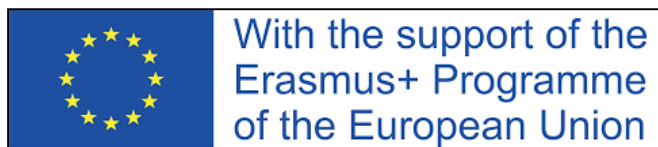
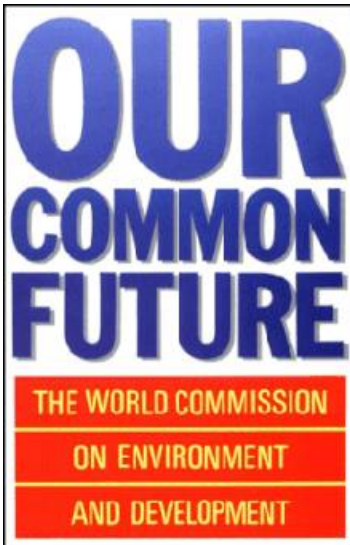




# SUSTAINABLE DEVELOPMENT AND ENERGY SECURITY OF EUROPE

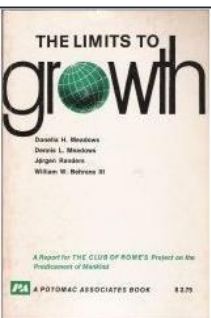
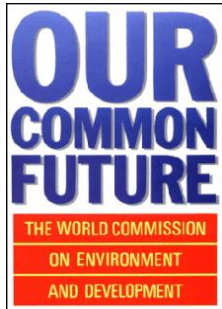


**Igor Yakymenko,  
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"**Sustainable development** is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report / Our Common Future, 1987)







## **THE TREATY ON EUROPEAN UNION** (The Treaty of Maastricht, 1993)

### Article 3.

3. The Union shall establish an internal market. It shall work **for the sustainable development of Europe** based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment.



## **Strategic documents of the EU on sustainable development:**

Council of the European Union (2006), Review of the EU Sustainable Development Strategy (EU SDS) — Renewed Strategy, 10917/06.

European Commission (2009), Mainstreaming sustainable development into EU policies: 2009 review of the European Union Strategy for Sustainable Development, COM (2009) 400 final, Brussels.

European Commission (2010), Europe 2020 — A strategy for smart, sustainable and inclusive growth, COM (2010)2020 final, Brussels.



Europe 2020 puts forward three mutually reinforcing priorities:

- Smart growth: developing an economy based on knowledge and innovation.
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.



The EU needs to define where it wants to be by 2020. To this end, the Commission proposes the following EU headline targets:

- 3% of the EU's GDP should be invested in R&D.
- The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).
- The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.



## Strategic documents of the EU on sustainable development (2012-2019)

European Commission (2012), Innovating for Sustainable Growth: **A Bioeconomy for Europe**, COM(2012) 60, Brussels

European Commission (2015), **Closing the loop - An EU action plan for the Circular Economy** COM(2015) 614, Brussels.

European Commission (2016), Next steps for a sustainable European future: European action for sustainability, COM(2016) 739, Brussels

European Commission (2018), A sustainable Bioeconomy for Europe: Strengthening the connection between economy, society and the environment, COM(2018) 673, Brussels

