BRIEFING

European Parliament

Energy saving and demand reduction

SUMMARY

Since Russia invaded Ukraine, Europe has found itself in an energy crisis. Skyrocketing gas and electricity prices, coupled with energy supply concerns, have obliged the European Union (EU) to take action to mitigate the situation.

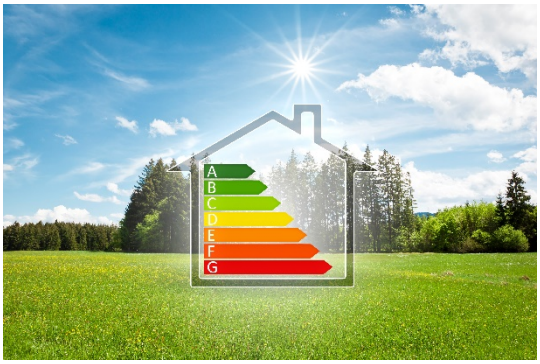
Reducing energy consumption is seen as one of the key measures the EU Member States can take to reduce energy bills and tackle supply issues. It can help them reduce their energy import dependency and prepare for a winter of possible gas supply disruptions. It can also help the EU reach its climate goals in line with the European Green Deal.

The EU has taken a number of steps both to align its policies with more ambitious climate goals and to boost energy independence. In terms of long-term measures, the Energy Efficiency Directive is currently being revised to increase the EU-wide targets for the reduction of energy consumption by 2030. Similarly, the Energy Performance of Buildings Directive is also under revision to further improve the energy efficiency of buildings. One of the ways to achieve this would be through an enhanced energy performance certification system, boosting renovation rates and popularising solar panels.

Further EU measures aimed at saving energy and reducing demand in the short term include: a plan to reduce gas demand so as to ensure sufficient supplies in the winter; a proposed reduction of electricity demand as part of efforts to combat high energy prices; and an EU energy saving plan under REPowerEU, to cut the EU's reliance on Russian fossil fuels. Key actions leading to reduced energy consumption include stepping up building renovation, implementing energy efficiency solutions, accelerating the rollout of renewables and promoting behavioural change by means of information campaigns.

Reducing energy demand is part of broader ongoing efforts to address the energy crisis, complementing action aimed at diversifying imports, boosting EU energy production and redesigning the EU energy market.

The European Parliament has supported measures to reduce energy demand reduction, improve energy efficiency and increase energy savings in a number of resolutions.



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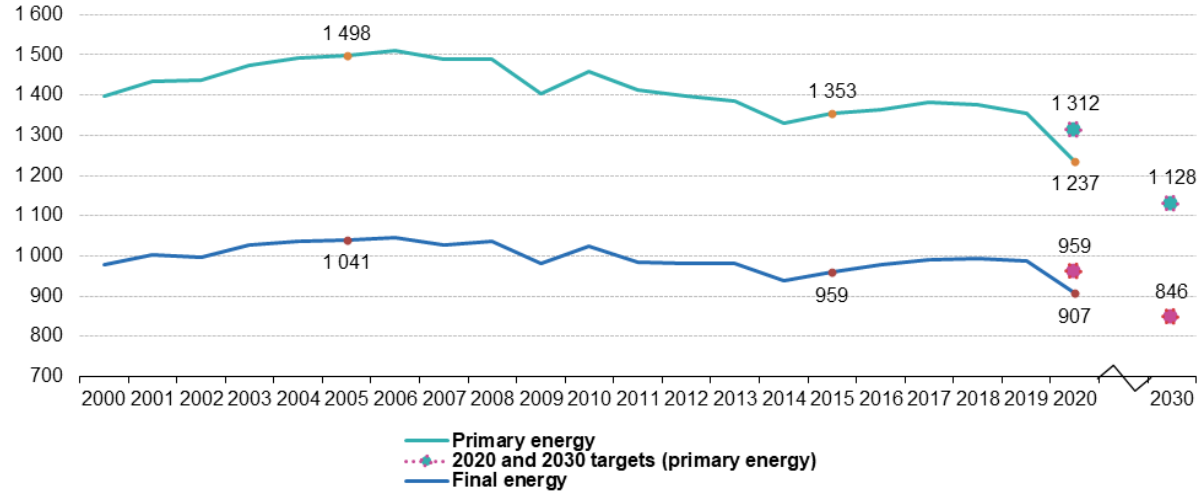
Introduction

