



JOURNÉE TECHNIQUE 2022

LES MATÉRIAUX ALTERNATIFS :
une opportunité exceptionnelle pour
atteindre la neutralité carbone





Challenges for Coal Combustion Products towards Carbon Neutrality

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European Coal Combustion
Products Association

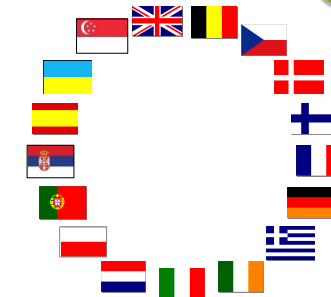


ECOBA in brief



ECOBA is the “European Coal Combustion Products Association”

- Established in 1990 by European energy producer and marketing companies to deal with matters related to the use of coal combustion products (CCPs) as raw and construction materials
- Represents more than 86 % of European (EU28) CCP production
- ECOBA members consider coal ashes and desulphurization products generated in coal-fired power plants valuable raw and construction materials which can be utilized in various environmentally compatible ways.



The mission of ECOBA is

- encourage the development of the use of CCPs from coal-fired power stations, both on the industrial and the environmental level
- develop the legal/regulatory measures for the recognition, acceptance and promotion of CCPs in Europe as valuable raw materials
- participate in international activities, including co-operation within the framework of the EU, and ensure the exchange of information and documentation among the various national and international bodies

Introduction - Energy in Europe



The power industry in European power plants is under continuous pressure

- to meet stricter Emission limits values (BREF/BAT)
- to accomplish with legal requirements for clean air and today especially for CO₂ reduction and climate neutrality
- to meet market requirements on availability and economic production

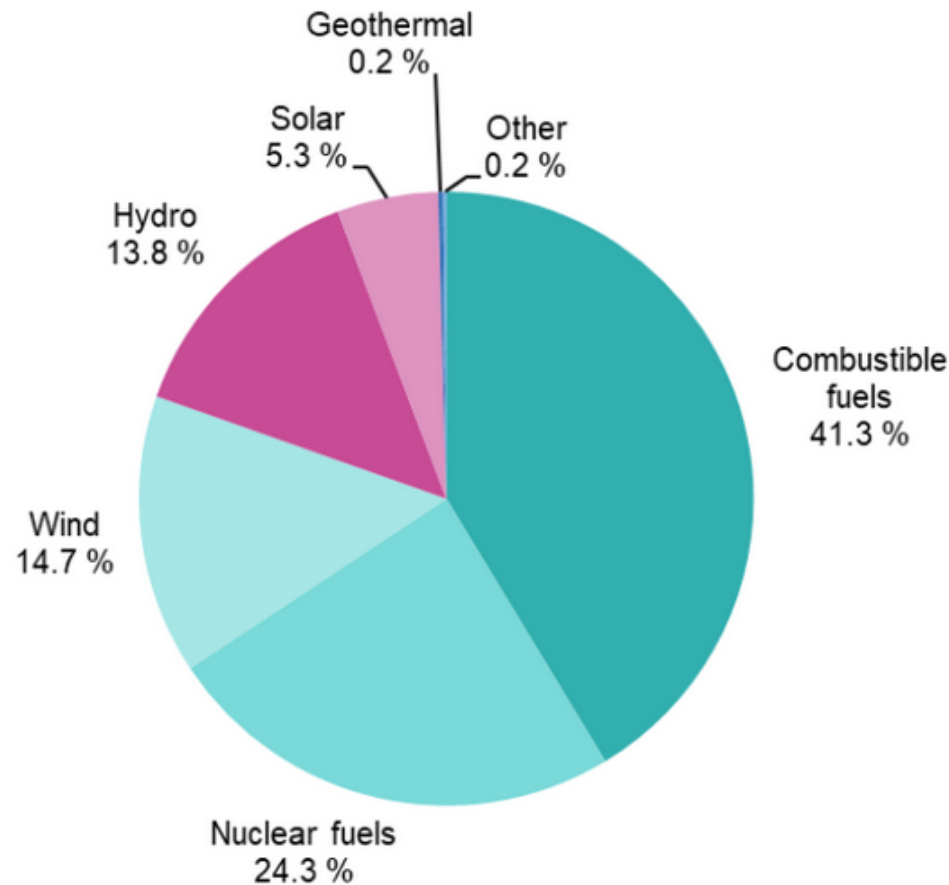
Coal is still a major fuel for energy production with strong reduction in single member states. More than 103 million tonnes of Coal Combustion Products (CCPs) result in Europe

CCPs are used since decades as construction material and in constructions. They are not only essential for performance of building materials but also for their sustainability. Availability is a major problem in some member states and re-use from stock or imports are a tool to serve market needs.

