



EMBER

COAL TO CLEAN ENERGY POLICY

Impact Report 2021

2021: An Extraordinary Year

“ Ember has experienced an incredible year of impact on energy & climate policy - with a new international presence, accelerating the shift away from coal with policymakers and campaigners across Asia.

Though the name has changed from Sandbag, the organisation I founded a decade ago, the same commitment to evidence remains, and the same focus on using data to find the climate policy tipping points. ”

Baroness Bryony Worthington
Founder & Director



2021 began with a landmark moment as Ember revealed renewables overtook fossil fuels as Europe's main source of electricity in 2020, whilst the globe saw the largest in coal on record.

Throughout 2021 our message has been clear: coal must be consigned to history. And we've been at the forefront of changing policy to make this happen. From shaping the Indian government's coal commitments at COP26, to deep involvement in launching the new EU methane strategy, to leading the campaign which won a UK commitment to 2035 zero-carbon power - Ember is now a key force in tracking the global electricity transition and creating the policy that shapes it.

We are pleased to share some of our key success stories in this report.



The Challenge

A rapid phase-out of coal power is essential to limit global heating to 1.5 degrees.

However, the coal-to-clean transition is moving too slowly.

Coal-fired power plants are still responsible for 30% of all global CO₂ emissions. Coal generation must fall by 11% every year this decade. Despite a global pandemic, it fell by just 4% in 2020.



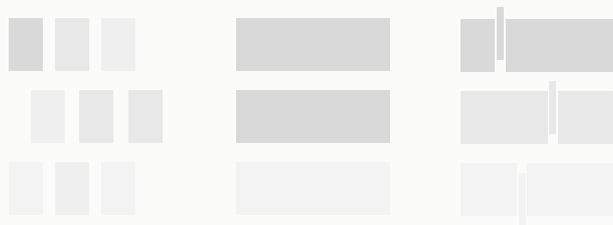
Our Mission

**Accelerate the global
transition from coal
to clean electricity.**



What we do

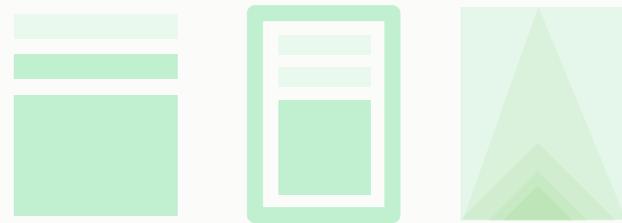
We turn data into action.



GATHER

CURATE

ANALYSE



CHANGE
policy

SHIFT
narratives

EMPOWER
campaigns

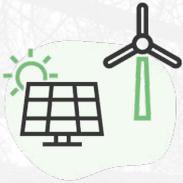
We gather, curate and analyse data on the global power sector and its impact on the climate.

Our data and analysis changes energy policy, shifts the global narrative, and empowers campaign organisations.



Our Vision:

A zero carbon global electricity system



1. Wind & solar to lead the transition

The electricity grid of the future will be dominated by wind & solar, supported by a mixture of technologies, including hydro, nuclear, geothermal, batteries, hydrogen, and other long-term energy storage.



2. Everything electrified

Electrification will cut emissions from transport, heat, industry and other sectors - and every single person in the world's growing population will have access to power. Global electricity demand will be many times larger than today.



3. The end of fossil fuel use

Unabated coal and gas power will be entirely eliminated. There may be a transitional role for CCS — but only if it demonstrably reduces grid carbon intensity (including lifecycle emissions).

2021 reports and commentary Jan-Jun



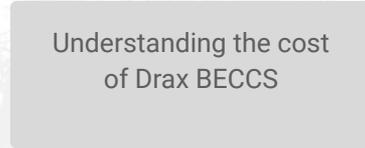
EU Power Sector 2020

Jan



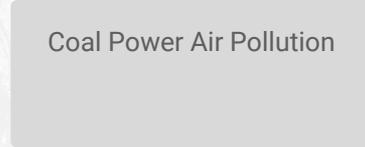
Global Electricity Review

Mar



Understanding the cost of Drax BECCS

May



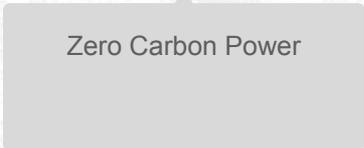
Coal Power Air Pollution



Feb

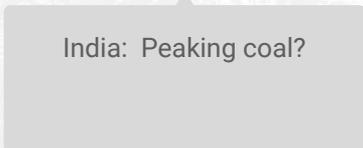


China's aluminium production



Zero Carbon Power

Apr



India: Peaking coal?



