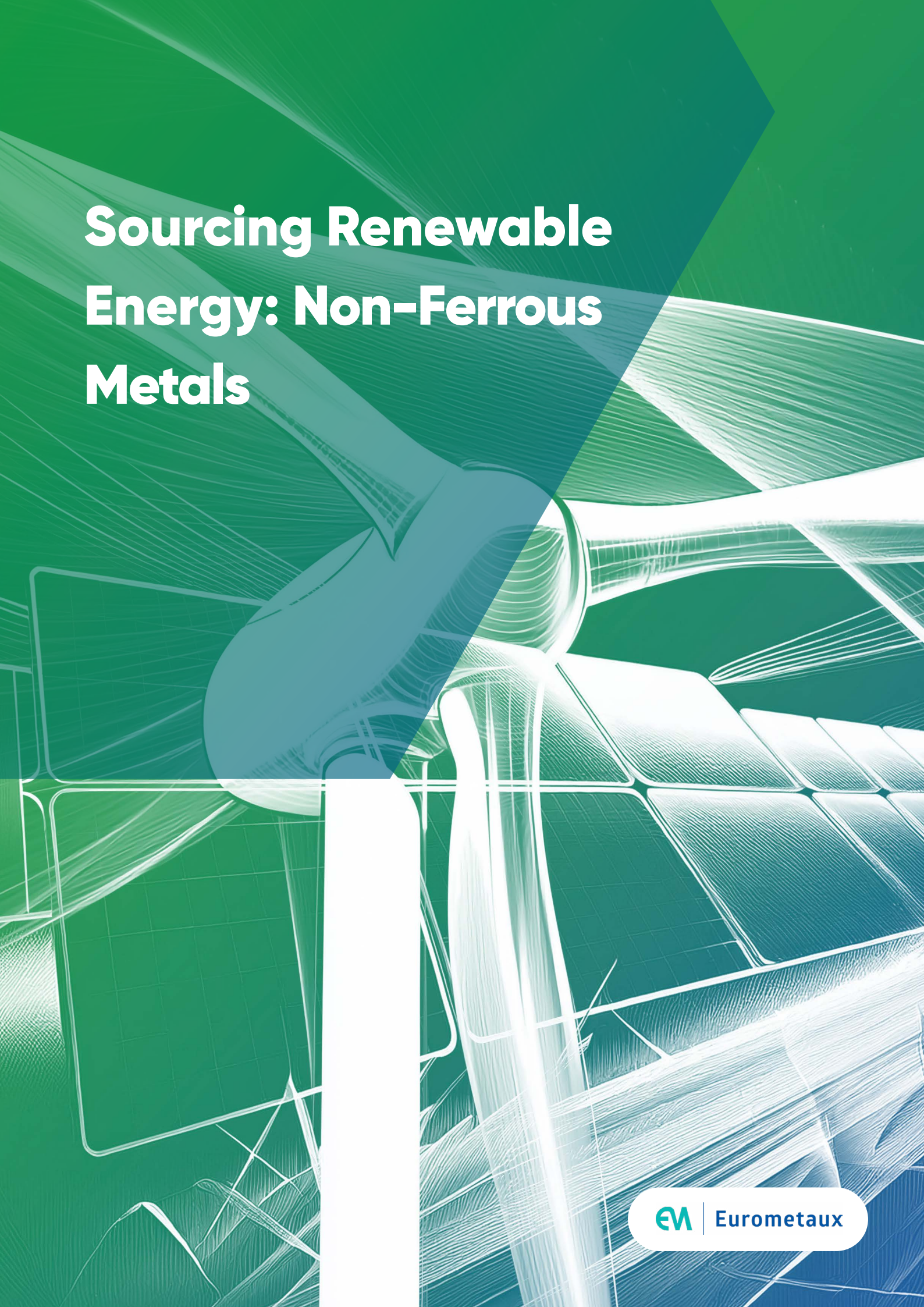
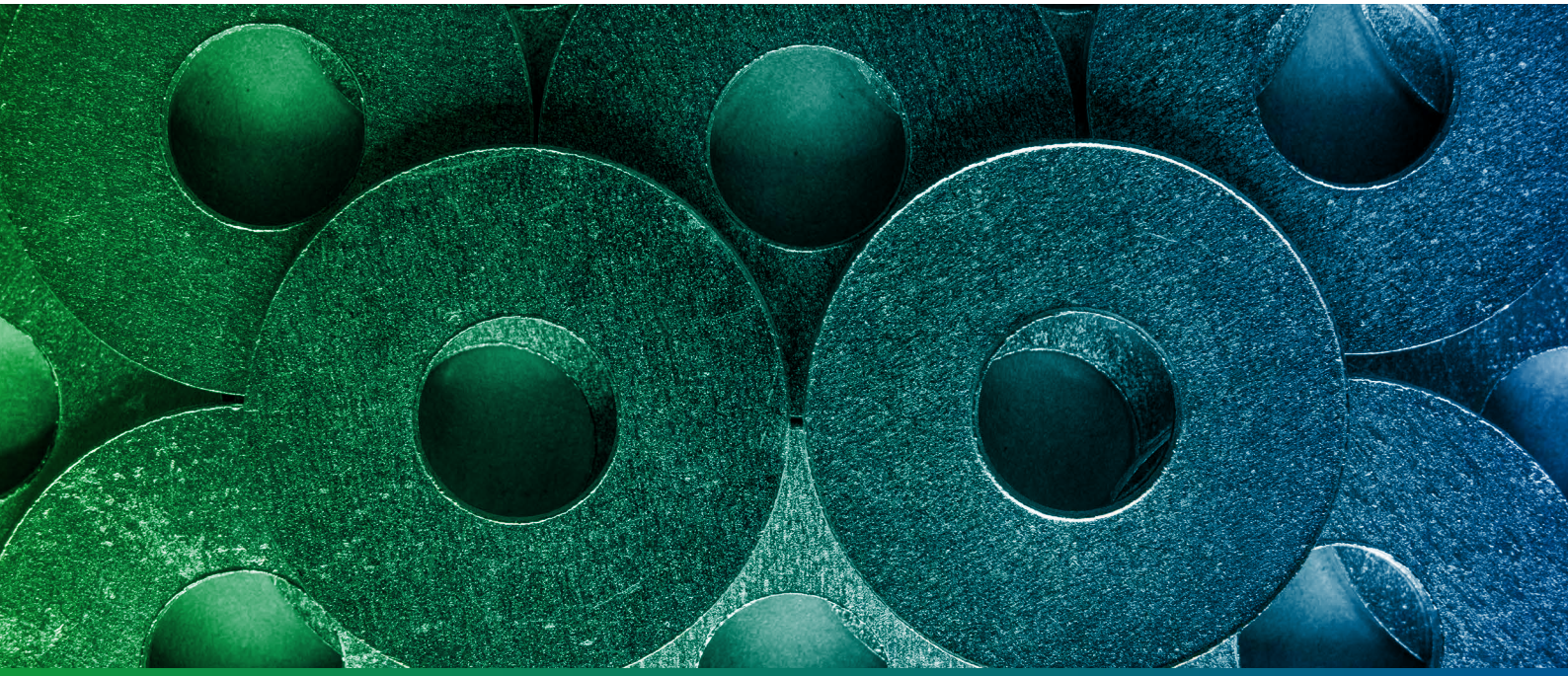
# Sourcing Renewable Energy: Non-Ferrous Metals



