AIEE SYMPOSIUM 2021

Repowering: frameworks and business cases

ERG
EVOLVING ENERGIES

December 15th 2021

AGENDA

- **WHO WE ARE**
- **INDUSTRIAL CONTEXT**
  - NET-ZERO STRATEGY
  - REGULATORY ASPECTS
  - ESG
  - TECHNOLOGICAL IMPROVEMENT
- **BOTTLENECKS**
  - AUTHORIZATION PROCESS
  - GRID ACCESS
- **CONCLUSIONS**

WHO WE ARE

80+ years
in the energy sector

Listed
on the Milan stock exchange

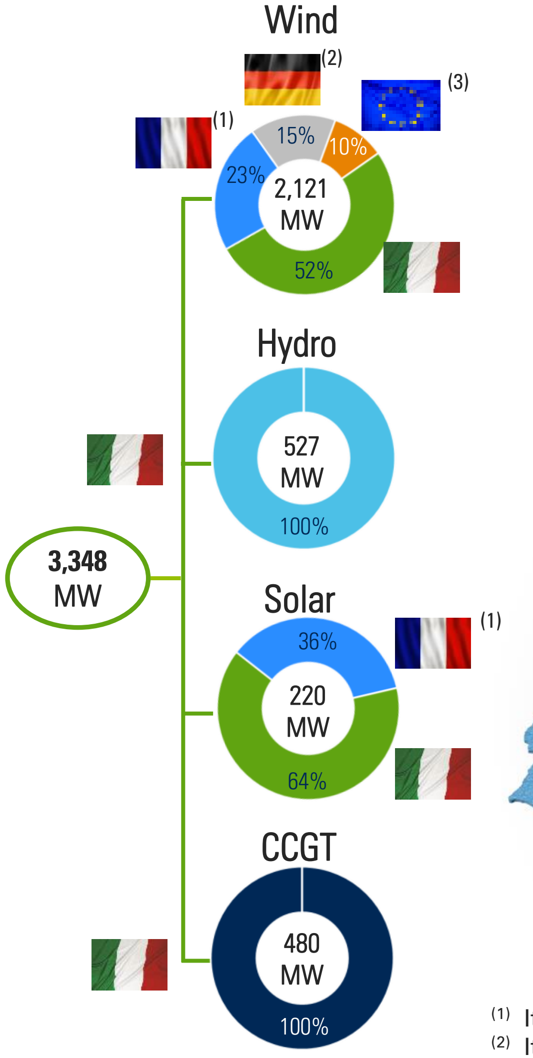
Leading
renewable operator in Italy

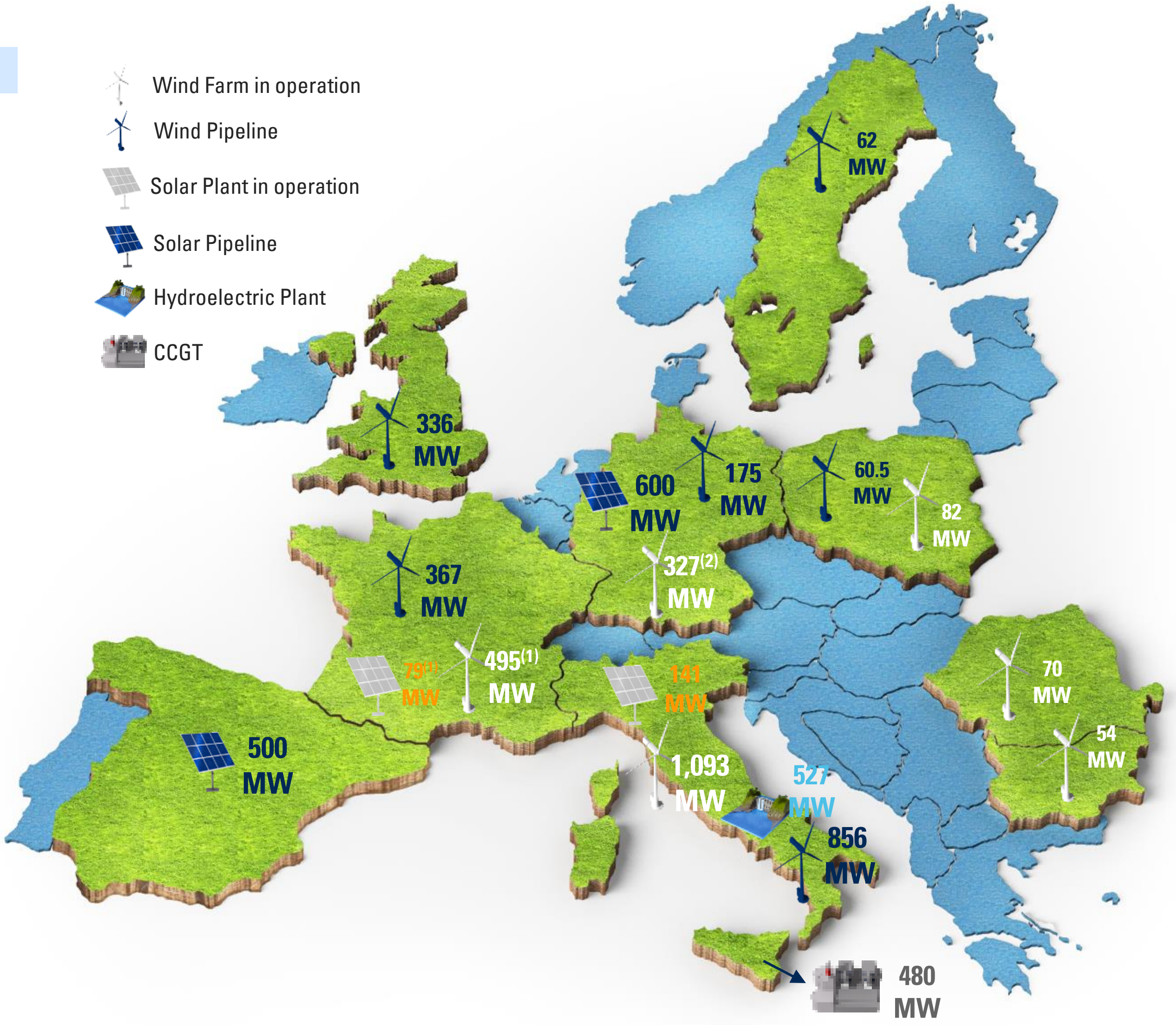
Main player
in European onshore market

business model oriented towards sustainable development and decarbonization objectives, consistent with the transition process of the energy system underway worldwide.