Energy in Europe



Net electricity generation in EU in 2020 (% based on GWh)



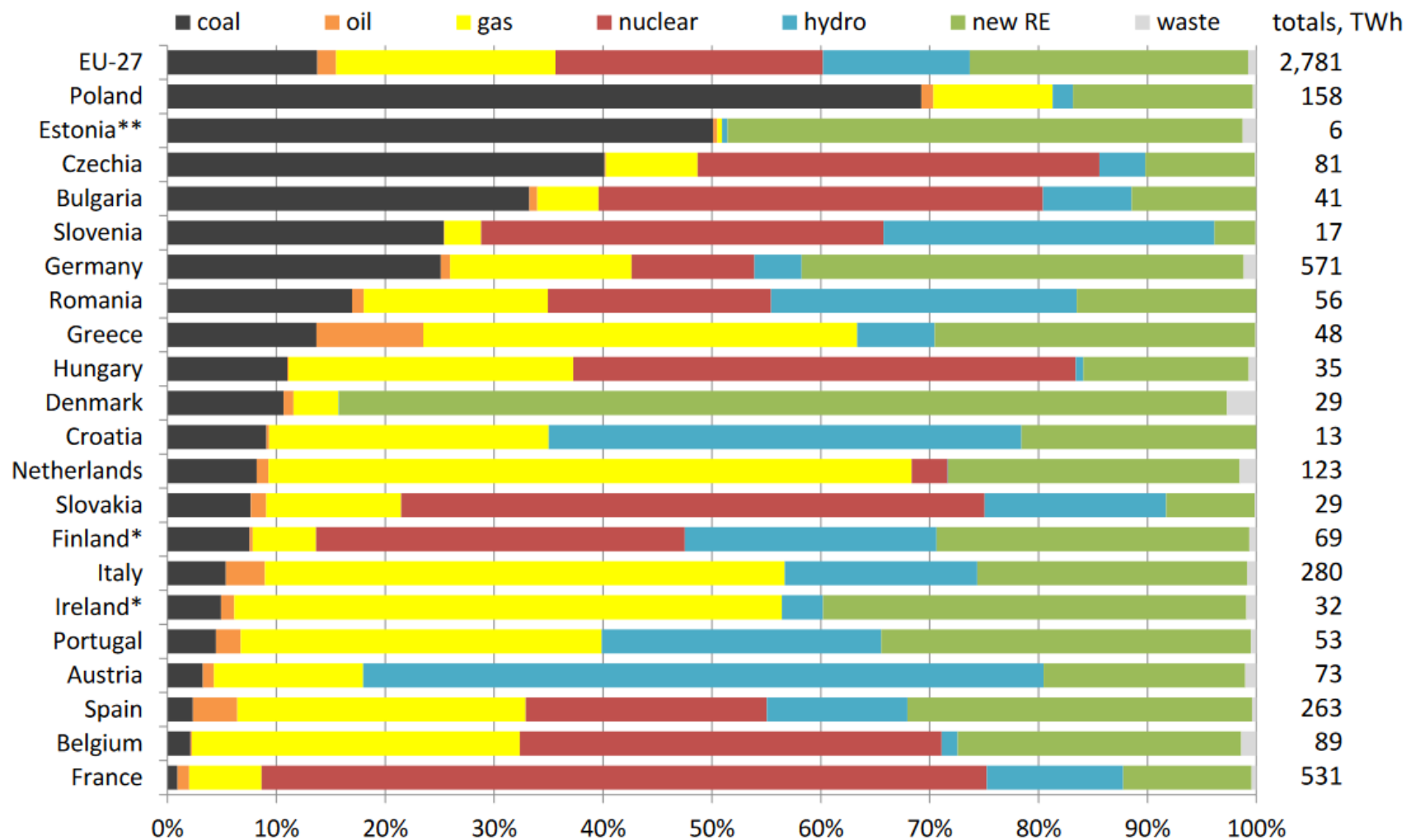
More than half (58.6 %) of the net electricity generated in the EU in 2019 came from non-combustible primary sources. Less than half (41.3 %) came from combustible fuels (such as natural gas, coal and oil). A quarter came from nuclear power. Among the renewable energy sources highest share was from wind turbines (14.7 %), followed by hydropower plants (13.8 %) and solar power (5.3 %).

Source: EUROSTAT

Energy in Europe



Energy mix for EU electricity generation in 2020



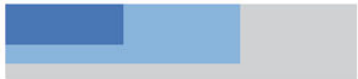
Source: Eurostat database nrg_bal_peh, last update 14.04.2022 (n.b. coal includes peat* and oil shale**)

CCPs in Europe (production and use)



