Goldman Sachs

The Energy Affordability Crisis: Quantification, Solutions, Implications

Following the spike in gas and power prices since mid-June, we believe that the Energy Crisis, and in particular affordability, has reached a tipping point, likely requiring significant policy intervention. In our view, the market continues to underestimate the depth, the breadth and the structural repercussions of the crisis – we believe these will be even deeper than the 1970s oil crisis. At current forward prices, we estimate that **energy bills** will peak early next year at **c.€500/month** for a typical European family, implying a **c.200% increase** vs. 2021. For Europe as a whole, this implies a **c.€2 tn surge** in bills, or c.15% of GDP, we estimate.

We believe the market is overly negative on regulatory risk and believe that **near-term solutions could be a major clearing event.** We see scope for the introduction of **price caps** in power generation, which we estimate could save Europe c.€650 bn pa. Yet, price caps would not fully solve the affordability issue: this is why the introduction of a **"tariff deficit"** might eventually be needed, to spread the spike in bills over 10-20 years and allowing Utilities to securitize these future payments.

Towards a new market design and full electrification. We present structural solutions, including a new market design in power generation – to decouple gas prices from the remuneration of fixed-cost generation sources (hydro, nuclear, wind, solar) – and an acceleration in the electrification of the economy. The deflationary effect of RES sources could **lower energy bills by c.75%** vs. current levels and make future energy costs more stable.

Sector implications. We believe the market is exaggerating regulatory concerns in power generation, the more so given indications reported in QE and Reuters (September 1), which suggest that the EU is planning to recommend the **introduction of price caps,** and the **elimination of windfall taxes.** This would be a positive development, we believe. At the same time, investors appear to be ignoring the structural positives, such as the urgent need to accelerate electrification investments. This drives our strong preference for renewables portfolios: we highlight **RWE, EDP and Orsted (all Buy).**

TTF one-year forward price hit 281 €/MWh on Aug. 25, 2022

TTF one-year forward price was 16 €/MWh on Jan. 7, 2020

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Following the spike in gas and power prices since mid-June, we believe that the Energy Crisis, and in particular affordability, has reached a tipping point, likely requiring significant policy intervention. In our view, the market continues to underestimate the depth, the breadth and the structural repercussions of the crisis – we believe these will be even deeper than the 1970s oil crisis. At current forward prices, we estimate that **energy bills** will peak early next year **at c.€500/month** for a typical European family, implying a **c.200% increase** vs. 2021. For Europe as a whole, this implies a **c.€2 tn surge** in bills, or c.15% of GDP.

We believe the market is overly negative on regulatory risk as currently Utilities do not enjoy any windfall profit: owing to hedges, 2022 earnings largely reflect the commodity backdrop of one/two years ago. Thus, most ad hoc measures would limit future increases in power generation profits, as opposed to lowering current earnings. Also, in the context of a +€2 tn increase in energy bills, even eliminating the bottom line of the sector (c.€30 bn for 2022E) would only contribute to solving c.1% of the problem, leaving 99% unresolved.

Near-term solutions could be a major clearing event: price caps and tariff deficit. We see scope for the introduction of **price caps** in power generation, which we estimate could save Europe c.€650 bn pa. Yet, price caps would not fully solve the affordability issue: the increase in energy bills would still be of +€1.3 tn, or c.10% of GDP, we estimate. This is why the introduction of a **"tariff deficit"** might eventually be needed, to spread the spike in bills over 10-20 years and allowing Utilities to securitize these future payments.

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Sector implications. We believe the market is exaggerating regulatory concerns in power generation, the more so given indications reported in QE and Reuters (September 1), which suggest that the EU is planning to recommend the introduction of price caps, and the elimination of windfall taxes. This would be a positive development, we believe. At the same time, investors appear to be ignoring the structural positives, such as the urgent need to accelerate electrification investments. This drives our strong preference for renewables portfolios: we highlight **RWE, Orsted and EDP (all Buy)**.

Executive Summary

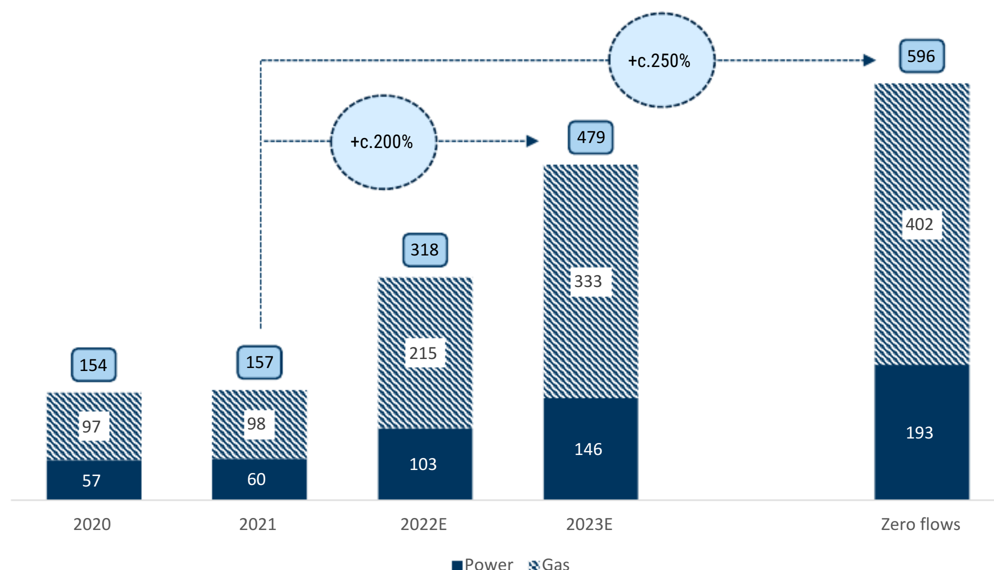
Following the spike in European gas and power prices since mid-June, we believe that the Energy Crisis, and in particular affordability, has reached a tipping point, likely requiring significant policy intervention. In our view, the market continues to underestimate the depth, the breadth and the structural repercussions of the crisis – we believe the repercussions will be even deeper than the 1970s oil crisis.

At current forward prices, we estimate that **energy bills** will peak early next year **at c.€500/month** for a typical European family, implying **c.200% increase** vs. 2021. For Europe as a whole, this implies a **c.€2 tn surge** in energy bills, or c.15% of GDP. We believe the market is exaggerating regulatory concerns in power generation, the more so given indications reported in QE and Reuters (September 1), which suggest that the EU is planning to recommend the introduction of price caps, and the elimination of windfall taxes. This would be a very positive development, we believe. At the same time, investors appear to be ignoring the structural positives, such as the urgent need to accelerate electrification investments. This drives our strong preference for renewables portfolios: we highlight **RWE, Orsted and EDP (all Buy)**. Certain power generators may benefit too from the above-mentioned clearing event (eg, Engie), whilst others more exposed to spot sales (Solaria, Acciona Energia) could face some top-line pressure. Risks persist on supply activities for now (Enel, EON, Endesa), although the introduction of a tariff deficit would greatly de-risk these portfolios.

Consumers soon to spend c.€500/month on power and gas

For most families and industrial customers, energy bills are renegotiated every twelve months; on our estimates, energy bills for most consumers will peak this winter. We estimate a c.€500/month cost for power and gas currently, implying a c.200% increase vs. 2021 when average bills were c.€160/month. Energy bills could approach €600/month in a zero flows (from Russia) scenario we believe (see here for more on this zero flows scenario).

Exhibit 1: Based on current forward curves, household energy bills in Italy could reach nearly €500/month
Italian power and gas household bills evolution (€/month)



Source: Eurostat, Goldman Sachs Global Investment Research

For Europe as a whole, assuming the same magnitude of increase, this would be equivalent to a near +c.€2 tn increase in gas and power spending (equivalent to c.15% of GDP).

Exhibit 2: For Europe as a whole, the increase in energy costs between 2021 and 2023 could approach €2 tn
Europe's increase in energy costs calculation (TWh, €/MWh and € bn)

	Power	Gas	Energy
Consumption TWh	3,300	5,500	-
Consumption adj for CCGTs TWh	3,300	4,125	-
Energy price in 2021 *€/MWh*	75	27	-
Current energy price *€/MWh*	450	200	-
Energy bills increase 2021-now *€ bn*	1,238	714	**1,951**

Source: Goldman Sachs Global Investment Research

The following Exhibit shows a sensitivity analysis in the surge in energy bills for Europe, depending on the development of gas and power prices.

Exhibit 3: Europe's energy bills could surge by c.€1-4 trillion vs 2021, depending on the evolution of gas/power prices

Surge in Europe's gas/power bills vs 2021 (power at €75/MWh, gas at €27/MWh)

	EU Energy bills increase vs 2021 (€ bn)		
	Power	Gas	Energy
Gas €100/MWh, Power €250/MWh	578	301	**879**
Gas €150/MWh, Power €350/MWh	908	507	**1,415**
Gas €200/MWh, Power €450/MWh	1,238	714	**1,951**
Gas €250/MWh, Power €550/MWh	1,568	920	**2,487**
Gas €300/MWh, Power €650/MWh	1,898	1,126	**3,024**
Gas €350/MWh, Power €750/MWh	2,228	1,332	**3,560**
Gas €400/MWh, Power€ 850/MWh	2,558	1,539	**4,096**

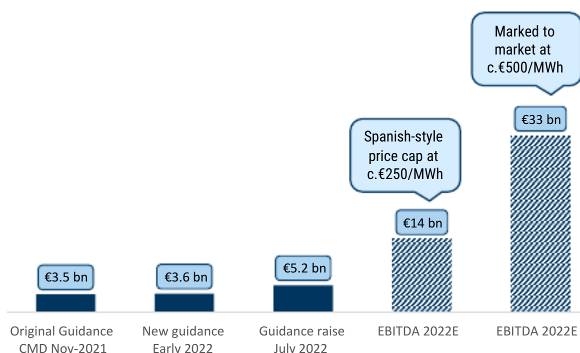
Source: Goldman Sachs Global Investment Research

Windfall taxes: focus appears misplaced

As described above, the increase in energy bills for Europe implied by current forward curves is c.€2 tn; as a reference, European Utilities generate c.€30 bn of net income per year, globally and across divisions (including regulated activities). In this context, even eliminating the Utilities' bottom line would mitigate only c.1% of the increase in bills we anticipate, while harming private investment in energy security and compromising the REPowerEU plan. Crucially, consensus estimates (Bloomberg) do not reflect current energy prices: for 2022-25, consensus EBITDA estimates for RWE are c.€4-4.5 bn, while marking-to-market for current gas/power forward curves, we estimate that 2022 EBITDA would reach c.€30 bn (roughly RWE's current market capitalisation and c.7x greater than consensus).

Exhibit 4: RWE has substantially raised its guidance several times this year

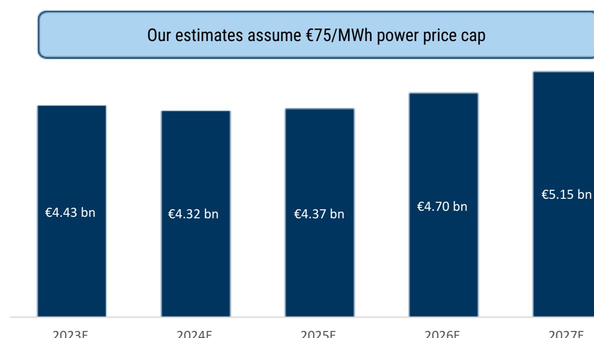
RWE's 2022 EBITDA guidance - evolution and in different scenarios (€ bn)



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 5: Our estimates for RWE include a €75/MWh power price cap

RWE's EBITDA evolution, GSe (€ bn)

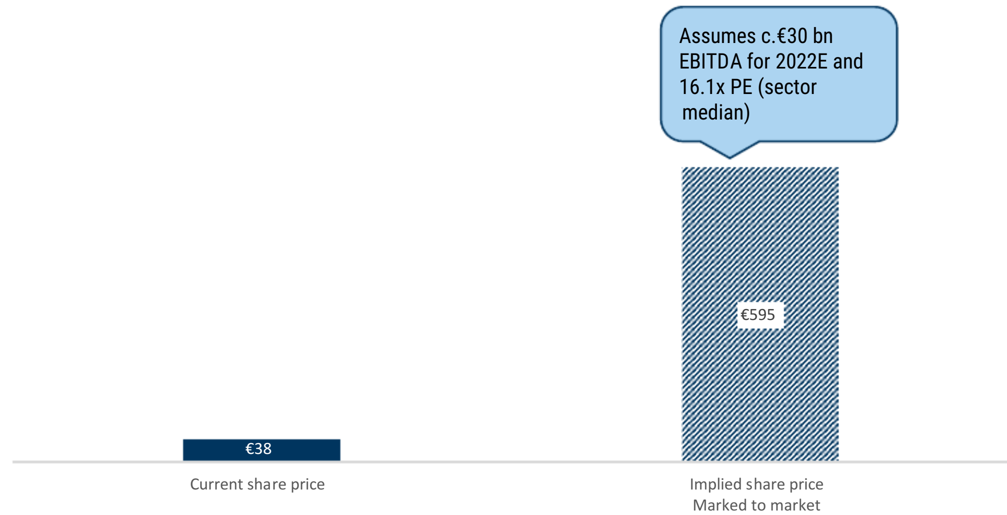


Source: Goldman Sachs Global Investment Research

A marked-to-market EBITDA of c.€30 bn for 2022E would imply, on our estimates, net

income of c.€25 bn. If we assume the sector median P/E for 2022E (currently 16.1x), the implied share price for RWE in this scenario would be c.€600, vs. the current share price of €38.

Exhibit 6: In a fully marked-to-market scenario, we estimate RWE could be worth c.€600/share
RWE's implied share price in different scenarios (€ per share)

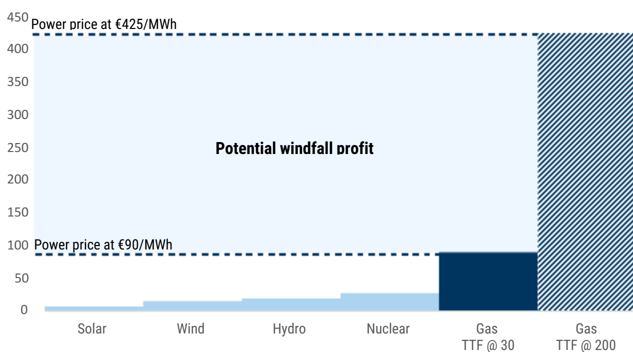


Source: Bloomberg, Goldman Sachs Global Investment Research

Near-term solutions: price caps and tariff deficit

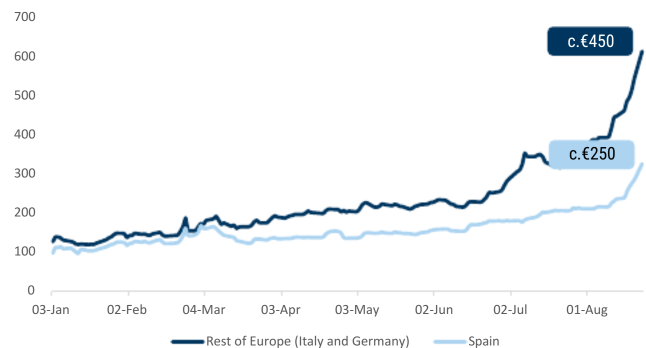
We see scope for the introduction of price caps in power generation, which we estimate could save Europe c.€650 bn in power bills pa. These could follow the example set in Spain, where there are two co-existing caps: (1) a cap on gas prices that CCGTs are permitted to translate to the electricity price (c.€70/MWhg, which compares with current TTF levels of c.€200/MWhg); and (2) a cap on the level of remuneration fixed-cost technologies (hydro, nuclear, wind, solar) are allowed to receive (c.€75/MWh).

