



nationalgridESO

# Trading of 24/7 Carbon Free Energy (CFE)

AFRY, Granular Energy and Nord Pool

16 MAY 2024

INTRODUCTIONS

AFRY is working with Granular Energy and Nord Pool to understand implications of Trading of 24/7 Carbon Free Energy (CFE) for ESO



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# Agenda

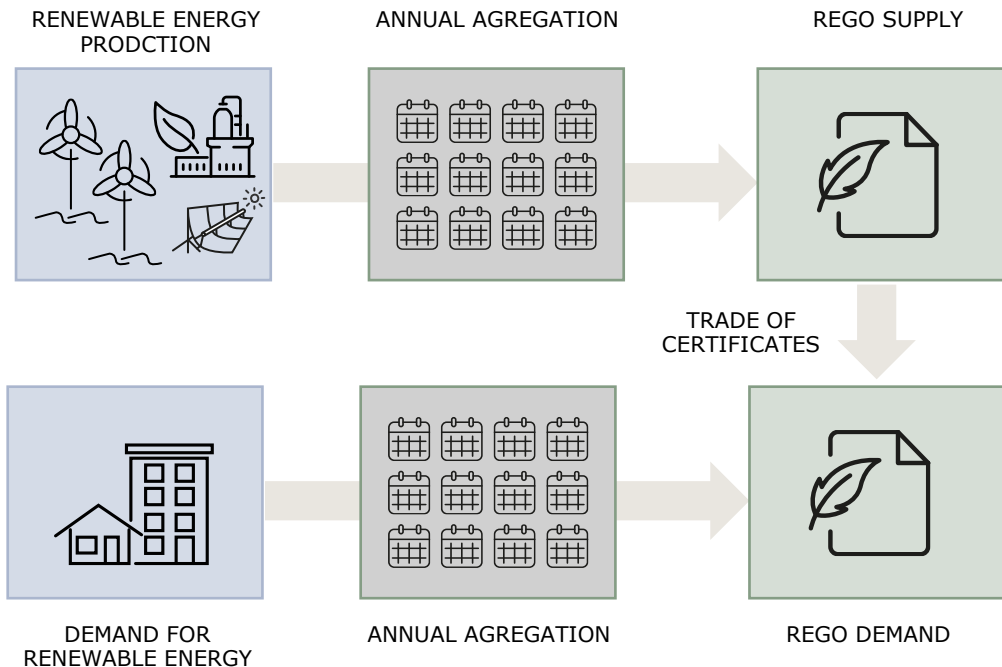
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| 1. What is 24/7 CFE matching?                   | 3  |
| 2. Why is interest in 24/7 matching increasing? | 8  |
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## WHAT IS 24/7 CFE MATCHING?

Interest is growing in moving from today's annual matching of energy attribute certificates towards more granular matching by place and time

### REGOS ALLOW CONSUMERS TO COMMIT TO RENEWABLE ENERGY ON AN ANNUAL BASIS



### 24/7 MATCHING IS AN EVOLUTION TO CURRENT CFE SCHEMES

- Renewable Energy Guarantee of Origin (REGOs) certificates, were implemented in 2003 by OFGEM
- The aim was to provide transparency that electricity generated was from renewable energy
- Certificates match on an annual basis
- Once issued, REGOs can be traded with or without the electricity to which it was issued
- OFGEM also issues other energy attribute certificates and fuel mix is reported by energy suppliers annually
- It is a case of when rather than if, energy attribute certificates will transition from annual matching to hourly or sub-hourly matching
- Once available, granular energy certificates based on electricity metering data are likely to become an essential instrument for the electricity sector
- Previously separate and unconnected wholesale power markets and energy certificate markets will become increasingly aligned

## WHAT IS 24/7 CFE MATCHING?

The current approach does not provide transparency to consumers and 100% renewable offers are being discredited

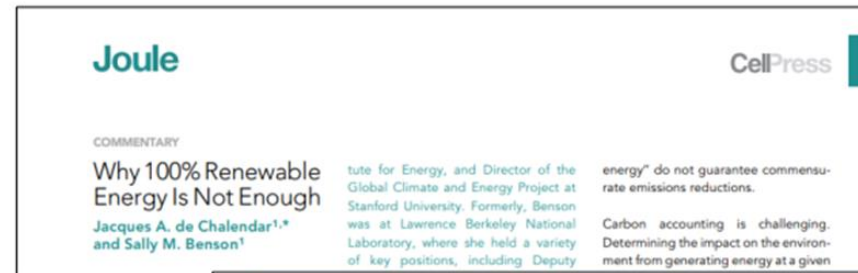
Independent.ie 

### Electricity firms told to drop 'false' 100pc green power claims

February 09 2023

Electricity companies are misleading hundreds of thousands of customers by claiming to supply 100pc renewable power, an advertising watchdog investigation has found.