Jun

2021 reports and commentary Jan-Jun

Jan	<ul style="list-style-type: none">● Milestone Reached as Renewables Overtake Fossil Fuels in the UK
Feb	<ul style="list-style-type: none">● Utilities Beyond Fossil Fuels● China's aluminium production surged by 5% in 2020, producing more emissions than Indonesia● The Drax gas plant is dead - but others remain● India's coal power declines for second consecutive year
Mar	<ul style="list-style-type: none">● Ember's first year● UK spent £350m on new gas power despite nearing fossil phase-out● Disappointing lack of ambition in Poland's Energy Policy until 2040● Halfway there: 50% of Europe's coal plants on track for 2030 closure
Apr	<ul style="list-style-type: none">● Top 25 Coal Power Countries in 2020● Gas power plants overtook lignite in 2020 to become Europe's #1 power sector emitter● Aluminium: A barometer for China's green recovery● Energy giants demand millions from Dutch taxpayers for stranded coal assets
May	<ul style="list-style-type: none">● Renewables supplied only a third of Africa's electricity demand growth● OECD progress towards zero carbon electricity by 2035● Germany's flawed assumptions behind €4.4bn lignite compensation: exclusive analysis● Gas drives Europe's fossil comeback one year on from Covid-19● IEA's Net Zero by 2050● Coal Power Air Pollution● Message to the P4G Summit
Jun	<ul style="list-style-type: none">● IEA's global roadmap for net-zero energy emissions: Insights for China