Exhibit 7: Potential windfall profits are created in rising gas price environments
Impact from rising gas prices on power supply curve (€/MWh)



Source: Goldman Sachs Global Investment Research

Exhibit 8: A temporary price cap on gas led to a decoupling of the Spanish forward curve from those of the rest of Europe
Forward (1-year) power price evolution, by region (€/MWh)



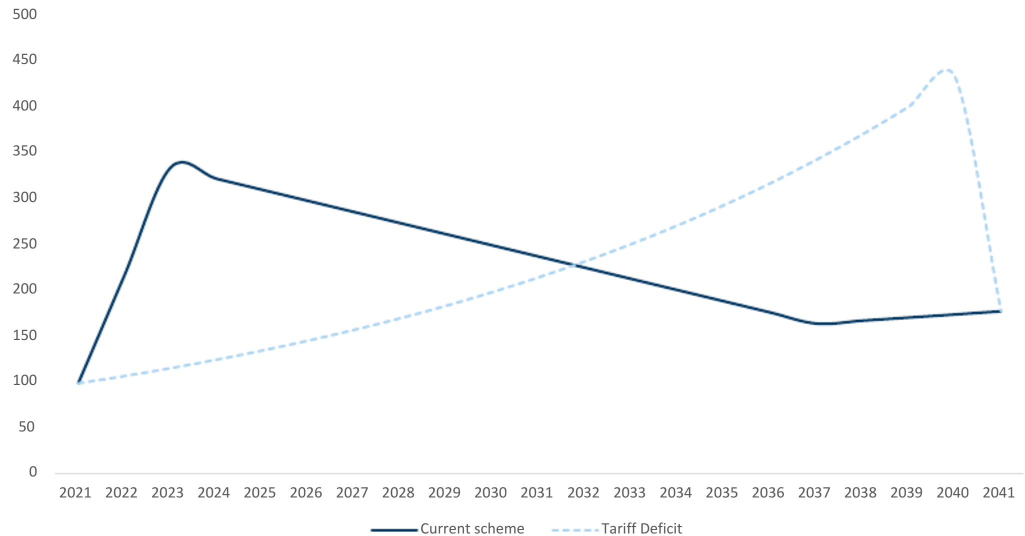
Source: Bloomberg, Goldman Sachs Global Investment Research

However, price caps would not fully solve the affordability issue: the increase in gas and

power bills would still be +€1.3 tn, or c.10% of GDP, we estimate. This is why the introduction of a "tariff deficit" might eventually be needed, to spread the recent spike in bills over 10-20 years, and allowing the Utilities to securitize promptly these future payments. Although this scheme would limit demand destruction, we believe it would smooth the increase in tariffs, limit the near-term decline in industrial production, and largely defuse regulatory risk.

Exhibit 9: Tariff deficit would spread the same cost for gas bills, over a much longer period, as seen in this example for Italy

Italy monthly gas bills per household evolution, average per month (€/month)

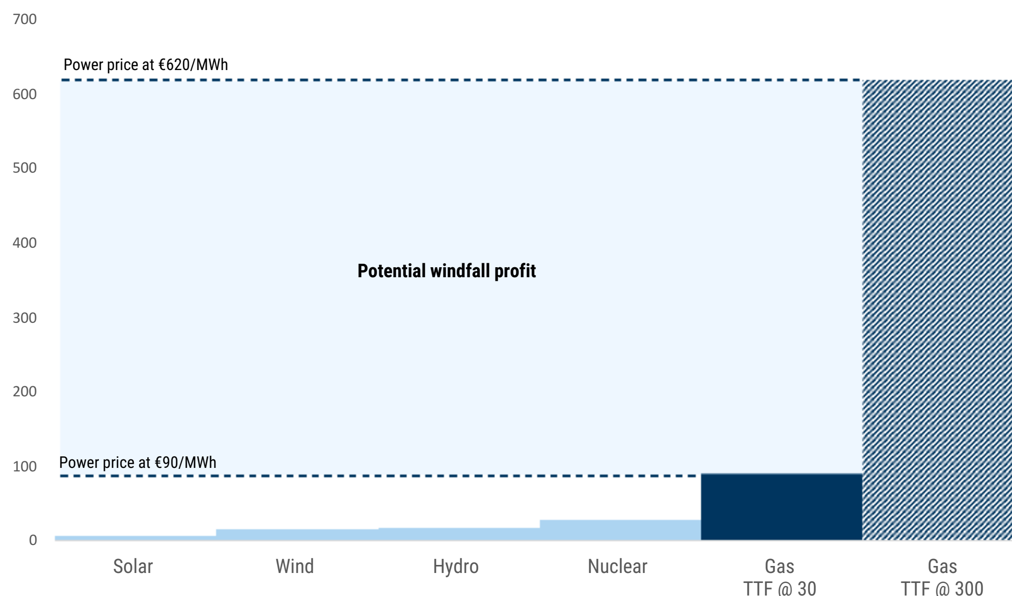


Source: Goldman Sachs Global Investment Research, Eurostat

Towards a new market design and full electrification

We present structural solutions, including a new market design in power generation – to decouple gas prices from the remuneration of fixed-cost generation sources (hydro, nuclear, wind, solar) – and an acceleration in the electrification of the economy. The deflationary effect (and the fixed-cost nature) of RES sources could **lower energy bills by c.75% vs**. current levels, while the fixed-cost nature of RES would make future energy costs more stable.

Exhibit 10: Merchant, fixed-cost activities benefit from rising gas/power prices, without any impact on the cost base
Impact from rising gas prices on power supply curve (€/MWh)



Source: Goldman Sachs Global Investment Research

Industry implications: near-term negatives vs. structural positives

We believe the market is exaggerating regulatory concerns in power generation, the more so given indications reported in QE and Reuters (September 1), which suggest that the EU is planning to recommend the introduction of price caps, and the elimination of windfall taxes. This would be a very positive development, we believe. Additionally, we see most of the negatives from the perspective of the utilities (regulatory risk, demand destruction) as temporary, while the positives (a green energy capex super-cycle and higher-for-longer energy prices) appear more structural.

Stock conclusions: we favour RES and look for regulatory inflection points

In our view, price caps might in fact prove a near-term relief, especially if coupled with a recommendation for the elimination of all other windfall taxes, as reported in the Reuters article mentioned above. Structurally, higher-for-longer energy prices and (broadly speaking) the strong need to accelerate investments drive our strong preference for companies with a RES developer focus: we highlight **RWE, EDP** and **Orsted (all Buy)**.

Certain power generators may benefit too from the above-mentioned clearing event (eg, **Engie**), whilst others more exposed to spot sales (**Solaria**, **Acciona Energia**) could face some top-line pressure.

While regulatory intervention remains a risk (it may ease once energy bills have peaked this winter), we believe the introduction of a tariff deficit would be a major positive as it would meaningfully reduce this risk. In this scenario, **Enel** and **EON** (in our view,

currently seen by the market as high-risk, given their large customer portfolios) would be the main beneficiaries.

What's priced in

- **Renewable generators**. The REPowerEU plan identifies renewables as a key tool to achieve energy security. The reform of permitting could fast-track the conversion of pipelines into real megawatts. Complying with the plan would require more than €1 tn of investment in wind and solar, by 2030, we estimate. The US IRA plan could see further upside to this figure. We believe RES stocks provide excellent secular thematic exposure, and should benefit from the higher-for-longer scenario for energy prices too. We believe Buy-rated RWE and EDP are pricing in capacity additions only until 2024-25, with all of these assets are already secured/under construction. We also flag that, despite market concerns regarding a possible equity raise (see here), Orsted is now trading at a meaningful discount to our estimate of its fair value, and that capacity additions to 2028 have already been awarded.

Exhibit 11: Most pure play RES companies price in only a few years of future growth over and above that already awarded/ready-to-build

Years of future growth priced in by the main renewable players in Europe

Company	Additions discounted until	Visibility on assets u/construction until	Yrs of uncertain growth priced in	Ex-growth value: existing + ready-to build (eur)
EDP	2024	2024	0	€5.1/sh
RWE	2025	2025	0	€39.3/sh
Orsted	2029	2028	1	DKK 699/sh
EDPR	2030	2024	6	€19.4/sh

Calculated using our existing valuation methodologies and amending our current capacity addition forecasts to solve for current share prices.

Source: Goldman Sachs Global Investment Research

- **Suppliers**. Supply activities are currently seen as very high risk by the market, owing to a number of threats (regulatory intervention, rising bad debts, the potential of incurring trading losses). Although these activities may represent a relatively limited part of the portfolios of certain integrated Utilities (c.15% of 2022E EBITDA for Enel and Endesa, and c.20% for EON), Supply activities represent the lion's share of group revenues. For instance, for 2022, we estimate that EON will report Supply revenues of c.€70 bn and Enel c.€40 bn (Endesa c.€15 bn); thus, any tariff freeze, any increase in bad debts, or any trading loss could have a material impact. We calculate that since early February (when concerns over a potential Ukraine conflict started to intensify further), EON, Enel and Endesa have lost €34 bn of combined market capitalisation. The impact appears particularly severe for EON and Enel. As such, we believe that any event that removes regulatory concerns could quickly drive a turnaround in perceptions. We argue that, given ongoing demand destruction in gas (in Germany above all), and the potential for rationing, some of

these supply portfolios could ultimately prove over-hedged. Selling any excess gas (or power) in the market could lead to meaningful (one-off) gains.

Exhibit 12: The main suppliers present large risks, but have already lost c.€40 bn of market capitalisation; we see a tariff deficit as the key potential boost

Market cap reduction of the main supply companies since early February 2022 peaks

Company	February Peak share price	August 29 share price	Shares mn	Mkt cap decline € bn
EON	€12.4/sh	€8.6/sh	2,641	-€10 bn
Enel	€6.9/sh	€4.8/sh	10,167	-€21 bn
Endesa	€19.8/sh	€17.7/sh	3,657	-€8 bn
Market Cap				**-€39 bn**

Source: Goldman Sachs Global Investment Research

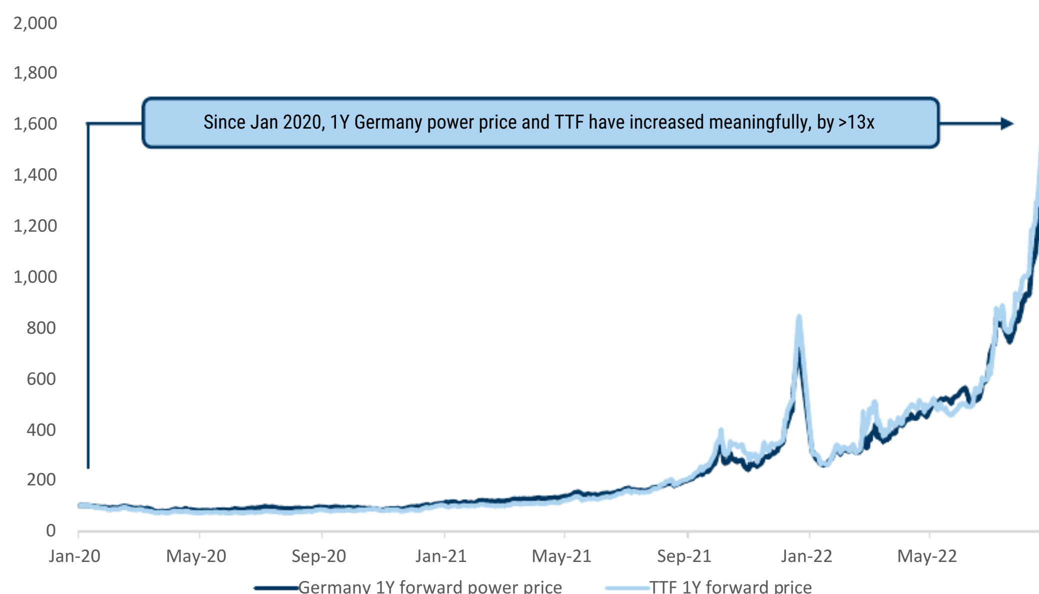
Quantifying the affordability issue: Consumers are being squeezed

For most families and industrial customers in Europe, energy bills are renegotiated every twelve months; on our estimates, energy bills for most consumers will peak this winter: we estimate a c.€500/month for power and gas, implying a c.200% increase vs. 2021 (bills were c.€160/month). Energy bills could approach €600/month in a zero flows (from Russia) scenario. For Europe as a whole, this would be equivalent to a near +c.€2 tn increase in gas and power spending (equivalent to c.15% of GDP, we estimate).

Households could see their monthly spend rise to c.€500/month

Since January 2020, 1-year forward gas and power prices – usually the reference when signing new energy supply contracts for families or industrial customers – have each increased by more than 13x. The following exhibit shows this evolution, rebased to 100.

Exhibit 13: Since early 2020, 1-year forward gas and power prices have increased by more than 13x
Germany power and TTF 1-year forward price evolution (rebased to 100)



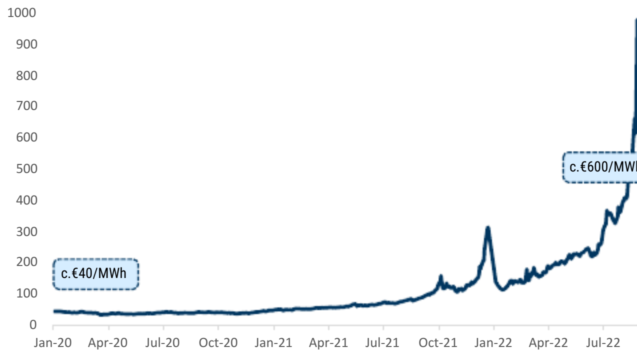
As of August 31, 2022

Source: Bloomberg, Goldman Sachs Global Investment Research

The two exhibits below show the evolution of gas and power prices in absolute terms. As can be seen, the German 1-year forward price is currently c.€600/MWh, from just over €40/MWh two years ago. Other countries in Europe have seen a similar evolution. Gas (TTF) is now at c.€240/MWh, from €16/MWh in early 2020.

