Coal, lignite and mine methane under EU climate and energy policy
EURACOAL: 24 members and an observer from 14 countries

- DEBRIV – Deutsche Braunkohlen-Industrie-Verein (DEU)
- ZSDNP – Czech Confederation of Coal and Oil Producers (CZE)
- PPC – Public Power Corporation (GRC)
- PGG – Polska Grupa Górnicza S.A. (POL)
- PPWB – Confederation of Polish Lignite Producers (POL)
- GIPH – Górnicza Izba Przemysłowo-Handlowa (POL)
- PATROMIN – Asociaţia Patronală Minieră din Romania (ROU)
- BAZ – Borsod-Abaúj-Zemplén County Government (HUN)
- MMI – Mini Maritza Istok (BGR)
- GIG – Central Mining Research Institute (POL)
- CPERI/CERTH – Chemical Process and Energy Resources Institute (GRC)
- BSN – Branchenverband Steinkohle und Nachbergbau (DEU)

- DTEK (UKR)
- Donetsksteel (UKR)
- Lubelski Węgiel „Bogdanka” S.A. (POL)
- Premogovnik Velenje, d.o.o. (SVN)
- HBP – Hornonitrianske bane Prievidza, a.s. (SVK)
- EPS – Electric Power Industry of Serbia (SRB)
- TKI – Turkish Coal Enterprises (TUR) – observer
- RMU “Banovići” d.d. (BIH)
- IMG-PAN Strata Mechanics Research Institute (POL)
- Geocontrol S.A. (ESP)
- Subterra Ingeniería S.L. (ESP)
- DMT GmbH & Co. KG (DEU)
Despite a strong recovery in 2021 and 2022, EU production and imports were below the pre-pandemic levels of 2019.

Source: EURACOAL members – * 2021 data
Note: bars show million tonnes of coal equivalent (Mtce) while figures at top of bars show millions of physical tonnes (Mt)
Production of coal and lignite, 2022

- Germany
- Poland
- Bulgaria
- Czechia
- Romania
- Greece
- Hungary
- Slovenia
- Slovakia
- Norway

Eurostat

40th Pittsburgh International Coal Conference, Istanbul
Coal and lignite in EU electricity generation, 2021

Source: Eurostat database, last update 28.04.2023 (n.b. coal includes peat* and oil shale**)

** global average 35%

EU-27 average 15.6%
Coal and lignite in the REPowerEU Plan of 18 May 2022

- “Existing coal capacities might be used longer than expected”
- More coal power in 2030: +105 TWh (+41% c.f. Fit-for-55)
- 36% decrease in coal and lignite demand from 2020 to 2030
- GHG reduction target for 2030 reached with more RES and investment in energy efficiency
- Projected fossil gas saving: 24 bcm in 2030 (c.f. IEA’s 22 bcm) for a €2 billion CAPEX investment

*ref. SWD(2022) 230 final*
Fit-for-55 climate targets 2030 and 2050:

70% less coal in 2030 c.f. 2015

GHG emission reduction over the 10 years from now to 2030 has to be much faster (c.3×) than the reduction over the 30 years 1990-2020.

sources: European Commission and EEA
Fit-for-55 & REPowerEU – wind and solar PV forecast to grow

n.b. in 2020, the total installed capacity of all generation types in the EU was c. 1000 GW

sources: European Commission and IEA
Coal, peat & oil shale phase-out plans in EU Member States

- Detailed phase-out plan to be announced

Timeline:
- 2020
- 2030
- 2040
- 2050

Countries represented by flags:
- France
- Germany
- Italy
- Spain
- Portugal
- Sweden
- Poland
- Bulgaria

Slide 11  4-6/10/2023  40th Pittsburgh International Coal Conference, Istanbul
China coal production 1900-2022 (and European production)

The Just Transition Fund is part of the cohesion policy family

€25 billion to soften the impacts of the energy transition

93 territories, covering coal regions and carbon-intensive regions

A variety of investment themes are supported:
– half of JTF investments help people find new skills & reinvent the local economy
– getting ready for the future: clean energy, circular economy and innovation
– cleaning the environment
– in specific cases, the JTF supports large enterprises and ETS installations

The European Commission helps JTF regions to implement their plans

Industry value chains will continue to contribute to the socio-economic development of the lignite regions, so include companies in plans.
Just Transition Fund (JTF) – approved territorial plans

Map showing approved territorial just transition plans in Europe.
€25.4 billion JTF to be allocated over 2021-2027 budget period

<table>
<thead>
<tr>
<th>Country</th>
<th>Allocation 2021-2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL</td>
<td>3,847,346,473</td>
</tr>
<tr>
<td>DE</td>
<td>2,382,379,247</td>
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<tr>
<td>RO</td>
<td>2,139,715,532</td>
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<tr>
<td>CZ</td>
<td>1,641,492,008</td>
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<tr>
<td>FR</td>
<td>990,339,045</td>
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<td>EL</td>
<td>1,375,059,412</td>
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<td>IT</td>
<td>1,029,588,558</td>
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<td>ES</td>
<td>835,331,611</td>
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<tr>
<td>NL</td>
<td>1,198,275,617.9</td>
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<tr>
<td>SK</td>
<td>1,164,093,056.95</td>
</tr>
</tbody>
</table>

More information:

- Just Transition Platform - JTP Working Groups on carbon-intensive regions - Repository of knowledge products
- To help Member States in preparing their TJTPs, the Commission services published a Staff Working Document in September 2021.
- Just Transition Fund open data page - JTF finances planned dataset - JTF achievement dataset
The European Commission proposal to revise the IED would:

- Set limits for all plants at the strictest ends of BAT-AEL ranges, despite these having been achieved at perhaps only one plant under ideal conditions!

