
accenture
Game Changers
for a 3-to-1 acceleration

Executive Summary

Twin Crises

Climate Crisis

Aggressive decarbonization is required across all sectors to limit warming

Energy Crisis

Raising urgent energy security and affordability concerns

Five Game Changers

1. **Raise the game on clean and renewable power and grids**

   Remove bottlenecks to renewable deployment by accelerating permitting, grid connection, and investment certainty

2. **Electrify everything that can be electrified**

   Electrify end use to drive efficiency, tackle emissions, enhance energy security, and create a healthier society

3. **Strengthen the backbone of the transition**

   Invest in strengthening grid infrastructure and technologies to enable advanced system operations to create flexibility and enhance security and resiliency

4. **Unlock the power of the demand side**

   Accelerate consumer adoption of electric solutions and technologies to shave peak power and enhance system efficiency

5. **Secure signals, secure investment**

   Provide enhanced investor certainty and signals to support final investment decision and unlock the clean energy investment pipeline

A Key Enabler

Address the skills gap

Anticipate and build the workforce of the future through training and reskilling to address the twin crises while creating significant new job growth

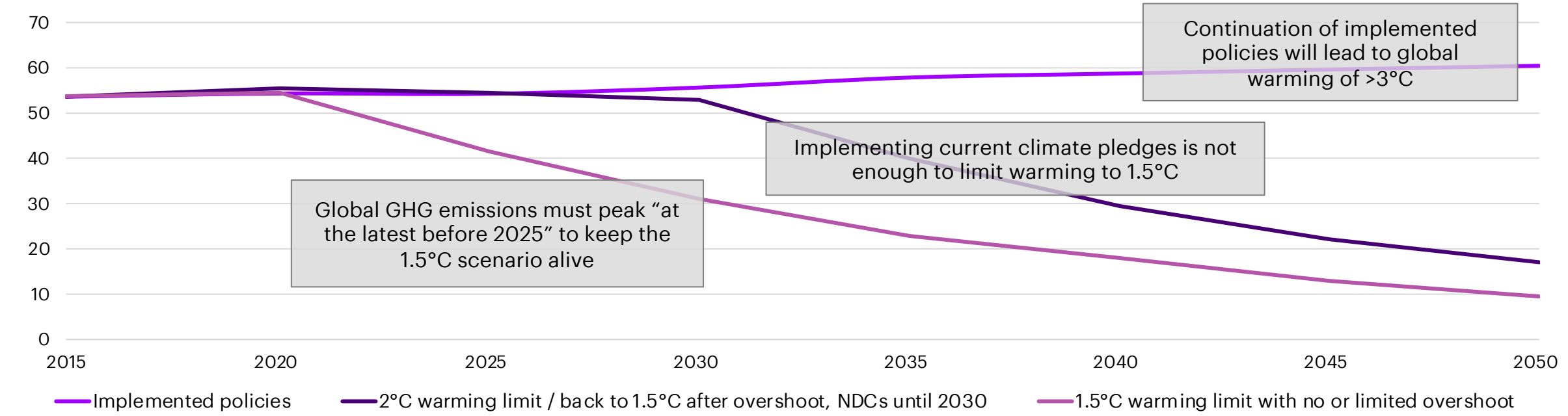
The energy transition in Europe needs to enter a phase of unprecedented acceleration

The time to act was yesterday

The outcomes of COP26 and recent IPCC reports have reiterated the urgency to accelerate action to deliver on the Paris Climate Agreement

Global GHG emissions under various warming scenarios[1]

$Gtco_2$-eq / year



Public and private sectors must accelerate action to deliver on commitments

While 57% of CEOs believe they are making sufficient efforts to limit the global rise in temperature to 1.5°C, only 2% have validated their targets with the Science Based Targets initiative[2]

Source: [1] IPCC AR6 Climate Change 2022: Mitigation of Climate Change; [2] 2021 UNGC-Accenture CEO Study on Sustainability

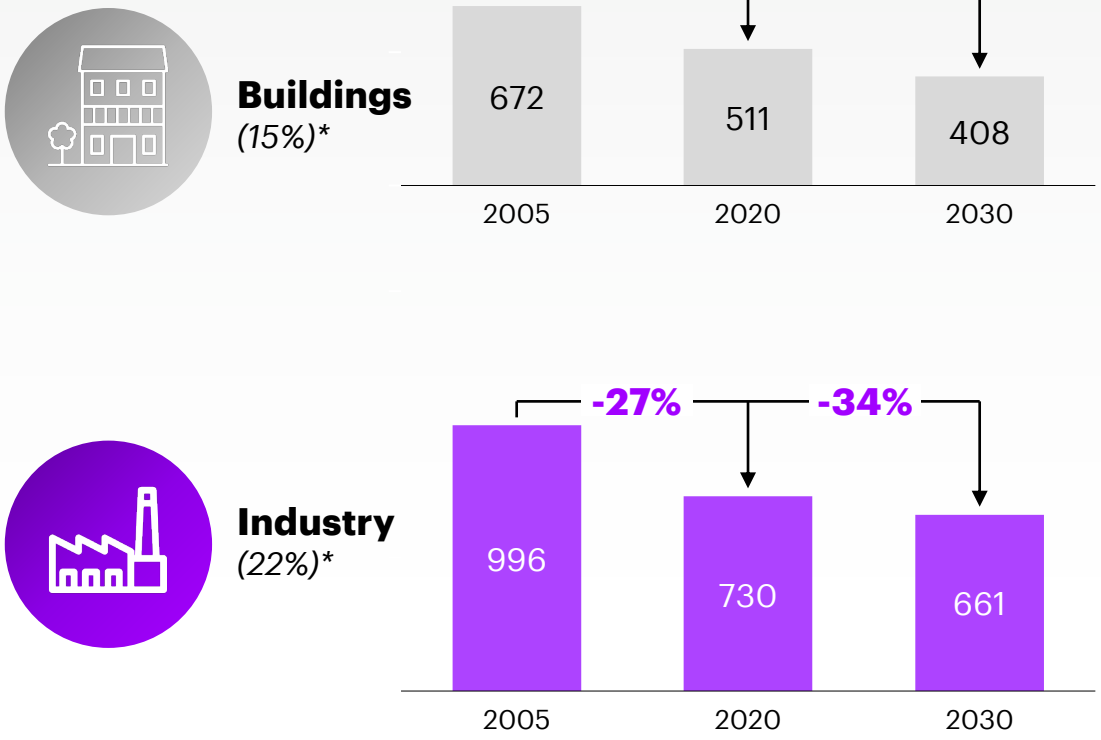
Clean energy transformation will have profound impact across all sectors in Europe

All sectors will need to contribute to achieve -55% GHG emissions by 2030

European Union GHG emissions[3]

$Mtco_2$-eq

** % is 2020 sectoral emissions share*

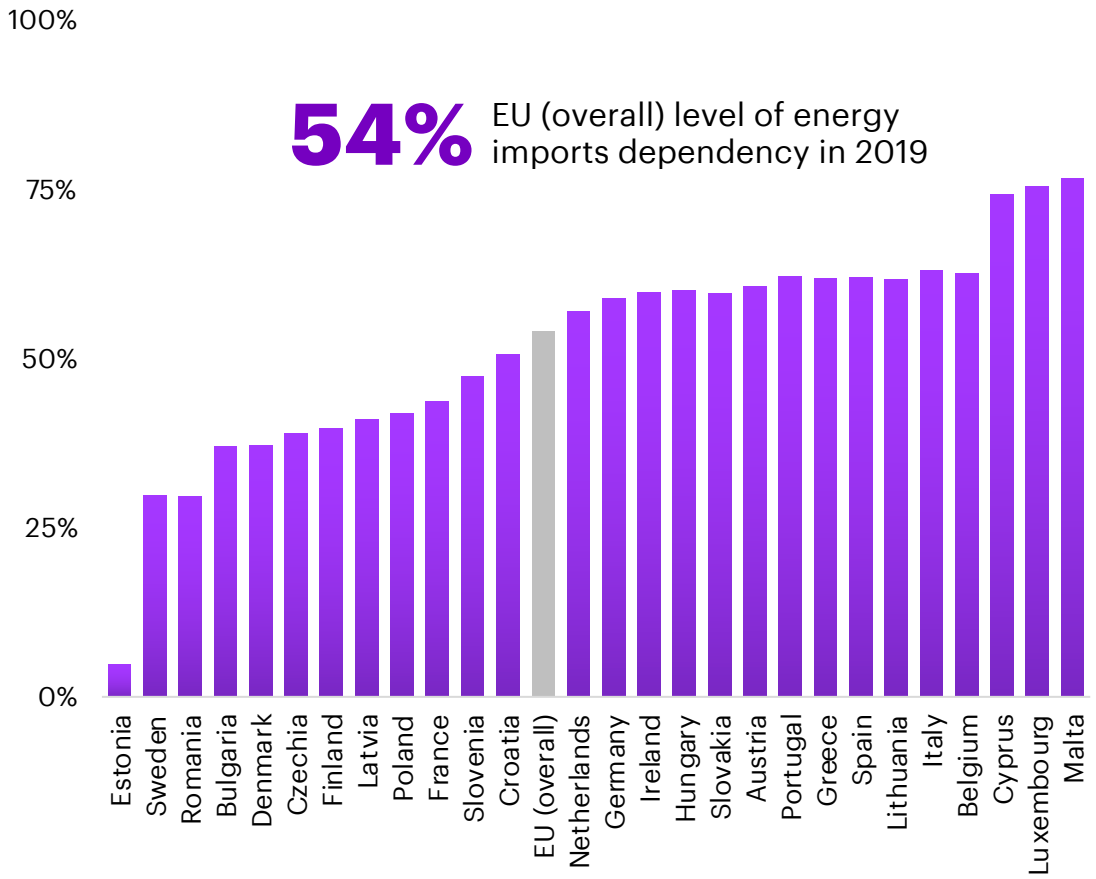


Source: [3] EEA Trends and Projections in Europe 2021, 2020 approx. inventory and 2030 projections