European Commission (2019), **The European Green Deal**, COM(2019) 640, Brussels



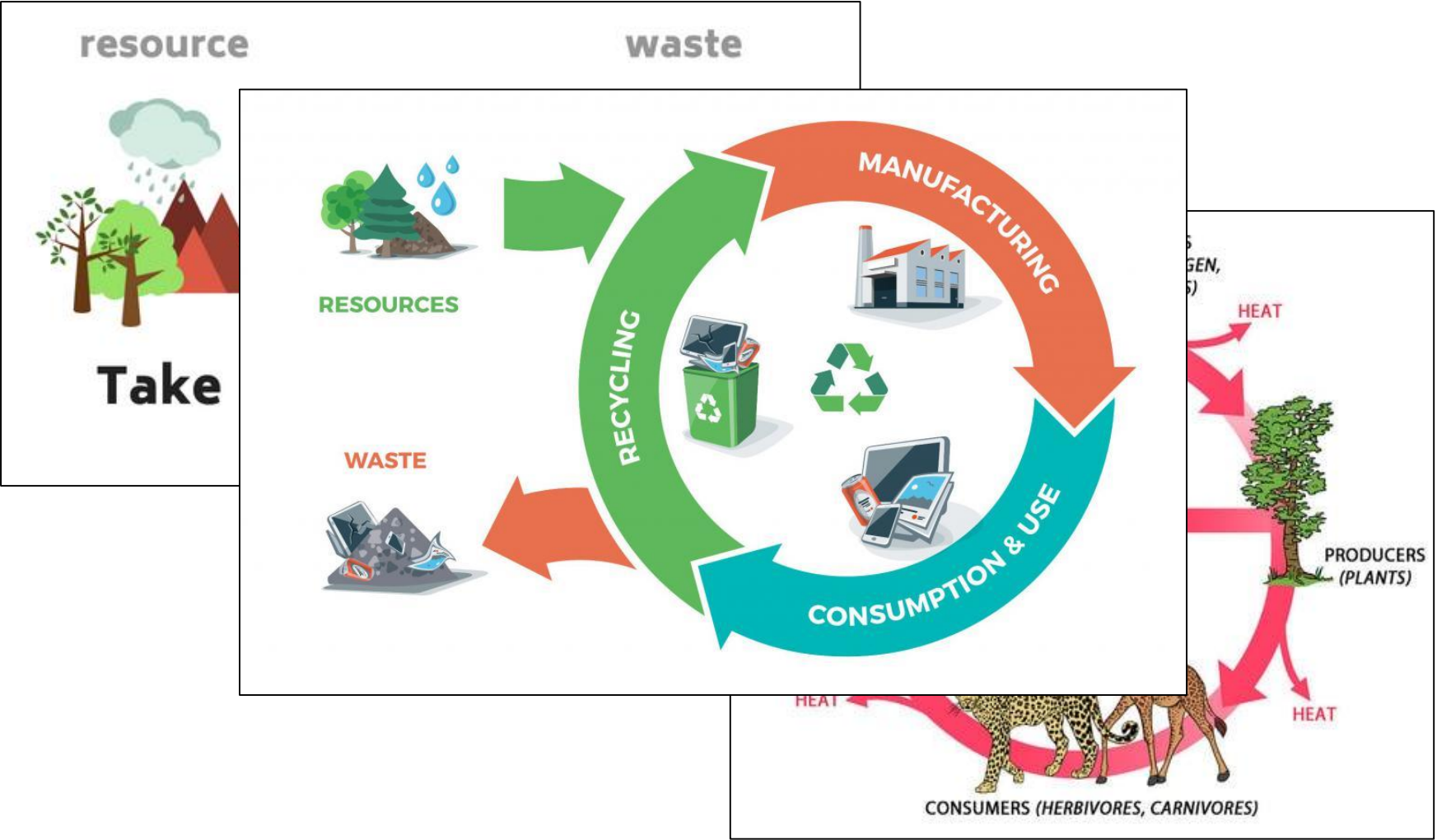


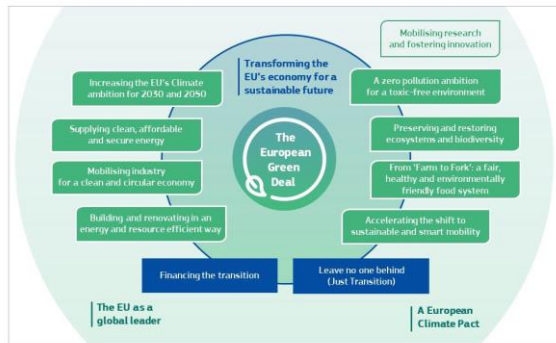
# A new **bioeconomy** strategy for a sustainable Europe



		EMPLOYMENT (MILLION JOBS)	TURNOVER (BILLION EUR)	VALUE ADDED (BILLION EUR)
	AGRICULTURE	9.2	380	174
	FORESTRY	0.5	50	24
	FISHING AND AQUACULTURE	0.2	12	7

European Commission (2015), Closing the loop - An EU action plan for the Circular Economy COM(2015) 614, Brussels.



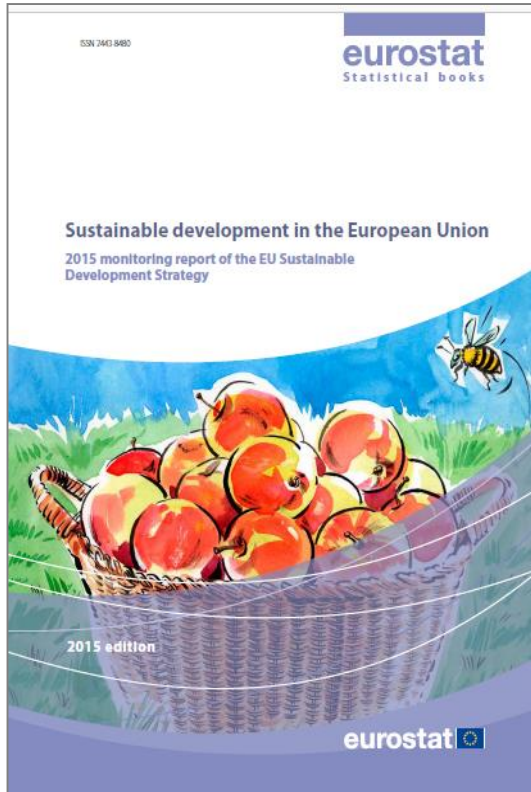


## European Commission (2019), **The European Green Deal**, COM(2019) 640, Brussels

This Communication sets out a European Green Deal for the European Union (EU) and its citizens. It resets the Commission’s commitment to tackling climate and environmental-related challenges that is this generation’s defining task.

The European Green Deal is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are

**no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.**

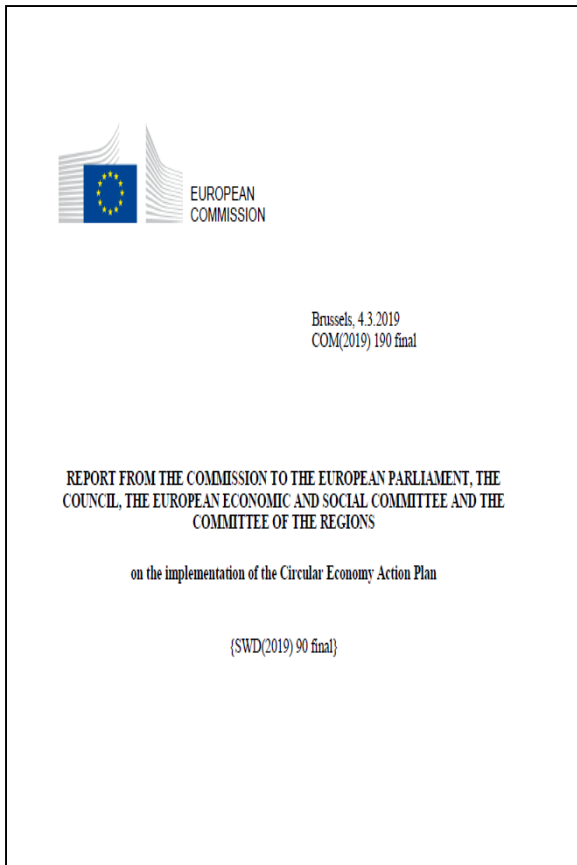


2015.

