Delivering EU energy security through climate action

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European Climate Foundation

Forewords

Russia's invasion of Ukraine has plunged Europe into an energy crisis that puts at risk the well-being of citizens and the stability of economies across the continent.

The International Energy Agency (IEA) has been warning about Russia's manipulation of gas markets at Europe's expense since well before the invasion. And once the full scale of Russian aggression became clear on 24 February, we moved quickly to provide EU policy makers with a 10-Point Plan to significantly reduce reliance on gas imports from Russia in the space of a year.

Our recommendations were designed to be consistent with the European Green Deal and support energy security and affordability. They focused on the need to maximise gas supplies from other sources; accelerate the deployment of solar and wind; make the most of existing low emissions energy sources, such as nuclear and renewables; ramp up energy efficiency measures in homes and businesses; and take steps to save energy by turning down the thermostat.

I have been greatly encouraged by the engagement of governments across the EU with the recommendations of our plan, and we are working directly with many of them, in close cooperation with the European Commission, to help implement practical and effective policy measures.

Since the IEA published our 10-Point Plan on 1 March, the challenges for Europe's gas supplies have become even more grave as Russia has drastically cut flows in recent weeks at a time when European countries have been trying to fill up their gas storage ahead of winter. This is a red alert for EU governments and calls for immediate efforts to reduce gas consumption now to prepare for what promises to be a tough winter.

As the IEA has repeatedly underlined, Europe and the world do not have to choose between addressing today's energy security crisis and the climate crisis. While lost supplies from Russia need to be replaced in some cases through short-term increases in fossil fuel production elsewhere, the lasting solution to both crises is a huge and rapid scaling up of investment in energy efficiency, renewables and other clean technologies.

In recent months, I have been very pleased to see leading energy experts further exploring and building on the ideas and recommendations the IEA has put forward – including the notable case of this new paper from the European Climate Foundation and the Hewlett Foundation. It offers fresh insights and valuable country-specific analysis on key questions Europe faces as it navigates the current energy security crisis while striving to continue making progress towards its climate goals.

Dr Fatih Birol, Executive Director,
International Energy Agency

Russia's invasion of Ukraine has upended the energy landscape in Europe and painfully laid bare Europe's dependency on Russian fossil fuels. Europe is facing a perilous winter, with the threat of Russia cutting off the gas growing more plausible by the day.

Amid spiralling inflation and a looming economic recession, citizens are hurting already. Policy makers will have difficult decisions to make in order to maintain solidarity and shield the most vulnerable.

The European Climate Foundation and the Hewlett Foundation have convened a group of experts around the question of Europe's energy security: this winter and in the medium term, towards 2025.

This paper contains our collective analysis. Taking both a 2022 and 2025 perspective allows us to examine the different levers available to ensure our energy security while protecting a sound trajectory on climate action.

The expert consensus is simple: Europe faces a difficult winter. Risks of supply shortages are real. No amount of alternative gas imports can offset them. The answer to evading shortage -related crises lie with extraordinary energy savings schemes, the potential shutdown of some gas-consuming industrial facilities, alternative supplies, fuel switching, and the rapid deployment of clean energy solutions, heat pumps and home renovations.

This energy crisis - met with an inadequate response - will lead to a societal crisis. The combination of the intense pressures on the cost of living with soaring energy and commodity prices presents a major challenge to governments across Europe. For this reason, strong social policy measures will be as vital as the energy response: to respond to the soaring costs faced by households, and to address fuel poverty through targeted energy efficiency programmes.

In short, we need an EU-wide institutional response to protecting the most vulnerable, and strong intra-EU solidarity with those countries on the frontline.

Laurence Tubiana, Chief Executive Officer, European Climate Foundation

Executive Summary

This report draws on insights and analysis by a number of experts to consider whether and how the EU would be able to deal with a full cut off from Russian gas supplies going into the winter of 2022 and out to 2025 without jeopardizing medium-term energy and climate targets. The report covers the nature of the EU's security of supply challenge, an assessment of the levers which can address this challenge in the short- and mid-term, and recommendations on specific actions for European states to take.

The EU is facing an energy security challenge on a level not seen before. Short-term measures currently being discussed include securing additional gas imports, temporarily increasing the usage of other fossil fuels such as coal, and rapidly scaling up consumer-oriented demand side actions.

If all EU member states can agree on these decisions and successfully deploy a combination of supply and demand measures, as well as incentivize behavioral changes, much of the shortfall can be managed. However, this won't be easy, and particularly this winter, emergency gas management measures may be needed.

The analyses conducted confirm that there is a path for Europe to secure its energy supply over the next winters and into 2025, and to do so in conformity with its medium-term climate commitments. The key to this lies in the EU rapidly and fully implementing two recently announced programmes ('Fit for 55' and 'REPowerEU'), and depends on European countries launching programmes supporting additional energy security levers. These levers include a mix of aggressive deployment of renewables, energy efficiency, electrification, as well as a temporary ramp-up of LNG imports over the next 36 months, which can be achieved without requiring the construction of new onshore or piped gas infrastructure projects.

A focus on accelerating and scaling up the deployment of clean energy solutions would also lead to a rapid structural decline in overall gas demand beyond 2025. This would mean that there is no need for new gas infrastructure and also ensure that there is a clear exit path from the inevitable near-term plateau in coal use.

The choices that the EU makes today will have global ramifications. With wise choices, the EU has the potential to emerge from this crisis both stronger on energy security, through a greater reliance on home-grown renewable electricity, and as a leader in the fight against climate change. Europe's success in turning the page on its natural gas dependency can demonstrate a pathway for a cleaner energy future that the rest of the world can emulate.

Six key recommendations for policy makers

1. Fast-track permitting for wind and solar projects.
2. Leverage public interest and financing programmes to improve energy efficiency.
3. Accelerate industrial electrification.
4. Define and execute a robust materials and equipment supply policy.
5. Build human resources capacity for renewables build up and residential heat pump installation.
6. Limit gas infrastructure investments to temporary FSRUs on short-term contracts

Summary of impact potential of additional measures to ensure energy security in Europe

There are 15 structural levers across supply and demand available for the EU to reduce gas demand or shift to alternative suppliers

Impact assessed per lever - not in combination

Lever	Gas offset potential[2], bcm 2022	Gas offset potential[2], bcm 2025	Climate impact[1], MtCO2e 2022-2030 cumulative
1 Increase LNG imports to existing terminals	~57-70	~53-66	~160-200
2 Increase coal-fired power generation	~20-25	~23-33	~380-470
3 Increase piped gas imports	~5-6	~1-2	~0-1
4 Accelerate RES deployment	~4-5	~22-28	~ -(570-460)
5 Increase LNG import via temporary FSRU terminals	~2-3	~26-32	~50-65
6 Accelerate buildings electrification & energy efficiency	~1-2	~9-12	~ -(290-230)
7 Increase biomass use in power and heat generation	~1-2	~0-1	~-(4-3)
8 Delay industry coal-to-gas transition	~1-2	~-(0-1)	~0-1
9 Accelerate industry electrification & energy efficiency	~0-1	~10-13	~-(75-60)
10 Increase nuclear power generation	~0-1	~3-4	~-(60-50)
11 Increase use of biogas and biomethane	~0-1	~3-4	~-(80-65)
12 Reduce leakage and flaring	~0	~0-1	~ -(15-12)
13 Add new onshore LNG terminals	~0	~8-10	~15-20
14 Expand existing onshore LNG terminals	~0	~6-8	~10-15
15 Increase Green hydrogen and ammonia supply[3]	~0	~ -(1-0)	~120-155
Total	~91-117	~162-211	
Russian gas supply to offset	153-167	153-167	

1. Net change in cumulative emissions 2022-2030 from maximum lever potential vs. baseline scenario, which includes successful implementation of Fit for 55 measures
2. Theoretical potential to offset Russian gas supply (as compared to 2021 levels for levers 1,3,5,7,8,10,11,12) or reduce gas demand (as compared to 2022/25 projections for levers 2,6,9,10,13,14,15 or compared to Fit For 55 target for lever 4 (RES)); low values indicative of +/-10% uncertainty in analysis of maximum theoretical potential; actual gas offset potential realized will depend on commitment to levers as well as external factors such as global LNG price dynamics, raw material or labor availability, and more
3. REPowerEU target includes import of 10MT of green H2 by 2030, which would reduce dependence on imported gas as well as unlock further emissions; impact here reflects production which can be ramped up by 2025; because green hydrogen relies on renewables that would otherwise be used to displace gas in the power sector, the impact on gas demand is negative until ~2030, at which point the power mix is sufficiently renewable for green hydrogen to effectively displace gas