Exhibit 14: Currently, the German power price is c.€600/MWh, from just over €40/MWh in early 2020

Germany 1-year forward power price evolution (€/MWh)



As of August 31, 2022

Source: Bloomberg

Exhibit 15: The gas TTF price is now c.€240/MWh, from c.€16/MWh in Jan 2020

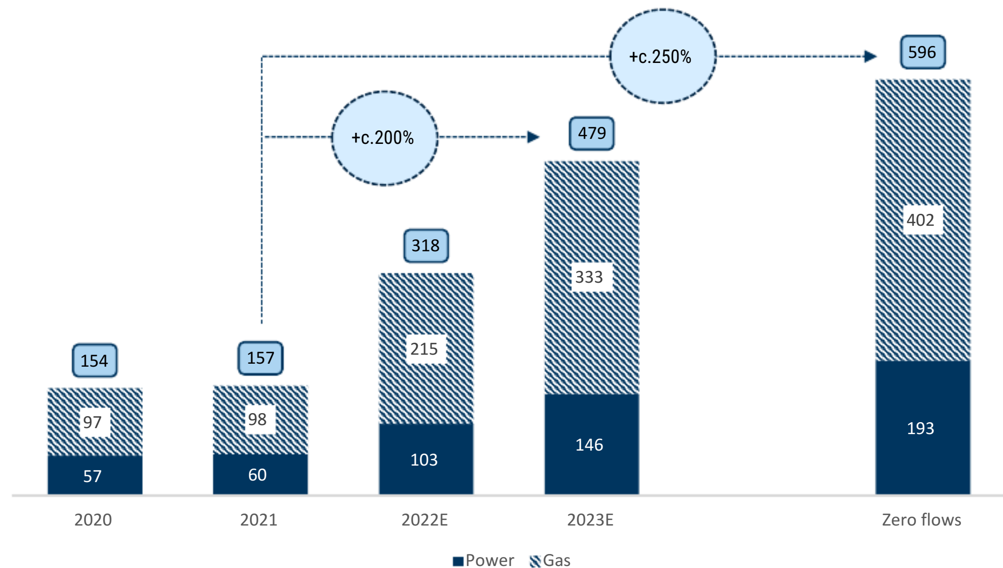
TTF 1-year forward price evolution (€/MWh)

Source: Bloomberg

On our estimates, in 2021, the average Italian family spent about €160/month on power and gas consumption, or less than €2,000 per year. The current forward curves suggest that the marginal renegotiation is at a cost of c.€500/month, a c.200% increase from the 2021 level. Energy bills could approach €600/month in a zero flows (from Russia) scenario, we estimate (see here and here for previous supporting analysis).

Exhibit 16: Based on current forward curves, household energy bills in Italy could reach nearly €500/month by 2023

Italian power and gas household bills evolution (€/month)

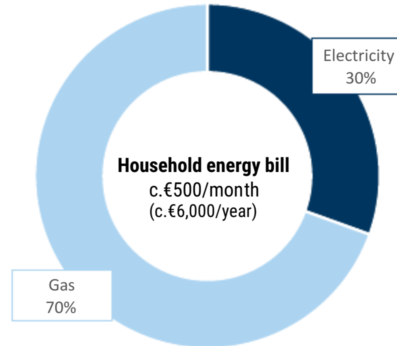


Source: Eurostat, Goldman Sachs Global Investment Research

The exhibit below shows that gas would be the main contributor to the increase in household energy bills, representing more than two-thirds of it.

Exhibit 17: On our mark-to-market estimates, gas will account for about two-thirds of the average monthly energy bill payment

Typical Italian household energy bill breakdown by source, 2023E (percentage)

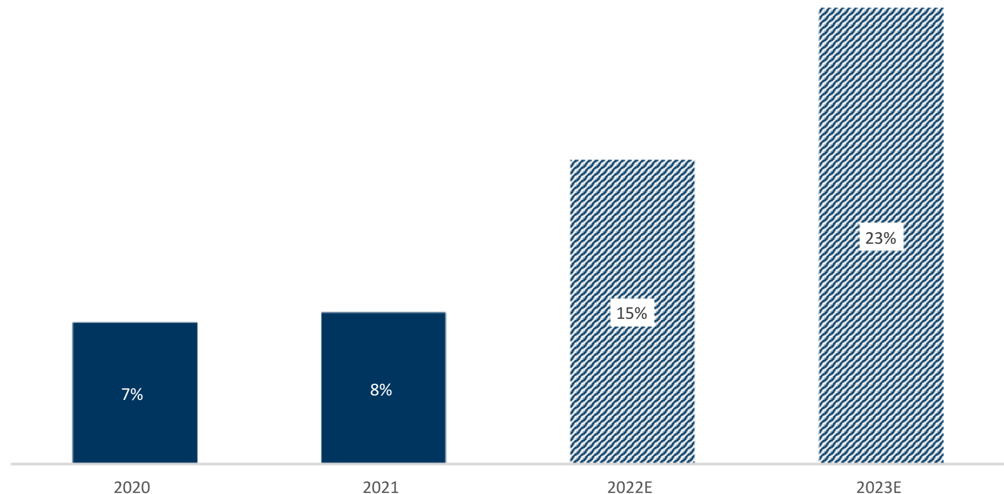


Source: Goldman Sachs Global Investment Research

The following exhibit shows the evolution of gas/power bills, as a percentage of households' disposable income, for Europe. As a reference, over the last decade (including 2020), energy bills have represented c.7% of households' income in the region. At current power and gas prices however, this percentage could significantly increase over the next few years. As per below, if we assume constant household incomes to 2023 (at 2020 levels) and current forward curves, energy bills could represent more than 20% of households' disposable income by then, >3x the current level.

Exhibit 18: At current gas/power prices, energy bills could represent >20% of households' disposable income by 2023, we estimate

EU households' energy bills over gross disposable income evolution (percentage)



EU average calculated as an average of Germany, Spain, France and Italy

Source: Eurostat, Goldman Sachs Global Investment Research

The energy crisis could cost Europe c.€2 tn in higher energy bills

For Europe as a whole, we estimate that the increase in energy costs through 2021-23 could approach €2 tn, equivalent to c.15% of the region's GDP.

Exhibit 19: For Europe as a whole, the increase in energy costs through 2021-23 could approach €2 tn, we estimate

Europe's increase in energy costs calculation (TWh, €/MWh and € bn)

	Power	Gas	Energy
Consumption TWh	3,300	5,500	-
Consumption adj for CCGTs TWh	3,300	4,125	-
Energy price in 2021 *€/MWh*	75	27	-
Current energy price *€/MWh*	450	200	-
Energy bills increase 2021-now *€ bn*	1,238	714	**1,951**

Source: Goldman Sachs Global Investment Research

The following Exhibit shows a sensitivity analysis in the surge in energy bills for Europe, depending on the development of gas and power prices.

Exhibit 20: Europe's energy bills could surge by c.€1-4 trillion vs 2021, depending on the evolution of gas/power prices

Surge in Europe's gas/power bills vs 2021 (power at €75/MWh, gas at €27/MWh)

	EU Energy bills increase vs 2021 (€ bn)		
	Power	**Gas**	**Energy**
Gas €100/MWh, Power €250/MWh	578	301	**879**
Gas €150/MWh, Power €350/MWh	908	507	**1,415**
Gas €200/MWh, Power €450/MWh	1,238	714	**1,951**
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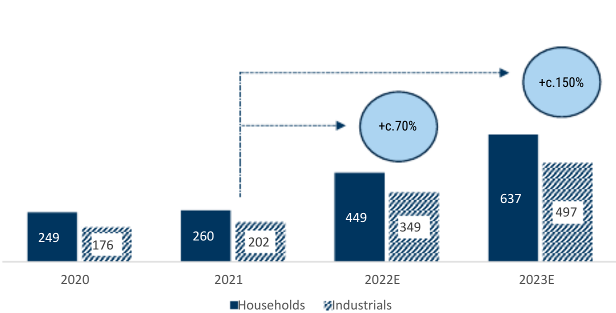
Gas €350/MWh, Power €750/MWh	2,228	1,332	**3,560**
Gas €400/MWh, Power€ 850/MWh	2,558	1,539	**4,096**

Source: Goldman Sachs Global Investment Research

If current 1-year forward prices remain unchanged for the coming six months, we estimate that supply contract renegotiations would lift the EU's power and gas unitary bills by c.200%, vs. 2021. As a reference, the exhibits below show (using Italy as an example) the unitary cost of energy (€/MWh) evolution of gas and electricity, for both industrial users and households.

Exhibit 21: EU power bills could increase by c.70% in 2022, and by c.150% in 2023, vs. 2021

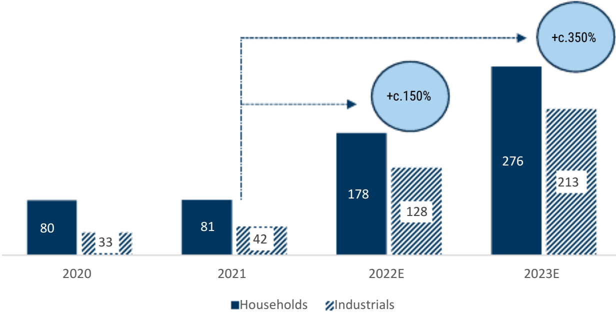
Italian household and industrial electricity bills; evolution (€/MWh)



Source: Eurostat, Goldman Sachs Global Investment Research

Exhibit 22: EU gas bills could increase by c.150% in 2022, and by c.350% in 2023, vs.2021

Italian household and industrial gas bills; evolution (€/MWh)



Source: Eurostat, Goldman Sachs Global Investment Research

Windfall taxes debate is misplaced: the RWE paradox

As described above, we estimate that the increase in energy bills for Europe on a mark-to-market basis is currently c.€2 tn, vs.2021. European Utilities generate c.€30 bn of net income, globally, across their divisions. In this context, even eliminating the Utilities' bottom line would mitigate only c.1% of the increase in bills we anticipate, while harming private investment in energy security and compromising the REPowerEU plan. Crucially, consensus estimates (Bloomberg) do not reflect current energy prices: for example, if we were to mark-to-market for current gas/power forward curves, our 2022E EBITDA for RWE would reach c.€30 bn, roughly in line with its current market cap, and c.7x greater than current consensus.

Eliminating the European Utilities' net income would address only c.1% of the problem

The European Utilities generate c.€30 bn net income annually, globally and across all divisions (including regulated activities). As such, even eliminating the Utilities' bottom line would solve c.1% of the problem.

Exhibit 23: European Utilities generate c.€30 bn net income pa: eliminating this would address only c.1% of the problem

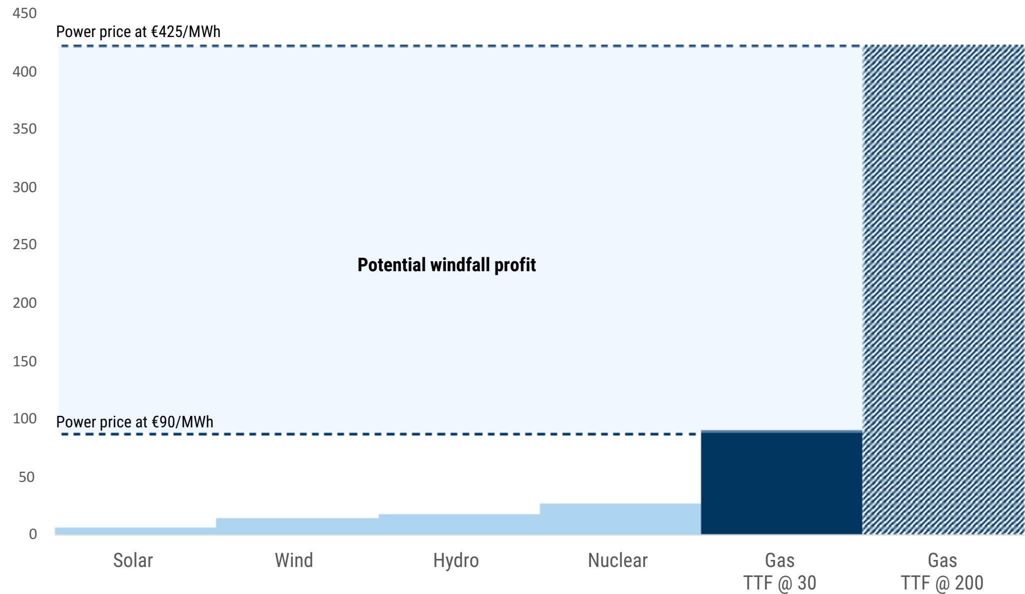
European Utilities annual net income evolution, 2021-25E (€ bn)

Source: Goldman Sachs Global Investment Research

Severe ad hoc measures would seriously impair the ability to carry out the REPowerEU plan

Given the impact that the Energy Crisis is likely to have on households' disposable incomes and on corporate margins, we believe all excess profits will be subject to measures. As described in previous reports (see here), we believe there is one major area to address: fixed-cost power generation. Merchant, fixed-cost activities (hydro, nuclear, merchant wind, merchant solar) benefit from rising gas/power prices, without any impact on the cost base. This is shown in the following exhibit.

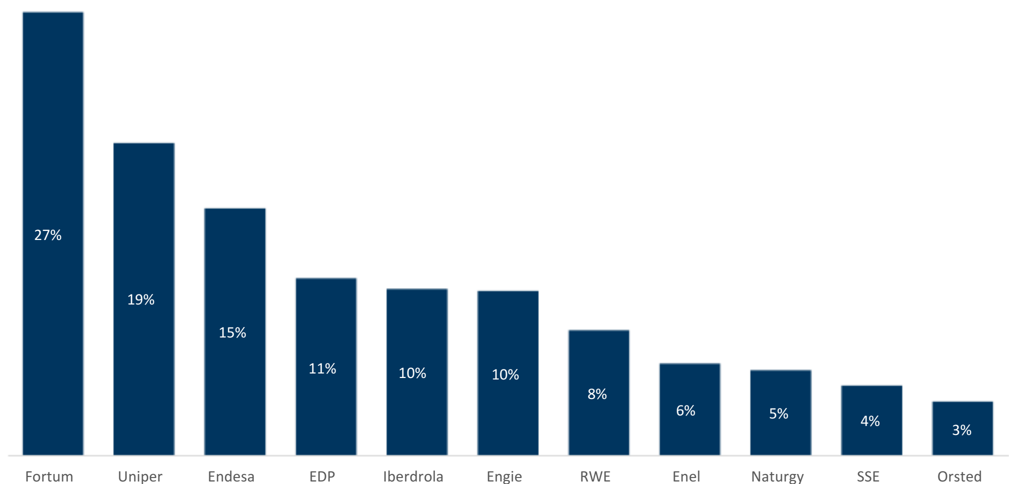
Exhibit 24: Merchant, fixed-cost activities benefit from rising gas/power prices, without any impact on the cost base
Impact from rising gas prices on power supply curve (€/MWh)



Source: Goldman Sachs Global Investment Research

In this context, investors continue to ask us about the sensitivity of company earnings to a €10/MWh windfall tax (or price cap) – we show our estimate of this in the following exhibit.