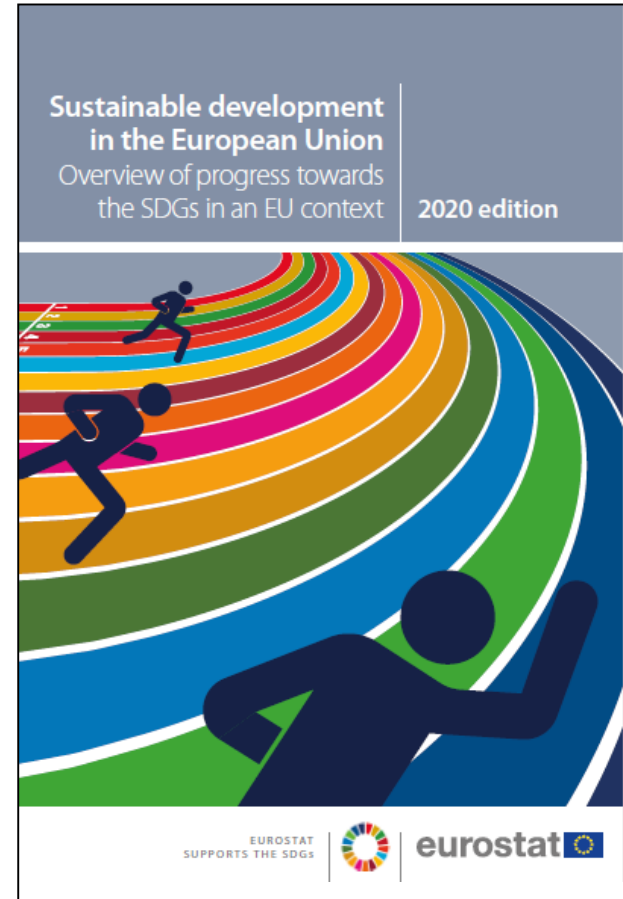
## Monitoring reports on Sustainable development



2017.



REPORT FROM THE COMMISSION on the implementation of the Circular Economy Action Plan. COM(2019) 190



Sustainable development in the European Union  
Overview of progress towards the SDGs in an EU context, Eurostat, 2020

## BASIC EDUCATION



Early school leavers in 2019  
**10.2%** of population aged 18 to 24

- 0.9 pp since 2014



Early childhood education in 2018  
**94.8%** of children between 4 and the starting age of compulsory education

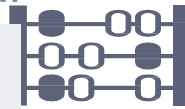
+ 0.9 pp since 2013

Underachievement in reading, maths and science in 2018  
% of 15-year-old students who fail to reach level 2 in PISA



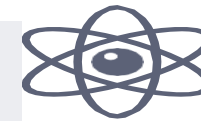
**22.5%**

+ 2.5 pp since 2015



**22.9%**

+ 0.7 pp since 2015



**22.3%**

+ 1.2 pp since 2015

## TERTIARY EDUCATION

in 2019



Tertiary educational attainment  
**40.3%** of population aged 30 to 34

+ 3.8 pp since 2014



Employed recent graduates  
**80.9%** of population aged 20 to 34 who completed ISCED 3-8

+ 5.9 pp since 2014

## ADULT LEARNING



Adult learning in 2019  
**10.8%** of population aged 25 to 64

+ 0.7 pp since 2014

Source: Eurostat (Online data codes: [sdg\\_04\\_10](#), [sdg\\_04\\_30](#), [sdg\\_04\\_40](#), [sdg\\_04\\_20](#), [sdg\\_04\\_50](#) and [sdg\\_04\\_60](#))

## CLIMATE MITIGATION

in 2018



Greenhouse gas emissions (1)

**794** Index, 1990=100  
- 2.2 index points

since 2013



GHG intensity of energy consumption

**85.7** Index, 2000=100  
- 3.5 index points

since 2013



Renewable energy of gross final energy consumption

**18.9%**  
+ 2.2 pp since 2013



CO<sub>2</sub> emissions from new passenger cars

**119.6g**  
- 5.4 % since 2013

## CLIMATE IMPACTS



Near surface temperature deviation in 2009 - 2018

Global: **0.91** °C deviation, compared to 1850-1899 average  
European: **1.61**



Climate-related economic losses in 2017

**EUR 121 billion**  
+ 7.6 % since 2012



Ocean acidity in 2018

**8.06 pH** value  
- 0.1 % since 2013

## SUPPORT TO CLIMATE ACTION



Climate-related expenditure in 2017 (2)

