10th Working Group Consumer Centric Market Design

Elia – 18th March 2024

Wifi Access

The Hotel – Guest-Wifi

Agenda

- **DiMaX** & incentive faster settlement for BRPs
- **Real-Time Price** - feedback of the public consultation
- **Sustainability Solutions** - overview
- **AOB**

DiMaX & incentive faster settlement for BRPs

Agenda

1. Research questions & scope of the analysis
2. Methodology & historical data analysis
3. Conclusions

1. Research questions & scope of the analysis

Research questions in scope of deliverable 2

An analysis of the historical financial risks, as a consequence of the current way of handling BRP invoices, such as:

- An analysis of the **historical risks of a guarantee which is too low**, being the risk for Elia (and consequently society) that the guarantee of a BRP was insufficient at any moment in time to cover the invoices should the BRP have had payment problems
- An analysis of the **historical risks of a guarantee which is too high**, being the risk for the BRP (and consequently society) that the guarantee of a BRP had remained too high, due to contractual obligations, than was required to cover the invoices should the BRP have had payment problems

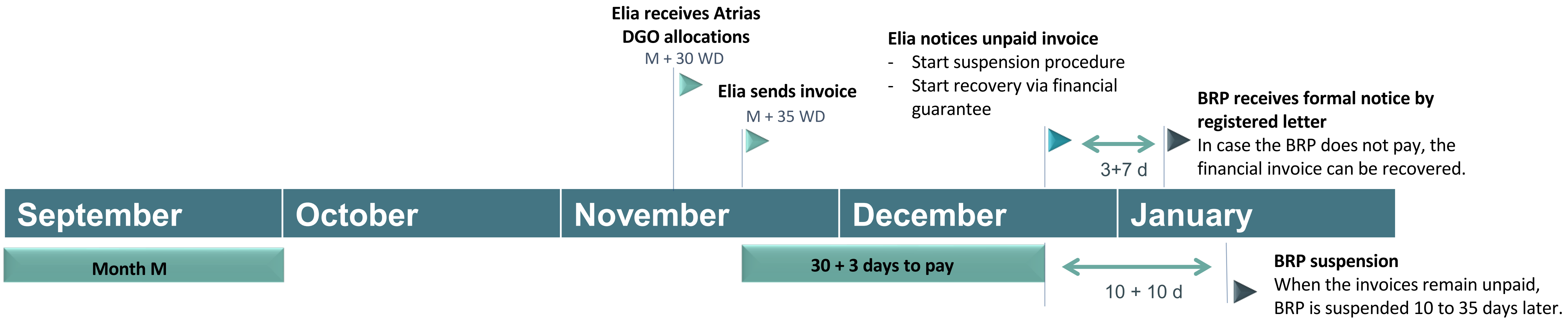
Scope of the analysis – input parameters

The scope was defined as follows:

- The **period in scope is 2021 until 2023 included**. 2022 represents a year of increased risk due to the energy crisis.
- Elia considers all **BRPs that were active** at any point in time during the period in scope.
- The requested financial guarantee amount of the BRPs is calculated according to the **T&C BRP currently in force (11/2021).**

Scope of the analysis – timing

- Invoices and guarantees are determined on a monthly level. Payment and recovery of the guarantee are contractually defined.
- A guarantee issued during a month > valid first of the month
- 5 months between a BRP becoming insolvent at the beginning of month M, and Elia being able to recover the financial guarantee
- Guarantee month M + 3 is used.



2. Methodology & historical analysis

Methodology – financial guarantees

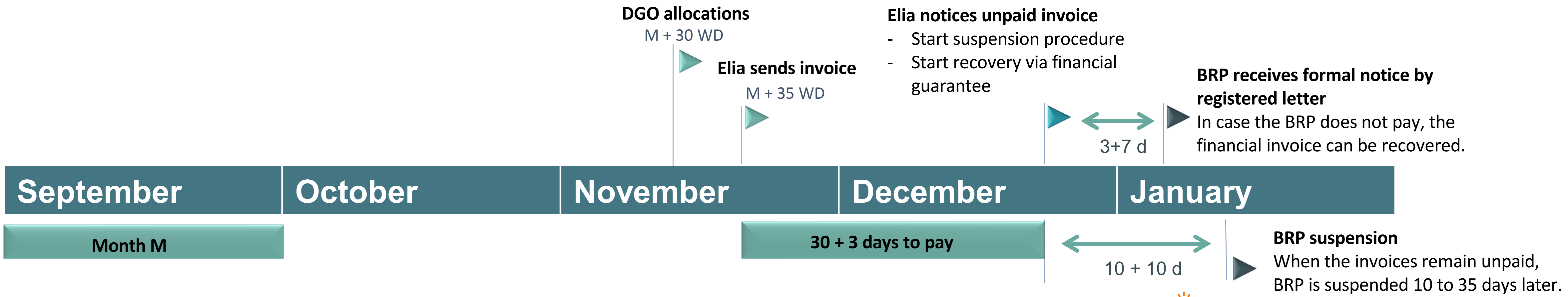
- **The financial guarantees serve as a surety for Elia and society as a whole.** In case of BRP insolvency, outstanding invoice amounts can be covered.
- **The financial guarantee is defined in the T&C BRP**, and consists of 2 formulas. The BRP guarantee is determined at the highest value of both formulas:
    1. $financial\ guarantee = 31\ days\ x\ 24h\ x\ 5\%\ x\ 50\frac{EUR}{MWh}\ x\ MaxBRPPosition$
    2. The highest invoice of the past 12 months

Positie van [BRP] (BRP-P)	Waarde variabele waarborg
BRP-P ≤ 50 MW	€ 93.000
50 MW < BRP-P ≤ 100 MW	€ 186.000
100 MW < BRP-P ≤ 200 MW	€ 372.000
200 MW < BRP-P ≤ 300 MW	€ 558.000
300 MW < BRP-P ≤ 450 MW	€ 837.000
450 MW < BRP-P ≤ 600 MW	€ 1.116.000
600 MW < BRP-P ≤ 750 MW	€ 1.395.000
750 MW < BRP-P ≤ 900 MW	€ 1.674.000
900 MW < BRP-P ≤ 1050 MW	€ 1.953.000
1050 MW < BRP-P ≤ 1200 MW	€ 2.232.000
1200 MW < BRP-P ≤ 1500 MW	€ 2.790.000
BRP-P > 1500 MW	€ 3.000.000

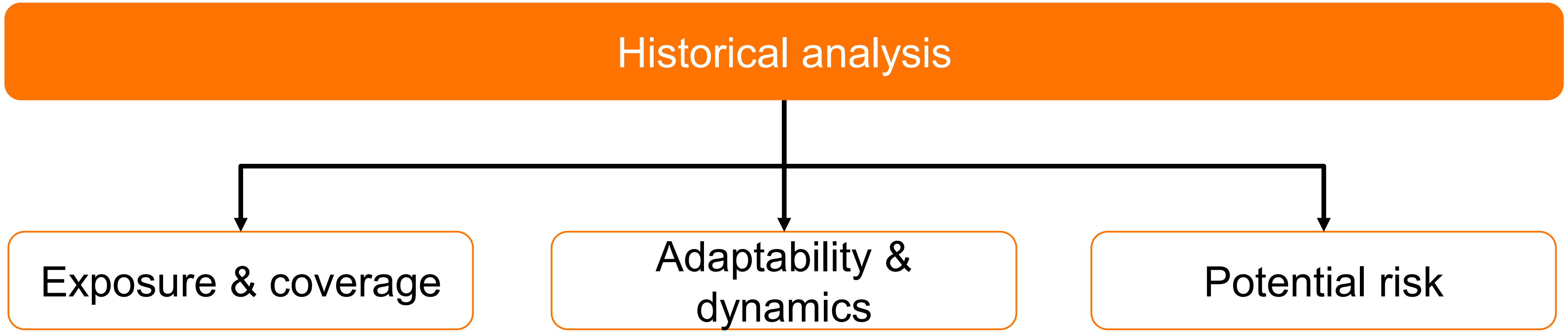
Methodology – exposure, coverage & overcoverage

The following concepts were defined:

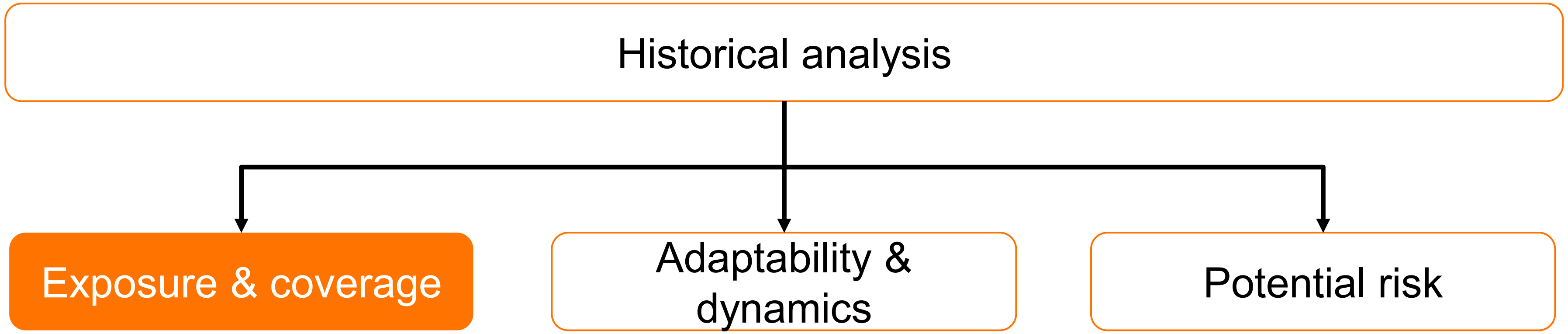
Exposure	Sum of invoices M-3, M-2, M-1, M, M+1
Coverage	Part of the exposure that is covered by financial guarantee.
Overcoverage	Remaining bank guarantee after coverage = difference between the bank guarantee and the coverage.



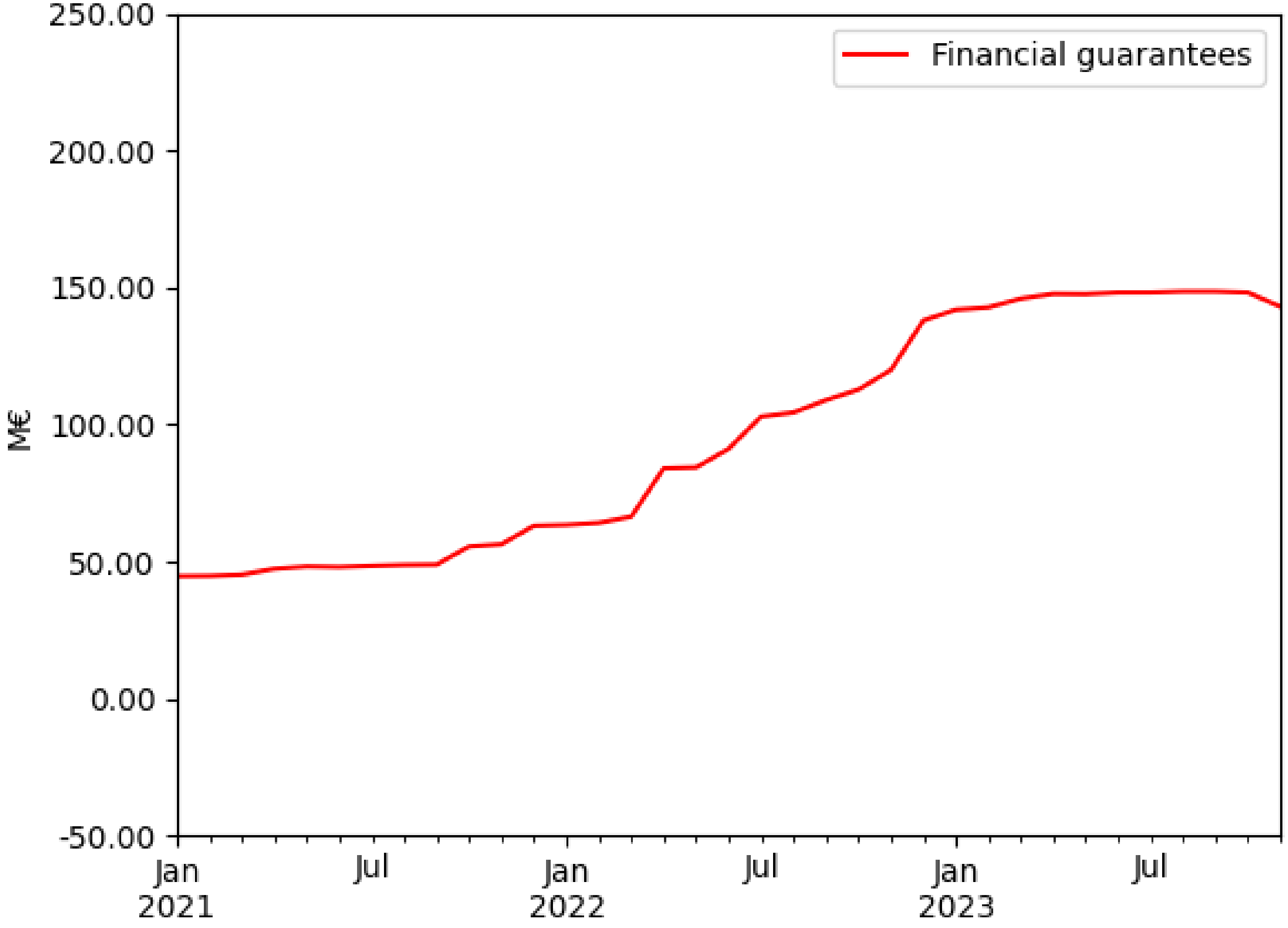
The analysis investigates 3 elements of the risk on the guarantees being too high or too low