Eurometaux

# Sourcing renewable energy: non-ferrous metals

This paper zooms in on the non-ferrous metals sector (NFM): globally-traded commodities producers which are highly electro-intensive and therefore extremely price sensitive to volatility in the energy spot market. What are the benefits of renewable energy procurement, like corporate renewable power purchase agreements (PPAs), and can Europe unlock green energy for NFM?



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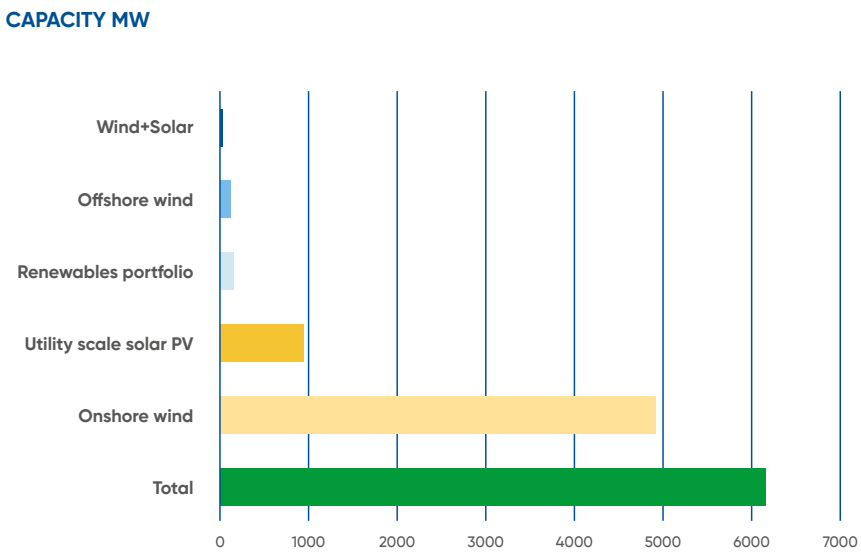
# Energy procurement in non-ferrous metals

All data courtesy of RE-Source Platform. The graphs display data about Eurometaux's non-ferrous metals and mining members.

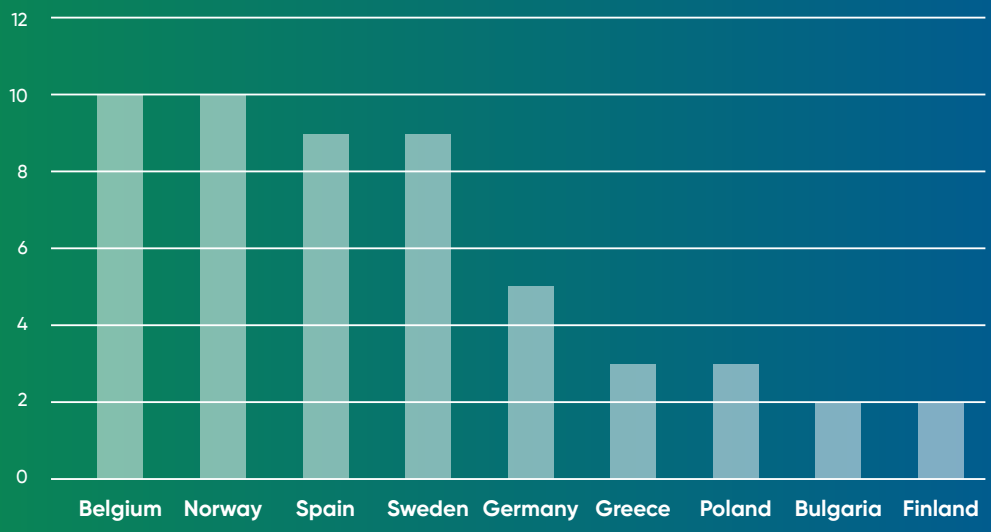
RE-Source's data analysis excludes chemicals producers active in the metals sector. The data covers EU, Norway and the UK from 2014 up to and including H1 2024. The data comes from publicly announced deals. [1]

## PPA capacity MW per technology




[1] RE-Source data is viewable here:

## Number deals per country




**Learn more about NFM and their energy profile, and the current European PPA market data in the Annex FAQ!**

**For comparison, the overall electricity needs of non-ferrous metals = approximately 101 TWh (before the energy crisis)**

CASE STUDY

# Zinc and lead producer in Bulgaria

*"We believe that partnering with Enery is a viable business approach to achieve sustainable and long-lasting effects from the implementation of green solutions. The interaction between responsible energy consumers and competent suppliers and producers of green energy is at the core of achieving the EU's clean energy goals"*

**KCM AD**

**BUYER**
KCM AD, Bulgarian zinc and lead producer

**SELLER**
Enery

**SIGNED IN**
June 2023

**TYPE OF AGREEMENT**
Corporate PPA

**DURATION**
12 years

**SOLAR PLANT LOCATION**
Bulgaria

**COMPANY ANNUAL CONSUMPTION**
400 GWh / year

**ESTIMATED ANNUAL CONTRACTED ELECTRICITY**
40 GWh / year (10% of KCM's annual consumption)

**RENEWABLES %**
30% of total consumption

*Enery solar plant in Bulgaria*

*KCM AD lead and zinc smelting plant in Bulgaria*

CASE STUDY

# Copper refinery in Spain

*"Atlantic Copper has signed three long-term PPA through Fortia Energía, a power purchasing platform for large industrial consumers, of which it is a founding member. These agreements boost the penetration of renewable energy in Spain, whose projects require greater price visibility that they will receive for the energy than that offered by the electricity market forecasts. For Atlantic Copper, the importance of these agreements lies in the fact that the energy to be supplied to the Huelva Metallurgical Complex will come mainly from renewable sources."*

**Atlantic Copper Social Responsibility Report 2020 (source here and press release here).**

**BUYER**
Atlantic Copper (subsidiary of Freeport McMoRan) through Fortia Energía, a power purchasing platform for large industrial consumers, where it is a founding member.