**EUR 194 billion**



Covenant of Mayors for Climate and Energy signatories in 2019

**11.6%** of population  
+ 6.8 pp since 2014

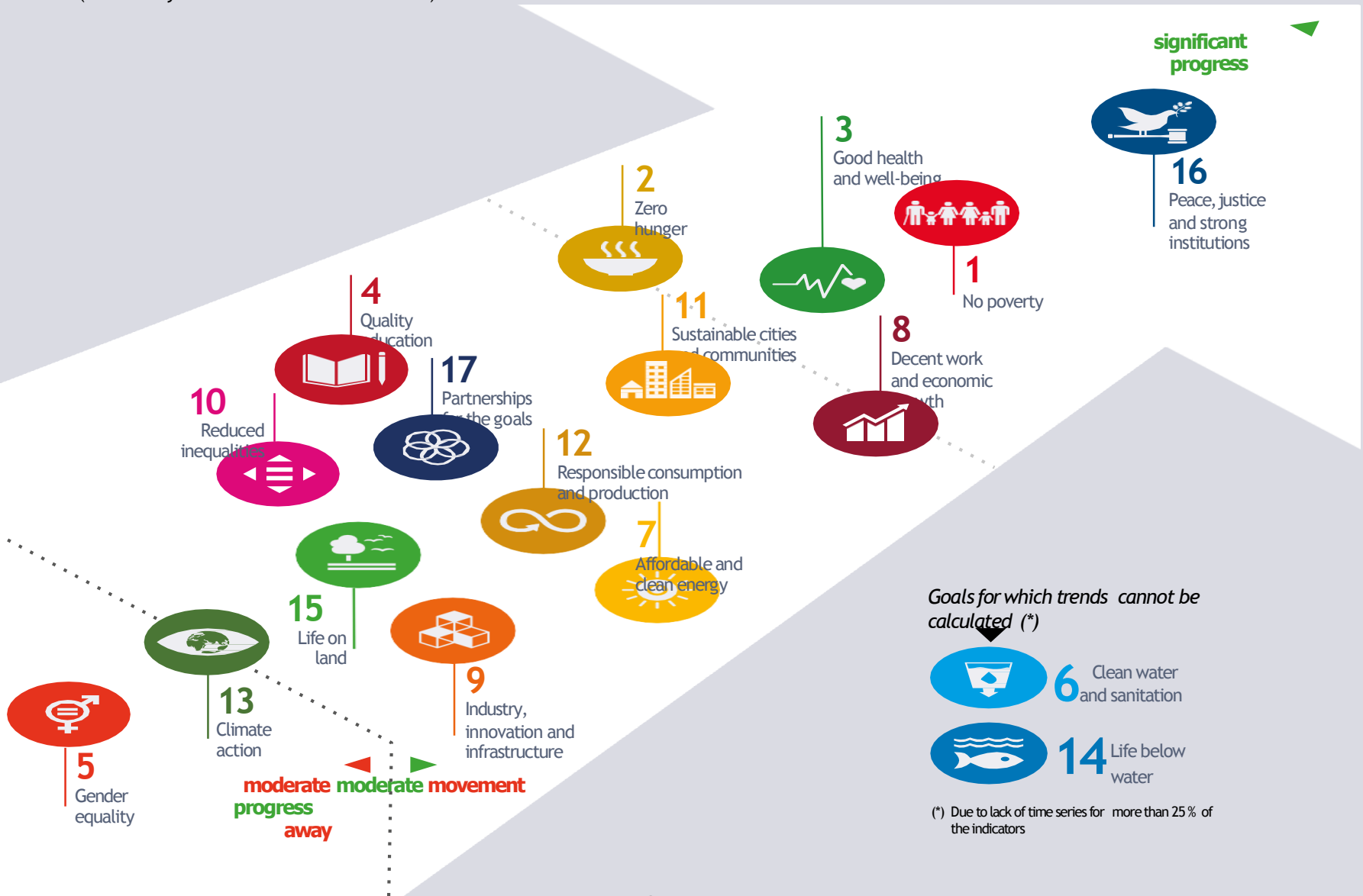
(1) 2018 data are provisional estimates based on the EEA's approximated GHG inventory for the year 2018.

(2) Data refer to EU Member States, the European Commission and the European Investment Bank.

Source: Eurostat (Online data sources: [sdg 13 10](#), [sdg 13 20](#), [sdg 07 40](#), [sdg 12 30](#), [sdg 13 30](#), [sdg 13 40](#), [sdg 14 50](#), [sdg 13 50](#) and [sdg 13 60](#))

# Overview of EU-27 progress towards the SDGs over the past 5 years, 2020

(Data mainly refer to 2013- 2018 or 2014- 2019)







# Energy security of the European Union

Strasbourg, 8.3.2022 COM(2022) 108 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE  
EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE  
COMMITTEE OF THE REGIONS

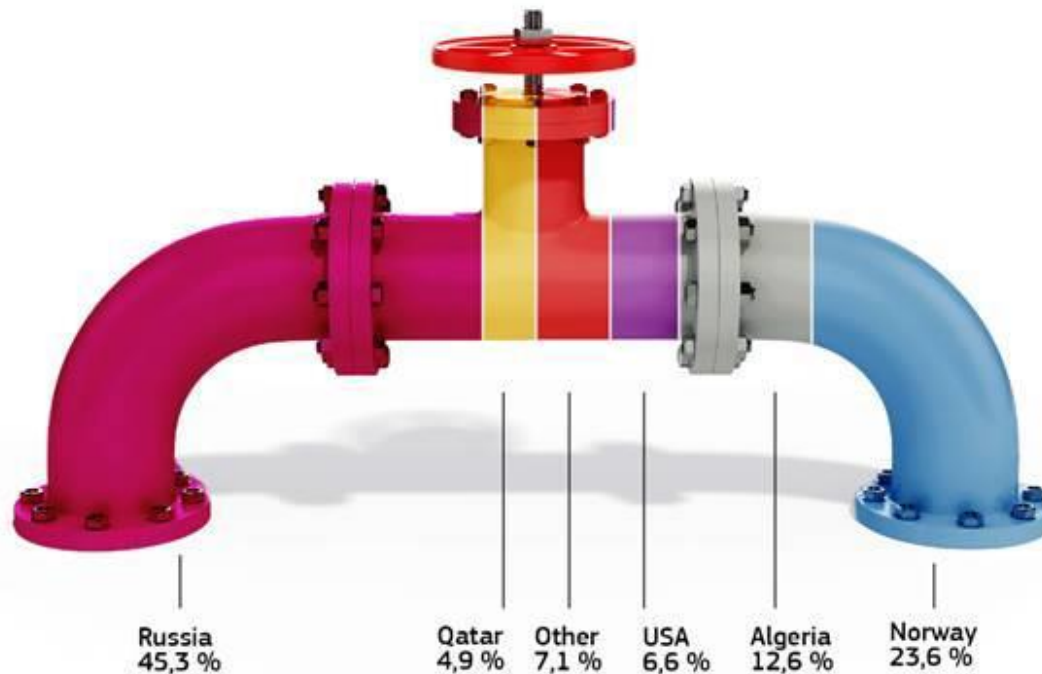
**REPowerEU: Joint European Action for more affordable, secure and  
sustainable energy**