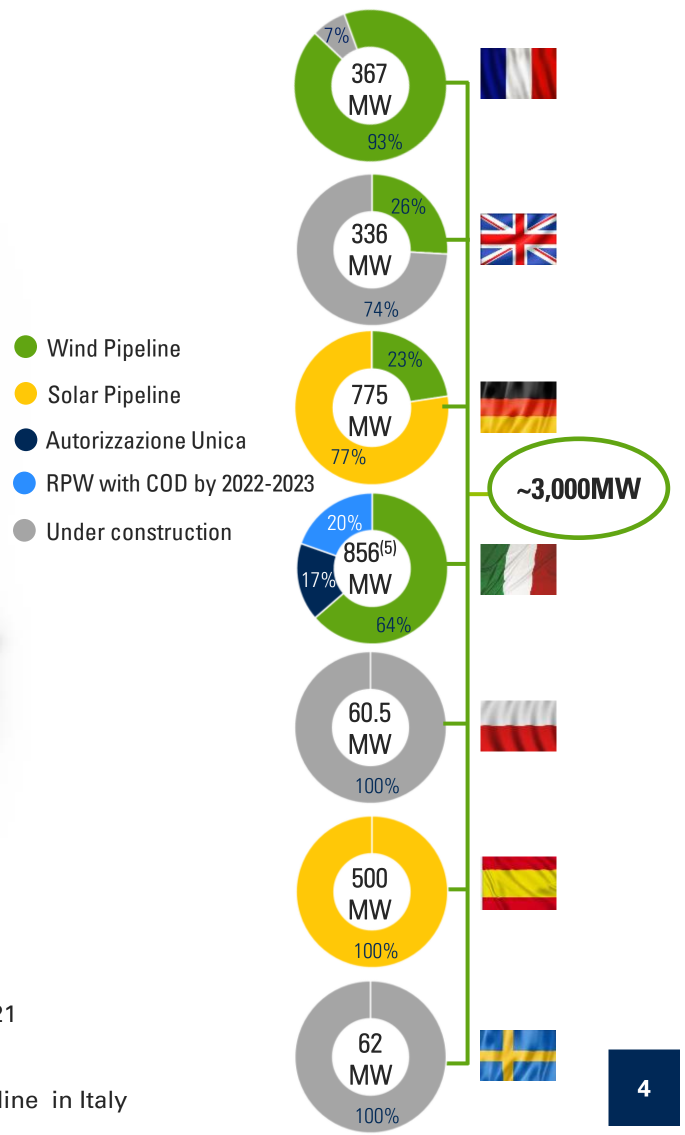
ERG TODAY: A SOLID PLATFORM OF ASSETS TO BOOST FUTURE GROWTH

Total installed Capacity





Pipeline(4)



(1) It includes the recent acquisition of 41MW Wind and 57MW, Solar whose closing took place on 28 October 2021
(2) It includes the recent wind acquisition for 55MW, whose closing took place on October 1, 2021
(3) It refers to Poland, Romania and Bulgaria
(4) Pipeline (~3,000MW) is on a gross basis and includes: ~400 MW in construction, repowering & greenfield pipeline in Italy and pipeline for solar & wind greenfield in EU
(5) Repowering is on a gross basis

ERG TOMORROW: MAIN TARGETS OF 2021-25 BUSINESS PLAN

Key 2021-2025 Strategic Guidelines		ERG's 2021-2025 Targets
Growth in scale	Setting high growth ambition RES portfolio	**+1.5GW** through RPW, Greenfield and M&A
Energy Sales / Mgmt	Securing energy sales through PPA/CfD	**80%** regulated
Geographical diversification	Positioning over multiple geographies	**~10 countries (vs 7 @2020)**
Solar as strategic pillar	Wind and solar as growth drivers, with solar gaining share	**+~0.5GW of solar PV**
Seed in Innovation	Capturing opportunities in Storage & other technologies	**Scouting** of opportunities
Conventional is "legacy"	RES-centricity on asset base and development.	**Opportunity of Asset Rotation**
Integration of ESG	ESG fully integrated in business strategy	**ESG Plan**

INDUSTRIAL CONTEXT

NET-ZERO STRATEGY

Decarbonisation of electricity one of the pillar of the EU Carbon Law, with unprecedented targets

