

Energy Intensive Industry: Using Biomass to Reach Carbon Neutrality by 2050

26 October 2021 | 14:00 - 16:00 CEST

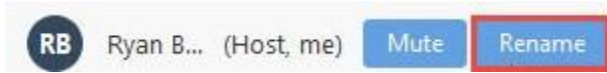
Webinar



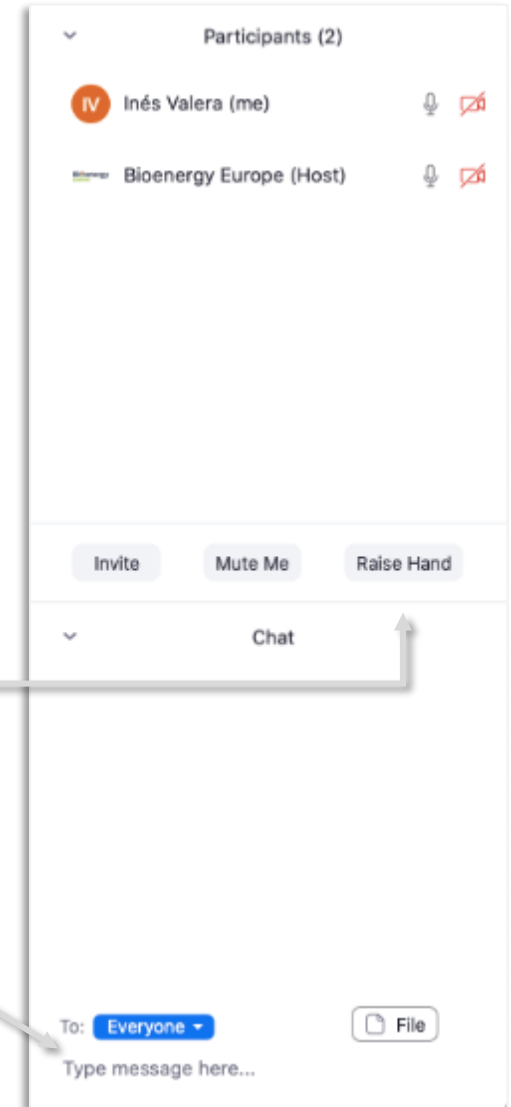
Before we start....



Participant tag: add your first name & last name



Technical issue? use the chat or email Francisco Matias (lourencomatias@bioenergyeurope.org)



Energy Intensive Industry: Using Biomass to Reach Carbon Neutrality by 2050

26 October 2021 | 2:00 – 4:00 PM

Webinar

2:00 PM Welcome – Jean-Marc Jossart, Bioenergy Europe

2:15 PM Introduction to biomass usage in Energy Intensive Industry

POLICY FRAMEWORK

EU policies supporting the decarbonization of EII industries
Heiko Kunst, Deputy Head of Unit, [EC DG Climate Action](#)

BIOMASS SUPPLY AND USE

Biomass use for industrial processes – an overview
Olle Olsson, Team leader, [IEA task 40](#)

ROADMAPS ENERGY INTENSIVE INDUSTRIES

Cement industry – 2050 carbon neutrality roadmap
Nikos Nikolakakos, Environment and Resources Manager, [CEMBUREAU](#)

Steel industry - CO₂ reductions initiatives through biomass use
Andrew Purvis, Director Safety Environment and Technology, [World Steel Association](#)

EXPERTS INTRODUCTION & GROUPS CREATION

Rachael Levinson, Senior Research Manager, [Hawkins Wright](#)
John Robert McFarlane, Biomass broker, [AlbionDesign](#)
Krister Rosenqvist, CEO, [Cleantek Trade](#)
Evaldas Margis, Director of Commerce, [AXIS Tech](#)
Jonas Kugelevičius, Head of Engineering Group, [AXIS Tech](#)

3:00 PM Group discussions on key issues with experts

POLICY FRAMEWORK
BIOMASS SUPPLY (INCL. TORREFACTION)
BIOMASS USE

3:45 PM Wrap-up and closing – Gilles Gauthier, Bioenergy Europe



Consortium

RE4iNDUSTRY

TECHNOLOGICAL AND SOCIAL EXPERTS



RENEWABLE ENERGY-ORIENTED ASSOCIATIONS



ENERGY INTENSIVE INDUSTRIES



THE MUSIC TEAM

Renewable energy advisory SME's



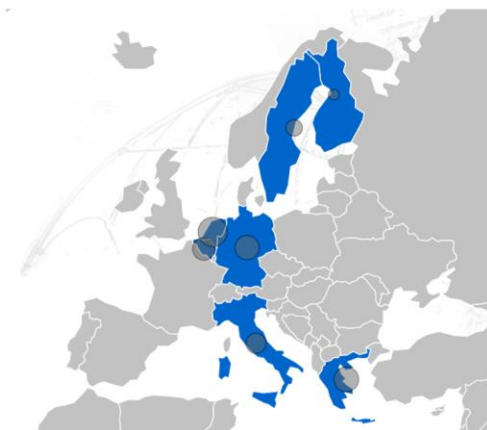
(Bio)energy RTD institutes



Member organisations



Case study partners (economic actors)



About Us



Common voice of European bioenergy since 1990



Unites 40+ national associations and 140+ companies/research



Hosting 2 networks



Our Activities & Services



EU Policy Monitoring & Influence



Market Data



Visibility



Networking



Free & Discounted event



Quality & sustainability certifications

Our Working Groups

Members Only

Domestic Heating

Next Date: TBC

Promotes biomass in the domestic heating sector and discusses building regulations, air emissions and stove & boilers certifications.

Pellets

Next Date: 24.11.2021

Discusses common issues and opportunities regarding the development of the European pellet market (residential, commercial, industrial) and proposes actions to overcome current barriers.

Agrobiomass

Next Date: TBC

Promotes underutilized biomass feedstocks (e.g. residues from agriculture, dedicated perennial lignocellulosic crops) through ad hoc policies.

Competitiveness

Next Date: 25.11.2021

Provides updates on key existing and emerging policy topics determining the competitiveness of bioenergy sector within the EU (e.g. carbon tax, state aid)

Sustainability

Next Date: TBC

Monitors climate and energy legislation impacting the European bioenergy sector and advocates for an efficient EU sustainability policy for biomass for heating and electricity production.

Wood Supply

Next Date: TBC

Provides with active exchanges of data, market trends and news in legislation.

Task Force Carbon Removals

Next Date: TBC

Influence EU legislation in order to create markets for carbon removals.

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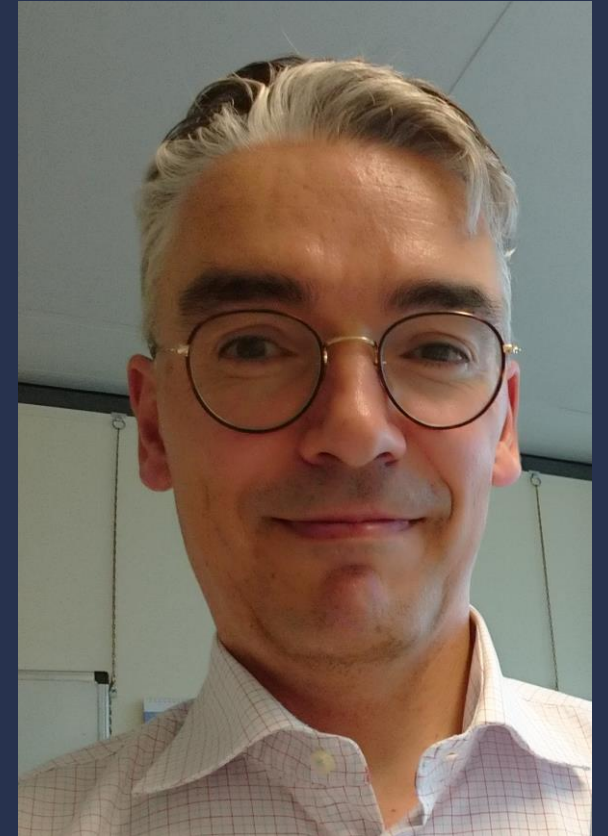
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EU policies supporting the decarbonization of EII industries

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EU Policies supporting the de-carbonisation of energy-intensive industries

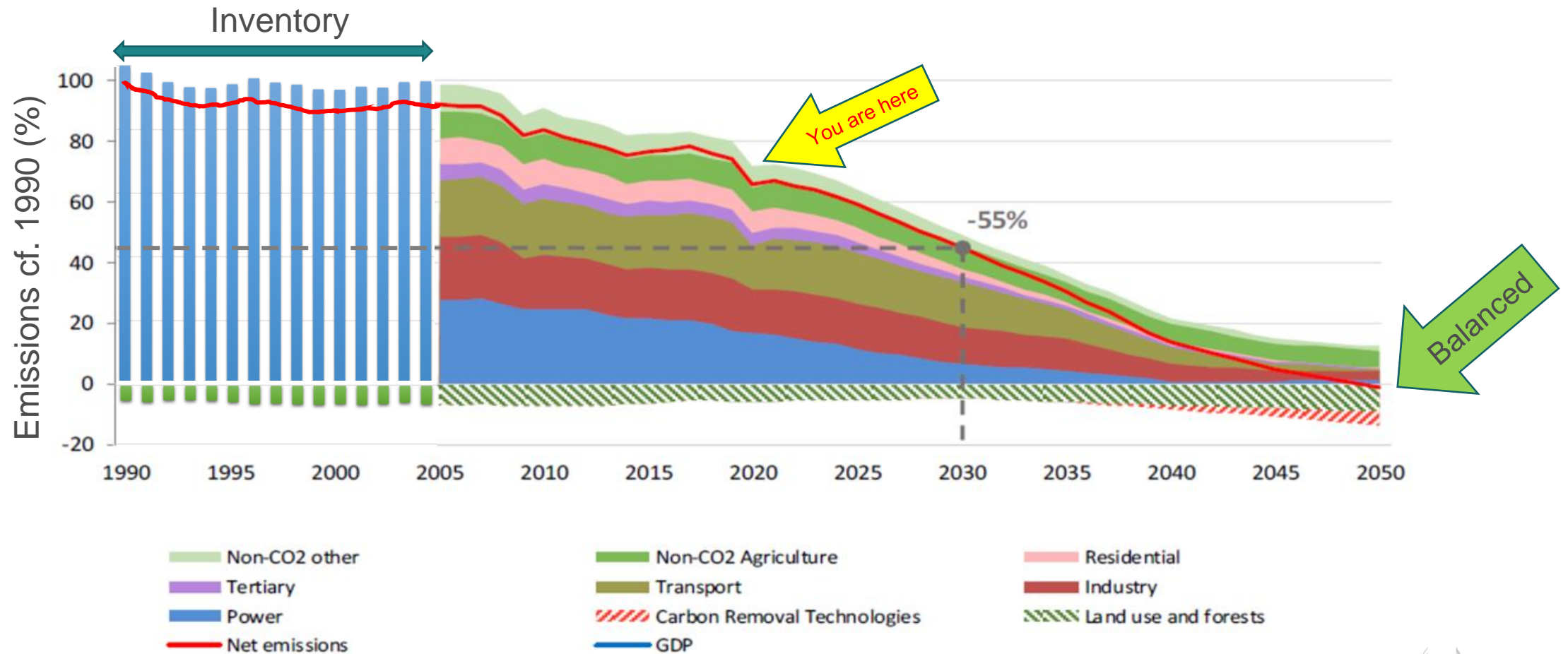
Heiko Kunst

Deputy Head of Unit

ETS Implementation and IT, DG CLIMA

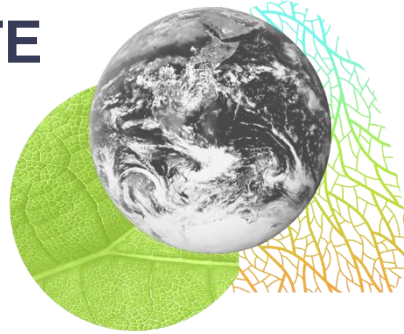
26 October 2021

Pathway to climate neutrality

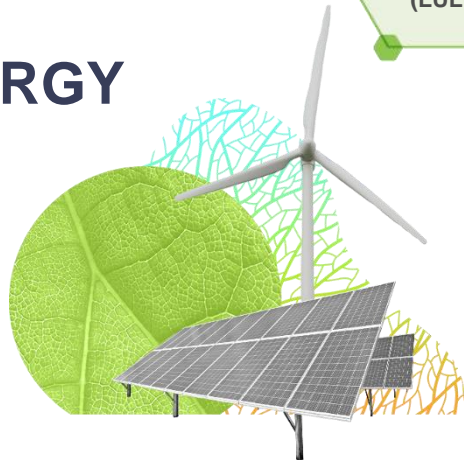


Delivering on the “Fit for 55” commitment

CLIMATE



ENERGY



TRANSPORT



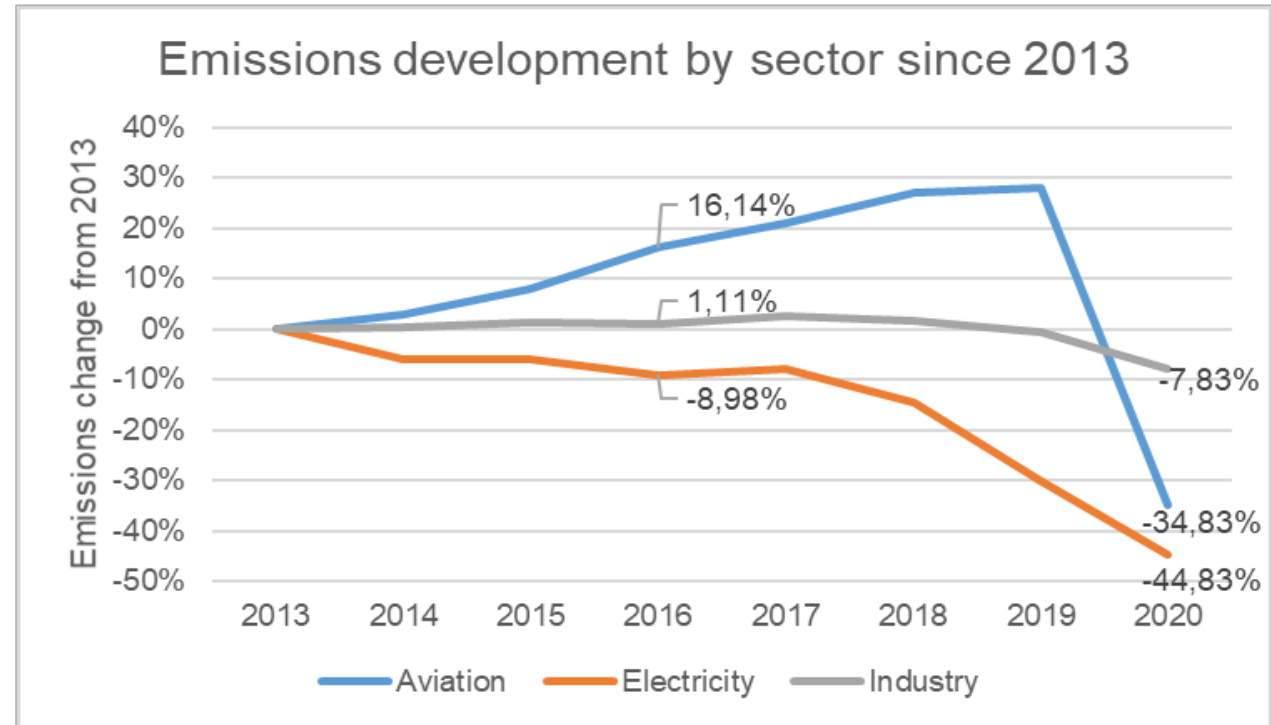
TAXATION AND TRADE



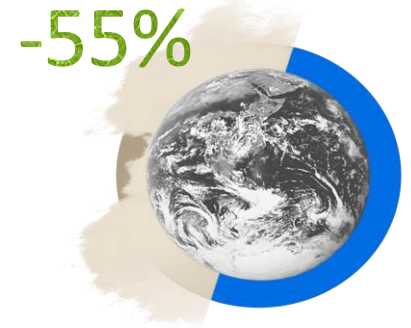
Revision of the EU ETS

EU ETS is performing well: emissions decrease

- In 2020, emissions reduced by **13%** compared to 2019
- In 2019 emissions reduced by **9%** compared to 2018
- Since the start of the ETS in 2005, total emissions from stationary installations reduced by **43%**

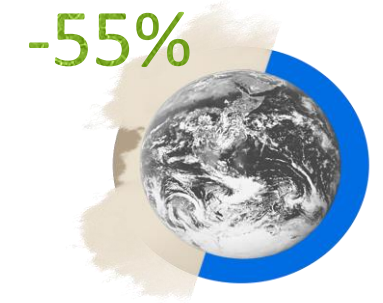


Revision of the EU ETS



Strengthening the existing ETS: cap

- Need to **update the cap in line with -55%**: increase linear reduction factor (currently 2.2%) combined with an one-off cap reduction
- Cap and linear reduction factor need to take into account ETS extension to maritime
- Cost-effective contribution of ETS sectors to -55%, including extension to maritime, lead to a **new 2030 reduction objective of -61%** compared to 2005 (currently -43% without maritime)
- Increased EU ETS **linear reduction factor** from 2024: **4.2%**
- **One-off reduction of the cap** in the year of entry into force to align the cap with emissions (if 2024: 117 Mt), while at the same time cap increase through the maritime transport extension



Revision of the EU ETS

Strengthening the existing ETS: free allocation

- **Free allocation** continues to be based on benchmarks. No changes to the free allocation (FA) share (43% + 3% buffer)
- **Better targeted FA:** Maximum annual reduction rate of the benchmarks increased to 2.5% (currently 1.6%). Shifts more free allocation to sectors that are harder to decarbonise
- More targeted free allocation and inclusion of maritime sector **limit the risk / size of the** factor reducing free allocation for all sectors. Delays application of CSCF by around 1 year and reduces its value by around 6% as average for the period 2026 – 2030.
- **Scope of benchmarks broadened:** Remove barriers for the deployment of new technologies such as green hydrogen or hydrogen based steel to guarantee a level playing field among technologies.
- **Conditionality to decarbonisation efforts:** 25% reduction of FA for installations not implementing cost-efficient measures identified in energy efficiency audits or equivalent measures

Revision of the EU ETS

Strengthening the existing ETS: Protection against the risk of carbon leakage



- **Free allocation under the ETS and the proposed Carbon Border Adjustment Mechanism (CBAM) are interlinked:** To ensure compatibility with the EU's international obligations, and maintain incentives to decarbonize, free allocation will be phased out as CBAM is phased in for selected sectors
 - **Free allocation will be reduced by 10 percentage points each year** for CBAM sectors, starting at 90% in 2026 and reaching zero in 2035
 - **Industrial CBAM sectors** are iron & steel, cement, fertilisers and aluminium; they represent around 50% of the total free allocation in the period 2021–2025
 - Free allocation no longer provided to **these sectors**, **allowances** must be **auctioned** and the revenues accrue to the Innovation Fund