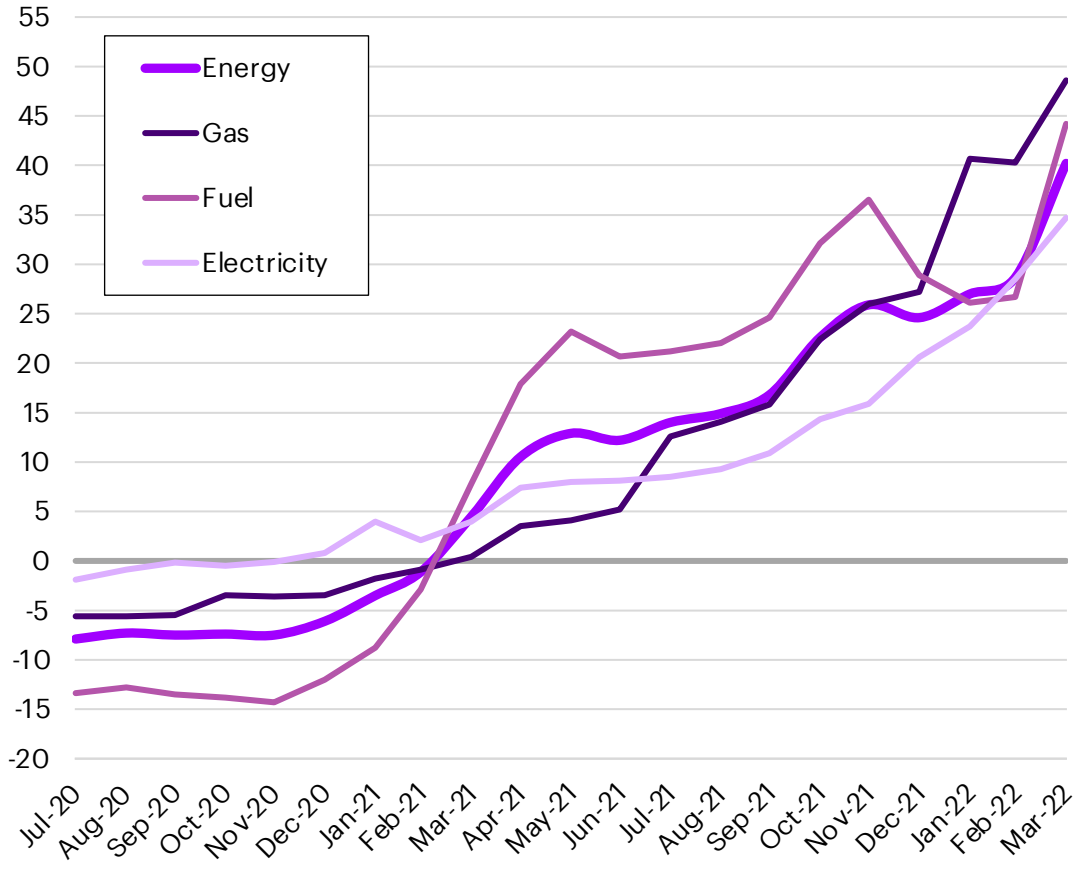
Energy prices have risen sharply – gas price is a key driver

Dependence on energy imports continues to expose the EU to changes in gas prices

EU energy imports dependency[4]
Net energy imports / gross inland energy consumption (2019)



Evolution of energy prices in the European Union[5]
Annual rate of change

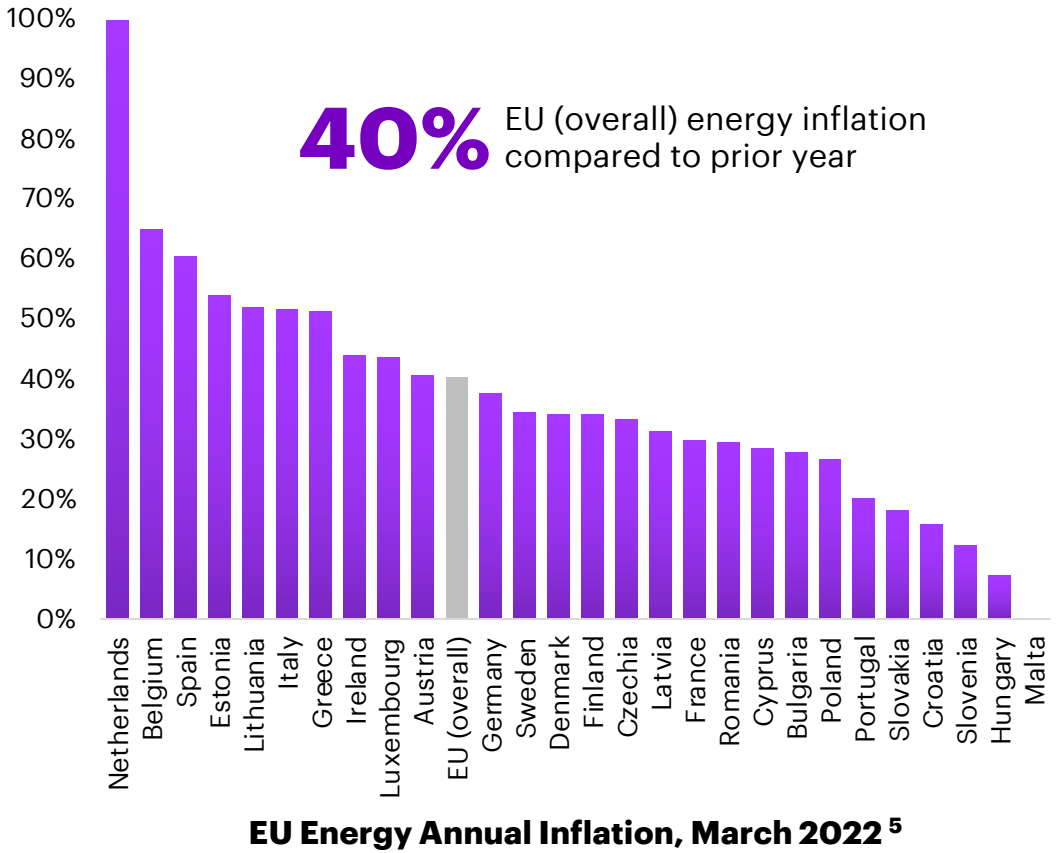


Source: [4] Eurostat Data Browser: Energy Imports Dependency; [5] Eurostat Data Browser: Harmonized Index of Consumer Prices, sub-components of energy include gas, fuel, and electricity

Consumers are urgently looking for measures to lower their bills

Dependence on energy imports continues to expose the EU to changes in gas prices

Steep energy price increases across the EU represent the largest contributor to overall inflation...