2030

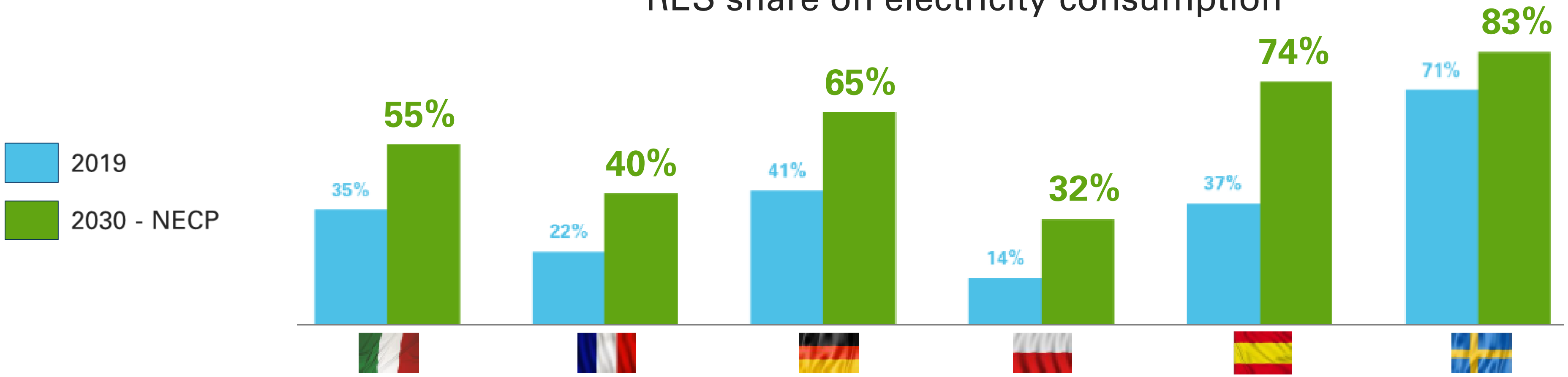
CO2 emissions reduction
55%

40%
RES

36-39%
Energy efficiency

2050 **Climate Net Neutrality**

RES share on electricity consumption



Source: Eurostat Database

INDUSTRIAL CONTEXT

REGULATORY ASPECTS

- **EU - RED II** opens the tendering procedures to all producers of electricity / technology from RES on **non-discriminatory basis**

- **Germany** (EEG - *Energiewende* 2021) **and France** (PPE - *Programmations pluriannuelles de l'énergie*):
  - repowering projects are allowed to join auctions for RES with **no differences/restrictions** compared to greenfield ones.

RES auctions – main topics

Country	CfD 2 ways	CfD 1 way	Duration (y)	Inflation adj.	Tech. neutrality	Restrictions for RPW
	X		20	no	yes	**yes!**
	X		20	yes (partially)	no	no
		X	20	no	no	no

- **Italy**:
  - Repowering has only been allowed to participate in RES auctions since the end of 2020, when the "2020 Simplification Decree" came into force
  - No limits on capacity addiction
  - However, **several restrictions remain for RPW**:
    - access to auction **only in case of spare-capacity** not assigned to greenfield
    - further **extra-cut of 5% to the allocated tariff,** despite RWP being more expensive in terms of investment (e.g. dismantling of the existing assets).

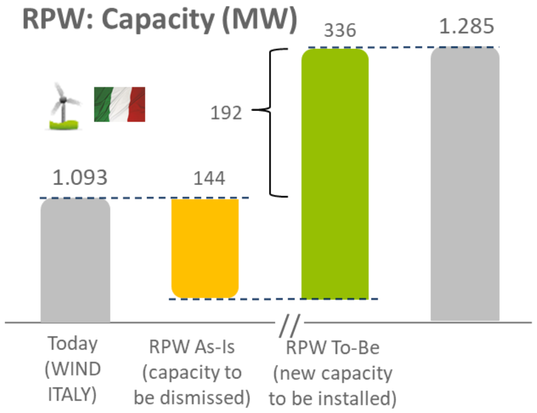
INDUSTRIAL CONTEXT

CO_2 FOOTPRINT REDUCTION THROUGH REPOWERING

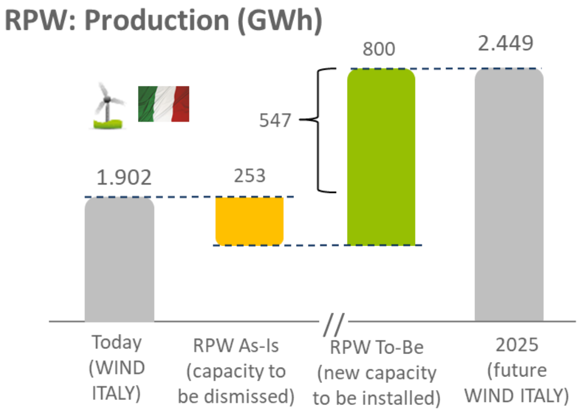
ERG assets in the Repowering pipeline

	MW As-Is	MW after RPW	MW addition
RPW Italy	372	809	437
RPW France	22	47	25
RPW Germany	17	24	7
	411	**880**	**469**

BP 21-25 RPW: Capacity (MW)



BP 21-25 RPW: Production (GWh)



Key industrial drivers
Case study

Location: **Sicily**

	WF AS-IS	WF RPW
COD	mar-05	set-23
N. WTG	59	24
WTG model	Vestas V52	Vestas V136
Power per WTG	0,9	4,2
Total capacity	50,2	101
Tip height	76	180
Hub height	50	112