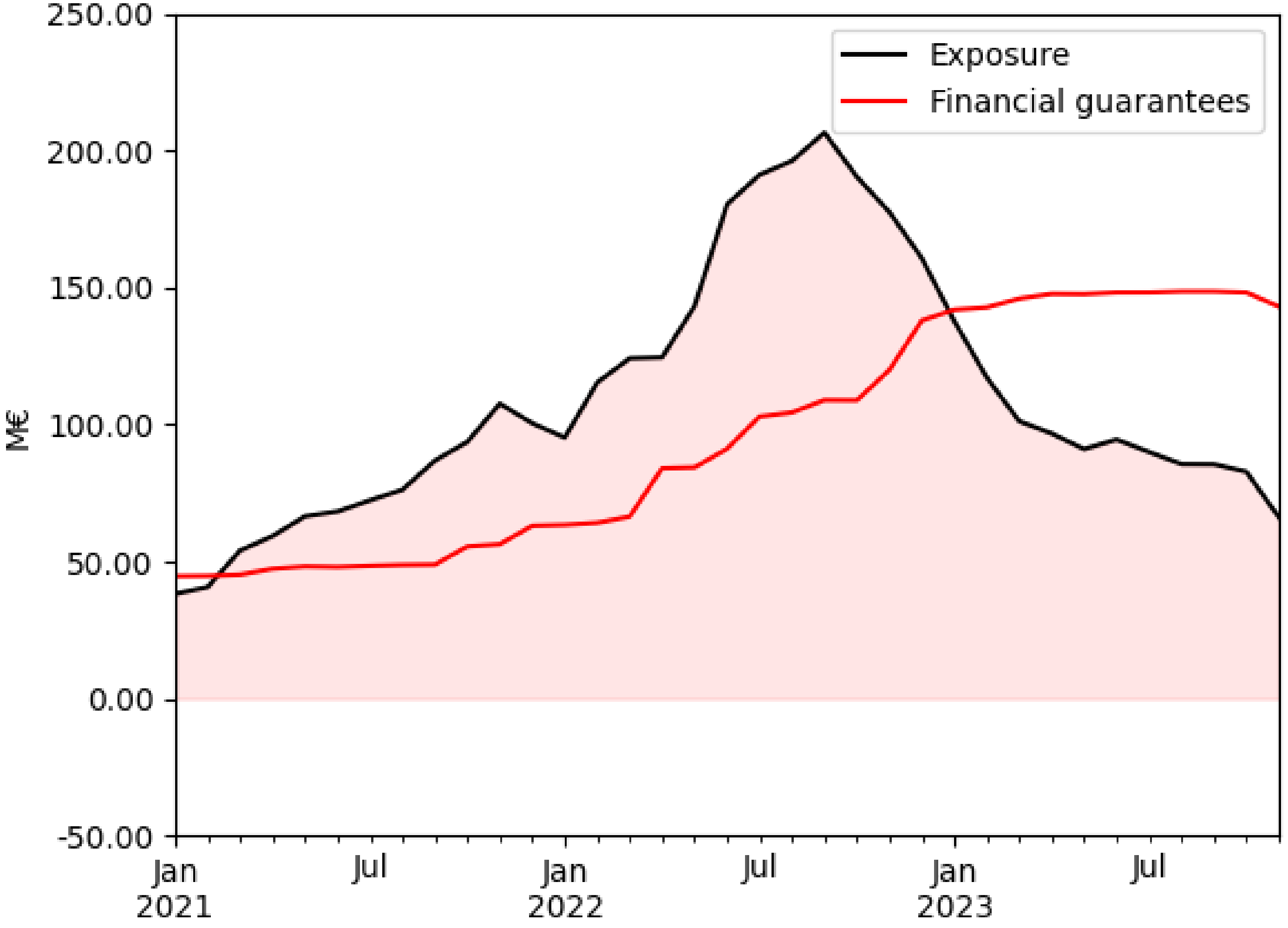
Exposure & coverage



Financial guarantees of all BRPs 2021 – 2023

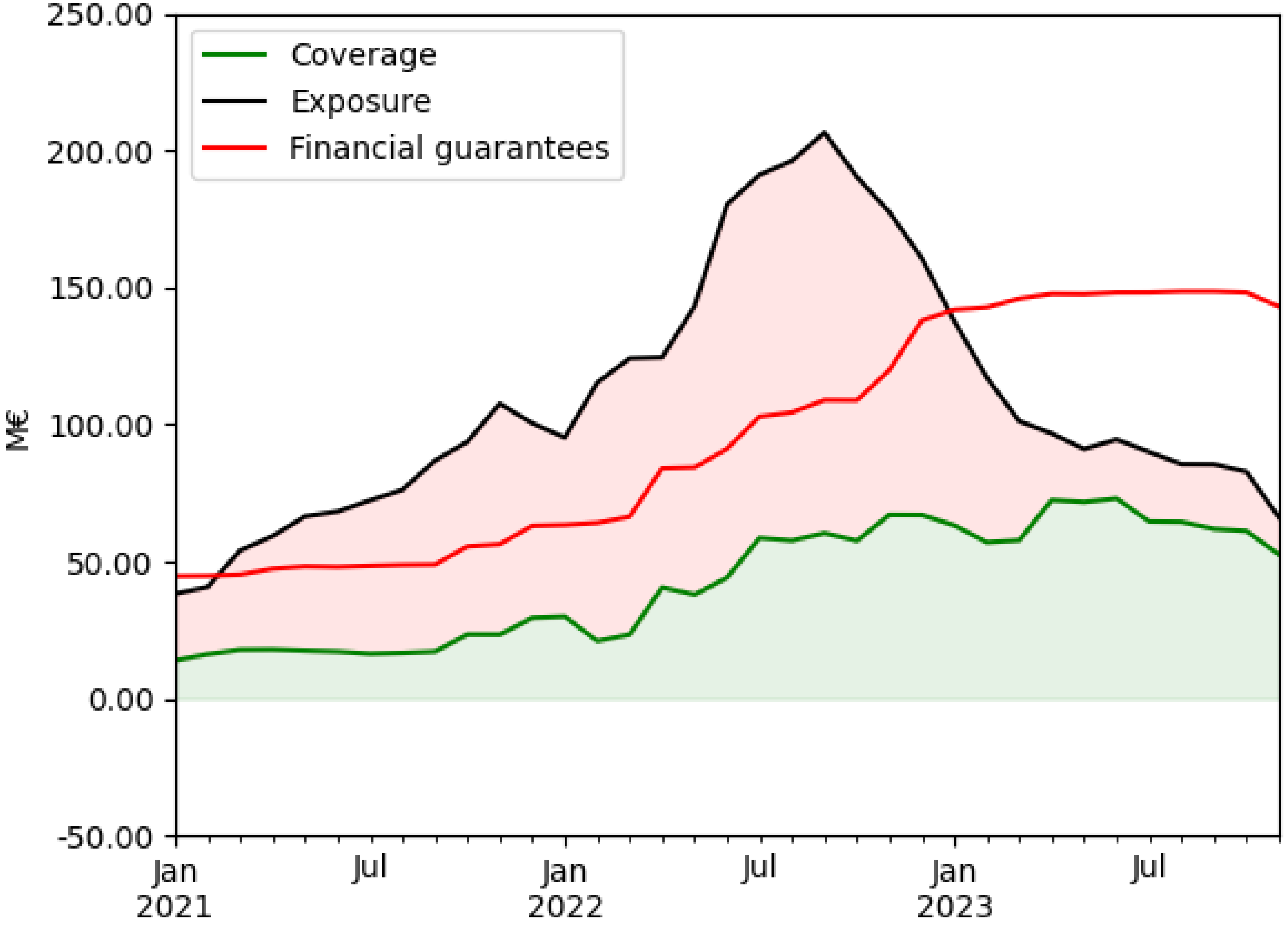


Exposure of all BRPs 2021 – 2023



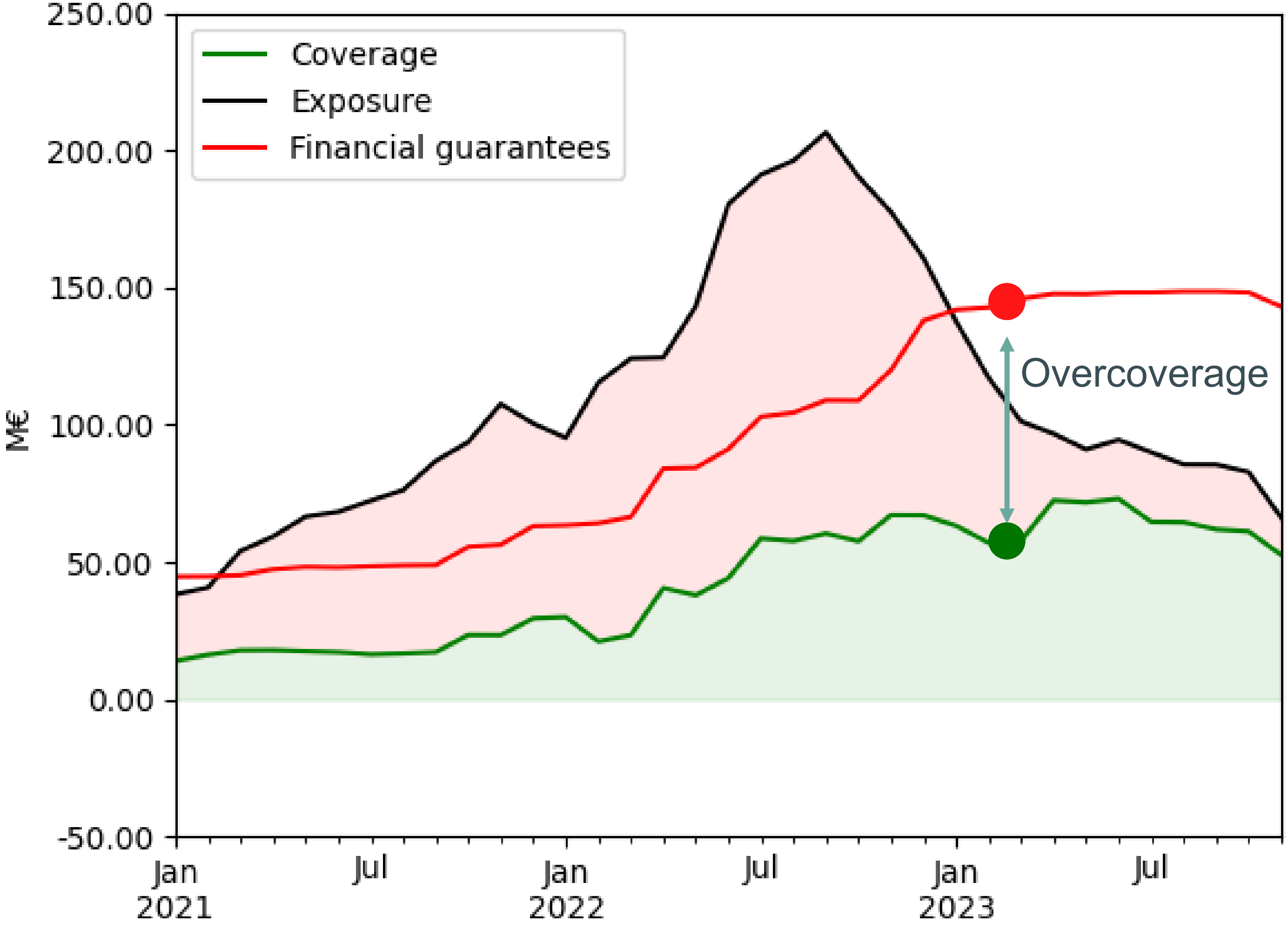
Coverage of all BRPs 2021 – 2023

Exposure	Sum of invoices M-3, M-2, M-1, M, M+1	
Coverage	Coverage of exposure by financial guarantee	39%
Overcoverage	Financial guarantee in excess of exposure	