2021 reports and commentary Jul-Dec



European Electricity
Review H1

Jul

Stepping on the Gas

The UK Clean Power Plan

India's Zombie threat

Coal Mine Methane

Remaining Coal Power
Polluters

Coal Power Emissions
Per Capita G20

Nov

Aug

Global Electricity Review
H1

Oct

UK biomass emits more
CO2 than coal

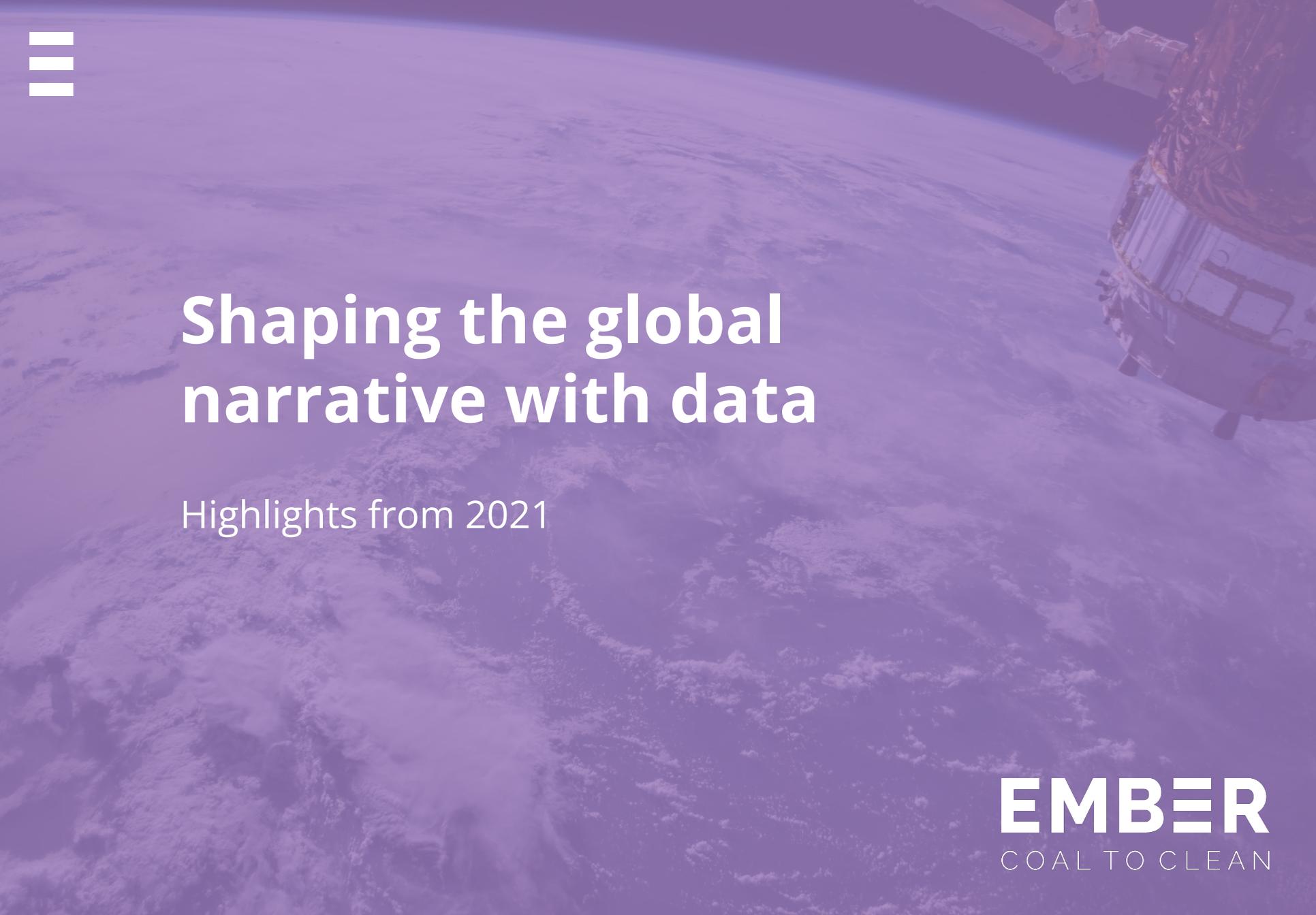
Dec

Soaring fossil gas costs
responsible for EU
electricity price increase



2021 reports and commentary Jul-Dec

Jul	<ul style="list-style-type: none">• Top 15 Wind and Solar Power Countries in 2020
Aug	<ul style="list-style-type: none">• Why efficiency improvement is a key enabler for coal phase-out in China• Clean power by 2035 to meet climate targets says National Grid• EU solar power hits new record peak this summer
Sep	<ul style="list-style-type: none">• Soaring fossil gas costs drive 86% of UK electricity price increases• British public and businesses back clean power 2035• Turkey: New wind and solar power now cheaper than running existing coal plants relying on imports
Oct	<ul style="list-style-type: none">• Solar Power Can Help Solve China's Coal Power Dilemma• No New Coal Factbook• UK biomass emits more CO2 than coal• Gas price spike to add £29 billion to UK electricity bills next year• IEA WEO shows COP pledges needs to address electricity decarbonisation head-on• Soaring fossil gas costs responsible for EU electricity price increase• G7 poised to lead the world towards clean electrification• Czechia exposed to fossil electricity price shocks
Nov	<ul style="list-style-type: none">• Coal Mine Methane• Today's new coal phase-out announcements: an explainer• Latest TYNDP Draft Scenarios Miss Key Decarbonisation Milestones• Coal Power Emissions Per Capita show Australia and South Korea far beyond India and China• COP26: Making coal history
Dec	<ul style="list-style-type: none">• Gas-reliant Italy is lagging behind in Europe's race to renewables

A satellite in space, with Earth's surface visible in the background. The satellite is partially visible on the right side of the frame, showing its complex structure and solar panels. The Earth's surface is covered in a dense network of white clouds, with some darker landmasses visible. The overall scene is bathed in a purple and blue light, suggesting a sunset or sunrise from space.

Shaping the global narrative with data

Highlights from 2021

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Shaping the global narrative with data

Global & EU Annual and Half year reports achieve widespread coverage

FT

Bloomberg



Forbes

TAGESSPIEGEL

东方财富网
eastmoney.com

THE ECONOMIC TIMES

TheJakartaPost

Le Monde



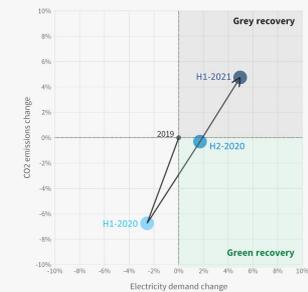
la Repubblica

AFP

Global electricity emissions bounce back above pre-pandemic levels

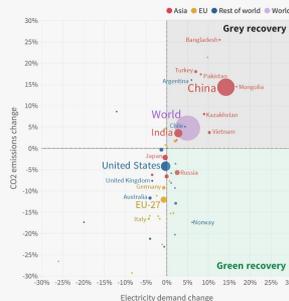
EMBER

Global change versus the same period in 2019

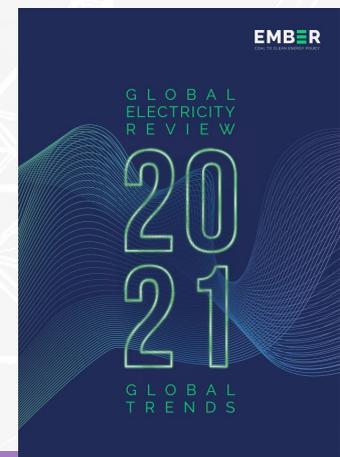


Ember's Global Electricity Review 2021 half year update. See report for full methodology