Production & CapEx

Expected P50 (h/y)	2350
Expected P50 (GWh/y)	237
DProd vs As-Is (GWh/y)	187
Capex (M€/MW)	1,1

ERG started the RPW in 2017 in Italy, in 2019 in France and in 2020 in Germany.
In Italy we currently have exceeded 55% of the authorized projects included in the 21-25 plan
Economics of projects always evaluated in differential terms on the basis of the ERG investment strategy

INDUSTRIAL CONTEXT

ESG – EVALUATION IMPACT ON ESG MATTERS

Planet	
Carbon neutrality	●
Economia Circolare	●
Innovazione tecnologica	●
Efficienza energetica	●
Transizione Energetica	●
Utilizzo delle Risorse	●

Engagement	
Next Generation	n.a.
Community benefit	●
Finanziamenti partecipativi	n.a.
Sharing Benefit	n.a.

Governance	
Funding Green	●
Impatto su Rating ESG	●
Sustainable Procurement	●
Societa Offshore	n.a.
Contenziosi in ambito ESG	n.a.

Circular Economy: Reuse / Recycle / Recovery of at least 98% by weight (in line with the ESG objective)

Engagement: environmental mitigation measures equal to 3% of turnover are planned (greater than the 1% for community objective)

Repowering projects have 10 items with a "positive" impact on ESG

Positive impact ● Negative Impact ● Not Applicable n.a.