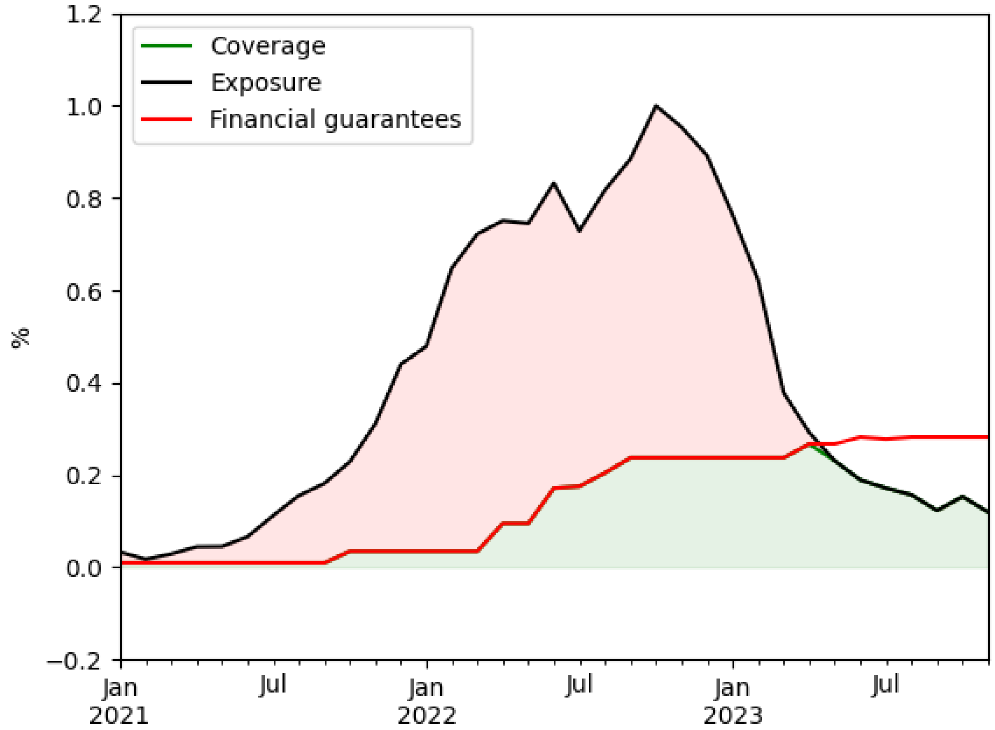


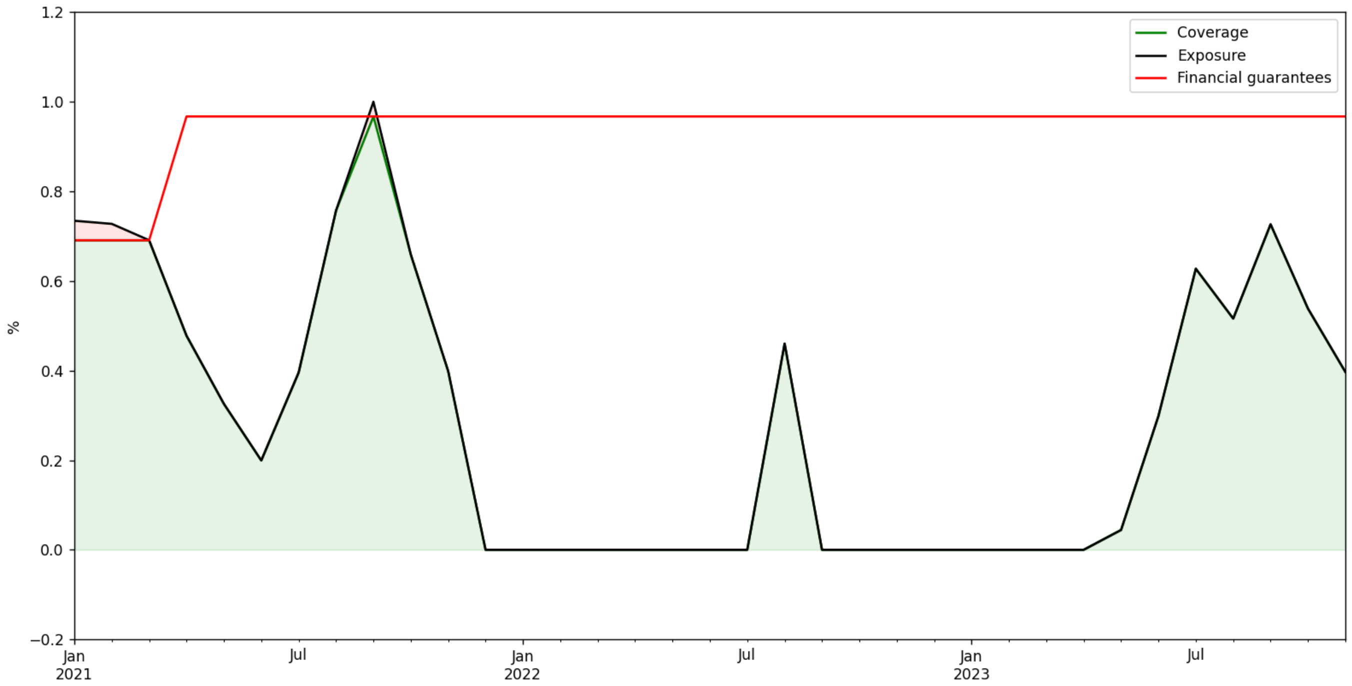
Overcoverage of all BRPs 2021 – 2023

Exposure	Sum of invoices M-3, M-2, M-1, M, M+1	
Coverage	Coverage of exposure by financial guarantee	39%
Overcoverage	Financial guarantee in excess of exposure	55%



Examples of individual BRPs – exposure & coverage





Exposure	Sum of invoices M-3, M-2, M-1, M, M+1	
Coverage	Coverage of exposure by financial guarantee	29%
Overcoverage	Financial guarantee in excess of exposure	17%

Exposure	Sum of invoices M-3, M-2, M-1, M, M+1	
Coverage	Coverage of exposure by financial guarantee	99%
Overcoverage	Financial guarantee in excess of exposure	70%

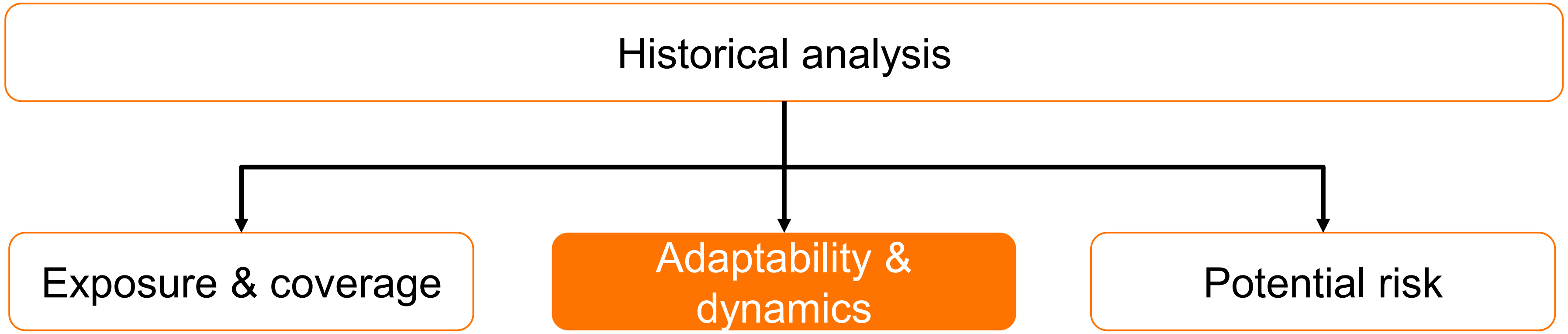
Key observations – exposure & coverage

- Large exposure due to contractual invoice lead time
- Laging effect – 2 months to receive invoice
- Difference in exposure and coverage between BRPs

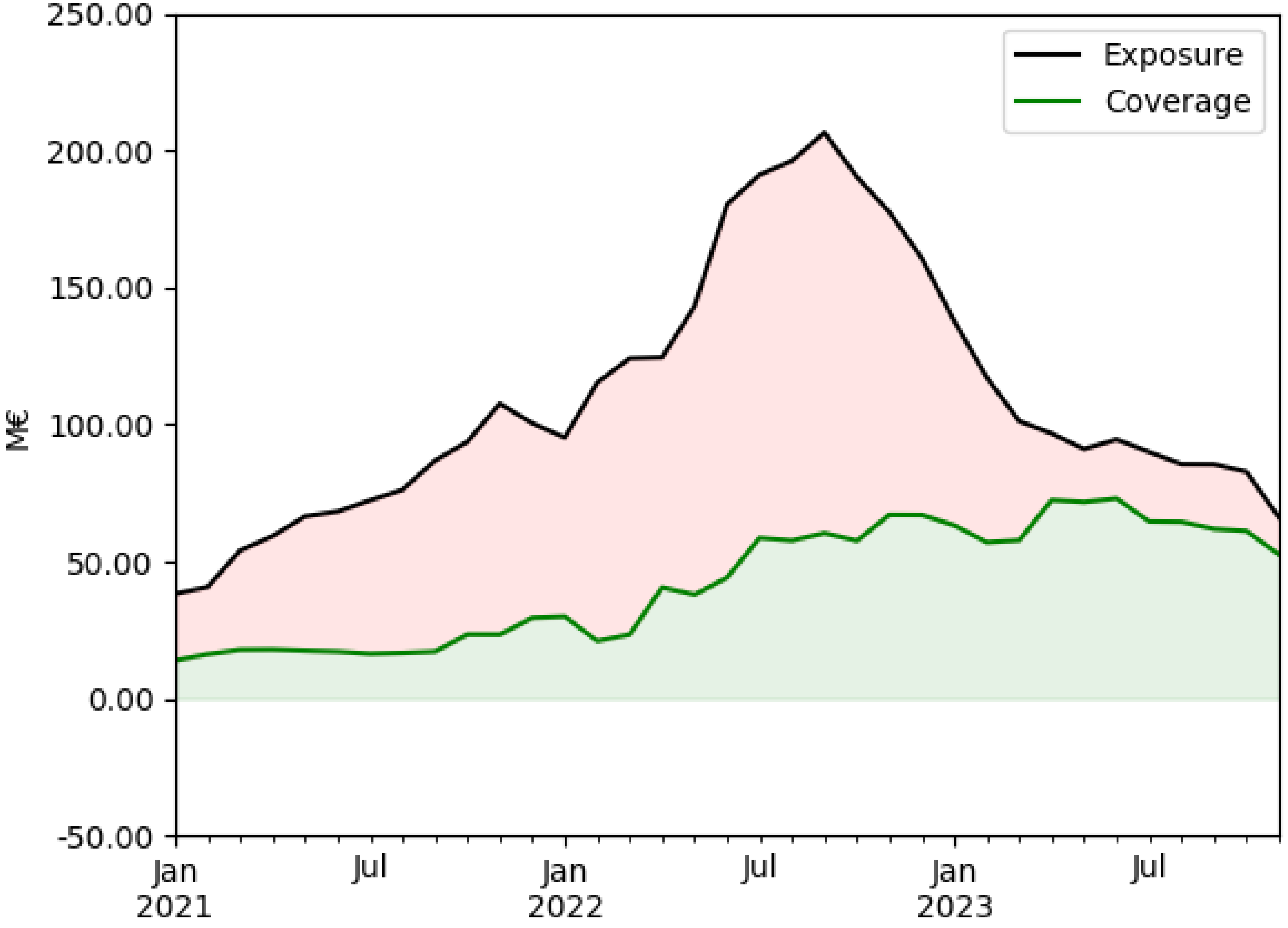
Elia proposes to:

- Investigate invoice lead time reduction – DiMaX
- Determine desired coverage, taking into account balance between coverage & overcoverage

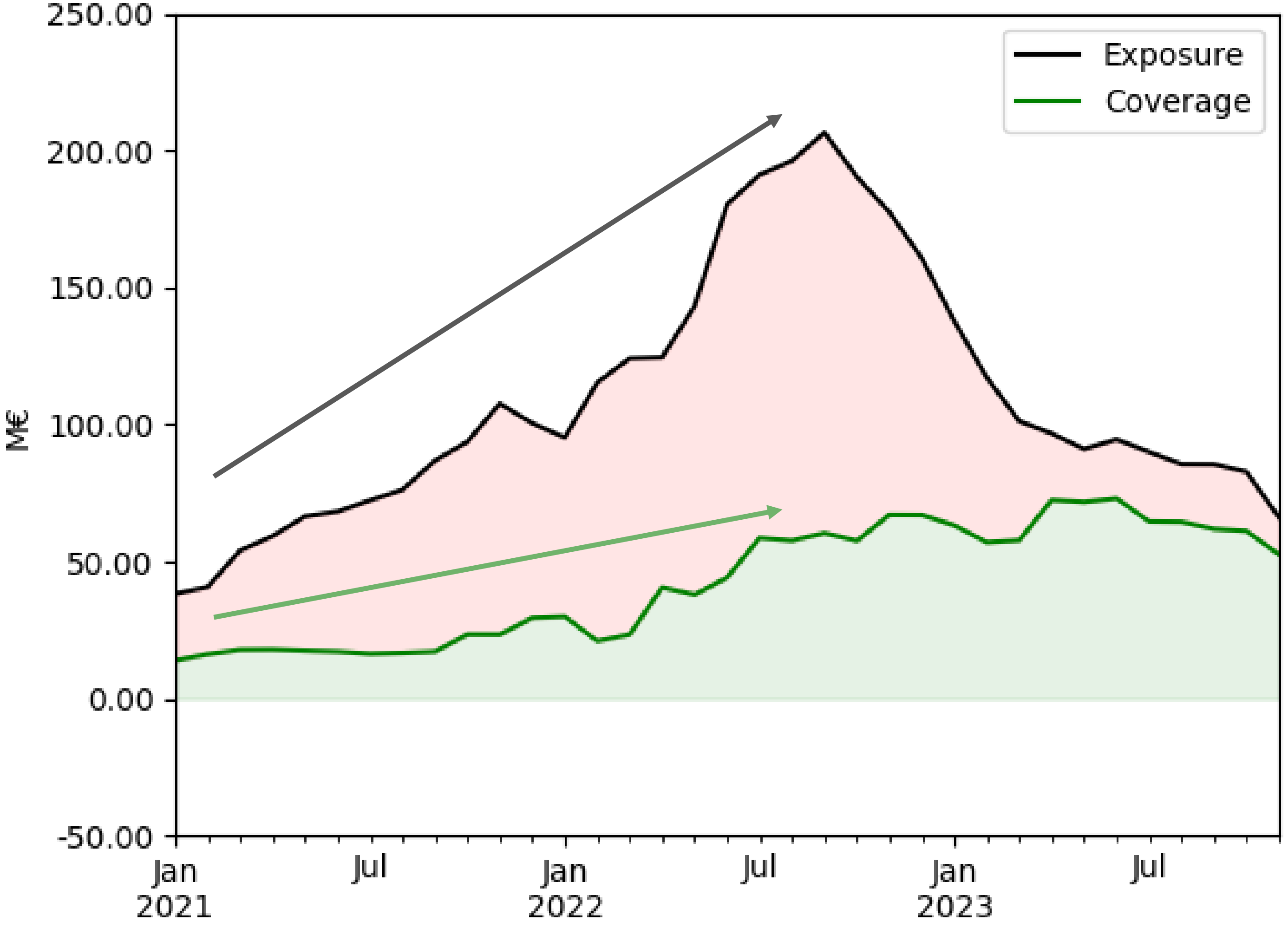
Adaptability & dynamics of the financial guarantee