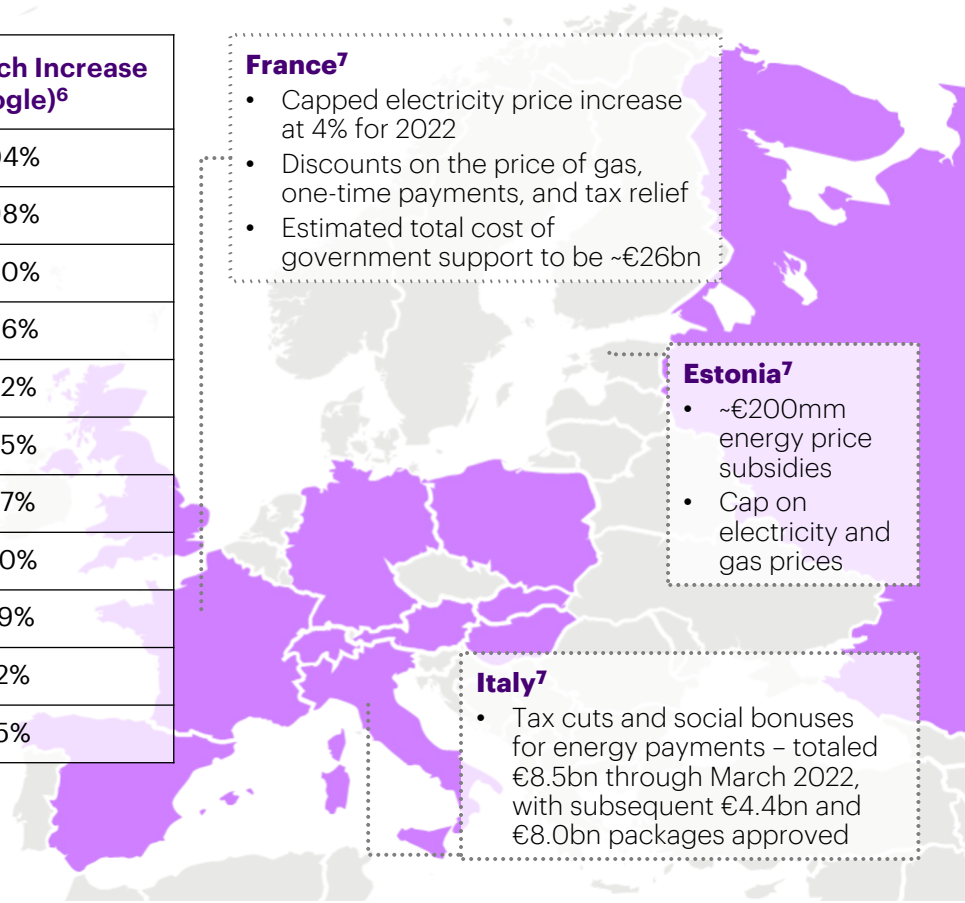


EU Energy Annual Inflation, March 2022 [5]

...increasing consumer energy price concerns and driving governments to respond with short-term interventions

Country	Price Search Increase (Google)[6]
Italy	704%
Spain	298%
Russia	230%
Austria*	226%
Switzerland*	192%
Hungary	135%
France	127%
Germany	120%
UK	119%
Slovakia*	72%
Poland	25%

Countries sampled



France[7]
- Capped electricity price increase at 4% for 2022
- Discounts on the price of gas, one-time payments, and tax relief
- Estimated total cost of government support to be ~€26bn

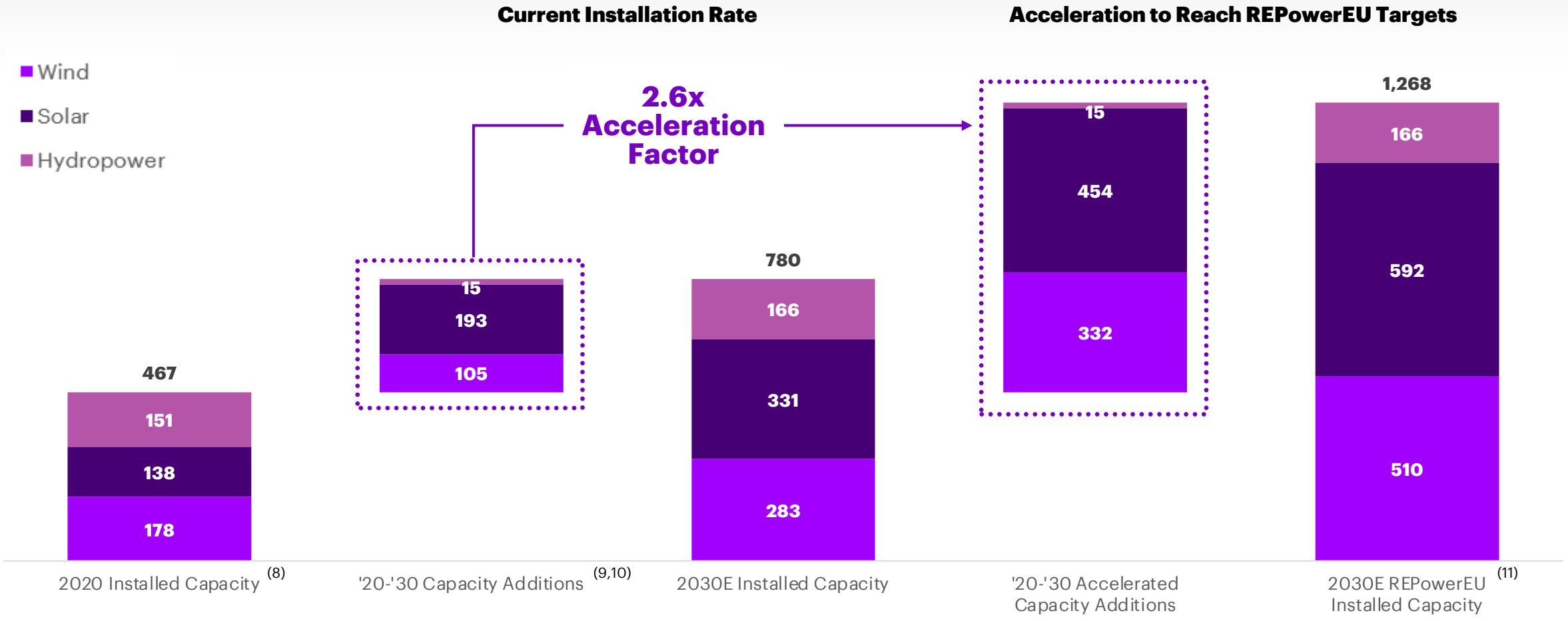
Estonia[7]
- ~€200mm energy price subsidies
- Cap on electricity and gas prices

Italy[7]
- Tax cuts and social bonuses for energy payments – totaled €8.5bn through March 2022, with subsequent €4.4bn and €8.0bn packages approved

Source: [5] Eurostat Data Browser: Harmonized Index of Consumer Prices; [6] Accenture analysis of Google Trends, average search interest in gas or fuel prices 24th Feb 2022 – 7th Apr 2022, compared to baseline: 6th Jan 2022 – 23rd Feb 2022, * Post-war outbreak period refers to 24th Feb 2022 – 7th Mar 2022; [7] Bruegel, National Policies to Shield Consumers from Rising Energy Prices

Incremental changes are not enough to deliver

Acceleration of renewable energy capacity additions required to reach REPowerEU targets
Renewable energy capacity (GW)