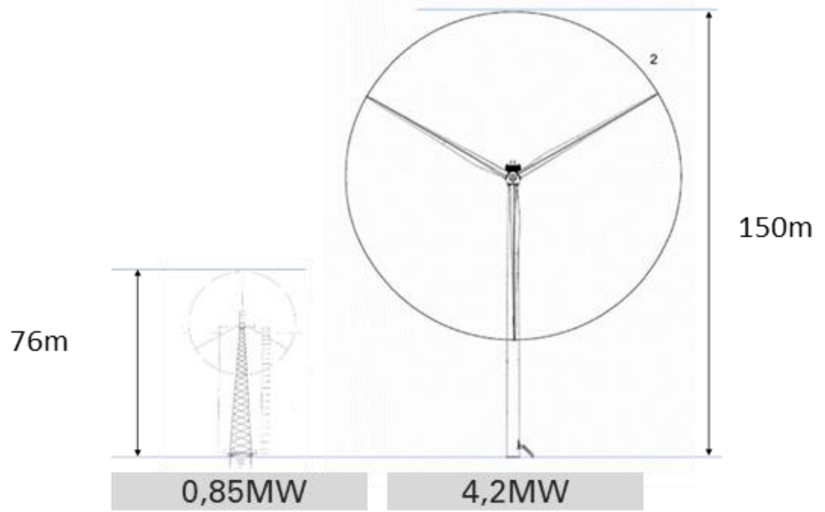
INDUSTRIAL CONTEXT

TECHNOLOGICAL IMPROVEMENT

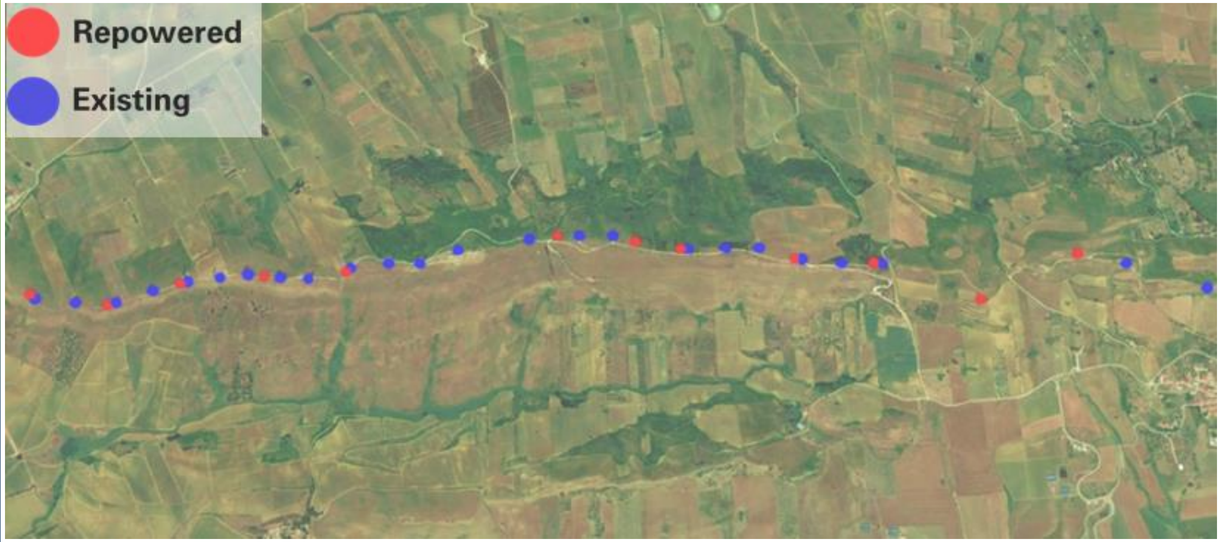
ERG industrial ratios for repowering

- ✓ Land use: **less** than As-Is
- ✓ WTGs reduction **-0,5x**
- ✓ Power increase **+2,5x**
- ✓ Energy increase **+3,5x**