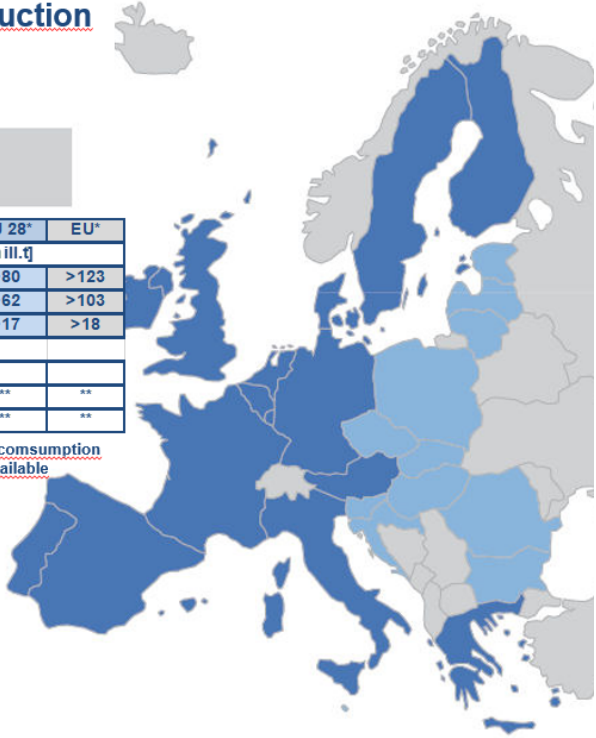
CCP Production in Europe

Statistics CCP production EU15 / EU28 / EU



	EU15	EU 28*	EU*
Production			[mill.t]
CCPs total	27	>80	>123
ashes	20	>62	>103
desulph. products	7	>17	>18
utilisation rate			
construction ind.	50%	**	**
constr. + reclam.	96%	**	**

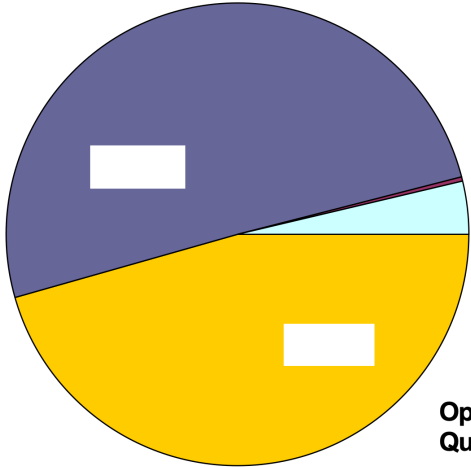
* data and calculation based on coal consumption
** information on uses only partly available



more than 123 Mio t of CCPs in Europe

Utilisation and Disposal of CCPs in Europe (EU 15)

construction industry and underground mining



Stockpile, 0.3%

Open Cast Mines, Quarries and Pits

Hard coal ashes mainly used in construction industry (e.g cement and concrete), ashes from lignite production mainly used in restoration of open cast mines

Energy Strategies and Fit-for-55



- Beside increased emission limit values also the reduction of emissions have developed. In 2007, a plan for climate change was discussed and after tough negotiation a Climate and Energy package was published in 2009.
- The European Green Deal, presented in the communication (COM(2019)640) of 11 December 2019, sets out a detailed vision to make **Europe the first climate-neutral continent by 2050**, safeguard biodiversity, establish a circular economy and eliminate pollution, while boosting the competitive-ness of European industry and ensuring a just transition for the regions and workers affected.
- In the Commission work program for 2021, the revisions and initiatives linked to the **European Green Deal climate actions** and in particular the climate target plan's 55 % net reduction target are presented under the **Fit-for-55 package**.

Energy Strategies and Fit-for-55



Европейски парламент Parlamento Europeo Evropský parlament Europa-Parlamentet Europäisches Parlament
Euroopa Parlament Ευρωπαϊκό Κοινοβούλιο European Parliament Parlement européen Parlaimint na hEorpa
Europski parlament Parlamento europeo Eiropas Parlaments Europos Parlamentas Európai Parlament
Parlament Ewropew Europees Parlement Parlament Europejski Parlamento Europeu Parlamentul European
Európsky parlament Evropski parlament Euroopan parlamentti Europaparlamentet

Energy Policy: General Principles

Achievements	Dec 2008 Climate and Energy Package	Jan 2014 Climate and Energy Framework	Dec 2019 European Green Deal	Juli 2021 Law on Emission Trading (2021/0211)
Reduction of greenhouse gas emission (basis 1990 level)	20	40	55	55
Increase renewables energy consumption	20	32		
Improvement energy efficiency	20	32.5		
Interconnection EU electricity system		15		