- End the certainty of national emission limit values set for all plants, destroying the level playing field and requiring individual plant limits
  - reliance on exemptions as a rule!

- Accelerate the revision of permits and new Environmental Management Systems (EMS) for every plant.

- Grant additional rights to NGOs, including a reversal of the “burden-of-proof” legal principle.

Another blow to industry in times of crisis, but coal mining stays out.
The European Commission proposal would mean:
- a ban on venting and flaring of methane with no exemptions for mine safety
- the premature **closure of Polish and Slovenian underground coal mines**
- costly obligations for all hard coal mines that have closed since 1972
- costly obligations to monitor and verify emissions from operating lignite mines – with no option to curb emissions

To reduce methane emissions, secure energy supply and allow a Just Transition, EURACOAL called for amendments:
- allow limited methane venting and flaring for operational and safety reasons
- encourage Member States to incentivise **more methane capture and use**
- lignite mine operators should be allowed to use deposit-specific, average national emissions factors – as in UNFCCC reporting

**Methane emissions from lignite mines are reported to be low and marginal, at the limits of detection.**
Projected PGG coal production and $\text{CH}_4$ emissions to 2049

- **Coal production** (Mt)
- **Methane emissions** (kt)

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal Production (Mt)</th>
<th>Methane Emissions (kt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2024</td>
<td>20</td>
<td>250</td>
</tr>
<tr>
<td>2029</td>
<td>15</td>
<td>200</td>
</tr>
<tr>
<td>2034</td>
<td>10</td>
<td>150</td>
</tr>
<tr>
<td>2039</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>2044</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>2049</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Coal mine methane (CMM) and ventilation air methane (VAM)
RFCS Modernisation Package came into force August 2021

- A €1.6 billion “trust fund”
- Revised legal basis COM(2020) 319
- Technical guidelines COM(2020) 320
- Financial guidelines COM(2020) 321
- Annual call €40 million (was €60 million)
- New “Big Ticket” annual calls (€71 million):
  - Clean Steel Partnership call (€52 million)
  - Coal Regions in Transition call (€19 million)
- RFCS research programme managed by European Research Executive Agency since 1 April 2021

Research Fund for Coal & Steel

- € 40 M RFCS annual call
- € c.130 M 2021-2027 large coal projects Just Transition Mechanism
- € c.350 M 2021-2027 Breakthrough Clean Steel projects

Revision of coal and steel research objectives

RFCS research programme
DD-MET – directional drilling for methane drainage

RFCS grant no.847338 – DD-MET – RFCS-2018

- **Target:** an alternative, more effective and economic method of methane drainage from longwalls or methane capture from goafs.

- **Impacts:** increased mine safety, higher productivity, reduced methane emissions, and lower costs.
REM
RFCS BIG TICKETS PROJECT

Reduction of methane emissions from post mining goafs to minimise their inflow into VAM
Ventilation air methane (VAM) installations worldwide

- Thoresby mine, 1994
  - 10,000 Nm³/h

- Enlow Fork mine, 2007
  - 10,000 Nm³/h

- Verdeo McElroy mine, 2012
  - 250,000 Nm³/h
  - 6 MW steam turbine

- GaoHe mine, 2014
  - 1,020,000 Nm³/h
  - 20 MW steam turbine

- Appin Colliery mine, 2001
  - 10,000 Nm³/h

- Datong mine, 2011
  - 370,000 Nm³/h
  - Hot water generation

- Zhengzhou mine, 2008
  - 62,500 Nm³/h
  - Hot water generation

- West Cliff mine, 2006
  - 250,000 Nm³/h
  - 6 MW steam turbine

Source: DÜRR AG
VAM at Gaohe coal mine, Shanxi Lu’An Mining Group, China
Thank you!


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## Coal mine methane – definitions

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBM</td>
<td>Coalbed methane is recovered from virgin (unmined) coalbeds by drilling wells from the surface, sometimes prior to underground mining</td>
</tr>
<tr>
<td>CMM</td>
<td>Coal mine methane is methane gas which is captured by drilling drainage boreholes underground before or during mining operations. Typically, 30% of coal mine methane can be drained and is often used for heat and power generation.*</td>
</tr>
<tr>
<td>VAM</td>
<td>Ventilation air methane is the methane desorbed from coal seams or released from voids during mining, not captured by drainage but diluted with fresh air for safety reasons before venting the mixed gas to atmosphere via mine roadways and exhaust shafts. Typically, 70% of mine methane leaves an underground mine in the ventilation air.*</td>
</tr>
<tr>
<td>AMM</td>
<td>Abandoned mine methane is the methane gas remaining (and in some instances newly generated by microbes) in closed coal mines. Methane held in voids, coal seams and other gas-bearing strata that have been disturbed or intercepted by mining operations can escape to atmosphere, but quantities vary from mine to mine. AMM emissions change with atmospheric pressure and will eventually stop when mines flood.</td>
</tr>
<tr>
<td>SMM</td>
<td>Surface mine methane is the methane released during opencast or open-pit mining. Emissions from surface lignite mines in Europe are reported to be low and marginal, at the limits of detection, because little or no thermal methane is present from the coalification process in these shallow, geologically young seams.</td>
</tr>
</tbody>
</table>

Total global methane emissions, 2012/2019 and EU anthropogenic methane emissions, 2018

Sources: IEA Methane Tracker 2020 (non-energy data for 2012 – the latest year for which reliable estimates are available, Sauonis et al (2020); estimated energy data for the year 2019); COM(2020) 663 (breakdown of EU anthropogenic methane emissions); and European Environment Agency (EEA) greenhouse gas data viewer (total EU anthropogenic methane emissions for 2018).