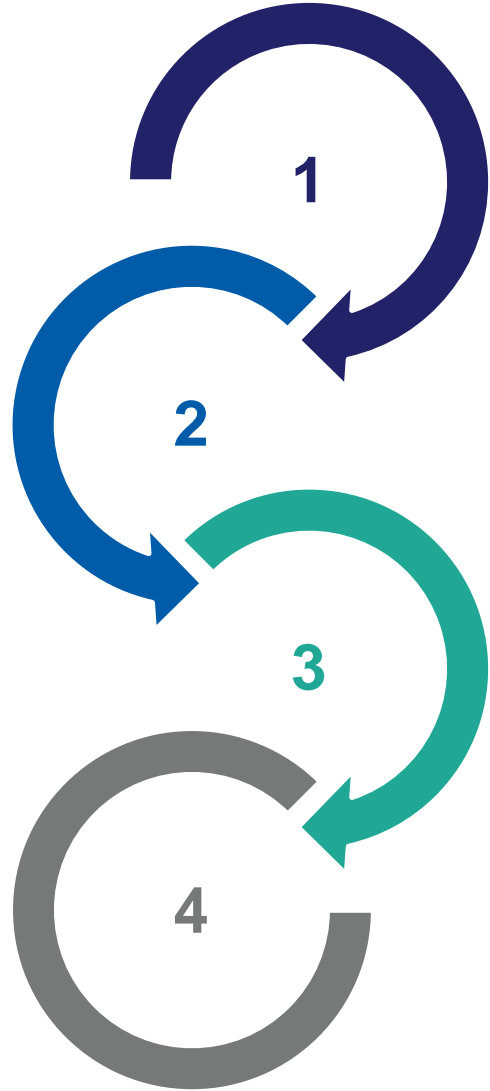




Energy transition in Italy

Challenges and opportunities in the European context

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Why energy transition? What is energy transition for?

Energy transition is not just a matter of climate change and environmental policies, but it is also an answer to energy price soaring as well as our energy dependence

What does energy transition mean?

Energy transition is not only about renewables. Energy transition means renewables and electrification of final energy consumption

How are we doing with energy transition?

Current RES development and electrification growth rate are still very slow, we are quite far away from energy transition targets

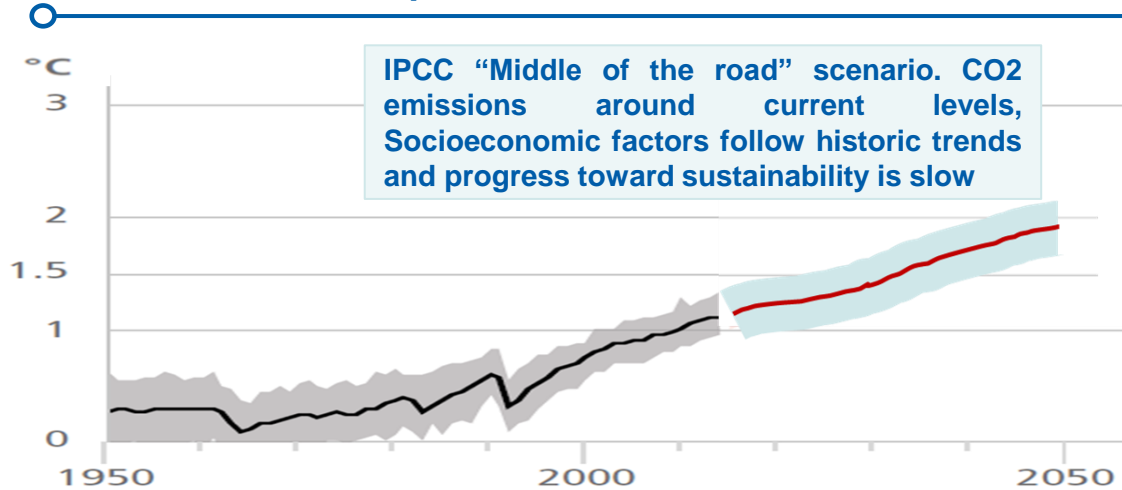
What do we really need to do to achieve energy transition?