**SELLER**
ENGIE Spain

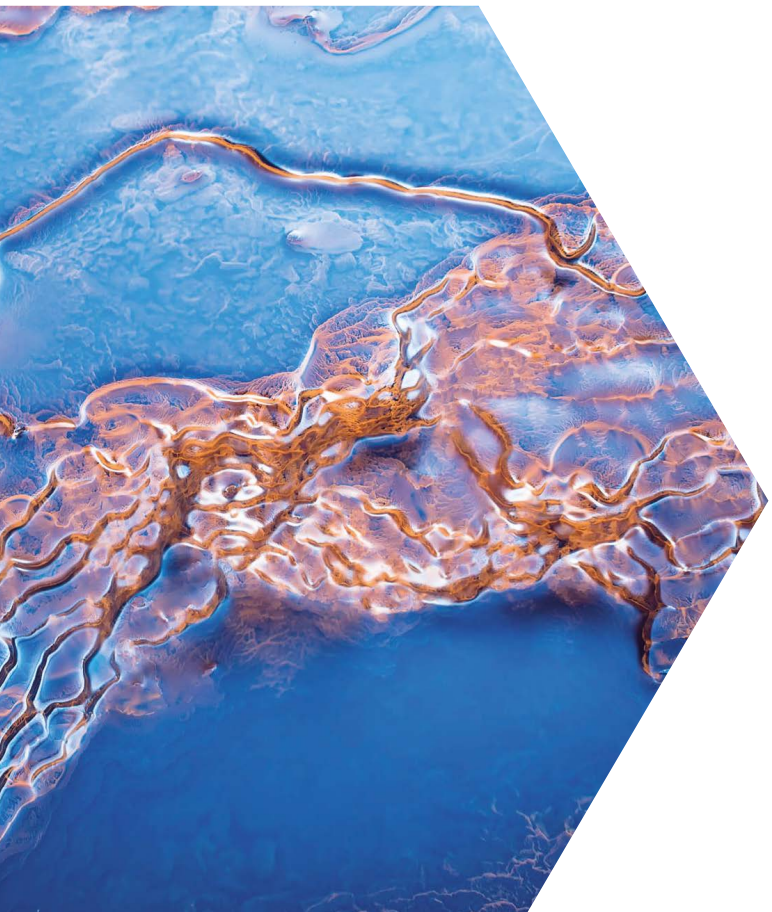
**SIGNED IN**
January 2020

**TYPE OF AGREEMENT**
Multicorporate PPA

**DURATION**
11 years

**PLANT LOCATION**
The energy from Engie's southern European renewables and delivered to the copper refinery in Spain.

**ESTIMATED ANNUAL CONTRACTED ELECTRICITY**
More 400 GWh / year to be supplied to Fortia Energía from a renewables portfolio.

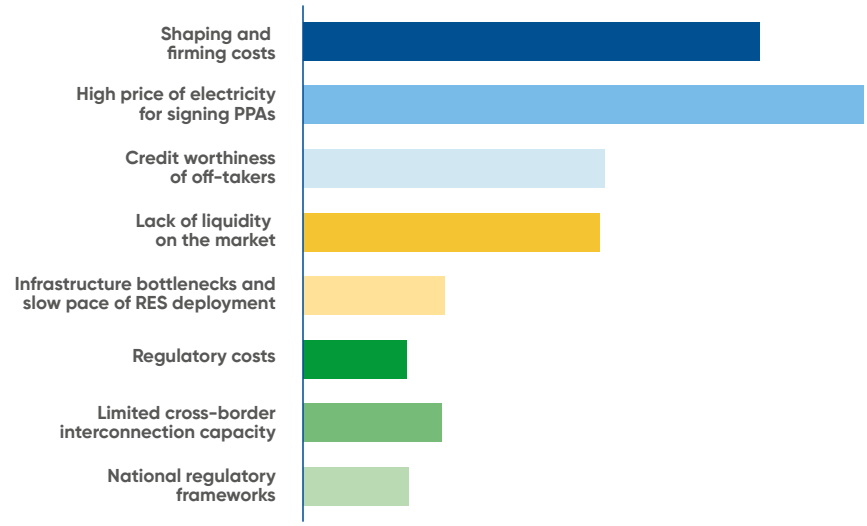


# PPA market barriers

Whilst some NFM corporates are already procuring renewables, a survey carried out amongst Eurometaux's members sheds lights on barriers specific to NFM producers to sign PPAs, some of which had already been identified by the Commission in its 2019 Report. Questions to Eurometaux's members centred on whether they had signed a PPA, and, if so, the model, volume, and type; as well as any challenges they encountered. This section also combines with barriers to opening up the PPA market identified by RE-Source Platform.

## NFM-specific PPA barriers

**MOST CITED BARRIERS AMONG NFM COMPANIES**




## Where & what kind of PPAs?

- Eurometaux members reported wider use of the instrument in Western Europe and the Nordics.
- Physical PPAs are preferred to financial PPAs.
- Reported sources of electricity vary from solar, wind to hydropower, depending on the location and availability of facilities.
- The number of PPAs signed per company varies from none to 9, however the volume of green electricity procured via renewable PPAs only partially covers the plant's demand.

## Most significant barrier: shaping and firming costs

The biggest obstacle for NFM industry and other electro-intensive sectors lies in the shaping and firming costs created by renewable energy's variable generation. The vast majority of PPAs are physical pay-as-produced, meaning that the consumer receives the electricity whenever it is produced, if it is produced and in the quantity that it is produced. This creates challenges for baseload consumers who need stable and high supply of electricity with limited flexibility potential.

