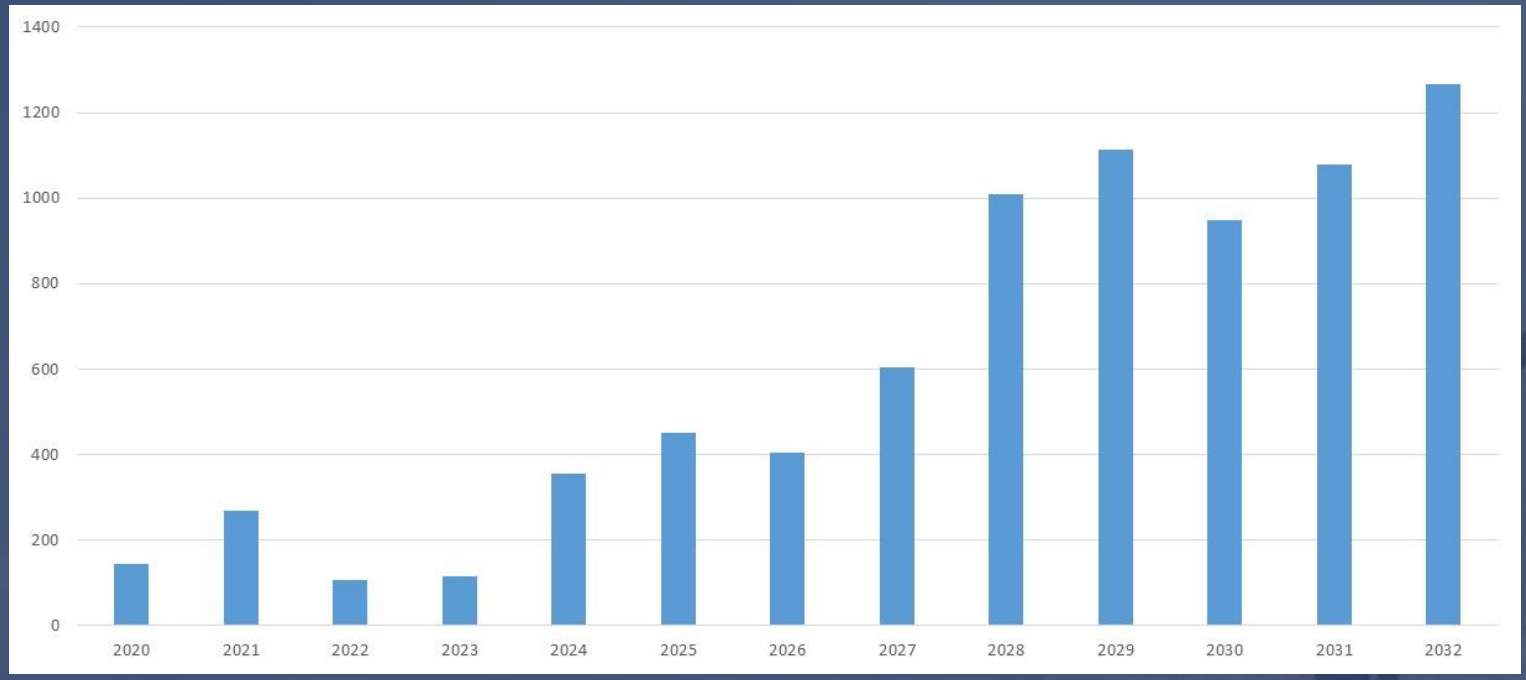
Analysis (two stages)

1. What does influence decision making for EoL?
2. What is happening to old wind turbines?

Outputs

‘When the turbines stop’ published article in ERSS; graphical summaries of research results; final report; secondary schools teaching material