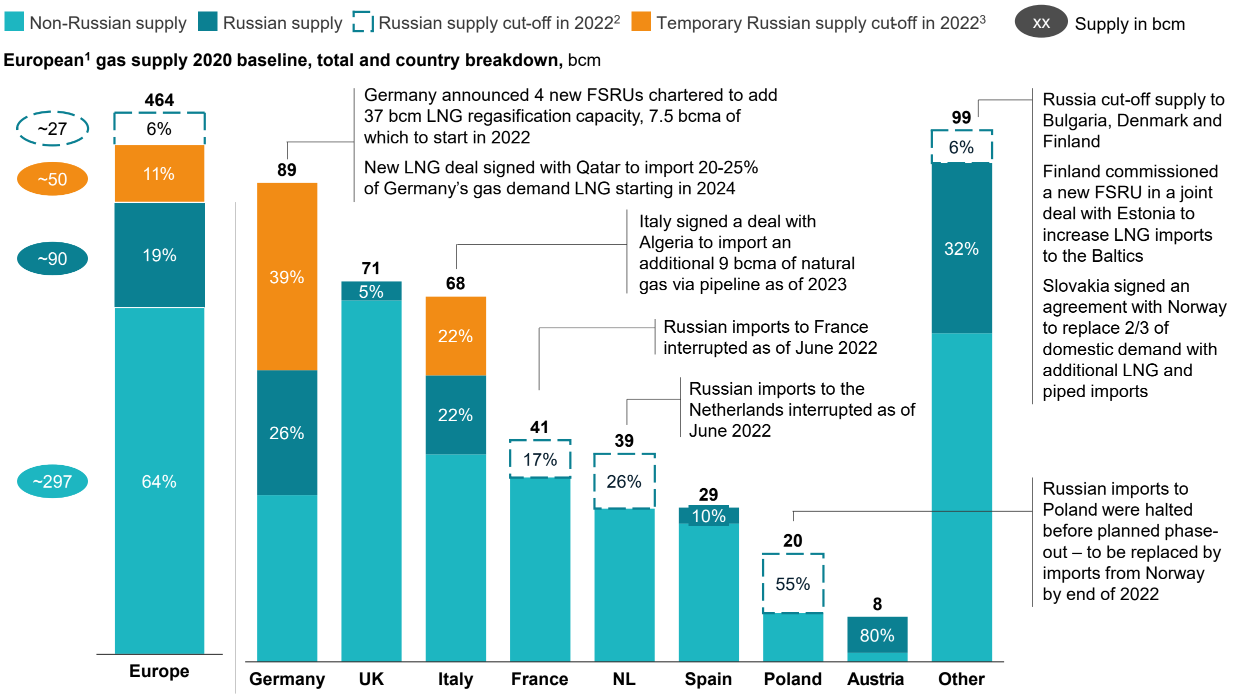
Source: Spire, European Commission, Cambridge Architectural Research, BPIE, RePowerEU, European Commission, EIA, Bloomberg, CEDIGAZ, GIIGNL, ENTSOG, Artelys, SolarPowerEurope, WindEurope, Fit for 55 package, FA Windenergie an Land, European Wind Association, IRENA, BCC Research, EurObserver 2020, EHPA, CEMAC analysis, OEC, Clepa, Reuters, World Steel Association, BDH, IEA, BP Statistical Review, Rystad, North Sea Transition Authority, Oxford Institute for Energy Studies, McKinsey Energy Insights' EUPipeFlow and LNGFlow

1. Europe is facing two concurrent and interrelated challenges: energy insecurity rooted in fossil dependence and emissions-driven climate change

The European Union's energy needs are supplied primarily by fossil fuels. Specifically, oil and other petroleum products, natural gas, and solid fossil fuels make up ~70% of the energy supply, and renewables and nuclear power provide the balance. Of the total energy consumption in 2020, 58% was imported.[1] In 2021, Russian imports accounted for 7% of oil consumed in Europe[2], as well as 12% of coal (30% of hard coal), and 31% (or 153 bcm) of natural gas.[3] This high level of foreign dependence has been thrown into sharp focus by Russia's recent invasion of Ukraine, which has in particular jeopardized the availability of natural gas – disrupting its supply and increasing its price. The threat is not evenly distributed across the region. Germany and Italy have an elevated risk, as they source roughly two-thirds and two-fifths of their natural gas from Russia, respectively.[1] With some supply already cut off to the Netherlands, Poland, Finland, Bulgaria, and Denmark, and Nordstream1 flows recently reduced by 60%, the threat has already partially materialized.[4]

1 eurostat analysis, March 28, 2022 (link)
2 Unless otherwise specified, "Europe" includes the EU27 member states, United Kingdom, and Switzerland
3 bp Statistical Review of World Energy, 2022
4 Press search: Washington Post (link); NPR (link); Reuters (link, link); Politico (link)

Gas supply to Europe in 2020



1. EU27 + UK + Switzerland + Norway
2. Countries with Russian gas supply cut-off as of June 2022 include Netherlands, France, Poland, Bulgaria, Finland, Denmark
3. Delivery reductions to Italy and Germany

Source: Press Search, bp 2021 statistical review of world energy, McKinsey Energy Insights' EUPipeFlow, McKinsey Energy Insights' LNGFlow, Spire

For its part, the EU has been actively setting forth a path to reduce its dependence on greenhouse gas emitting energy sources, including natural gas. In the Fit for 55 package announced last summer, the EU committed to a 55% emissions reduction by 2030, compared to 1990 levels.[5] Plans to reach this target include, among other measures, a reduction in gas demand of ~116 bcm by 2030. Six of the legislative measures included in the package aim to lower gas consumption by adjusting carbon emissions caps or costs, or by setting more ambitious targets for energy efficiency and renewable energy sources. By raising these targets and introducing new targets, such as increased biomethane production, the REPowerEU package proposed in May would more than double the desired reduction in gas demand to 310 bcm, with the goal of making Europe completely independent of Russian fossil fuels by 2027 at the latest.[6]

While these plans address both greater energy independence and lower emissions, the 2030 timeline is itself a challenge, as it appears simultaneously too early to build out all the required infrastructure and too late to address the immediate need for energy security. With the timeline for EU energy security now being heavily influenced from the outside, the EU will need to act with greater resolve to extricate itself from high-risk fossil fuel sources. This may mean that more aggressive action on clean energy scale-up may be both more politically feasible and necessary, keeping in mind that levers that address energy security are inextricably linked to two other important factors: climate targets and energy affordability. In other words, decision makers will need to manage both prices and potential short-term emissions increases, in their efforts to ensure energy security.

5 European Commission, "'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality"
6 European Commission, REPowerEU Plan

2. There are several levers available to the EU to address the immediate energy security risk and the longer-term goals of energy independence

Energy security is obviously an urgent matter, as action must be taken before this winter, and there are several levers that the EU can pull to speed the journey toward energy independence. These actions represent a mix of reducing demand for natural gas – either by reducing energy demand or by shifting to other energy sources – and sourcing new natural gas supply from other countries. The table below presents a set of 15 levers in rank order of their estimated gas offset potential vs. baseline in 2022 as well as 2025, with resulting climate impacts of the actions in terms of cumulative 2022-2030 emissions. The baseline for each lever represents the gas demand and supply anticipated in 2022/2025, assuming policies announced prior to the invasion of Ukraine (e.g., coal phase-outs, nuclear phase-outs, and Fit for 55 targets for renewables, heat pumps, energy efficiency) were met.

List of levers discussed in this work which increase energy security in Europe

There are 15 structural levers across supply and demand available for the EU to reduce gas demand or shift to alternative suppliers

Impact assessed per lever - not in combination

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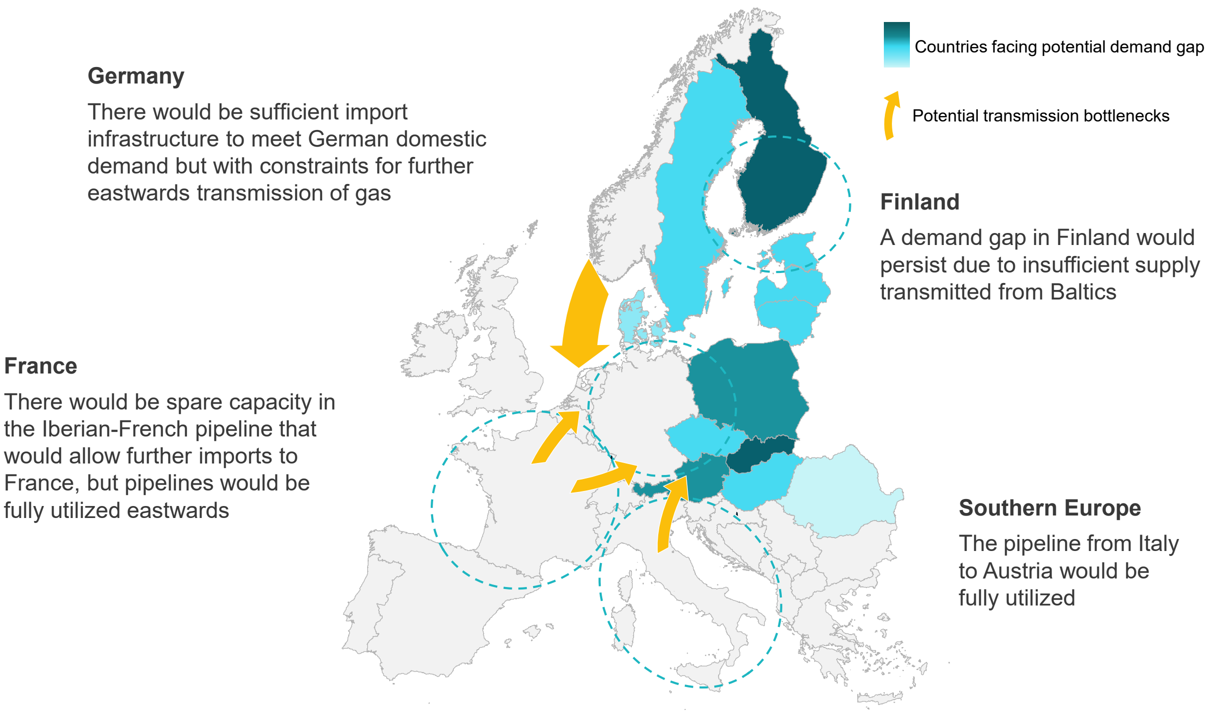
(1) Increase LNG imports to existing terminals