Electricity from renewables PPAs can only be consumed after being shaped, and this involves significant additional costs. NFM can either shape it themselves or sign a 'baseload PPA' where the shaping is done by another party. Nonetheless, the cost of shaping will be passed on to the energy buyer either way. In most European markets, this cost is **prohibitive for NFM producers.**

Further, once a pay-as-produced PPA is signed with a long duration, for instance 10 plus years, there is **significant uncertainty on how shaping cost will develop over the PPA's duration.** The situation in the market can change suddenly and the buyer will be locked into a long-term contract where the shaping cost continues to increase.

**Definition**
The shaping cost is the additional cost for consumers induced by transforming the variable renewable generation to a baseload profile, which increases the costs of renewable electricity. (Enervis 2021, p.16)

**Shaping costs are likely to increase over time, as the level of wind and solar penetration increases.** This is something that can already be observed in the European electricity market, where countries with higher renewable shares on their grids, like Germany and Denmark, tend to have higher shaping costs (2). As we add more renewables into the energy system, the price decreases during the hours of high renewables production but is high during the other hours of the day. This increases the shaping cost, since coporates have to sell the excess electricity during the hours of high production - when the market price is low, reducing revenues - and then corporates must buy electricity to cover the shortfalls in RES production, during hours when the market price will be much higher. So you end up selling low and buying high. For industrial consumers who have signed a pay-as-produced PPA, this means selling the surplus renewable electricity during hours of high production at a low price or negative, but then buying the deficit of electricity from the market at a high price during hours of low production. This difference between the selling price and the purchase price of the electricity represents the shaping costs and it is problematic for electro-intensives which are cost-sensitive.

**Definition**

Firming costs (also known as capacity firming or renewable firming) are the other costs caused by the variable nature of renewable generation. For example, the weather changes and a renewable power plant produces more or less electricity than expected, leading to the need to adjust consumer's position in the balancing market (Enervis 2021, p. 16).

[2] Enervis, Green Pool
LINK

[3] See FAQ for more explanations on the European power market organisation.

## Potential solution: Green Pool proposal - Greece

The 'Green Pool' proposal is a scheme to help electro-intensive consumers sign RES PPAs by partly de-risking the shaping exercise.[4]

• PPAs signed by electro-intensives are pooled together by an aggregator (this already reduces the shaping cost). These PPAs will be purely market-based, resulting from the bilateral discussions between the buyer and the seller.

• The aggregator then undertakes the shaping exercise and supplies the consumer with a supply matching the consumer's profile.

• Part of the resulting shaping cost is covered by public funding, whereas the rest is passed on the consumers in a way that reflects the shaping cost that each consumer's profile has created (to maintain the incentive for each consumer to improve their consumption profile).

• To maximise the efficiency of the entire exercise, the aggregator is selected each year by way of a competitive tender. Utilities that would like to undertake the role of aggregator submit a bid reflecting the cost at which they can shape the electricity by trading in the electricity markets over the course of the following year. The lowest bid wins, and this establishes the maximum level of support that can be given (thereby maintaining an incentive for the aggregator to operate as efficiently as possible within the existing electricity markets).

• The Green Pool can add 4 GW of new wind & solar in Greece while enabling energy-intensive industry to decarbonise electricity consumption by signing competitive RES PPAs. The estimated emission savings of Green Pool would be more than 7,5 million tons and would trigger private investments of 4 billion Euro.

[4] Enervis, Study: The Green Pool – A concept for decarbonizing the electro-intensive industry of Greece, LINK

# Barriers to the broader PPA market

## Credit worthiness of energy buyers

- PPAs are long-term agreements up to 15 years typically (or even longer), which therefore includes a significant degree of uncertainty on the contracting parties: default risk or counterparties' insolvency.

## Risk of CfDs draining the PPAs market

- The design of 2-way contracts for difference (CfD) can risk crowding out volumes for PPAs. The design of national CfDs schemes should include a requirement for a certain amount of renewable output to be placed on the PPAs market.

## Lack of clear and unequivocal definition of industrial decarbonisation in state aid rules

- The present state aid provisions (Guidelines on State aid for Climate, Environmental protection and Energy, Temporary Crisis and Transition Framework, Innovation Fund) do not provide specific provisions for regulating aid for reduction of scope 2 emissions. CEEAG does provide aid for supporting production of renewables or biofuels – but it stops short of providing an incentive for consuming decarbonised electricity.

## Knowledge

Access to the PPA market is still driven by corporates with dedicated energy procurement teams or financial resources to hire consulting firms which are specialised in corporate energy sourcing. Many companies have limited knowledge about the benefits of PPAs or how to go about signing one.

## Infrastructure bottlenecks for the renewable energy rollout

Grid availability is an issue.[5] Grids are often saturated, which poses significant problems for signing PPAs with new wind and solar capacity as delivery of contracted electricity becomes uncertain. Some energy buyers have poor grid connection, or face delays in grid connection.
Lengthy permitting processes slow down new renewables projects which has a knock-on effect for the PPA market.

## Price cannibalization

Price cannibalization during hours of renewables generation abundance is a high risk for both electro-intensives and energy producers as excess renewable electricity is sold at low or negative prices. This essentially exacerbates the shaping risk issue analysed above, leading to higher costs for the offtaker.

## Divergences in RES supply across different Member States

The sheer difference in RES availability level in the market can be illustrated by the Nordics having more abundant RES electrificy (including dispatchable hydropower), thus leading to more physical PPAs signed there by NFMs becasue this reduces shaping costs.

## GOs

Guarantees of origin (GOs) certify that a given quantity of electricity is produced from renewable sources. They can either be sold together with the underlying electricity in a "bundled" renewable PPA or traded in separate contracts, without any physical link to the concrete renewable electricity. The GO market is important particularly for the virtual PPA market.
A GO is issued per MWh of electricity produced from renewable sources, but prices vary greatly due to factors such as production technology, location and time of production. Certificates may be traded across most of the European continent, with a few exceptions e.g. due to some countries not being registered to the Association of Issuing Bodies (AIB) that coordinates the European GO system. Administrative burden and long issuing procedures at national level constitute barriers to the use of GOs. With increased granularity of certification and hybridisation of renewables, the importance of improving the system emerges.