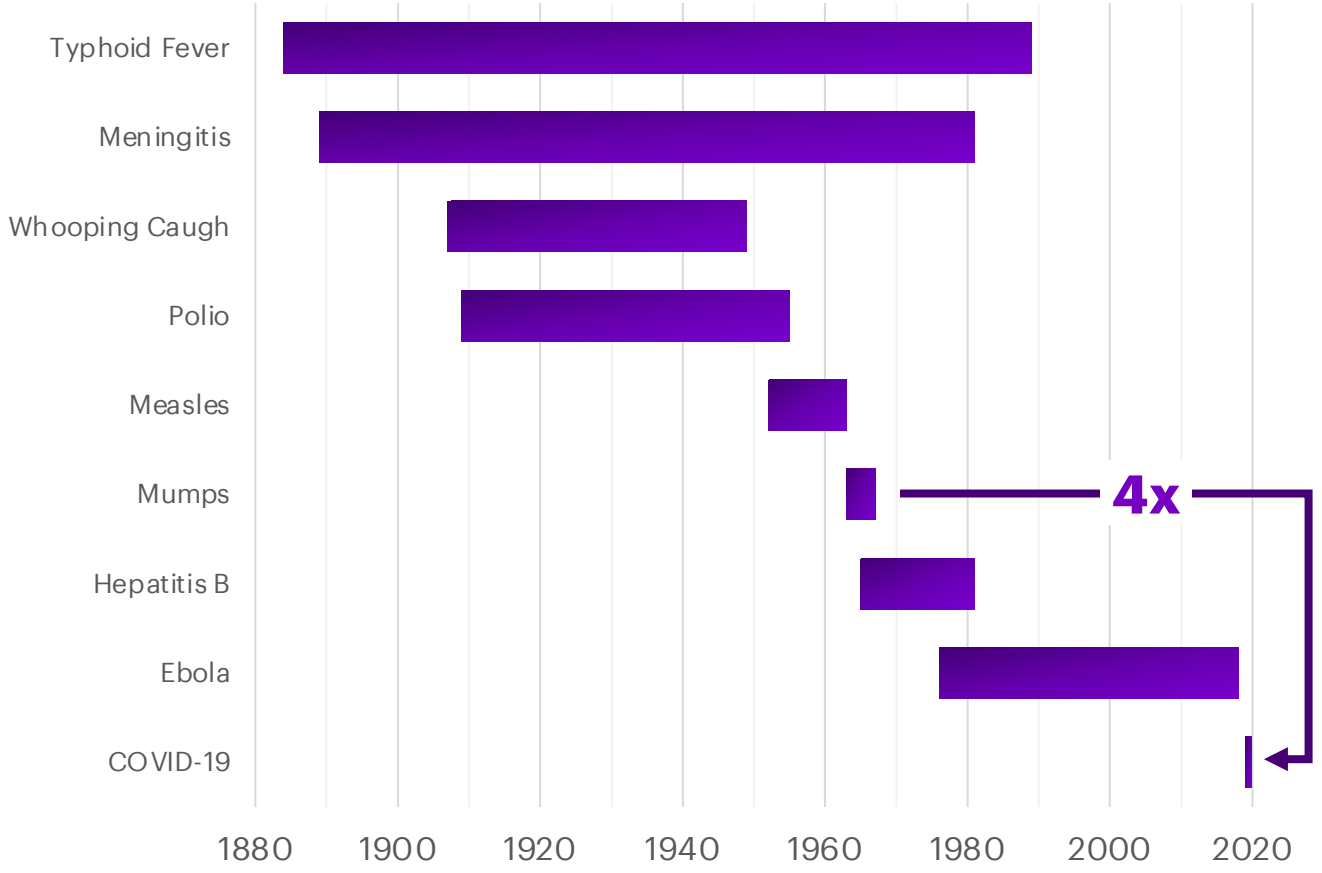


Source: [8] Eurelectric Power Barometer 2021, adjusted to reflect only EU-27 scope; [9,10] Wind Europe, SolarPower Europe, assumes capacity additions continue at same pace as EU-27 2020 annual capacity additions for wind (10.5GW) and solar (19.3GW), assumes hydropower target aligned with Eurelectric Power Barometer 2021 expectations (adjusted to reflect only EU-27 scope); [11] REPowerEU Plan SWD Targets, RE for 10Mt of green hydrogen assumed to be included in 2030E REPowerEU installed renewable energy capacity, hydropower target assumed to align with Eurelectric 2030E installed capacity (adjusted to reflect only EU-27 scope)

We have achieved a similar acceleration before

Vaccine development in under one year had never been previously achieved, until the COVID-19 vaccine

Vaccine development timeline[12]
Year of pathogen discovery to year of vaccine licensing



While vaccine development previously took 4 years or more, multiple COVID-19 vaccines were developed and brought to market in under 1 year

- COVID-19 vaccine development time represents a **4x acceleration** of the previous record, which was 4 years of development for the mumps vaccine
- Multiple game changers and orchestrated action made this acceleration possible
  - Rapid commercial deployment of new (mRNA) technology
  - Unconventional international collaboration
  - Streamlining and parallel processing of permitting steps
  - Public investment to enable business risk taking
  - Large-scale redeployment of people

Source: [12] Nature 589, 16-18 (2021)

REPowerEU makes clear that renewables and electrification are the solution

REPowerEU envisions...

"**reducing faster the use of fossil fuels** in our homes, buildings, industry, and power system, by **boosting energy efficiency, increasing renewables** and **electrification**, and **addressing infrastructure bottlenecks**."[11]

Increasing RE deployment and permitting reform

45%
2030 target for renewables share

Accelerating rollout of solar capacity

x2 solar PV capacity by 2025

58 TWh additional rooftop generation by 2025

Doubling deployment rate of heat pumps

10
million units over the next five years

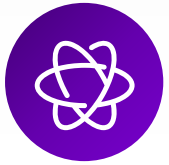
Decarbonizing industry via electrification & hydrogen

Innovation Fund
to be brought forward to support the switch

Accelerating hydrogen production and imports

x2 domestic production by 2030 vs. Fit for 55

x4 total (incl. imports) by 2030 vs. Fit for 55*



Scaling up renewable generation for hydrogen

120 GW
electrolyzer capacity needed by 2030

Source: [11] REPowerEU Plan SWD (May 2022); * Includes scaling required to meet overall domestic hydrogen production (10 Mt) and imports (10 Mt) targets

Game changers are urgently required across the energy system

Five key game changers needed to accelerate action and address the twin crises

1. **Raise the game on clean and renewable power and grids**
   Remove bottlenecks to renewable deployment by accelerating permitting, grid connection, and investment certainty

2. **Electrify everything that can be electrified**
   Electrify end use to drive efficiency, tackle emissions, enhance energy security, and create a healthier society

3. **Strengthen grids, the backbone of the transition**
   Invest in strengthening grid infrastructure and technologies to enable advanced system operations to create flexibility and enhance security and resiliency

4. **Unlock the power of the demand side**
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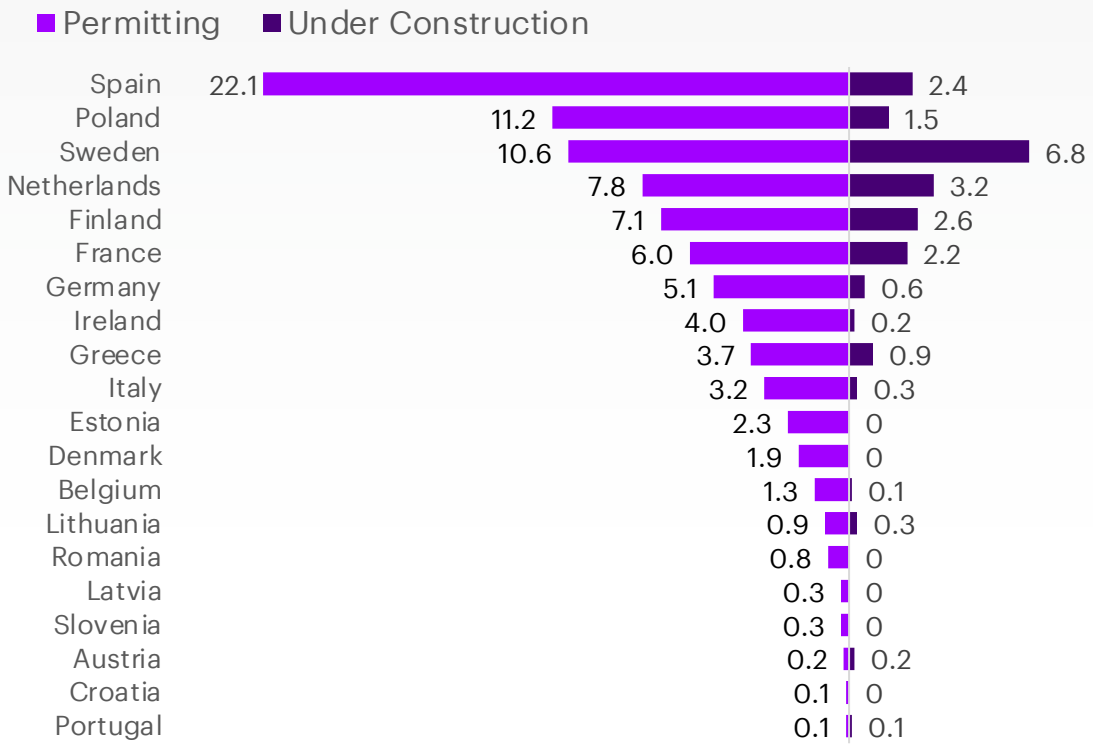
Raise the game on clean and renewable power and grids

The process for permitting, developing and building new renewable generation capacity and grid connection infrastructure must become much shorter to enable the addition of over 800 GW of renewable capacity by 2030

EU has 4x more wind capacity in permitting than under construction, requiring forthcoming policy and rule changes

Top 20 EU countries by wind pipeline capacity[13]
Broken down by development stage (GW)



Supply chain bottlenecks and rising material prices are causing renewable power projects to be delayed or cancelled

56% of the 90GW of projected new utility-scale solar worldwide slated for 2022 at risk of being either delayed or cancelled[14]

50% Increase in the price of PV modules in the second half of 2021, following a tripling of polysilicon prices[14]

6x Increase in freight costs for wind turbines since the start of 2020[15]

"We have components where **delivery times have been increased** from **5 weeks to nearly 50 weeks**"[15]

Andreas Nauen, Siemens Gamesa Chief Executive

Source: [13] Energy Monitor - Global Data, only wind projects with more than 5MW of capacity represented; [14] CNBC, 26 October 2021; [15] FT, 17 February 2022

Raise the game on clean and renewable power and grids

Innovative solutions are emerging and demonstrate how technology deployment can unleash efficiency, accelerate permitting and development processes, and contribute to sustainability outcomes

Siemens Games / NVIDIA: Use of Digital Twins in Wind Farm Development[16]

Siemens Gamesa and NVIDIA have partnered to develop digital twins of wind farms, which dramatically speed up analysis of adding new turbines to existing farms or constructing entirely new wind farms. The platform will achieve quicker calculations to optimize wind farm layouts, increasing overall production while reducing loads and operating costs.