[Incremental gas offset potential of up to 70 bcma in 2022, up to 66 bcma in 2025] – Although European regasification capacity is 209 bcma, the practical headroom to increase imports in 2022 is limited to ~57-70 bcm. These figures for gas offset potential assume available LNG supply, either via short term increases in production from export countries or a redistribution of global flows. If this supply can indeed be secured, there will be impacts on other markets which are dependent on LNG trade. Market dynamics have been and are also expected to continue to be tight, with any changes likely to impact prices.

Additional imports above the ~57-70 bcm number would therefore likely start to run into global market constraints as well as capacity constraints of intra-European pipelines. Iberia and UK, for example, account for 63% of European regasification capacity (81 and 50 bcm capacity, respectively). An estimated 77 bcm of regasification capacity from Iberia and UK is currently unused yet only 35 bcm is practically available to Europe due to pipeline capacity restrictions. Of the remaining 78 bcm of EU regasification capacity, 43 bcm is centered around Western Europe, concentrated in Benelux and France, and constrained by pipeline capacities to Central and Eastern European countries.[7] While further build-out of additional pipeline capacity to relieve intra-European bottlenecks is a topic of discussion, it is important to think through new infrastructure investments carefully. The additional redundancy could reduce the reliance of supply on any one country/region, however any new investment should be built with considerations for the coming net zero economy. Ensuring 'future-proof' infrastructure able to e.g., transport hydrogen and evaluating the risk of asset stranding and/or lock-in to fossil fuels are necessary considerations. This comes in addition to understanding the timeline to deliver relief from the current crisis may not be feasible for many of these projects.

Additionally, it should be noted that energy can be transported via the electricity grid across border where gas flows are constrained in the form of power generation. While building new transmission is difficult, price signals can encourage flows such as from Iberia into central Europe through France, wherein for example, 1 GW of transmission operating continuously can supply the equivalent of ~2bcma.



7 CEDIGAZ; McKinsey Energy Insights' EUPipeflow; McKinsey Energy Insights' LNGFlow; Spire; GIIGNL

(2) Increase coal-fired power generation

[Incremental gas offset potential of up to 25 bcm in 2022, up to 33 bcm in 2025] – Coal plant capacity and utilization are expected to continue declining through 2030, as market economics shift thermal generation to other (renewable) sources, plants reach natural end of life, and some countries expedite plant retirements to follow through on coal phase-out commitments. This lever entails two approaches: extending plant lifetimes and/or increasing utilization of active coal plants.

Today, the EU has ~115 GW of coal power plants, of which ~75 GW is in countries that have committed to phasing out coal by the early 2030s. Approximately 35GW are expected to retire by 2025, but with measures to extend lifetimes, all but 10GW could remain online, offsetting gas by ~6-8 bcm.[8]

The utilization of Europe's fleet runs at ~55-60% on average today.[9] Prior to March of this year, utilization for those plants remaining online by 2025 could be expected to drop to nearly ~30%.[10] If the remaining fleet could run without constraint, utilization in 2025 could be as high as ~35-40%, offsetting ~17-25 bcm of gas. Beyond carbon emissions, this lever is not free of consequences; a slower ramp-down of coal generation could have implications on needed capital expenditures at plants, including pollution controls, potential mine extensions at lignite sites, and a need for near-term market measures to enable the output. This continued reliance would require identifying trade partners to import hard coal, which may lead to additional pressures on the global markets. Incremental supply from the U.S. or Colombia could be sufficient to displace Russian hard coal imports; otherwise, Europe might depend on South Africa or Indonesia to free up export volume.

These measures should be taken with care, and should be implemented conditionally wherein a sustained aggressive scale-up of clean energy development could then bring countries back on track to meet, or nearly meet, their coal phase-out commitments.

(3) Increase piped imports from legacy suppliers

[Incremental gas offset potential of up to 6 bcm in 2022, up to 2 bcm in 2025] – In 2021, the EU imported 138 bcm of piped gas from non-Russian legacy suppliers, including Norway, Azerbaijan, Libya and Algeria.[3]

Prior to the conflict, Europe was already set to import an additional 9 bcm from Azerbaijan and Norway in 2022, with the new Baltic pipe and TAP projects servicing countries with low intra-European connectivity and high reliance on Russian gas.[11] Norway could deliver up to 6 bcm of extra gas this year, whereas capacity-constrained pipelines limit additional imports from Azerbaijan.

Algeria has 12 bcma of pipeline available and had planned to supply Italy with 9-10 bcma of gas starting in 2023 in exchange for Italy's proposed investments in Algerian renewable energy sources (RES).[12] However, these flows would offset anticipated decreases in imports from Libya and Norway by 2025, resulting in a net potential of ~2 bcma. Piped imports carry an additional benefit of lower upstream emissions vs LNG-sourced natural gas.

8 McKinsey Energy Insights' Global Energy Perspective 2022; European Commission, National Energy and Climate Plans (NECPs)
9 ENTSO-E
10 McKinsey Energy Insights' Global Energy Perspective 2022; European Commission, National Energy and Climate Plans (NECPs)
11 The Oxford Institute for Energy Studies; McKinsey Energy Insights' EUPipeflow; McKinsey Energy Insights' LNGFlow; Spire
12 ENTSOG; Press Search: Al Jazeera (link)

(4) Accelerate renewables deployment

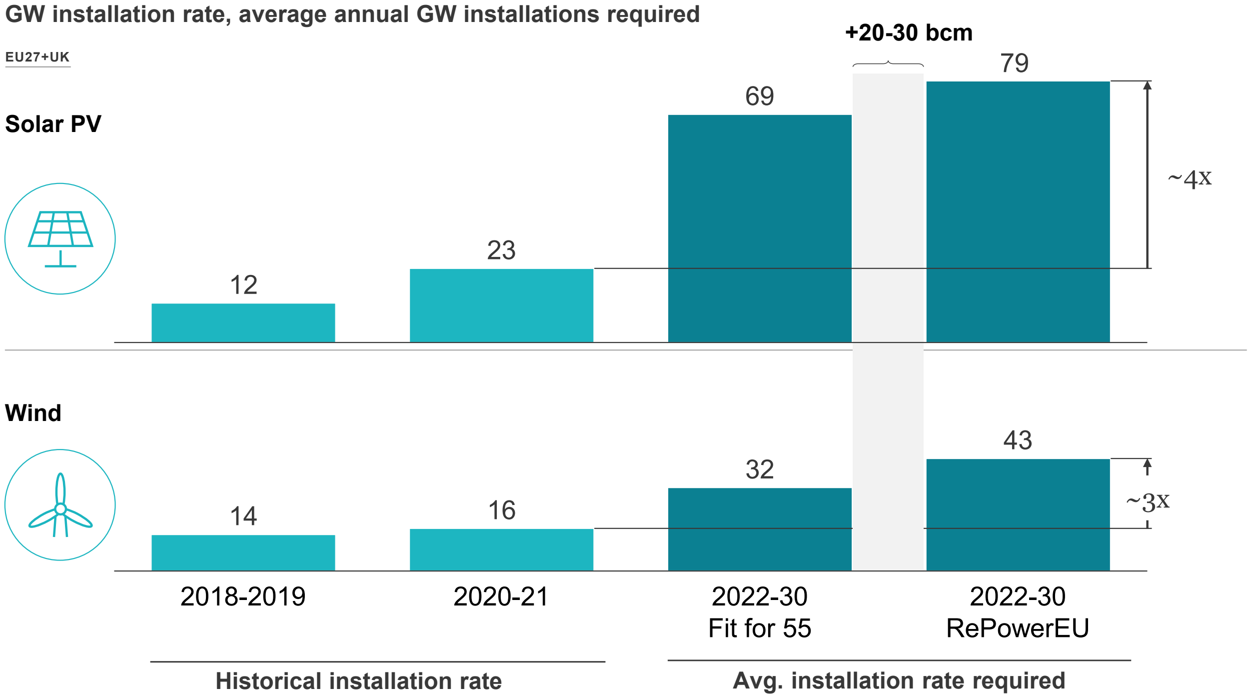
[Incremental gas offset potential of up to 5 bcm in 2022, up to 28 bcm in 2025] – Uptake of RES in the EU has averaged ~39 GW p.a. over the last two years, a 50% improvement (attributable to a doubling of solar installations) from the 26 GW p.a. installed in 2018-19.[13] Yet this roll-out rate would need to increase two- or three-fold vs. today to meet the Fit for 55 targets. Meeting the new REPowerEU targets and capturing an additional ~23-33 bcm of gas demand reduction would require deployment rates of ~80 GW p.a. in solar and ~43 GW p.a. in Wind, or four, respectively, three times faster than what we see today. Such an acceleration would require a number of measures and creative approaches. These may include deploying solar on roof-tops and in zones with low grade land, as well as addressing current long lead times of permitting processes which are blocking many projects currently. Typical duration of wind projects highly varies across core EU countries such as Germany, Spain, France and Italy and can take from 3-4 up to 8-10 years in the worst case, while solar from 1-3 up to 4-6 years.