Revision of the EU ETS

Strengthening the existing ETS: accelerating investment in low-carbon innovation & improved auction revenue use

- **Increased Innovation Fund from 450 to 650 million allowances:** 150 of the additional 200 million allowances from the new emissions trading system for road transport and buildings
- Also allowances which would otherwise be allocated for free to industry sectors covered by the Carbon Border Adjustment Mechanism **added to the Innovation Fund** from 2026 to 2030
- **Supporting contracts for difference under the Innovation Fund:** a tool to provide support to the early deployment of innovative technologies and to complement the existing funding mechanisms in the Innovation Fund.
- **Improving the use of auction revenues:** a commitment for Member States to use the entirety of their revenues on climate and energy (including social) purposes

Thank you



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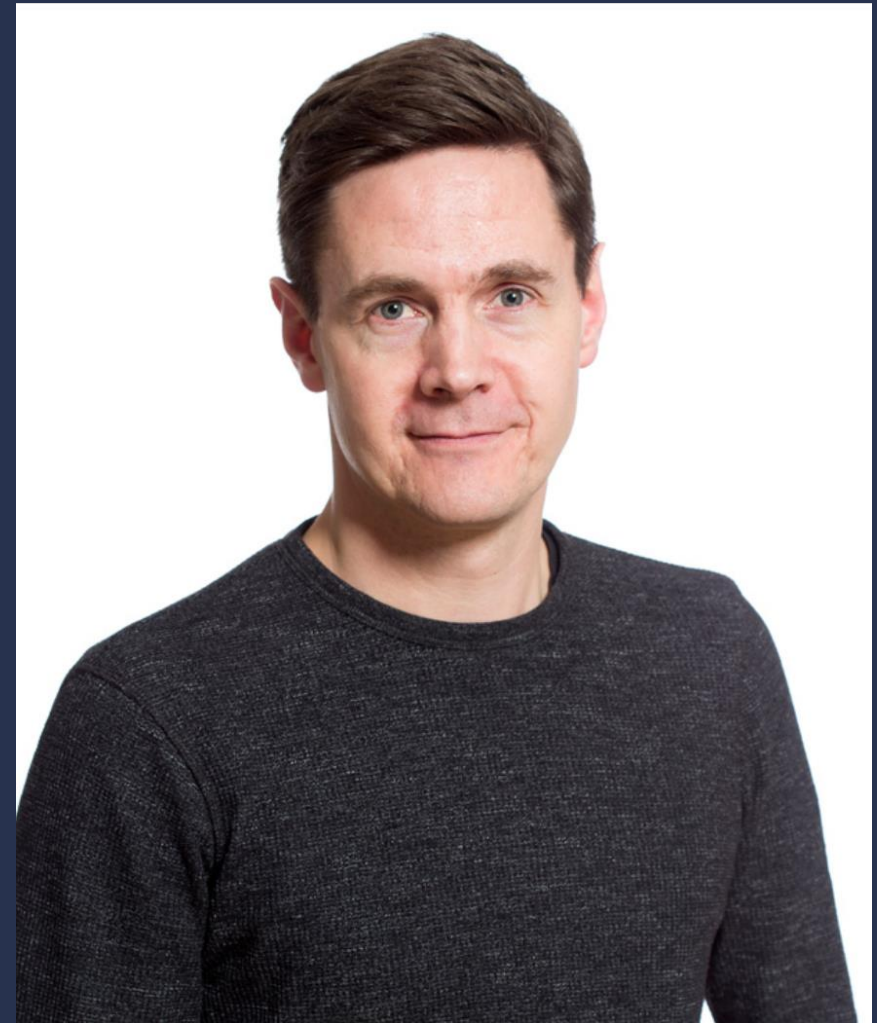
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BIOMASS SUPPLY AND USE

Biomass use for industrial processes – an overview

Olle Olsson, Team leader, IEA task 40





IEA Bioenergy
Technology Collaboration Programme



Decarbonizing process heat for industry: the role of biomass

Olle Olsson

Stockholm Environment Institute (SEI) & IEA Bioenergy Task 40

26 Oct 2021

The IEA Bioenergy Technology Collaboration Programme (TCP) is organised under the auspices of the International Energy Agency (IEA) but is functionally and legally autonomous. Views, findings and publications of the IEA Bioenergy TCP do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.

Technology Collaboration Programme

by **iea**

Background on IEA Bioenergy

- Technology Collaboration Programme (TCP) organized under the auspices of the IEA
- Work carried out in 11 thematic expert groups ("Tasks")
- *Bioenergy for High Temperature Heat in Industry* - an IEA Bioenergy Inter-Task project
 - Task 32 (*Biomass combustion*)
 - Task 33 (*Thermal gasification of biomass*)
 - Task 34 (*Direct Thermal Liquefaction*)
 - Task 36 (*Material and energy valorisation of waste in a circular economy*)
 - Task 40 (*Deployment of biobased value chains*)

Industrial heat - characteristics

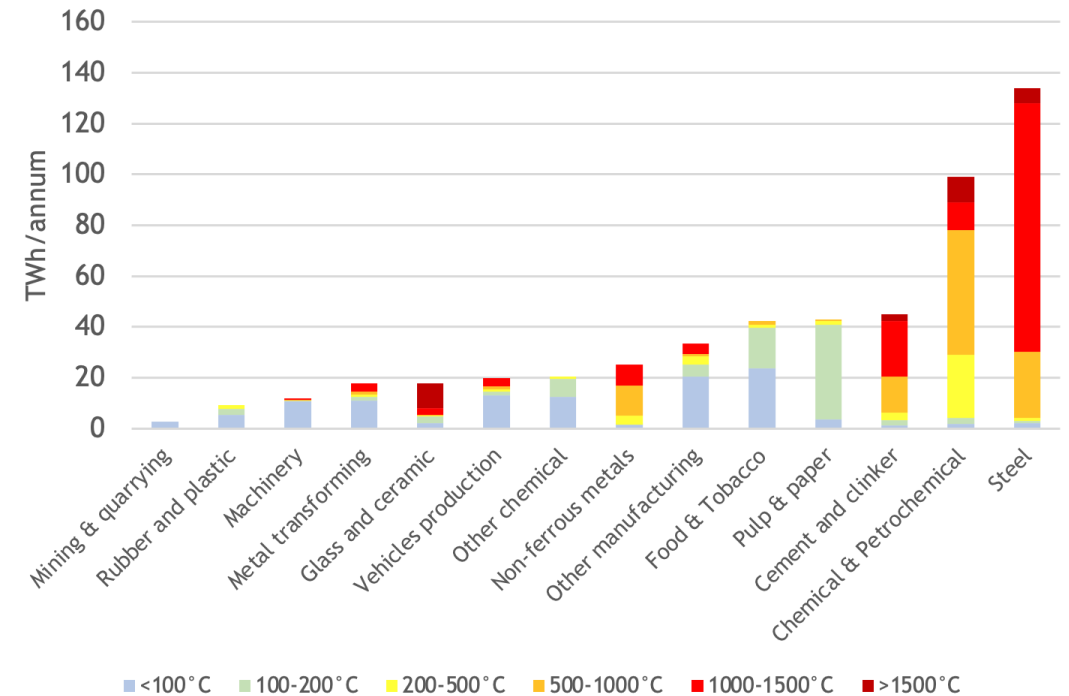
- Industry ~30% of global GHG emissions - though not all of it from heat
- Industrial heat is very diverse - many different applications that vary in
 - Temperature
 - Direct/indirect heat
 - Control & flexibility
 - ...
- Heterogeneity -> difficult to generalize (and difficult to analyze!)

Example: which temperature intervals should be used?

Naegler et al (2015)	100°C	100-500°C		500-1000°C		>1000°C	
Philibert (2017)	<150°C	150-400°C		>400°C			
Bataille et al (2018)	<250°C		250-1000°C			>1000°C	
McKinsey & Co (2018)	<100°C	100-500°C		500-1600°C			>1600°C
Malico et al (2019)	<100°C	100-200°C	200-500°C		>500°C		
ARENA (2019)	< 150°C	150-250°C	250-800°C		>800°C		
Madeddu et al (2020)	<100°C	100-400°C		400°C-1000°C		>1000°C	
Lenz et al (2020)	<100°C	100-200°C	200-500°C		500-1000°C		1000-1500°C
							>1500°C

But if we still try to generalize...

- High temperatures (>500°C) especially in metals and minerals processing - direct heating
- Lower temperatures (~50-500°C) in wide variety of sectors, indirectly (incl via steam)

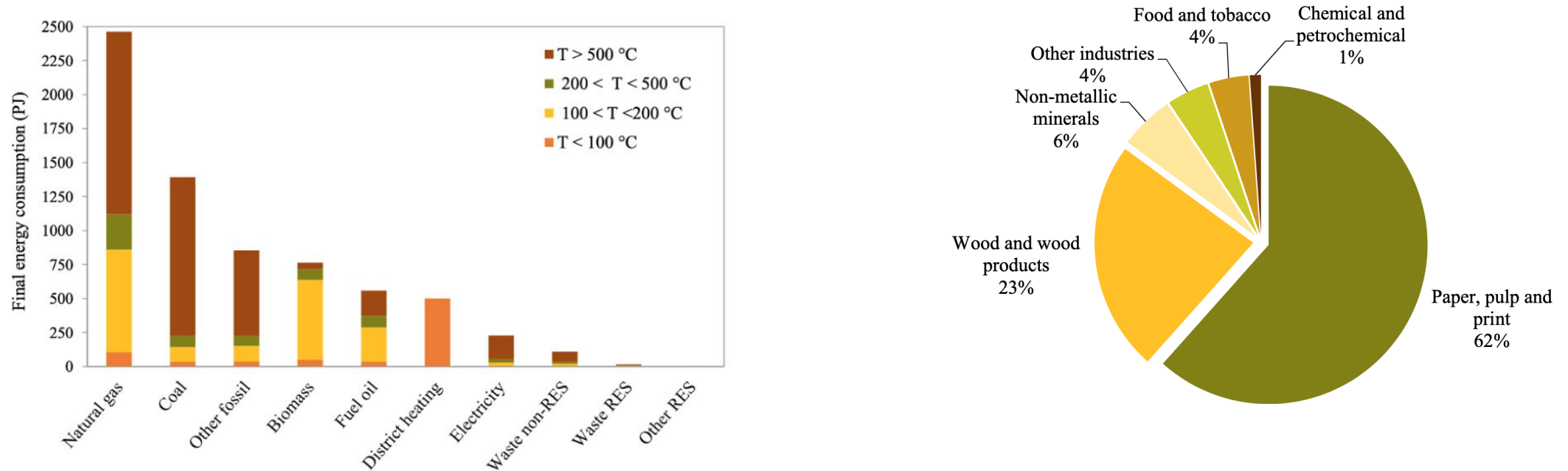


2013 industrial heat use in Germany
(Data from Lenz et al, 2020)

Industrial heat decarbonization options - hot takes

- CCS: avoids stranding of assets, but costly & infrastructure challenging
- Electrification: feasible at lower temps, less mature at higher temps
- Hydrogen: allows retrofitting of natural gas heating, but costs challenging
- Biomass?

Use of biomass in industrial heat (EU)



Figures from Malico, I., Pereira, R. N., Gonçalves, A. C. and Sousa, A. M. (2019). Current status and future perspectives for energy production from solid biomass in the European industry. *Renewable and Sustainable Energy Reviews*, 112. 960–77.

Potential for bioenergy in industrial heat

- Pros
 - Comes in many different forms, so can cover most needs currently met by fossil fuels
 - Retrofits could therefore be relatively small
 - Can enable negative emissions when combined with CCS
- Cons
 - Technological maturity varies
 - Difficult to generalize because local availability key for price
 - Larger volumes may be expensive and complicated to source

Again, difficult to generalize, - let's draw on examples



Industrial Process Heat: case study 1

Combustion of wood chips and composting residues for process steam generation in a potato processing industry

Contribution of Task 32 to the intertask project on industrial heat
September 2020



Technology Collaboration Programme
11/2020



Industrial Process Heat: case study 2

Gasification of paper reject to displace natural gas usage in a pulp and paper process

Contribution of Task 33 to the intertask project on industrial heat



Technology Collaboration Programme
11/2020



Industrial Process Heat: case study 3

Process steam in a dairy factory via fast pyrolysis bio-oil

Contribution of Task 34 to the intertask project on industrial heat
September 2020



Technology Collaboration Programme
11/2020



Industrial Process Heat: case study 4

Waste-to-Energy for the production of steam for paper production

Contribution of Task 36 to the intertask project on industrial heat
September 2020



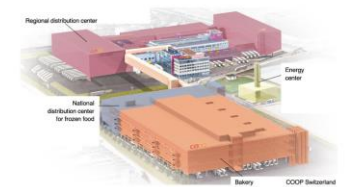
Technology Collaboration Programme
11/2020



Industrial Process Heat: case study 5

Combustion of wood chips and grain residues for process heat supply in the largest bakery in Switzerland

Contribution of Task 32 to the intertask project on industrial heat
October 2021



Technology Collaboration Programme
11/2021

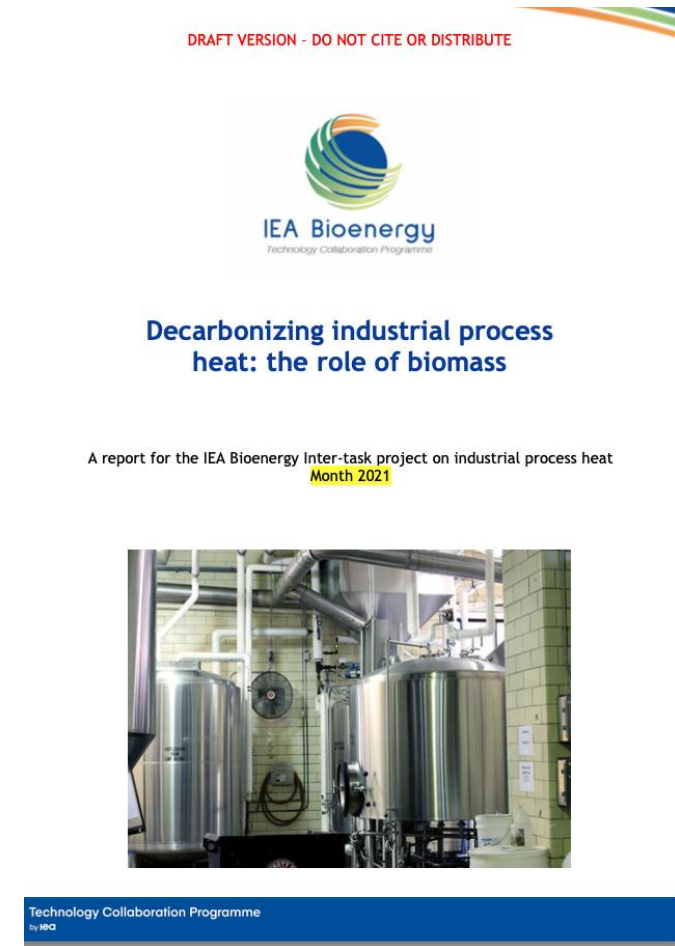
<https://itp-hightemperatureheat.ieabioenergy.com/iea-publications/>

Lessons from the cases

- Choice of solution depends on existing technology, biomass availability and site-specifics related to logistics
- Cost reductions key driver
- Low/high opex vs low/high capex?
- Strong relationships in value chain important

Moving forward & policy aspects

- EU ETS (+CBAM?)
- Public procurement
- Value chain collaborations:
 - Cost increases in processes may be miniscule if carried to sticker price
 - Brand owners, OEMs etc push towards lower life cycle emission products?
- Opportunities for biomass by adding value, e.g., through bio-CCS & CDR



(Coming soon!)

Thank you!