Energy Strategies Impacts power industry

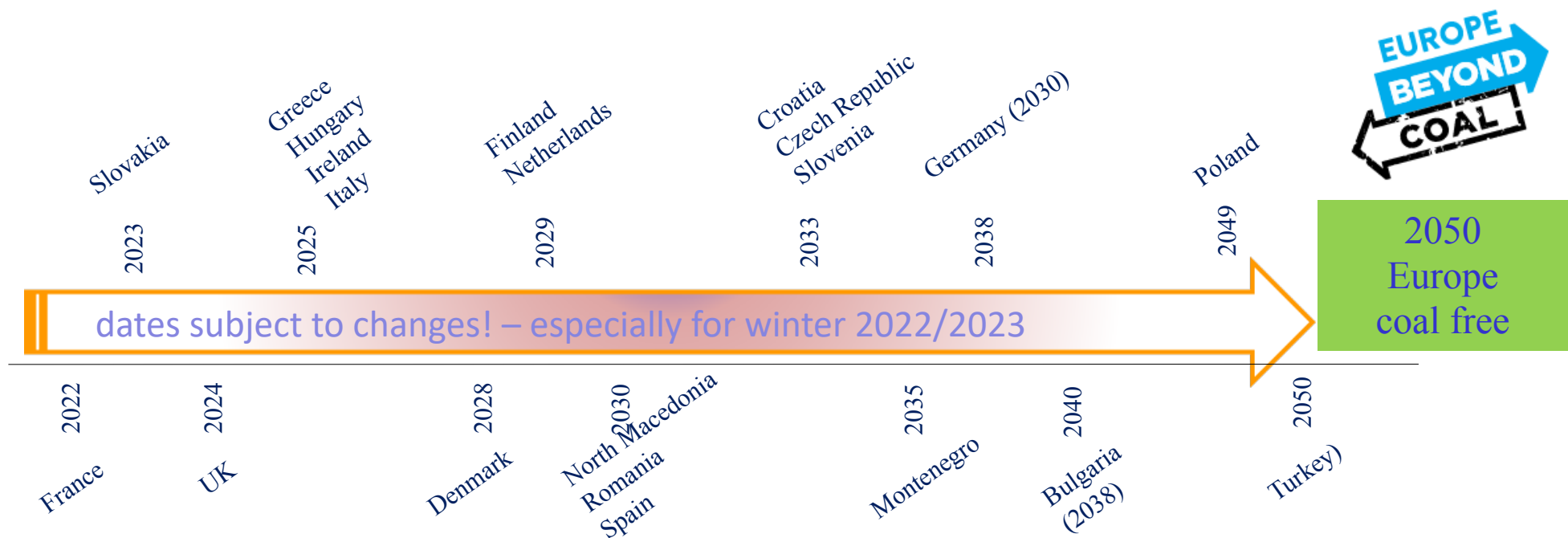


Coal phase-out in Europe - status / announcements

No coal in energy mix: Albania, Cyprus, Estonia (oil shale), Iceland, Latvia, Lithuania, Luxembourg, Malta, Norway, Switzerland

No phase out under discussion: Bosnia-Herzegovina, Kosovo, Poland, Serbia

Phased out: 2016 Belgium; 2020 Austria, Sweden; 2021 Portugal



European Green Deal Impacts construction industry



Environment

Home > Topics > Circular economy

Circular economy

The EU aims to transition to a circular economy to make Europe cleaner and more competitive.

Main laws: [Waste Framework Directive](#) and other EU waste laws, [Proposal for a Regulation on Batteries](#), [Directive on single-use plastics](#), [Ecodesign working plan 2016-2019](#), [new Fertilising Products regulation](#), [Water reuse regulation](#)

Connected topics: [Chemicals](#), [Industrial emissions](#), [Plastics](#), [Secondary raw material](#), [Sustainable development](#)

Connected strategies: [New circular economy action plan](#), [First circular economy action plan \(2015 – 2019\)](#), [Chemicals strategy for sustainability](#), [Zero pollution action plan](#), [Biodiversity strategy for 2030](#), [Plastics strategy](#), [Action plan on critical raw materials](#), [New industrial strategy](#)

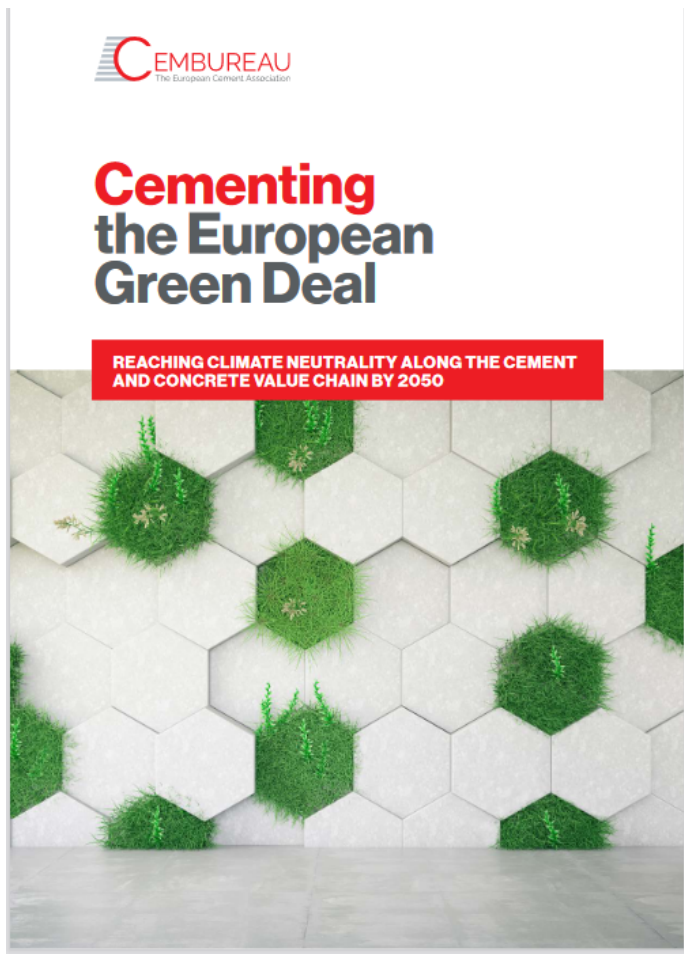


CCPs (as such) are not circular but contribute to sustainability of construction product and constructions with good examples for a successful Circular Economy

European Green Deal Impacts construction industry



CEMBUREAU's Carbon Neutrality Roadmap
(as one! example for options for the construction industry)



Carbon Capture, Use and Storage (CCUS) will account for **42% of the CO₂ emissions reduction** in the sector. The EU should urgently look at developing a **pan-European CO₂ transportation and storage network**, provide continued **funding to demonstrators** and **support the business case** of the technology through State Aid.