The required scale-up would put pressure on supply chains for solar and wind, potentially leading to higher costs, although some analyses suggest the global challenge is not entirely daunting[14]. Across both technologies, power electronics are likely to face shortages in the short term due to the fact that the majority of semiconductors are produced in Asia. For solar panels, in particular, China provides more than 70 percent of Europe's solar cell and module components.[15] For wind, challenges are expected around the sourcing of the rare earth metals (Neodymium and Praseodymium) used in permanent magnets.

(5) Increase LNG import via temporary FSRU terminals

[Incremental gas offset potential of up to 3 bcm in 2022, up to 32 bcm in 2025] – Floating storage and regasification units (FSRUs) are a rapidly-deployed, lower-capex (~$300-500M for a new vessel, typically leased from owners) approach to satisfying short-term LNG needs (<10 years).[16] FSRUs increase the regasification capacity of countries with lower intra-European connectivity, with the potential of adding ~63 bcma regasification capacity by 2025. The deployment of 7 FSRUs by 2025 to countries with little to no regasification capacity has already been announced, including FSRU Hoëgh Esperanza in Germany in Q4 2022. All announced deployments come from an existing global fleet of 48 FSRUs, of which 11 (with total capacity of 70 bcm) are currently uncontracted[17]. In light of expected EU gas demand reductions up to and beyond 2030, and in order to avoid a longer-term lock in or bridge to new onshore assets the deployment of FSRUs could come with imposed conditionality regarding deployment and import contract duration.

13 SolarPower Europe, EU Market Outlook for Solar Power 2021-2025; WindEurope, Wind Energy in Europe: 2021 Statistics and the outlook for 2022-2026
14 BNEF: Solar Growth Estimates for 2050 Are Aggressive, But Not Unrealistic (link)
15 IHS, Wood Mackenzie (link)
16 ExxonMobil, Floating Storage and Regasification Units; Timera Energy, How FSRU's are impacting LNG market evolution (2018); Appraisal Model for FSRU Greenfield Energy Projects, Dimitrios Dimitriou and Pangiotis Zeimpekis (2022)
17 GIIGNL; VesselFinder; Press Search: Offshore Energy (link); Upstream (link, link); Reuters (link); TradeWinds (link) (2022)



Source: SolarPowerEurope, WindEurope, Fit for 55 package, RePowerEU package proposal, Rhodium Group, Reuters

(6) Accelerate buildings electrification and energy efficiency

[Incremental gas offset potential of up to 2 bcm in 2022, up to 12 bcm in 2025] – Increased installation of insulation and heat pumps in residential and commercial buildings could reduce gas demand by ~9-12 bcma by 2025. This would require more than doubling the annual rate of heat pump installation from ~1 million p.a. today. Meeting the even more ambitious REPowerEU goal of tripling the heat pump fleet by 2030 would require a deployment rate of up to four times faster than today.[18] However some countries are already taking action, with Germany targeting 0.5M/yr installs in 2024, and Austria moving to ban gas boilers in new buildings as of 2023.[19]

(7) Increase biomass use in power and heat generation

[Incremental gas offset potential of up to 2 bcm in 2022, up to 1 bcm in 2025] – Biomass power production can be increased without net new assets through co-firing in some existing coal plants, while long-term conversion or greenfield sites are also possible, likely post-2025. A sustainable supply of biomass, if that is possible to develop, would need to be ensured to avoid impacting the agriculture sector in the EU, while increased imports in the near term may be an option, if supplies can be secured. Lithuania could serve as an example, as the country successfully shifted its district and residential heating fuel sources from natural gas to woody biomass (in part, domestically harvested) to diversify away from Russian gas.[20]

(8) Delay industry coal-to-gas transition

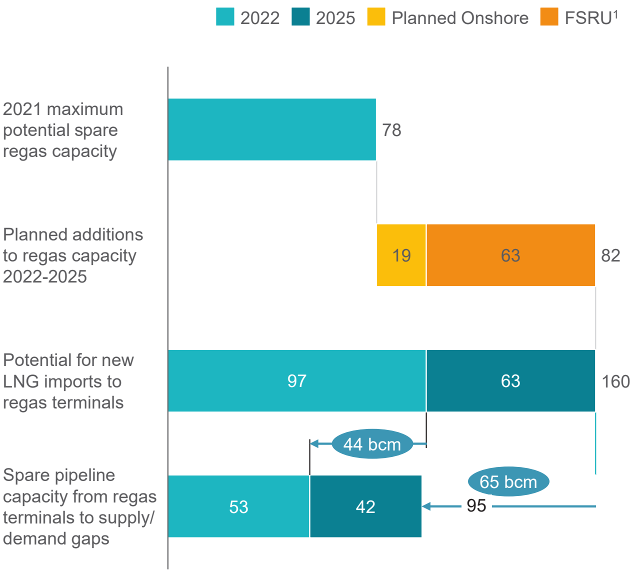
[Incremental gas offset potential of up to 2 bcm in 2022, up to negative 1 in 2025] – Postponing the transition from coal to gas in industrial co-generation units could decrease planned dependency on imported gas in the short term. Activating this lever would give the region time to scale up technology and adoption rates moving toward process electrification, entirely skipping a bridge solution of gas-fired co-generation units. However, in the near term, emissions would increase with continued coal combustion. The impact is a mid-term increase in emissions, with a potential to move more quickly to full electrification while avoiding stranding some capital upgrades – however, the electricity generation needed would require additional natural gas.

18 GIIGNL; VesselFinder; Press Sea
19 EURACTIV (link) and (link)
20 IEA, Lithuania 2021 Energy Policy Review

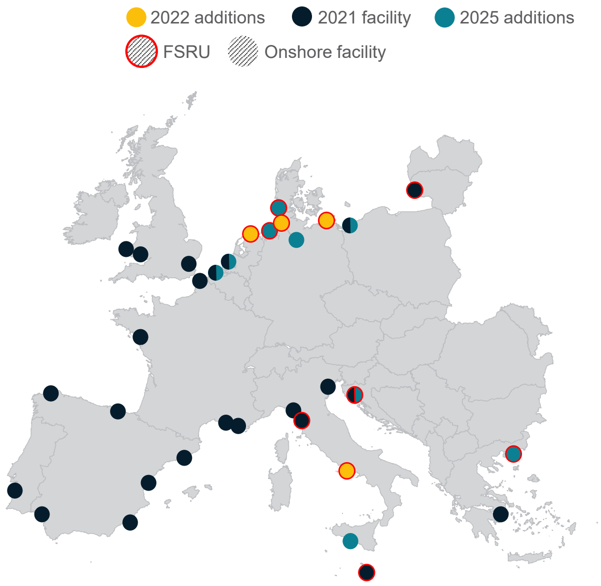
(9) Accelerate industry electrification and energy efficiency

[Incremental gas offset potential of up to 1 bcm in 2022, up to 13 bcm in 2025] – This lever involves scaling up adoption of electric heat pumps in low / medium-temperature processes (<2000C) and advanced heat recovery technology. Today, there are ~1,000 industry heat pumps installed. This could be scaled to ~4,000 by 2025 and ~10,000 by 2030. The largest drivers for accelerating industrial heat pump deployment are to improve access to hardware and to facilitate awareness among industry players, as total cost of ownership (TCO) is already favorable compared to gas boilers in most countries, especially with elevated gas prices.[21]

Planned regas capacity additions to 2025 and potential for increased imports, bcma