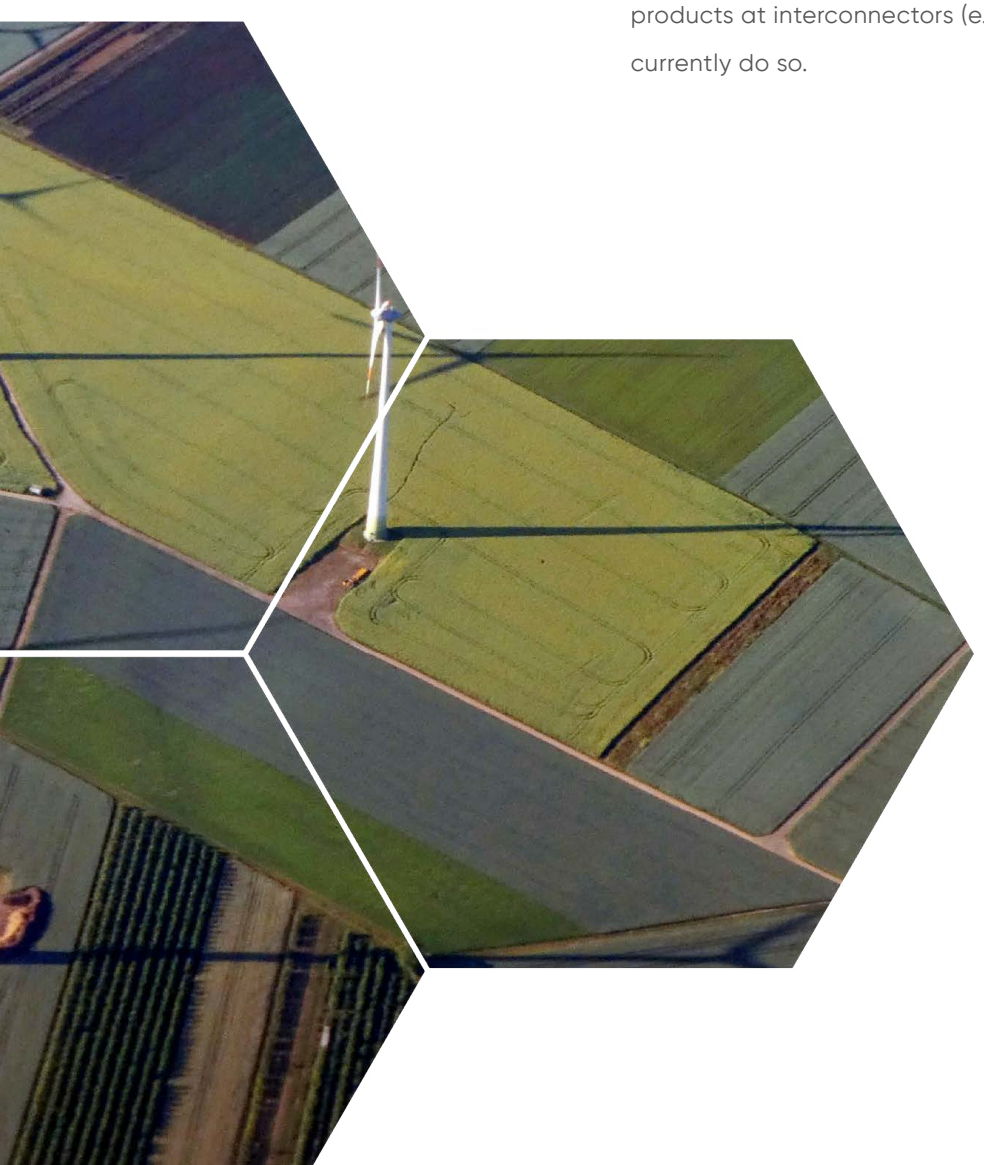
[5] The International Energy Agency's (IEA) recent report on Electricity Grids and Secure Energy Transitions provides that grids are becoming a bottleneck to clean energy transitions with at least 3000 GW of renewable power projects (of which 1500 GW are in advanced stages) are waiting in grid connection queues. This is equivalent to five times the amount of solar PV and wind capacity added in 2022.

## Regulatory costs

Whilst REMIT and EMIR are necessary for market regulation and functioning, reporting obligations are additional costs which are challenging for NFM producers which are highly price sensitive.

## Limited cross-border interconnection capacity

In order to sign a cross-border physical PPA, the equivalent capacity must be booked at the interconnector. However, this is currently impossible to book this capacity for periods longer than one year. Importing electricity is only guaranteed for the first year. Hence, cross-border physical PPAs are currently not possible since they have a longer duration. Corporates need certainty that they will be able to import the electricity and also with regard to the cost of the transmission capacity. Transmission System Operators (TSOs) are already allowed to offer longer term duration products at interconnectors (e.g. 5 or 10 year products) but they do not currently do so.



## Market interventions

Inframarginal revenues price caps implemented in some Member States have been detrimental to PPAs. According to a report from the European Commission[6], the revenue caps introduced during the energy crisis created significant regulatory uncertainty and negatively affected the uptake of PPAs, even making renewable PPAs completely impossible in certain Member States.

## Electrification

At time of writing, Europe's rate of electrification is stuck at 25% of all energy use. Europe's ability to safely and economically continue with the current level of renewable energy deployment will depend on having a constantly increasing electricity demand, and the increased level of renewable energy curtailments we have seen over the previous year is – to a large extent – explained by the decreasing electricity demand (caused by industrial demand destruction). More importantly, such additional electricity demand must be flexible in order to avoid a further disproportionate increase in the need for system reserves, which adds significant energy, capacity and flexibility costs[7].

[6] European Commission, Report from the Commission to the European Parliament and the Council on the review of emergency interventions to address high energy prices in accordance with Council Regulation (EU) 2022/1854, COM(2023) 302 final, 2023. Report

[7] For example, the annual offtake of an average NFM industry e.g. 1,5TWh is tantamount to the annual consumption of roughly 450.000 EVs (or 450.000 electric heat pumps), however, the former is predictable and steady (albeit with limited flexibility) while the latter is rather erratic, necessitating massive fast-ramping (upwards & downwards) capacity. Additionally, in case the demand increase is primarily driven by such dispersed and volatile consumption, this will require a complete redesign and rebuild of the transmission & distribution grids to allow safe operation and frequency maintenance, given that most grids have been designed to accommodate 'pre-transition' household demand.