Exhibit 25: Fortum, Uniper and Endesa would be particularly sensitive to a windfall tax, we estimate
Net income sensitivity to a €10/MWh windfall tax by company, 2023E (percentage)

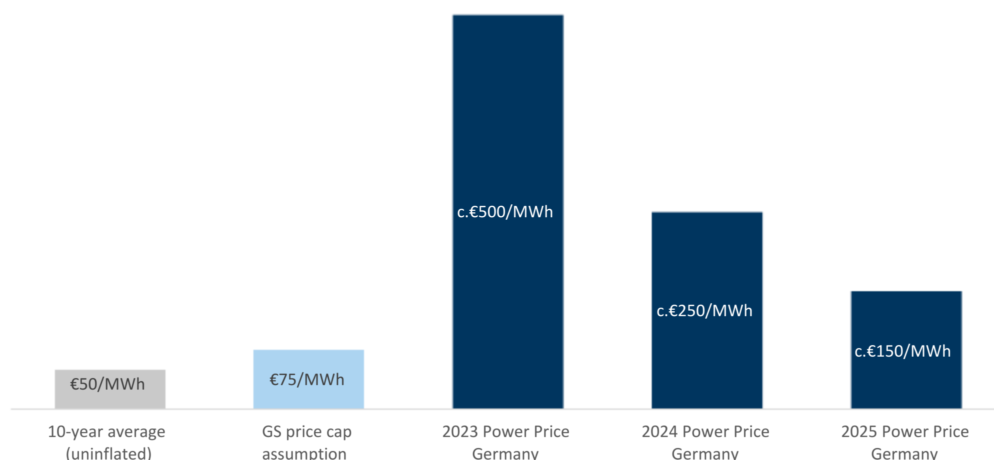


Source: Goldman Sachs Global Investment Research

Critically, the base-case assumptions are vital to this analysis: our current estimates assume a €75/MWh price cap on unregulated volumes sold. The exhibit below provides

context for this, showing the historical long-term power price of c.€50/MWh, our price cap assumption of €75/MWh (consistent with measures already implemented in Spain and Italy), and the forward curves in Germany for 2023-25.

Exhibit 26: Our estimates assume a €75/MWh price cap on unregulated volumes sold, well below current forward curves in Germany
Germany power price under different scenarios (€/MWh)



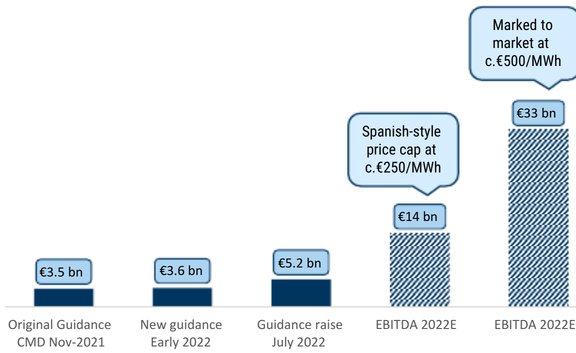
Source: Bloomberg, Goldman Sachs Global Investment Research

The RWE paradox: c.€30 bn mark-to-market EBITDA absent from guidance...what windfall?

RWE's share price has been falling since late last week, coinciding with press reports (here) suggesting a windfall profit tax could be introduced in Germany. Until now, nothing has been confirmed, but we view the share price movement as a counter-intuitive response to suggestions of such a tax, for the following reasons:

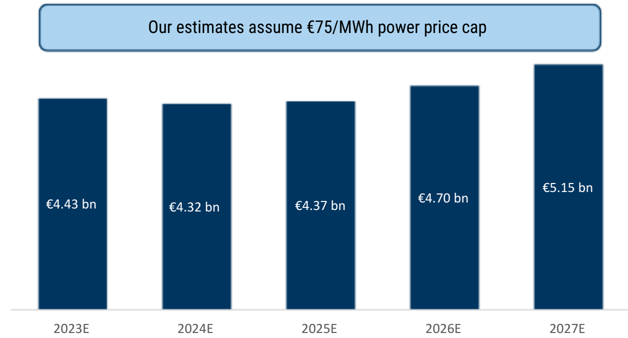
1. If we were to mark to market gas and power prices to the current forward curve (German 1Y forward at c.€500/MWh), we estimate that RWE would deliver EBITDA of c.€30 bn for 2022. Marking to market instead with a price cap mechanism similar to that which was introduced in Spain/Italy recently would bring RWE's potential EBITDA close to c.€15 bn;
2. This year, the company has substantially raised its 2022 EBITDA guidance (it is now at €5.0-5.5 bn). Besides being entirely disconnected from the mark to market level, we note that most of recent upgrade to guidance has been driven by activities outside Germany;
3. Per our analysis, the stock is pricing in no upside from the higher-for-longer energy backdrop, and is pricing in zero value from future capacity additions: our 2024-25 EPS estimates already assume a price-cap of €75/MWh (£75/MWh in the UK) across the entire portfolio, and on this basis we are still c.20% ahead of Bloomberg consensus.

Exhibit 27: RWE has substantially raised its guidance this year
RWE's EBITDA 2022 guidance evolution and marked to market (€ bn)



Source: Company data, Goldman Sachs Global Investment Research

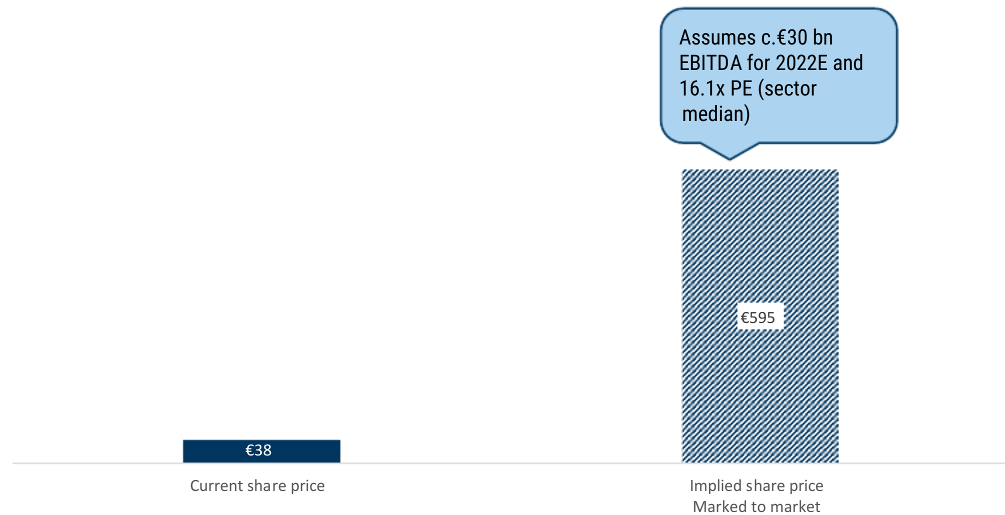
Exhibit 28: Our estimates for RWE include €75/MWh power price cap
RWE's EBITDA evolution, GSe (€ bn)



Source: Goldman Sachs Global Investment Research

A marked-to-market EBITDA of c.€30 bn for 2022E would imply, on our estimates, net income of c.€25 bn. If we assume the sector median P/E for 2022E (currently 16.1x), the implied share price for RWE in this scenario would be close to €600, vs. the current share price of €38.

Exhibit 29: In a fully marked-to-market scenario, RWE could be worth c.€600/share
RWE's implied share price in different scenarios (€ per share)



Source: Bloomberg, Goldman Sachs Global Investment Research

Likely solutions and why the market appears overly-negative

On September 9, the EU will meet to discuss potential solutions to the triple-digit spike in power prices: its core aim is to contain bill increases, or to support consumers that are burdened by it. As part of this process, we believe that the EU is likely to introduce rules to limit the future rise in profits for power and gas companies. As such, the goal is not to address windfall profits per se. We anticipate the introduction of price caps in power generation, which we estimate could save Europe c.€650 bn in power bills pa. However, we do not believe that price caps would fully solve the affordability issue: the increase in gas and power bills would still be of +€1.3 tn, or c.10% of GDP we estimate. This is why we believe a "tariff deficit" might eventually be needed, to spread the recent spike in bills over 10-20 years and allow the Utilities to securitize promptly these future payments. Although this scheme would limit demand destruction, it would smooth the increase in tariffs, limit the near-term decline in industrial production, and largely defuse regulatory risk, in our view.

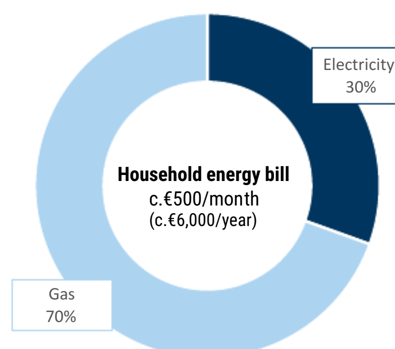
We believe the market is exaggerating regulatory concerns around power generation – the more so given indications reported in QE and Reuters (September 1), which suggest that the EU is planning to recommend the introduction of price caps, and the elimination of windfall taxes.

Why is the EU meeting on energy?

Before we address the measures that might be announced, we consider what specific problem the EU is trying to resolve:

- **The problem is one of affordability, not excess profits.** The EU will meet with its main objective being to find a solution to the triple-digit spike in energy bills: its core aim is to contain bill increases, or to support consumers that are burdened by it. As part of this process, we believe that the EU is likely to introduce rules to limit the future rise in the profits of power and gas companies. As such, the goal is not to address windfall profits per se. Currently, European Utilities generate c.€30 bn of net income, globally, across their divisions, which reflects the commodity backdrop in 2020-21, as Utilities forward hedge/sell power and gas. In this context, even eliminating the Utilities' bottom line would mitigate only 1% of the increase in bills we anticipate, while harming private investment in energy security and compromising the REPowerEU plan.
- **Gas is even more relevant than power.** On our mark-to-market estimates, gas will account for about two-thirds of the average Italian monthly energy bill payment in 2023. Power will account for only one-third. Therefore, assuming the goal is to solve the affordability problem, solving the gas issue is a more pressing concern than the cost of power. And in gas, Utilities are the "middle man"; in other words, Utilities have to procure gas at rising cost and must increase bills to pass these costs through. In gas, the upstream producers are in fact seeing rising revenues and profits.

Exhibit 30: On our mark-to-market estimates, gas will account for about two-thirds of the average monthly energy bill payment
Typical Italian household energy bill breakdown by source, 2023E (percentage)



Source: Goldman Sachs Global Investment Research

We see scope for price-caps and (potentially) a tariff-deficit

Given the success of measures already introduced in certain countries (Spain, Italy, France), and our own analysis, we see three potential outcomes of the meeting.

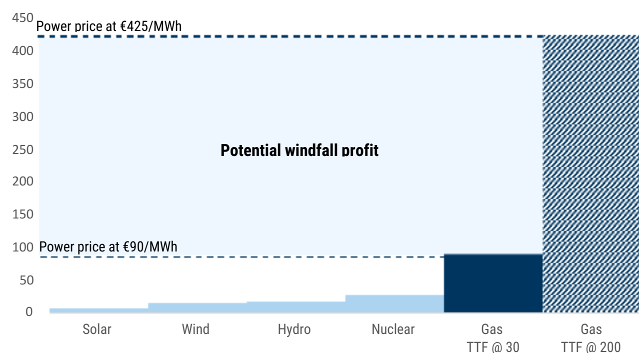
Temporary price caps

There are two types of price caps that we believe might be introduced:

1. **Power generation price cap on gas.** As seen in Spain, CCGTs are fully compensated for gas procured, while the gas price which CCGTs can translate into hourly power prices is capped. In Spain, the gas price will be capped at €70/MWh by the end of the year, or about 25% of the current TTF price. Essentially, this means that a CCGT would be remunerated for its gas procurement cost (say c.€200/MWhg currently), but only be able to translate a capped gas price (c.€70/MWh in Spain) into the power hourly auctions. As a result, although the profitability of CCGTs remains unchanged under this mechanism, it leads to a decoupling of the Spanish forward curves from those of the rest of Europe, as shown in the exhibit below.
2. **Power generation price cap on fixed-cost technologies.** Power prices for fixed-cost technologies (hydro, nuclear, merchant wind, merchant solar) could simply be capped: in Italy for instance, the government has chosen to use the 10-year average, revalued by inflation (up to €67/MWh if certain conditions are met). In Spain, forward sales from fixed-cost technologies are capped at €75/MWh (adjusted for network losses).

Exhibit 31: Potential windfall profits are created in rising gas price environments

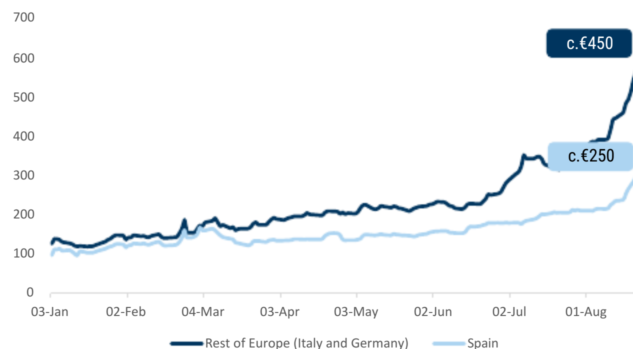
Impact from rising gas prices on power supply curve (€/MWh)



Source: Goldman Sachs Global Investment Research

Exhibit 32: A temporary price cap on gas led to a decoupling of the Spanish forward curve from those of the rest of Europe

Forward (1-year) power price evolution, by region (€/MWh)



Source: Bloomberg, Goldman Sachs Global Investment Research

We estimate that introducing a power generation price cap on gas across Europe, like the one in Spain, would lower European power bills by c.€650 bn. This would bring the mark-to-market increase in energy bills to +€1.3 tn vs. the current mtm level of +€2 tn (vs. 2021), thus lowering the potential amount that would need to be securitized each year. Finally, we note that a price cap on gas does not preclude an additional price cap on power prices applied to fixed cost technologies (solar, wind, hydro and nuclear).