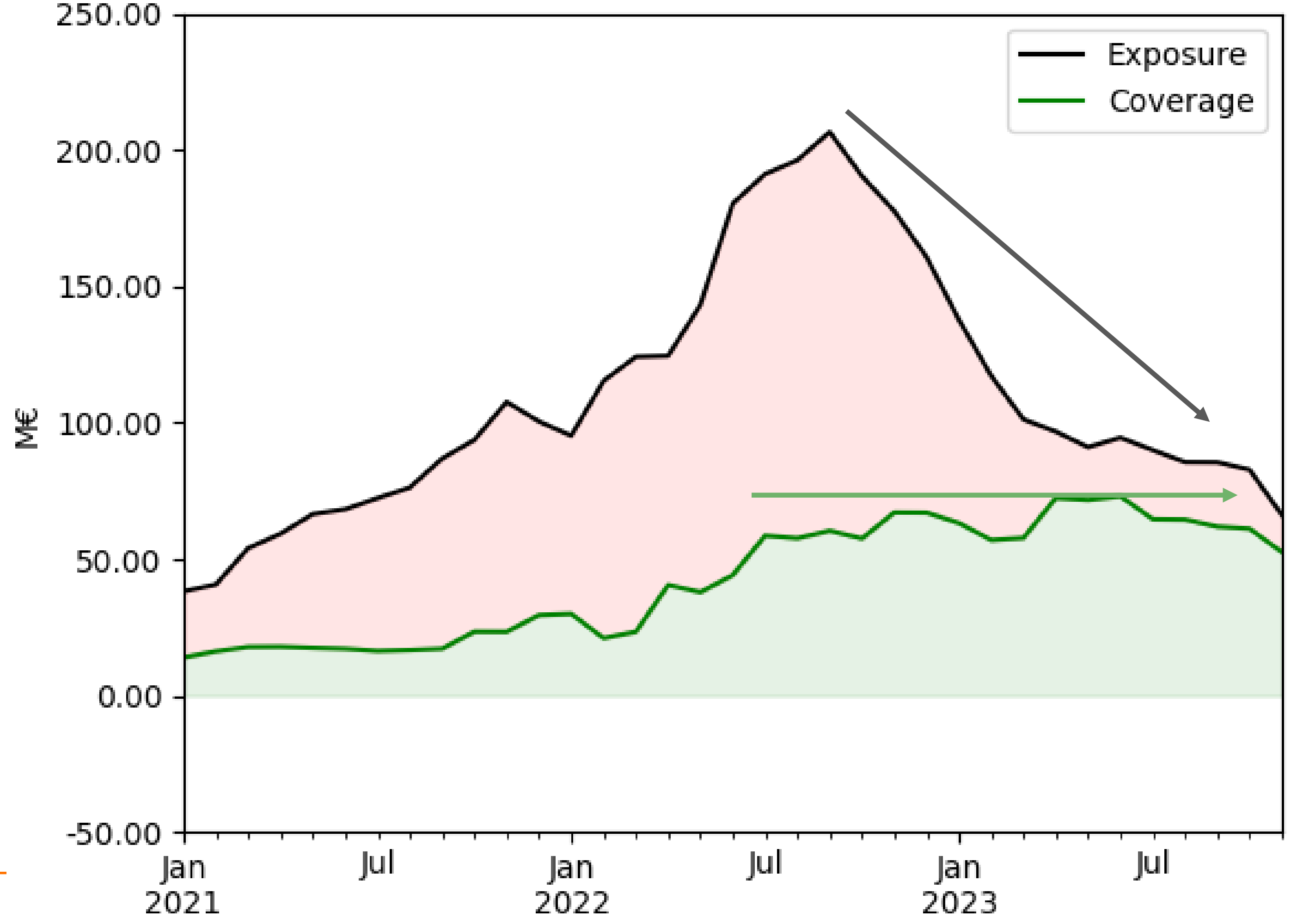
Coverage of all BRPs 2021 – 2023



Coverage of all BRPs 2021 – 2023



Coverage of all BRPs 2021 – 2023



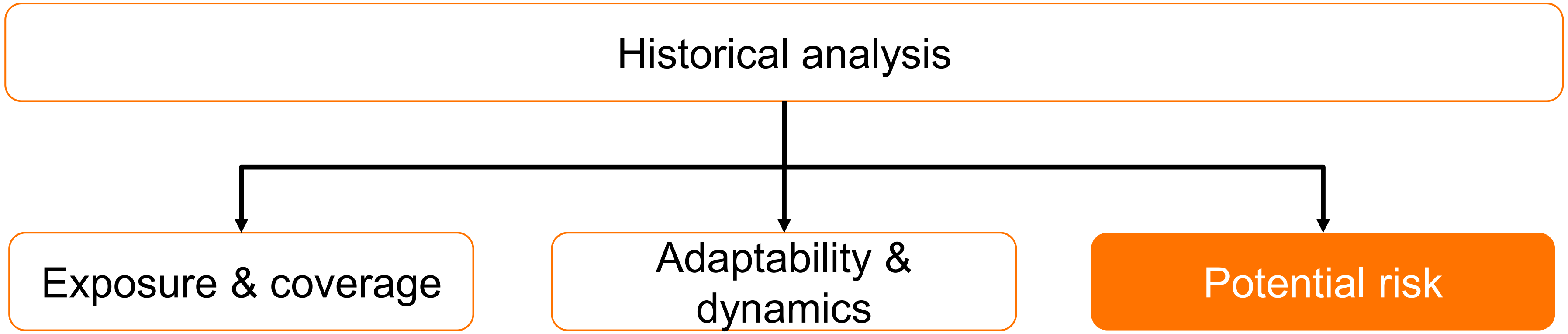
Key observations – adaptability & dynamics of the financial guarantee

- Exposure increases & decreases – potential large swings
- Financial guarantee only increases > 12-month highest invoice rule

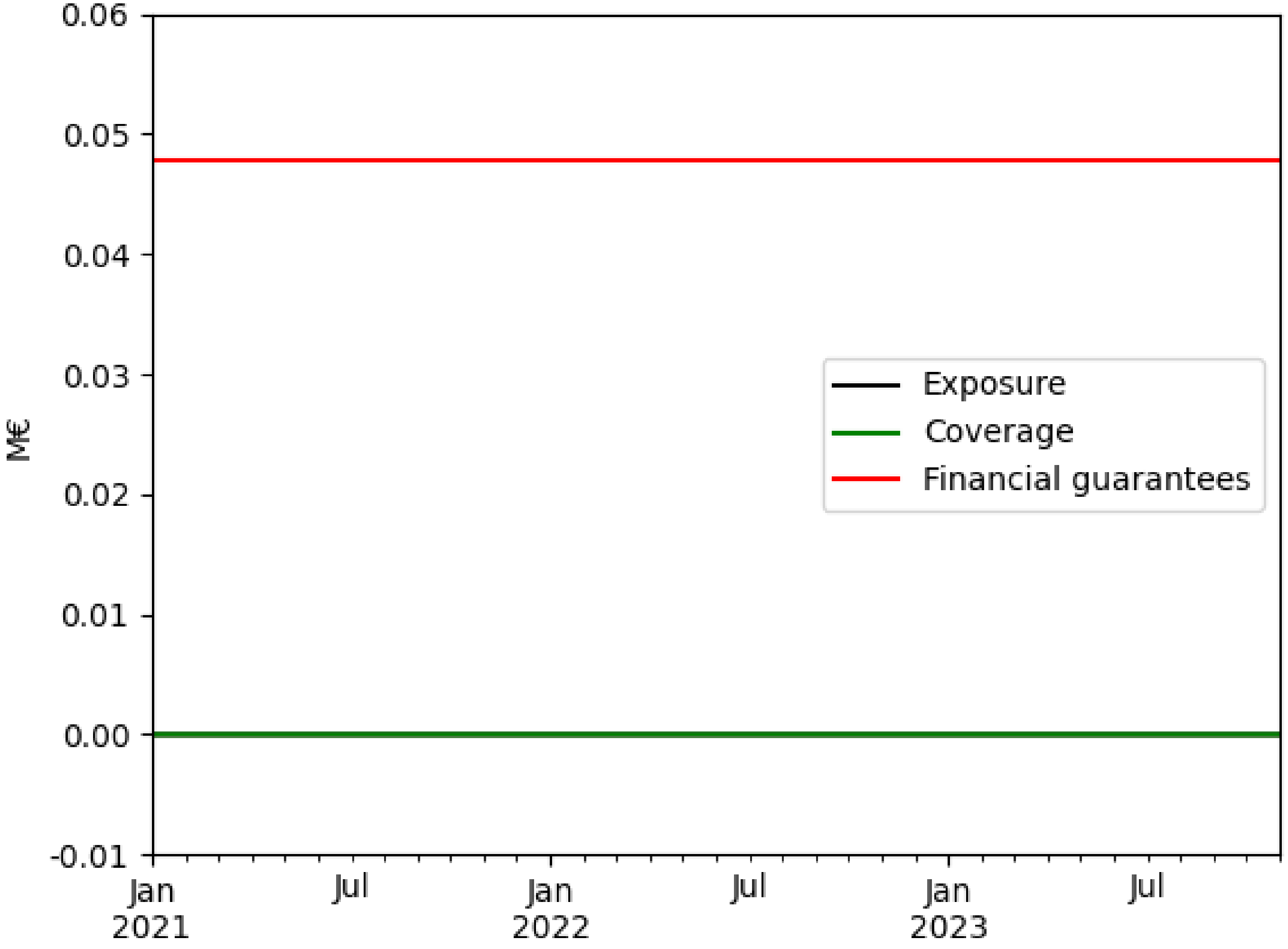
Elia proposes to:

- Re-evaluate 12-month highest invoice rule
- Investigate adapting the financial guarantee to current market situation

Potential risk related to BRP imbalances



Example of individual BRP with no physical offtake (“trader BRP”)



Exposure	Sum of invoices M-3, M-2, M-1, M, M+1	
Coverage	Coverage of exposure by financial guarantee	100%
Overcoverage	Financial guarantee in excess of exposure	100%

However, there is still a risk related to the positions BRPs take. A major shock could occur, leading to BRP insolvency

Imbalance price percentile

BRP position	Guarantee amount	10% 57 €/MWh	25% 82 €/MWh	50% 122 €/MWh	75% 194 €/MWh	90% 267 €/MWh
10 MW	93.000 €	163h	113h	76h	48h	35h
25 MW	93.000 €	65h	45h	30h	19h	14h
50 MW	93.000 €	33h	23h	15h	10h	7h
250 MW	558.000 €	39h	27h	18h	12h	8h
500 MW	1.116.000 €	39h	27h	18h	12h	8h
4000 MW	3.000.000 €	35h	24h	16h	10h	7h

BRP positions by percentile

10%	25%	50%	75%	90%	95%
5 MW	20 MW	71 MW	254 MW	859 MW	1741 MW

Key observations – potential risk related to BRP imbalances

- There are BRPs with no or limited invoices > limited historical exposure
- Still risk related to open positions
- BRP positions differ from assumed positions in guarantee table

Elia proposes to:

- Determine desired coverage, taking into account balance between coverage & overcoverage
- Investigate adapting the guarantee formula based on current imbalance prices
- As described in DiMaX, the threshold of 50MW will be removed from the formula. The upper threshold of 1.500 MW will be evaluated

3. Conclusions

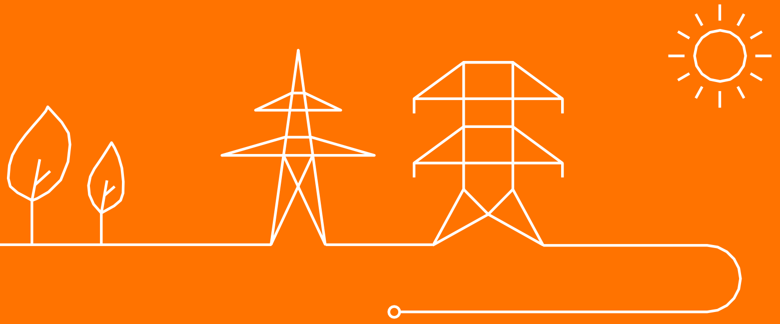
Recap of the conclusions

The historical analysis of the financial guarantees shows that **at times, the guarantees were too low, and at other times, the guarantees were too high.**

Elia proposes to:

1. Investigate how to reduce the contractual invoice lead time – cfr. DiMaX
2. Determine desired coverage, taking into account balance between coverage & overcoverage
3. Investigate adapting the financial guarantee formulas to allow for more adaptability to the risk
4. As described in DiMaX, the threshold of 50MW will be removed from the formula. The upper threshold of 1.500 MW will be evaluated

Thank you



Real-Time Price - feedback of the public consultation

RTP design note – feedback of public consultation

- Consultation period of 7 weeks (22/12/23 to 9/2/24) including holidays
- 7 reactions received

One confidential answer

Overall trend in the reactions

- **Supporting the decentral balancing model** (co-existence of explicit and implicit balancing)
- **Welcoming the initiative** to work on a clear and robust real-time price signal
- But **requesting for more clarity** on detailed design, implementation plan and timeline
- And highlighting **some attention points** to take into account in the detailed design

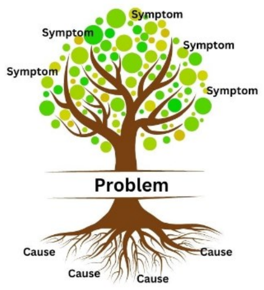
High-level conclusions
Market parties support a decentral balancing model

Market parties support a decentral balancing model where both explicit and implicit participations are allowed and facilitated, so that all the flexibility can find its way to the system.

In this context, market parties welcome the discussions on Imbalance Price evolutions.

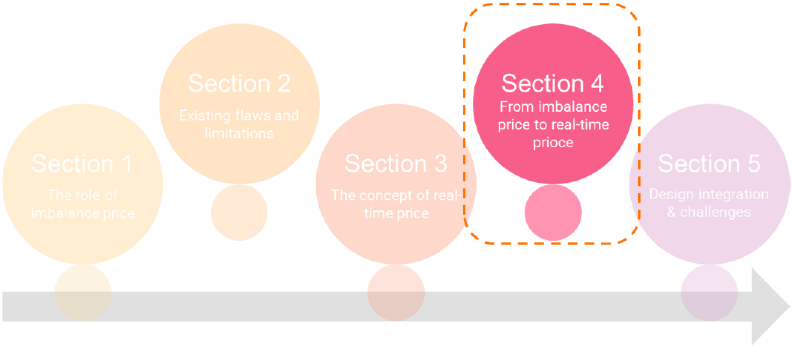
High-level conclusions

Some market parties ask Elia to tackle the underlying root causes of the existing Imbalance Price flaws and limitations



Some market parties warn Elia that some existing flaws of the Imbalance Price might be caused by the currently limited available liquidity in some balancing products and ask Elia to rather focus on initiatives to increase this liquidity (e.g. removing barriers to explicit participation) than on treating the “symptoms” of this lack of liquidity in the Imbalance Price design.

Elia agrees that some of the current Imbalance Price observations are explained by a lack of liquidity in (local) merit order lists, and repeats its commitment to continue working on reducing the entry barriers for explicit participations (see roadmap presented in UsersGroup on March 1st). However, Elia is convinced that some of the limitations of the existing Imbalance Price are inherent to the Imbalance Price design (formula, current approach for the publications, etc.) and can hence only be solved by Imbalance Price evolutions.