# Solutions

## Our 6 calls to action for policymakers:

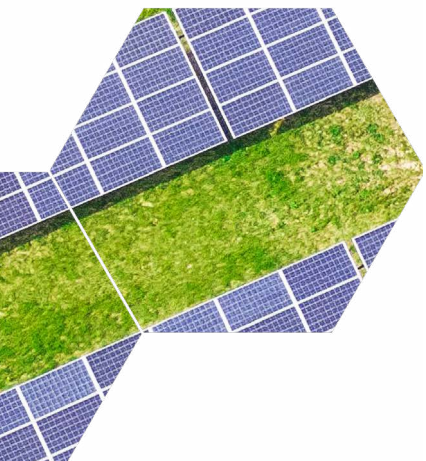
### 1. Unlock PPAs

In implementing the EMD particularly, Member States should:

- Map out and address national-level PPA barriers. The plan to promote PPAs must be in the National Energy and Climate Plans (NECPs).
- Preserve a competitive PPA market via smart auction design and allow for the combination of PPA and CfDs to finance new renewable assets.
- For the purpose of ensuring European industry competitiveness and encouraging consumption of renewable electricity and subsequent deployment, governments may decide that it is necessary to provide industrial energy off-takers with a subsidy for the shaping costs. See Annex 4 on energy pooling.
- Ensure that publicly financed renewable projects reserve part of their capacity for PPAs, and design CfDs to ensure no crowding out effect for the PPA market. This could be utilised to drive corporate PPAs for industrial off-takers.

The Commission should:

- Pay particular attention to the barriers identified in this paper as they monitor Member State implementation, as well as the barriers identified in the European Commission's 2019 report on 'Competitiveness of corporate sourcing of renewable energy' (ENER/C2/2016-501).
- Draw up guidelines to facilitate the homogeneous implementation of the EMD article on PPAs and remove barriers.
- Prioritise renewable PPAs over CfDs in regards to support schemes.



## 2. Mitigate credit risk

Easy-to-access guarantee schemes backed by Member States and commercial banks or the European Investment Bank (EIB) are needed to tackle the cost of risk associated with the credit worthiness of energy intensive industries. Where Member States or EIB bear the credit default risk of off-takers, it improves the financial position of both buyers and sellers, avoids heavy guarantee-requirements from sellers and directly accelerates negotiation process.

Guarantee schemes (either at national or EU level) must be designed appropriately:

- Based on best practices developed in the EIB's Investment Advisory Hub[8] and on the lesson learnt from existing national guarantee schemes (see Annex 3)
- Taking into consideration innovations in the PPA markets (new types of customers, multi-buyer PPAs, integration of storage etc.).

## 3. Remove wind and solar bottlenecks

- Full implementation of the revised EU Electricity Market Design, Renewable Energy Directive, and Grids Action Plan to address permitting and grid issues.
- Facilitating cost-effective investment framework for renewables remains important.

## 4. Keep EU harmonisation

No more patchwork national-level interventions in the electricity markets such as inframarginal revenue caps.

## 5. Invest and manage flexibility resources

- Massively invest in flexibility resources and put in place policies supporting the emergence of dispatchable decarbonised capacities. This will help support electro-intensives which are generally less flexible, due to their baseload consumers profile.
- Energy buyers must be adequately incentivised to offer flexibility services to the electricity grid, for example by designing support schemes remunerating demand-side response (where technically, locationally and commercially feasible).
- The technologies connecting renewables production to intensive consumption profiles, such as storage technologies, are already here, awaiting for political signals to be upscaled to create a better business case.

[8] European Commission, Report from the Commission to the European Parliament and the Council on the review of emergency interventions to address high energy prices in accordance with Council Regulation (EU) 2022/1854, COM(2023) 302 final, 2023. Report

### 6. Guarantees of origin (GOs) for all projects

- When following the power in "bundled" renewable PPAs, GOs are an important tool to provide traceability of renewable electricity. All renewables projects must issue GOs, including small renewables projects.
- All EU Member States must join the Association of Issuing Bodies (AIB) to implement an EU-level standard registration process.
- Running both operation licence and GO registration processes in parallel should be permitted.

## Our 5 calls to action for energy buyers and suppliers:

### 1. Bridge education gap

Utilise all educational tools and events, e.g., via the RE-Source Platform, to bridge the education gap between buyers and suppliers, leading to new partnerships.

### 2. Spread awareness of NFM challenges

- Educate policymakers and industry players of the challenges outlined in this paper.
- Negotiate deals with the NFM-specific barriers in mind and help NFM benefit from the hedging benefits of PPAs.

### 3. Increase flexibility

- Develop the business case for storage, business incentives to invest in storage, scale up the battery industry as it has been done with renewables.
- Via demand-response services, when adequately incentivised while taking into consideration technical, locational and commercial limitations of NFM.
- Ensure flexibility mechanisms are designed and implemented at Member State level, taking into account the specific needs of the system and the actual available flexible resources.

## 4. Innovate deals

- Sign hybrid PPAs or renewables portfolios with wind, solar and storage. Hybrid PPAs maximise the compatibility of wind and solar and provide less variable loads.
- Some corporates may choose to pursue a strategy which prioritises local and hourly matching which can reduce exposure of consumers to volatile electricity prices, provided their consumption profile technically and financially allows it.

## 5. Utilise multi-party energy procurement options:

- Energy pooling and aggregation models: PPAs between a supplier and aggregator, which shoulders the risk and then distributes electricity to a group of industrials; or pooling of energy between a group of buyers are early examples of how the PPA market is innovating. Best practice must be shared to make this an accessible option for NFM companies. See Annex 4 for more information on this model.
- Multi-buyer PPAs: Under a multi-buyer agreement, the PPA meets the group of energy buyers' consumption, and is an efficient use of the produced electricity.
- Multi-seller PPAs: Under a multi-seller agreement, an energy buyer with a large demand can benefit from multiple sellers and sources of electricity to meet its load.

# Annex

ANNEX 1

## FAQ. What is marginal pricing?

The European electricity market has a unique organisation – also known as the "marginal pricing system" – where the cheapest power generators are admitted to the market first and where the most expensive generator (such as gas or coal fired power plants – due to carbon pricing and cost of energy commodity itself) sets the final price. All generators will then align to and receive the latter price. This EU marginal price setting system exposes consumers to the prices of the most expensive power generators.