European regasification capacity, bcma



Additional 63 bcm of regas capacity in new locations would unlock 42 bcm of supply potential by using alternative supply routes with no new pipeline infrastructure needed

Source: CEDIGAZ, Press search, McKinsey Energy Insights' EUPipeflow, McKinsey Energy Insights' LNGFlow, Spire, GIIGNL

(10) Increase nuclear power generation vs pre-conflict baseline

[Incremental gas offset potential of up to 1 bcm in 2022, up to 4 bcm in 2025] – This lever addresses the possibility to delay nuclear power plan phaseouts or increase plant utilization where feasible. Thirteen EU member states operate ~100 GW of nuclear power plants, more than half of which are in France. 28 GW (or ~45%) of the French nuclear fleet is temporarily offline for maintenance, repairs, and lifetime extensions, limiting the potential of this lever. Belgium has already agreed to extend the lifetime of 2 reactors by 10 years, until 2035, but will continue with plans to decommission the remaining 5 reactors between 2022-2025. Germany will continue to phase out its remaining 4 GW by 2023. Additional reactors (~3 GW) under construction are likely to become operational by 2025 in France and Slovakia. However, all other planned reactors would not be operational for at least another 5 years.[22]

21 (2018); Appraisal Model for FSRU Greenfield Energy Projects, Dimitrios Dimitriou and Pangiotis Zeimpekis
22 World Nuclear Association

(11) Increase use of biogas and biomethane

[Incremental gas offset potential of up to 1 bcm in 2022, up to 4 bcm in 2025] – Biomethane can be used as a "drop-in replacement" for current gas supplies to decarbonize end-uses which are difficult to electrify or where methane is necessary as a feedstock. Biomethane use can be increased by upgrading biogas output, as well as identifying additional sustainable sources such as organic waste and forest and agricultural residues. REPowerEU targets 35 bcm of biomethane production by 2030. Yet, any new biomethane production in the next 3-4 years will come from plants already in construction or operational or possibly from optimizations to feedstock or processes that improve yield, leading to ~3-4 bcm gas offset by 2025.[6]

(12) Reduce leakage and flaring

[Incremental gas offset potential negligible in 2022, up to 1 bcm in 2025] – Nearly ~2 bcma of gas in Europe is currently lost to flaring or leakage during production and transmission, according to the BP World Energy review 2022. If 20% of this could be reduced by 2025, ~0.6 bcma of domestic gas supply could be unlocked.

(13) Add new onshore LNG terminals

[Incremental gas offset potential negligible in 2022, up to 10 bcm in 2025] – New onshore facilities of at least 30 bcma capacity have already been announced in Europe, however, only one of the facilities in Germany is expected to be completed by 2025, bringing only an additional ~8 bcma of regasification capacity online.[23] It is worth noting that new onshore LNG terminals would require lifetimes of over 10 years for economic viability, whereas future utilization of these assets would be in doubt beyond 2025 if the EU remains on track with the deployment of clean energy solutions in line with its 2030 targets.

(14) Expand existing onshore LNG terminals

[Incremental gas offset potential negligible in 2022, up to 8 bcm in 2025] – Three expansions are planned for existing onshore regasification terminals in Poland, Netherlands, and Croatia. When completed, these expansions would provide an additional ~11 bcma regasification capacity, allowing for ~6-8 bcma displacement of Russian gas supply.[24] As with the addition of new terminals, from 2025 onward this additional import capacity may quickly be rendered redundant by the EU's overall trajectory on gas demand reductions by 2030

(15) Increase green Hydrogen and ammonia supply

[Incremental gas offset potential negligible in 2022, up to negative 1 bcm in 2025] – Building on incentives for EU green hydrogen (H2) production could further support energy independence and decarbonization efforts in the long term. However, production of green H2 is not a strong near-term, economy-wide energy security or decarbonization lever. Nearly all incremental wind/solar generation in the power sector would be practically displacing fossil fuels, so any domestic hydrogen production must include a careful assessment of short-term trade-offs to ensure that the electricity needed for electrolysis comes from additional renewable power that would not otherwise offset gas-fired generation.

However, imports of green hydrogen and ammonia could be used to offset natural gas consumption for domestic production of these feedstocks. REPowerEU sets a goal of 10MT of green hydrogen imports by 2030, yet most of this is only likely to become available post-2025 given current project pipelines. For example, the Asian Renewable Energy Hub (1.6 Mt green hydrogen) in Australia, aims for an operational start in 2025, following FID in 2021.[25]

23 Offshore Energy (link); Upstream (link, link); Reuters (link); TradeWinds (link)
24 Offshore Energy (link, link); De Tijd (link); S&P Global (link)
25 Press Search: NS Energy (link)

Beyond these 15 levers, increasing domestic gas production was not considered as a lever given that European yields are either stagnating or in decline or that fields are closing for other reasons, with no viable options to ramp up indigenous production by 2022 or 2025. The Dutch government has committed to closing the Groeningen fields in the Netherlands by end of 2023 due to concerns of increased seismic activity associated with production in the region. Despite calls to reopen the fields, the government has explained that "Groningen field will only be an option of last resort".[26] The UK began producing additional gas in March of this year from a gas field associated with the Saturn Banks project.[27]

Other potential levers not evaluated include increased imports of grey hydrogen or ammonia or other non-energy products, reversion from using gas to burning oil products as fuel, increased trading, and connectivity of the electric grid.

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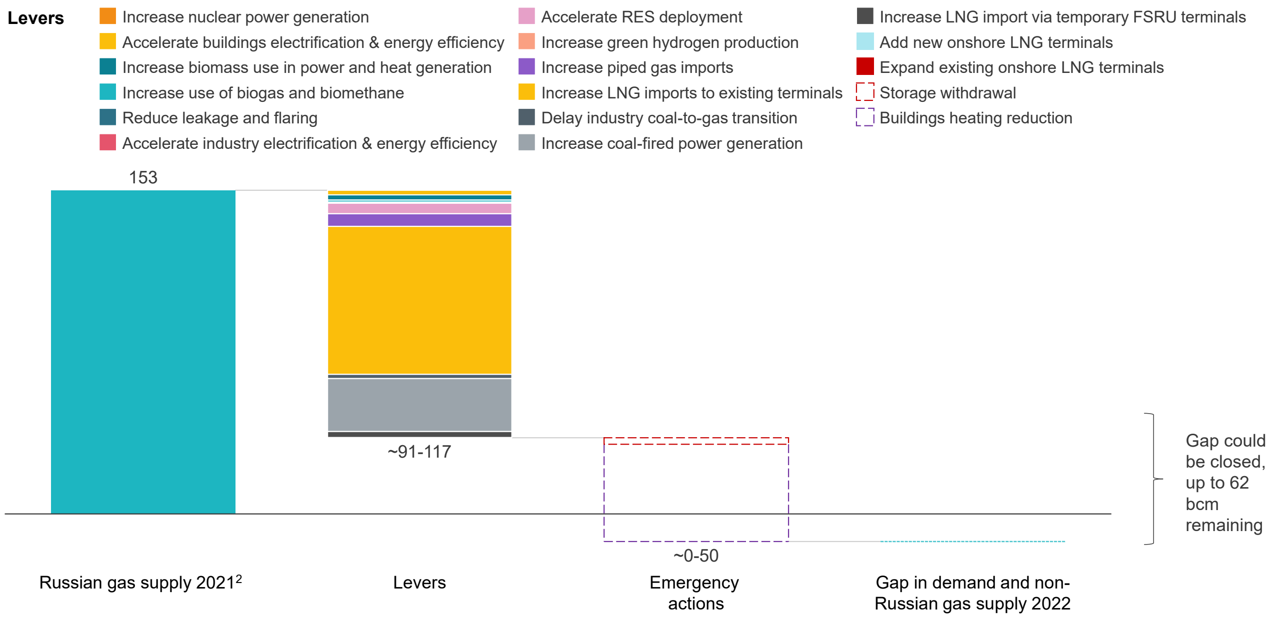
26 Government of the Netherlands (link); Press Search: Euractiv (link); Reuters (link)
27 Press Search: Morningstar (link)

3.
Should the Russian gas supply be cut off in the short term (e.g.,winter of 2022-23), the full potential of all levers available may not be enough to cover the shortfall.

A speedy, but still multi-year, phase-out of Russian gas will no longer be an option for the EU should Russia decide to fully cut off the supply. If the winter of 2022-23 were to suddenly become the requisite target date for the EU's independence from Russia's gas, then additional measures may be required.