High-level conclusions
Market parties ask for transparency

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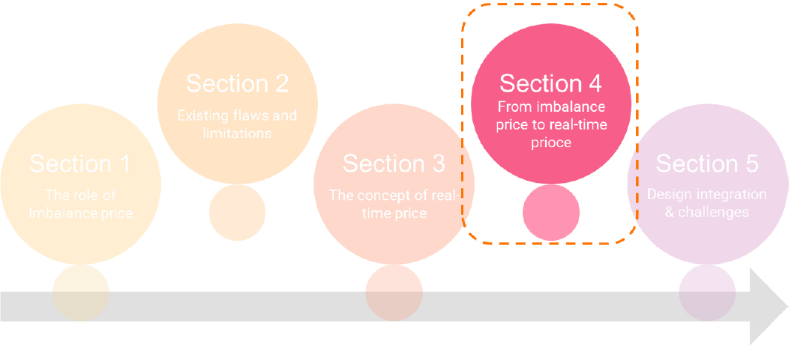
Market parties support Elia's proposal to continue publishing (at least) the same data as today, on top of the real-time forecast. Some market parties expressed their concerns regarding the lack of transparency of the future real-time price due to the "black-box" nature of the SI forecaster and to what is perceived as "intervention" in the imbalance price (i.e. the fact that in some circumstances, Elia proposes that the real-time price slightly deviates from the marginal mFRR price.

Elia understands market parties' concerns about transparency and commits to publish all the relevant data and to provide as much information as possible about the AI models used to forecast the real-time price, subject to confidentiality. Regarding the "price intervention", Elia reminds that the deviations of the RTP from the marginal mFRR price that it has in mind should be occasional and limited in magnitude and only aim at allowing a finer regulation of the system balance when the mFRR merit order list entails important discontinuities (large vertical steps, indivisible bids, etc.).



High-level conclusions
Market parties warn against the removal of the aFRR component

Some market parties believe that the marginal cost of both aFRR and mFRR should be reflected in the Imbalance Price, and this for different reasons:

- Some of them believe that it is necessary to ensure a liquid merit order list, which is, in their view, a pre-requisite for the RTP mechanism
- Other believe that it is necessary to take aFRR prices into account in order to make the price signal more volatile and hence to provide a signal to develop the required flexibility in a context where market circumstances become more volatile (due to renewables)

Elia is currently investigating the role of the aFRR prices in the Imbalance Price construction and does not necessarily believe that it is necessary/possible to use these (4 seconds based) prices to correctly reflect the true value of energy on a 15' basis. Elia does not believe that the necessity to have a liquid merit order list should be considered in the decision to use the aFRR prices (or not) in the imbalance price construction. Elia agrees with market parties that it should rather work on the root cause than on the symptoms and continue working on decreasing the entry barriers to explicit participation, instead of tweaking the imbalance price design. Elia does also not agree that it is the role of the imbalance price to provide a signal to invest in flexible assets able to provide "aFRR-like" reactions - and hence to react to aFRR fast-moving prices (see next slide).

Is it the role of the imbalance price to provide signal to invest in very fast assets (i.e. assets able to deliver aFRR)?

According to Elia, the answer is no.

ONE (15’ based) imbalance price	vs	225 (4’’ based) aFRR prices

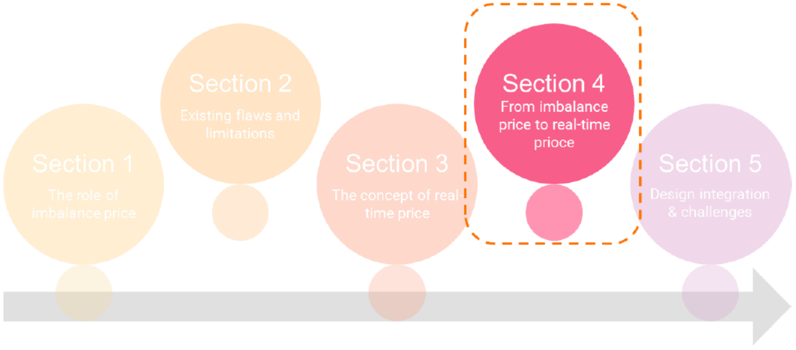
As long as the Imbalance Settlement Period (defined at EU level) remains equal to 15’, the implicit reaction occurring in the system can, by design, only be driven by one single price value (being the ex-post calculated imbalance price) for each 15’ block. It is therefore not possible, not efficient and not fair to try to encourage and steer “aFRR like” implicit reactions in the system based on this unique signal.

In this context, using the highly volatile aFRR prices in the construction of the Imbalance Price does not seem appropriate : it significantly decreases the readability and the predictability of the price signal and does not help reflecting the true RT value of flexibility on a 15’ basis.

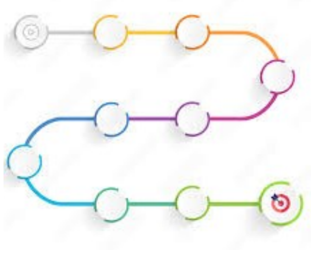
Besides, it creates erratic imbalance price publications within the quarter-hour, which, in a system with lower and lower inertia, can cause dangerous oscillations for the grid.

Especially in a system where a “proactive” mFRR activation strategy is applied (which is what Elia will need to apply as from the connection to MARI), and hence where the aFRR delivered energy should, in average, be close to zero (since the aFRR product would then mainly be used to balance the intra quarter-hour ripple in the system imbalance), it seems questionable to use the aFRR prices in the Imbalance Price construction. As announced in the design note, Elia would therefore like to at least investigate alternative contributions of aFRR activations to the Imbalance Price.

The increasing intra quarter-hour volatility of market conditions (due to increased penetration of renewables) should rather be reflected in the aFRR prices than in the Imbalance Price, and the aFRR market should hence be attractive enough to foster the investments in very fast (aFRR compliant) assets. It is not the objective of the Imbalance Price to develop this flexibility.



High-level conclusions
Market parties ask for detailed proposals, timelines and implementation plans



Market parties insist that the discussions now evolve towards detailed design proposal and concrete implementation plans.

Some market parties request clarifications about how the implementation of this RTP design will integrate with the changes of the Imbalance Price formula foreseen in the context of the connection to the European balancing platforms.

Market parties insist on the necessity to have a transparent and smooth regulatory approval process in place.

Elia understands the need for market parties to now move to the next phase of the discussions and deep dive into the detailed design. As announced in the design note, these discussions are on the agenda for the rest of 2024 and will lead to a second, more detailed, design note.

Elia also understands the confusion created by the co-existence of two Imbalance Price design discussions : the one linked to the upcoming connection to the EU balancing platforms, and the one linked to the evolutions towards a RTP. The reason for the co-existence of these discussions is that Elia wants to avoid reproducing the long and cumbersome discussions that have been held under pressure to find an Imbalance Price formula allowing a safe connection to the EU balancing platforms, and therefore anticipates on the next step. Even though no precise timeline and implementation plan can be provided at this stage, Elia believes that the RTP will be necessary to guarantee a safe and efficient balancing model once a large volume of very fast assets is connected to the grid, which is expected for 2026-2027. Elia will strive to have the RTP concept implemented by then and commits to provide more information about the implementation plan in the upcoming more detailed discussions

Additional considerations and specific questions

A few more specific questions and considerations were raised in some answers to the public consultation. ELIA will initiate bilateral discussions with the concerned market parties in order to answer these questions and/or further discuss some considerations.

Next steps 2024

RTP & SBC – Next Steps

Wave 1 – Q1 & Q2 2024

- Hackaton to demonstrate RTP value
- Alignment on formula and forecast evolutions
- Legal assessment of RTP concept

Wave 2 – Q3 & Q4 2024

- Open design questions and design note trajectory
- SBC // run?

Exact timings to be confirmed

Continuous improvement of SBC and its building blocks (e.g. Simplify model)

Sustainability Solutions - overview

The transition towards 24/7 carbon-free energy will involve more stringent requirements and new capabilities

Sustainability reporting requirements, and the desire for clean energy consumption, is growing…

Companies

"Ambition: net zero by 2050"

Investors

"Looking for green investments"

Regulation

"CO2 reduction requirements"

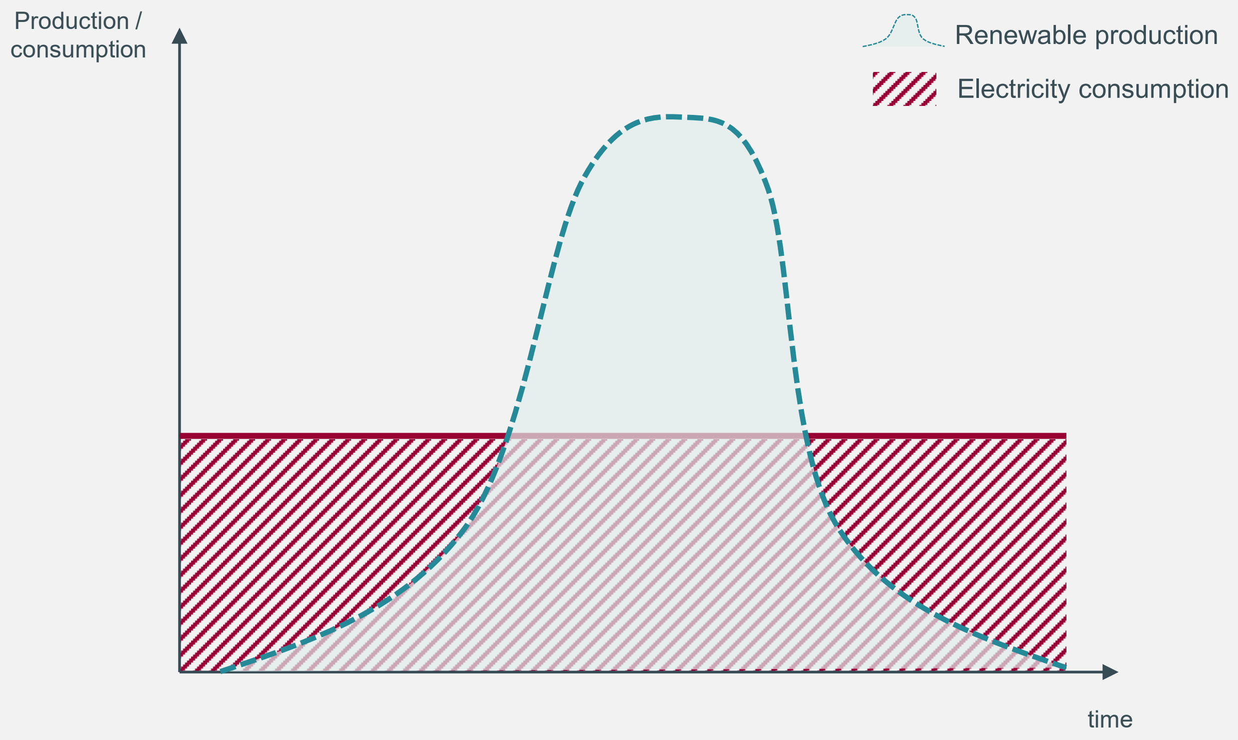
Consumers

"Desire for green products"

Politics

"Reduce dependence on fossil fuels"

…although the way how we still measure green electricity is incorrect and facilitates green washing



Quantity focused: if the sum of consumption equals the sum of production, over a year, you are 100% green…..

The purchase of electricity is covered in scope 2 emission reporting. 2 methods to calculate the emission factor apply.

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Scope 1

Direct emissions

Scope 2

Purchased electricity for own use

Scope 3

Production of purchased materials

Scope 2 Emissions (MT CO2e) = **Activity Data** (Quantity Purchased Electricity) (MWh) × **Emission Factor**

Market-Based Factors

Emission factors derived from contractual information, applied on a MWh basis

Reflects emissions associated with electricity suppliers that companies have purposefully chosen, thereby also highlighting a company's lack of choice to use less carbon-intensive resources.

Location-Based Factors

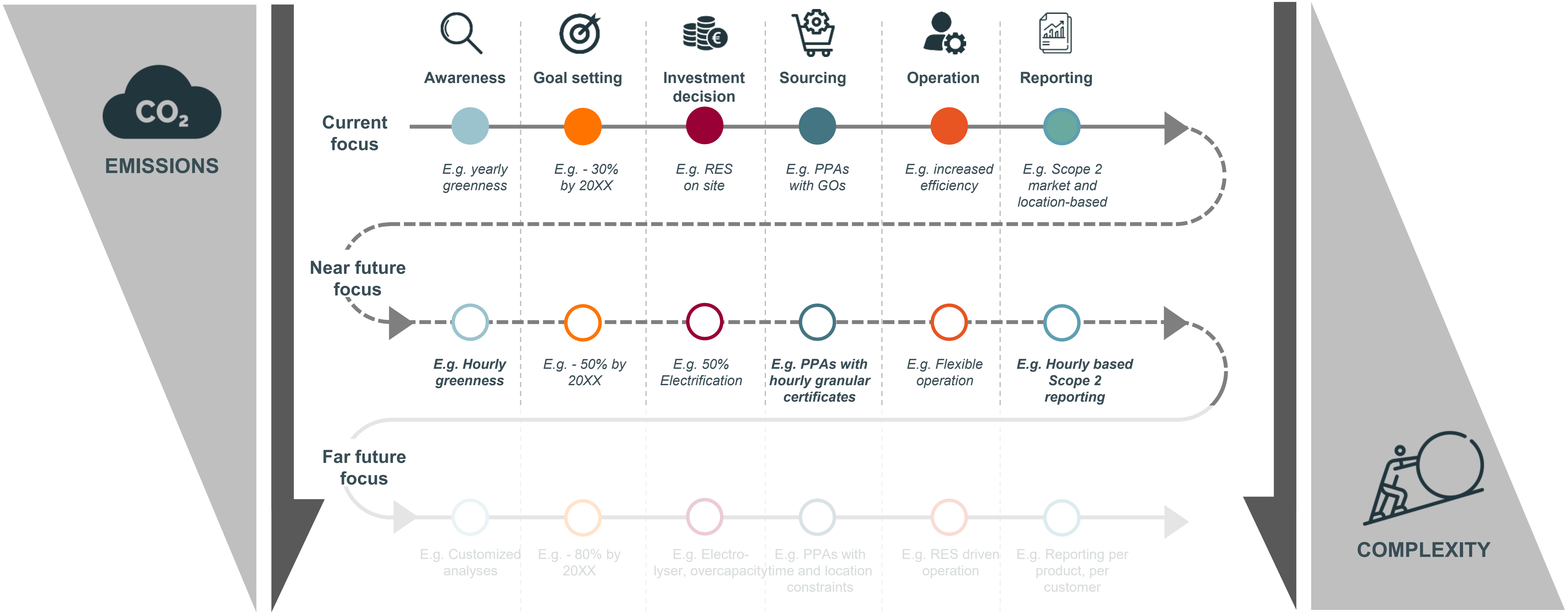
An emission factor that represents the average emissions intensity of whats generating on the grid

Location-based methods **solely consider the carbon intensity in the grid** within the location where your physical operations are located and do not factor in any contractual agreements you might have

https://watchwire.ai/a-deep-dive-on-scope-2-emissions-location-based-market-based-methods/

To further reduce CO2 emissions, sustainability based activities are here to stay and will even become more complex.