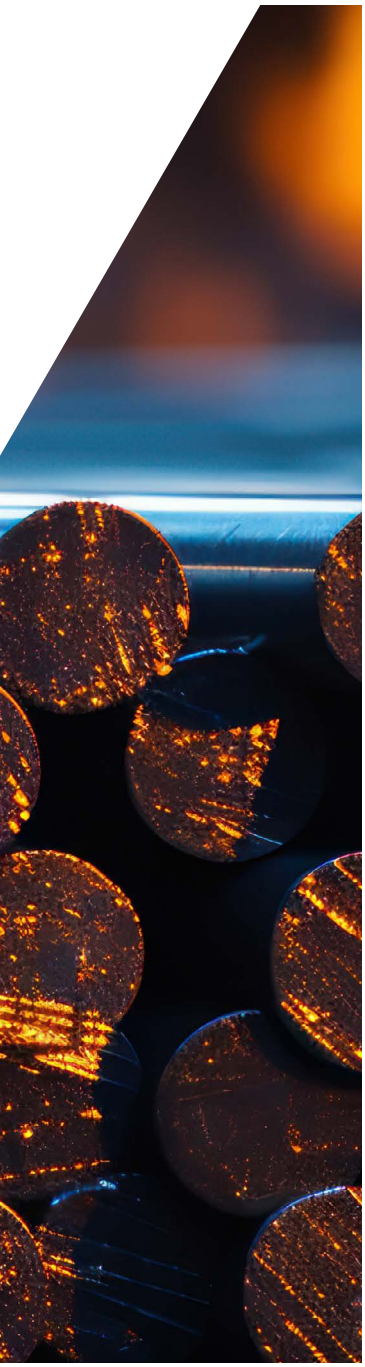
## What is the state of corporate renewable energy sourcing in Europe?

The corporate sourcing market in Europe has taken off over the last few years, particularly via corporate renewable PPAs – direct purchases of electricity between renewable energy developers and corporate energy buyers. Starting in Europe in 2013, the PPA market has grown to a cumulative capacity of 8.7GW, over 10.4 GW of which was contracted in 2023 alone (August 2024 data[9]). However, a lot more needs to be done to meet the NFM electricity demand of around 101 TWh. PPAs serve the purpose of helping corporates decarbonize through mitigating scope 2 emissions; and PPAs are a financing instrument which helps developers fund new wind and solar farms.

## What procurement tool is suited for different buyer profiles?

- **As-generated CPPA:** Buyer gets gross production from site; most competitive for price but riskiest. Recommended for sophisticated buyers.
- **Baseload CPPA:** Most demanded PPA but not all developers can provide it. Good balance for the buyer between cost and risk. Riskier for developers.
- **As consumed CPPA:** Developer matches customer's energy consumption curve. Most common for non-sophisticated buyers. Only developers with a large portfolio can offer this.
- **Multi-buyer PPA:** These can be physical (delivered through the same grid transfer of energy certificates) or virtual (financial agreement + energy certificates). This can be a fixed price or fixed pricing structure.
- **Alternative to a CPPA:** Many corporates will not want (risk appetite) or be able to sign a 5-20 year PPA. In this case:
  - Renewables self-generation onsite
  - Bundled or unbundled energy certificates
  - Passive procurement: take from grid if local mix is highly decarbonised

[9] RE-Source PPA deal tracker.



ANNEX 2

# Energy profile of non-ferrous metals industry

The EU non-ferrous metals industry (NFM) covers the whole value chains of metals across Europe, from extraction to manufacturing and recycling (900+ facilities). NFM includes aluminium, copper, silicon, zinc, lithium, cobalt, nickel and many more.

## Highly electro-intensive and baseload energy consumers

European producers of NFM are highly electrified, with electricity costs representing up to 40% of their total production costs.[10] NFM producers are extremely sensitive to electricity prices and surges in electricity prices bear detrimental effects on the industry. For example, 50% of EU aluminium, zinc and silicon capacity was forced offline in 2022 due to continuous soaring prices (a situation that started in autumn 2021 and peaked in summer 2022) and have been unable to restart production since. This is because electricity prices in Europe as of mid-2024 are still two times higher than historical levels. Taking the decision to reopen requires competitive electricity prices, including all costs that are included in procuring electricity, sufficient volumes of electricity secured over a longer period of time. Reopening also entails costs to cover the damages to the installation and the technical requirements – depending on the volume of the closed capacity it can be millions of euros – so a business case for the reopening needs to be there to convince shareholders to approve the spending of millions. Beyond this, there needs to be a market for the reopened volumes – namely the metals prices global quotations to be high enough to ensure the business case.Some aluminium smelters announced complete closures in Germany[11] and Slovenia[12] in late 2022.

Most NFM producers are identified as 'baseload consumers', which means that these sectors in general have a stable consumption of electricity with limited flexibility potential, depending on the technology. Zinc smelters have a higher degree of flexibility, being able to curtail/shut down and reopen more easily and adapt their consumption profile to daytime or nighttime operation.

[10] Commission, Report on energy prices and costs in Europe COM(2024) 136 final: More specifically, electricity covers 34% of production costs for primary aluminium, 22% of production costs for zinc and 38% of production costs for ferro-alloys silicon.

[11] Mining Technology, *Germany's Speira to close aluminium smelting at Rheinwerk plant*, 2023.

[12] Hydro, *Slovalco will stop primary aluminium production*, 2022.

## ‘Price-taker’ nature

NFMs are globally traded commodities: metals’ prices are set at global level on commodity exchanges like the London Metals Exchange. Because metals producers have no control over their products’ sale price, they are ‘price-takers’, which means that they are unable to pass-on additional local costs (such as high electricity prices in Europe or EU ETS costs) to their customers without being at disadvantage against competitors in other areas of the world and losing their market share.

## Key enablers of the green and digital transition

The global energy and digital transitions are metal-intensive. NFMs such as aluminium, copper, lithium, nickel, zinc or silicon, etc, are required for the production of solar panels, wind turbines, electric vehicles, batteries, electricity and data transmission cables, energy efficiency applications for buildings (see table below). This non-exhaustive list of technologies and applications that are necessary to achieve the twin transition demonstrates the role of metals. Subsequently, a thriving EU NFM industry has a positive impact on achieving carbon emission reductions as these metal production volumes replace imports with a higher carbon footprint.