Problems with the EU's energy supply started multiplying with the economic rebound following the pandemic and Russia's manipulation of EU energy markets, which it achieved by keeping gas supply volumes lower than usual in 2021. Since then, in the aftermath of Russia's war of aggression against Ukraine, a full-blown energy crisis has descended upon the EU. To address the situation, the Member States have been mulling over various options, including making energy savings, diversifying imports and boosting EU energy production. Reducing energy consumption helps counteract energy shortages and decrease energy bills. At the same time, the objective is aligned with the EU's climate goals for 2030 and 2050, as it helps bring down greenhouse gas emissions.

According to Eurostat, EU primary and final energy consumption[1] peaked in 2006 (see Figure 1). Despite some fluctuations, it has been systematically decreasing ever since. In 2020, energy consumption plummeted due to COVID-related restrictions and then rebounded to a certain degree in the following year. However, the overall trend in the past few years has been a downward one.

Figure 1 – Primary and final energy consumption, EU, 2000-2020, Mtoe



Source: Eurostat, 2022.

Energy is used by all sectors of the economy: industry (32 % of final energy consumption in 2020), transport (26 %), households (25 %), services (12 %), and agriculture and forestry (3 %). About half of EU energy consumption goes for heating and cooling. The building sector is the single largest energy consumer in the EU. According to a 2019 JRC report, 75 % of buildings are energy inefficient, one third (35 %) are over 50 years old and over 40 % were built before 1960. Only about 1 % of the existing building stock undergoes energy-related renovations each year. Many homes use old technologies and wasteful appliances. Heating, cooling and domestic hot water account for about 80 % of energy use in residential buildings, with two thirds of this energy coming from fossil fuels.

The Energy Efficiency Directive (EED) set an EU-wide 20 % energy consumption-reduction target for 2020 and a 32.5 % target for 2030. These percentages correspond to a limit of 1 312 Mtoe (million tonnes of oil equivalent) in 2020 and 1 128 Mtoe in 2030 for primary energy consumption, and 959 Mtoe in 2020 and 846 Mtoe in 2030 for final energy consumption.[2] Eurostat says the EU exceeded its 20 % reduction target for 2020 by 5.8 % for primary energy consumption and by 5.4 % for final energy consumption. While efforts are still needed to reach the 2030 values, the ongoing revision of the directive seeks to further increase these targets to align them with the latest EU climate ambitions and energy autonomy goals.

The EU has also taken a number of steps to boost the process of reducing energy consumption in the context of recent supply issues and rising energy prices. The REPowerEU plan of May 2022, aimed at making the EU independent of Russian energy, introduced a new legislative proposal seeking to increase the energy efficiency target in the EED, boost renewables in the Renewable Energy Directive and introduce an obligation to install solar panels on buildings in the Energy Performance of Buildings Directive (with a view to improving energy efficiency). REPowerEU also includes an EU save energy plan outlining short-term and long-term measures to reduce energy use. Further measures include a gas demand reduction plan of July 2022 (reduction of gas consumption by 15 %) and an electricity use reduction (by 5-10 %) proposed in September 2022 as part of the intervention to bring down energy prices. Earlier policies include the Renovation Wave strategy, a framework for energy efficiency of buildings set out in the Energy Performance of Buildings Directive; this framework also includes the well-known energy certification system for buildings (A-G scale) and the Ecodesign and Energy Labelling Directives (for instance, their provisions on the colour-coded energy labelling informing consumers about energy efficiency of products).

EU countries have also launched energy saving campaigns; examples include the Belgian 'J'ai un impact/Ik heb impact' (I have impact) campaign offering energy saving tips and information on support for home renovations, the German rules limiting lighting and heating in public buildings, and the Finnish an information campaign targeting households. After the Fukushima disaster, Japan launched a similar 'saving electricity' campaign ('setsuden'), which included voluntary efforts by households and compulsory targets for companies. Actions included decreasing the use of air conditioning, turning off lights during daytime, using energy saving lightbulbs and appliances, adjusting office dress codes, introducing flexible working schedules, switching off escalators and non-essential lighting for advertising, etc. Setsuden helped reduce peak electricity demand by 20 %.