As Elia we want to support and engage with industry in their sustainability challenges, and foster new innovation



To support the (preparation of) next steps, Elia's current sustainability services focus on the hourly timeframe

	Yearly	Hourly (24/7)		
Market-based	Guarantees of Origin (GO)	Granular Certificates (GC)	→	1 Energy Track & Trace
Location-based	Annual CO2 emission factor	Hourly emission factor	→	2 Eco2Grid 3 EPIC Sustain. Insights

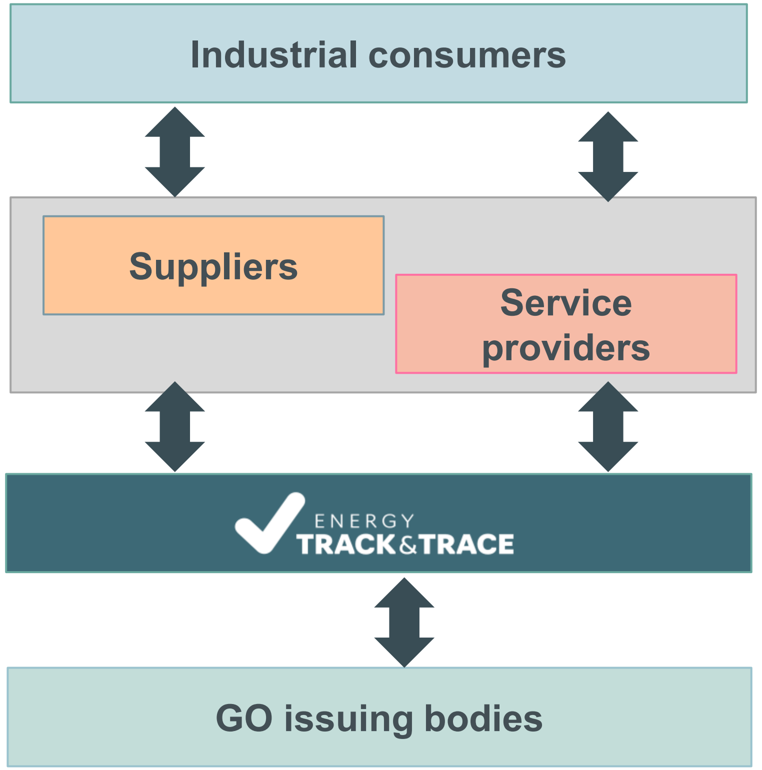
WHY THESE INITIATIVES?

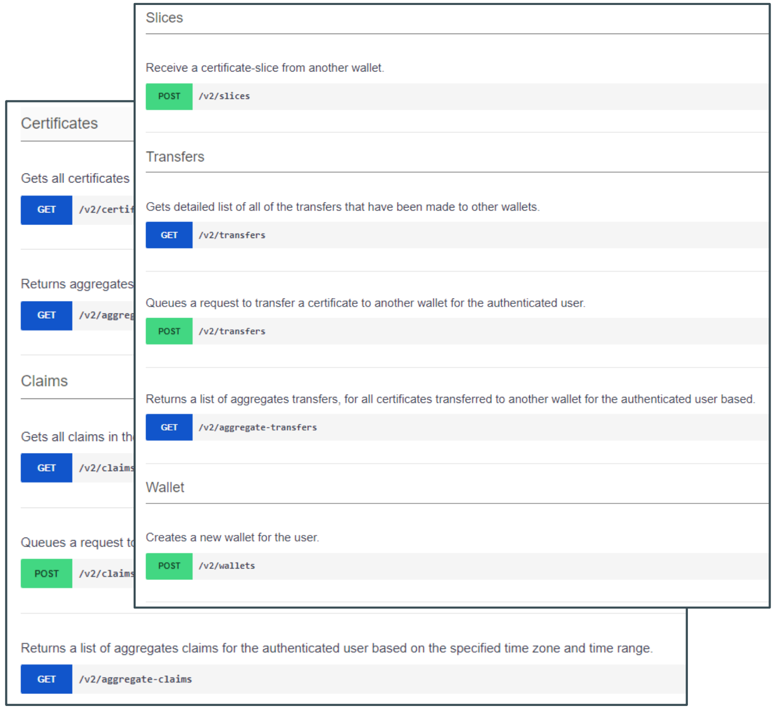
- Better integrate renewables
- More transparency on sustainability
- In anticipation of upcoming legislation
- To facilitate new innovations
- Legal requirement as a TSO (Eco2Grid)

Energy Track & Trace

1

Energy Track and Trace is a platform that facilitates the **24/7 matching of energy** production and consumption, by the issuance, registration and cancellation of **granular certificates**. The scheme is **voluntary** and complementary to the existing Guarantees of Origin (GO) scheme. Exposed as **APIs** on **Traxes**. Collaboration with Energinet (Denmark) and Elering (Estonia).





Accessible via APIs

For who?

- Energy service providers
- Energy suppliers
- Industrial users (integrating the role of energy service provider)

Why should I care?

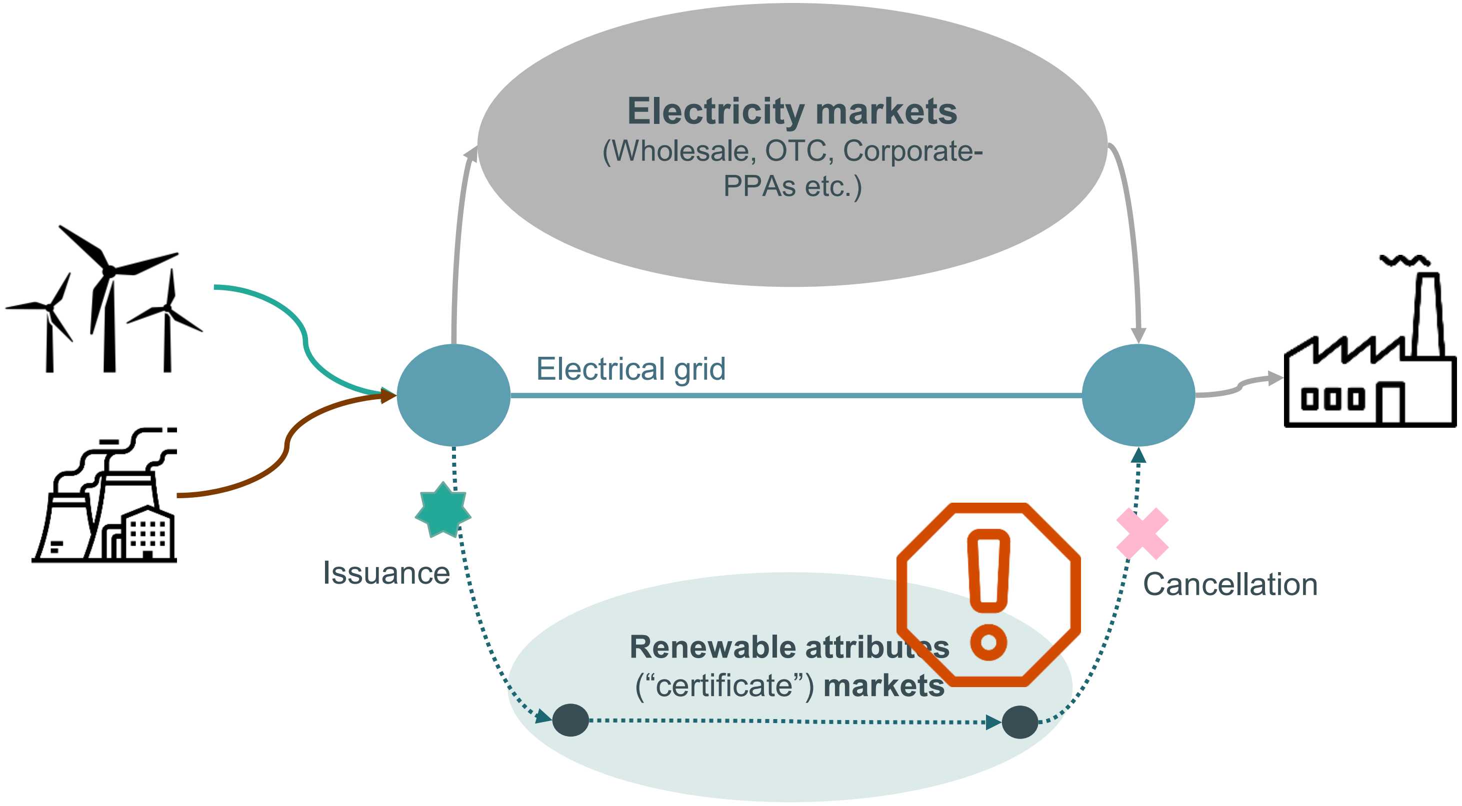
- Ready-to-use solution to offer a 24/7 service offering.
- Elia serves as trusted party towards your customers

How to get more info (and get started)?

https://energytrackandtrace.com/

1 The current system of guarantees of origin (GoOs) matches production and consumption based on VOLUME, without considering the time

EXISTING SYSTEM:
guarantees of origin (GoO)

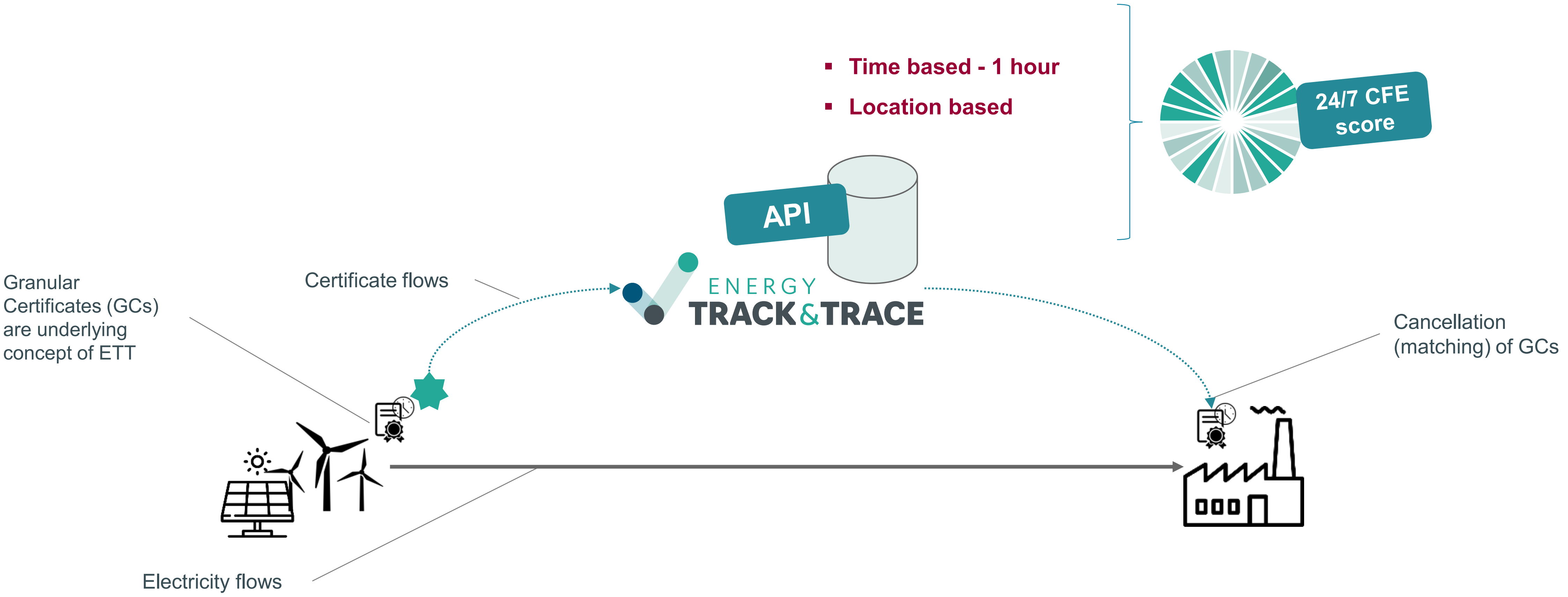


The book-and-claim approach brings the **maximum liquidity** to the commodity „electricity" (and makes it tradable as such).

However, the energy certificates of today (Guarantees of Origins) are **not providing enough clarity** to the consumers.

1 Granular certificates and “ETT” starting point is the TIME: matching what has been produced and consumed in 1 hour timeslot

NEW PROPOSAL:
granular certificates (GC)

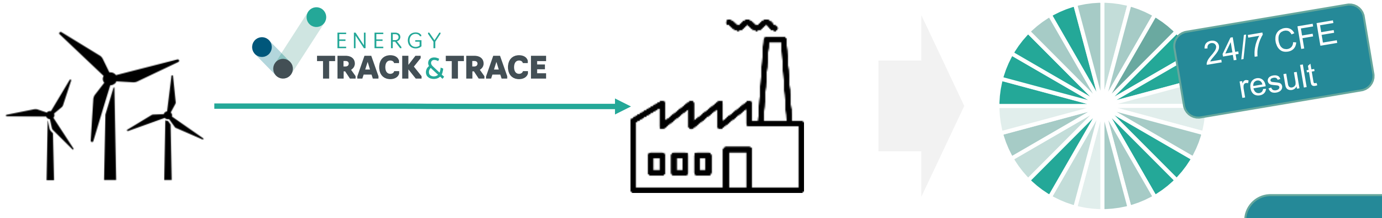


1 To avoid double counting, the ETT system (with granular certificates) is connected to the exiting GO schemes

In order to provide immediate value to our customers, ETT has been designed as a **voluntary certification product** that **coexists** with the EU Guarantee of Origin (GO). Compliance with the EU GO scheme is the **legal basis** for all claims made with ETT.