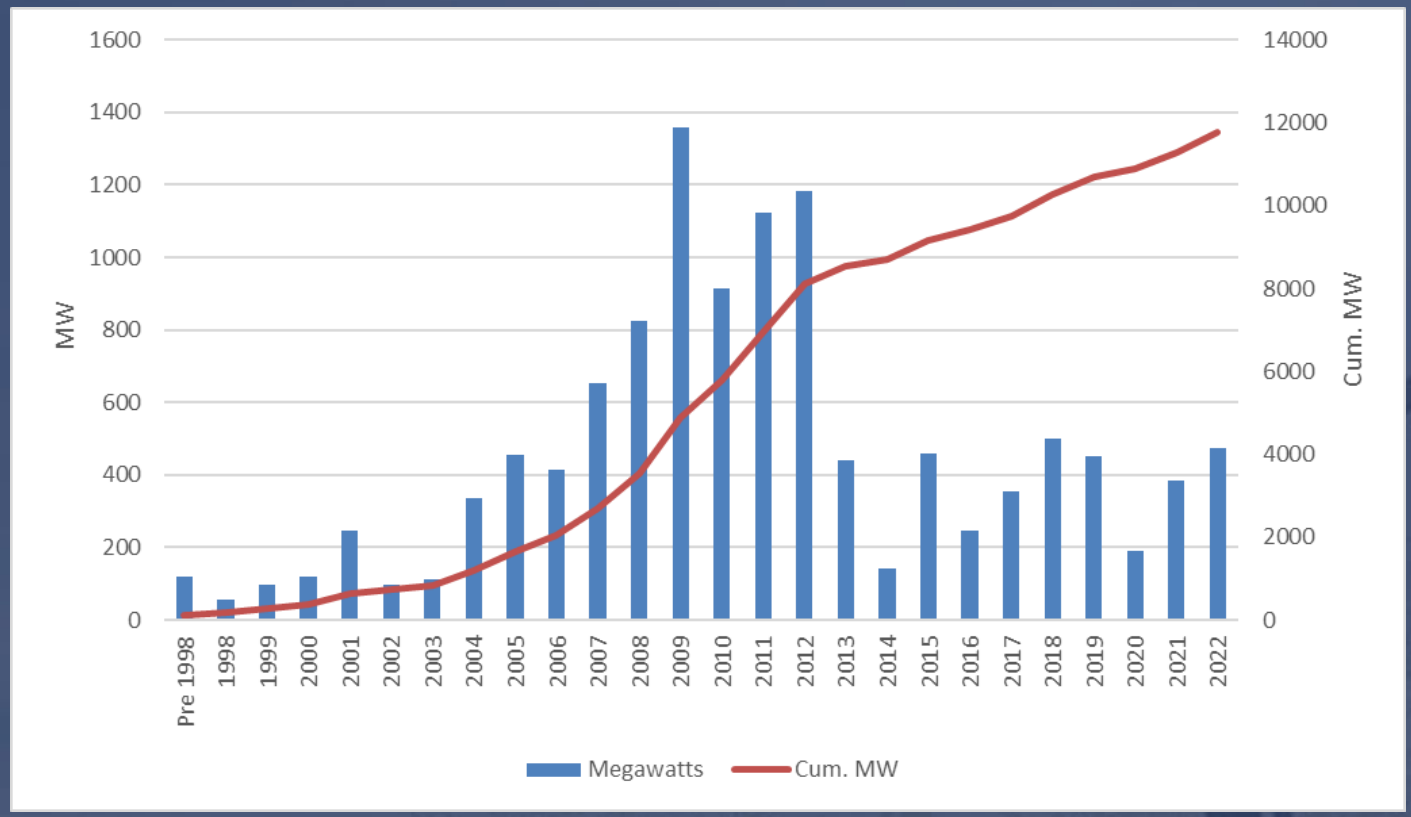
Wind capacity to be decommissioned in MW (2020-2032)



Source: ANEV, Elettricita' Futura & Assocomposti, 2021

- ✓ ***Approx 1.5 GW of wind could be decommissioned by 2025;***
- ✓ ***5 times higher by 2032***

Wind energy in Italy: installed capacity (pre1998-2022)



Source: GSE, 2023 & Anev, 2022; 2023

Italian 2030 TARGETS:

- NECP- 44 GW of Renewables
- RE-Power EU- 70 GW of Renewables
- Fit for 55- 85 GW of renewables
- 19.000 MW of installed wind capacity by 2030

Factors influencing decision making for EoL

Technical/ design life	**Economic/ business model**
Legislative/ regulatory	**Business environment**

Technical/ design life

Real data information on site performance will determine ‘age’ (e.g. parts will wear out more quickly in sites with stronger wind speeds)

Good levels of maintenance may enable turbine components to last longer (certificate of life-time extension & spare parts)

Life-time strategy decision (e.g. 15th year of life cycle of a turbine)

A mix of business plans for repowering WTs as early as 8-9 years

Economic/ business model

Incentive regimes [2017-2019 1.4 GW expired; 2023-2028 6.1 GW will expire (GSE, 2019)]

Electricity prices and duration of original business models (Auctions, PPAs & operation costs)

Second-hand markets for dismissed turbines

Older sites often ‘best sites’ for improved productivity

Legislative/ regulatory

Authorisation processes to build the wind farm (Operating licences for 20 years/ 30 years; Rights on the land/ end of land use contracts)

Changes in policy and financial support:

- Repowering and green field projects in the same auctions (..but with some tariff reductions);

- Changes in authorisations (permitting regulations for modifications, simplification of authorisations and permitting timing)

- Changes in Env Impact analysis: on a differential basis from existing plants

Changes in designated areas; what constitutes minor modifications?