It is estimated that coordinated EU efforts to save energy, building renovations (insulation, solar panels and heat pumps), promotion of energy-efficient appliances and behavioural changes to reduce energy consumption can similarly contribute to significant moderation of demand.

EU policies

Proposed electricity demand reduction

On 14 September 2022, the Commission presented a proposal for a Council regulation on an emergency intervention to address high energy prices. One of the proposed measures is a reduction in electricity demand, setting out two electricity demand-reduction targets. The first is the reduction of total monthly gross electricity consumption by 10 % (compared to the average consumption in the reference period). The second is an obligation for Member States to reduce gross electricity consumption during peak price hours: at least 5 % on average per hour (compared with forecasted consumption), amounting to 3-4 hours per weekday on average. Targeting the most expensive hours is expected to lower electricity prices, as this is usually the time when gas-fired power generation is used. Gas prices have been particularly high during the energy crisis, while the current design of the electricity market relies on the 'marginal pricing' (merit order) model. This means that the most expensive fuel in the energy mix sets the price paid by consumers. Both measures would apply from 1 December 2022 to 31 March 2023, while the Member States may choose the specific measures to reduce electricity consumption. These could include auctions or tender schemes, financial compensation, smart metering systems allowing consumers to adjust consumption during the day, targeted consumer information campaigns, etc. The Commission estimates that this would lead to a reduction of gas consumption of around 1.2 bcm (billion cubic metres) over 4 months.

Gas demand reduction plan

In a communication from 20 July 2022, the Commission presented the European gas demand reduction plan, outlining the gas supply situation, existing EU measures to ensure security of supply, the plan's rationale and its main principles. The annex to the communication presents possible

demand reduction measures. These include fuel switching measures, market-based instruments (auctioning or tendering systems, swap contracts between large customers, interruptible contracts), awareness-raising campaigns, and a targeted obligation to reduce heating and cooling. The annex also lays down criteria for prioritising critical non-protected consumers ('protected customers' such as households, district heating to households, essential services and SMEs are already covered by the Security of Gas Supply Regulation). These criteria include societal criticality; cross-border value chain criticality; potential damage to installations; possibilities for reducing gas consumption; product/component substitution; as well as economic aspects. One of the key principles of the plan is substitution, i.e. shifting away from gas to other energy sources, preferably renewables. However, the Commission admits that carbon-intensive sources such as diesel or coal may need to be temporarily deployed. It also underlines the efforts to accelerate LNG infrastructure development. The annex also explains the governance framework and stages of crisis response.

The plan was accompanied by a Council Regulation **on coordinated demand reduction measures for gas** (of 5 August 2022), introducing the option of voluntary gas demand reduction by 15 % this winter (compared to the average consumption in the past 5 years).[3] The regulation also foresees making the reduction mandatory, should the Council declare a 'Union alert' on security of supply (if proposed by the Commission). The alert could be activated in case of severe gas shortage risk, an exceptionally high gas demand, or on the request of five or more Member States that have declared a national-level alert. The main aim of the voluntary gas demand reduction is for Member States to increase savings for the winter to prepare for possible disruptions of gas delivery from Russia. The reduction would take place between 1 August 2022 and 31 March 2023, while the Member States can choose specific measures to achieve it. Member States can seek exemptions and limits on the reduction in a number of cases; for instance, whenever they are not interconnected to other Member States' gas networks, their electricity grids are not synchronised with the European electricity system, they are more reliant on gas for electricity production or for critical industries, they are facing an electricity crisis, or they have overshot their gas storage filling targets.

When taking demand reduction measures, Member States should prioritise those that do not affect protected customers and other sectors critical for society (e.g. healthcare and defence). Long-lasting damage to industrial installations should also be avoided. In particular, Member States are encouraged to consider measures to reduce gas consumption in the electricity sector, to promote fuel switching and reduced consumption in the industry, national awareness-raising campaigns, and targeted obligations to reduce heating and cooling.

The regulation also requires an update of the national emergency plans by 31 October 2022, so that they include proposed voluntary or mandatory demand reduction measures, and regular reporting to the Commission on demand reduction results.