NEW PROPOSAL: granular certificates (GC)

Time-based



Translation into GO scheme

EXISTING SYSTEM: guarantees of origin (GO)

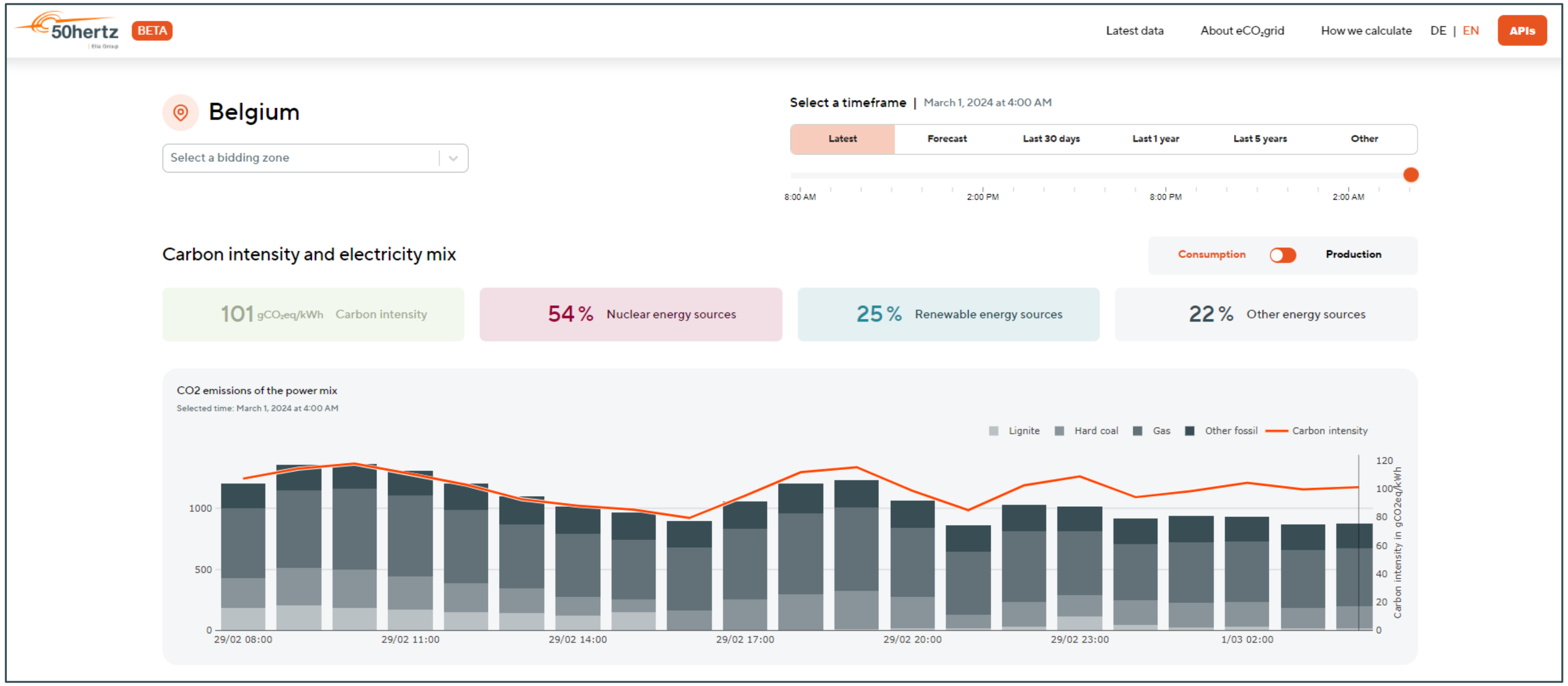
Volume-based

EECS
EUROPEAN ENERGY CERTIFICATE SYSTEM

2

Eco2Grid

Eco2Grid informs about the **CO2 intensity** and **source of energy**, for every bidding zone in Europe, and this for the past, the present, and the future.
Publicly and freely accessible via a **dashboard** and via **API**.



Printscreen of the "Eco2Grid" website, with info on the Belgian bidding zone

For who?

- Any interested party or individual

Why should I care?

- Interesting information as citizen or as company
- Access via API unlocks new opportunities for innovative use cases

How to get more info (and get started)?

https://eco2grid.50hertz.com/

2

Eco2Grid – dashboard example

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Belgium

Select a bidding zone

Select a timeframe | March 15, 2024 at 5:00 AM

Latest	Forecast	Last 30 days	Last 1 year	Last 5 years	Other

10:00 AM 6:00 PM 12:00 AM

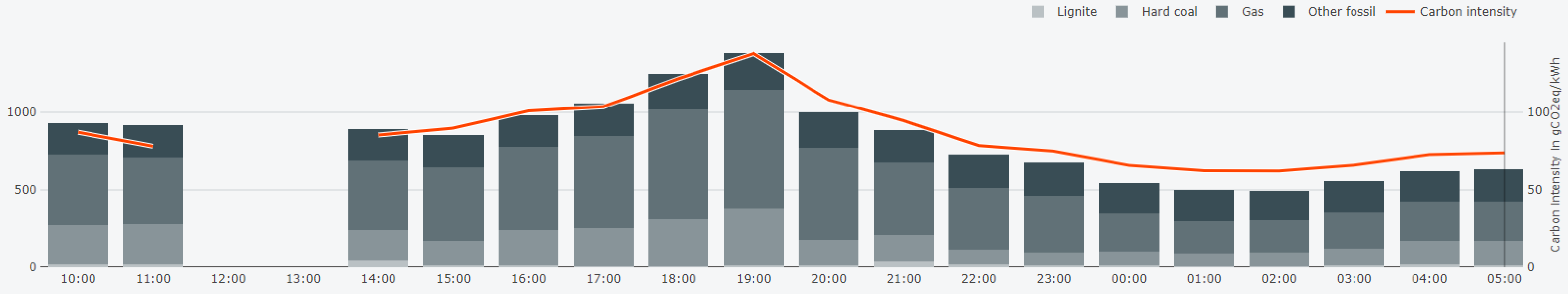
Carbon intensity and electricity mix

Consumption Production

74 gCO_2eq/kWh Carbon intensity	40 % Nuclear energy sources	44 % Renewable energy sources	16 % Other energy sources

CO2 emissions of the power mix

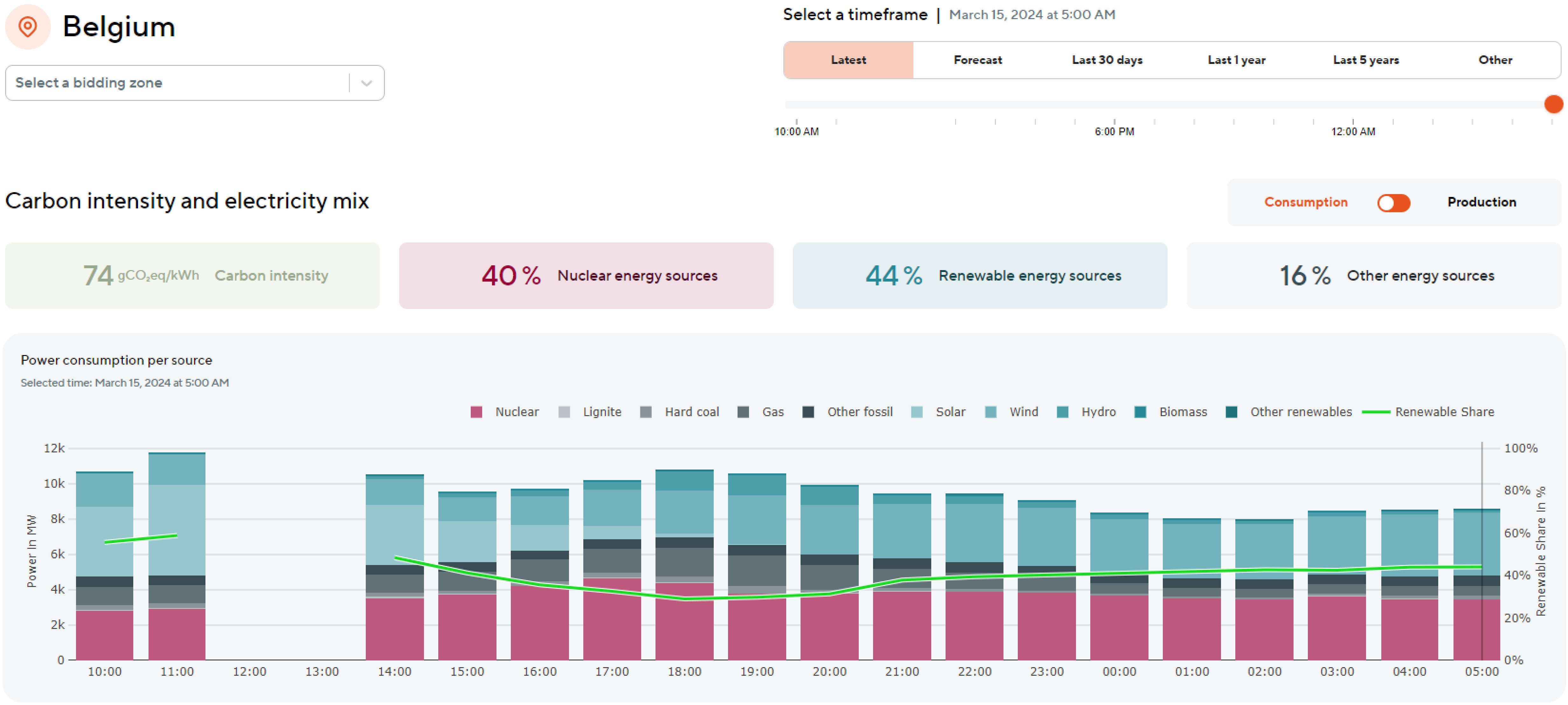
Selected time: March 15, 2024 at 5:00 AM



Source: *eCO₂grid*

2

Eco2Grid – dashboard example



Source: [eCO_2grid]

2 Eco2Grid - carbon intensity of electricity

Carbon intensity of electricity: The number of grams of carbon dioxide (CO_2) emitted while generating one unit of electricity (kWh)

European legislation to come into force by the end of 2024

Internal and external processes

e.g. for manufaturing, grid losses, …

What are my Scope 2 emissions and how can I reduce them?

When do I charge my asset (e.g. car) with the lowest carbon footprint?

Renewable Energy Directive III – Article 20a

‘1. Member States shall require transmission system operators […] to make available information on the share of renewable electricity and the greenhouse gas emissions content of the electricity supplied in each bidding zone, as accurately as possible in intervals equal to the market settlement frequency but of no more than one hour, with forecasting where available. This information and data […] shall be made available digitally […] so that it can be used […] by electricity market participants, aggregators, consumers and end-users, and that it can be read by electronic communication devices such as smart metering systems, electric vehicle recharging points, heating and cooling systems and building energy management systems.’

2 **Eco2Grid - Calculation and complexity:** Correct and complete input data

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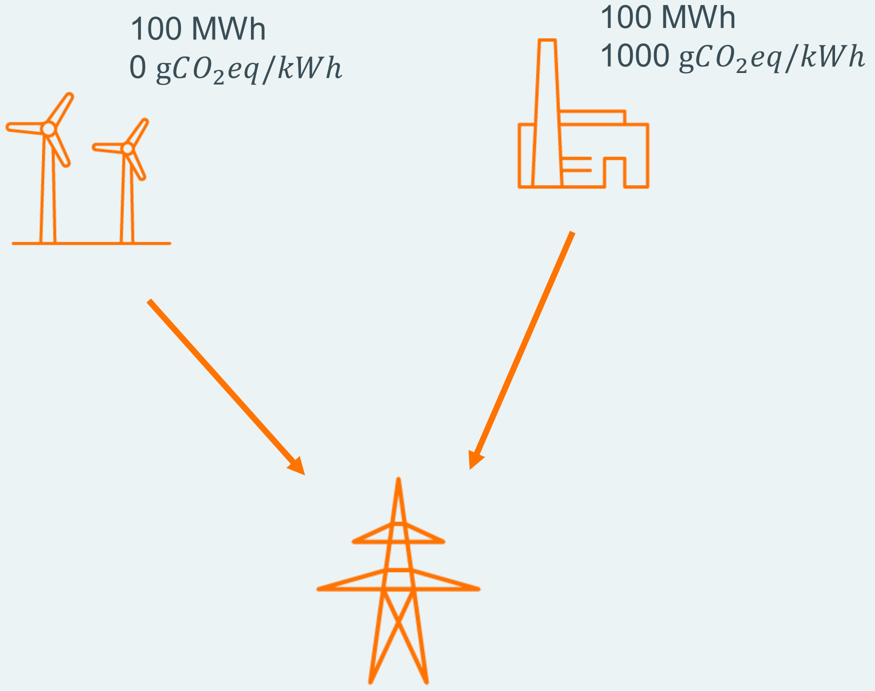


$$= \frac{100 \text{ MWh} * 1000 \; gCO_2eq/kWh + 100 \text{ MWh} * 0 \; gCO_2eq/kWh}{200 \; MWh}$$

$$\mathbf{= 500 \; gCO_2eq/kWh}$$

The carbon intensity depends on the amount of **electricity produced by a power plant** and the **specific emission factor**

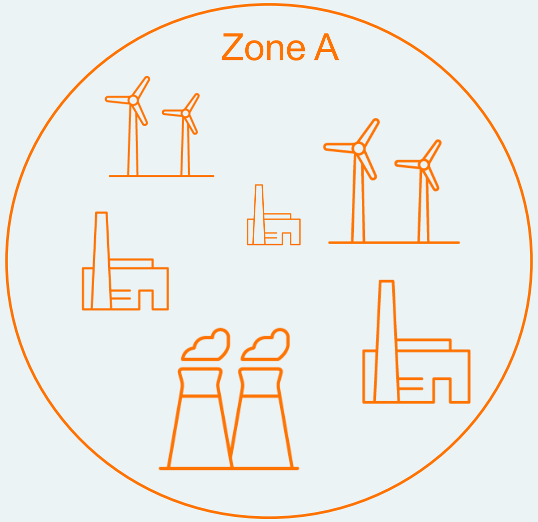
→ Input data we need:

- Hourly electricity generation per power plant
- Emission factors of all power plant