H1-2021 versus H1-2019



Global electricity emissions bounce back above pre-pandemic levels



One third of the media coverage for the GER H1 Review was in China

998 MEDIA ARTICLES

1.29M SOCIAL REACH

10.4k PAGE VIEWS

Shaping the global narrative with data

Impressive growth in Ember's reach

- 7k media mentions - 3.5x more than last year - with 3.2B potential reach and £300m PR value (ref: Meltwater Media Monitoring)
- Media hits in 100+ countries. Top locations: US, China, UK, Turkey, India, Germany, Poland
- 290k website visitors and 700k page views - 3.5x more than last year
- 11.6K Twitter followers - up from 5.4k last year
- 8.4 million Twitter impressions - 3x more than last year
- 5k LinkedIn followers - up from 1.4k last year
- Launched a newsletter which now has 300+ followers and an amazing 50% average open rate

7k MEDIA MENTIONS 

8.4 MILLION SOCIAL REACH 

700k PAGE VIEWS 

FT

Bloomberg

REUTERS

Forbes

TAGESSPIEGEL

东方财富网
eastmoney.com

ET THE ECONOMIC TIMES

TheJakartaPost

Le Monde

ALJAZERA

la Repubblica

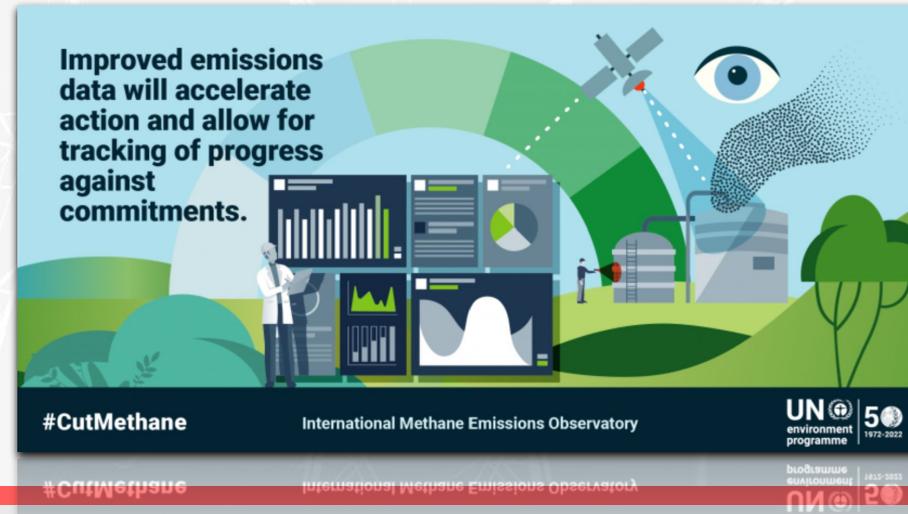
AFP

Shaping the global narrative

Case Study: Coal Mine Methane

Helping to establish the coal mine methane program at UNEP

- UNEP have done about of decade of work on methane from oil & gas, but with coal mine methane, they've only just began - thanks partly to Ember highlighting the problem
- Combining Ember's knowledge of coal mining with EDF's satellite knowhow



Ember sits on the IMEO CMM steering committee and in the technical committee

Shaping the global narrative

Case Study: Coal Mine Methane

Ember seen as leading NGO in the coal mine methane space



- Ember works with top NGOs on reducing atmospheric methane concentrations, such as Environmental Defence Fund (EDF), Clean Air Task Force (CATF) and Environmental Investigation Agency.
- Ember's staff are experts in working groups and steering committee United Nations Environmental Programme's (UNEP) initiative to measure reduce methane emissions from the metallurgical coal sector, with the International Methane Emissions Observatory (IMEO) and leading met-coal companies - Glencore, BHP Billiton, Anglo American.
- We co-host a series of roundtables with United Nations Environmental Council for Europe (UNECE), where industry experts share their views and analysis around CMM.

“Ember is widely regarded to be one the leading NGOs in the coal mine methane space and Instrat highly values its expertise on their subject.” Michal Hetmanski, CEO, Instrat Foundation.

Shaping the global narrative

Case Study: Energy pricing

Reframing the energy crisis away from blaming carbon pricing

- Ember showed Fossil gas is to blame for soaring electricity prices around Europe, not EU climate policy
- Presentations to academics, think tanks and MEPs, experts, industry roundtables, plus widespread media coverage helped shape narrative.

ft.com

Spain backtracks over levy on electricity companies' 'excess profits'

Energy sector had warned the measure would put future investment at risk



Ursula von der Leyen
@vonderleyen



Energy prices are rising globally.

Gas prices almost doubled compared to 2020 and producers are not increasing supplies sufficiently, despite rising demand.