The **replacement of fossil fuels by non-recyclable and biomass waste**, and the use of alternative raw materials, will deliver another **15% of the emissions reduction in the cement industry**. Policies should support this circular approach by **facilitating waste shipment** between EU countries, and **discouraging both landfill and exports** of waste outside of the EU.

Bringing low carbon-cements products to the market will deliver an additional **13% emissions reduction**. Upcoming policies should aim to reduce European building's CO₂ footprint, be based on a **life-cycle approach**, and **incentivise the market uptake** of low-carbon products.



A level playing field on carbon, regulatory certainty as well as an ambitious industrial transformation agenda, will be **pivotal to deliver the investments needed** to achieve carbon neutrality.

Note: use of ashes in cement and concrete is state of the art!
ashes are covered in EU and nat. standards and regul.

Option CCPs

European Green Deal CCPs in standards & regulations



Selected **European product standards** under regular revision

- EN 197-1 Cement
- EN 450-1 Fly ash for concrete
- EN 13282 Hydraulic road binder
- *EN 14227* *Hydraulically bound mixtures*

- EN 12620 Aggregates for concrete
- EN 13042 Aggregates for bituminous....
- EN 13139 Aggregates for mortars
- EN 13242 Aggregates for un-/bound mixtures
- EN 13055 Lightweight aggregates

- EN 206 Concrete
- Concrete products, Road Constr. Materials

**Definitions
for **siliceous**
and
calcareous ash**

**Lists of source
materials now
in CEN/TS 17438**

**Application
standards/
rules for
application**

- Alternative way via EU or national evaluation (former approval)
- Experiences by project approvals especially in road constr. & earthworks

ECOBA active in CEN Committees (CEN – The European Committee for Standardisation -
(TC 51 Cement; TC 104 Concrete; TC 154 Aggregates; TC 241 Gypsum; TC 227 Road construc.; TC 351 Hor. Test. Pr.)
ECOBA members active in national mirror committees

Coal Combustion Products as Ressources



CCPS: Market needs

- In addition to **quality, availability** is important to serve construction projects especially in member states with existing markets. **Today also important for CO₂ reduction of construction products and constructions! (basis EN 15804)**
- **Forecasting** of production to serve market needs cause more efforts in CCP management.
- **Stock management**
 - whether in silo or on site as well as
 - beneficiation for fresh produced or stockpiled ash

is being discussed together with
- **Cross border transport** as options for safeguarding availability of CCPs to specific markets.

Coal Combustion Products as Ressources



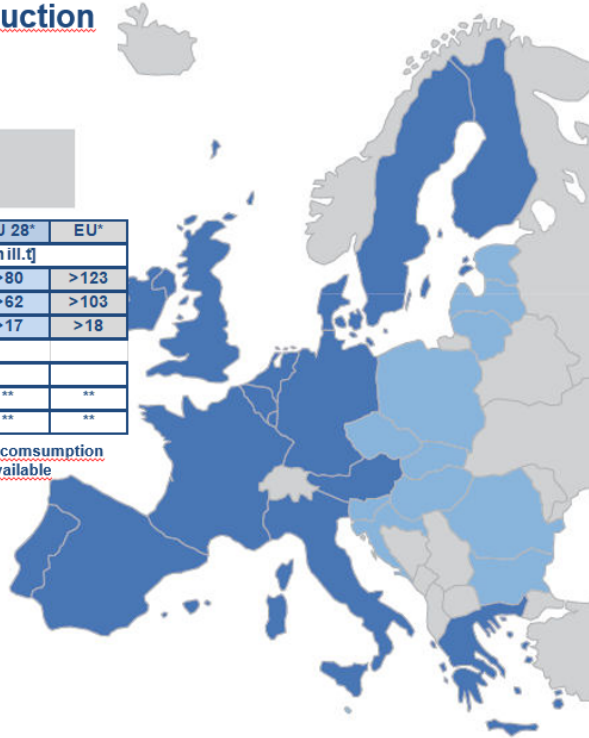
ECOBA statistics on production and use of CCPs (fresh production!)