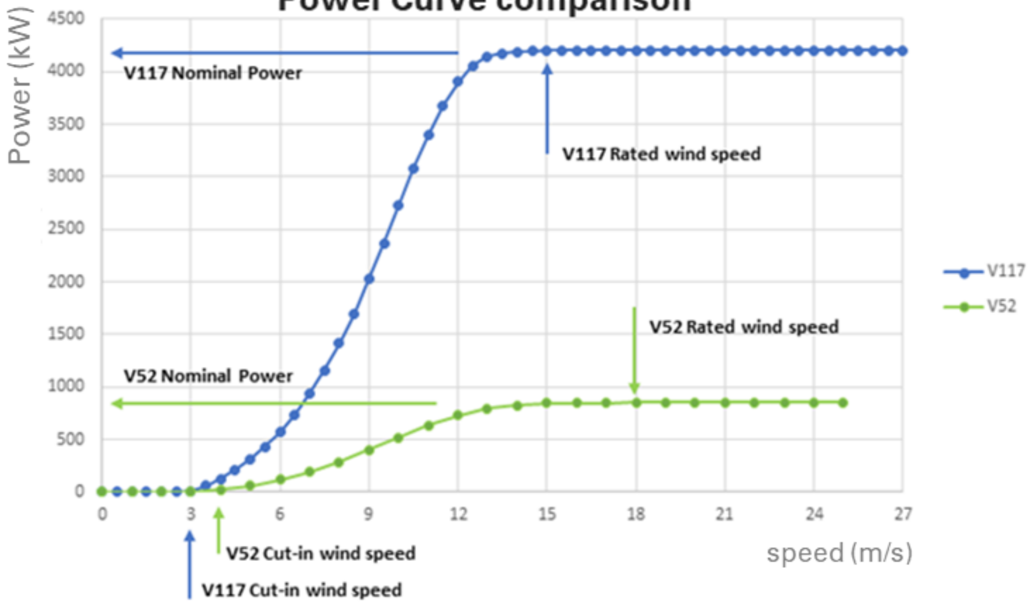
Site fitting: power increase



Case study: Layout example



Power Curve comparison



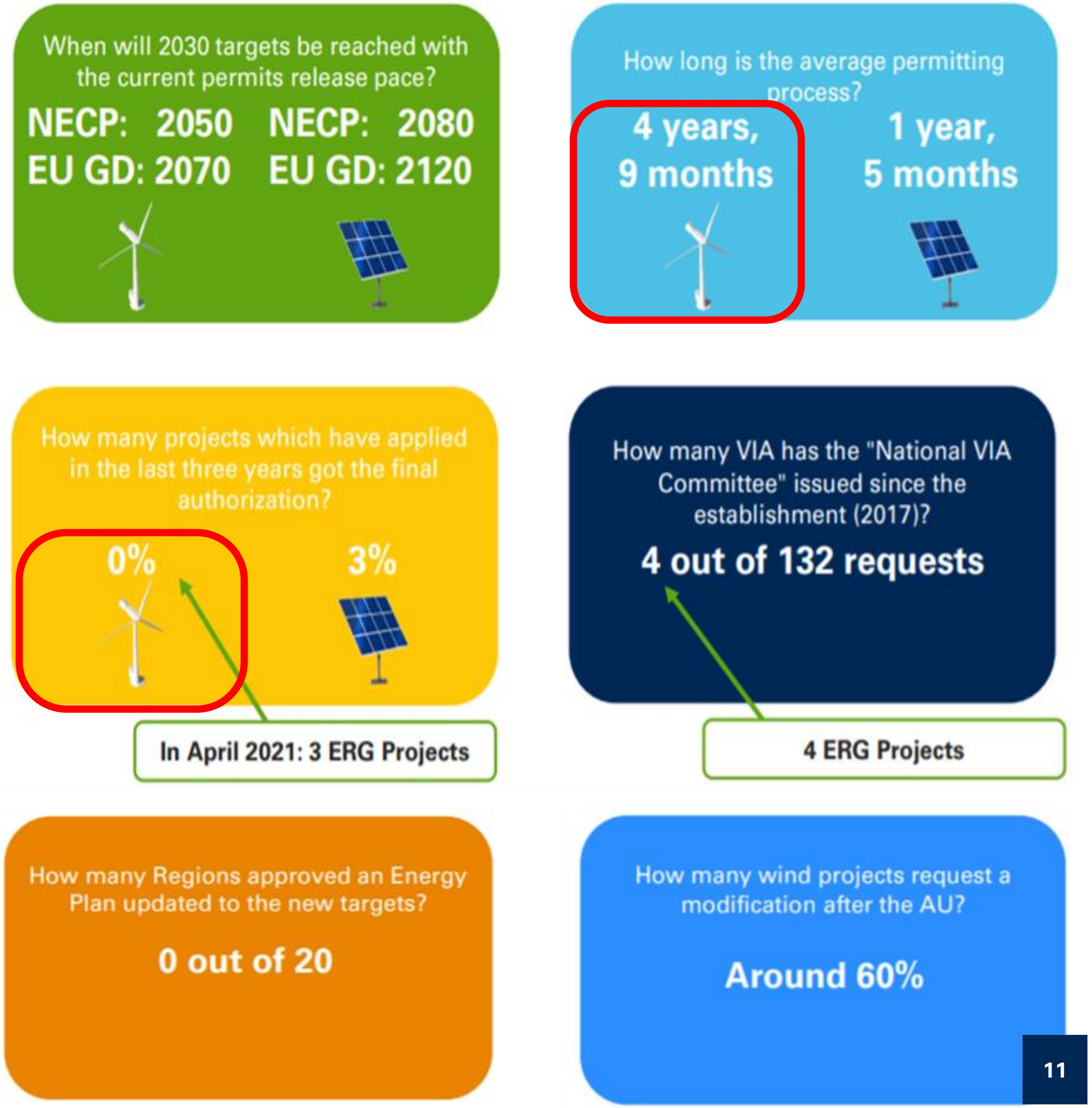
The old wind farms are built with obsolete technologies, thus do not exploit the full wind potential
Repowering allows to improve the energy gain from the windiest sites

BOTTLENECKS

AUTHORIZATION PROCESS

- **Too long path** (around 4-5 years in Italy in the near past)
- Apart from **some brand new (and positive) simplifications in Italy** (slide up), repowering globally follows the same path as greenfield projects, when RED II is calling for
  - 2 years for green field projects
  - **1 year for repowering!**
- **27 Public Entities** – on average - involved in the authorization process in Italy, Spain, France
- Possible **disputes, judicial appeals, ideological oppositions and claims promoted** by Public Entities (Ministries, Regional Authorities, Local Authorities) basically about **landscape protection**, despite repowering projects take place on areas already installed

Focus on Italy (as for May 2021)