Lever impact available through 2022 to address energy security

Aggregated impact of supply & demand levers on reducing demand of Russian gas, bcm



Source: Spire, European Commission, Cambridge Architectural Research, BPIE, RePowerEU, European Commission, EIA, Bloomberg, CEDIGAZ, GIIGNL, ENTSOG, Artelys, SolarPowerEurope, WindEurope, Fit for 55 package, FA Windenergie an Land, European Wind Association, IRENA, BCC Research, EurObserver 2020, EHPA, CEMAC analysis, OEC, Clepa, Reuters, World Steel Association, BDH, IEA, BP Statistical Review, Rystad, North Sea Transition Authority, Oxford Institute for Energy Studies, McKinsey Energy Insights' EUPipeFlow and LNGFlow

Assuming all available levers are activated to close the gap in 2022 and achieve their full theoretical potential, ~0-62 bcm of gas demand may remain unmet. A strong market response to higher prices could drive some additional demand reduction and partially close the gap – Gas prices have been significantly elevated since the fall of 2021 and demand decreased by 9% in the first four months of 2022 compared to the same period in 2021, while there was a 35% reduction in demand in May for Germany.[28] If this elasticity were applied to the full year, an additional ~40-45 bcm of demand could be reduced. However, market signals alone may be insufficient to drive enough demand reduction in the case of an imminent gas cut-off and could carry high costs to society. Recognizing this, some governments have already taken steps to mitigate the socioeconomic impact of higher energy prices (e.g., the Netherlands temporarily lowered energy taxes from 21% to 9%).[29] While this should ease the economic burdens for citizens, this will in turn also limit the effect of price signals.

One may see further decreases in industry consumption if high prices continue throughout the year. The drop in demand observed to date may be an underestimation of what is to come, if attributed to an overall expectation that high gas prices were transitory. If prices are expected to remain elevated, some industries may be forced to make operational and footprint decisions commensurate with the challenge; however, quantifying this response is difficult, and rapid decisions are not likely to be made.

The unpredictability, lack of control and high risk of relying entirely on market signals means that governments may have no choice but to rely on emergency measures. These include the withdrawal of stored gas; the introduction of strong social/public signals to reduce building heating consumption; or temporary, partial and/or selective industrial curtailment:

Storage withdrawal – This emergency measure borrows forward from future years but may be needed to avoid difficult curtailments, with up to 3 bcm potential. Preparing for the necessity of energy withdrawal requires an assessment of how much of a storage drawdown might actually be possible. Europe has ~135 bcm of gas storage capacity, yet a technical minimum of 15-20% of capacity must remain in storage to maintain sufficient pressure as to ensure continued usability of the storage facilities.[30] Currently, fill rates are higher than historical levels in May/June, but there is still uncertainty over the ability to refill levels over summer 2022 to reach ~80% fill by October 2022, especially with reduced flows from Nordstream1.[31] The storage volumes are used as a working reserve and typically are drawn down to ~20-50% of capacity by the end of winter. EU storage levels were at near-historic lows in March/April of 2022, so while filling rapidly can create headroom to manage through the coming winter, the net impact of drawing back down by April of 2023 will not displace significant imports on an annual basis.

Heating reduction in buildings – Key shifts in heat usage could have a combined gas-offset impact of 46 bcm. The part of this emergency measure making the biggest contribution (nearly half of the total impact) is a behavioral shift in which residents tolerate a little less warmth (~1 to 2-degree Celsius cooler than average) in buildings in the winter. Another behavioral shift – turning off radiators in unoccupied rooms of a home or building – could deliver an additional gas offset of up to 7 bcm. Looking at non-behavioral measures, a planning shift at the municipal level – delaying the official start of "heating season" – could contribute another 7 bcm. Beyond this, an analysis by BPIE indicates that an additional 10 bcm could be saved by reducing heating in public buildings from 21ºC to 18ºC.[32] Additionally, converting either gas-fired or resistive-electric water heating to use of heat-pump water heaters could provide energy efficiency measures which do not in any way impact comfort, but would also enable some measure of demand flexibility if equipped with smart controls. In determining which campaigns/policies to pursue it is important to understand that behavioral shifts can be recommended and incentivized, but not enforced, while the planning shift is within the relevant authority's control.

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28 Eurostat, BDEW (link)
29 Government of the Netherlands (link)
30 Gas Infrastructure Europe (GIE); European Council, Infographic – What is the EU's gas storage capacity?
31 AGSI+, GIE AISBL
32 BPIE, REPowerEU Energy Savings Plan: Time to Switch to Action

Selective temporary or partial industrial curtailment – Extremely careful management of any curtailment will be of utmost importance to ensure the health and safety of EU citizens and would benefit from strategic decisions to minimize downstream implications and potential knock-on effects. This calls for very robust and sophisticated scenario planning and analysis. Temporary facility shutdowns with worker furloughs are one direct measure, while partial curtailments would come from reducing throughput while keeping sites operating. With each of these approaches, the level and duration that could be sustained would be both country- and industry-specific.

Combined with successful engagement of the full list of levers, the first two emergency measures – storage withdrawal and heating reductions in buildings – could help draw the supply-demand gap down to ~0-62 bcm in 2022 versus a baseline which does not consider market-based demand destruction.

4. The EU has a few paths to replace demand for Russian gas by 2025 without serious climate impact – but a focus on accelerated clean energy deployment reduces the scale of any difficult trade-offs

How European gas demand will evolve over the next few years is not certain and depends highly on success of policy implementation and impacts of market signals. To date in 2022, we have seen demand drop 9% over last year.26 Further contributing to the uncertainty is the unpredictability of seasonal temperatures from year to year. Additionally, if the EU achieves its Fit for 55 targets, European gas demand could be reduced by ~45 bcm below 2020 levels.

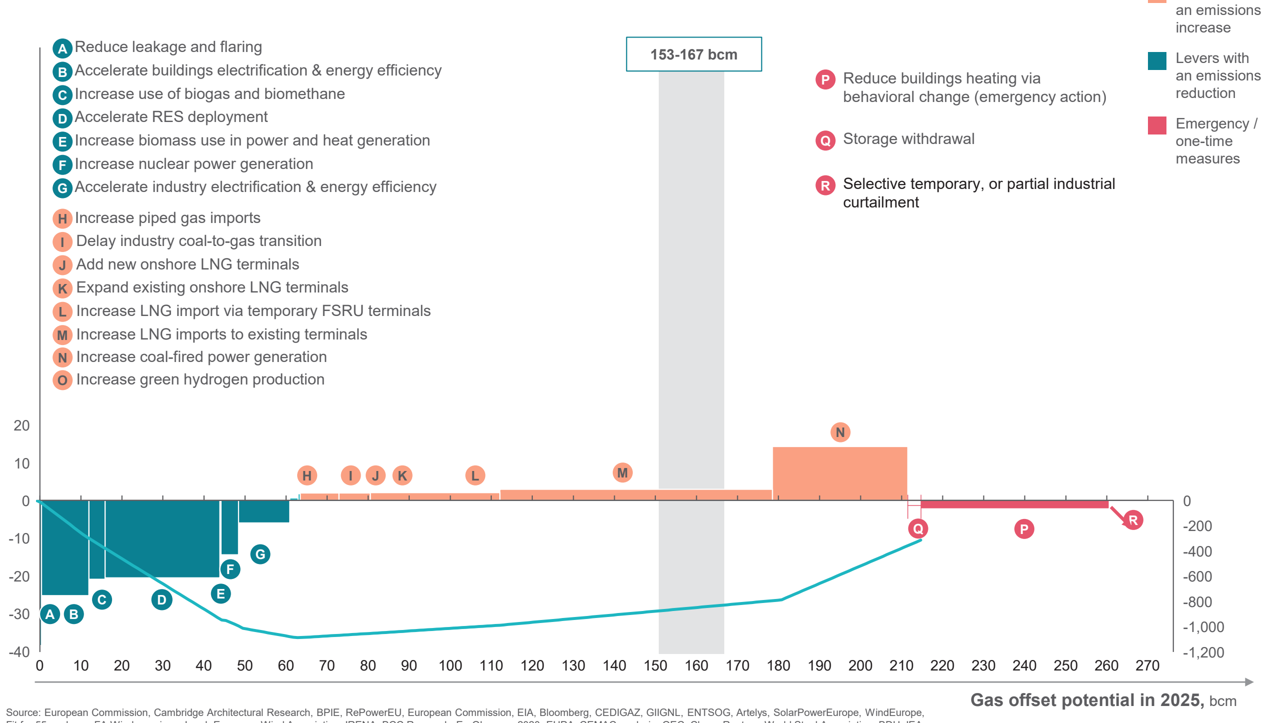
The exact demand figure in 2025 will determine how difficult it would be to close the secure energy supply gap. With no growth in demand or further disruption between now and 2025, the levers described above could provide "enough" offset by 2025. Six levers alone, accounting for 80% of the full offset potential of all levers, could be sufficient to displace all the Russian gas imported in 2021.

It is conceivable that more aggressive measures may become politically feasible and necessary in the event that Russia cuts off gas supplies. In such a scenario, gas prices are likely to remain very high and be accompanied by a political and security imperative to minimize exposure to natural gas imports. These factors might combine to drive even stronger action on clean energy deployment, but also may mean that some of the near-term "emergency" measures such as curtailment of certain industries becomes an economic and/or political necessity.