SSE Utilizing AI for Environmental Impact Monitoring[17]

SSE in the UK is using leading-edge AI technology to document the wellbeing and population of puffins. If successful, it is expected the technology will be used for several species recognition projects around SSE sites including hydro power stations and wind farms. Solutions of this kind will contribute to environmental and habitat protection and provide data to accelerate environmental impact assessments and planning.

NGET Power Flow Project to Unleash Smarter Controls in Existing Transmission Network[18]

National Grid Electricity Transmission (NGET) has partnered with SmartWires to utilize their modular power flow control technology. This helps to remove transmission bottlenecks and unlock unused capacity on the existing network.

NGET has already installed 48 SmartValves across five circuits at three of its substations in the North of England, creating 1.5 GW of extra capacity; enough to power one million UK homes with renewable energy.

With the increasing volume of renewable generation seeking to connect to the network, NGET sees a pressing need for even more capacity in the area in 2022. By scaling up the initial SmartValve deployments near Harker and Penwortham, NGET can unlock extra capacity on the existing circuits, and ultimately transfer more renewable power to its customers in a timely and cost-effective way.

Source: [16] Siemens Gamesa / NVIDIA; [17] SSE; [18] NGET Power Flow Project

Game Changer 2

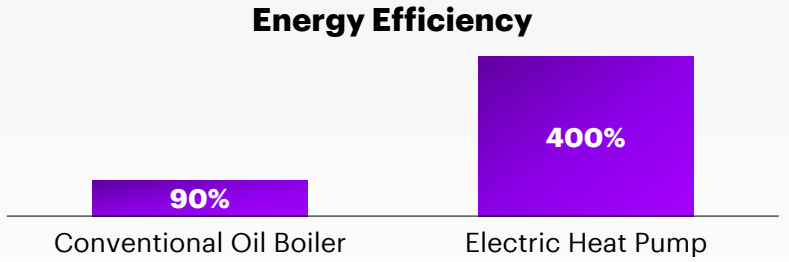
Electrify everything that can be electrified

Electrification will tackle emissions and enhance energy security and efficiency. It will also critically contribute to a healthier society - air pollution continues to drive a significant public health burden in the EU linked to 350,000 premature deaths per annum[19]

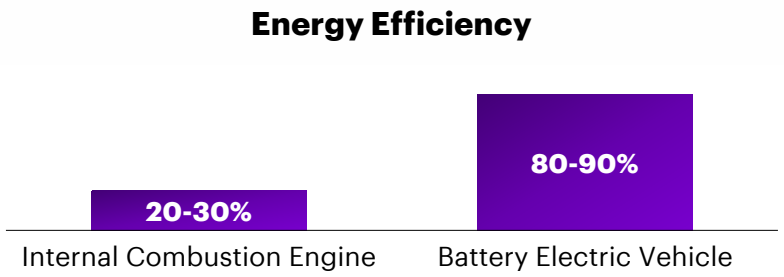
01 Electrification is crucial to reaching net zero by 2050 and creating a more livable world

Clean electrification will tackle emissions providing a decarbonized alternative to fossil fuels and enabling a healthier society

02 Electric heating solutions save energy, reduce dependence on imported fossil fuels, and lower consumer bills[20]



03 Battery electric vehicles are more efficient, travel 3-4x the distance with the same amount of energy, and improve air quality[21]



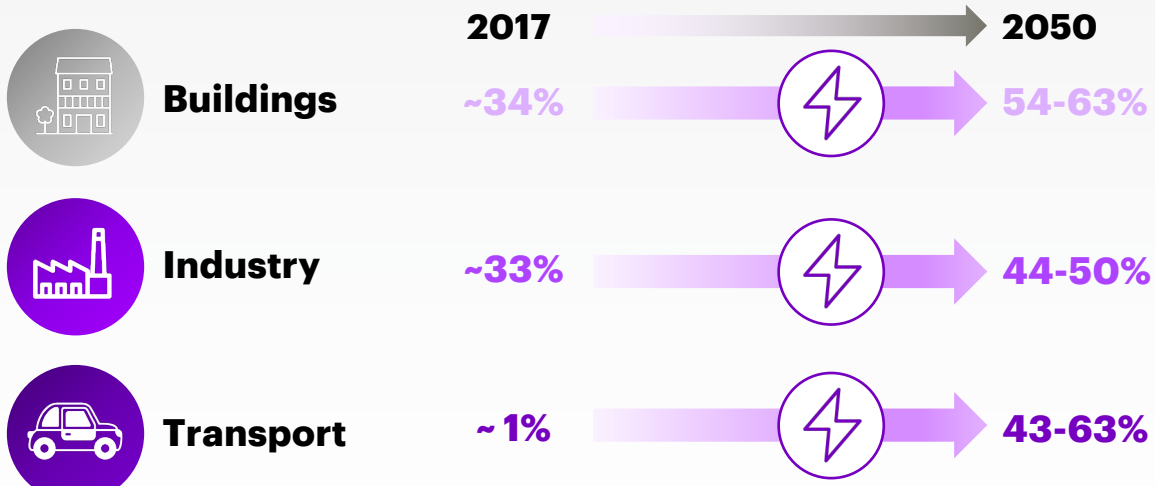
Source: [19] EEA, Health Impacts of Air Pollution in Europe: 2021; [20] Eurelectric, Power Barometer 2020; [21] Electrification Alliance Declaration

Game Changer 2

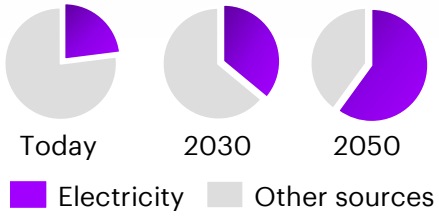
Electrify everything that can be electrified

There is significant potential to increase electrification across buildings, transport and industry and this will deliver on emissions reductions, efficiency gains and enhanced health outcomes.

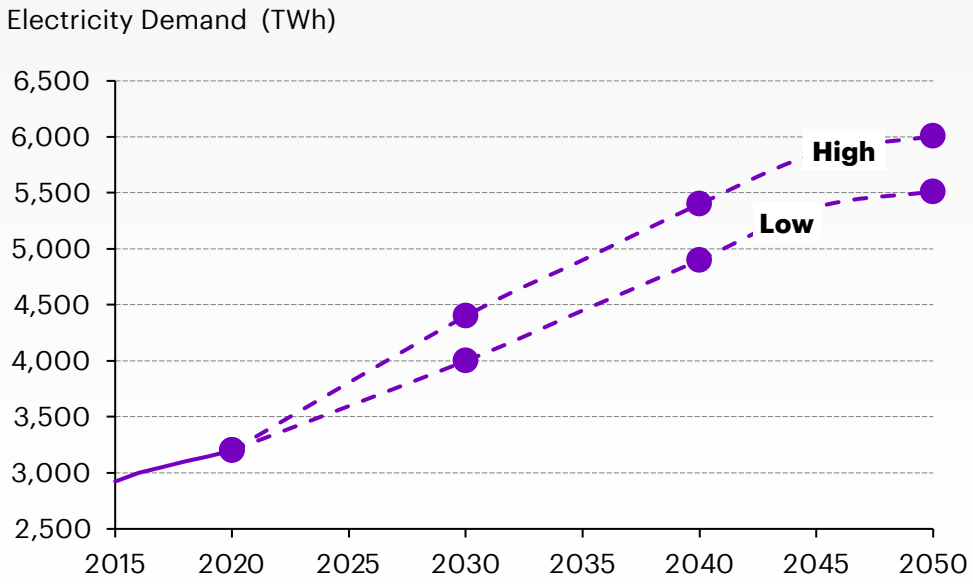
Expected EU electrification by sector[22]



Generating a higher share of electricity in the European energy mix[22]



Rise in total electricity demand in Europe (2015- 2050)[22]



2x Overall increase in **electricity demand** by 2050 vs. 2015

Source: [22] Eurelectric Decarbonisation Pathways including EU-27 + UK + EEA, share of electricity consumption as fraction of total final energy consumption, 2050 range determined by 90% decarbonization and 95% decarbonization/Net Zero scenarios, total European energy mix direct electrification rate from 95% decarbonization/Net Zero scenario; 2015-2050 total (direct and indirect) electricity demand in Europe determined by 90% decarbonization (Low) and 95% decarbonization/Net Zero (High) scenarios

Game Changer 3

Strengthen grids, the backbone of the transition

Timely and efficient integration of renewables requires a reversal of the decline in crucial infrastructure investment. Activating key integration levers[23] to create system flexibility will reduce overall need for capital build and unleash system value outcomes.