But renewables prices have remained stable.

"Thank you very much for the final version of your report about energy prices and climate protection in Slovakia. It is very useful for us. We have already published it and sent it to the media and stakeholders. We appreciate your help and hope that we will be able to work with you in the future" Senior advisor to Mr. Martin Hojsik (MEP)

*"Thank you once again for your contribution to the Czech briefing. We made it with the facts to that evening primetime on the main tv channel. The topic was there also evening before the briefing and we managed, by one briefing, to change the framing from **blaming ETS to blaming russian gas.**"* Adam Ondráček, European Climate Foundation



Our Italian report into the risks of Italy remaining dependent on gas is mentioned in the FT

11.5k SOCIAL REACH 

971 PAGE VIEWS 

Shaping the global narrative

Case Study: Energy pricing

Ember charts used by European Commission



Ursula von der Leyen
@vonderleyen

Rising gas prices push up the cost of electricity in EU.

Almost all EU Member State have taken measures to shield the most vulnerable people, as recommended by [@EU_Commission](#)

This week, we presented proposals make our energy system more robust as well as more sustainable.

Skyrocketing fossil gas prices push up cost of EU electricity

Fossil gas costs vs. carbon costs for EU electricity generation from combined cycle gas turbines

CO₂ costs Gas costs

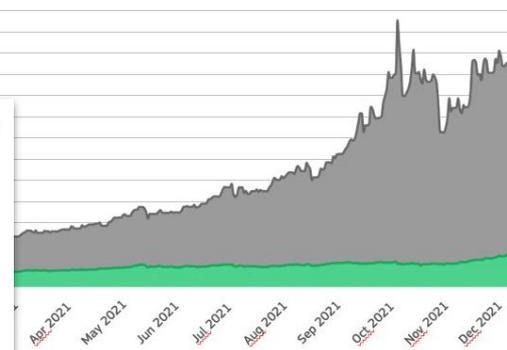
280

Skyrocketing fossil gas prices push up cost of EU electricity

Fossil gas costs vs. carbon cost for EU electricity generation from combined cycle gas turbines

CO₂ costs Gas costs

280
260
240
220
200
180



(for EU-ETS carbon prices (December contract) and plant efficiency rate of 55% (Lower Heating Value))



EMBER

Shaping the global narrative

Case Study: China's energy transition

Electricity transition in China is in a new phase with renewable energy starting to challenge the dominant position of coal power.

"In a year of dramatic shifts in global energy markets, Ember's reports, with a fresh and international take, provide a unique gateway for the Chinese audience to benchmark china's power transition against the international trend. I find the products of Ember illustrative, data-driven, and are easy to digest for readers here in China. Ember has been recognized as a think tank of a global view with an expert touch on China's nuance."

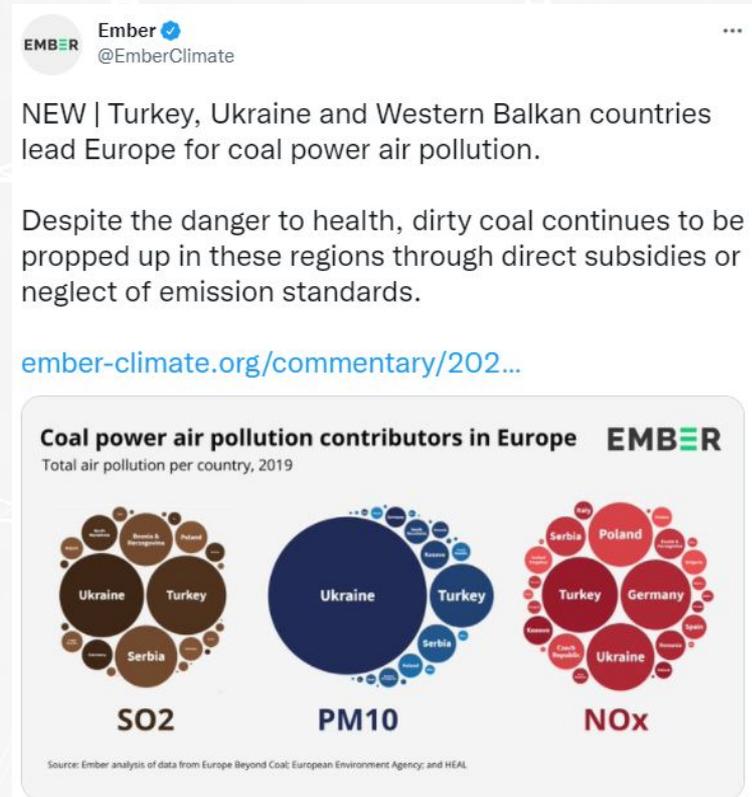
- 10+ op-eds, in top-tier media (e.g., [China Energy News](#), [Energy Magazine](#)), on issues pertaining to electricity system reconfiguration in China.
- Showing that solar power is a key solution to [China's coal power dilemma](#).
- Showing that China's recent power crisis is mainly attributable to the [inflexibility of the system](#) to govern its transition.
- Personal interview by [Phoenix Weekly](#).
- Contributions to Carbon Brief's China section (e.g., [1](#), [2](#), and [3](#))
- Stressing the criticality of taking [immediate action to coal power phase-out](#) in China