CCP Production in Europe

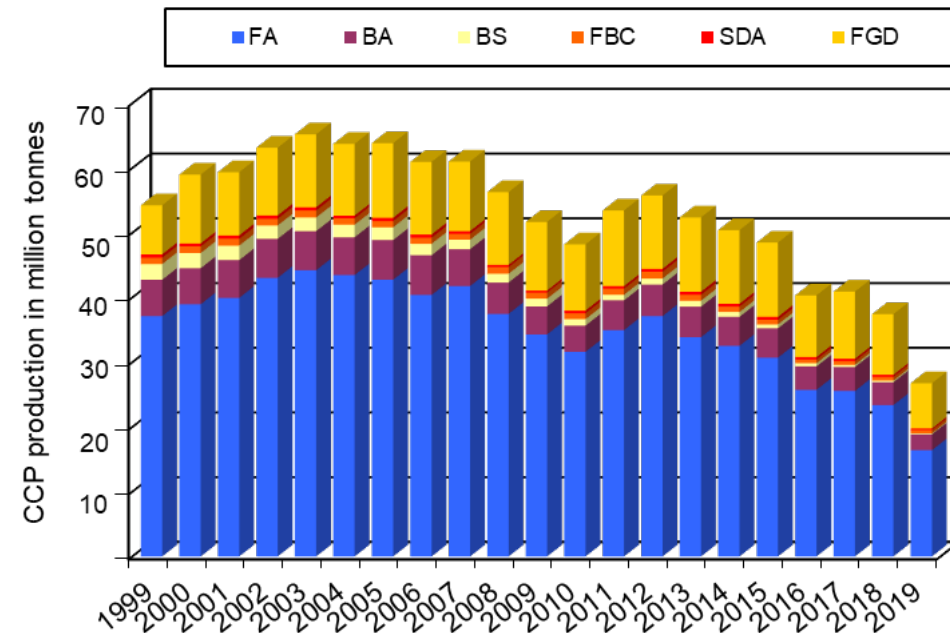
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Development of CCP production in Europe EU15 from 1999 to 2019



FA – fly ash; BA – bottom ash; BS – boiler slag; FBC – FBC ash; SDA – SDA product; FGD – FGD gypsum

Coal Combustion Products as Ressources



Availability of ash: re-use from stock

- Re-use from stock is practised for more than 50 years in Europe (30 year for also re-drying)
- Data for re-use from stock and/or import are covered by the ECOBA statistics. The figures from 2010 to 2019 range from 0.4 to 2.2 Mt with increasing tendency.
- Projects ongoing or newly started in different EU-countries