Olle.Olsson@sei.org

<https://itp-hightemperatureheat.ieabioenergy.com/iea-publications/>

ROADMAPS ENERGY INTENSIVE INDUSTRIES

Cement industry – 2050 carbon neutrality roadmap

Nikos Nikolakakos, Environment and Resources Manager

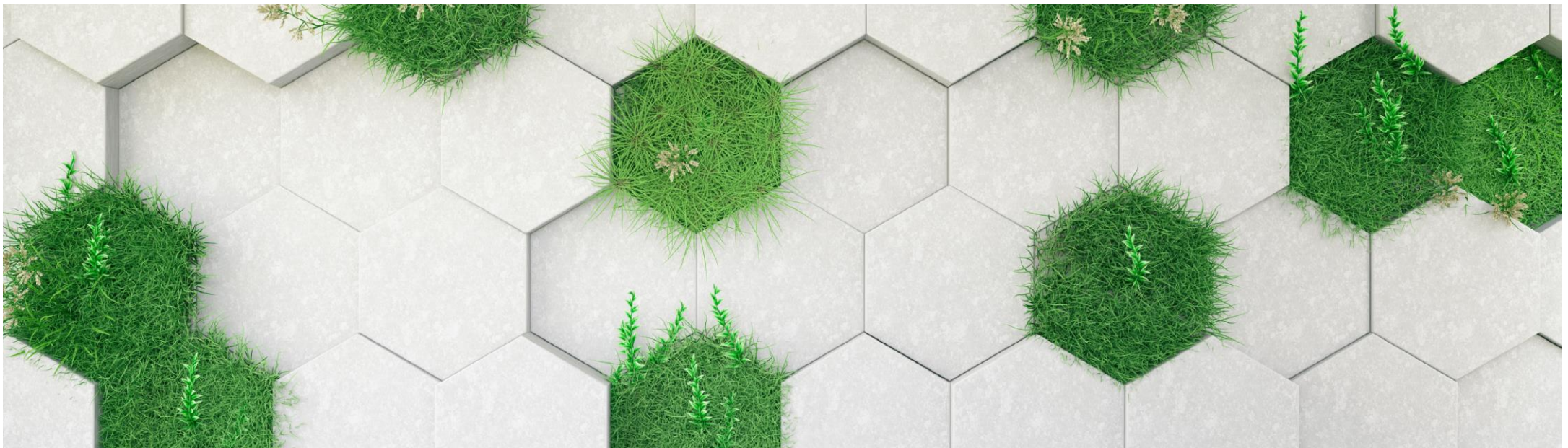
CEMBUREAU

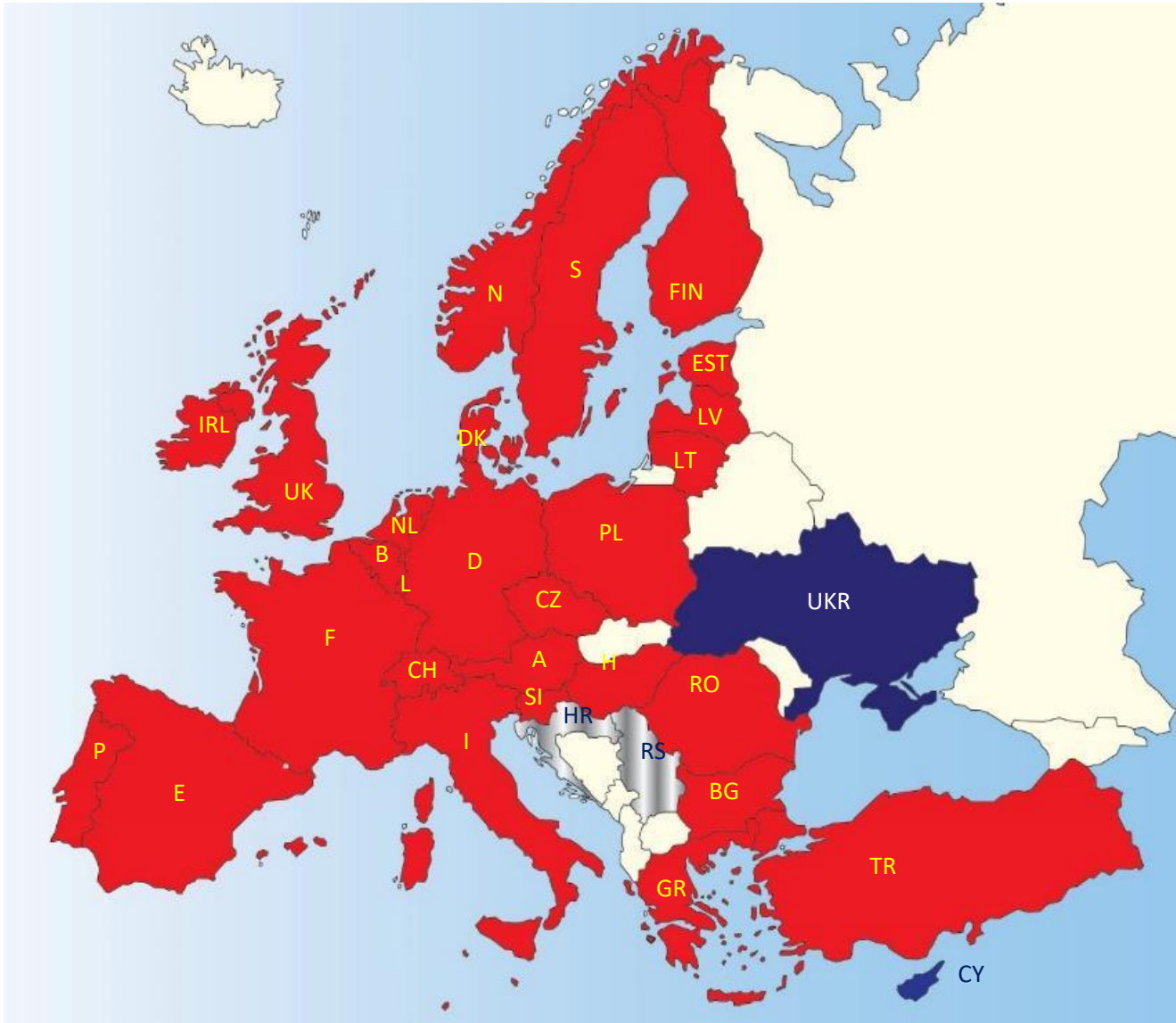


CEMENT INDUSTRY 2050 CARBON NEUTRALITY ROADMAP

Nikos Nikolakakos

Environment & Resources Manager, CEMBUREAU





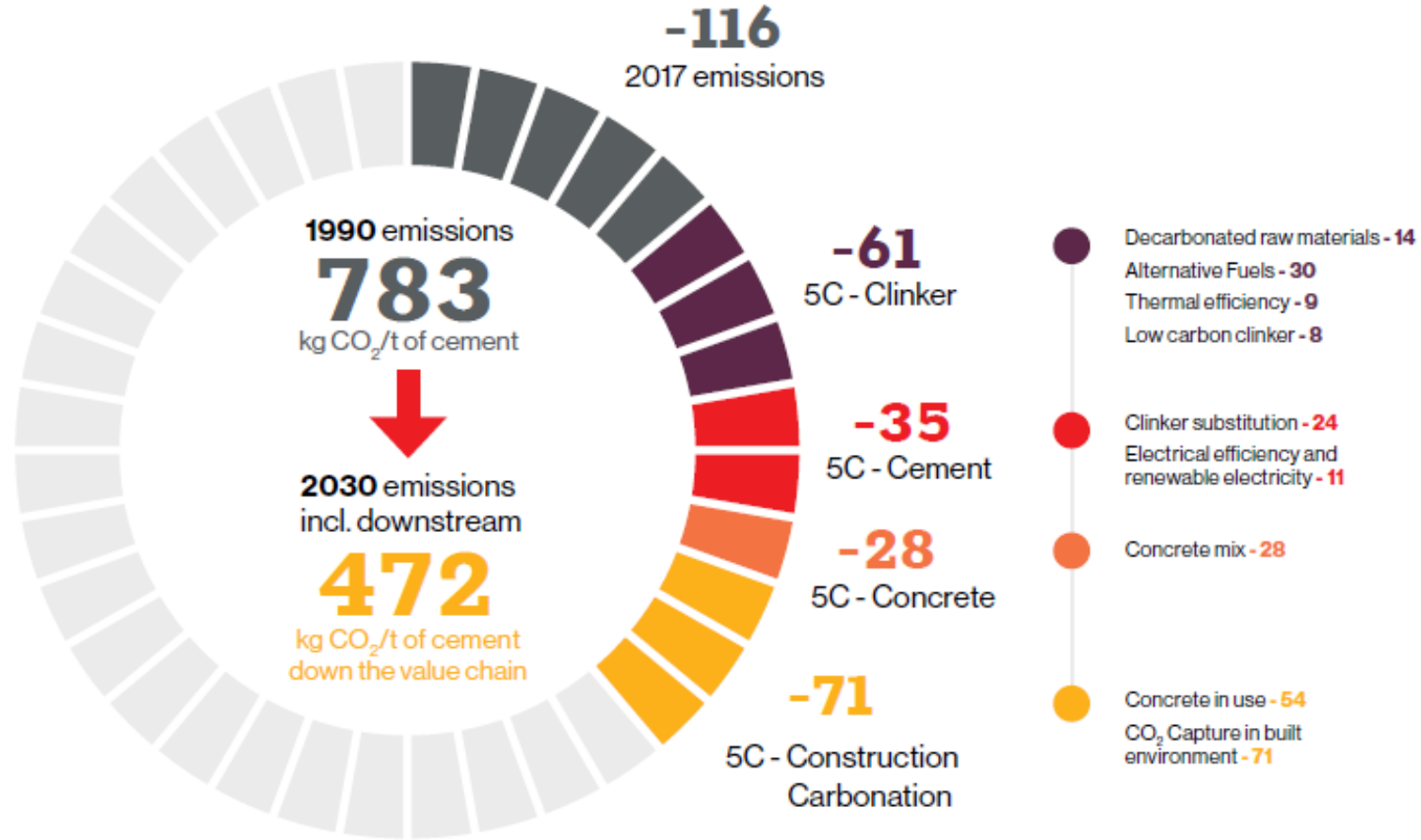
CEMBUREAU is the European Cement Association and is based in Brussels

The Association acts as spokesperson for the cement industry before the EU institutions and other public authorities.

- Full Members
- Associate Members
- Cooperation agreement

CEMBUREAU 2030 roadmap

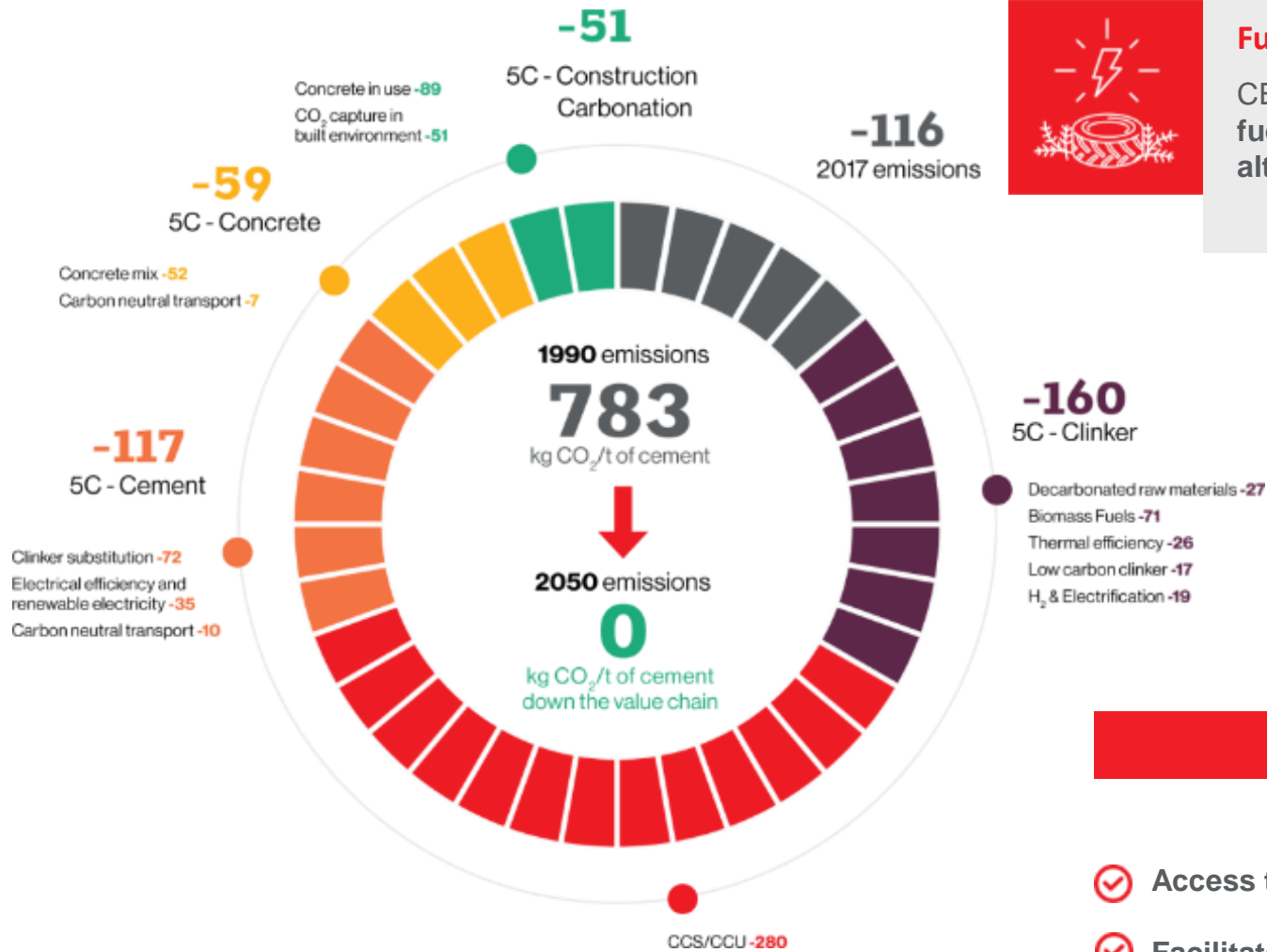
CO₂ reduction along the cement value chain (5Cs: clinker, cement, concrete, construction, re-carbonation)



<https://cembureau.eu/library/reports/2050-carbon-neutrality-roadmap/>

CEMBUREAU 2050 roadmap

CO₂ reduction along the cement value chain (5Cs: clinker, cement, concrete, construction, re-carbonation)



Fuel Substitution and Zero Fuel Emissions Research

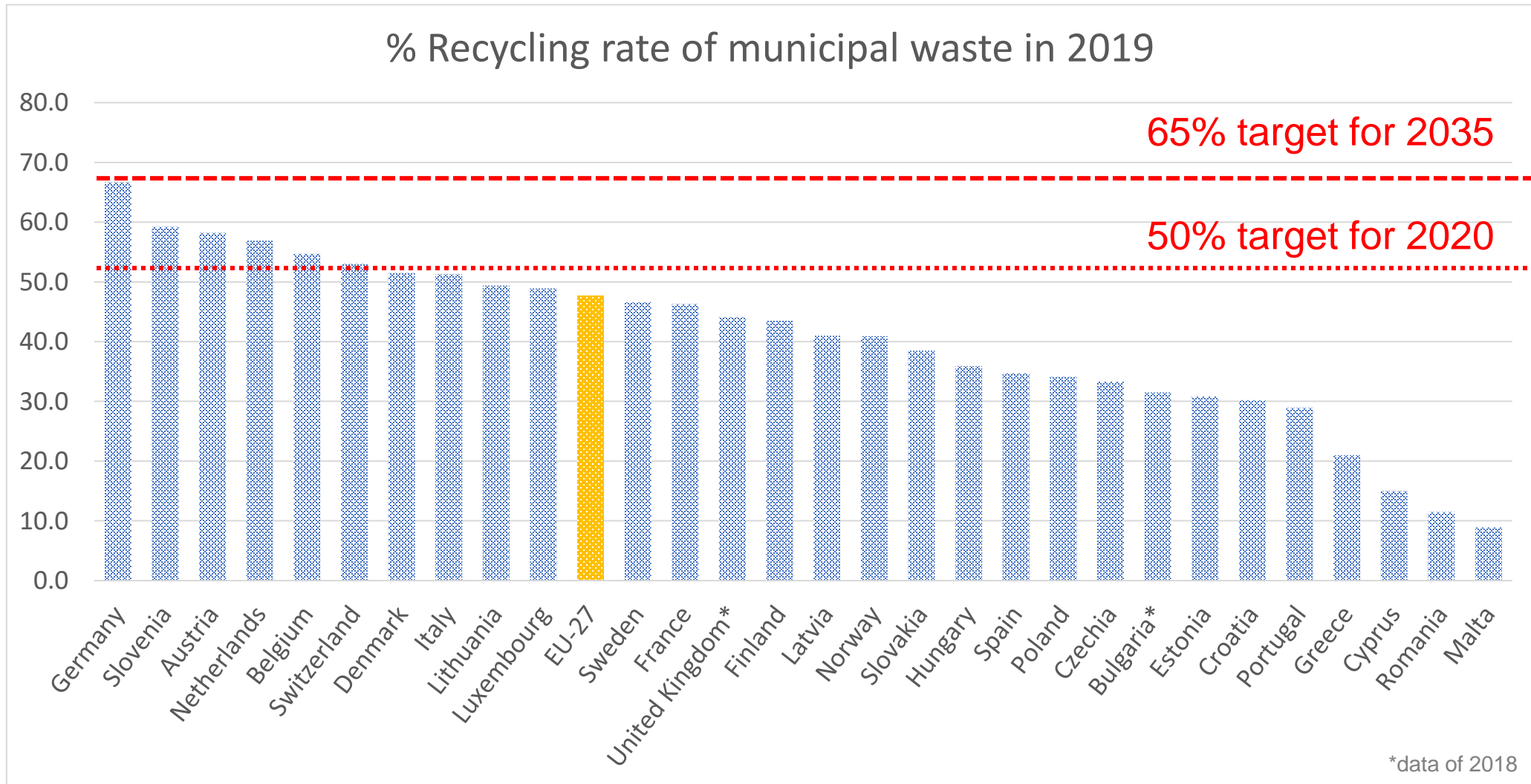
CEMBUREAU targets to reach **60% alternative fuels** containing **30% biomass** in 2030, and **90% alternative fuels** with **50% biomass** by 2050.



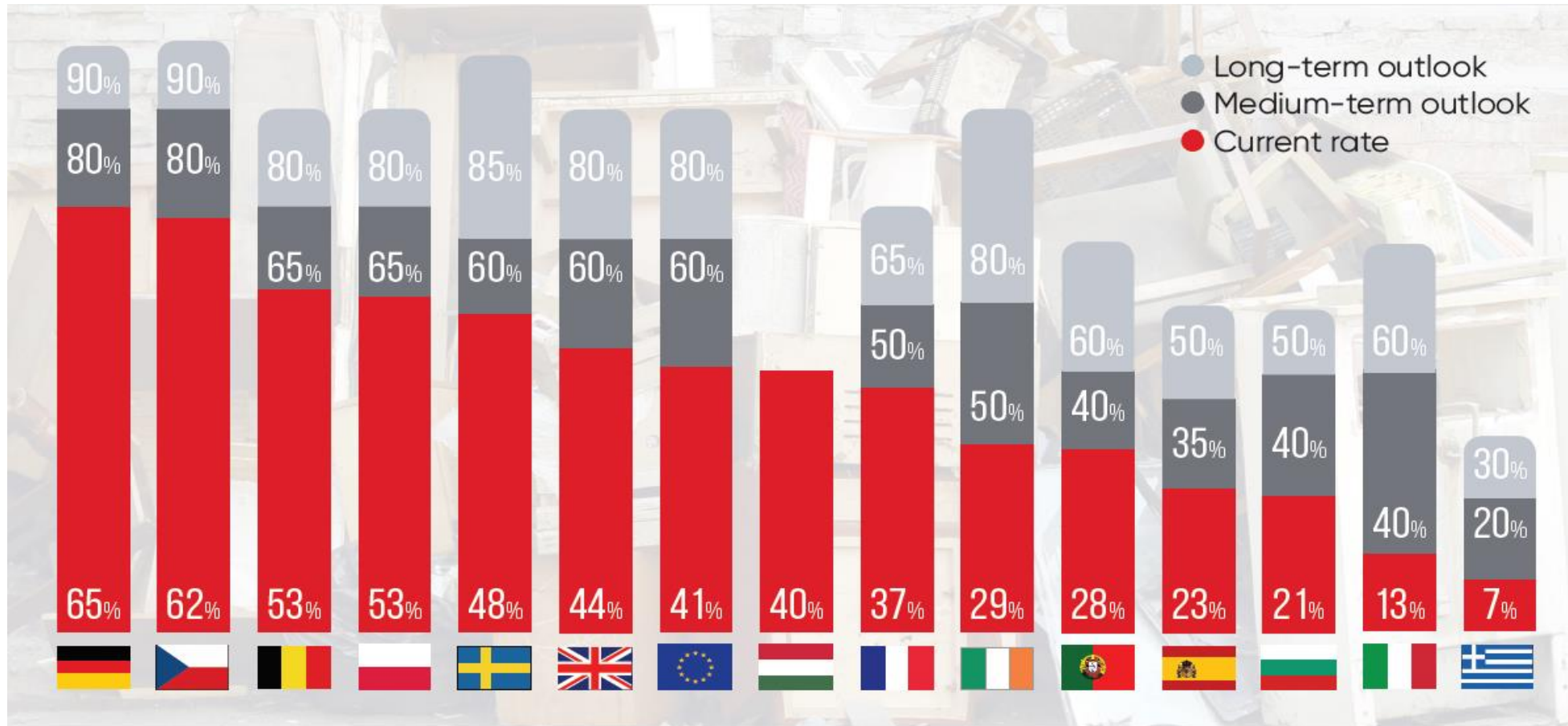
Policy asks

- ✓ Access to non-recyclable waste and biomass waste
- ✓ Facilitate waste shipment
- ✓ Ban on landfill