Shaping the global narrative

Case Study: Coal power in Turkey, Ukraine and Western Balkans

Ember showed the economic and environmental impact of coal power

Statistics highlight that Turkey, Ukraine and Western Balkans rank highest for coal power air pollution in Europe



Ember  @EmberClimate

NEW | Turkey, Ukraine and Western Balkan countries lead Europe for coal power air pollution.

Despite the danger to health, dirty coal continues to be propped up in these regions through direct subsidies or neglect of emission standards.

ember-climate.org/commentary/202...

Coal power air pollution contributors in Europe EMBER

Total air pollution per country, 2019



Pollutant	Top Contributor	Other Contributors
SO2	Ukraine	Turkey, Serbia, Bosnia & Herzegovina, Poland
PM10	Ukraine	Turkey, Serbia
NOx	Turkey	Poland, Germany, Ukraine, Serbia, Czech Republic

Source: Ember analysis of data from Europe Beyond Coal; European Environment Agency; and HEAL

51 MEDIA ARTICLES

2491 PAGE VIEWS



Shaping the global narrative

Case Study: Coal power in Turkey, Ukraine and Western Balkans

Imported coal blog featured on Turkish Ministry of Trade website and was quoted by the climate envoy/deputy minister

More recently Deputy Minister of Environment / Climate Envoy published a column to say “Farewell to coal”, indicating Turkey’s intention to move away from the fossil fuel-based development model with its significant investments in renewable energy
(Source: <https://www.dunya.com/kose-yazisi/komure-veda/645291>)

Kömürden Elektrik Üretim Maliyeti Rüzgârın İki Katına Yaklaştı

07 Ekim 2021

İklim ve enerji odaklı düşünce kuruluşu EMBER Türkiye’de rüzgâr ve güneş enerjisi ile ithal kömüre dayalı yatırımları karşılaştıran bir analiz yayınladı.

Cost of Electricity Generation from Coal Nearly Twice That of Wind

07 October 2021

Climate and energy-focused think tank EMBER has published an analysis comparing wind and solar energy and imported coal-based investments in Turkey.

According to the analysis of the organization, the investment cost of wind power plant in Turkey decreased by 32% and the cost of solar energy by 50% compared to five years ago.

This decline enabled the leveled electricity generation costs for new investments to fall to US\$ 40.8/MWh in wind energy and US\$ 51.9/MWh in solar energy.

However, coal prices, which have doubled in only the last four months and reached the highest level in the last 10 years, have increased the same value to 73 USD/MWh for imported coal power plants.

In the analysis, it was pointed out that 45% of the existing coal-fired power plants in Turkey use imported coal, and it was shared that in 2021, Turkey will spend 5 billion dollars on coal imports, 3 billion dollars of which is for electricity generation.

Source: [Yesilekonomi.com](https://www.yesilekonomi.com)

Published by: TR Ministry of Commerce, General Directorate of Trade Research and Risk Assessment

An aerial photograph of a coal mine, showing various pieces of heavy machinery, conveyor belts, and large piles of coal. The entire image is overlaid with a semi-transparent yellow filter. In the top left corner, there are three horizontal white bars of varying lengths, resembling a menu icon.

Developing high impact policies

Highlights from 2021

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COAL TO CLEAN

Developing high impact policies

Case Study: Coal Mine Methane

Analysis of coal mine methane influences policy solutions at EU level

Ember highlighted that the short term climate impact of coal mine methane leaks is larger than the EU's entire CO2 emissions.

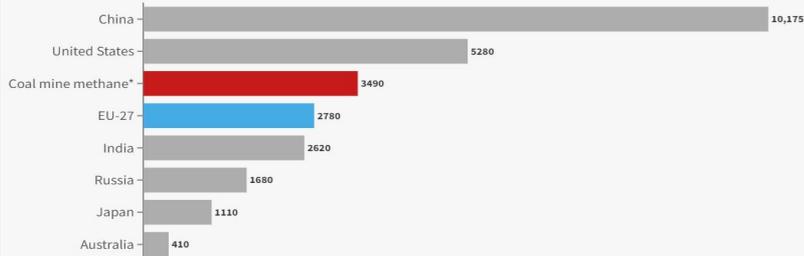
In December the European Commission proposed action on this climate crisis multiplier.