The Commission estimates that the EU plan for reducing gas demand would allow EU-wide savings of 45 bcm of gas over a period of 8 months (for the duration of the plan).[4]

EU save energy plan under REPowerEU

In May 2022, the Commission proposed the EU save energy plan as part of the REPowerEU package. The plan came in the context of the need to save energy in order to reduce the EU's dependency on Russian energy imports, mitigate the impact of high energy prices and respond to potential energy shortages. It proposes a series of measures to achieve immediate energy savings and boost energy efficiency in the medium and long term.

Short-term energy-saving measures in the plan focus on voluntary choices and habit changes, such as optimising heating and cooling temperatures, reducing air travel, shifting to public transport, using household appliances more efficiently and switching off the lights. Member States are encouraged to hold information campaigns, to introduce incentives such as rebates on the purchase of more efficient appliances or reduced VAT on high-efficiency heating systems, and to include energy saving skills in school curricula. The plan also includes a toolbox of measures to achieve

immediate energy savings: carrying out information campaigns on energy wastage in households, promoting insulation measures in buildings, and offering financial incentives for replacement of fossil fuel systems with renewables. As regards transport, the toolbox suggests measures such as reinforcing electric vehicles, offering price reductions for public and rail transport and incentives for walking and cycling, promoting efficient driving, and organising car-free days in cities.

As regards mid- and long-term structural energy efficiency measures, the plan highlights several legislative initiatives, such as additional savings and energy efficiency measures under the revised Energy Efficiency Directive (EED) and the Energy Performance of Buildings Directive, a proposal for a regulation on ecodesign for sustainable products (see EPRS briefing), energy-labelling measures, and the reform of the Single European Sky Regulation to enable the modernisation of air traffic management. The Commission is also considering a legislative initiative to increase the share of zero emission vehicles and a legislative package on greening freight transport.

Other mid- and long-term measures will also build on existing efforts, such as the EU climate targets, the governance structure based on national energy and climate plans (NECPs), and EU rules on ecodesign and energy labelling. Increasing energy efficiency will require a further stepping up of these efforts, for instance, by strengthening the national energy savings obligation, increasing energy efficiency in key sectors, cutting subsidies for fossil fuel technologies, promoting renewable technologies and developing energy-saving technologies, and enhancing the implementation of energy audit results. Other possible measures include additional minimum energy performance standards for buildings, phasing out Member States' subsidies for fossil fuel-based boilers and banning such boilers in buildings, strengthening national energy efficiency requirements for new buildings, tightening national heating system requirements for existing buildings, and further increasing energy efficiency in transport.

'Playing my part' campaign

On 21 April 2022, the International Energy Agency (IEA) and the European Commission published a guide on ways individuals, companies and public institutions can reduce energy use and save money. It also encourages national and local governments to help unlock even more energy savings and support consumer action.

Nine energy-saving actions have been identified:

1. Turn down heating and use less air-conditioning.
2. Adjust your boiler's settings.
3. Work from home.
4. Use your car more economically.
5. Reduce your speed on highways.
6. Leave your car at home on Sundays (in large cities).
7. Walk or bike short journeys instead of driving.
8. Use public transport.
9. Skip the plane, take the train.

The guide provides information on how much energy and money would be saved by implementing each action. It is estimated that a typical EU household could save almost €500 a year, if all recommendations were followed.

Source: International Energy Agency and European Commission, 2022.

As part of promoting the energy-saving efforts, the Commission also intends to develop awareness-raising materials for use by other bodies, publicise its 'Playing my part' campaign (organised jointly with the International Energy Agency – see Box) and launch a European product registration for energy labelling (EPREL) database consumer interface.

EU legislation on energy efficiency

In addition to the above demand-reduction measures requiring conscious and sustained action by consumers and users, the EU has also adopted legislation on energy efficiency that relates to the generic energy use in buildings and appliances.