We need to speed up permitting processes for renewables, networks and storage and be more courageous on policies for the promotion of final energy consumption electrification

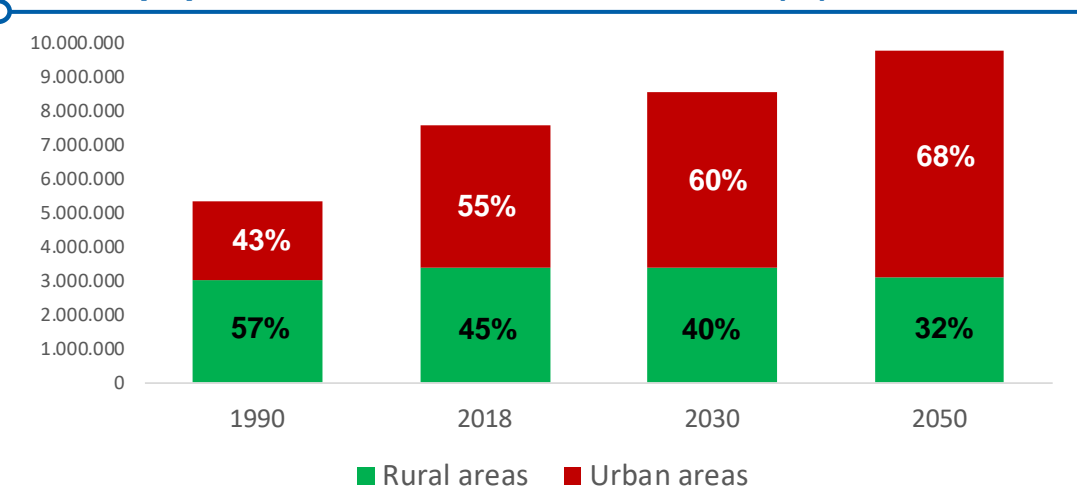
Why energy transition? What is energy transition for?

Not just to neutralise climate change and global warming but also a crucial move to achieve more liveable cities, affordable energy prices and energy independence.

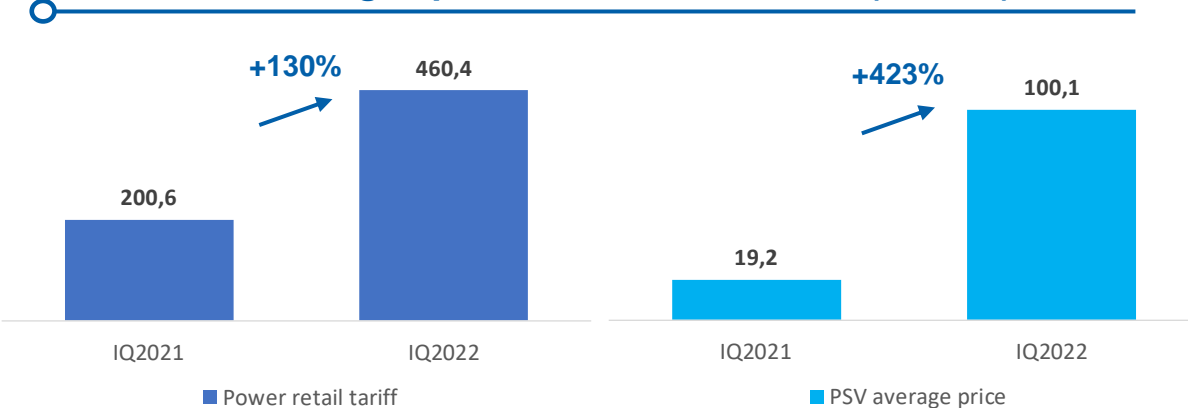
Global surface temperature increase relative to 1850–1900*



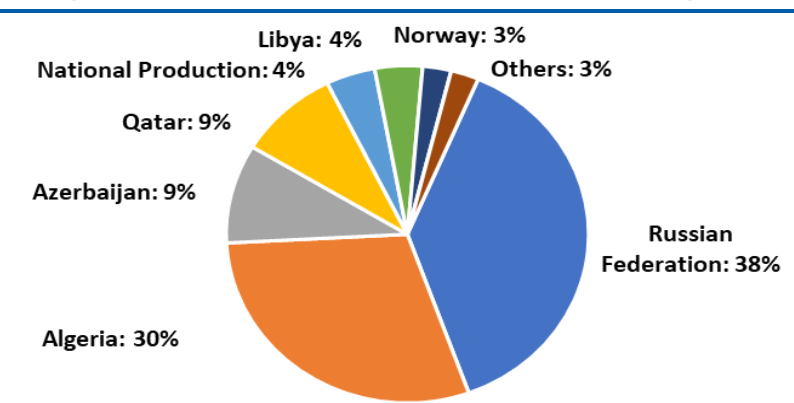
World population in urban and rural areas (n.)**