Exhibit 33: Without a price cap mechanism, we estimate energy costs at the EU level would amount to c.€2 tn pa

Europe's increase in energy costs calculation (TWh, €/MWh and € bn)

Status Quo	Power	Gas	Energy
Consumption TWh	3,300	5,500	-
Consumption adj for CCGTs TWh	3,300	4,125	-
Energy price in 2021 *€/MWh*	75	27	-
Current energy price *€/MWh*	450	200	-
Energy bills increase 2021-now *€ bn*	1,238	714	**1,951**

Source: Goldman Sachs Global Investment Research

Exhibit 34: Introducing a price cap mechanism on gas like the one in Spain would lower European energy costs by c.€650 bn, to c.€1.3 tn pa

Europe's increase in energy costs calculation (TWh, €/MWh and € bn)

With a power generation price cap on gas	Power	Gas	Energy
Consumption TWh	3,300	5,500	-
Consumption adj for CCGTs TWh	3,300	4,125	-
Energy price in 2021 *€/MWh*	75	27	-
Current energy price *€/MWh*	250	200	-
Energy bills increase 2021-now *€ bn*	578	714	**1,291**

Source: Goldman Sachs Global Investment Research

Tariff deficit

This mechanism would essentially defer and spread the spike in energy bills over a number of years (in our example, we assume +8% pa, for c.20 years), thus smoothing the impact on consumers. In such a scheme, Utilities typically securitize these receivables with a credit institution. Given the large amounts involved on this occasion (c.€2 tn, as already detailed), the securitization might be done at a centralized level (ECB, Eurobonds). More details on the tariff deficit mechanism can be found in *Tariff Deficit would minimize the impact on consumers* section, later in this report.

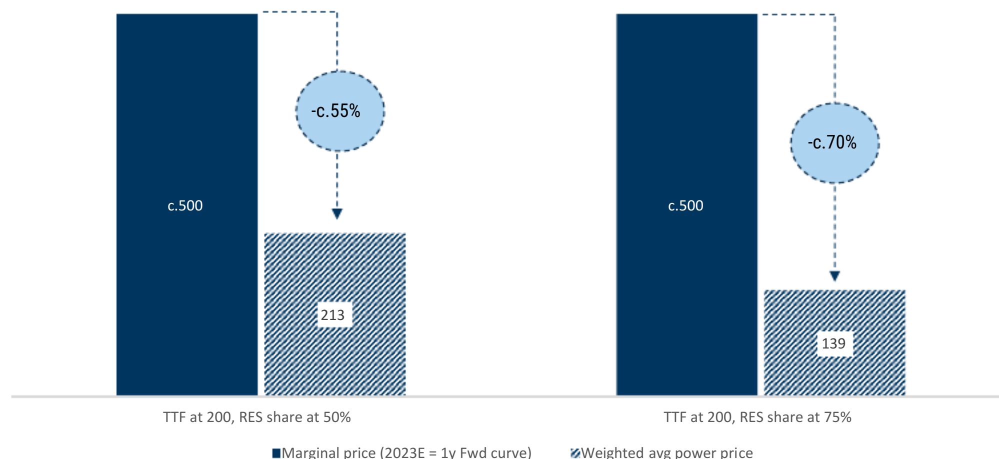
Longer term: New market design and gas decoupling

As explained in our October 2021 report (see here), the increase in commodity prices

throughout 2021, the gradual rising share of fixed-cost generation (wind, solar), and the shrinking role of thermal plants were good enough reasons to spark a debate on a new market design. In that same report, we noted that the main critique of the current system is that gas plants, which currently produce c.25% of the electricity needed, set prices c.75% of the time, implying high power prices for the entire system. A new design may require protracted debate (1-2 years) as the technicalities and the analysis of potential repercussions is highly complex. Nevertheless, one approach might aim to decouple gas prices from the prices achieved by fixed-cost technologies. Wind and solar in particular could be remunerated on a "cost-plus" basis for the duration of their lives, we believe. In our view, customers are better served when the profitability of wind or solar are driven by competitive auctions, rather than being linked to the gas price. Moving away from "marginal pricing" and towards a system based on "weighted average" prices could lower current forward curves from c.€500/MWh to €210/MWh, as shown in the following exhibit, a c.55% reduction. If we were to increase the share of RES production in the system to 75% (consistent with the REPowerEU plan), we estimate that power prices would drop further, to c.€140/MWh (a c.70% reduction) using this weighted average approach.

Exhibit 35: Moving away from marginal pricing and towards a system based on weighted average prices could significantly lower current forward curves

Power price under different market designs, under different scenarios (€/MWh)



This calculation assumes the following prices for the remaining technologies: hydro (€50/MWh), nuclear (€65/MWh), onshore wind (€45/MWh), offshore wind (€70/MWh), solar (€40/MWh), other renewables (€85/MWh), lignite (c.€130/MWh) and coal (c.€200/MWh)

Source: Goldman Sachs Global Investment Research

Tariff deficit would minimize the impact on consumers

The introduction of a "tariff deficit" could provide a powerful tool: such a mechanism would essentially defer and spread the increase in energy bills over a number of years (we illustrate this by assuming +8% pa, for c.20 years), smoothing the impact on consumers. In such a scheme, Utilities would securitize these receivables with a credit institution, as seen recently in France, in Spain in the 2000s, and as is currently being debated in the UK and Italy. A state guarantee would reduce risks further, and should allow for lower securitization costs. Such a development could prove a material positive, clearing regulatory event risk, particularly for businesses with large supply portfolios (e.g., EON, Enel).

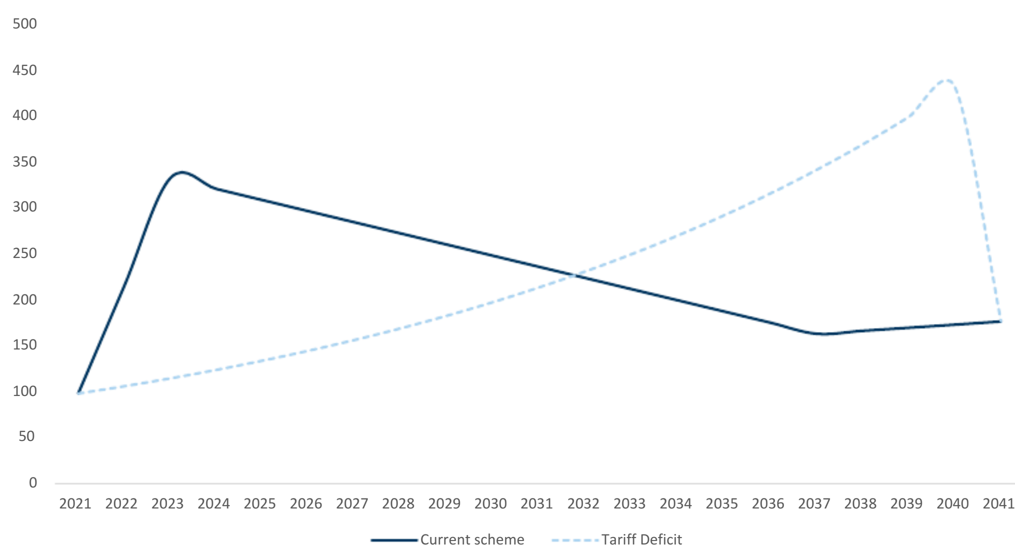
How would a tariff deficit work in practice?

We present a simulation of how a theoretical tariff deficit approach might work and its impact on Italian gas bills. On our estimates, in 2021 a typical family spent (on average) nearly €100/month on gas bills. Under the current regime (clients are liberalized and typically sign 12-month fixed-price contracts with suppliers), we estimate that 2022 gas bills will reach nearly €220/month, and then peak in 2023 (based on the current forward curves) at above €300/month.

A tariff deficit would spread these bills over time. As a hypothetical example, an annual increase of 8% in bills out to 2040 (from the 2021 average) would imply (assuming no cost of carry, i.e., no interest rate adjustment, for simplicity) the same payments in gas bills over the coming couple of decades, but with a very different schedule. In 2041, bills would normalize.

Exhibit 36: Tariff deficit would spread the same cost for gas bills, over a much longer period of time, as seen in this example for Italy

Italy monthly gas bills per household evolution, average per month (€/month)



Source: Goldman Sachs Global Investment Research, Eurostat

Clearly, for this approach to be effective, certain conditions are needed:

- **Securitization**: the ability to securitize these future payments is key in our view, to avoid any excessive burden on the balance sheets of Utilities (the Utilities would have to procure gas at very expensive price levels, and would be selling it at a loss until, in our example, 2031). Securitizing these future payments would allow the Utilities to maintain solid credit ratings and an appropriate liquidity position.
- **Cost of carry adjustment**: for simplicity, our example assumes no cost of carry. Clearly though, any tariff payment deferral would likely have to be adjusted (increased) for interest costs.
- **Visibility on the decline in long-term bills**: the tariff deficit mechanism works as an extraordinary measure, in extraordinary circumstances. We believe the double-digit supply shock caused by the reduction in Russian gas flows qualifies as such. Over the past 15 years, the average gas price in Europe has been less than €25/MWh. Although the market may remain tighter for longer, alternative supplies (US LNG, North Africa, etc.) and – most of all – the electrification of buildings (space heating) imply, in our view, a near-certain reduction in longer-term costs.

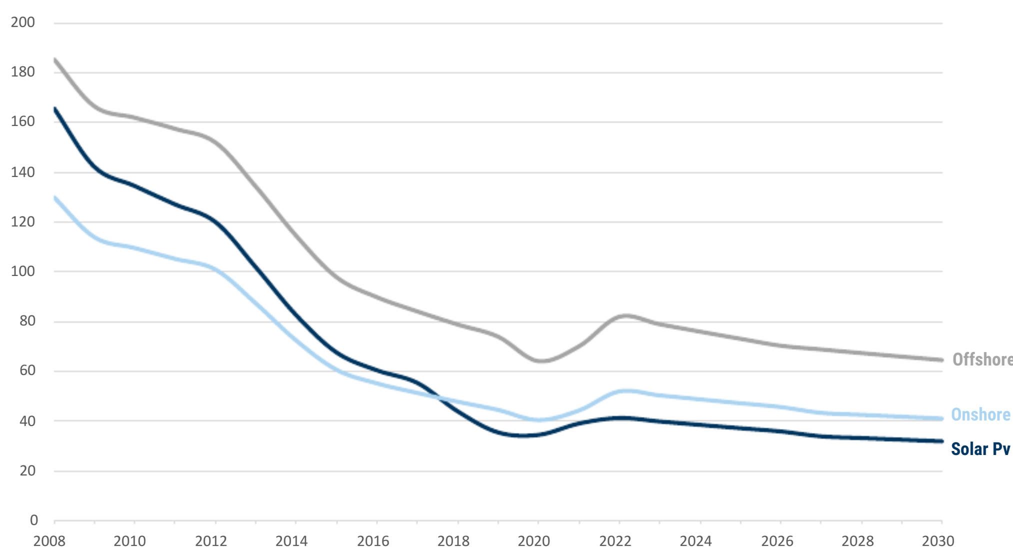
RES are part of the solution to the affordability problem

We see renewable sources (wind and solar above all) as central to any structural solution to the energy affordability crisis. Since 2010, the levelized cost of electricity of these technologies has fallen by c.60%-80%. Depending on location and technology type, on our 2025 estimates, the LCOE for wind and solar will be €35-70/MWh (consistent with IRRs at 200 bp over WACC). This compares with forward curves across Europe of c.€500/MWh in most regions, and replacement costs for thermal plants at c.€600/MWh.

A 60%-80% drop in LCOE since 2010

Over the past decade, the economics of renewables have dramatically improved. The cost of onshore wind, as an example, has dropped by more than c.60% since 2010, mainly driven by the better performance (i.e., output) of larger and larger turbines. We have seen an even steeper cost reduction for solar PV, which today is c.80% cheaper to develop and operate than it was ten years ago. Here, most of the cost reduction has been a result of the industrialisation and automation of the manufacturing process.

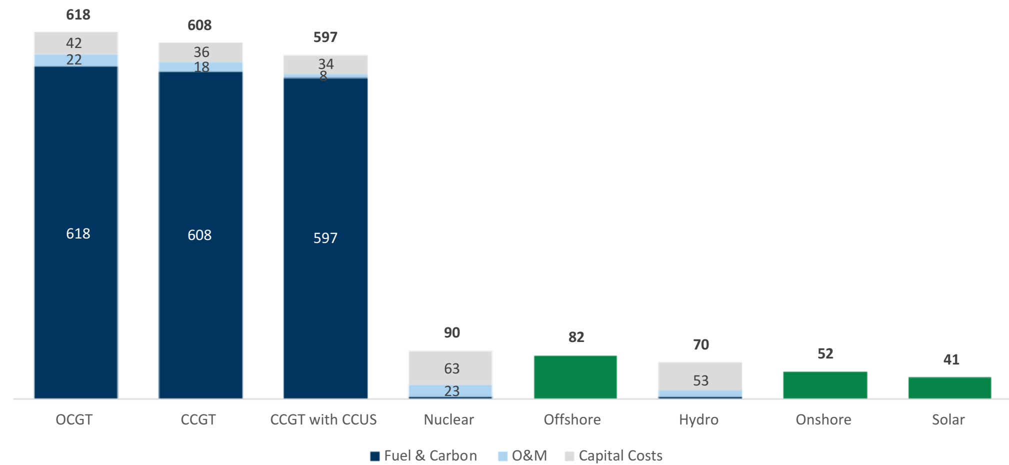
Exhibit 37: The cost of renewable generation has decreased by c.60%-80% since 2008
Wind and solar LCOEs (€/MWh)



Source: Goldman Sachs Global Investment Research

Renewables have become a deflationary force for power systems. In other words, wind and solar are now part of the solution to the affordability problem, not their cause. The following exhibit shows that the LCOEs of wind and solar are well below the cash costs of thermal plants, and are even lower than the replacement costs of legacy generation assets.