Strong requirements on thermal coal production in the EU will drive down emissions, making sure the full scope of coal's climate impact is acknowledged in production.

In 2021 an Ember employee took a secondment to the EU to assist them in developing their methane strategy.

Coal mine methane has a larger short-term climate impact than the total CO2 emissions of the EU-27 **EMBER**

CO2 emissions in million tonnes in 2019.



Source: Total country CO2-only emissions from Global Carbon Project.

*Coal mine methane emissions are estimated by the IEA at 40.5 million tonnes, which means their short-term climate impact is 3,490 million tonnes of CO2 equivalent, where a multiplier of 86 is used to assess methane's impact over 20 years compared to CO2.

The short term climate impact of coal mine methane leaks is larger than the EU's entire CO2 emissions

Developing high impact policies

Case Study: Contribution to India's Net Zero 2070 commitment

Policy Impact:

Research

In-depth analysis demonstrates new coal not necessary to meet demand - whilst an enormous solar potential exists.

Lobbying

Working with the Indian and UK COP26 teams on potential Indian commitments.

Shifted narrative around peaking coal

Ember built trust, bringing together key organisations in roundtable conference which helped experts in India now talking openly about "phasing down coal"



Developing high impact policies

Case Study: Contribution to India's Net Zero 2070 commitment

"Ember's speed and accuracy in electricity sector analysis has been particularly useful in setting new narratives. In India, Ember's intervention on 'coal generation peak' and 'zombie coal projects' was particularly useful in setting new narratives in the country. The reports were widely covered and quoted by several experts in the field. In addition, Ember's quick analysis of carbon tax and the energy crisis was also very useful in highlighting the need to move away from fossil fuel towards renewables. Ember's 'Global electricity review' and H1 reviews help track actual movements from coal to clean - which is useful in evaluating efforts towards power sector decarbonisation. GSCC sees value in providing communications support to Ember."

Hozefa Merchant, GSCC

INDIA'S ZOMBIE THREAT

27 GW of unnecessary planned coal power plants threaten India's RE goals

EMBER

38 MEDIA ARTICLES 

191.4k SOCIAL REACH 

643 PAGE VIEWS 



Empowering evidence-led campaigns

Highlights from 2021

Empowering evidence-led campaigns

Case Study: UK commitment to fully clean power by 2035

Winning a UK commitment to clean power by 2035

- Launched the concept - Used our power sector knowledge to empower other advocates including Green Alliance
- Held roundtable with big energy companies and BEIS
- Convened business letter to show private sector support and commissioned YouGov polling to show public sector support
- Shared UK Clean Power Plan report with Conservative MPs and No. 10
- Wrote briefing advising on BEIS commitment
- Showed how gas price spike increasing energy bills



Findings disseminated directly to UK gov politicians and civil servants

THE TIMES
Monday October 4 2021 (Hindustan Times) No. 7593

First for football

City and Liverpool share spoils in a thriller

All Britain's electricity to be green by 2035

PM will pledge huge investment in clean energy

Leak reveals financial secrets of world leaders

Gas phase-out in the power sector is possible by 2035 or before

EMBER

10 MEDIA ARTICLES

217k SOCIAL REACH

274 PAGE VIEWS



Empowering evidence-led campaigns

Case Study: UK commitment to fully clean power by 2035

Impact:

Our lobbying with UK government, working with other NGO's, and providing timely analysis played a key role in the UK government announcing a 2035 clean power target.

This commitment, in the run up to COP26 lets other countries see the possibility of phasing out fossil fuels.