Power tariff and gas prices IQ2021 vs IQ2022 (€/MWh)



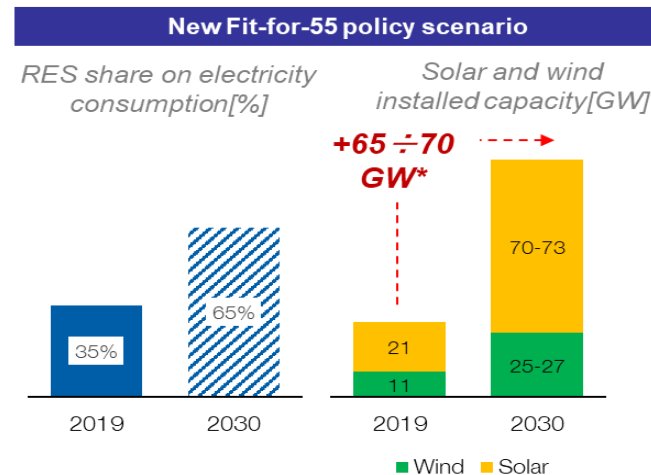
Italy natural gas consumption by country-of-origin 2021






Energy transition gives us a chance to change this situation. Pushing renewables and electrification gives us the chance to reach the environmental targets, increase our energy independence and reduce energy prices

What does energy transition mean?

Energy transition is not only about renewables.
Energy transition means renewables and
electrification of final energy consumption