Energy Efficiency Directive

The Energy Efficiency Directive, as amended in 2018, sets out the EU's energy efficiency targets: 20 % for 2020 and 32.5 % for 2030. These percentages refer to a reduction of primary and final energy

consumption compared with a baseline scenario. In light of the European Green Deal and the new climate goals for 2030 and 2050 enshrined in the European Climate Law, the EU decided to increase the energy efficiency targets even further. As part of the 'fit for 55' package of July 2021, the European Commission proposed to recast the EED and raise the target by 9 % compared to the 2020 reference scenario (this corresponds to a reduction of 36 % for final and 39 % for primary energy consumption under the 2007 reference scenario for 2030 – 1 023 Mtoe for primary energy and 787 Mtoe for final energy). In light of the energy supply crisis caused by Russia's invasion of Ukraine, the Commission proposed to raise this target further to 13 % in another legislative proposal issued under the REPowerEU plan of May 2022. This corresponds to a reduction of 39 % for final energy and 41.5 % for primary energy consumption (upper limits of 750 Mtoe for final energy consumption and 980 Mtoe for primary energy consumption in 2030). The negotiations on the revision of the directive are still ongoing (see EPRS briefing).

Member States set their own indicative national energy efficiency contributions to achieve these goals. They communicate their national contributions to the 2030 target through their national energy and climate plans. The directive also sets annual energy savings obligations, a renovation obligation for buildings owned by central governments and a requirement for administrations to take into account energy efficiency in government purchases. It furthermore encourages the use of metering systems and the provision of transparent information to consumers on their energy consumption, and suggests a number of measures promoting energy efficiency. It also embeds the 'energy efficiency first' principle in EU legislation to ensure that energy efficiency is taken into account in policy and investment decisions.

Energy Performance of Buildings Directive

The Energy Performance of Buildings Directive (EPBD), as amended in 2018, sets out a framework for calculating the energy performance of buildings, covering elements such as heating and cooling, hot water, ventilation, lighting and other technical building systems. It introduces rules on setting minimum energy performance requirements for new and existing buildings, a system for energy certification of buildings, and an obligation for new buildings to meet minimum standards and for public buildings to achieve near-zero energy status. It also requires that Member States draw up long-term renovation strategies covering residential and non-residential buildings, encourages the use of smart technologies and supports the rollout of electric vehicle recharging in buildings' car parks.

As part of the 'fit for 55' package, the Commission proposed a revision to the directive in December 2021 (negotiations are ongoing – see EPRS briefing). The changes aim to further boost energy-efficient building renovation rates and uptake of renewable energy to make the buildings sector compatible with the EU climate targets. The revision introduces a new definition of 'zero-emissions buildings' (as ones with very high energy performance and energy obtained from renewables) for new public buildings from 2027 and renovated buildings from 2030. It furthermore improves provisions on energy performance certificates, proposes ending subsidies for fossil fuel boilers and boosting smart systems. The long-term building renovation strategies are to be replaced by national building renovation plans, with concrete renovation targets for 2030, 2040 and 2050. The EPBD revision had also been previously announced under the 2020 Renovation Wave strategy, which aims to double annual renovation rates and achieve 35 million renovated buildings by 2030.

The REPowerEU package of May 2022 also includes a targeted amendment to the EPBD, introducing a new article on solar energy in buildings. The Member States would be obliged to ensure the deployment of solar energy installations by 2030 or earlier, depending on the type of building.

European Parliament position

In a legislative resolution of 23 June 2022 on the proposal for a gas storage regulation, the European Parliament (EP) pointed out that 'energy savings and energy efficiency are key contributors' to the objective of reinforcing the security of gas supply at EU level.

In its resolution of 19 May 2022 on The social and economic consequences for the EU of the Russian war in Ukraine – reinforcing the EU's capacity to act, the Parliament called for increased 'coordination of the planning and financing of energy efficiency' as part of the efforts to ensure energy sovereignty and independence from Russian supplies.

In a resolution of 15 January 2020 on the European Green Deal, the Parliament called for a revision of the EED and the EPBD 'in line with the EU's increased climate ambition' and for the implementation of both directives to be reinforced, inter alia through binding national targets. It also underlined the high energy-saving potential of the buildings sector.

The EP resolution of 17 September 2020 on Maximising the energy efficiency potential of the EU building stock asked the Commission for an upward revision of energy efficiency targets for 2030 and to propose 'minimum annual renovation rates for buildings and policy measures' so as to ensure deep renovations, among other things. It also highlighted the importance of financial support and thus the need to 'ensure that the respective funds of the new MFF [multiannual financial framework] prioritise dedicated amounts for energy efficiency and building renovations'.