House on Bohatyrskya Street, Kyiv after shelling of 14 March 2022,  
[https://cs.m.wikipedia.org/wiki/Soubor:House\\_on\\_Bohatyrskya\\_Street\\_after\\_shelling\\_of\\_14\\_March\\_2022\\_\(01\).jpg](https://cs.m.wikipedia.org/wiki/Soubor:House_on_Bohatyrskya_Street_after_shelling_of_14_March_2022_(01).jpg)

**Following the invasion of Ukraine by Russia, the case for a rapid clean energy transition has never been stronger and clearer.** The EU imports 90% of its gas consumption, with Russia providing more than 40% of the EU's total gas consumption. Russia also accounts for 27% of oil imports and 46% of coal imports.

COM(2022) 108 final





## **Energy as a tool of foreign policy of authoritarian states, in particular Russia**

This paper was requested by the European Parliament's  
Committee on Foreign Affairs.

English-language manuscript was completed on 27 April 2018.

Printed in Belgium.

Author: Rem KORTEWEG, Senior Research Fellow, Clingendael,  
The Netherlands



and so the 1973 OPEC oil embargo is mentioned as an instance of the offensive use of energy resources by a number of Arab countries. A brief assessment follows below.

<i>Energy-rich authoritarian states</i>	<i>Use of energy as an offensive tool of foreign policy</i>	<i>Use of energy as a defensive tool of foreign policy</i>
Azerbaijan	Delay of development trans-Caspian pipeline, gas pipeline bypassing Armenia	gas pipeline to Europe
Iran	participated in 1973 oil embargo	favourable oil contracts (mainly China)
Kazakhstan	No	n/a
Libya	participated in 1973 oil embargo	Close ties with European energy firms
Qatar	participated in 1973 oil embargo	largest LNG supplier globally
Russian Federation	energy price discounts, energy cuts, diversionary pipelines, long-term gas supply contracts	pipeline interdependency with major European powers, particularly Germany
Saudi Arabia	participated in 1973 oil embargo	largest oil producer in Middle East, close energy ties with major powers
Turkmenistan	No	gas pipeline to China
Uzbekistan	No	n/a
Venezuela	participated in 1973 oil embargo	oil deals with Russia and China

**Table 2: Examples of offensive & defensive use of energy as a tool of foreign policy**

In defensive terms, in its effort to maintain political independence after the collapse of the Soviet Union, Azerbaijan's authoritarian leadership has sought to build energy ties with Europe. It has done so by



disruption in natural gas supplies could thus directly impact European citizens, particularly if it comes during the winter. On the face of it, this underlines Europe's vulnerability to political leverage.

	Imports from Russia 2016 (bcm), excludes transit	Consumption of Natural gas 2016 (bcm)	Share of Russian imports in 2016 natural gas consumption (red = more than 50 %)	Share of natural gas of total primary energy mix (red = more than 50 %)
Austria	5.6	8.7	64	22
Belarus	16.6	17	98	64
Belgium	5.4	15.4	35	23
Bulgaria	3.2	3	106 (includes re-export)	15
Denmark	1.8	3.2	56	17
Croatia	0.6 (data from 2015)	1.7 ( data from 2015)	59	19
Czech Republic	4.2	7.8	54	18
Estonia	0.4	0.5 (data from 2015)	80	7
Finland	2.3	2.0	115 (includes re-export)	6
France	10.5	42.6	25	16
Germany	46	80.5	57	22
Greece	2.5	2.8	89	10
Hungary	5.1	8.9	57	37
Italy	22.7	64.5	35	38
Latvia	1	1.3 (data from 2015)	79	36
Lithuania	1	1.8	55	25
Netherlands	14.7	33.6	44	35
Poland	10.2	17.3	59	16
Romania	1.5	10.6	14	29
Slovakia	3.6	4.4	81	25
Slovenia	0.52	0.70	75	12 (data from 2015)
Turkey	23.2	42.1	55	27

Table 6: EU gas dependence on Russia

Source: BP Statistical Review of World Energy 2017, IEA statistics, Gazprom Export delivery statistics

**The EU needs to be ready for any scenario. It can reach independence from Russian gas well before the end of the decade. The sooner and more decisively we diversify our supply, accelerate the roll out of green energy technologies and reduce our demand of energy, the earlier we can substitute Russian gas.**

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REPowerEU will seek to diversify gas supplies, speed up the roll-out of renewable gases and replace gas in heating and power generation. This can **reduce EU demand for Russian gas by two thirds before the end of the year.**

EC Press Release, 8 March 2022

**Phasing out our dependence on fossil fuels from Russia can be done well before 2030. To do so, the Commission proposes a REPowerEU plan that will increase the resilience of the EU-wide energy system based on two pillars:**

- **Diversifying gas supplies**, via higher LNG imports and pipeline imports from non-Russian suppliers, and higher levels of biomethane and hydrogen.
- **Reducing faster our dependence on fossil fuels** at the level of homes, buildings and the industry, and at the level of the power system by boosting energy efficiency gains, increasing the share of renewable and addressing infrastructure bottlenecks.