Variable Renewable Energy Integration Levers

System Operation	System operation practices such as strategic dispatch and operating a system across an expanded blueprint can unlock significant flexibility, often at lower economic costs than options that require changes to the physical power system
Markets	Market mechanisms that ensure revenue sufficiency for renewable energy, liquid ancillary service markets and joint market operation form the basis of needed investment in both renewable energy and the required system resiliency
Load	Demand-side flexibility such as demand response from industrial & commercial to residential load can maximize renewable energy at a point in time, and provide necessary grid flexibility
Flexible Generation	Increased flexibility in ramping and response of dispatchable generation (conventional and hydro) can support increased variable renewable energy by offering grid resiliency and ancillary services
Networks	Network development is key to enabling connection of increased renewable energy to power systems, This is through building new infrastructure, reinforcing existing or applying advanced system management to optimize the network
Storage	Energy storage, in either chemical, thermal or pumped form, supports increased renewable energy – both by supplying the system with electricity when renewable generation falls off, and by offering grid stability through ancillary services

The World Economic Forum System Value Framework holistically evaluates economic, environmental, social, and technical outcomes of potential energy solutions across 12 dimensions.[24] Utilizing key integration levers can deliver on critical system value outcomes:

Source: [23] National Renewable Energy Laboratory; [24] World Economic Forum: System Value Framework

Strengthen grids, the backbone of the transition

System Operation

Energy system operators need to prepare for (increasingly frequent) disruptive events as well as for managing large swings in supply and demand in short time periods. Strengthening grid operation and control by embedding technology and innovation will enable system operators to rethink energy security and system resiliency.

On October 16, 2017, tropical storm Ophelia hit Ireland and the UK with record-breaking winds. System-wide disruption was avoided by the TSO optimization of wind energy and system stability.[25]

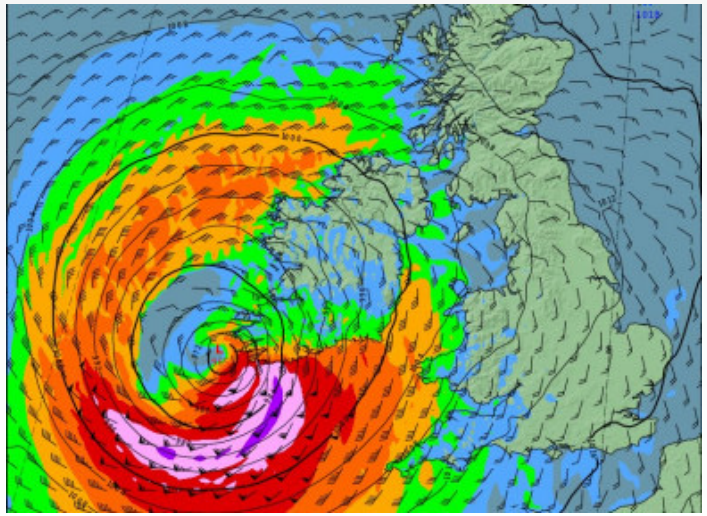
As the storm progressed across the island, the system operator was forced to anticipate sudden changes in both electricity supply and demand, as distribution lines were damaged and as wind turbines could go into high-speed shutdown.

Wind power was **controlled remotely by the TSO** and could be curtailed on a regional basis as the storm passed over Ireland.

Wind generation was **temporarily reduced** in order to avoid sudden electricity reduction as a result of high-speed shutdown of wind turbines.

Conventional generation was brought on load to **provide reserve** to the grid.

As the storm passed, wind curtailment was lifted regionally, and **wind power was maximized** when safe to do so.



Storm Ophelia - Met Eireann – October 2017

Despite excessive wind speeds, considerable amounts of wind generation were accommodated on the Irish system

In a storm of this magnitude, higher levels of wind energy curtailment would have been actioned to maintain system security, but with data on the location and direction of the storm, and remote control of the wind farms at a localized level, wind power was optimized and met more of the system demand

Source: [25] EPRI, 2018

Game Changer 3

Strengthen grids, the backbone of the transition

Load

Variable renewable generation and demand response can be orchestrated to deliver security and resiliency outcomes by deploying advanced forecasting, data visualization, analytics and decision support tools. Grids must be modernized and digitized to support unlocking this opportunity.

Forecasting Load

Enhanced load forecasting will be critical in a decentralized power system to facilitate balancing, unlock flexibility and decarbonize in an efficient manner

Modern and digitally enabled grids

Advanced forecasting, data visualization, analytics and decision support tools

Forecasting Renewables

More precise weather and operational forecasting will provide better visibility of available variable renewable generation to facilitate demand / temporal matching

Google 24/7 Carbon Free Data Centers[26]

In 2020, Google announced their target to run their data centers on zero carbon electricity 24/7 by 2030 through commercial and technical measures

These measures will include matching operational electricity use to availability of variable renewable generation through carbon-intelligent computing

The day-ahead forecast predicting the average hourly carbon intensity of the local electrical grid is compared to internal forecasts of hourly power requirements – allowing computing tasks to be shifted and aligned with low-carbon electricity supply

Matching can be done without additional computer hardware and without impacting the performance of service delivery

Source: [26] Google: 24/7 Carbon Free Data Centers

Game Changer 4

Unlock the power of the demand side

Deploying smart meters, smart grids and other technologies coupled with the right price signals and incentives can unlock demand side opportunities to maximize the potential for efficiency, flexibility, circularity and shared infrastructure synergy.

Maximize the efficiency opportunity

Energy efficiency is a principal solution for the energy transition, reducing emissions, costs and the need for energy imports, and lowering costs for households and businesses. Maximizing the contribution that energy efficiency can make will reduce the need for new infrastructure to meet demand and decarbonization targets. Recognizing this, REPowerEU has raised the energy efficiency target from 9% to 13% by 2030.[11]

Harness the potential for flexibility

Demand Response programs provide a vital source of flexibility by contracting businesses to reduce their non-essential energy use from time to time or to engage on site generation assets to support the grid. Similarly, electric solutions coupled with time-of-use tariffs can be used to encourage residential customers to shift demand to off-peak times. Smart devices and automated response will enhance flexibility in the future.

Repurpose waste and unlock shared infrastructure synergies

Building on the efficiency improvements in individual industrial plants and processes, industrial clusters can exploit synergies between cluster partners and processes. This can unlock resource efficiency, enable waste streams to be repurposed, and infrastructure synergies to be unleashed across energy and water systems. The additional efficiency gains benefit the plant, cluster and in the surrounding areas including residential.

Sanofi – Manufacturing Plant Optimization for Pharma products with virtual twins[27]
Virtual twin technology is used to optimize remote manufacturing through real-time data capturing and analysis. The process is digitalized and is 80 times more productive than a traditional factory. It can make medicines in less time for twice the number of patients with 80 percent less energy.

EnelX - Demand Response Programme[28]
Customers receive payments for participation and gain access to the energy markets. Businesses with the ability to switch to back-up power, reduce some non-essential energy use, or ramp up or down power generation assets when there is an imbalance of supply and demand on the grid can participate.

Amazon - Waste Heat to District Heat[29]
Amazon Web Services (AWS) data center in Dublin, Ireland, will provide waste heat to a new District Heating Scheme to serve public sector, residential and commercial customers. The first phase of the scheme is projected to save 1,500 tonnes of carbon per annum.

Source: [11] REPowerEU Plan SWD; [27] Accenture - Designing Disruption: Virtual Twins and Sustainability; [28] EnelX: Demand Response; [29] Amazon: Local Community Buildings in Ireland to be Heated by Amazon Data Centre

Game Changer 4

Unlock the power of the demand side

Consumer adoption of electric solutions will improve system efficiency, reduce peak-demand, and increase system flexibility but consumers need support

Fewer than one in five consumers already use low-carbon electric heating, home energy generation or an electric vehicle with cost cited as a primary barrier. Lack of knowledge, poor digital skills and disinterest are also stopping consumers from taking part in the energy transition. The awareness gap must be addressed.