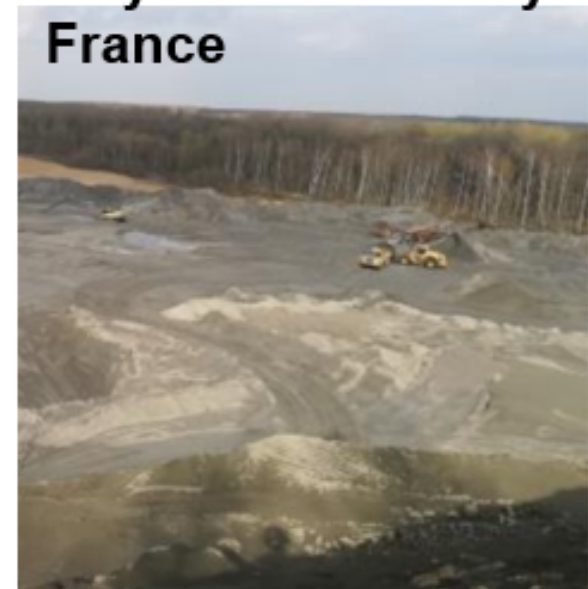
The Gale Common Extraction Project/UK



The HENA Project Belgium



50 years re-use wet 30 years re-use dry France

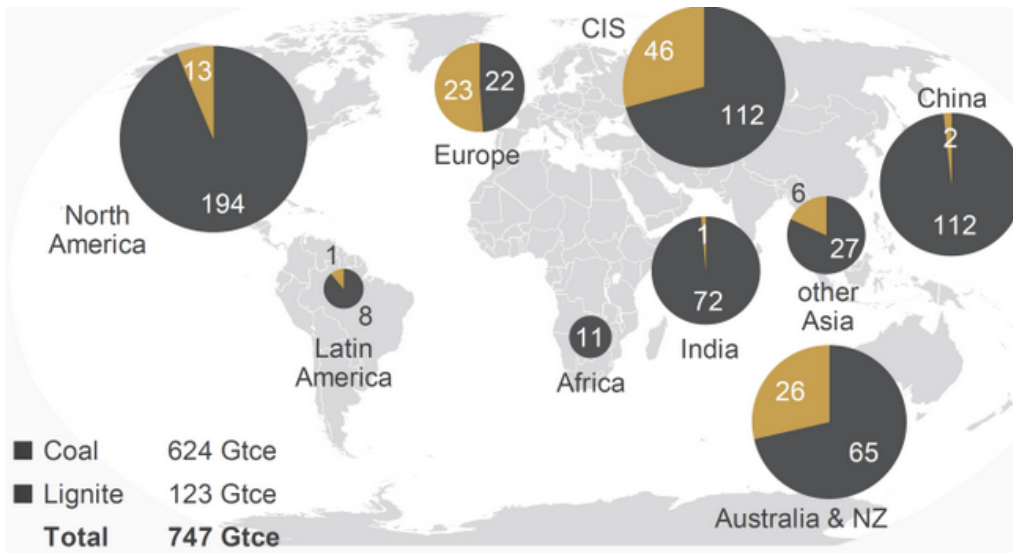


Coal Combustion Products as Ressources



Availability of ash: imports

Global hard coal and lignite reserves



<https://euracoal.eu/coal/coal-use-worldwide/>

+ Annual production and utilisation rates of CCPs by country/region



Country/Region	CCPs Production (Mt)	CCPs Utilisation (Mt)	Utilisation Rate %
Australia	12.6	5.9	46.8
Asia			
- China	585	404	69.1
- Korea	7.5	6.2	82.7
- India	226	191	84.5
- Japan	12.3	12.1	96.9
- Other Asia	22.4	13.2	58.9
Europe	103		
-EU15	19.4	21.5	110.8
Middle East & Africa	33.9	3.9	11.5
Israel	0.6	0.5	83.3
United States of America	45.8	27.3	59.6
Brazil	4.1	1.2	30.0
Canada	3.2	3.0	93.8
Russian Federation	30.2	3.1	10.3
Total	1086.6	692.1	63.9

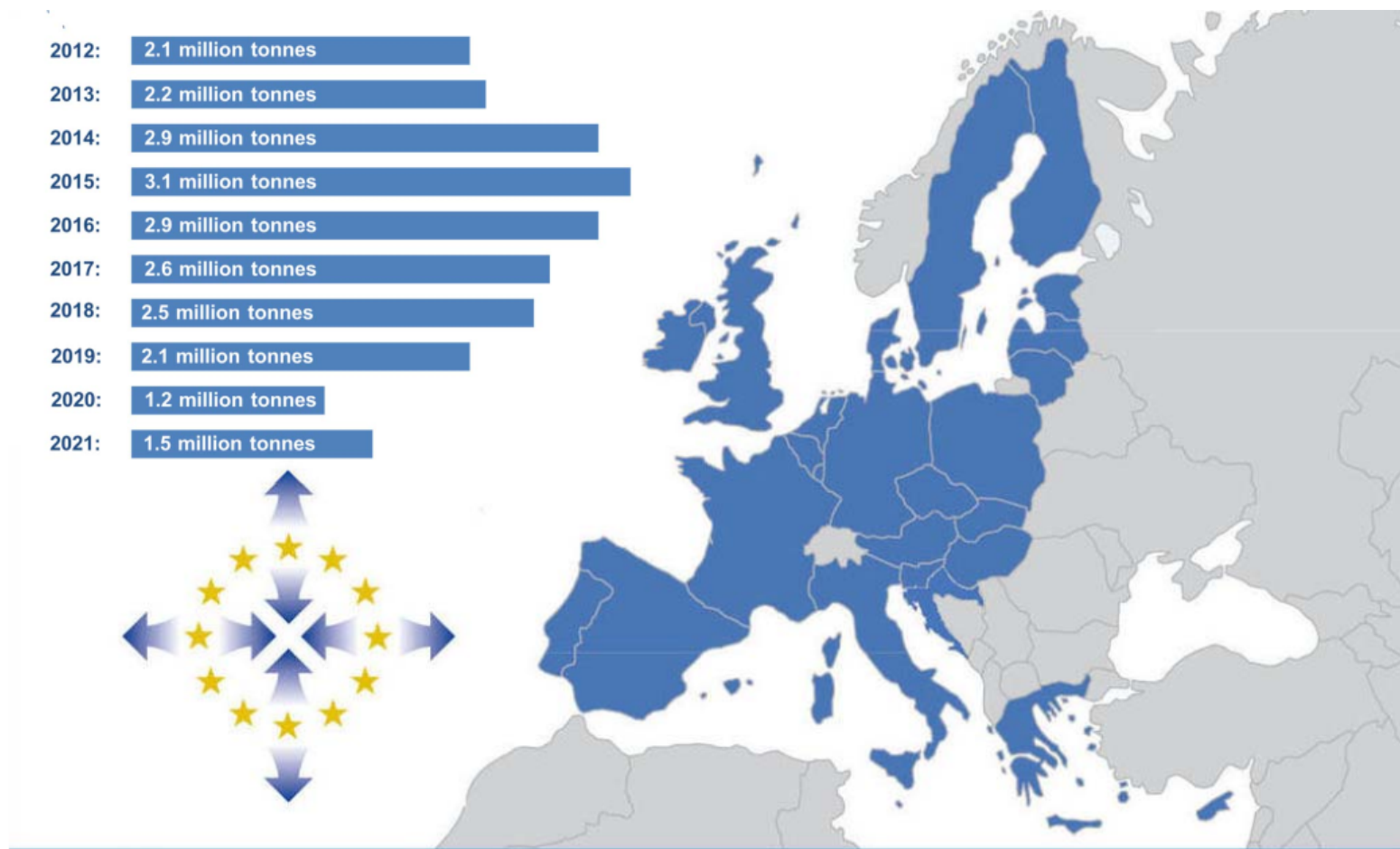
2010: 780 Mt; → 2017: 1200 Mt → 2019: 1100 Mt

- Energy Production by coal world-wide continues on high level resulting in huge amount of ashes
- For imports the quality, certification systems and registration need have to be considered
- Regular imports by ship only from EU countries (by now!)