## Metals used for the energy transition technologies

| | Renewable technology | Electricity networks | Battery storage | Electric vehicles | Hydrogen | Demand increase: 2050 v 2020 |
|---|---|---|---|---|---|---|
| **Aluminium** | ✓ | ✓ | ✓ | ✓ | ✓ | **+ 33%** |
| **Copper** | ✓ | ✓ | ✓ | ✓ | ✓ | **+ 35%** |
| **Zinc** | ✓ | ✓ | | ✓ | ✓ | **+ 11%** |
| **Silicon** | ✓ | | | ✓ | | **+ 46%** |
| **Lithium** | | | ✓ | ✓ | | **+ 3.535%** |
| **Nickel** | ✓ | | ✓ | ✓ | ✓ | **+ 103%** |
| **Cobalt** | ✓ | | ✓ | ✓ | | **+ 331%** |

See KU Leuven (2021) ‘Metals for Clean Energy: Pathways to solving Europe’s raw materials challenge’ here.

ANNEX 3

# Guarantee schemes explained

As identified, energy buyer bankability, or credit risk, is a major barrier to the PPA market. Guarantee schemes have been identified in the electricity market design (EMD) reform as a solution. Some Member States have put in place guarantee schemes to de-risk PPAs, but the positive impact of these tools still remains to be determined. Under the EMD reform, Member States must ensure that such schemes are in place.

## France

In 2023, France launched a guarantee scheme aimed at covering corporate PPA offtakers default risk, with total scheme budget designed for up to 500 MW of renewables projects ('Garantie Electricité Renouvelable').[13]

- The guarantee covers 80% of the producer's expected remuneration if the buyer defaults before the end of the contract, for example due to bankruptcy.
- The scheme applies to physical renewable PPAs for a minimum guaranteed volume of 10 GWh per year and with a duration of at least 10 years, signed in metropolitan France between a renewable producer and an industrial firm.
- The output must come from newly built or repowered solar and onshore wind plants.
- So far, the guarantee scheme has been granted to one agri-food company (Bonduelle) in October 2023 , and one graphite fibre products maker (Tokai Cobex), in March 2024.[14]

## Norway

The Norwegian guarantee scheme, put in place by the government agency called 'EksFin' (Export Financing), was established in 2011.

- This guarantee is pledged to the power seller, guaranteeing the payments from the buyer. It enables the seller (or energy producer) to de-risk cash flows and enter into PPAs with companies considered too risky. The scheme is applicable to metals, chemicals and wood processing.
- The price of the guarantee is roughly in line with the price from commercial banks in order to comply with state aid rules. The main advantage of the EksFin guarantee is to provide a guarantee with a much longer duration than commercial banks are willing to do.

[13] Ministère de l'économie, des finances et de la souveraineté industrielle et numérique, *Mise en œuvre d'un fonds garantissant les contrats d'approvisionnement de long terme pour des industriels lorsqu'ils sont adossés à des installations renouvelables*, 2022.

[14] BPI France, *Signature du 1er contrat de garantie relatif à l'approvisionnement en électricité de long terme pour des industriels lorsqu'ils sont adossés à des installations renouvelables*, 2023.

- However, this government guarantee scheme is not always useful since power companies can accept the counterparty risk without guarantees. As most Norwegian power producers are state-owned (leading to a higher risk appetite), they do not require a guarantee from the buyer of the power. Also Norwegian industrial energy buyers have a good credit rating.
- The EksFin guarantee scheme has only been used only 5 times, and only when the seller of the power is a wind farm (often owned by consortia with partially foreign owners and dependent on project financing by banks).

## Spain

In 2021, Spanish State established the 'Reserve Fund to Guarantee Large Electricity Consumers' (FERGEI). Energy suppliers often require hedges as a condition for the conclusion of PPAs but guarantees for contracts beyond three to five years were not currently available on the Spanish market according to the Spanish authorities. Therefore, the FERGEI was designed to offer State guarantees to PPA going beyond five years.

- The scheme was approved by the Commission in January 2021,[15] with a budget of up to 600 million EUR for the first three years.[16]
- FERGEI guarantees may be provided in one of the following forms:
  - Guarantee policy covering up to 80% of the non-payment risk in favour of a financial entity that is bearing such risk,

    or

  - Guarantee policy covering up to 80% of the non-payment risk, directly to the power seller or intermediary that is bearing such risk.
- The Spanish Export Credit Agency "CESCE" was appointed to manage the FERGEI.
- The scheme was used only once, supporting a 12-year PPA signed in 2023 between a producer of long steel products and PV producer.

[15] European Commission, State aid: *Commission approves support scheme for energy-intensive companies in Spain*, 2021.

[16] European Commission, *State Aid SA.54558 (2020/N) – Spain Compensation for EIUs for the cost of financing of renewables, CHP and non-peninsular territories in Spain, C(2021) 12 final*, 2021.

ANNEX 4

# Energy Pooling explained

- Energy pooling is a new innovation in procurement where buyers group together to share risk or to and bring together complementary profiles. Pooling can involve all sizes of consumers, but realistically, it can deliver results when involving large consumers that have the knowledge and administrative capacity to carry out an such innovative and complex task.

- See the example where Acciona signed an agreement to supply 1 TWh/yr to Fortia. Under this arrangement, the power will be taken by Fortia Energia, an independent power producer that services industrial consumers in Spain and Portugal. Here Fortia is an aggregator and balances the energy between the industrial customers.

- PPAs involve numerous costs, including the procured electricity (EUR/MWh) for the duration of the agreement, the GOs (usually included in the price of the PPA), sleeving costs, shaping and firming costs, supply costs (grid fees, network losses, taxes), and lawyer and consultant fees. These costs may not be realistic for every type of buyer.

- When signing a pay-as-produced PPA, electro-intensive industries, like NFM, need to pay shaping costs, which in many Member States can be high, in order to meet their baseload energy demand. These additional costs increase the final cost paid by NFM to consume renewable electricity..

- Many electro-intensive industries are exposed to global competition, therefore a globally-competitive electricity price becomes crucial. Governments may decide that it is necessary to provide industrial energy off-takers with a subsidy for these shaping costs to ensure European industry competitiveness. If this is deemed necessary, it is important to include provisions in the design of these subsidies to ensure that shaping electricity[17] is 100% renewable; against disincentivising industrial off-taker flexibility; and preserving responses to electricity price fluctuations.

[17] Shaping electricity in a PPA includes the following: (a) extra (=excess) power output sold to the grid during hours when renewables output is higher than offtake & (b) extra (=deficit) power purchased from the grid during hours when renewables output is lower than offtake; shaping power within a renewable PPA is the sum of this exercise.

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