Municipal waste generation in EU ≈ 250 million tonnes per year

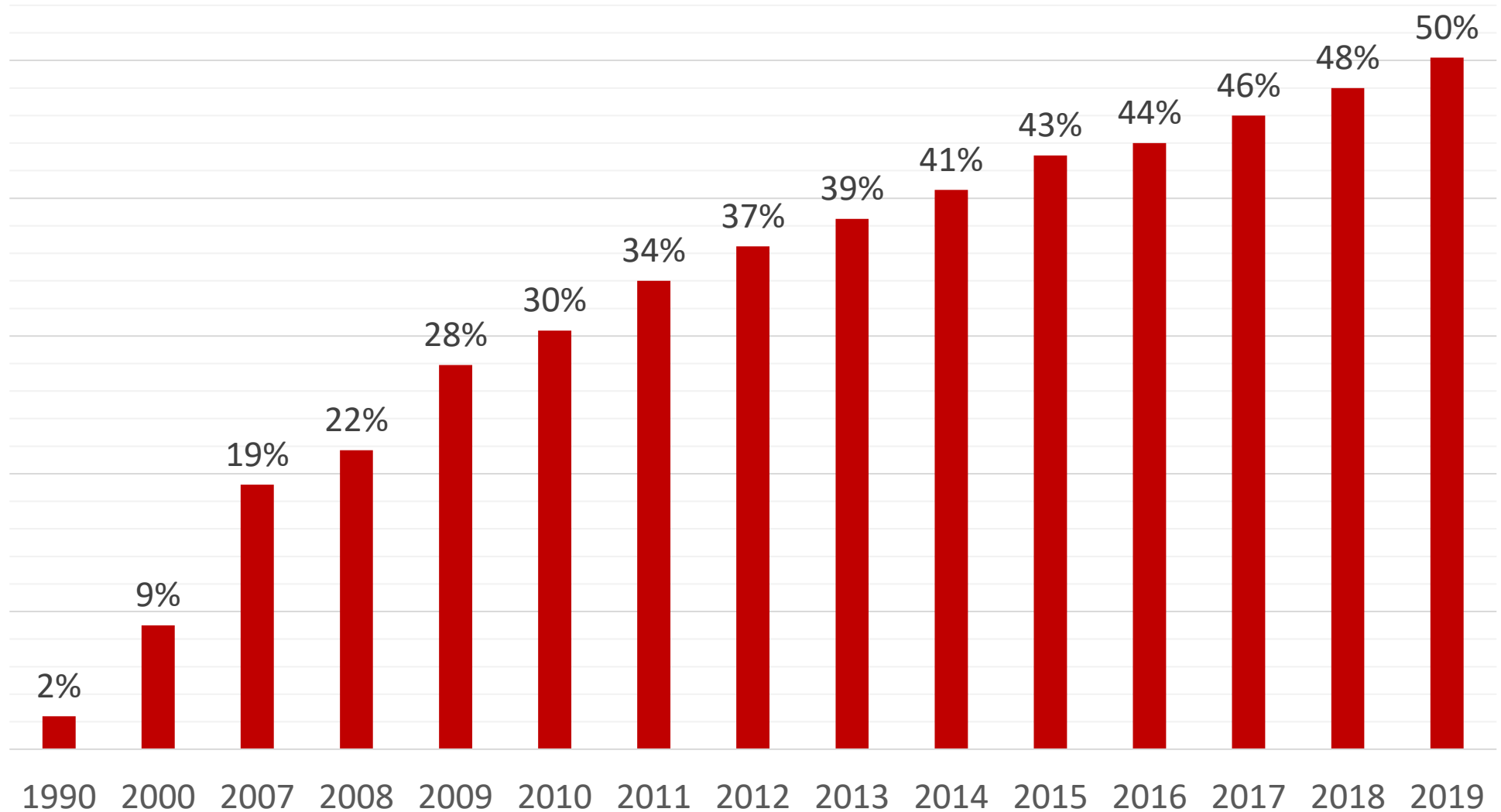


Ecofys studies “Status and prospects of co-processing of waste in EU cement plants”, [summary report April 2017](#) and [case studies May 2017](#)

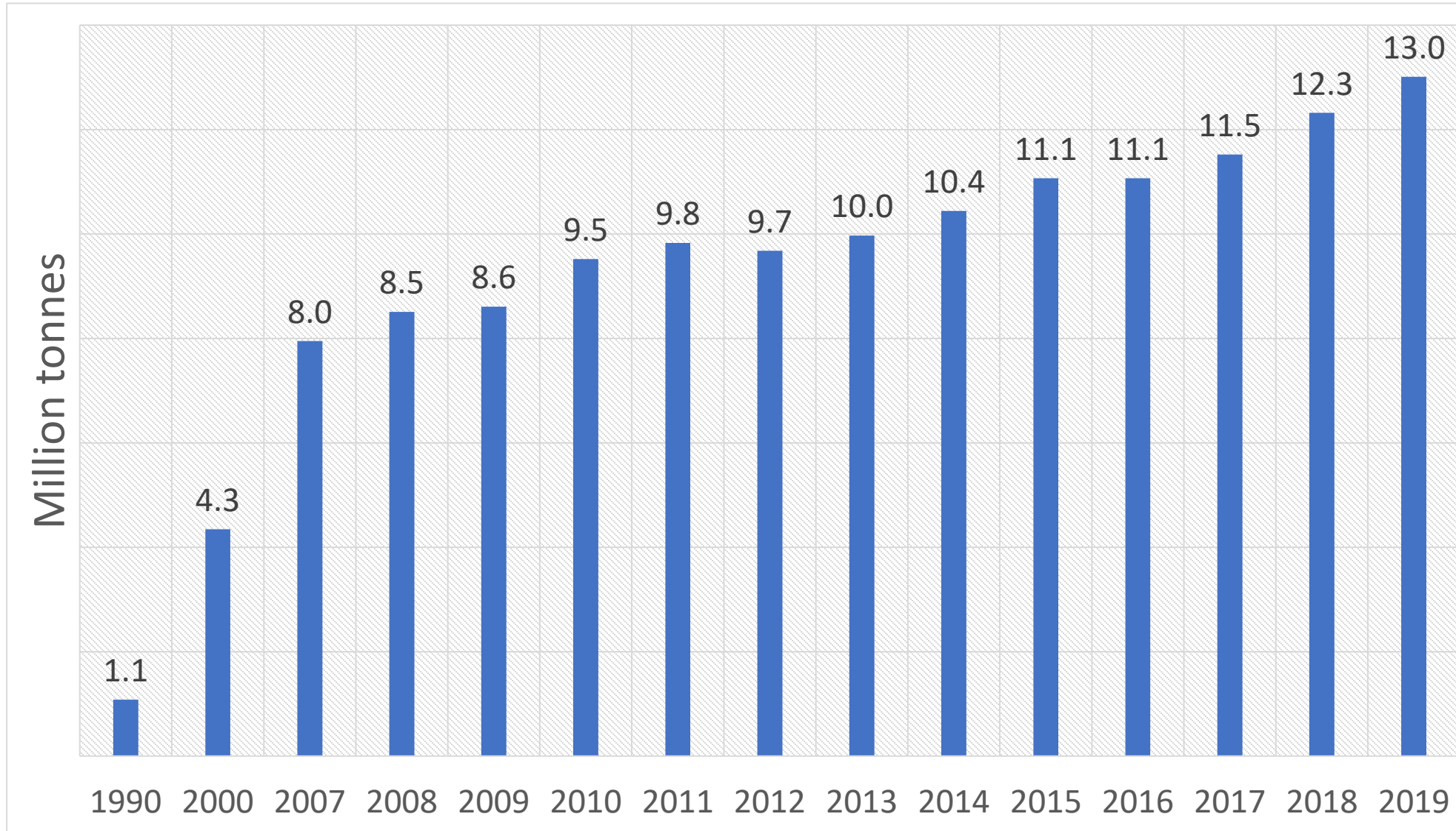


All data are for 2014, with the exception of Portugal and Bulgaria where data are from 2013.

% of Thermal energy from Alternative Fuels in the Cement sector in the EU



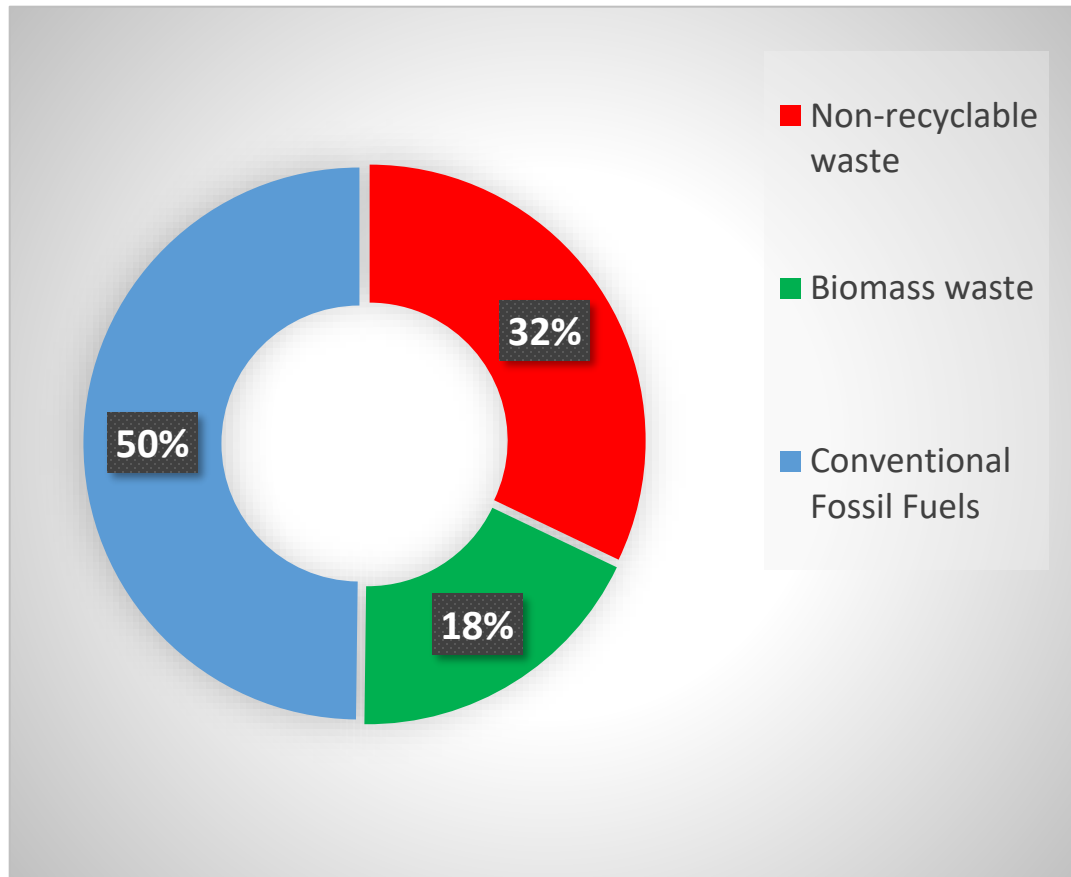
Alternative fuels used in the cement sector in the EU



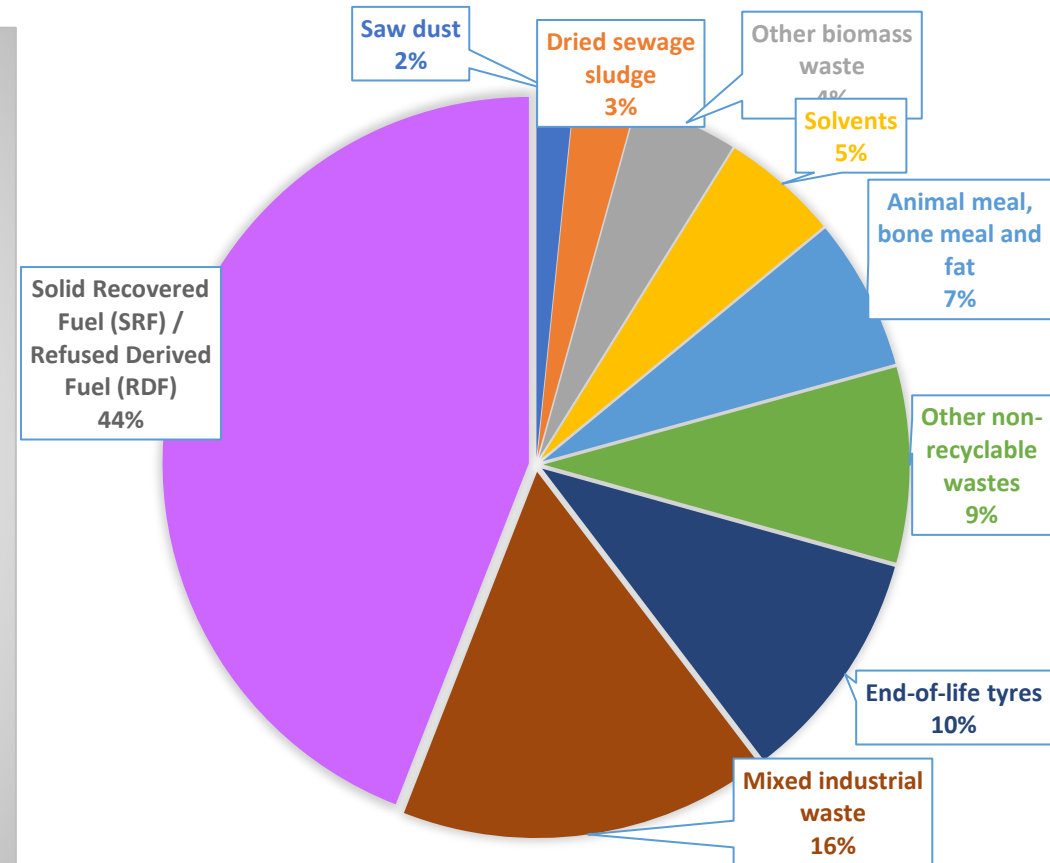
Source: Global Cement & Concrete Association (GCCA)

Update 2019 data: Alternative Fuels use in the EU

**THERMAL ENERGY CONSUMPTION BY FUEL TYPE
for the year 2019**

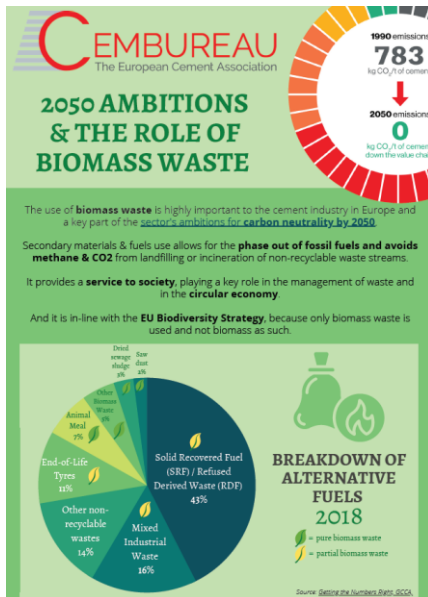


BREAKDOWN OF ALTERNATIVE FUELS 2019



Description of the waste streams used

<https://cembureau.eu/media/nqpnsbkh/biomass-waste-leaflet.pdf>



CEMBUREAU
The European Cement Association

2050 AMBITIONS & THE ROLE OF BIOMASS WASTE

The use of **biomass waste** is highly important to the cement industry in Europe and a key part of the **sector's ambitions for carbon neutrality by 2050**.

Secondary materials & fuels use allows for the **phase out of fossil fuels and avoids methane & CO₂** from landfilling or incineration of non-recyclable waste streams.

It provides a **service to society**, playing a key role in the management of waste and in the **circular economy**.

And it is in-line with the **EU Biodiversity Strategy**, because only biomass waste is used and not biomass as such.

1990 emissions
783
kg CO₂/t of cement

↓

2050 emissions
0
kg CO₂/t of cement
(down the value chain)

BREAKDOWN OF ALTERNATIVE FUELS 2018

- Solid Recovered Fuel (SRF) / Refused Derived Waste (RDF): 43%
- Mixed Industrial Waste: 16%
- Other non-recyclable wastes: 14%
- End-of-Life Tyres: 12%
- Animal Meal: 7%
- End-of-Life Tyres: 1%
- Other: 7%

Legend:
■ pure biomass waste
■ partial biomass waste

Source: *Setting the Numbers Right 2024*

	Animal meal is a biomass waste fuel resulted of animal carcasses processing in slaughterhouses, which for health reasons has to be used for energy production. The process and use are carefully regulated by national authorities.	 ANIMAL MEAL
	Solid recovered fuel (SRF) refers to a standardized waste-based fuel in accordance with EN15359. The term refuse derived fuel (RDF) , in general refers to a fuel produced by treating municipal solid waste (MSW), commercial and industrial waste (C&I) or construction and demolition waste (C&DW) by sorting, shredding and drying. Both SRF & RDF contain a highly significant, though variable, share of biomass.	
	End-of-life tyres have a high calorific value, which makes them an ideal fuel for the cement industry. At the same time, they have a high iron and silica content which makes them perfect for material recycling, allowing the cement industry to reduce its consumption of primary raw materials.	 END-OF-LIFE TYRES

It should be noted that tyres contain a significant amount of biogenic carbon (about 27% due to the content of natural rubber), thus leading to a direct reduction of fossil fuel-related CO₂ emissions.

The co-processing journey

<https://cembureau.eu/media/djtexpb/16298-cembureau-the-co-processing-journey-2019-06-04.pdf>



CEMBUREAU
The European Cement Association

The co-processing journey

How your waste is used to make cement

- When you dispose of waste, it is often the start of a journey at the heart of the concrete buildings you encounter every day.
- After being deposited correctly, the waste is collected, sorted and pre-treated to remove impurities, and then processed for efficient use in cement-making.
- During the pre-treatment, for example, used tyres are shredded to ensure maximum energy recovery. The treated waste material is then fed into cement kilns where it becomes a fuel and raw material.
- This simultaneous process in the kiln sees the organic component of the waste products fuel the cement kiln, and the mineral elements of the waste become part of the cement clinker. This means that co-processing results in no leftover materials, like ash.
- From then on, the cement is finished in the normal way and progresses further along its journey until it is used to make concrete or mortar which will help build the homes, hospitals and bridges of tomorrow.