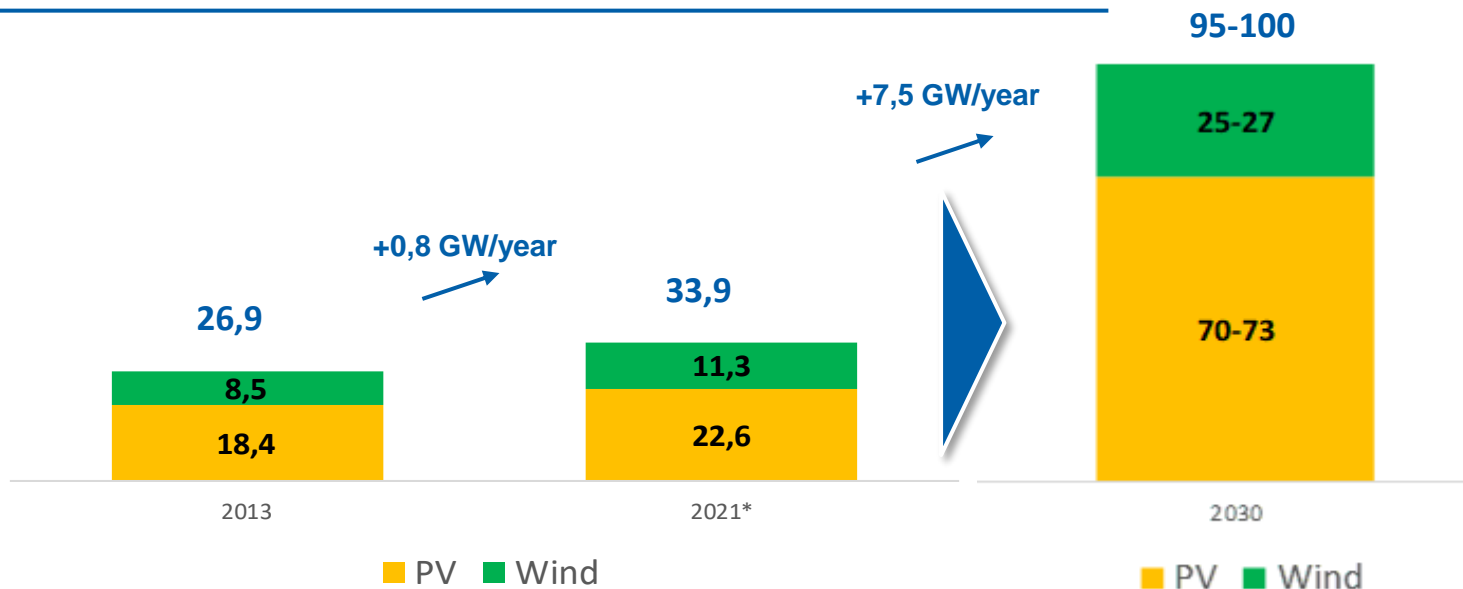
Expected benefits from electrification

	ADDITIONAL ELECTRICAL CONSUMPTION	GAS/OIL SAVING		CO ₂ SAVING	
		Best case*	Worst case**	Best case*	Worst case**
 1 mln Heat Pumps vs 1 mln Gas Boilers	+1,9 TWh	0,8 bln m ³ gas (8 TWh savings in primary energy from fossil fuels)	0,4 bln m ³ gas (4 TWh savings in primary energy from fossil fuels)	1,6 Mton CO ₂	0,8 Mton CO ₂
 1 mln EVs vs 1 mln Internal Combustion Vehicles	+2,1 TWh	730 mln of litres of gasoline (6,5 TWh savings in primary energy from fossil fuels)	N/A (2,3 TWh savings in primary energy from fossil fuels)	1,6 Mton CO ₂	0,8 Mton CO ₂
 1 mln Electric Cookings vs 1 mln Gas Cookings	+0,5 TWh	94 mln m ³ gas (0,9 TWh savings in primary energy from fossil fuels)	Comparable gas needs	0,2 Mton CO ₂	Comparable emissions

The electric vector – with RES - is the option to decarbonize the economy, except for the hard-to-abate sectors. This is the reason why it is necessary to fully electrify the residential sector and fully switch to electric mobility

How are we doing with energy transition?

Observed RES evolution in Italy and 2030 targets (GW)



- **Very slow growth between 2013 and 2021** (annual increases in installed capacity of less than 1 GW/year)
- **Need to promote the construction of about 65 GW of** (annual increases in installed capacity of about 7,5 GW/year)

Heat pumps stock in Italy (Mln)



30 million residential houses



Just **1,3 mln heat pumps** currently installed as main **heating and cooling** system



Still **19 bln m3 of gas consumption** for **residential appliances***

Passenger car registration in Italy (Mln)

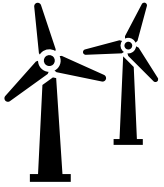


In **2021** about **1.5 mln** of new passenger **car registrations**

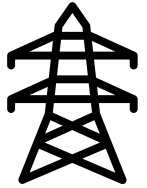


In 2021 just **67,000** of new **full electric cars registration** (5% of total new passenger car registration)

What do we really need to do to achieve the energy transition?



We need to **speed up the permitting processes** for **renewables, networks and storage**



The government has given a strong impulse during the last year, but it is a path still in progress and we really hope to see the results. Finally even European commission is pushing a lot on this topic, asking member states to simplify the authorization process



We need to be **more courageous on** policies for the promotion of **electrification of final energy consumption**



The “Fit for 55” package states that by 2035 no fuel cars must be sold any more and by 2030 all the new buildings should be zero-net emission buildings: TOO LATE, TOO SHY

POWER SYSTEM ISSUES

Reduction in regulating capability and system inertia due to change in production mix

Progressive phase-out of thermoelectric capacity with consequent problems of adequacy to the peak

Increased congestion related to non-homogeneous development of RES

Residual thermal load curve change with rapid load spikes due to RES volatility

Increased voltage regulation issues

Infrastructural interventions

Development of RES

Long term price signals

Storage systems

Flexibility resources



MAIN SOLUTIONS

Grid reinforcements (e.g. Tyrrhenian Link) and interconnection with foreign countries, investments to compensate for loss of inertia and voltage regulation (synchronous compensators, reactors)

Installation rates in the order of at least 8 GW per year are required, and it is also necessary to plan sufficiently in advance the quotas for auctions consistent with the 2030 objectives

The generation fleet will have to evolve by reducing the thermal capacity and increasing the share of renewables and storage. The generation fleet transformation is need to be driven by auctions for renewables and dedicated auctions for hydroelectric and electrochemical storage and for other programmable power plant (gas)

Implementation of new storage systems to provide regulating power to the system (voltage, frequency, inertia and short circuit power), ensure adequacy, manage overgeneration and residual load ramps

Evolution and integration of markets to meet new needs and opening of the services market to new resources

- RES development and final consumption electrification mean - looking after the planet – but also energy independence and price reduction
- Current RES development and electrification growth rate are still very slow
- Several system actions must be taken to achieve the energy transition (relaxing permitting processes and fostering electricity vector)



From a TSO perspective, 2030 and 2050 targets are achievable, but a mandatory roadmap with concrete milestones and a sustainable path shall be defined, promoting the right investments on network, storage and RES