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Full implementation of our Fit for 55 proposals would lower our gas consumption by 30%, equivalent to 100 bcm, by 2030. Together with additional gas diversification and more renewable gases, frontloaded energy savings and electrification have the potential to jointly deliver at least the equivalent of the 155 bcm imports of Russian gas.

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		2030	MEASURE	THE END OF 2022 (BCM equivalent) estimate	TO FF55 BY 2030 (BCM equivalent) estimate
<u>GAS DIVERSIFICATION</u>	NON-RU NATURAL GAS	-	LNG diversification	50*	50
		-	Pipeline import diversification	10	10
	MORE RENEWABLE GAS	17 bcm of biomethane production, saving 17 bcm	Boost biomethane production to 35bcm by 2030	3.5	18
		5.6 million tonnes of renewable hydrogen, saving 9-18.5 bcm	Boost hydrogen production and imports to 20mt by 2030	-	25-50
<u>ELECTRIFY EUROPE</u>	HOMES	Energy efficiency measures, saving 38 bcm	EU-wide energy saving, e.g. by turning down the thermostat for buildings' heating by 1°C, saving 10bcm	14	10
		<i>Counted under overall RES figures below</i>	Solar rooftops front loading – up to 15 TWh within a year	2.5	frontloaded
		30 million newly installed heat	Heat pump roll out front loading by	1.5	frontloaded

<b><u>ELECTRIFY EUROPE</u></b>			thermostat for buildings' heating by 1°C, saving 10bcm		
		<i>Counted under overall RES figures below</i>	Solar rooftops front loading – up to 15 TWh within a year	2.5	frontloaded
		30 million newly installed heat pumps installed in 2030, saving 35 bcm in 2030	Heat pump roll out front loading by doubling deployment resulting in a cumulative 10 million units over the next 5 years	1.5	frontloaded
	POWER SECTOR	Deploy 480 GW of wind capacities and 420 GW of solar capacities, saving 170bcm (and producing 5.6 Mt of Green Hydrogen)	Wind and solar front loading, increasing average deployment rate by 20%, saving 3bcm of gas, and additional capacities of 80GW by 2030 to accommodate for higher production of renewable hydrogen.	20	Gas savings from higher ambition counted under green hydrogen, the rest is frontloaded
<b><u>TRANSFORM INDUSTRY</u></b>	ENERGY-INTENSIVE INDUSTRIES	Front load electrification and renewable hydrogen uptake	Front load Innovation Fund and extend the scope to carbon contracts for difference	<i>Gas savings counted under the renewable hydrogen and renewables targets</i>	

\*all figures are estimates

An unprecedented LNG supply to the EU in January 2022 has ensured security of gas supply for this winter. The EU could import 50 bcm more of LNG (e.g. from Qatar, USA, Egypt, West Africa) on a yearly basis. Diversification of pipe sources (e.g. Azerbaijan, Algeria, Norway) could deliver another 10 bcm of yearly savings on Russian gas imports.

While diversifying supply, the EU fosters its international partnerships. The Commission will continue discussing within G7 and with major global purchasers of gas (Japan, South Korea, China, India) medium-term market developments.

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## Increase the EU production of biomethane

**Doubling the objective of Fit for 55 for biomethane would lead to the production of 35 billion cubic metres (bcm) per year by 2030.** To do so, Member States' CAP strategic plans should channel funding to biomethane produced from sustainable biomass sources, including in particular agricultural wastes and residues.

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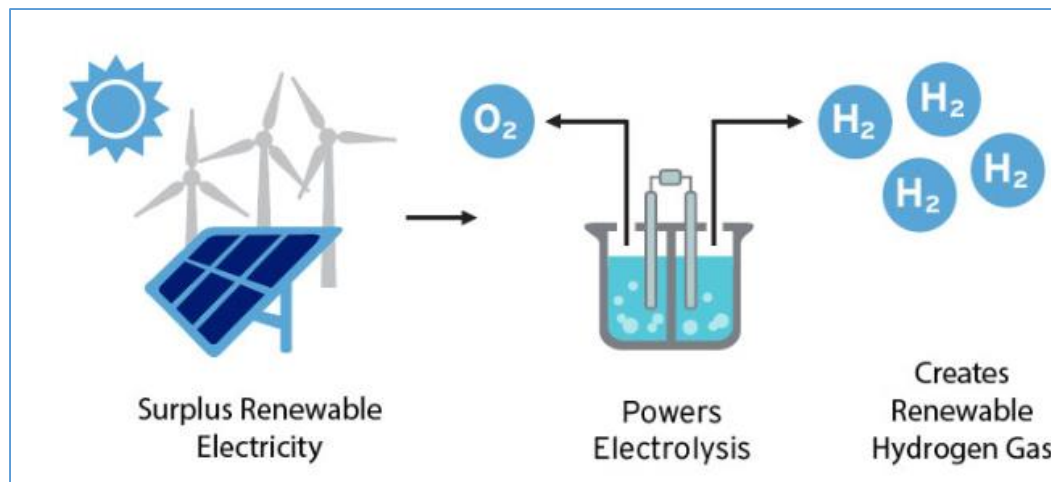


<https://www.euractiv.com/section/energy/news/europeans-confront-biomethane-cost-reduction-challenge/>

## Hydrogen Accelerator

**An additional 15 million tonnes (mt) of renewable hydrogen on top of the 5,6 mt foreseen under the Fit for 55 can replace 25-50 bcm per year of imported Russian gas by 2030.** This would be made of additional 10 mt of imported hydrogen from diverse sources and an additional 5 mt of hydrogen produced in Europe, going beyond the targets of the EU's hydrogen strategy and maximising the domestic production of hydrogen. Other forms of fossil-free hydrogen, notably nuclear-based, also play a role in substituting natural gas.