Share of consumers surveyed[30]

	Electric Heating	Home Energy Generation	Electric Mobility
Using Electric Solutions	18%	9%	7%
Ranking cost as main barrier to adoption	23%	26%	36%

- European energy suppliers have committed to help consumers optimize and reduce their energy use – with direct cost and environmental impact benefits
- Close to 80% of suppliers offer products and services for solar (PV) panels, home batteries, home energy management or other equipment to generate and store energy in the home
- Many consumers are looking for electric solutions, but many still are concerned about cost of adoption
- Other major barriers include lack of awareness and concerns regarding complexity and hassle
- Consumers need clear, accessible and reliable information and easy routes to adopt energy transition solutions

37% Lacking information and concerned about the hassle of adopting energy transition solutions

Source: [30] Eurelectric & Accenture. Pledge to the People

Game Changer 4

Unlock the power of the demand side

Governments are stepping in to provide consumers with financial incentives for adopting energy transition solutions[31]

Categories	Description	Selected Country Examples
Transport: EVs and Charging Stations	***Grants, tax breaks, and trade-in schemes*** *for the* ***purchase of BEVs and PHEVs*** *with assistance for charger installation*	• **France:** Ecological bonus up to €6K + €5K conversion bonus for scrapping ICE vehicle; can be combined with government-backed loans for up to €5K • **Luxembourg:** Up to €8K grant with additional support for the installation of communal or single-family charging stations • **Romania:** Subsidy up to €10K with additional tax breaks and charging grants for public and private entities
Heating & Cooling Systems	***Financial incentives*** *for the replacement of fossil-fuel powered systems, retrofitting activities, and* ***installation of heat pumps***	• **Austria:** Grant of €7.5K for houses to switch systems – potentially more for apartment buildings – along with income tax reductions • **Finland:** Up to €4K grant for residential buildings and households to convert to heat pumps / direct electricity + up to €7K tax credits for one-family households • **Poland:** Grants available for energy audits, thermo-modernization of buildings, and equipment installation with dedicated programs for lower-income earners
Home Renewable Energy Generation	***Grants for installation of solar, PV, and wind units*** *plus* ***premiums*** *for energy sold to the grid and self-consumption*	• **Bulgaria:** Financing for installation (solar for water heating, PV systems, storage) • **Czechia:** Direct financial support of €1.6K for small PV to €6.4K for large PV in combination with large-capacity battery solutions • **Italy:** Support based on net billing / feed-in-tariff schemes plus additional premiums for rooftop PVs and self-consumed energy • **Latvia:** Up to €4K grant for installation depending on the equipment's capacity

Source: [31] Eurelectric analysis of financial incentives and subsidy schemes in selected European countries

Game Changer 4

Unlock the power of the demand side

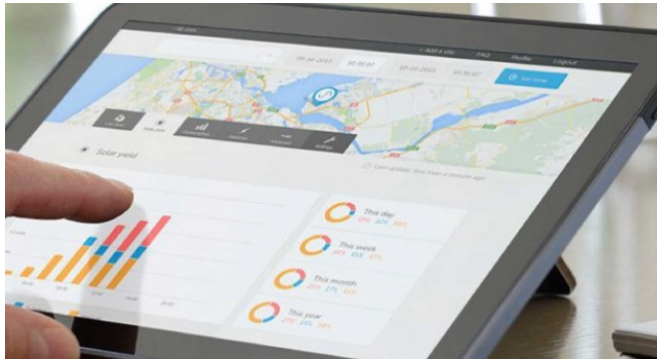
Leading companies are empowering consumers to be active participants in the energy system

ESB Networks' Dingle Project[32]

ESB Networks collaborated with local communities in Dingle, Ireland, to explore capabilities of new low-carbon technologies on the distribution network, and to **empower the local community** to take part in the clean energy future. The project **deployed renewable and clean energy technology in participants homes and businesses** including solar PV, residential scale batteries, heat pumps, and smart devices. The community acted as ambassadors for adoption of these low-carbon technologies, enhancing community engagement.

Tiko Energy – On Premises Peak Shaving[33]

tiko Energy (owned by Engie) connects to over 100MW of residential clients electrical equipment (heat pumps, batteries, solar PV, water heaters, etc.), and **creates storage networks** that can **react intelligently** to fluctuations in power system and balance accordingly.



Taos 100% Daytime Solar[34]

KCEC, an electric co-operative based in Taos, New Mexico, has installed **35MW of distributed solar power across homes and businesses** as well as standalone solar farms, coupled with 15MW of batteries. The aim is to provide **100% daytime solar** energy. Since installing this solar power, customer electricity bills have fallen by 25% in the past year, as other energy bills in the surrounding area have risen for the same period.

Source: [32] ESB Networks; [33] tiko Energy; [34] Taos

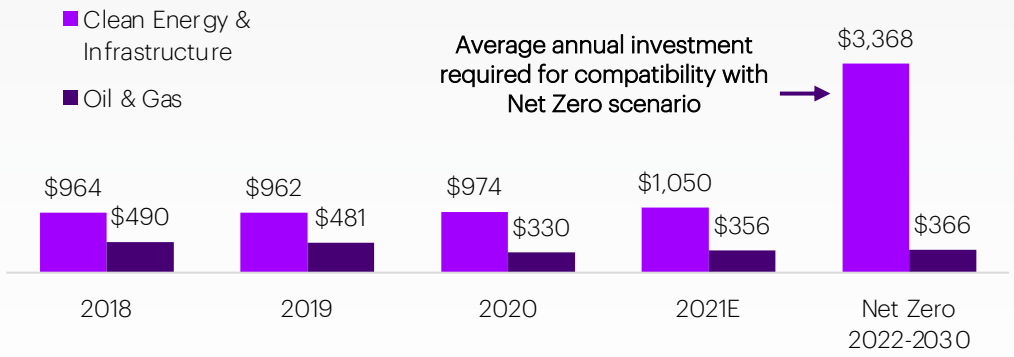
Game Changer 5

Secure signals, secure investment

Scaling up renewable generation, storage, power-to-X and demand-side flexibility on time to meet electrification coupled with green hydrogen production targets will require enhanced investor certainty to support final investment decision and unlock the project pipeline.

Transition related infrastructure spending is not ramping up fast enough for a Net-Zero pathway

Annual global investment[35]
USD in billions

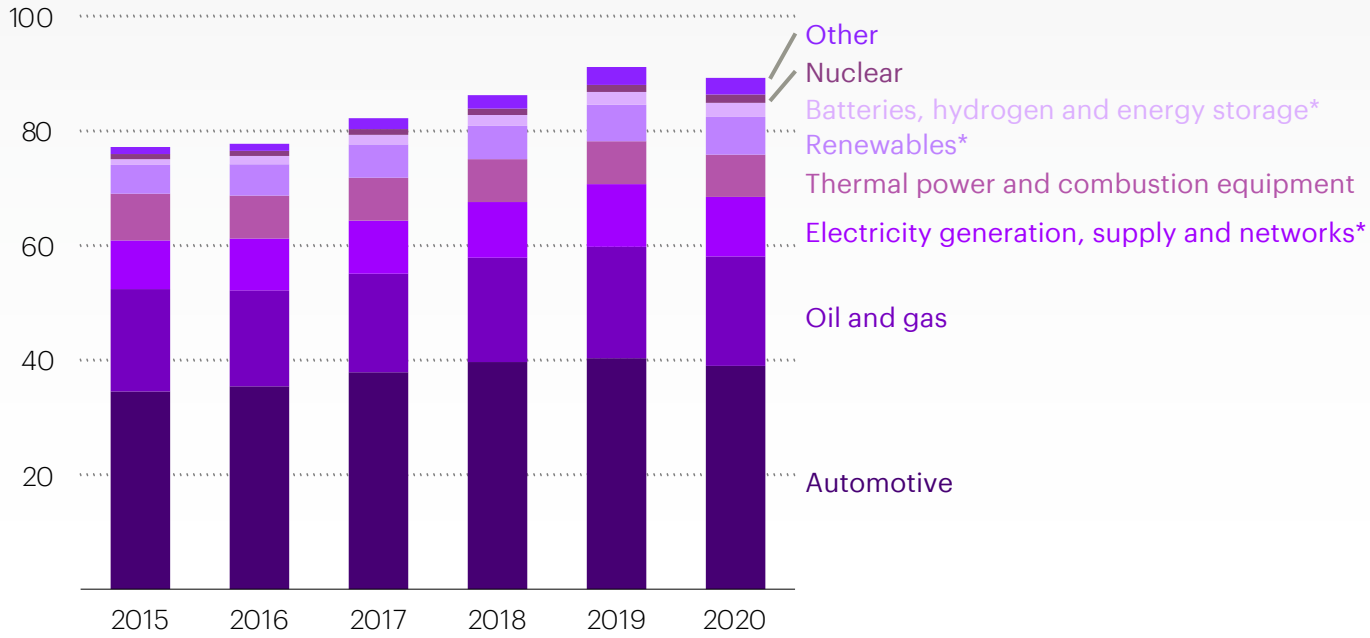


Scaling up renewable generation on time to deliver green hydrogen production targets will require **accelerated investor certainty** to unlock the significant project pipeline

REPowerEU aims to address this by measures including rolling out **carbon contracts for difference (CCfDs)** to support the uptake of green hydrogen by industry[11]

Transition related R&D spending is not ramping up fast enough for a Net-Zero pathway

Corporate R&D spend[35]
USD in billions



Total cumulative spend on transition related R&D* is equivalent to spend on oil & gas

Source: [35] IEA: World Energy Investment 2021; [11] REPowerEU Plan SWD

Key Enabler

Address the skills gap

Clean energy transition and electrification will create millions of European jobs

7.4M **Grids, networks, variable renewable energy and future power markets** jobs as wind and solar power generation share grows from 14% in 2018 to 55% in 2030[36]

489K **Efficiency and demand optimization** jobs from €2.5 billion annual efficiency investments in increased storage, digitalization, and electrification of buildings[37]