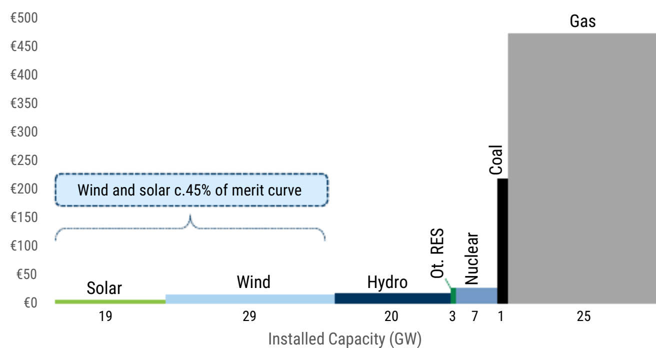
Exhibit 38: LCOEs of wind and solar are well below the cash costs of thermal plants, and are even lower than the replacement costs of legacy generation assets
Levelised cost of electricity by technoloy for 2022E, cost breakdown (€/MWh)



Source: Goldman Sachs Global Investment Research

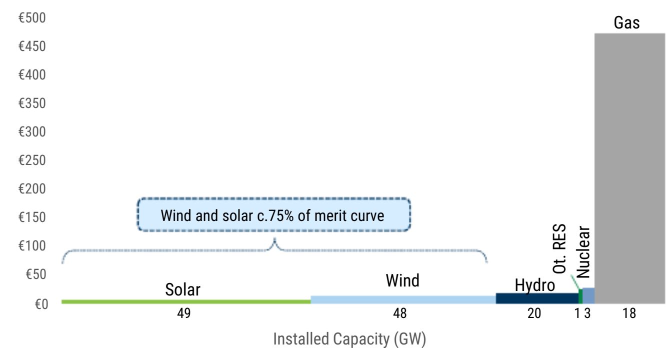
The following exhibits show the power generation supply curves in Spain, for 2022E and 2030E. We can see a significant increase in RES share (wind, solar) in the generation mix over time: while they represent c.45% of the generation mix in 2022E, by 2030E this should increase to c.75%. This leads, by the end of the decade, to a flattening of the merit order curve, marginalising the role of thermal plants. We estimate that thermal (gas) plants will be marginal some 60% of the time by then, vs. c.70%-80% currently. Given the cost-gap between gas plants and renewables, a lower share of thermal plants at the margin would put downward pressure on wholesale power prices.

Exhibit 39: Gas is the price-setting technology in most hours
Merit order curve (€/MWh), 2022E



Source: Goldman Sachs Global Investment Research

Exhibit 40: Renewables should shift the supply curve
Merit order curve (€/MWh), 2030E



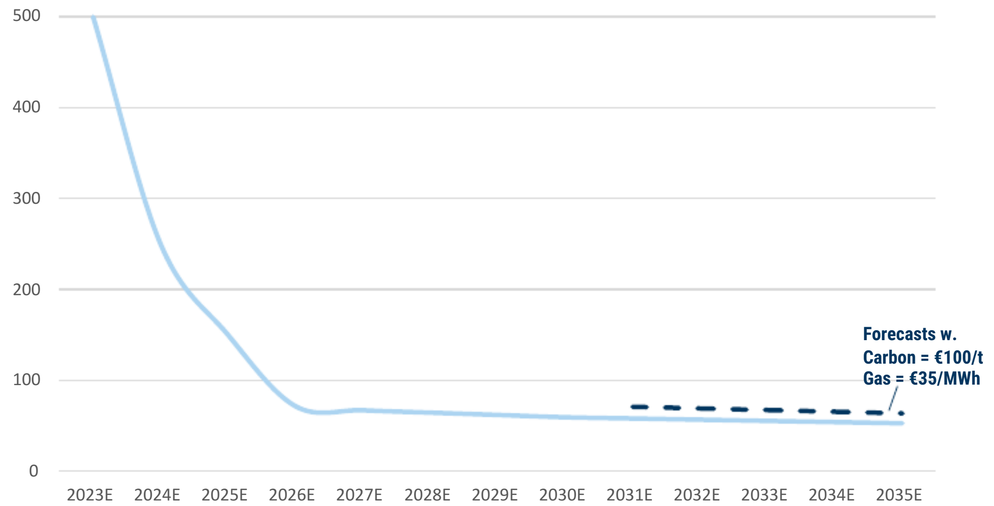
Source: Goldman Sachs Global Investment Research

Exhibit 41 details our power price forecast for the German market; in light of the deflationary effect of renewables, and thanks to the normalization of commodities, we forecast prices declining to c.€60/MWh by 2030, and being sub-€55/MWh by 2035. These are calculated assuming gas prices in line with the long-term average of

€22.5/MWhg and carbon at €50/t. If we were to maintain the CO_2 price at €100/t (the current level) and gas at €35/MWhg (the average between the long-term level and the 2021, pre-conflict, level), then our 2030-35 estimates would be much higher.

Exhibit 41: We expect the German power price to decline to c.€60/MWh by 2030E and to sub-€55/MWh by 2035E

German 1-year forward power price evolution under different scenarios, GSe (€/MWh)



Source: EEX, Goldman Sachs Global Investment Research

Electrification could cut household energy bills by c.75%

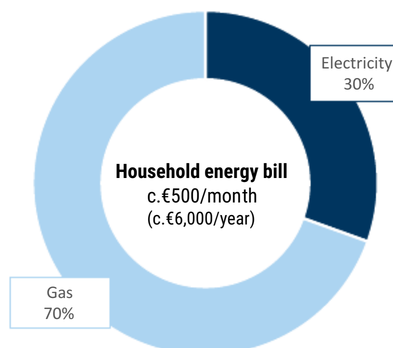
Structurally, we believe electrification would provide the most-cost effective, permanent solution: thanks to the RES cost advantage, electrifying power generation and buildings (heating) could lower energy bills by c.75% vs current levels. Furthermore, we believe bills would largely decouple from gas prices, thus minimizing the volatility of future monthly payments.

Italy: households could potentially spend c.€6,000 per year on energy bills by 2023, without intervention

If we were to assume the current gas/power forward curves remained constant, we estimate that by 2023, a typical household – we base our calculations on a typical Italian family, using official tariffs disclosed by Eurostat – would incur energy bills of c.€500/month (c.€6,000/year), reflecting two main cost items.

- **Electricity.** Electricity costs would represent about 30% of annual energy costs (c.€150/month), and would mostly reflect the costs of llighting and appliances in a typical household consuming 2.75 MWh per year.
- **Gas.** Gas bills in Italy would represent the remaining 70% of total energy costs (c.€350/month), and reflect the heavy utilisation of gas to heat residential homes during winter.

Exhibit 42: We estimate that households will spend c.€500/month on energy bills by 2023E
Typical Italian household energy bill breakdown by source, 2023E (percentage)



Source: Goldman Sachs Global Investment Research

Electrification of households could support a c.75% reduction in bills

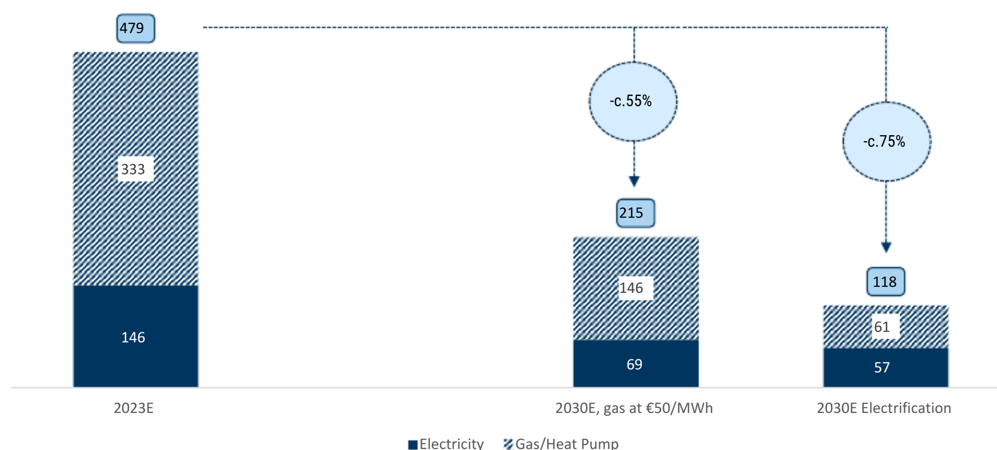
On our estimates, household energy bills could drop by c.80%, once fully electrified (see here for our previous supporting analysis on household electrification). This would imply nearly €400/month of savings (vs. current levels), or nearly €5,000 pa. This would be mostly owing to:

- **Electricity bills.** We would expect the unitary cost of electricity to drop by nearly

c.55% to 2030 in an electrification scenario. This would driven by: (1) the normalization of commodity prices (gas back to pre-crisis levels, at €50/MWh); (2) the deflationary pressure of growing RES capacity in the generation system; and (3) the lapsing of incentives on legacy RES investments.

- **Gas bills.** In an electrification scenario, we would expect gas bills to drop to zero, as heating would be electrified. This would, in turn, increase the consumption of electricity. We estimate that heat pump use (HPs) would more than double (to c.6-7 MWh pa) the annual consumption of electricity by households.

Exhibit 43: By 2030E, our analysis shows that energy bills could drop by c.75% in an electrification scenario
Typical household energy bill evolution in different scenarios (€ year)

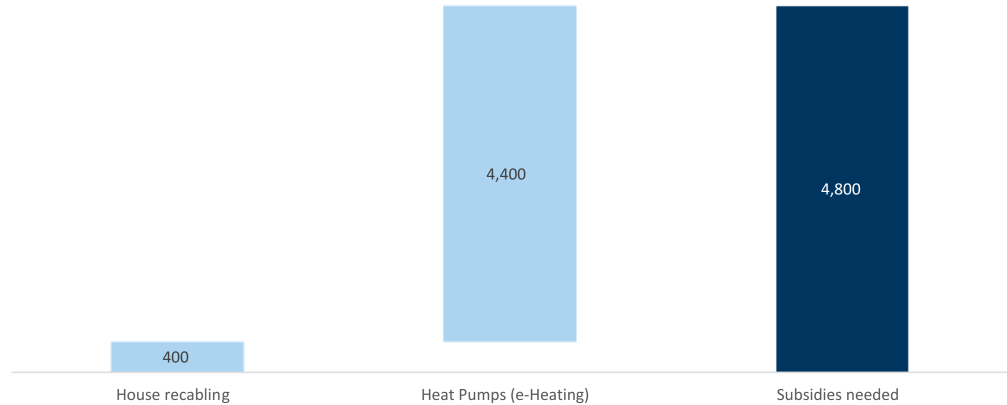


Source: Goldman Sachs Global Investment Research

The up-front costs of electrifying households

The electrification of households' energy bills implies the elimination of fossil fuel-based power generation, and the installation of a heat pump system to electrify heating. We see the need for energy policy in the process of household electrification as purely monetary: we estimate the up-front investment in HPs representing a total cost of c.€4,400 per given household. If we add to this the up-front costs for house recabling (as households intensify their electricity consumption via electrification, electricity cables will need an increase in voltage capacity, from c.3 kW to c.9 kW – also preparing consumers for an electric vehicle), the up-front investment for electrification would sit at just below €5,000 per household.

Exhibit 44: Up-front investments in HPs and recabling could represent a total cost of just below €5,000 per household, we estimate
Costs incurred in an electrification scenario, per household, breakdown by source (€)

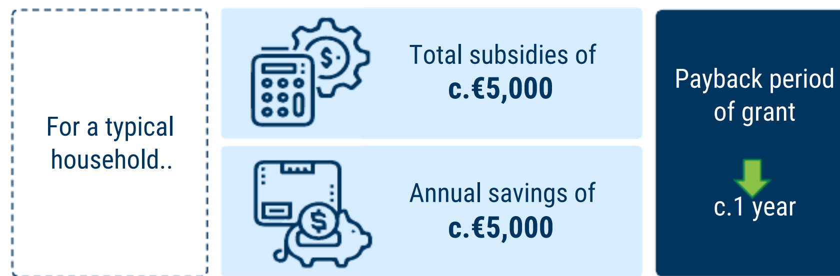


Source: Goldman Sachs Global Investment Research

- **Household recabling would require up-front investments of c.€400 per household.** This is the cost to upgrade cables to avoid overloads as household electricity consumption intensifies. We estimate an average cost per household of c.€70/kW, and we assume an average increase to c.9 kW from c.3 kW.
- **The electrification of heating would require some c.€4,400 of up-front costs.** This, based on our estimate, is the cost required to purchase a heat pump and to reconfigure the heating system accordingly (over and above the typical cost of a gas boiler). We assume the current cost gap between a heat pump and a gas boiler at c.€5,100, and we anticipate this gap narrowing by 2050, at a c.1% pa rate.

Against the c.€5,000 of subsidies needed, in the event that households were to be shielded from up-front electrification costs, we estimate that a typical family could save nearly €5,000 pa from there energy bills. In other words, the payback period of grants in this scenario would then be close to one year, based on current wholesale curves.

Exhibit 45: Payback period for grants for a typical household would be close to a year, at current wholesale curves



Source: Goldman Sachs Global Investment Research

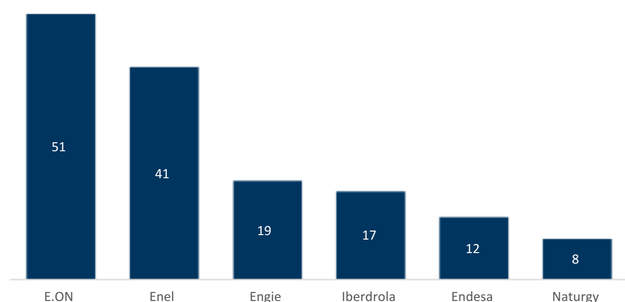
Stock negatives may be meaningful, but temporary

The Energy Affordability Crisis is likely to have several industry repercussions: the negatives may be meaningful, but appear more temporary in nature. First, we flag that regulatory risk may not yet have peaked, but may do so once energy bills have peaked this coming winter (per our expectation). Regulatory intervention could take different shapes: we investigate price-caps/windfall taxes, social tariffs and a tariff freeze. We also investigate how the spike in bills may cause demand destruction. We believe investors see power generation and (mostly) large supply portfolios as particularly risky.

Why large supply portfolios may (unjustly) be perceived as risky

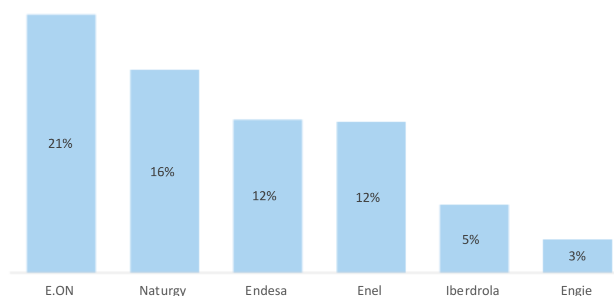
Since the start of the year, the share prices of companies with the largest exposures to supply activities (especially if they are 'short energy' - i.e., with a long customers position) have sharply underperformed. Stocks such as Enel and EON are down by more than 30% this year. Endesa and Naturgy are also down by nearly 10%.

Exhibit 46: EON and Enel have the largest portfolios of supply customers in Europe
Number of B2C power and gas supply customers in Europe by company in 2021 (mn)



Source: Company data

Exhibit 47: European supply activities account for >c.15% of Group EBITDA for EON, Naturgy and Endesa
Supply EBITDA in Europe over Group EBITDA by company, 2023E (percentage)



Source: Goldman Sachs Global Investment Research

We believe this perception of relatively high risk is driven by three factors: a higher risk of regulatory intervention, the risk of large trading losses, and the threat of rising bad debts.