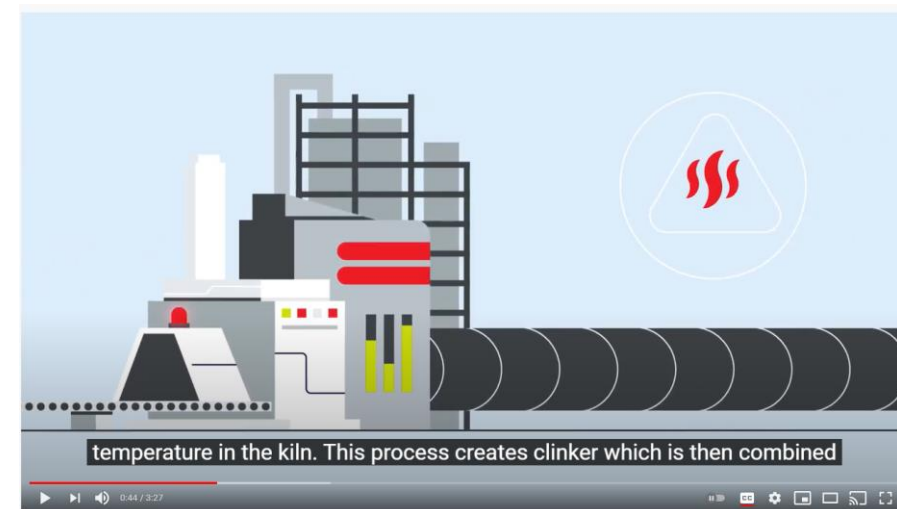
What is co-processing?

https://cembureau.eu/media/hbdhvp0s/what-is-co-processing-brochure_pm-version.pdf



Animation video: “processing waste to create cement”

<https://www.youtube.com/watch?v=iT-zMmZGVjA>





EMBUREAU

The European Cement Association

ROADMAPS ENERGY INTENSIVE INDUSTRIES

Steel industry - CO₂ reductions initiatives through biomass use

Andrew Purvis, Director Safety Environment and Technology

World Steel Association



The use of biomass in the steel industry

Andrew Purvis | Director, Safety Environment & Technology

World Steel Association (worldsteel)



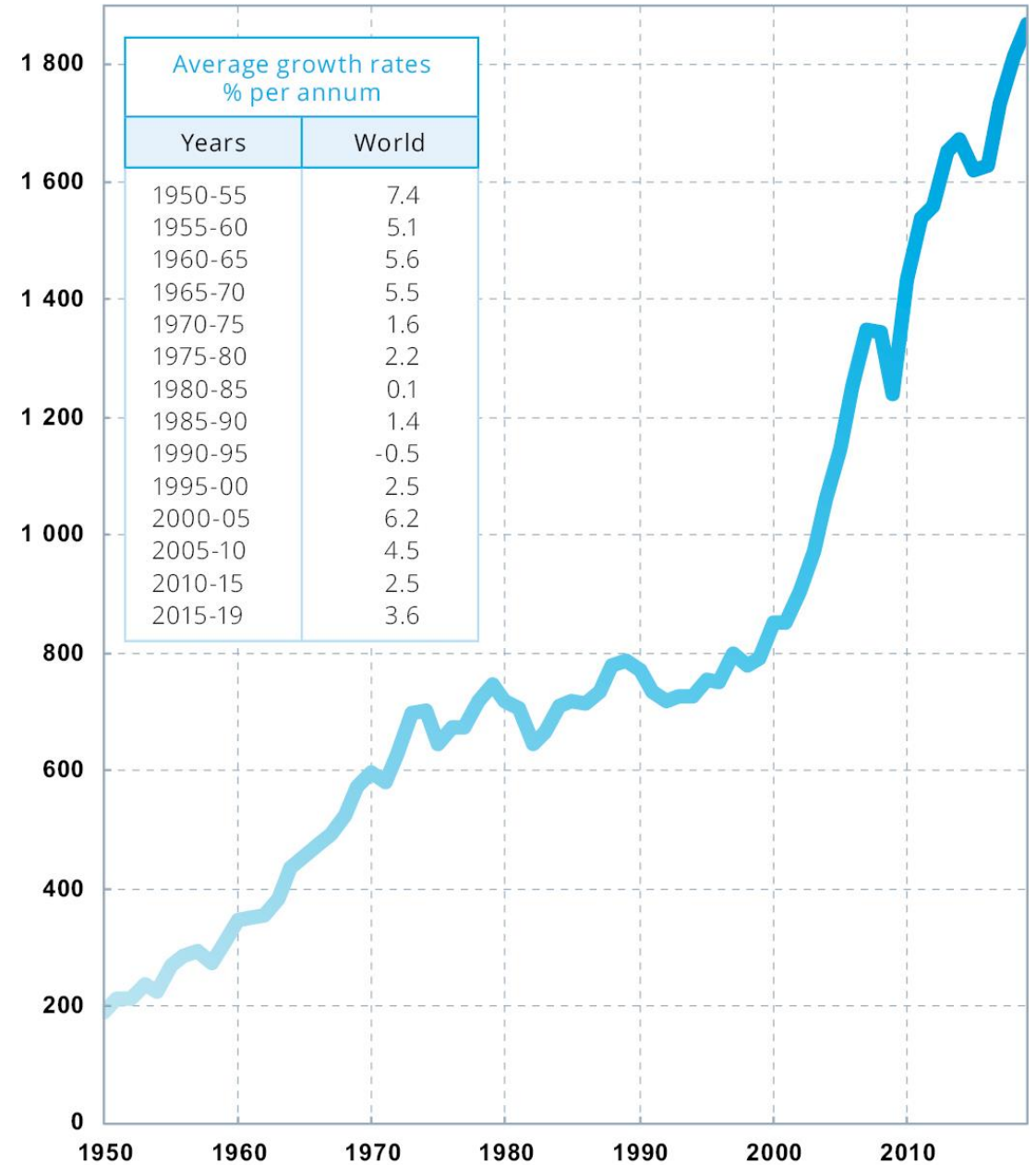
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The scale of the challenge

In 2020, on average, every tonne of steel produced led to the emission of 1.85 tonnes of CO₂.

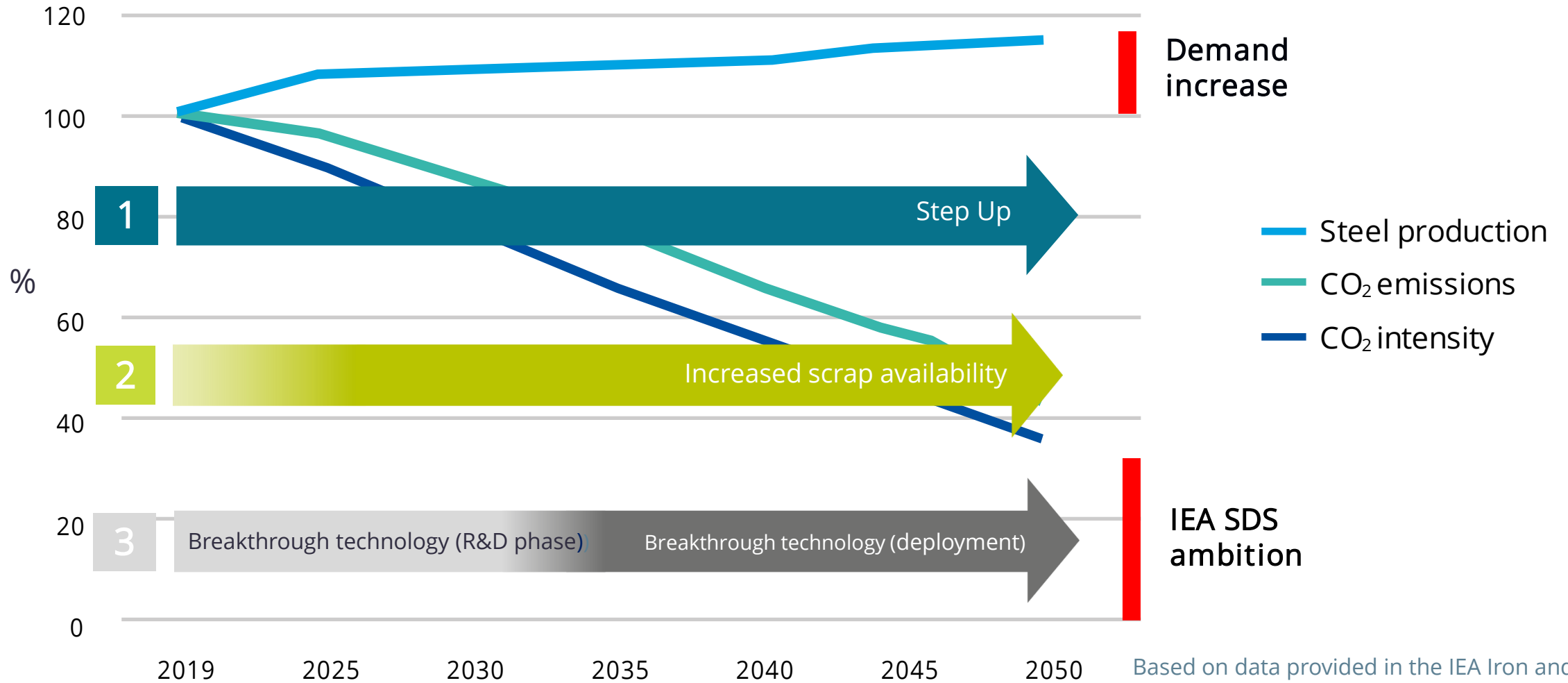
In 2020, the total direct emissions were of the order of 2.6 billion tonnes, representing between 7% and 9% of global anthropogenic CO₂ emissions.



worldsteel's 3-step approach



IEA scenario and our approach

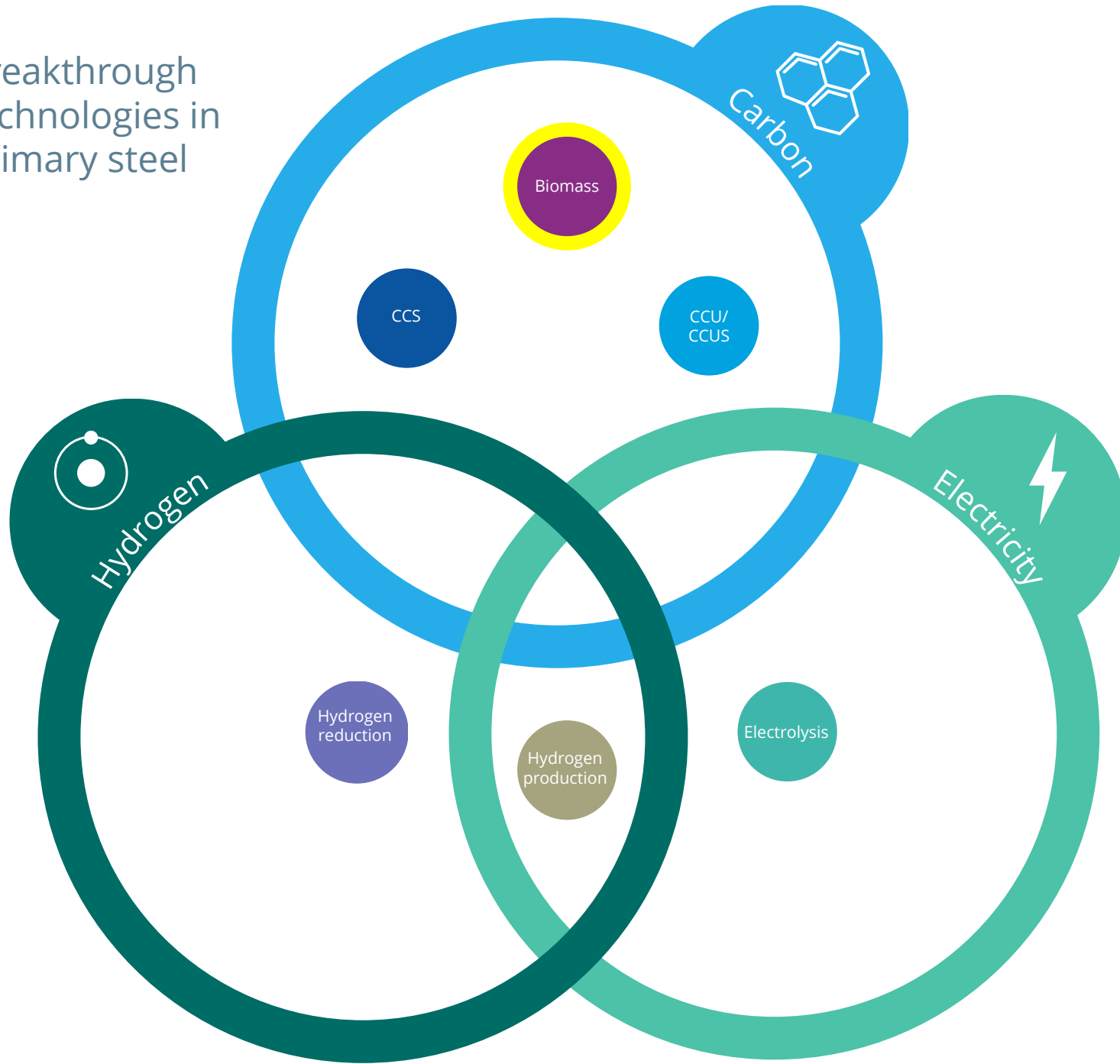


Based on data provided in the IEA Iron and Steel Technology Roadmap, October 2020

A portfolio of breakthrough technology options

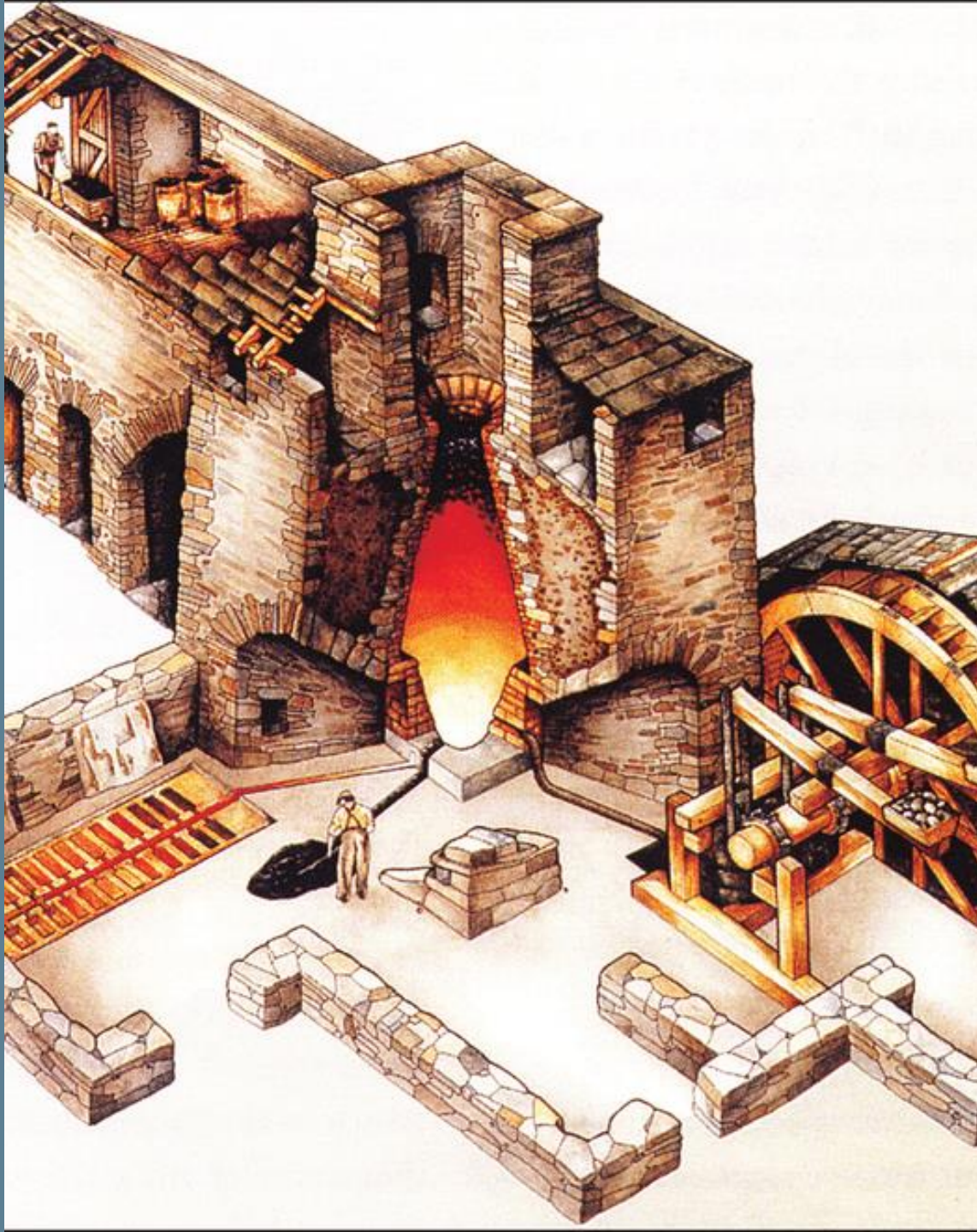


Breakthrough technologies in primary steel



Technology type:

- Biomass
- CCS
- CCU/CCUS
- Hydrogen reduction
- Hydrogen production
- Electricity



Ironmaking began with biomass

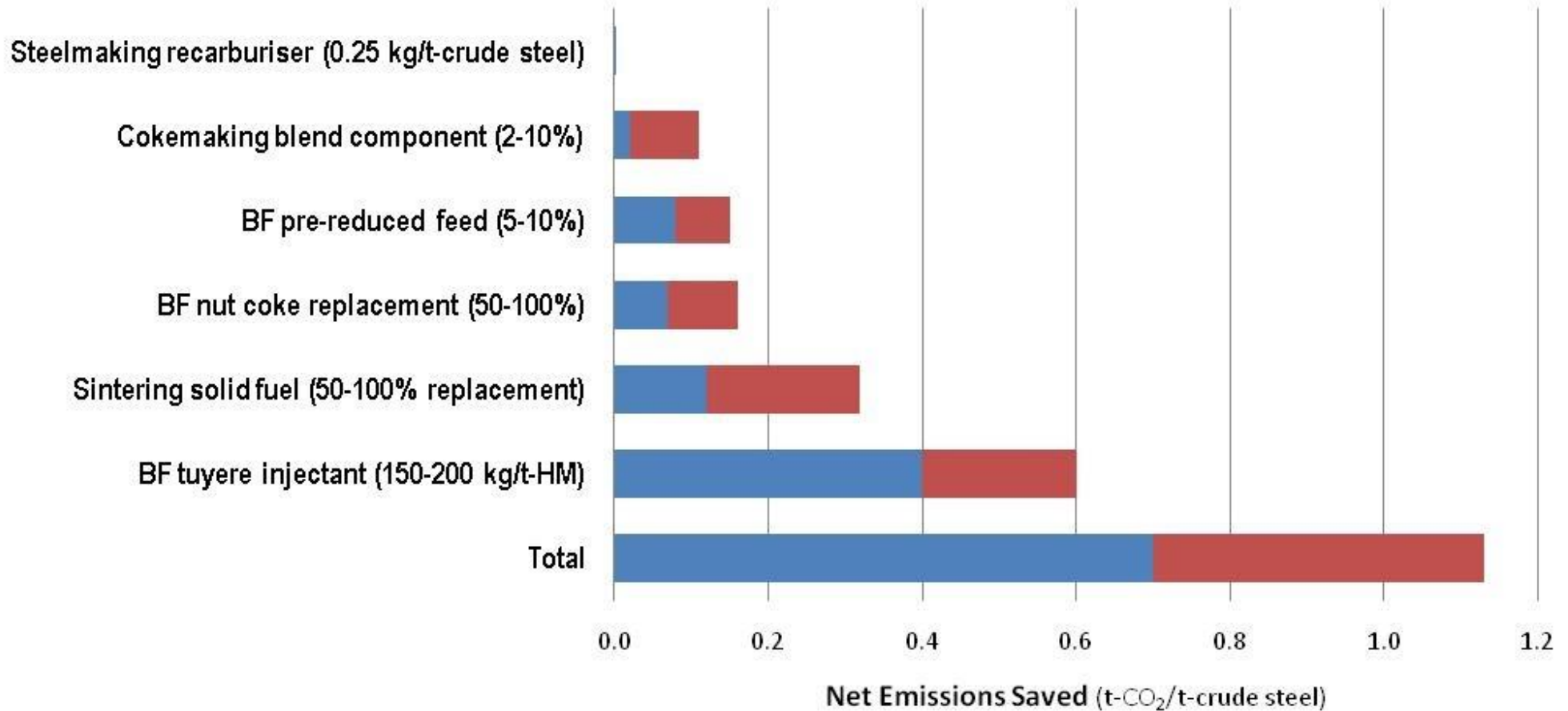
- In pre-historic and historic times biomass (charcoal) was used extensively in ironmaking
- Charcoal provided a source of carbon to reduce iron ore in the blast furnace.