Business environment

Stakeholder awareness of EOL
Waste awareness and circular business models opportunities

Desired outcome (e.g. repowering a win-win solution)

Collaboration and learning opportunities

Supply chain development (e.g. recycling opportunities)

Some reflections

The complexity of the decision-making process; an ad-hoc strategy

Key technical, economic and regulatory questions that must be asked before deciding on the most appropriate EoL option

Still very few projects currently undergoing decommissioning and either experiencing re-blading or repowering

Speed and uncertainty in regulatory regime; Inflation and wholesale electricity prices

Afterlife options for WIND INSTALLATIONS

UWE Bristol
Society with IBG

Lifetime extension

develop an end-of-life plan

towards lifetime extension

high-quality maintenance is key

CERTIFICATE

STILL GOT IT

RECERTIFY wind turbine assets

SIGNED

Repowering

I'm BACK and more POWERFUL than ever!

Repowering increases the MW outputs of the site

Look at reusing components or selling them in the second-hand market

PRE-LOVED WIND TURBINES

Re sell to suppliers

info about components INSIDE

USED WT BLADES

BLADES

explore opportunities to collaborate on repurposing turbine blades

Decommissioning

sometimes removing capacity is the only option

TYPE
SIZE
MATERIAL

availability of material data can facilitate turbine blade recycling

identify

RECYCLE

RE-USE

REDUCE

routes in the area

by Carla De Laurentis and Rebecca Windemer

graphic harvest by Maia Thomas

End of life decision making strategies for wind infrastructure

Is your wind farm 15 year or older?

EoL decisions need to be considered as early as the 15th year of the WT or within the last 3/4 years of the life cycle of a WT to evaluate the status of the mechanical and electrical components.

Options for extending the life-time guarantee or a certificate of life extension

Ongoing maintenance can have a positive impact on the design lifespan of components. High quality maintenance, a dedicated maintenance teams, maintenance plans and availability of replacing parts can extend the life of your farm.

Prioritise life extension options

Can you work with your supplier to get a certificate of life extension?
Can you request a professional certification for your turbine or its component?

Is your land-use agreement and permitting coming to an end?

Planning / operational licences may require turbine removal at a certain time. Public acceptance of the site might have changed

Options for renewing your land-use agreement and permitting

There might have been changes in the built environment surrounding your area and changes in the landscape designation.

Prioritise life extension options

Can you renew it?
Repowering and life-extension can be supported by a simplified planning process

Is your wind farm business model dependent on government incentive schemes or a PPA agreement?

It is important to consider your current business model; our research shows that some original business models were designed for 15 years, even though turbines may last for up to 25/ 30 years.

Options for repowering and re-blading

Re-powering can increase the MW output of your site and reduce the number of turbines on site. Fewer turbines will incur in lower operational costs.

Prioritise re-use

Can your turbines be sold in second-hand markets?
Can they be re-sold to your supplier?
Can you re-use in other locations?

Has your wind turbine been damaged/ experience a fault?

Parts will wear out quickly depending on wind speeds and turbines might become damaged rendering them unsafe to use, requiring replacement.

Options for replacement of parts

Parts for older models of WTs are increasingly difficult to find; Some countries are introducing a legislative ban for dismissed wind blades and there might be a cost of waste collection and landfilling related to the dismissed blade.

Prioritise re-purpose and recycling

Can you store dismissed components in your site?
Can you give a new life to your components?
Are there any potential recycling route in the area?
Do you have any material data that could facilitate recycling?

What about planning?

- Planning / operational licences may require turbine removal at a certain time e.g. UK 25 year consents
- Land use agreement and ability to re-negotiate;
- Availability/ scarcity of sites for reaching energy targets;
- Legislative policy context - influences developer confidence in deciding to repower / life-extend

Thank you for listening!
Any questions?

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