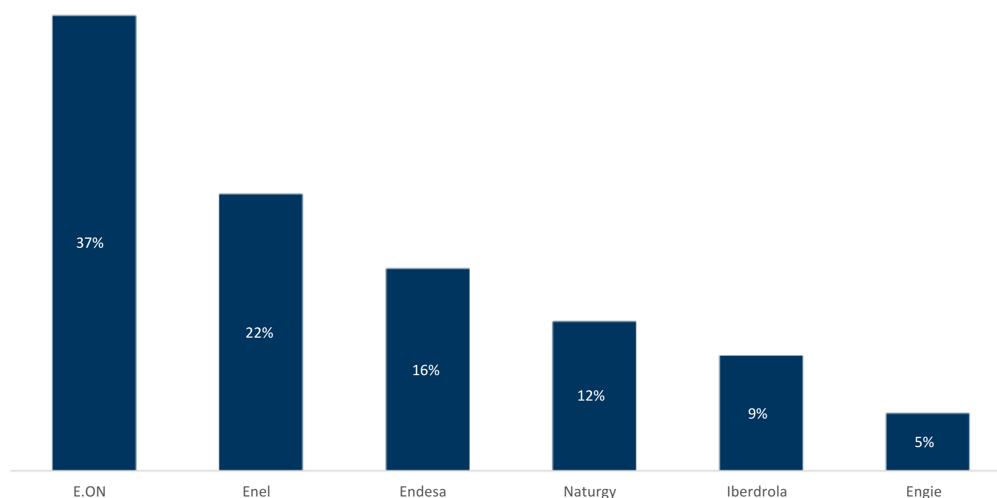
Three main sources of regulatory risk in supply activities

- **Price-caps and/or windfall taxes**. As seen in Spain (a recently introduced 1.2% revenue tax on supply) or in Romania (1Q-2022 tariff freeze), supply activities can be subject to ad hoc taxes, or tariff freezes. We believe a tariff freeze would be highly punitive (and unsustainable in the context of current price curves, as it would likely put considerable financial strain on suppliers). As a reference, a company with >50 mn customers such as EON could have c.€70 bn of revenue in Supply activities this year; as such, each 10% freeze could cost c.€7 bn, not so far away from EON's entire EBITDA.
- **Social tariffs**. Typically, a social tariff is a discount on energy bills, given to the most

vulnerable customers and paid by (socialized among) the other customers. In Spain, the government has imposed (and previously attempted to impose) a social tariff on suppliers, as a way to fund customer subsidies. In the UK, the price-cap on standard variable customers has limited the EBITDA margin that can be achieved on customers that are less prone to switch supplier. Given the exceptionality of the circumstances described in this report, the following exhibit (for purely illustrative purposes) shows our estimate of the potential bottom line impact that a 25% social tariff (at zero EBITDA margin) would have on the main Continental European suppliers.

Exhibit 48: The implementation of a 25% social tariff (paid by suppliers) could imply a c.40%-15% negative net income impact for EON, Enel and Endesa

Potential net income impact from the implementation of a social tariff, 2023E (percentage)



Iberdrola Europe's Supply Revenues for 2021 are GSe

Source: Goldman Sachs Global Investment Research

- **Tariff freeze.** A tariff freeze, in our view, could be highly detrimental to the broader energy system. Although they have been used, as seen in Romania in 1Q 2022, a freeze could create a significant spike in debt. For larger, listed corporates, the liquidity issues that this could create could lead to dividend cancellations, potential capital raises and would likely harm investments. For smaller suppliers, a freeze could threaten the entire business model. For these reasons, we see such measures as having only a very slim chance of being implemented.

Exhibit 49: A tariff freeze could be highly detrimental to the broader energy system, given the expected increase in supply revenues to 2023E

Potential supply revenues in Europe evolution by company, 2021-23E (€ bn)

Company	2021	2022E	2023E
E.ON	€62 bn	€92 bn	€123 bn
Enel	€37 bn	€56 bn	€75 bn
Iberdrola	€20 bn	€29 bn	€39 bn
Endesa	€16 bn	€24 bn	€32 bn
Engie	€12 bn	€19 bn	€25 bn
Naturgy	€8 bn	€12 bn	€16 bn
Increase vs 2021		50%	100%

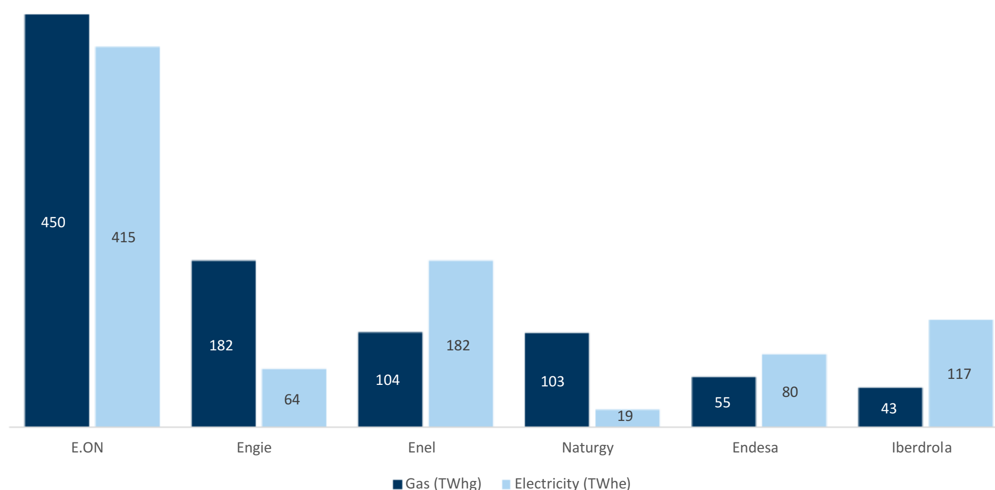
Source: Company data, Goldman Sachs Global Investment Research

Trading losses: a business risk in winter 2022/23E

The exhibit below shows volumes of electricity (TWhe) and gas (TWhg) supplied over a year (2021) by the main suppliers within our coverage. As can be seen, EON supplies the largest energy volumes in Europe (>400 TWh in both gas and electricity), followed by Engie (nearly 200 TWh of gas) and Enel (nearly 200 TWh of electricity).

Exhibit 50: EON, Engie and Enel are the EU utilities in our coverage supplying the largest volumes of gas and electricity

Gas (TWhg) and electricity (TWhe) volumes supplied in 2021 by company (TWhg and TWhe); 2021

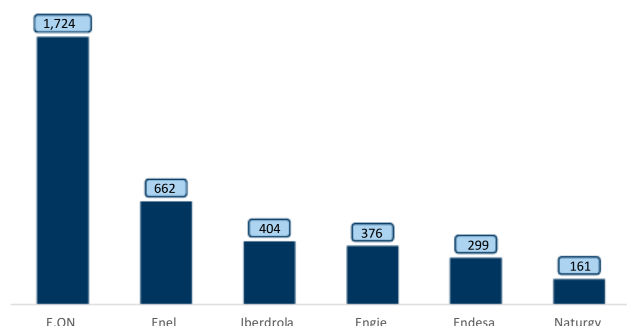


Source: Company data

Typically, suppliers hedge procurement/sales about 12 months in advance. It is not unusual for companies to leave a small share of their procurement unhedged however, to provide headroom for last-minute adjustments in consumption patterns (i.e., weather, churn rate, etc.). Although such a strategy works in a normalized pricing environment (the supplier can always access the market and buy additional volumes as needed), in environments such as the current one, this can entail large trading losses. To demonstrate this, we simulated the potential magnitude of trading losses in 4Q 2022E, if each company were to have a 2% short position in both gas and electricity volumes. The following exhibit shows the impact company-by-company. Our analysis assumes hedged prices of €55/MWh for gas and €65/MWh for electricity, vs. a 4Q 2022E gas price (TTF) at c.€235/MWh and power price at c.€625/MWh. We stress that, currently, in certain regions we are experiencing double-digit demand destruction in gas. This could therefore imply a "long energy position" into 4Q22E, and (potentially) large trading gains into year-end.

Exhibit 51: Trading losses in the current pricing environment could amount to €1.7 bn in the case of EON

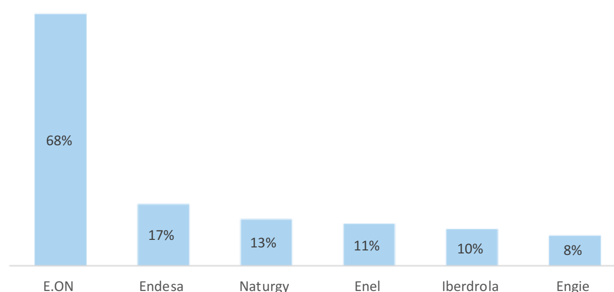
Illustrative: Potential impact from trading losses in 4Q 2022 by company (€ mn); assumes 2% short position in gas and electricity volumes



Source: Goldman Sachs Global Investment Research

Exhibit 52: Those lossses would be equivalent to c.70% of net income in the case of EON, and <25% for the remaining stocks

Net income (2022E) impact from illustrative potential trading losses in 4Q 2022E, by company (€ mn)

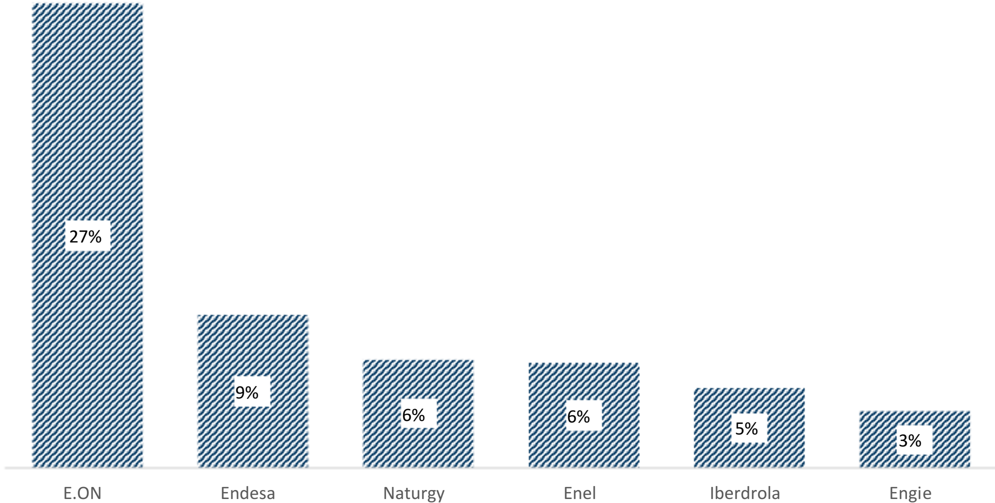


Source: Goldman Sachs Global Investment Research

Bad debt provisions could soon become relevant

Typically, suppliers are required to provision c.0.5%-1.0% of their revenues as bad debt, to account for any issues when collecting bills from consumers. However, with increasing energy bills, some consumers may struggle to pay them, or pay them on time. This could trigger further delays in payments, with companies potentially required to increase bad debt provisions to protect themselves against customers' defaults. As a reference, the following exhibit the potential impact from bad debt provisions (on 2023E net income), for each 0.5pp increase in bad debt provisions.

Exhibit 53: Rising energy bills could also trigger additional protection measures for suppliers, such as increasing bad debt provisions
Potential impact on net income for each 0.5pp increase in bad debt provisions, by company, 2023E (%)



Source: Goldman Sachs Global Investment Research

The positives are structural

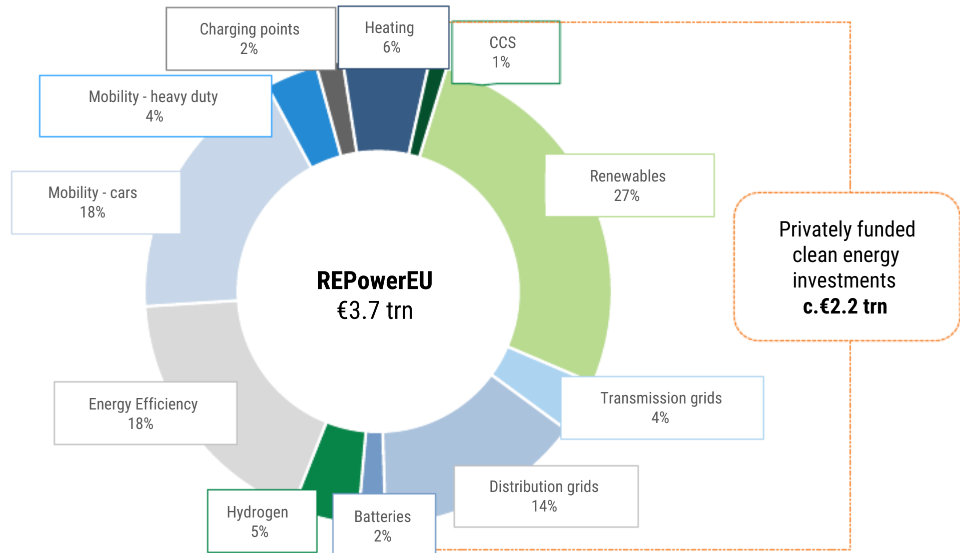
The ongoing Energy Affordability Crisis is likely to have several industry repercussions: the negative ones appear more temporary in nature (regulatory risk, demand destruction), whilst the positive ones (green energy capex super-cycle, higher for longer energy prices) have much longer duration.

Green capex supercycle is here to stay

As discussed in previous sections, we believe the current energy affordability crisis can only be structurally solved through the electrification of the European economy. Meeting the REPower EU goals would require the mobilisation of €3.7 tn at the EU level, we estimate. Of this, we estimate more than half (c.€2.2 tn) could be privately funded investment, carried out for the most part by green energy companies.