340K **Green hydrogen** jobs in the manufacturing and maintenance of electrolyzers for domestic and imported production[38]

199K **Electrification of transport** jobs created across electric vehicle infrastructure (130K), power upgrades (36K), and battery manufacturing (34K)[39]

125K **Net zero industrial cluster** jobs in the deployment of carbon capture installations, with total figures scaled from the expected job creation from top clusters in Europe (i.e., Humber)[40]

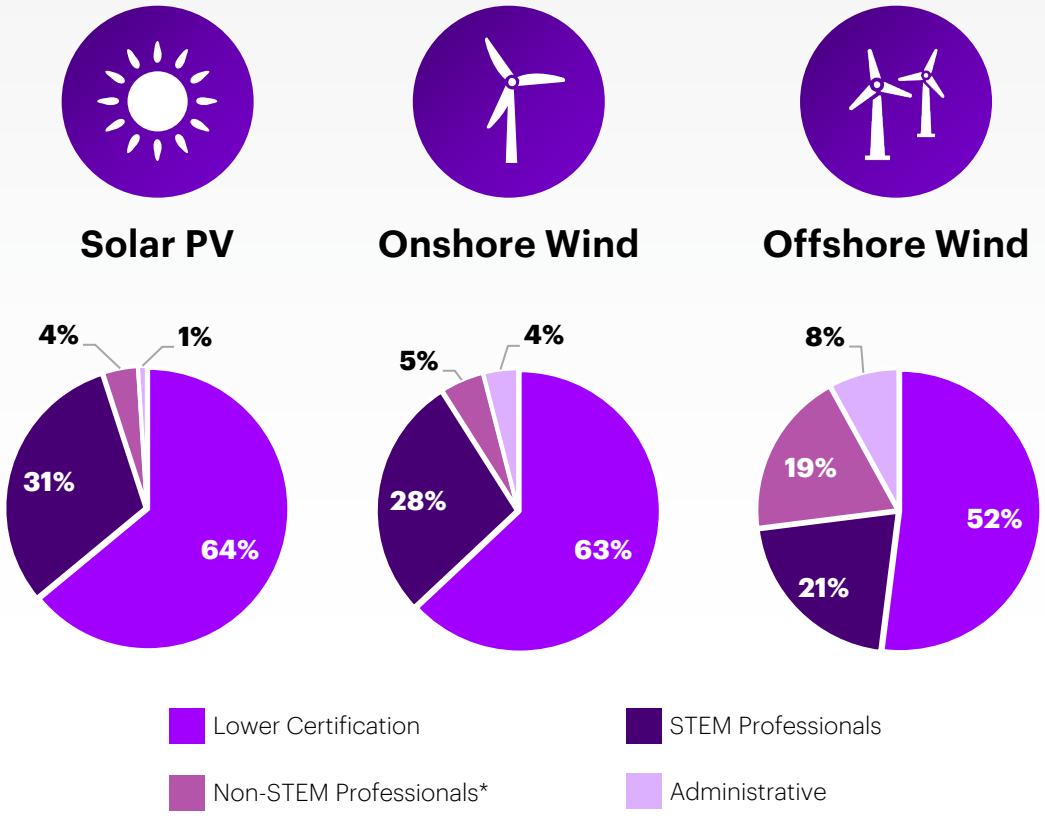
Source: [36] Generation volume based on BNEF forecasts; [37] EC Energy Efficiency Funding, figure based on EU-level €18 billion investment from 2014-2020 through European Structural & Investment Funds; [38] Hydrogen Europe Report, 170K domestic jobs required to manufacture and maintain electrolyzers for original Fit for 55 requirements – doubled to reach REPowerEU targets; [39] AIE Report; [40] BEIS, 50K jobs expected from the capture of 10Mt of carbon dioxide per year in the UK

Key Enabler

Address the skills gap

The energy transition will require an equally ambitious workforce and capabilities transition

The energy transition will employ workers with a variety of skill levels and trade experience...[41]



...with reskilling providing a significant opportunity to redeploy talent and take advantage of skill synergies

Offshore Oil & Gas → Offshore Wind

Areas of Overlap	Skill Synergies
Project Planning	• Environmental, geophysical, and geotechnical surveying for offshore development • Expertise working in inhospitable environments and coping with health/safety concerns
Manufacturing	• Designing and producing support structures for deep water sites
Installation & Grid Connection	• Similarities in constructing and decommissioning foundations and supplying needed cables • Comparable fabrication relating to steelwork
Operation & Maintenance	• Managing offshore assets from planned maintenance to defect detection / repairs

Coal → Solar PV[41]

43% Coal-fired power plant workers that could be transitioned without additional training

Heat Pump Installation[42]

1 wk Heating installers can be trained in one week to install heat pumps

Source: [41] IRENA: Renewable Energy and Jobs, Annual Review 2021, *includes logistics experts, regulation and standardisation experts, marketing professionals, and lawyers; [42] EURACTIV, March 2022

Key Enabler

Address the skills gap

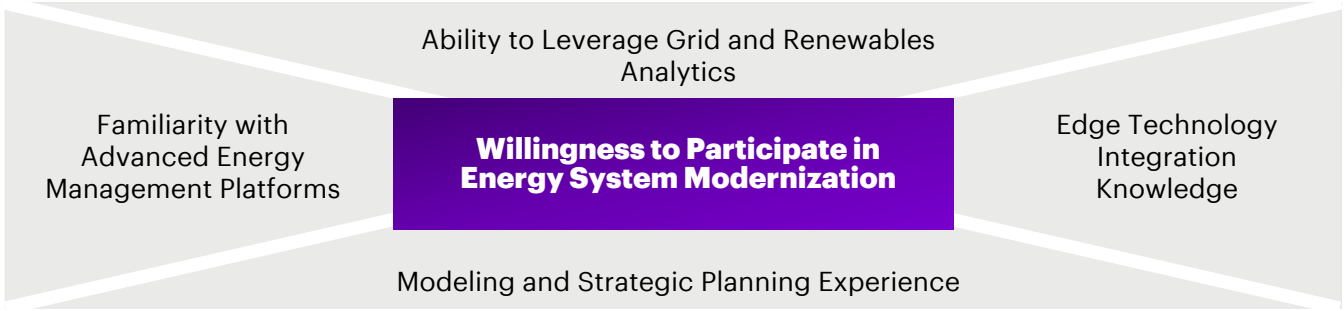
The workforce of the future will need to be data- and digital-fluent

Opportunity exists to close the skills gap in the energy industry by upskilling the existing experienced workforce through training in new technologies and digital operations

41% of energy recruiters report that **insufficient education and training** is the most significant driver of the skills shortage[43]

Energy companies are looking to address this challenge in multiple ways[43]

Skills needed in the next 10 years[44]



Enel Green Power

With wind turbine technician and solar PV installer representing the two fastest-growing jobs in the U.S.,[45] Enel Green Power is committed to **building the clean energy workforce of the future**[46]

01 Actively hiring to fill new positions across functions and business lines

02 Investing in job training programs and scholarships to upskill workers in local and rural communities

03 Providing long, stable careers that offer a consistent source of income and opportunity to build a better planet

Source: [43] Brunel, 2021; [44] Forbes, April 2022; [45] U.S. Bureau of Labor Statistics; [46] Enel Green Power

Technology, human ingenuity and a team game will transform the energy system

Technology

Realization of a new energy system will rely on innovation and harnessing digital applications and technology to accelerate infrastructure deployment and evolution of grid operations

Human Ingenuity

The workforce of the future must be trained, reskilled, and deployed by the millions in mission-critical roles across the new energy system

Team Game

Energy system players will need to collaborate in new ways to overcome bottlenecks and accelerate transformation of the energy system (e.g., including policymakers, planners, developers, network operators, and customers)

Contributors

Wytse Kaastra
Managing Director, Utilities & Sustainability Europe Lead
Accenture

Melissa Stark
Global Renewables and Energy Transition Services Lead
Accenture

Catherine O'Brien
Principal Director, Energy Transition Services
Accenture

Sytze Dijkstra
Senior Principal
Accenture Research

Kristian Ruby
Secretary General
Eurelectric

Bruce Douglas
Director Business and Communications
Eurelectric

Ioana Petcu
Press and Media Advisor
Eurelectric

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About Eurelectric

Eurelectric is the federation for the European electricity industry. We represent the power sector in over 32 European countries, speaking for more than 3,500 companies in power generation, distribution and supply. We contribute to the competitiveness of our industry, provide effective representation in public affairs and promote the role electricity in addressing the challenges of sustainable development. We draw on more than 1000 industry experts to ensure that our policy positions and opinions reflect the most recent developments in the sector. This structure of expertise ensures that Eurelectric's publications are based on high-quality input with up-to-date information. We currently have over 34 full members, representing the electricity industry in 32 European countries. Visit us at www.Eurelectric.org

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