Marginal abatement curve with climate and offset potential of levers by 2025

By 2025, Russian gas could be offset completely with limited climate impact, if all levers meet their full potential

Climate impact per gas offset, cumulative emissions by 2030 per gas offset in 2025, Left: *$MtCO_2$ / bcm* | *Right: cumulative $MtCO_2$*



Source: European Commission, Cambridge Architectural Research, BPIE, RePowerEU, European Commission, EIA, Bloomberg, CEDIGAZ, GIIGNL, ENTSOG, Artelys, SolarPowerEurope, WindEurope, Fit for 55 package, FA Windenergie an Land, European Wind Association, IRENA, BCC Research, EurObserver 2020, EHPA, CEMAC analysis, OEC, Clepa, Reuters, World Steel Association, BDH, IEA, BP Statistical Review, Rystad, McKinsey Energy Insights' EUPipeFlow and LNGFlow, Spire, North Sea Transition Authority, Oxford Institute for Energy Studies

What follows is a description of the trade-offs which must be thought through in the areas of **supply security, climate targets, and energy affordability** as a function of engaging these six levers:

Increasing LNG imports via existing terminals and FSRUs

Together, these two levers carry ~79-98 bcm of the impact potential by 2025 without the need to create new, long term gas import infrastructure. Given limited capacity to increase domestic gas production or increase piped imports from legacy providers, any supply-side response would rely heavily on LNG. Using spare capacity in existing terminals – including reallocating the 20 bcm of LNG previously imported from Russia – is the fastest way to shift gas supply away from Russia without disrupting demand. The second fastest way is to deploy FSRUs, which can take months, rather than the years required for infrastructure development and due to the short-term nature of their deployment pose less of a lock in risk than new onshore import infrastructure. FSRUs would see annual leases carry high costs if used longer term, although they would still result in much lower costs than long-term stranded assets.

Regarding supply security, the success of these levers combined depends on the ability to establish contracts with alternative LNG suppliers and compete with other regions (e.g., Latin America, Asia, or Africa). The U.S. and Qatar together already account for half of Europe's LNG imports, meaning any additional reliance on these countries brings further consolidation of supply – a valid temporary solution while longer-term energy security will require diversification. As for global competitiveness, Europe is already proving willing to pay higher spot prices than other markets. As the impact on other importing countries grows, so may their willingness to pay the highest prices, as observed when Pakistan paid to avoid blackouts last year. Owing to the global nature of demand/supply, more countries risk being priced out of the market and having to turn to burning fuel oil or coal to avoid blackouts[33]. Given this volatility and impacts to global stability, Europe would do well to minimize reliance on LNG as much as possible.

As for climate targets, emphasis on LNG, particularly if long-term infrastructure is built, can lead Europe to difficult economic decisions of stranding assets or finding itself in a 'lock in' to continued gas import. Additionally, this focus on LNG could lead to higher emissions over piped gas, at least in the short term, given the higher emissions and methane leakage risk associated with liquification, transport and regasification. However, an analysis by the Rocky Mountain Institute using OCI+ data suggests that a shift to US or Qatari LNG could possibly be climate-neutral given the length and leakiness of Russia's pipelines to Europe.

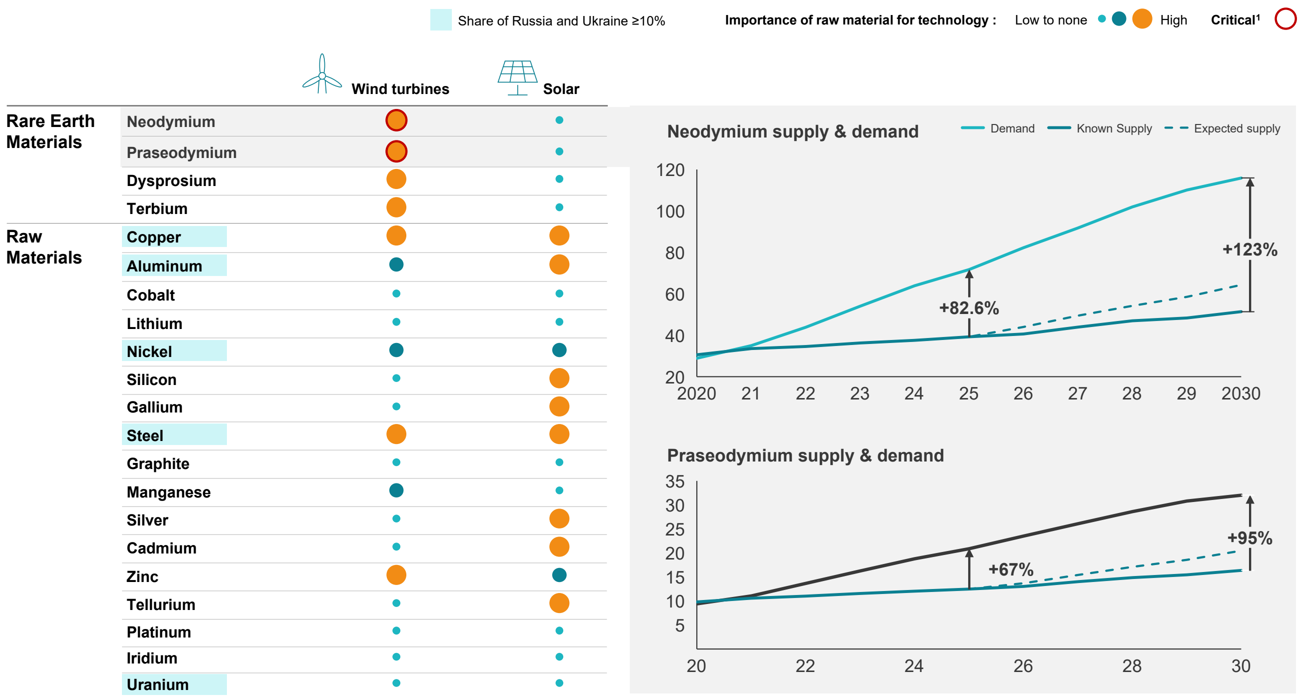
Finally, in terms of affordability, a significant addition to EU imports would almost surely impact the global dynamics of LNG and, consequently, gas prices. Any new infrastructure – not assessed in the above analysis due to the post-2025 timeframe required for development – would also require significant investments and have implications on end-users where higher-priced gas is required to pay down these investments, impacting global competitiveness of some industries. The full analysis on costs has not been undertaken in this work, and further analysis could further clarify the tradeoff impacts. However, the use of existing spare terminal capacity and deployment of FSRUs would, at least, avoid the risk of stranded assets.

Accelerating RES deployment

This analysis identified the upside of accelerating renewables deployment beyond the REPowerEU targets to be ~22-28 bcm by 2025. However, this upside is compared to a quite aggressive baseline, which assumes that countries will meet their stated commitments from Fit for 55. In fact, the current rate of deployment indicates that the member states collectively are already falling behind on their earlier installation targets. The undertaking represents an acceleration of RES deployment that would put the EU on pace toward its 2030 and 2050 goals and even further acceleration in order to surpass those targets. Another benefit to consider is the multiplier effect from accelerating RES deployment on the efficacy of other levers.

Regarding supply security, deployment of renewables would naturally replace imported energy sources with domestic supplies leading to greatly enhanced energy security. However, the speed of deployment will be partly dependent upon the ability to source both raw materials for production of equipment, as well as completed products. The supply chains for critical goods needed to deploy RES for some commodities are concentrated in a few places outside of Europe.[34]

33 Thailand at Risk of Fuel Shortages With Imported Natural Gas Too Pricey - Bloomberg; Energy Prices in Europe Are Creating Power Outages in Pakistan - Bloomberg
34 Rocky Mountain Institute, "Which gas will Europe import now?"



Source: Critical raw materials for strategic technologies and sectors in the EU, A foresight study, European Commission, Mar 9, 2020; The role of critical minerals in clean energy transition, IEA, May 2021; McKinsey article "The raw materials challenge: How the metals and mining sector will be at the core of enabling the energy transition"

As for climate targets, accelerated deployment of renewables is clearly aligned to meeting aggressive climate targets, and can help deliver on broader economy decarbonization by encouraging accelerated electrification to lower-carbon energy sources. Looking beyond 2025, an ongoing acceleration would further reduce the need for imported fossil fuels from any source, and provide a clear exit ramp from a period of elevated coal use to allow countries to stay on track for previous coal phase-out commitments.

Finally, in terms of affordability, the cost of new renewables assets is expected to be competitive with existing sources of energy. However, rapid deployment could increase costs of delivered projects for a variety of factors including deployment at suboptimal (but available) sites, more costly equipment given a higher willingness to pay in a global supply chain crunch, and less efficiencies of labor with a relatively newer workforce.