Exhibit 54: REPowerEU targets imply c.€3.7 tn of capital mobilisation by 2030E

Cumulative investments to 2030E under REPowerEU (€ tn and %)



Source: Goldman Sachs Global Investment Research

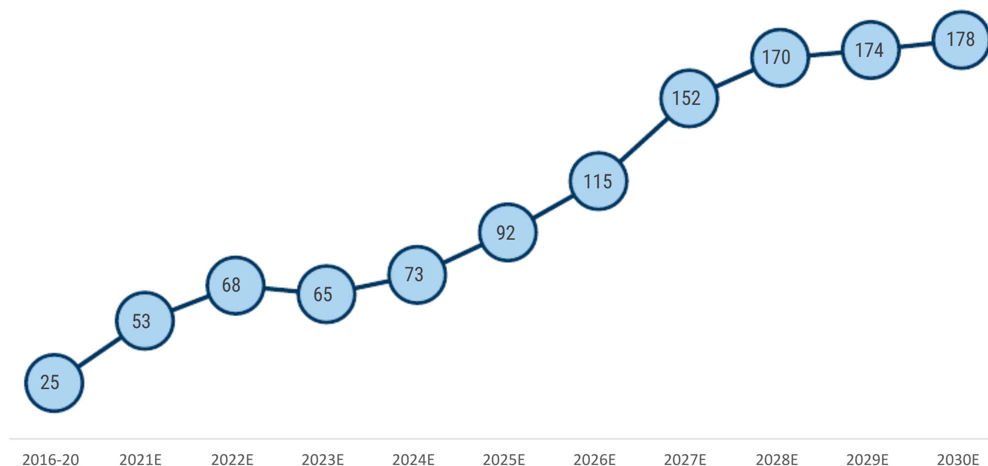
On renewables specifically (where we foresee c.€1 tn of investment to 2030E), complying with REPower EU plan requires the deployment of an additional c.900 GW in the region to 2030. This would represent a quadrupling of its installed wind and solar base (c.300 GW) in just over a decade.

Exhibit 55: REPowerEU targets >1,200 GW of renewable capacity by 2030
European solar and wind capacity under REPowerEU (GW)

Source: European Commission, Goldman Sachs Global Investment Research

However, the process of scaling up renewables investments does not happen overnight. The time needed to raise the number of public employees necessary to support the approval of permits, to develop larger pipelines, and to convert them into real assets, implies a lag between the announcement of new policies and the achievement of peak capacity growth. It is for these reasons that we believe the step up in RES investments will be gradual, and that growth will continue accelerating until the end of the decade. The following exhibit shows our estimates of the annual capex in wind/solar (€ bn) necessary for Europe to comply with its REPower EU plan. Investments (at c.€25 bn per year, in 2016-20, on average) could reach a peak of c.€180 bn pa by the end of the decade.

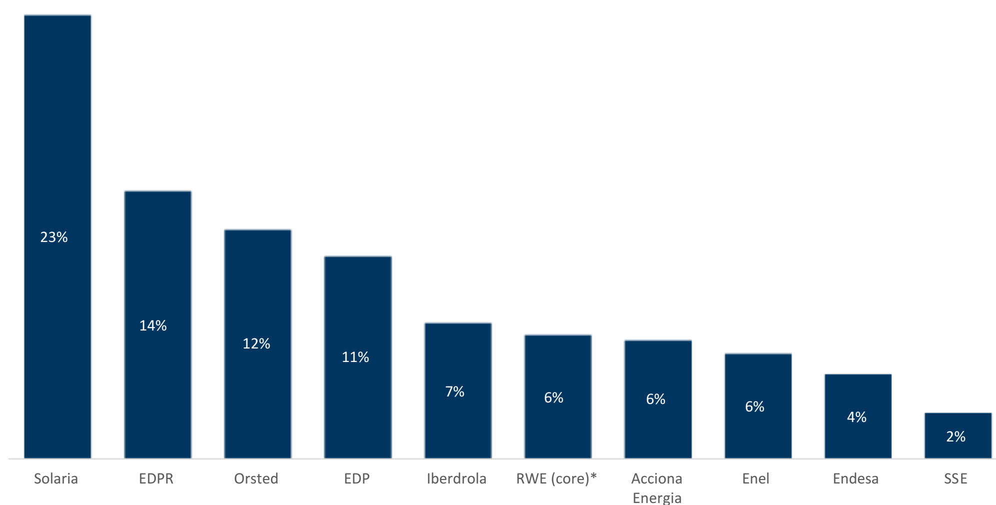
Exhibit 56: Annual investments in wind/solar could rise to c.€180 bn by 2030E
Europe's renewables annual capex evolution (€ bn)



Source: Goldman Sachs Global Investment Research

This would in turn imply strong EBITDA CAGRs for most of the GEMS, as we expect these companies to carry out the lion's share of this investment. Over 2022-27, we forecast GEMS delivering a 9% EBITDA CAGR on average.

Exhibit 57: We forecast the GEMS to deliver +9% CAGR to 2027E, thanks to rising renewable investments
GEMS EBITDA CAGR 2022-27E (%)



*2023-28E

Source: Goldman Sachs Global Investment Research

Higher-for-longer energy prices

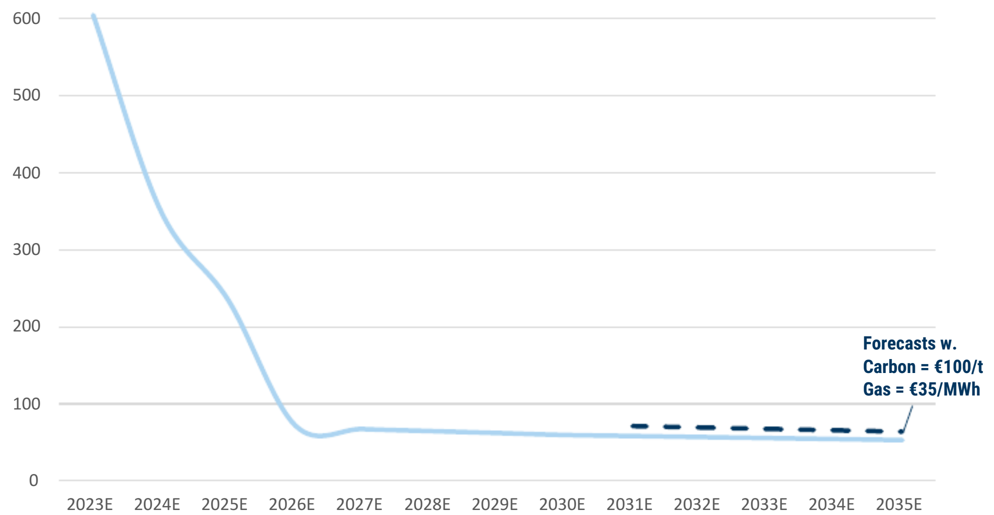
As noted earlier in this report, although we expect a gradual normalization of power prices to 2030 (in light of a normalization in commodity prices, together with the deflationary effect of renewables), we expect them to be at around €60/MWh by 2030E

and €55/MWh by 2035E, this would still be well above long-term average EU power prices, at c.€50/MWh.

We note that these are calculated assuming gas prices in line with the LT average of €22.5/MWhg and carbon at €50/t. If we were to keep the CO_2 price at €100/t (current levels) and gas at €35/MWhg (the average between the long-term level and the 2021 pre-conflict level), then our 2030-35 estimates would be much higher.

Exhibit 58: We expect the German power price to decline to c.€60/MWh by 2030 and to sub €55/MWh by 2035

German power price (€/MWh)



Source: EEX, Goldman Sachs Global Investment Research

Key stocks

EDP (Buy)

Investment thesis. We are Buy-rated for mainly two reasons: (1) renewables boost: with c.65% of EDP's medium-term (i.e. 2025E) profits from RES, and given its sizable pipeline, we believe EDP will be a key beneficiary of the EU's refocus on energy security and electrification. Further, we believe the company will raise its capacity additions target at the February 2023 CMD; (2) earnings momentum: we estimate a 5-year clean EPS CAGR (2022-27E) of 11%, which implies that by 2025 (and despite modelling a price cap of €65/MWh in Iberia) we are c.15% ahead of company guidance and Bloomberg consensus. At current levels, EDP's equity valuation ex-EDPR is only €1 bn, implying a 2023E stub P/E of <2x.

Valuation methodology. Our 12-month price target is €6.15. It is based on a combination of two fundamental methodologies with a 70% weighting: (1) a 2023E SOTP-based valuation, weighted at 35%, of €7.23/share; (2) a target 2023E P/E of 19.2x, weighted 65%, implying a value of €4.70/share. The remaining 30% of our price target is based on an unchanged M&A component that values renewables at 17.5x EBITDA and the other businesses at 10.5x, based on recent RES and integrated utilities transactions, implying a theoretical value of €7.50/share.

Key risks. Key risks to our view and price target include (1) lower-than-expected returns in new renewable installations, (2) significant depreciation in foreign currencies (USD/BRL), (3) higher sovereign risk in Iberia, and (4) lower commodity/power prices.

RWE (Buy; CL)

Investment thesis. Even though we anticipate regulatory intervention in power generation – our base case estimates already incorporate a price-cap of €75/MWh – we believe the market overlooks three major tailwinds:

1. S*trongly positive earnings momentum.* Thanks to higher energy prices, widening thermal spreads and successful execution on capacity additions, our 2022-25 EPS estimates are 15-25% ahead of Bloomberg Consensus. Our EBITDA estimates are c.25% ahead of company guidance for 2027; we expect a major upgrade in earnings targets at the next CMD, in early-2023.
2. *Secular play on electrification.* The need to accelerate electrification as a means of boosting energy security (coupled with the deflationary effect of wind/solar in power markets) should accelerate the development of renewables. Europe alone – as part of the REPowerEU plan – is targeting >€1 tn of RES investments by 2030; Germany accounts for a quarter of this. We believe RWE could roughly double renewables capex and add 4-5 GW pa (net) in the second half of the decade vs. c.2 GW pa currently.
3. *Lignite separation has been forgotten, but still alive.* Although the energy crisis has overcast the debate on the restructuring of the portfolio, we believe the potential separation of lignite activities is still an option. RWE is already (largely) a renewable

developer: by 2025, c.80% of EBITDA would be from clean sources. Yet, as discussed in previous research (see here), a full separation of lignite would most likely expand multiples further. As a reference, by 2025E RWE trades on c.7x EBITDA vs .Orsted at c.12x and EDPR at nearly 14x.

Valuation methodology. Our 12-month price target of €60 is based: (1) 85% on our SOTP base case valuation of €57.3/share. We value the renewables business using a long-term DCF assuming capacity additions until 2035, 30 years of useful life and no terminal value; and, (2) 15% on an M&A-based valuation of €74.7/share. We use a transaction multiples-based SOTP, which assumes a valuation of 17.5x EV/EBITDA for renewable activities and 7x for legacy assets. We base our M&A valuation on 2022-24E average EBITDA.

Key risks: (1) lower-than-expected compensation for early coal and lignite closures; (2) prolonged discussion to reach agreement on compensation for early coal and lignite closures; (3) delay in deal approvals; recession and falling power demand; (4) weak execution in the renewable pipeline; and (5) GBP/USD depreciation.

Orsted (Buy)

Investment thesis. We believe Orsted remains a key beneficiary of the secular electrification process. The acceleration in renewables investments should support further top-line growth, whilst the expansion in the addressable market may support future returns to decent levels. In the past year and a half, Orsted has been exceeding its 3 GW pa awards targets in offshore (4.5 GW in 2021, already 3 GW in 2022) and currently enjoys development visibility in offshore wind until 2028, we estimate. The recent amendments to the US investment tax credits should partly offset the capex cost inflation, and the REPowerEU plan should accelerate growth further. Besides a potential capital raise (as commented by management during the H1 2022 analyst call), we believe Orsted could become a go-to stock, especially in light of the share price decline in the past three weeks.

Valuation methodology. Our 12-month price target is DKK 950 and is 100% based on our SOTP valuation (2023E).

Key risks. Key risks to our view and price target include: (1) rising pressure on IRRs; (2) lower success rates on offshore wind auctions; (3) construction cost overruns; (4) lower power prices; (5) significant GBP depreciation; and (6) lower-than-expected load factors.

Disclosure Appendix

Reg AC

We, Alberto Gandolfi, Mafalda Pombeiro, Ajay Patel, Mathieu Pidoux and Simon Bergmann, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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Growth is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

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Energias de Portugal (€4.77), Orsted A/S (Dkr716.30) and RWE (€38.38)

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	Buy	Hold	Sell	Buy	Hold	Sell
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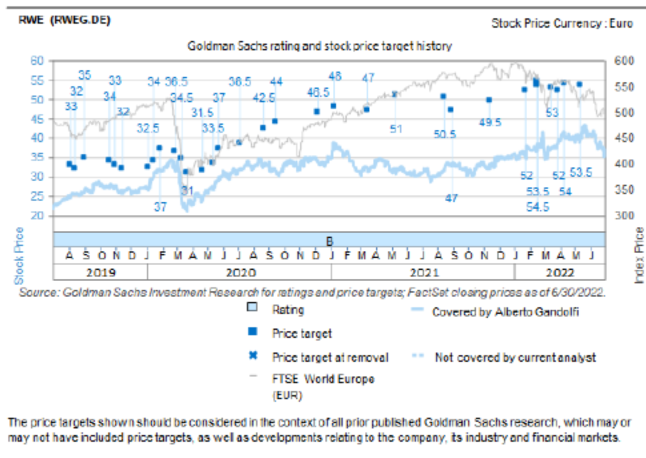

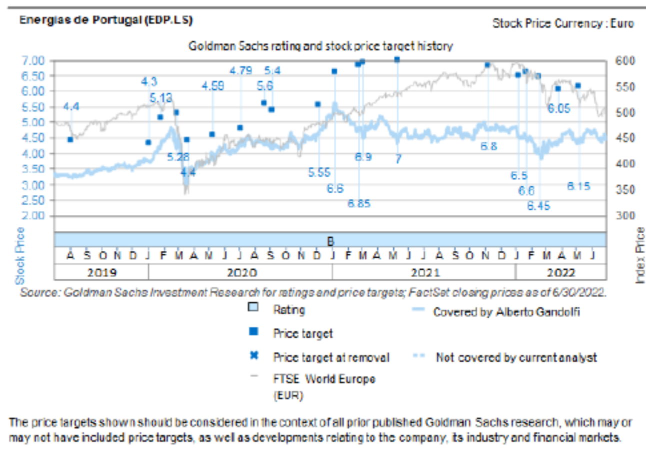

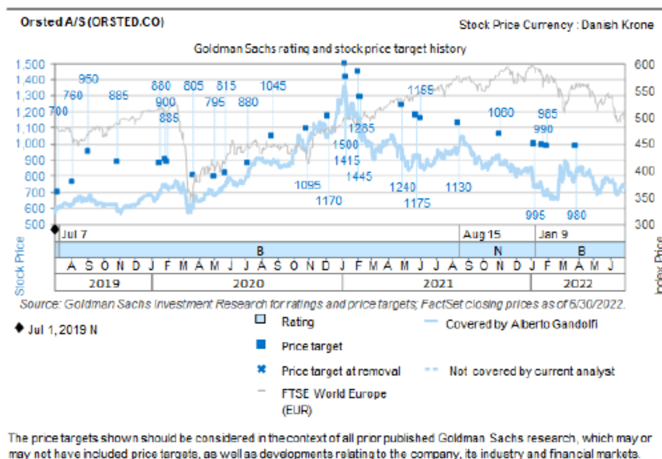

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