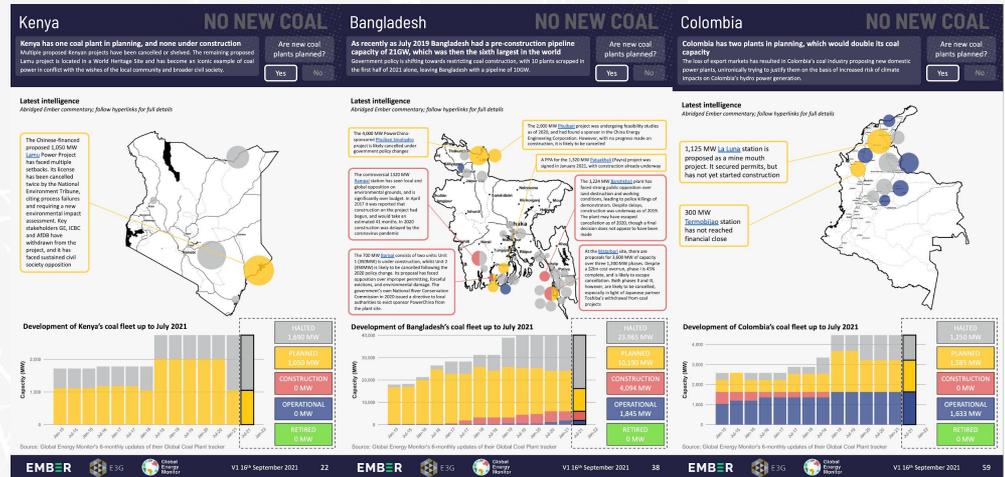
Covered by Politics Home, Business Green, New Statesman, 
Environmental Data Interactive Exchange, Recharge, EQ
Magazine, The Chemical Engineer,

Empowering evidence-led campaigns

Case Study: Blockers to Europe's electricity transition

Ahead of COP26, the No New Coal Handbook provides country profiles on the remaining coal pipeline

It cites the latest intelligence on new coal power plants in 70+ economies, alongside examples of pathfinding countries that have recently committed.





Scaling for success

Growing team, growing impact

EMBER

Growing team, growing impact

GLOBAL



Dave Jones
Global Programme Lead



Aditya Lolla
Senior Electricity Policy
Analyst - Asia



Muyi Yang
Senior Electricity Policy
Analyst - Asia



Maciej Zieliński
Junior Data Analyst



Pete Tunbridge
Junior Electricity Tracking
Analyst



Matt Ewen
Junior Electricity Tracking
Analyst



Nicolas Fulghum
Junior Data Analyst



Anatoli Smirnov
Coal Mine Methane Lead



Conal Campbell
Coal Mine Methane
Policy Analyst



Sabina Assan
Coal Mine Methane
Analyst



Małgorzata Kasprzak
Junior Research Analyst

Growing team, growing impact

EUROPE



Charles Moore
European Programme
Lead



Sarah Brown
Senior Electricity Analyst
- Europe



Chris Rosslowe
Energy & Climate Data
Analyst



Ufuk Alparslan
Energy & Climate Data
Analyst



Harriet Fox
Energy & Climate Data
Analyst



Tomos Harrison
Junior Electricity
Transition Analyst



**Elisabeth
Cremona**
Energy & Climate Data
Analyst



Pawel Czyżak
Senior Energy & Climate
Data Analyst

OPERATIONS & COMMUNICATIONS



Phil MacDonald
Chief Operating Officer



Hannah Broadbent
Head of Communications



Rini Sucahyo
Asia Communications
Manager



Alison Candlin
Comms + Operations
Assistant



Rajan Sachit
People Manager



Michele Trueman
Ops specialist

BOARD OF DIRECTORS



Bryony Worthington

Baroness Bryony Worthington is our founder. She is a key architect of the UK's Climate Change Act. Recent roles have included Executive Director at the Environmental Defense Fund Europe.



Gi Fernando MBE

Founder of many businesses including Techlightenment and Freeformers. Experienced investor and entrepreneur, Gi holds positions on various boards and has a significant very early stage investment portfolio of both social business and pure commercial



Matthew McFeeley

Matthew is an environmental lawyer at Richard Buxton Solicitors. He was previously an attorney at the Natural Resources Defense Council in Washington DC.



Harry Benham

Harry is Chair of the Board. An energy industry professional for over 30 years with BP, Shell and EY. Also Strategic Advisor on energy issues with Carbon Tracker Initiative.

NGO PARTNERS



EMBER continues to work with the Subak accelerator

We've joined Subak as a founding member to help accelerate and scale our impact alongside other NGO partners. We receive direct funding, access to a cooperative of climate data, and networking opportunities with other like minded partners.

HIGHLIGHTS FROM THE TEAM SURVEY

- A positive working environment
- An engaged, passionate and talented global team who feel that their work is making a difference
- High level of confidence in the management of Ember

94% of staff agree or strongly agree *'I enjoy working at Ember'*

70% of staff agree or strongly agree *'My work is having a real impact in tackling climate change'*

94% of staff agree or strongly agree *'I have confidence in the management of Ember'*

QUOTES FROM THE TEAM SURVEY

"Working at Ember really is a dream job - and I want to better contribute to growing its impact and expanding its areas of expertise"

"I feel really supported to grow and learn, and am so glad to be part of a team that is making impact"

"I love working as part of a global team who are so passionate, kind and talented. We are making a real difference and feel proud of what we are doing."



Contact

info@ember-climate.org
ember-climate.org

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