21st century biomass

- Different regions will adopt different breakthrough technology solutions, biomass isn't a silver bullet.
- Biomass can potentially be used to replace a proportion of fossil carbon resources.
 - As a reductant
 - As a source of alloying carbon
 - As a replacement for fossil energy in other processes
- The potential for biomass-derived products to mitigate CO₂ emissions in the BF-BOF route is substantial (32 – 58%)
- Some biomass is in use now, other steel companies are undertaking research

Biomass can make a significant impact

Proposed Biomass Applications: Integrated BF-BOF Route



Where are we seeing interest in biomass now?



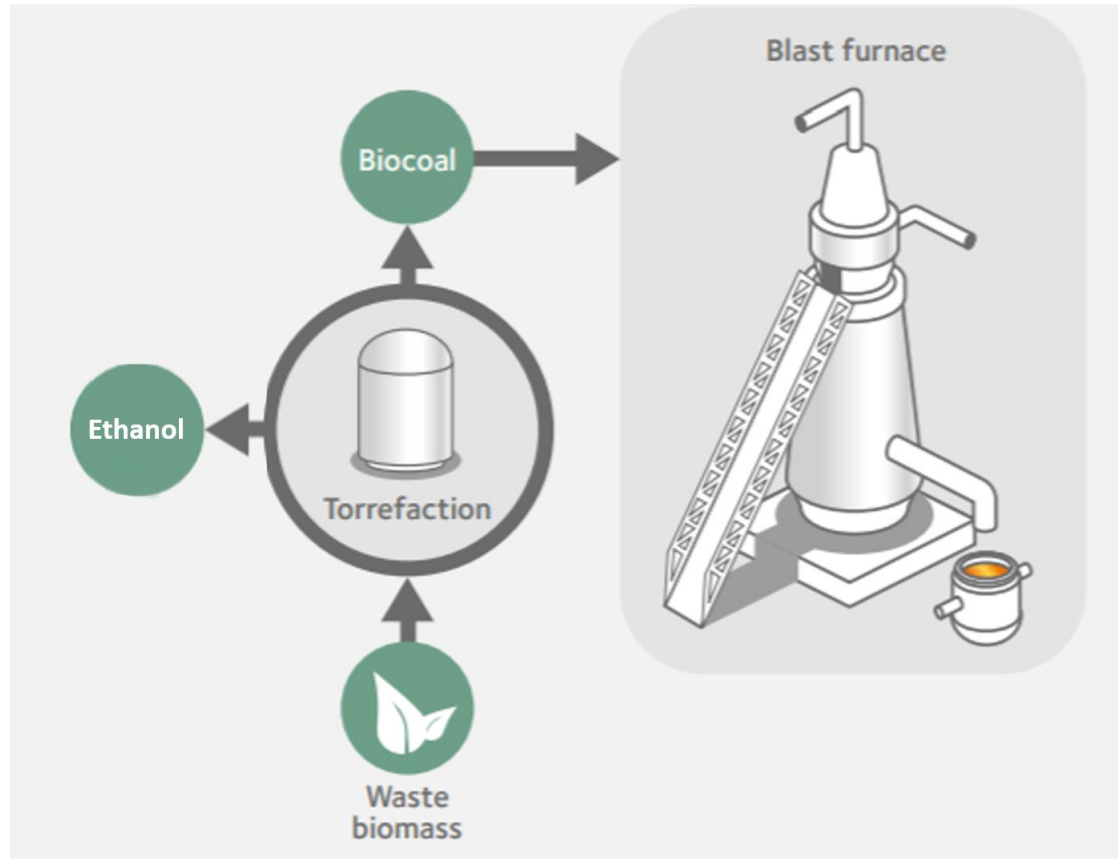
Aço Verde do Brasil , a charcoal based, carbon neutral steel plant



Gerdau uses as a renewable energy source known as a bioreducer - charcoal from planted forests - used to replace carbon in some of the company's units that use the blast furnace in its production process.

13 plants in South America use biomass.

Where are we seeing interest in biomass now?



ArcelorMittal is developing **Torero**, a torrefaction plant which will convert waste wood into a biocarbon suitable for the blast furnace.

Construction of the project started in 2018; production will begin in 2022.

Where are we seeing interest in biomass now?



ArcelorMittal's Sestao facility in Spain will be a full-scale zero-carbon emissions steel plant, using sustainable biomass or green hydrogen.



Tata Steel's Hisarna process can use coal, biomass or natural gas.

Where are we seeing interest in biomass now?



Biomass and other wood residues as reducing agents to replace coal.



Biochar/coal mixture pneumatic transport laboratory testing and furnace biochar injection trials are planned.

Some biomass issues - technical

- We are used to using fossil fuels, moving to alternative reductants represents a big change
- Charcoal/Biochar cannot be swapped 100% like-to-like with coal using existing technology, but can play a role
- Biomass with CCS offers the possibility for negative emissions
- Biomass blends can be engineered and can be better than coal (no gangue) and the possibility to better engineer slags

Biomass challenges - others

- Robust supply chains exist to move the large amounts of raw materials (such as coal, iron ore, lime, scrap) required in modern steelmaking.
- Similar supply chains will need to be developed to collect biomass at volume, convert and process, and to deliver it reliably to steel manufacturing facilities
- Many sectors are looking to use biomass e.g. there will be competition, potential land use competition with food production
- Sustainable credentials of biomass used would need to be proved
 - The full supply chain must be considered, and all emissions associated with the production, processing, transport and use of bioenergy

worldsteel policy paper

Restructured and expanded public website content in the new [Climate Action section](#) includes the policy paper and:

- Fact sheets detailing the suite of low-carbon breakthrough technologies currently under development.
- Examples of member initiatives in related areas, including new business practices encouraging low-carbon market development
- Work being carried out by other international organisations including the IEA and ResponsibleSteel

Public policy paper

Climate change and the production of iron and steel

Fact sheet

Biomass in steelmaking



The transition to a low-carbon world requires a transformation in the way we manufacture iron and steel. There is no single solution to CO₂-free steelmaking, and a broad portfolio of technological options is required, to be deployed alone, or in combination as local circumstances permit. This series of fact sheets describes and explores the status of a number of key technologies and issues.

What is biomass?

Biomass is renewable organic material that comes from plants and animals, containing stored chemical energy from the sun. Plants produce biomass through photosynthesis. Biomass can be burned directly for heat, converted to renewable liquid and gaseous fuels through various processes¹, or used in industrial processes such as steelmaking.

Biomass sources for energy include:

- Wood and wood processing wastes - firewood, wood pellets and wood chips, lumber and furniture mill sawdust and waste, and black liquor from pulp and paper mills
- Agricultural crops and waste materials - corn, soybeans, sugarcane, switchgrass, woody plants algae, and crop and food processing residues
- Biogenic materials in municipal solid waste - paper, cotton and wool products, and food, yard and wood wastes
- Animal manure and human sewage
- Landfill gas
- Biofuels made from biogenic alcohol

Why consider biomass in steelmaking?

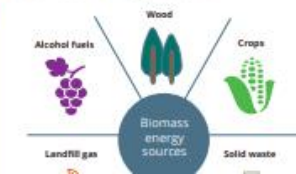
Under the right circumstances, biomass can be considered a carbon-free resource; therefore, it can be an attractive option to reduce emissions from iron and steel production.

The International Energy Agency (IEA)'s bioenergy programme notes that "within the biospheric carbon cycle, bioenergy can be carbon neutral because the carbon that is released during combustion has previously been sequestered from the atmosphere and will be sequestered again as the plants regrow, i.e. if sustainably produced.

However, the full supply chain must be considered, and all emissions associated with the production, processing, transport and use of bioenergy need to be included. Particularly harvesting, transport and processing generally involve fossil energy use. Nevertheless, analysis shows that the fossil energy used in the supply chain is generally a small fraction of the energy content of the bioenergy product, even for woody biomass transported over long distance, e.g. between North America and Europe."²

Biomass is already used to a significant degree in the power sector. For example, the former Drax coal-fired power plant in North Yorkshire, England, converted four of the power station's six generating units to use sustainable biomass instead of coal. This has transformed Drax, which supplies 5% of the country's electricity, into the UK's largest renewable power generator and the biggest decarbonisation project in Europe.

Biomass in iron and steelmaking



worldsteel contact



Andrew Purvis

Director, Safety, Environment & Technology

purvis@worldsteel.org

worldsteel

A S S O C I A T I O N

worldsteel.org | constructsteel.org | steeluniversity.org | worldautosteel.org | issf.org



GROUP DISCUSSIONs

POLICY FRAMEWORK

BIOMASS SUPPLY (INCL. TORREFACTION)

BIOMASS USE

Small group discussions

POLICY FRAMEWORK



*Jean-Marc Jossart
Secretary General
Bioenergy Europe*



*Giulia Cancian
Policy Director
Bioenergy Europe*



*Nikos Nikolakakos
Environment and
Resources Manager
CEMBUREAU*

Small group discussions

BIOMASS SUPPLY (AND TORREFACTION)



*Cristina Calderon
M. Intelligence Director
Bioenergy Europe*



*Rachael Levinson
Senior Research Manager
Hawkins Wright*



*John Robert McFarlane
Founder
Albion Design*



*Krister Rosenqvist
CEO
Cleantek Trade*



Hawkins Wright – consultants to the global biomass industry



The Outlook for Wood Pellets – Demand, Supply, Costs and Prices

The black pellet market outlook
An overview of the status of black/advanced
A multi-client study
Available February 2020

The global market for palm kernel shells (PKS)
An overview of the trade of PKS used for energy generation
August 2019



Assessing biomass supply

Examples of related projects:

- Frequent wood pellet market due diligence studies
- Overview of the global wood chip market
- World's first palm kernel shell market multi-client report
- Black pellet market outlook
- Analysis of the factors that will drive US wood markets over the next twenty-five years
- Due diligence assessment of the feedstock supply strategy of a coal-to-biomass conversion project

- Assessment of the cost competitiveness of different wood pellet suppliers
- Calculation of lifecycle GHG emissions for biomass supply chains

Small group discussions

BIOMASS SUPPLY (AND TORREFACTION)



Cristina Calderon
M. Intelligence Director
Bioenergy Europe



Rachael Levinson
Senior Research Manager
Hawkins Wright



John Robert McFarlane
Founder
Albion Design



Krister Rosenqvist
CEO
Cleantek Trade

Small group discussions

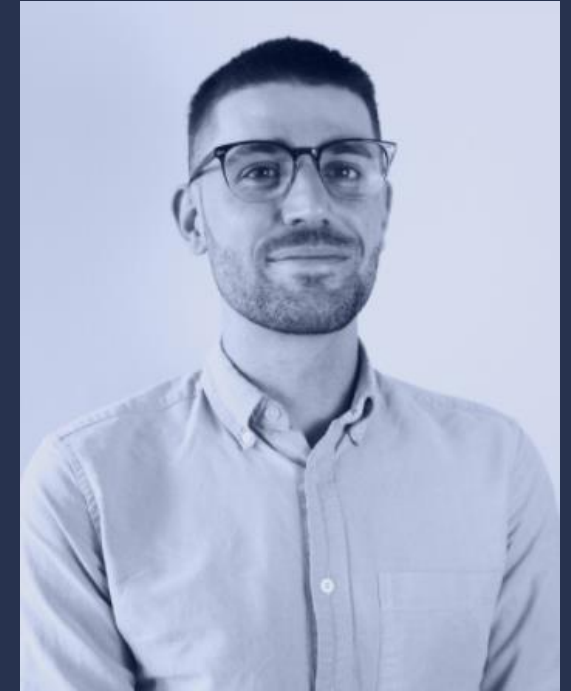
BIOMASS USE



*Jonas Kugelevicius
Head of Engineering Group
AXIS Tech*



*Evaldas Margis
Director of Commerce
AXIS Tech*



*Simon Lavergne
Technical Officer
Bioenergy Europe*



Evaldas Margis

Director of Commerce

Business development and project management of biofuel technological solutions for domestic and international markets.

AXIS Tech

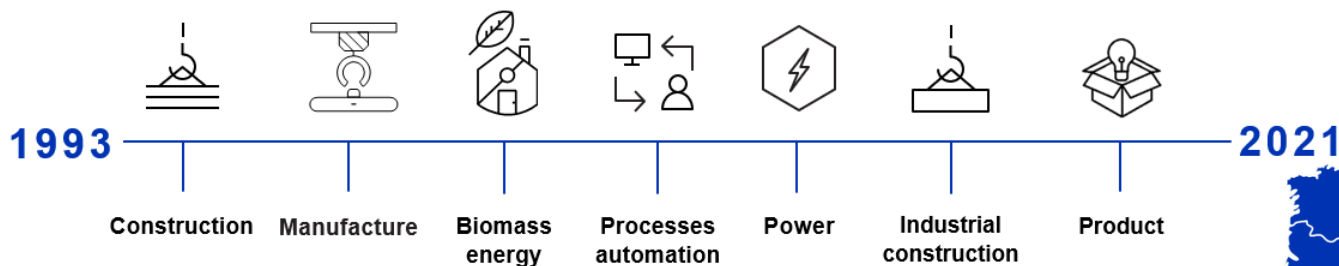
Handling. Heavy. Heat.

WE CARE

21 countries & over 500 clients

- Carbon neutral biomass energy solutions
- Respect for the environment
- Highest environmental standards
- Our produced equipment has more than 5500 MW of power
- Our equipment utilizes 3000 t/h biomass

OUR EXPERIENCE



FIELD OF ACTIVITIES

AXIS Tech

Handling.
Heavy.
Heat.