PERMITTING FOR REPOWERING - SIMPLIFICATION TOOLS

Transposition Decree of RED II into Law

RES-suitable Areas

Overview

- Choosen by **Regions** through specific **Laws**
  - **priority for exsisting RES-sites** (same renewable source)
  - meanwhile, sites of existing wind farms subject to «**non-substantial» modifications** (e.g. Repowering under certain dimensional limits) **are considered as Suitable**

Simplifications

- Permitting duration **reduced by 1/3**
- Non binding opinion of **Ministry of Culture**

Simplification Decree - 2021

Non-substantial mods

Simplifications

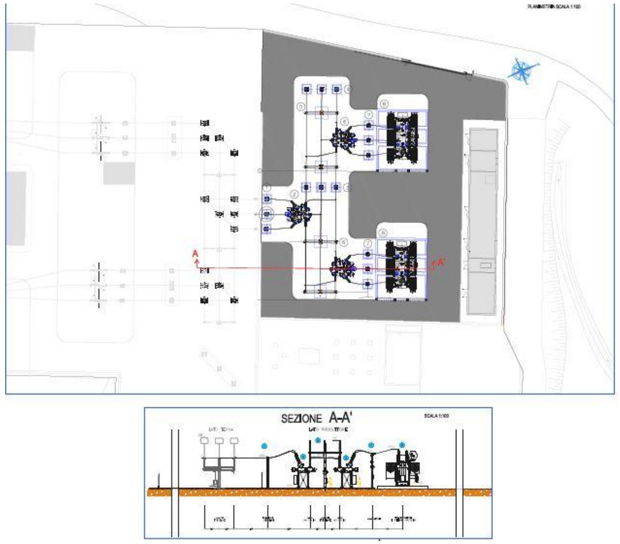
- **Start activity communication**
- Environmental permitting / procedures required
- Some expropriation issues to be addressed

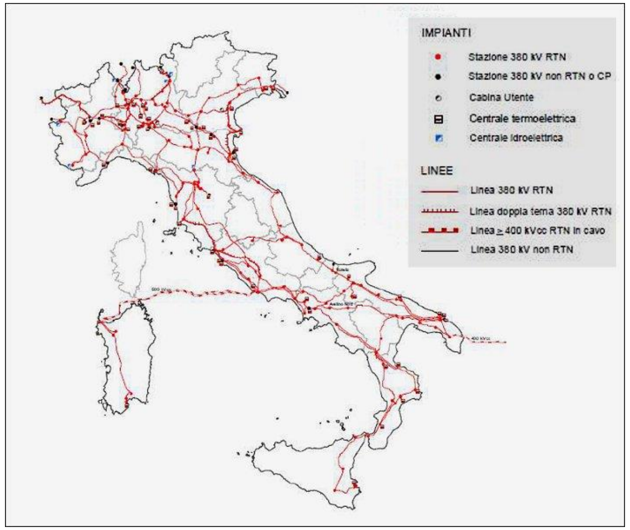
Original diameter	Max number of WTGs post operam	Maximum height post operam
≤ 70 m	min (n1 x 2/3; n1*d1/(d2-d1))	≤ h1 x 2,5
> 70 m	≤ n1*d1/d2	≤ h1 x 2

BOTTLENECKS

GRID ACCESS

- **High saturation degree** of the main electrical nodes of the national grid
- TSO’s electrical stations **are not provided with enough available HV terminal connectors**
- 2026 is the year when some European TSOs will complete their *Development Grid Plan* (e.g. Terna in Italy, REE in Spain). These plans cannot realistically allow to absorbe the energy production needed to hit the target defined by the NECP
    - › **many regions still lack effective connection solutions**





CONCLUSIONS

What do we need to unlock the potential of repowering?

- **Authorization processes** coherent with
  - **its real impact** (complexity and constraints) → **RPW is not Greenfield**
  - the **unprecedented wave of RES capacity** addition required by EU climate ambition
- **Access to RES auctions** on a fair **level playing field** with green field projects, **without penalisations**
- **Priority for RPW,** combining the **fight against soil consumption** and **increasing RES capacity/production,** while **halving the number of turbines**
- Investments in **transmission and distribution grids** attowing TSOs to underpin renewables expansion

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