COM(2022) 108 final



<https://www.fchea.org/in-transition/2019/7/22/unlocking-the-potential-of-hydrogen-energy-storage>

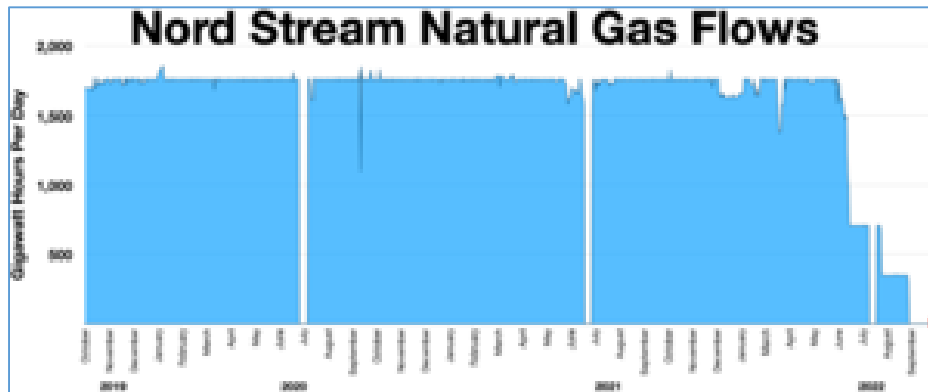
## **Rolling out solar, wind and heat pumps**

**Fit for 55 foresees the doubling of the EU's photovoltaic and wind capacities by 2025 and tripling by 2030, saving 170 bcm of yearly gas consumption by 2030.**

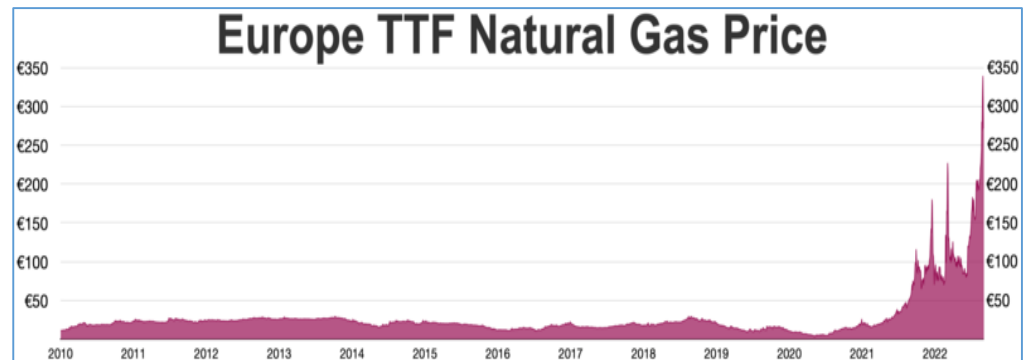
**By accelerating the roll out of rooftop solar PV systems by up to 15 TWh this year the EU could save an additional 2,5 bcm of gas.**

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[https://en.wikipedia.org/wiki/2022\\_Russia%E2%80%93European\\_Union\\_gas\\_dispute#:~:text=The%20Russia%E2%80%93EU%20gas%20dispute,t%20Europe%20by%20Russia's%20Gazprom.](https://en.wikipedia.org/wiki/2022_Russia%E2%80%93European_Union_gas_dispute#:~:text=The%20Russia%E2%80%93EU%20gas%20dispute,t%20Europe%20by%20Russia's%20Gazprom.)



Europe consumed 512 billion cubic metres (bcm) of natural gas in 2020, of which 185 bcm (36%) came from Russia. In early 2022, Russia supplied 45% of EU's natural gas imports, earning \$900 million a day, and by October 2022, it had decreased to 7.5%.