Industrial lifting equipment



Bulk material handling equipment



Steel processing

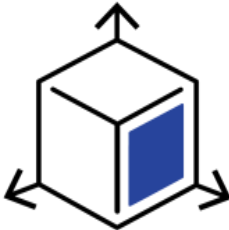


Biomass energy equipment

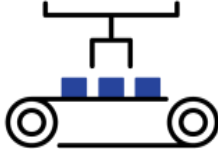
OUR SERVICES



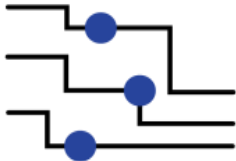
ENGINEERING



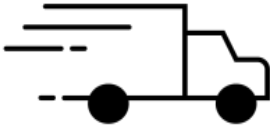
MECHANICAL DESIGN



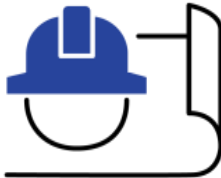
PRODUCTION



ELECTRICAL ASSEMBLY
AND PROGRAMMING FOR
THE MAIN EQUIPMENT



DELIVERY



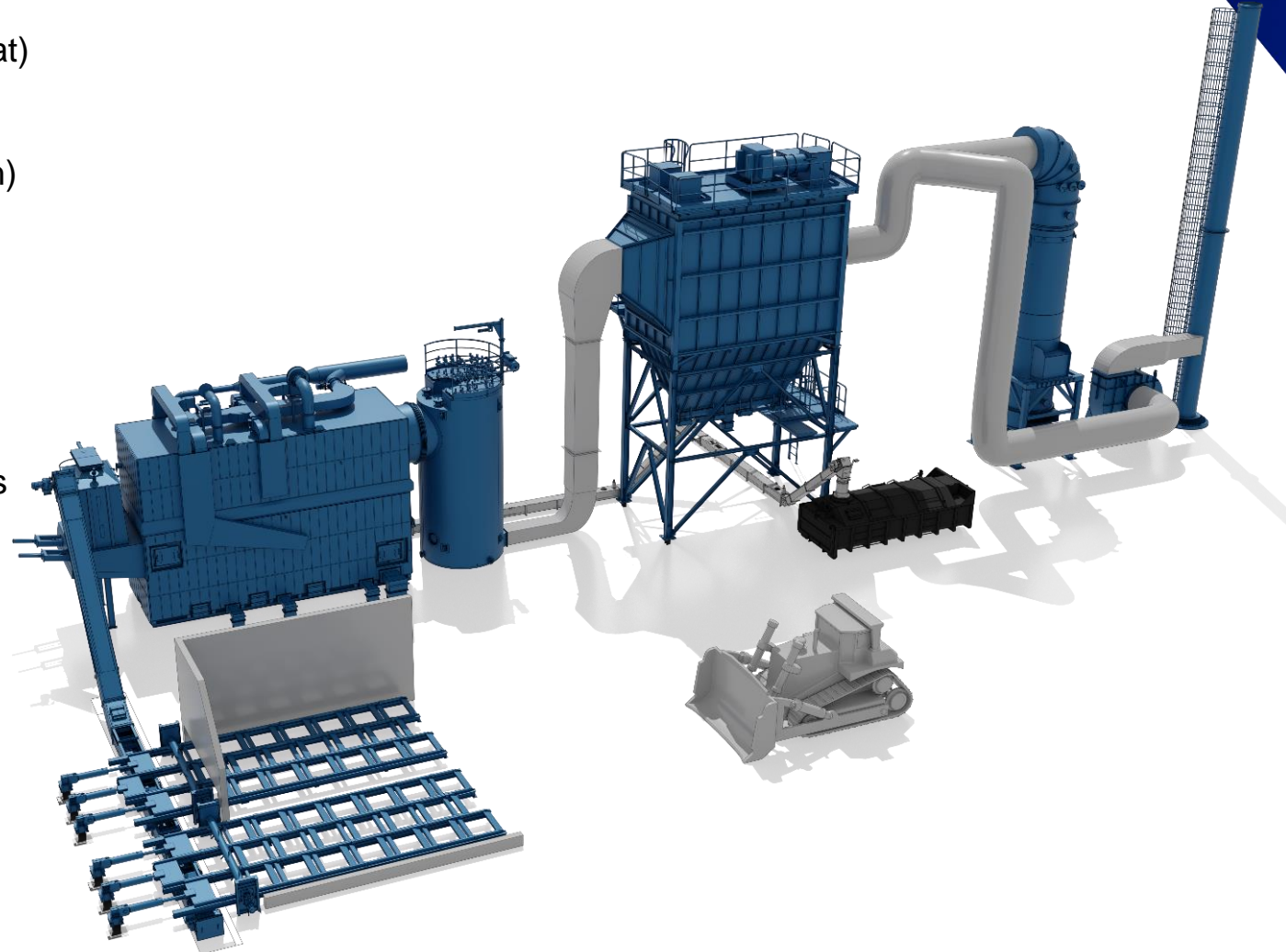
INSTALLATION ON SITE



WARRANTY AND POST-
WARRANTY SERVICE

BIOMASS ENERGY EQUIPMENT

- Water heating boiler units (5 – 25 MW heat)
- Saturated steam boiler units (8 – 35 t/h)
- Superheated steam boiler units (8 – 30 t/h)
- CHP (2.5 – 20 MWe; 10 – 80 MW heat)
- Thermal oil boiler plants (5 – 25 MW)
- Fuel handling equipment and systems
- Ash removal equipment and systems
- Flue gas cleaning equipment and systems
- Heat recovery equipment and systems



REFERENCES



**2x7 MW thermal oil
boiler plant**

Belarus



**21 MWe biomass boiler plant
Total capacity – 73,8 MW**

Estonia



**10,6 MW biomass boiler
plant**

Sweden

REFERENCES



**2x12 MW biomass boiler
plant**

Poland



**5 MWe biomass boiler plant
Total capacity - 26,3 MW**

Lithuania



Jonas Kugelevičius

Head of Engineering Group

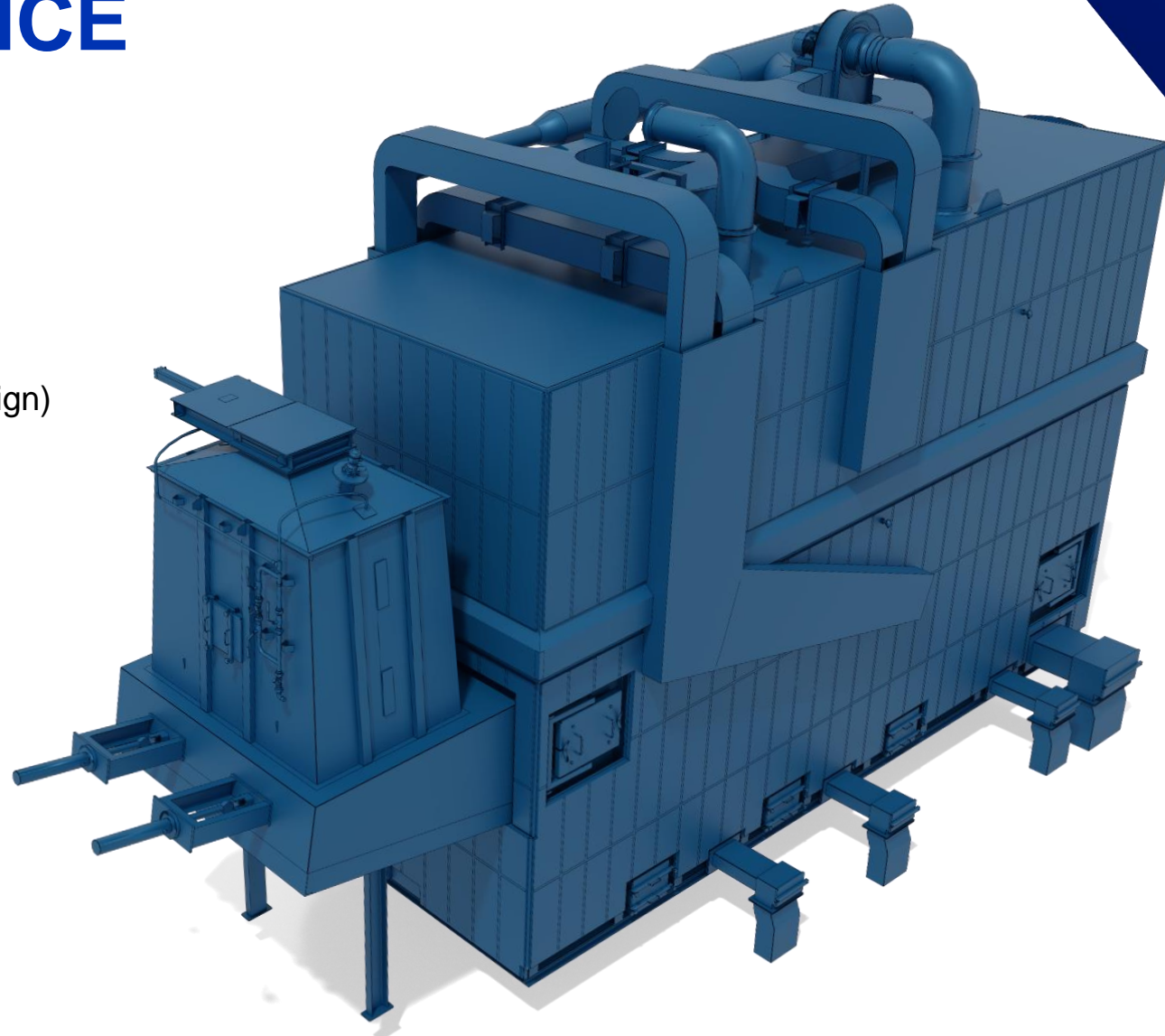
Experience as a project engineer in CHP plants, hot water boiler plants, thermal oil supply, pelletizing systems, etc. in a field of important energy issues, energy combustion technologies based on biomass fuels, sustainable energy technologies, and its relations with energy economics and environmental policy.

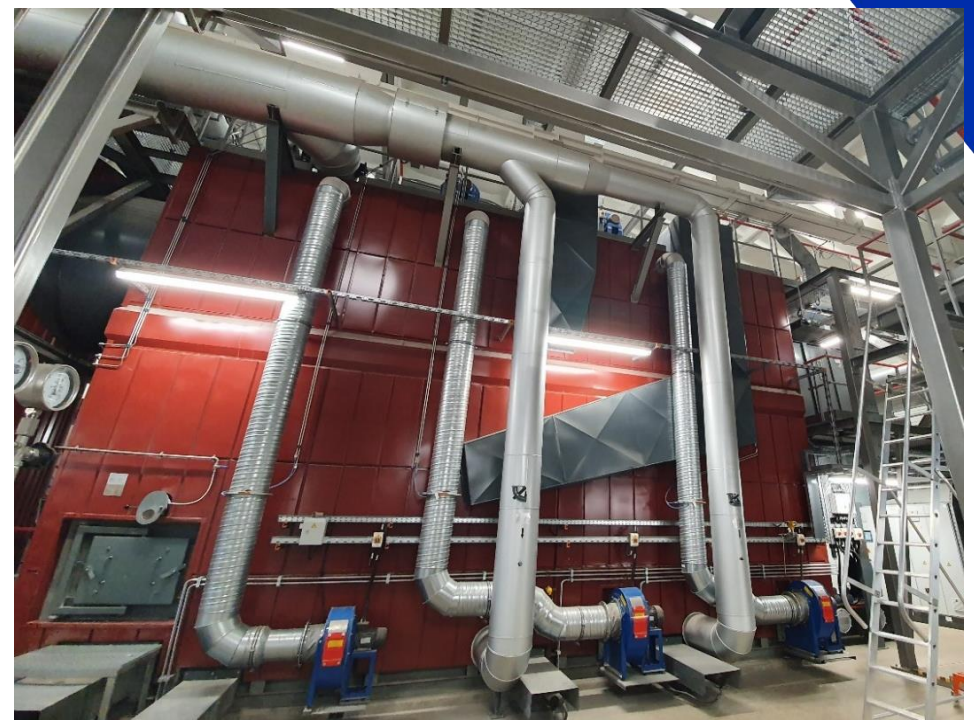
AXIS Tech

Handling. Heavy. Heat.

BIOFUEL FURNANCE

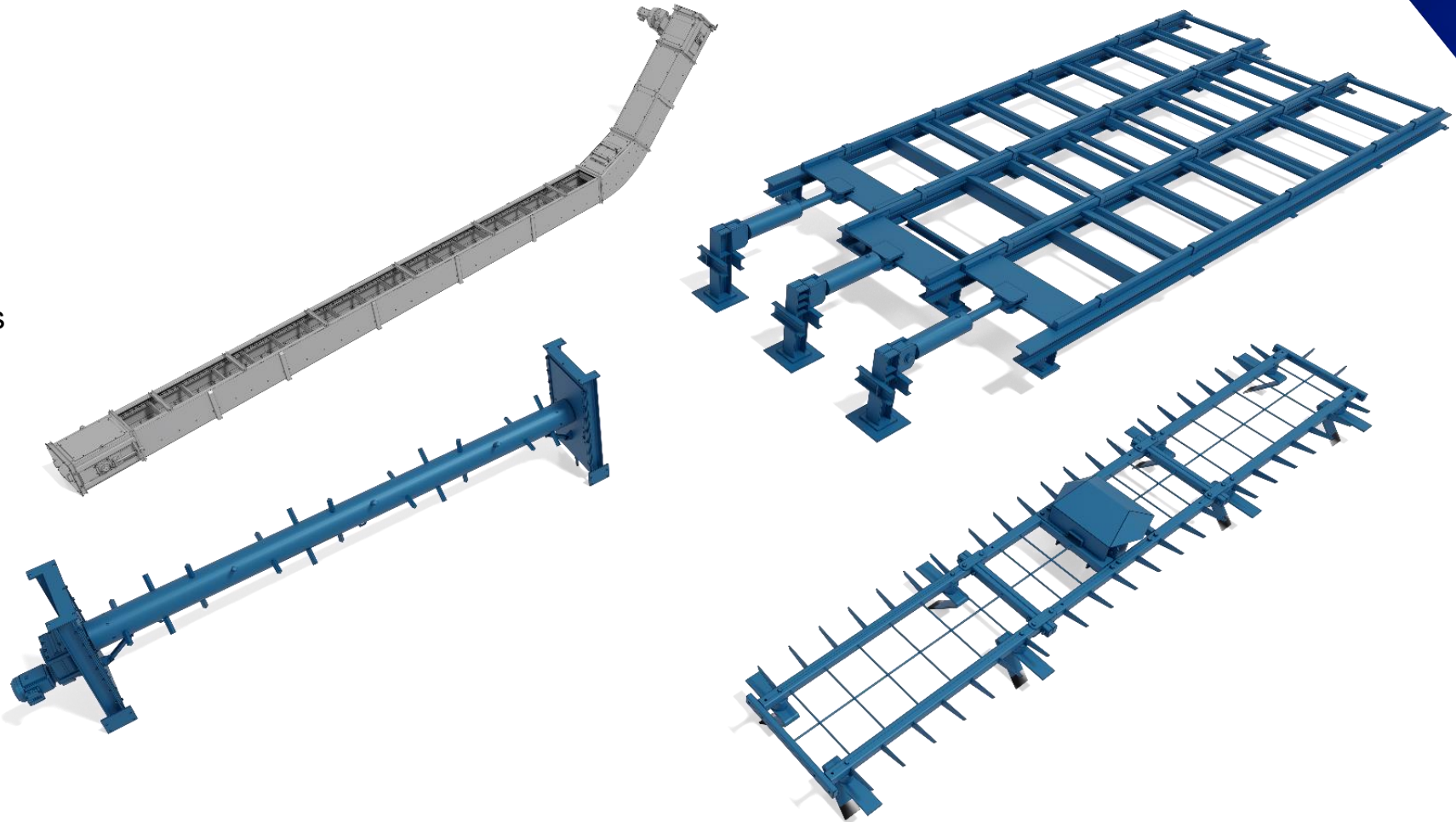
- Moving step grate furnace:
 - PKS type 6 – 15 MW
 - SAX type 12 – 30 MW
- Furnace for pelletizing lines (6 – 30 MW)
- Furnace for dry fuel (6 – 15 MW, under design)

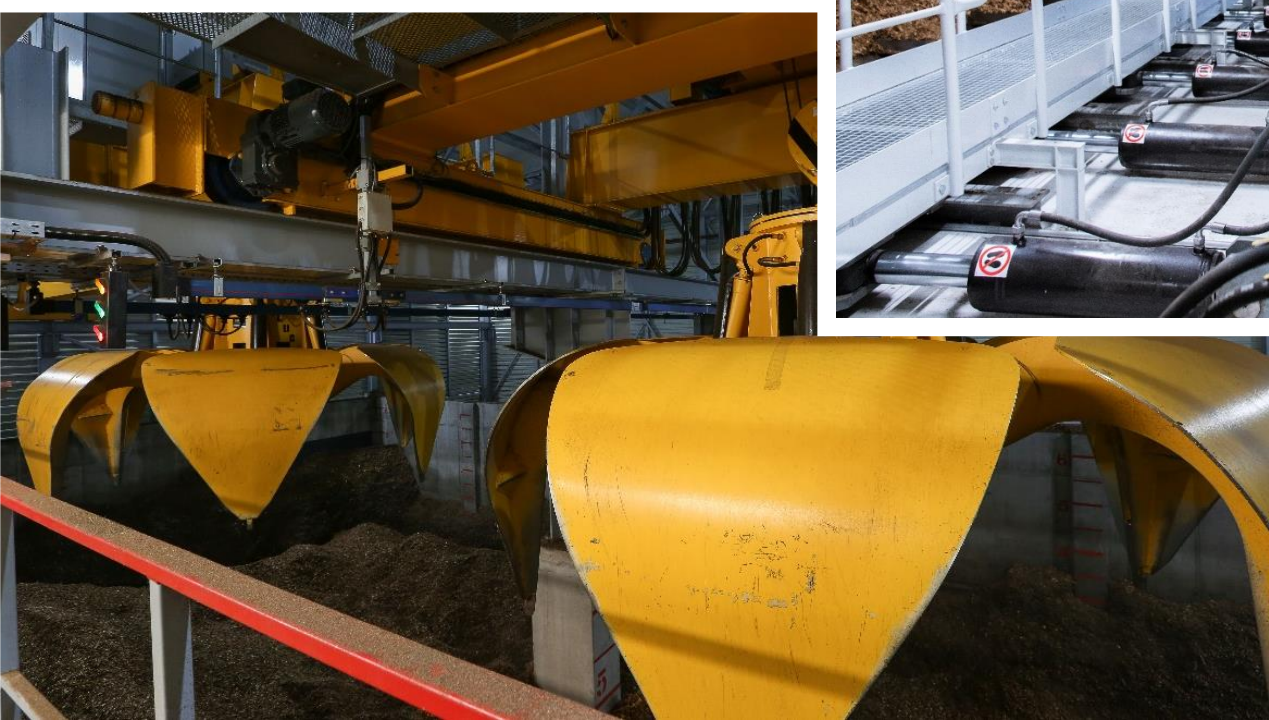




FUEL SUPPLY EQUIPMENT

- Moving floor platforms
- Fuel layer leveller
- Scrapper conveyors
- Vibro - sieves
- Screw conveyors
- Fuel distribution systems
- Fuel sorting systems
- Grab crane system



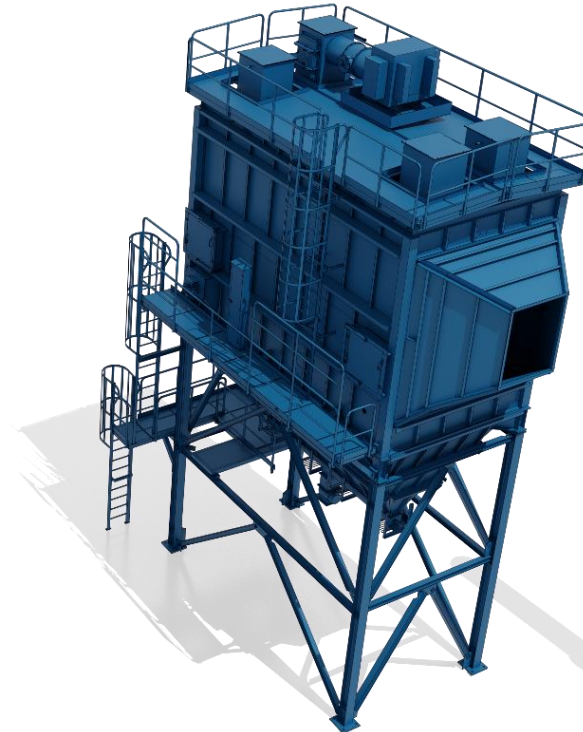
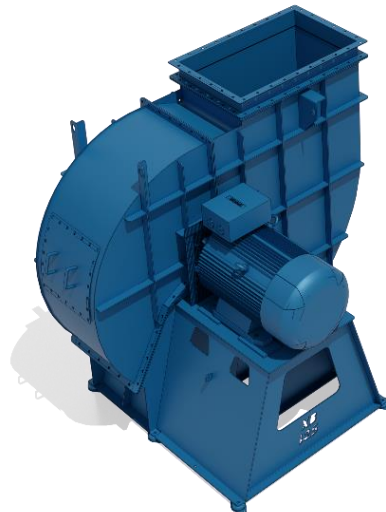