Accelerating industry and buildings electrification and energy efficiency

The installation of heat pumps in residential, commercial, and industrial settings, along with accompanying energy efficiency measures such as insulation in buildings and industrial process optimization, could contribute a combined gas offset of ~19-25 bcm in 2025.

To reach these offset potentials, deployments of residential heat pumps at rates of ~2 million annually are needed, up from 1 million in 2020. Additionally, industrial heat pump deployments would need to similarly double, capturing 8% of the market potential which represents replacement before end-of-life in some cases.

Regarding supply security, these electrification and efficiency (E/E) measures have a multi-decade lifetime which, in contrast to finding alternative gas suppliers, offes a long-term solution to achieving energy independence. However, two key challenges in ensuring sufficient heat pump supply are availability of a skilled workforce and the centrality of copper, steel, and semiconductors as input materials – all are components over which security of supply may remain uncertain in the near term.

As for climate targets, these E/E levers, by definition, carry lower emissions given their lower energy use, and the emissions savings associated with heat pumps will only improve as power systems move toward overall lower carbon delivery.

Finally, in terms of affordability, the impact of E/E levers would result in a net societal benefit, as the total cost of ownership (TCO) is already favorable in most case. However, the capital deployment required to make the shift poses a challenge for many consumers and would need to be addressed by policy or support schemes.

Increasing coal-fired power generation

Increasing the utilization of coal power plants and delaying their retirement holds the second-largest offset potential of all levers, ~23-33 bcm by 2025.

Regarding supply security, the ability to access this lever's potential immediately is a win for energy security. Coal supply is not a concern, at least for lignite plants sourced domestically. Still, depending on how much hard coal is required (and how long the lever is used), Europe will need to find suppliers to avoid continued imports from Russia.

As for climate targets, coal carries a disproportionately high share of CO2 emissions per bcm of gas offset, roughly 2-3 times more per unit of electricity produced, depending on the age and type of plant. Assuming that coal-fired power generation was maxed out, engaging this lever would lead to an addition 380-470 Mt in CO2 emissions if generation is increased versus plan to 2025 and ramped down to 2030, making it by far the most onerous from a climate perspective. However, if other levers are pursued aggressively and clear policy constraints to time-bound coal-related efforts are put in place, coal-fired power generation can again be reduced before 2025 resulting in less lock-in versus some of the other infrastructure-related levers.

Finally, in terms of affordability, the average price for coal has risen but not as sharply as gas prices.[35] Prices are likely to remain elevated in the short term if the hard coal supply is to shift from Russia to Colombia or the U.S., where the sector has effectively been mothballed.

35 EIA; Bloomberg

5. EU countries have a set of options torapidly cut exposure to Russian gas, with an acceleration of clean energy solutions delivering the strongest impacts on energy security and emissions targets

A closer look at a select few of the 15 levers described in this paper highlights a set of early actions that the region could undertake on the path towards energy security.

1. Fast-track permitting for RES.

Today, RES buildout in the EU is slowed down by long permitting processes. Significant new capacity (~90GW) is stuck in the permitting process today, some of which might be rejected. In fact, ~38% of the permitting pipeline for wind has been historically rejected.[36] Several actions could help speed up the currently years-long lead times, including:

a. Build up the resources and capacity of permitting authorities and increase digitization across the different steps to speed up the process and enable end-to-end tracking[37].

b. Simplify the permitting process by harmonizing regulatory rules (e.g., environmental, distance to settlements) and establish central authorities to enforce permitting timelines.

c. Make the process more flexible to accommodate changes in technology.

d. Create a fast-track process for repowering of plants.

e. Rapidly define and agree priority “go to” areas for RES development in each country with accelerated processes for environmental impact assessment and public consultation. To help address conservation concerns, this could be accompanied by identifying “no go” areas linked to the EU’s plans for a directive on habitat restoration.

f. Launch awareness campaigns to increase society’s acceptance of – and potential financial stake in - RES infrastructure and improve legal standing of RES technology

36 Global Data; WindEurope
37 Eclareon report highlighting barriers blocking wind and solar energy projects (link)

compared to conflicting public interests

2. Leverage public interest and financing programmes to improve energy efficiency.

The degree to which the public-at-large feels invested and is able to participate in the dual goals of energy independence and emissions reduction will impact the success of certain initiatives. Specific actions related to education and incentives to consider:

a. Use public awareness campaigns and incentives to encourage residential and commercial energy efficiency, heat pump, and rooftop solar adoption.

b. Set an end date for all new fossil fuel boilers.

c. Provide public finance programmes to support energy efficiency and heat pump retrofits for vulnerable households, and create smart financing packages, linked to building standards, for middle-income households.

d. Run buyback programmes for gas boilers, gas stovetops or inefficient appliances and tax those assets held beyond a certain timeframe.

e. Simultaneously, make the case for citizens to lower thermostats and turn off radiators in unused parts of their homes.

3. Accelerate industrial electrification.

Doubling the pace of installation of industrial heat pumps (IHPs) can lead to big gains in gas offset. Specifically, moving from the current target of 1,000 additional IHPs installed by 2025 to 2,000 IHPs, the region could achieve a gas offset of 13 bcm as opposed to the 7 bcm expected from the current pace. Potentially rapid payback considering expectations of elevated gas prices would make these deployments 'no regrets' for many players. Specific actions to consider include:

a. Create awareness campaigns that educate industry players on the cost advantages — in most regions industrial heat pumps were already more economic prior to the conflict in Ukraine and have only proven more advantageous since.

b. Offer, promote, or mandate heat pump feasibility studies within a certain timeframe to increase awareness and also inform prioritization of deployment.

c. Partner with lenders, expand loan guarantees, or offer capex subsidies to address concerns of high upfront costs.

4. Define and execute a robust materials and equipment supply policy.

While global production rates ramp up for key energy transition technologies, availability of necessary hardware is not guaranteed. As an example, industrial heat pumps can already have a 6-18 month lead time. To address this, governments can consider the following actions:

a. Enable EU-wide sourcing of strategic key materials, components, and raw materials, e.g., similar to the initiative of the European Raw Materials Alliance that has set targets to create a value chain to supply 25% of Europe's permanent magnets needs by 2030.

b. Work with trade partners to prioritize imports and establish joint supply chain alternatives for the near term, including critical items such as solar panels, heat pumps, and thermostats.

c. Critically evaluate the entire supply chain for upstream materials, also for those materials more critical long-term (e.g., nickel, copper, lithium, rare-earths).

d. Work jointly to identify and develop new global sources for raw materials (e.g., support new mining operations).

5. Build human resources capacity for renewables build up and residential heat pump installation.
Solar and wind accelerated build up will require ~3x the FTEs to meet 2030 targets, while wide-scale heat pump installation will also require a large and appropriately skilled workforce. Three actions look at the efficiencies of and incentives for building this workforce:

a. Reskilling – for example boiler technicians could be reskilled to install heat pumps, which could help the region meet the new demand of 88% more heat-pump technicians in just about one month. Reskilling the workforce for renewables deployment could be envisioned from adjacent non-growth sectors, e.g., conventional generation, Oil & Gas, although effort will be higher.

b. Create government subsidies to further speed the certification process for heatpumps

c. Train new technicians to close the remaining labor gap which will be small for heatpump installs, and much larger in the case of solar/wind deployment. Despite the longer training period, this labor force will be needed.

d. More generally, define a robust skills development programme to fill the extensive labor needs of the broader net-zero transition.

6. Limit gas infrastructure investments to temporary FSRUs on short term contracts
Increasing LNG imports is one of the largest near-term levers available to the EU. Up to 95 bcm of additional LNG could be imported based on the current unused capacity of existing pipelines. An increase in LNG, of course, would necessitate an increase in regasification, but capacity is limited. To increase regasification capacity in a way that avoids the risk of a long term lock in in conflict with climate targets, the EU should enter into short-term contracts with contracted decommissioning dates or other sunset clauses for floating storage and regasification units (FSRUs), particularly for member states with little current capacity. This could add ~63 bcma of regasification capacity by 2025.

In this approach, it is important that FSRUs are recognized as a short-term solution, given their cost structure, the high risk of global LNG price dynamics, and the implications of a continued reliance on imports. Therefore, these assets represent a candidate supply decision which can be quickly scaled back as other levers enable higher levels of energy security.

The path of “and”

Reinforcing European energy security and addressing climate change are both sizable and critical undertakings. While in the very short term they may appear hard to reconcile, there are clear actions that can be taken to address both simultaneously. The sooner these dual goals are made to converge, the lower the ultimate cost to society. The benefits of renewables and energy efficiency are cumulative, and all efforts should be made to ensure a strong growth trajectory. Until enough of those benefits are fully realized, individuals and corporations may need to take responsibility for curbing their demand in the least painful means possible to help Europe buy time. Governments and nations will be best served by weighing the trade-offs of security solutions with emissions and affordability, always with an eye on the long-term consequences of decisions.

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