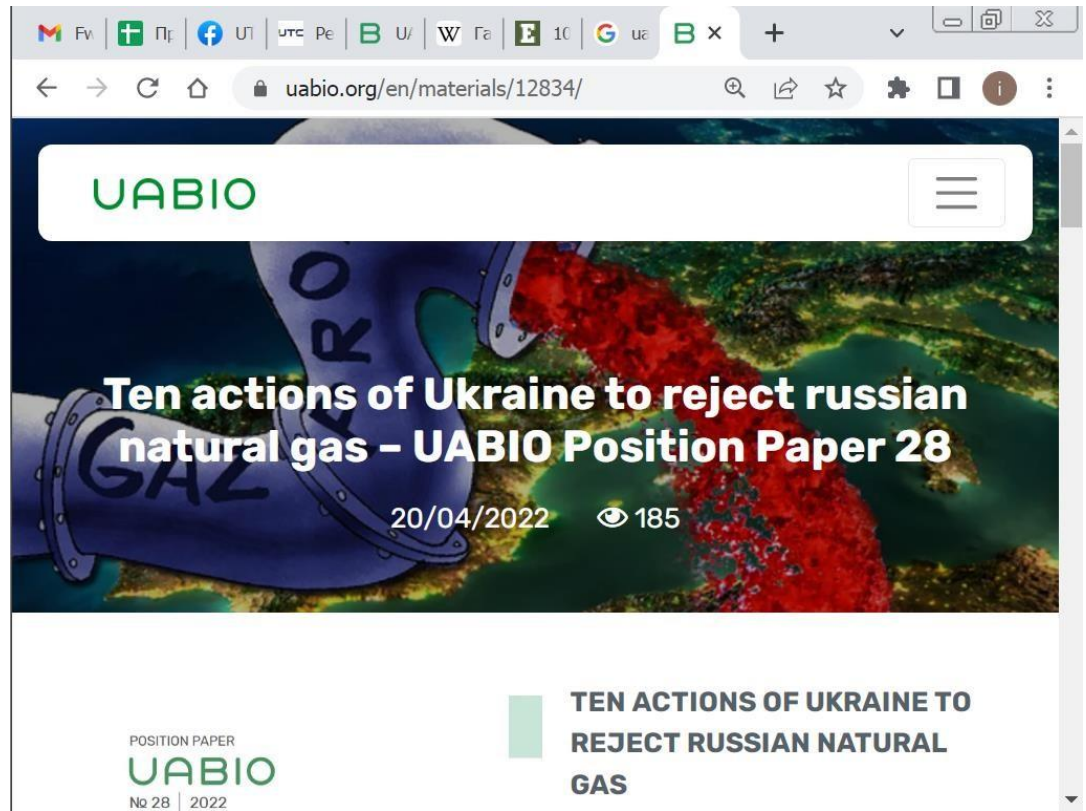
## Natural gas in Ukraine

Ukraine produces about 20 billion m<sup>3</sup> of natural gas per year.  
Ukraine imports about 8-10 billion cubic meters of gas per year.  
(In 2021, Ukraine consumed 27 billion m<sup>3</sup> of natural gas)

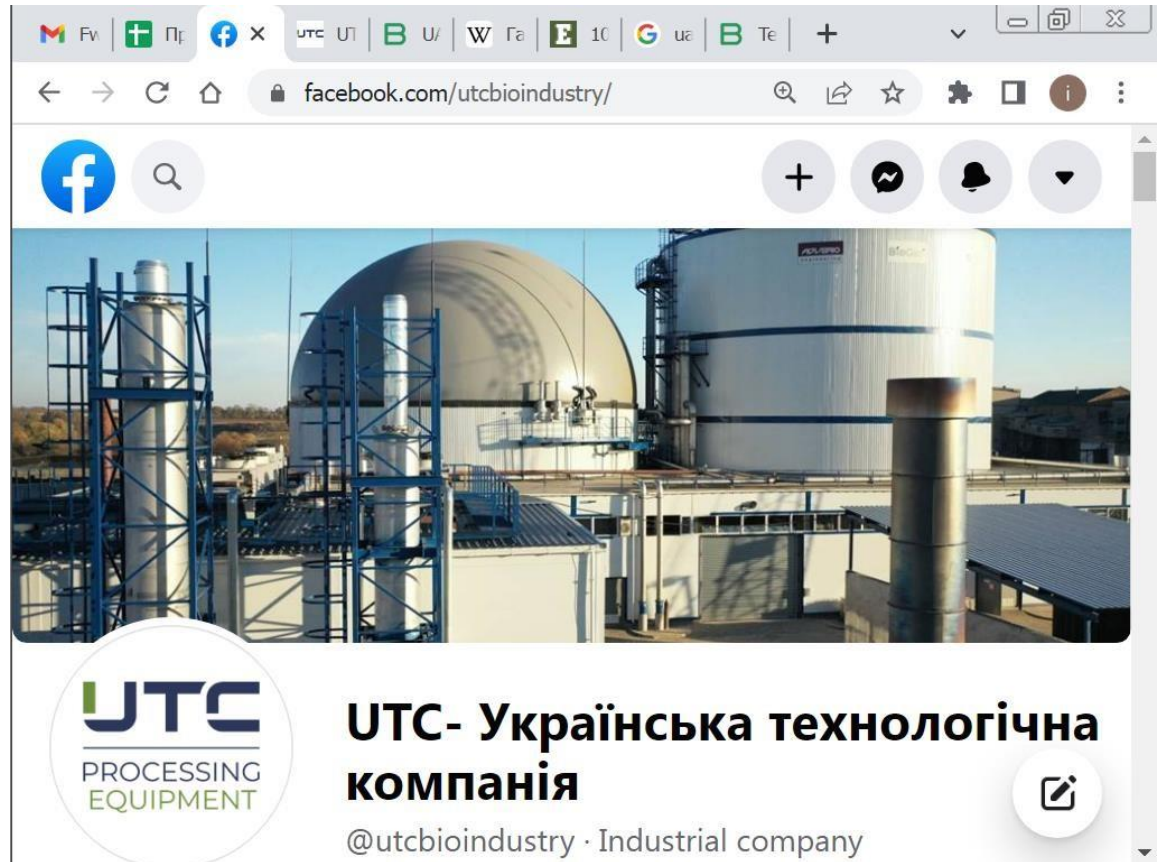
Міністерства енергетики України <https://bit.ly/3JPE9Gt>







Ukraine can potentially replace up to 10 billion m<sup>3</sup> of natural gas with biomass per year. The main components of the energy potential of biomass in Ukraine are: agricultural residues - 9.4 million tons per year, energy plants - 7.5 million tons per year.

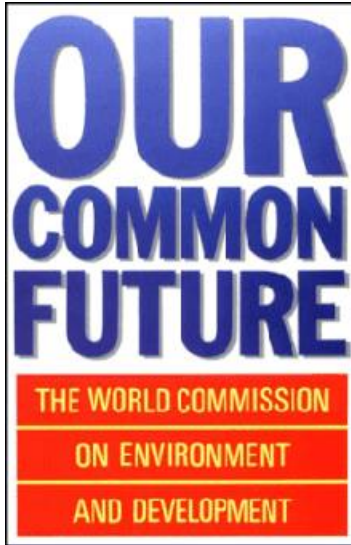


According to the estimates of the head of UTK Evgeniy Lukashevich, Ukraine has the potential to produce 10-15 billion cubic meters of biomethane per year.

# Energy efficiency in different countries, energy consumption, kgoi/1000 USD GDP, 2016



<https://businessviews.com.ua/ru/economy/id/energoefektivnist-v-ukrajini-1931/>



"**Sustainable development** is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report / Our Common Future, 1987)