FLUE GAS TREATMENT AND EXHAUST SYSTEMS

- Multicyclone (up to 150 mg / Nm³)
- Electrostatic precipitator (ESP) (up to 10 mg / Nm³)
- Bag filter (up to 10 mg / Nm³)
- Wet-type electrostatic filter (up to 1 mg / Nm³)
- Flue gas ducts and dampers
- Stack

SOLUTIONS FOR REDUCING NO_x:

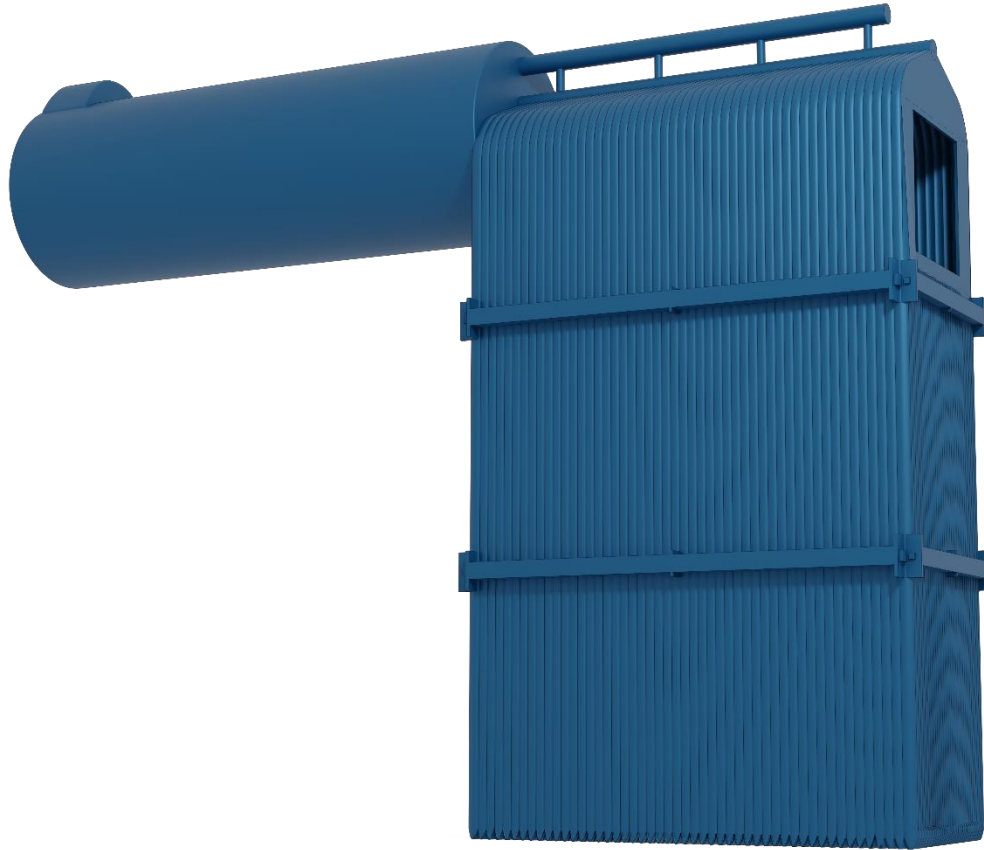
- SNCR systems

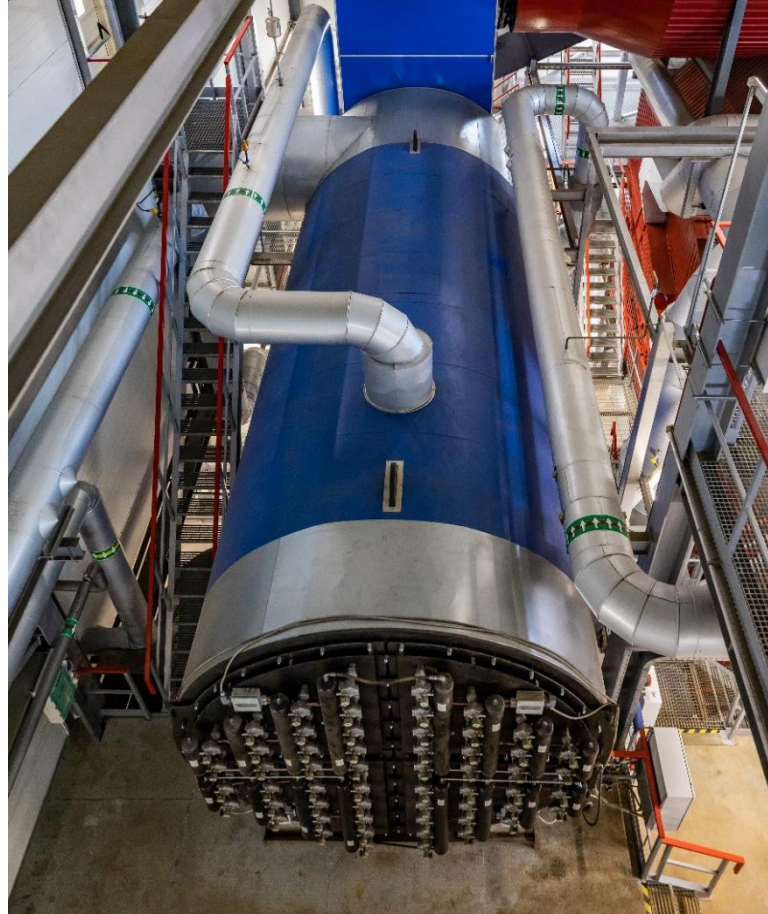
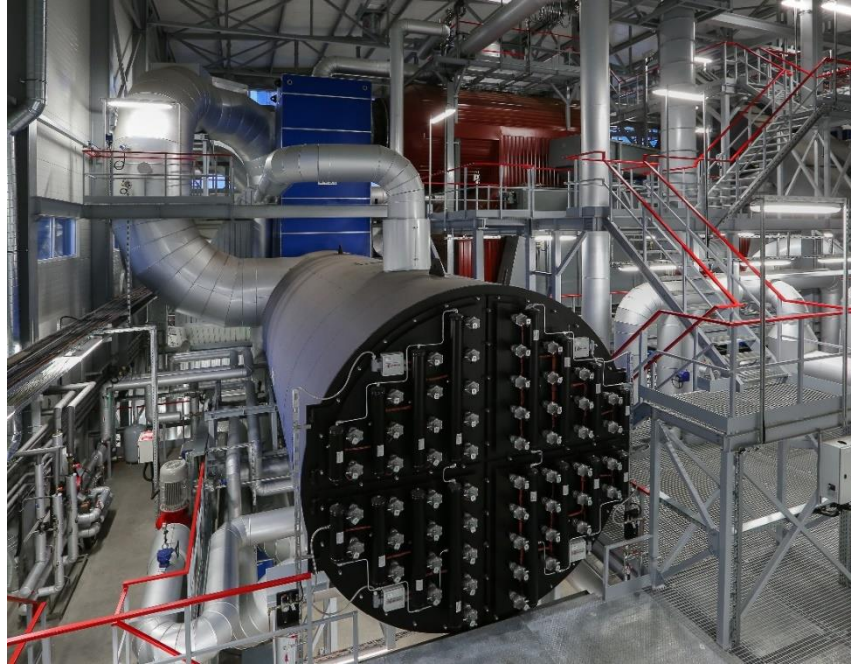




BOILERS

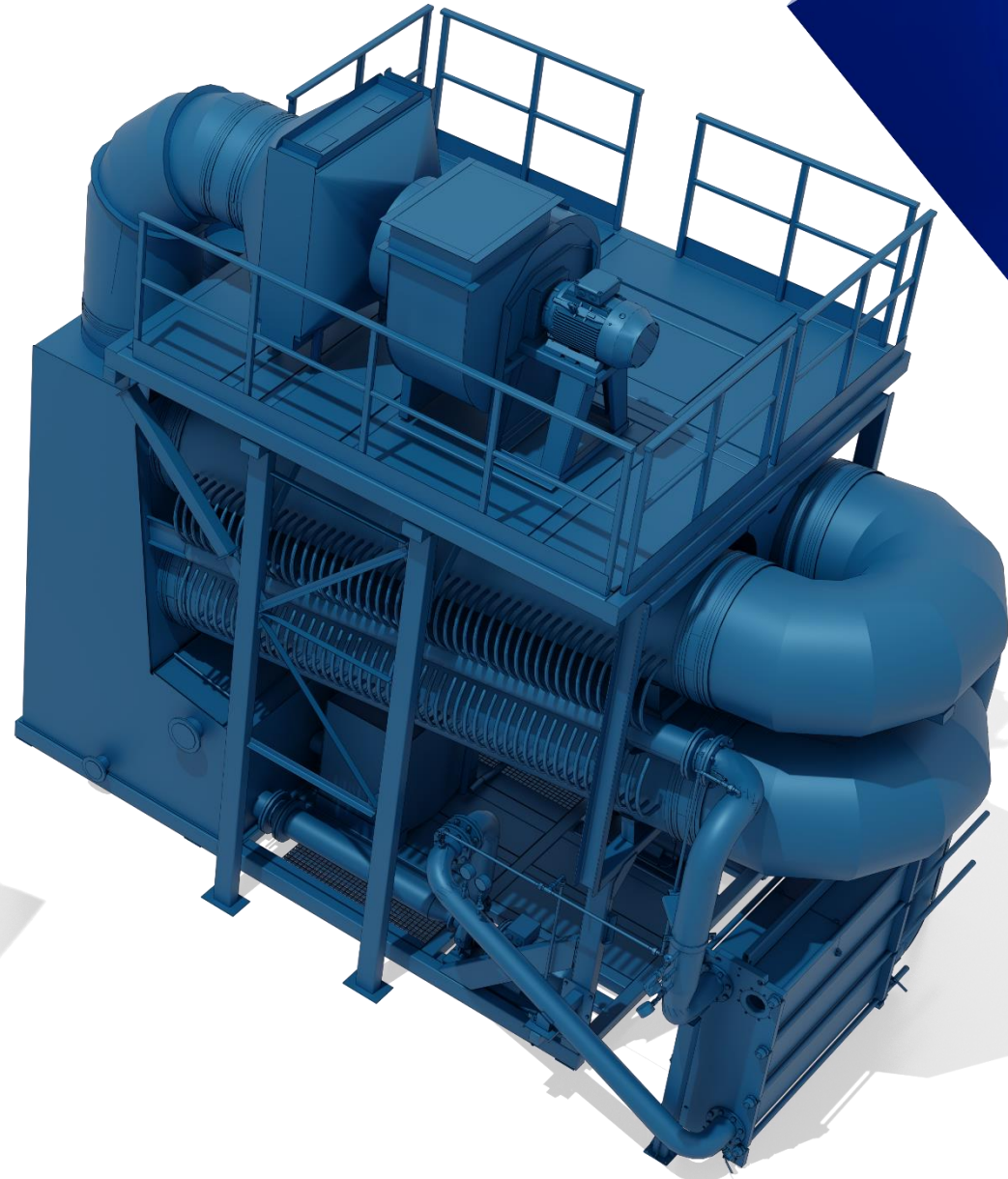
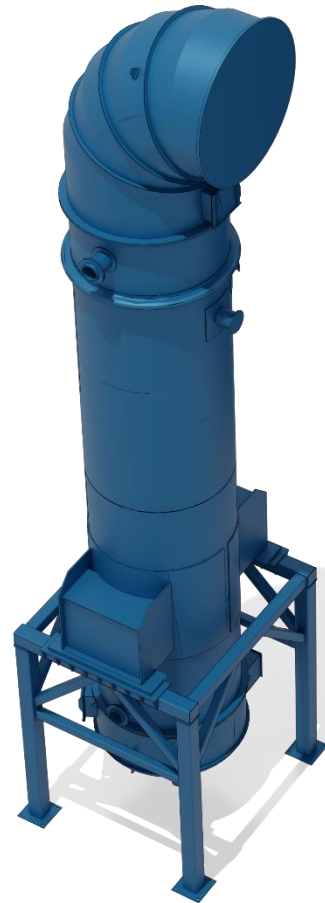
- Water heating boilers
- Steam boilers
- Thermal oil boilers





EQUIPMENT FOR IMPROVING EFFICIENCY

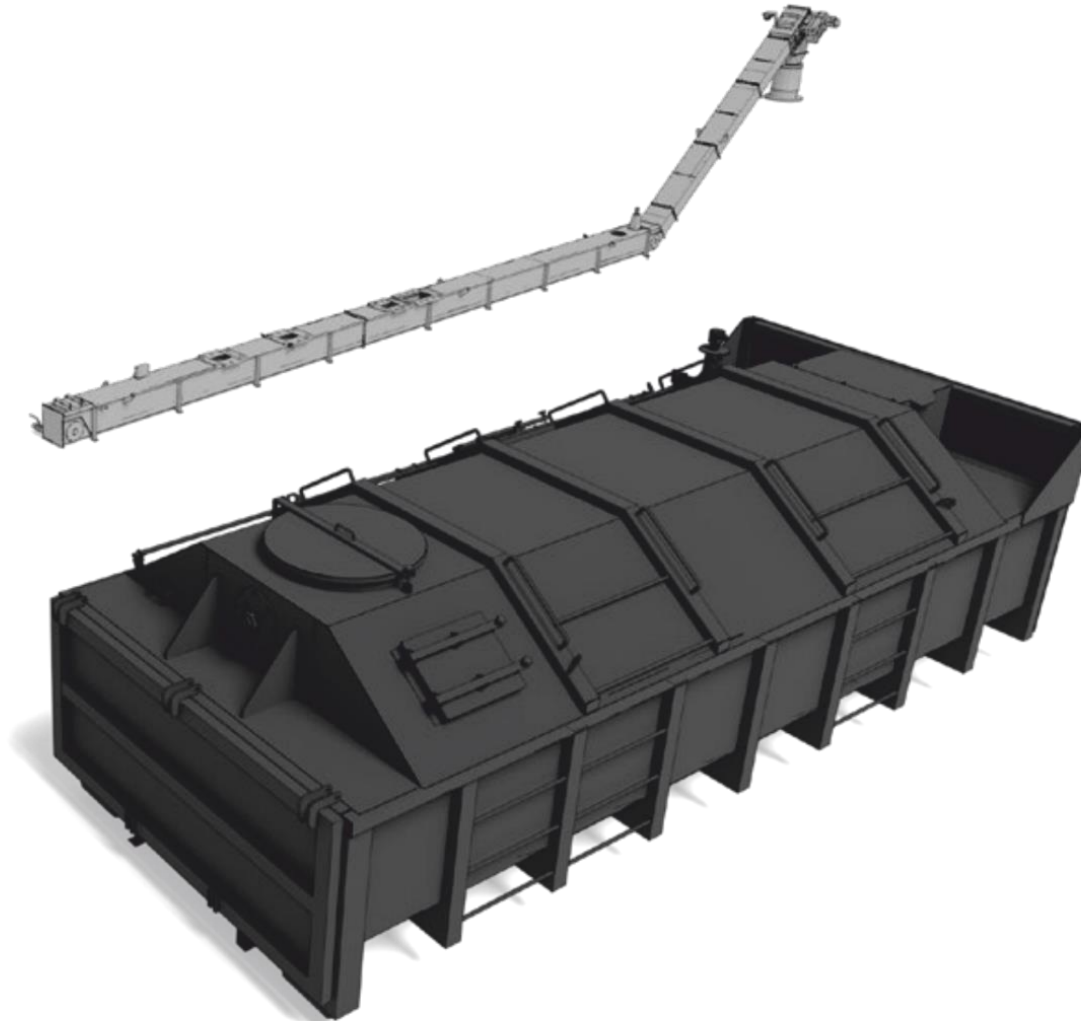
- Flue gas condensing economizer
- Dry-type economizer
- Heat pumps

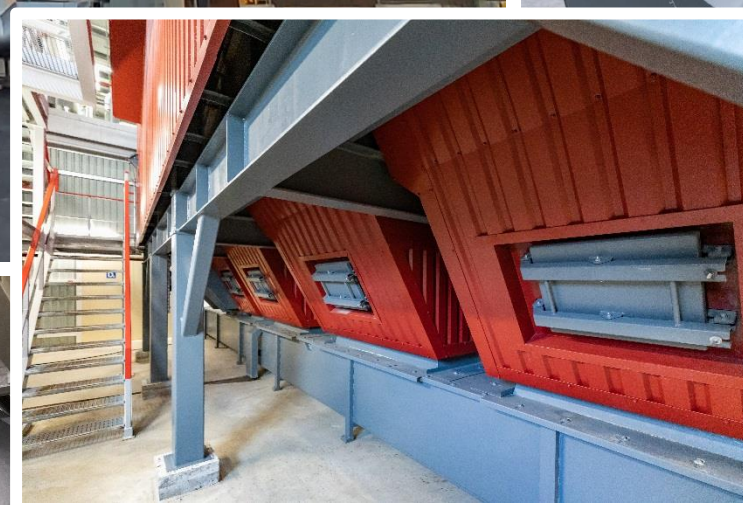




ASH DISPOSAL SYSTEM

- Dry ashes scrapper conveyor
- Wet ashes scrapper conveyor
- Screw transporter for ashes
- Rotary dispenser
- Ash container
- Other ash disposal elements







Get in touch!



info@axt.eu



www.axt.eu



[AXISTech](https://www.linkedin.com/company/AXISTech)

Select the group

- Policy framework
- Biomass supply
- Biomass use

Bored?

=> Change group at any time

Sound

- Microphone muted
- Webcam off

Questions/Comment?

- Use Chat

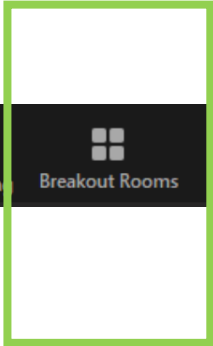
Want to speak?

- Virtually raise hand

GROUP DISCUSSIONS

Instructions

Unmute Start Video Security Participants 3 Polls Chat Share Screen Pause/Stop Recording Breakout Rooms Reactions End



Breakout Rooms - In Progress

- Breakout Room 1 Leave
 - [Participant]
- Breakout Room 2 **Join**
 - [Participant]

Broadcast a message to all Close All Rooms

Small group discussions

WRAP-UP



*Jean-Marc Jossart
Secretary General
Bioenergy Europe*



*Cristina Calderon
M. Intelligence Director
Bioenergy Europe*



*Simon Lavergne
Technical Officer
Bioenergy Europe*

Thank you for your attention!