Coal Combustion Products as Ressources



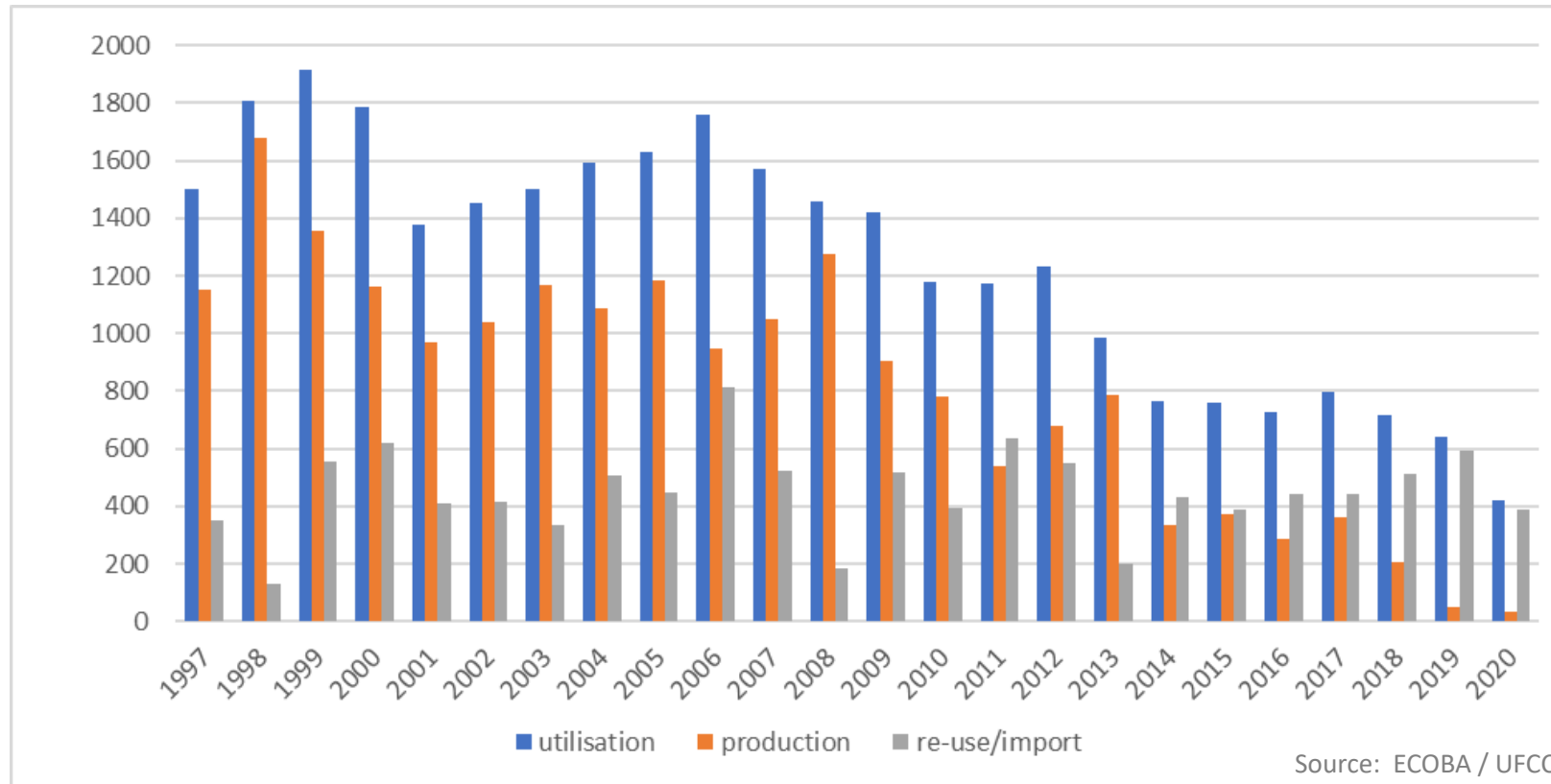
Availability of ash: cross border transport (import)



Coal Combustion Products as Ressources



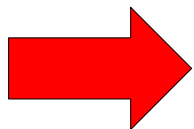
Availability of ash in France from 1997 to 2020: production vs re-use /import



- fresh production reduced over the years and are very low until shut down of last coal-fired power station (operation extended although phase-out announced!)
- Re-use from stock between 130 to 810 kto per year resulting in more than 10 million tonnes of ash reused from stock or imported



- Environmental Strategies, Directives, Regulations and laws with strict aims for CO₂ reduction resulted in retrofits of coal-fired power plants, construction of new and more efficient power plants meeting new Emission Limit Values but also to closures of power plants due to economic consideration and phase-out decisions.
- CCP production is depending on energy production by coal.
It's production and use has to consider quality and availability for serving existing markets. They contribute to the sustainability of construction materials and constructions!
- Aside the direct production in power plants the processing of ash from direct production as well as from stockpile and cross border transport has to be considered for safeguarding availability.



The operation of coal-fired power plants and the utilisation of CCPs is a continuous challenge!



**THANK YOU FOR
YOUR ATTENTION**

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