Stakeholders' views

BEUC, the European Consumer Organisation, recommended financial support for consumers to buy energy-efficient products and make improvements that reduce energy consumption (e.g. solar panels, heat pumps and home renovations).

BusinessEurope, the Confederation of European Business, while commenting on the current energy crisis stressed the importance of balancing supply-side measures (such as deployment of low-carbon energy sources, production of natural gas in Europe and diversification of external suppliers) with demand-side measures (e.g. market-based incentives to reduce gas and electricity demand, energy efficiency).

The Coalition for Energy Savings, commenting on the REPowerEU plan, highlighted that saving energy should be 'the cornerstone of Europe's energy independence'. It recommended measures for structurally reducing energy demand in the EU, in addition to promoting behavioural changes. It also stressed the importance of implementing the EU energy efficiency legislative framework. The European Alliance to Save Energy highlighted the contribution of energy efficiency in the short- and medium term to reduce the EU's reliance of fossil fuels, and analysed the potential of various sectors (such as buildings, industry, water utilities and transport) for increasing energy savings. It suggested a number of measures, including passive energy efficiency solutions, upgrading the lighting systems and building automation.

EuroACE, the European Alliance of Companies for Energy Efficiency in Buildings, welcomed the recast of EPBD and emphasised the need for holistic deep renovation, promotion of digital tools, and simulation of a building's energy use at the conceptual and design phases. In its campaign Renovate Europe, EurACE made a call for reducing the energy demand of EU building stock by 80 % in 2050. The campaign stresses that energy-efficient renovations would enable reaching the zero energy-buildings standard by the middle of the century, while reducing energy demand of buildings would help advance the goals of the REPowerEU plan.

Outlook

The energy crisis sparked by Russia's war on Ukraine has renewed focus on the need to save energy, improve energy efficiency and reduce energy demand. As the EU energy system undergoes accelerated transformation, this need is likely to gain even greater importance in the future.

According to a Bruegel policy contribution, reducing energy demand is essential for securing energy supply at least this winter. A European Policy Centre commentary suggests that a combination of many measures is needed to tackle the energy crisis. Demand reduction is an important one, as 'the cheapest energy is the one the EU doesn't use'. A 2021 European Parliament study on energy

efficiency recommends further measures, such as increasing industrial efficiency, making improved use of energy performance certificates, providing financial support for renovation, integrating the life cycle approach to buildings into policy frameworks, and offering tax incentives favouring energy efficiency. Further areas for future action include digitalising the energy system to increase real-time observability of energy data, and addressing the energy impact of the ICT sector.

Energy demand reduction is part of broader efforts to address the energy crisis, complementing actions such as diversifying imports, boosting EU energy production and redesigning the EU energy market. According to some commentators, demand reduction has so far been largely overlooked, as many countries have been subsidising the costs of energy consumption without sufficient measures to reduce consumption, and the response has been supply-centric. Existing and proposed EU solutions to reduce energy demand, improve energy efficiency and increase energy savings could generate broader benefits in this context in both the short and the longer term.

MAIN REFERENCES

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International Energy Agency and European Commission, Playing my part: How to save money, reduce reliance on Russian energy, support Ukraine and help the planet, April 2022.

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Notre Europe, Jacques Delors Institute, Energy Sufficiency: The missing lever to tackle the energy crisis, May 2022.

ENDNOTES

1 According to the Eurostat glossary, primary energy consumption measures the total energy demand of a country. It includes the energy sector and final consumption by end users, and accounts for transformation and distribution of energy. Final energy consumption is the total energy consumed by end users, such as households, industry and agriculture. It excludes energy used by the energy sector.

2 The original text of the 2018 directive mentions targets for the EU-28: primary energy consumption of no more than 1 483 Mtoe in 2020 and 1 273 Mtoe in 2030, as well as final energy consumption of no more than 1 086 Mtoe in 2020 and 956 Mtoe in 2030. These values had to be adjusted to the EU-27 following the UK's withdrawal from the EU.

3 A gas consumption reduction of 15 % compared to the average gas consumption in the period from 1 August to 31 March during the five consecutive years preceding the date of entry into force of the regulation, i.e. starting from 1 August 2017 to 31 March 2018.

4 According to the quarterly report on European gas markets, EU gas consumption in 2021 amounted to 412 bcm.

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