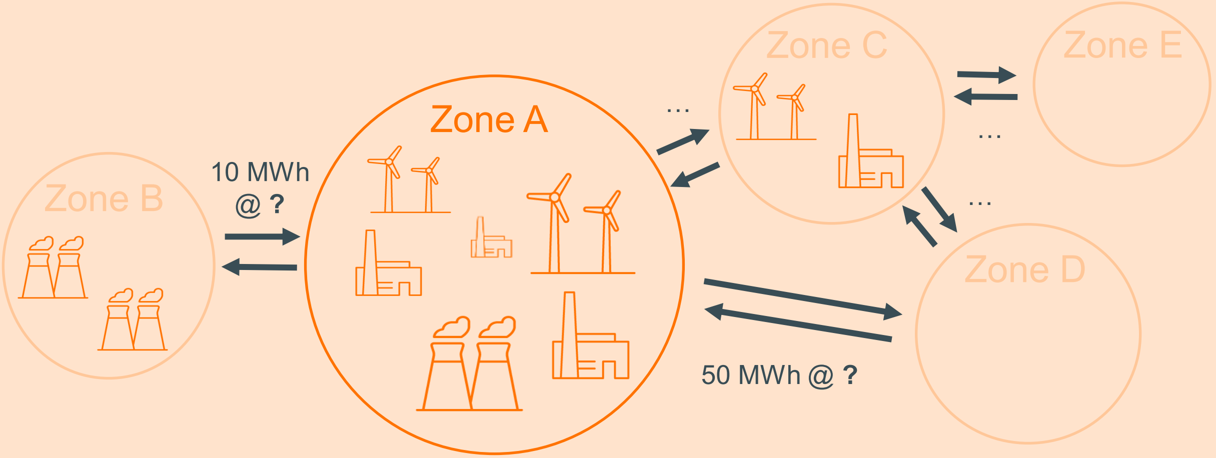
2

Eco2Grid - Calculation and complexity: Production vs. consumption based

Production based: Taking into account all the production that has taken place within the bidding zone



Consumption based: Additionally taking into account the electricity imported from neighboring countries, and their neighbors, and their …



→ We need to know the carbon intensity of the imported/exported electricity – setting up and **solving a system of equations** is necessary

→ To calculate the consumption-based carbon intensity of a single zone, it is necessary to **calculate the carbon intensity for all zones**

→ Correct and complete data for **all zones** necessary

2 Eco2Grid - Calculation and complexity

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Datasets being used

- freely accessible data, provided on the **ENTSO-E Transparency Platform**
  - Generation per production type, the load and the power flows between the bidding zones
  - Forecast of the total generation, the wind and solar generation, forecast of the load.
- Only the direct emissions (**Scope 2**) are considered and not the total life cycle emissions (Scope 3). As a result, emissions from renewables and nuclear power are zero

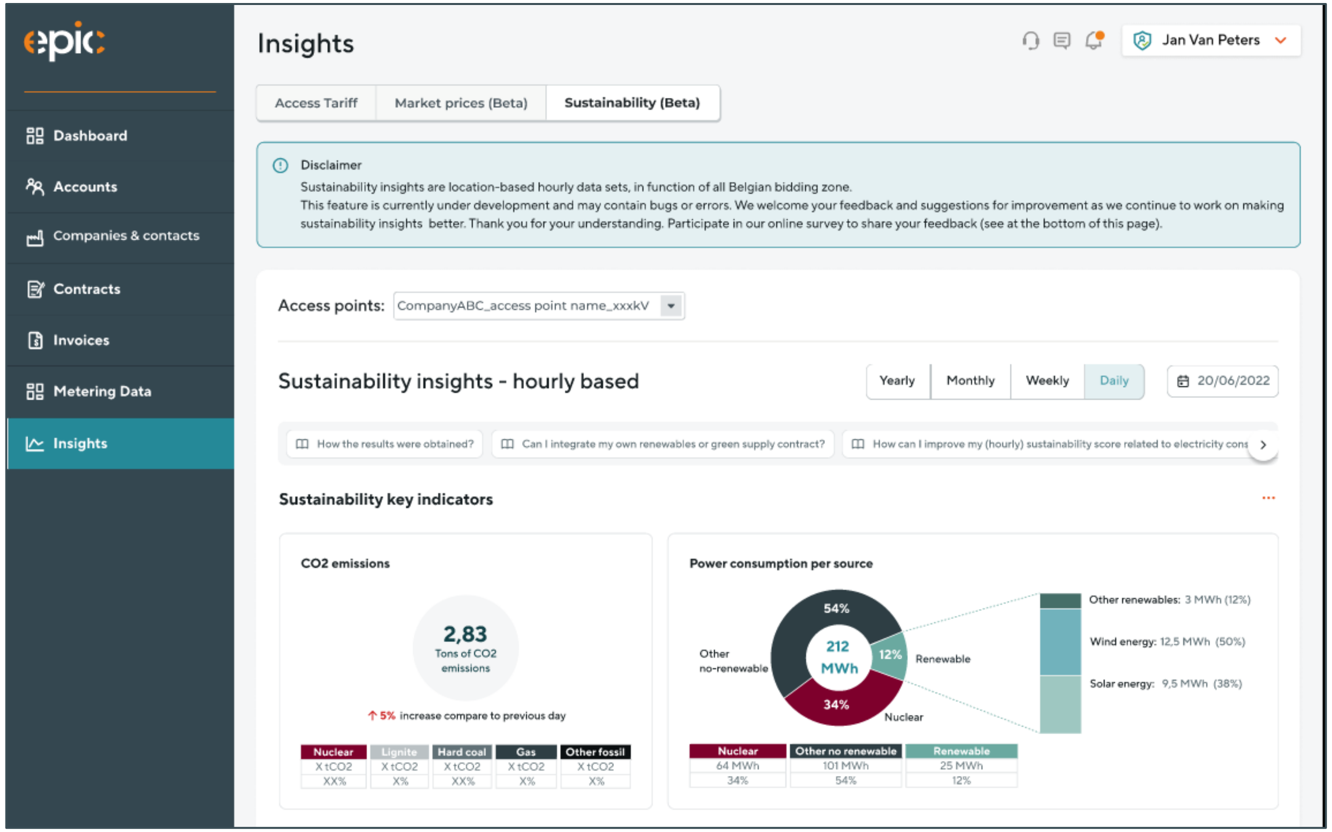
Forecast

- In principle, the calculation of the forecasted carbon intensity is the same as for historical data
- But: Right now, there is no complete forecast data for production – often only forecasts for wind and solar production are available (+ load forecast) → **we have to predict a lot of the data**

EPIC sustainability Insights

3

The new sustainability insights page in EPIC specifies, the CO2 emissions and source of energy, **in function of the load curve of the grid user**. It considers scope 2, local energy production is not considered. The Insights page will be on EPIC soon (end March / early April).



![Elia Group logo]

For who?

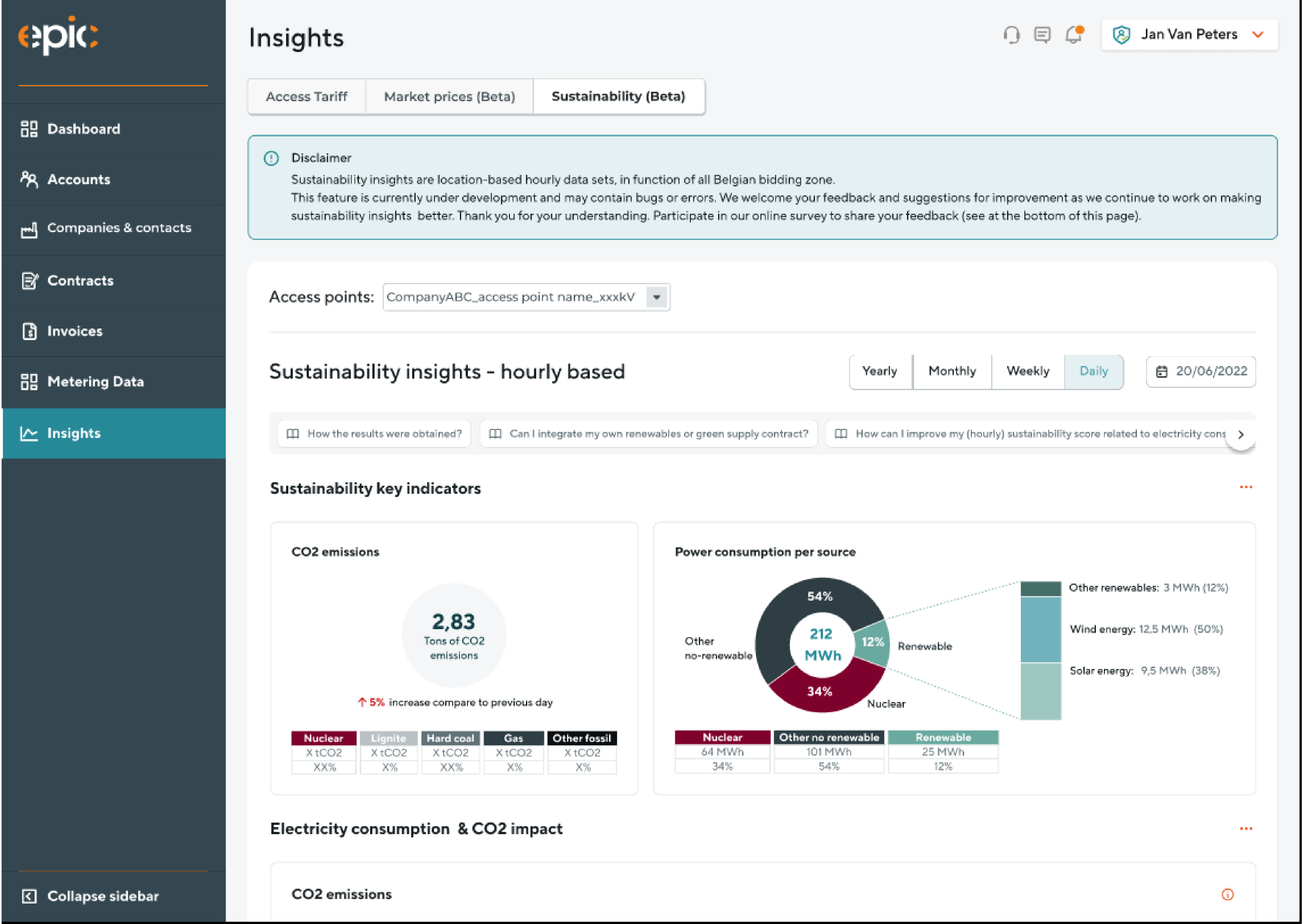
- Elia grid users

Why should I care?

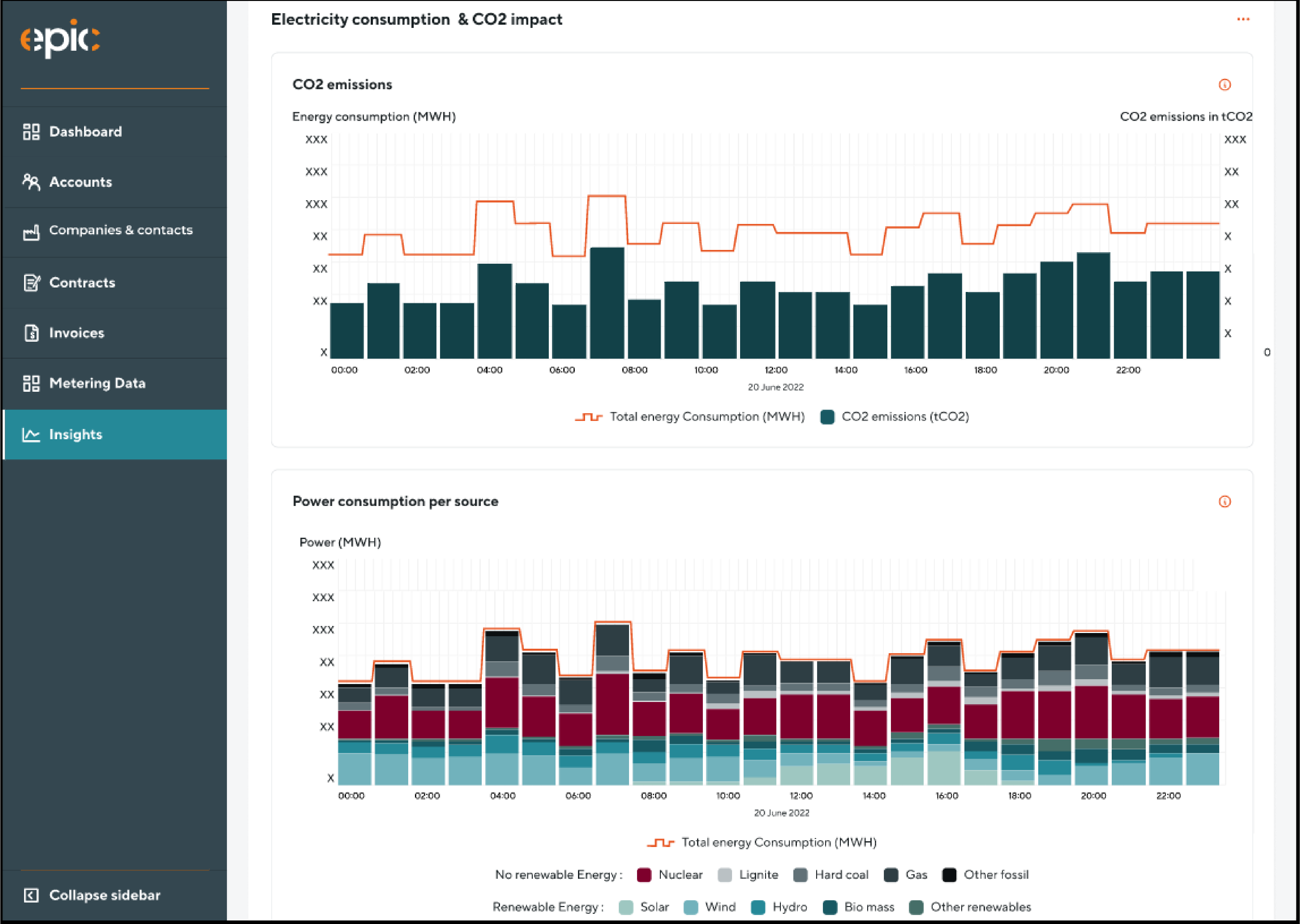
- Get awareness on the hourly level.
- Use the information as input for detailed sustainability reporting

How to get more info (and get started)?

https://epic-portal.io/



Sustainability key indicators, summarizing the main information



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Graphs with “CO2 emissions” and “power consumption per source”

Interested in your feedback!

Elia Group

Menti code

8255 5628

What are your main sustainability challenges?

What do you expect from Elia regarding sustainability?

We are interested in your feedback to keep on evolving our products!

Let's get in touch!

Reach out to you KAM (Energy)
or
jan.vandenbroucke@eliagroup.eu
(product owner, consumer centricity)

AOB