The Advertising Standards Authority of Ireland (ASAI) says the claim, investigated in adverts by Energia but used industry-wide, must be dropped from marketing materials.



**Joule** CellPress

COMMENTARY

#### Why 100% Renewable Energy Is Not Enough

Jacques A. de Chalendar<sup>1,\*</sup> and Sally M. Benson<sup>1</sup>

tute for Energy, and Director of the Global Climate and Energy Project at Stanford University. Formerly, Benson was at Lawrence Berkeley National Laboratory, where she held a variety of key positions, including Deputy

energy" do not guarantee commensurate emissions reductions.

Carbon accounting is challenging. Determining the impact on the environment from generating energy at a given



nature climate change ARTICLES

<https://doi.org/10.1038/s41558-022-01379-5>

Check for updates

### Renewable energy certificates threaten the integrity of corporate science-based targets

Anders Bjørn<sup>1,2,3</sup>, Shannon M. Lloyd<sup>1,3</sup>, Matthew Brander<sup>4</sup> and H. Damon Matthews<sup>2,3</sup>



The Washington Post  
Democracy Dies in Darkness

CLIMATE Environment Weather Climate Solutions Climate Lab Green Living Business of Climate

## Buying renewable energy doesn't mean what you think

The popular method of buying renewable 'credits' for emissions inflates green power claims

By Shannon Osato and Mallory Hammond

June 21, 2023 at 6:30 a.m. EDT

Source: Granular Energy

WHAT IS 24/7 CFE MATCHING?

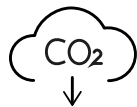
# 24/7 CFE matching empowers consumers to decarbonise their electricity consumption in real time

## THE CASE FOR CHANGE



### Increase transparency in CFE energy procurement

Unlocking 24/7 carbon accounting and reporting



### Accelerate grid decarbonisation

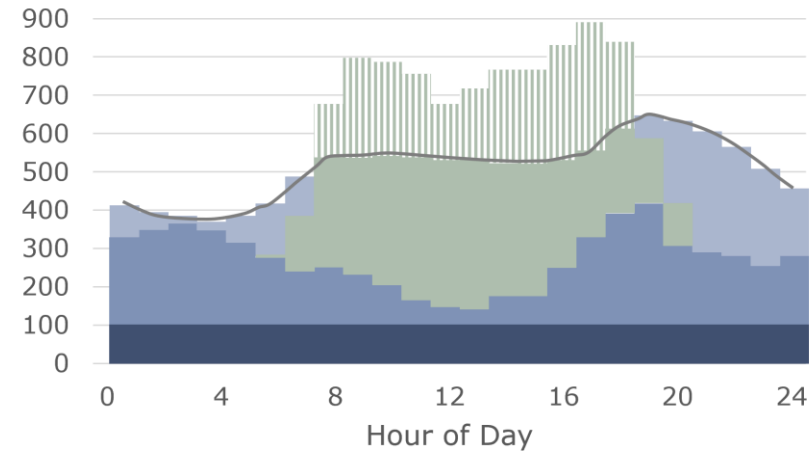
Provide time-based price signals for use of CFE



### Encourage investment and innovation

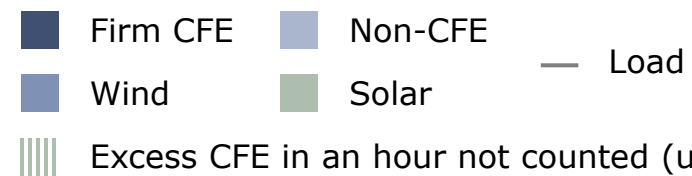
Creating incentives for flexibility solutions such as batteries and demand side response

## 24/7 CFE CERTIFICATES PROVIDE REALISTIC VIEW IN PLACE AND TIME OF CARBON INTENSITY OF CONSUMPTION



### Key Metrics

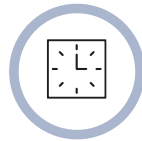
- Hourly Scope 2 Location-based Inventory (tons)** = Load \* System Average EF
- Improved Scope 2 Market-based Inventory (tons)** = Non-CFE \* EF
- CFE Score (%)** = "Consumed" CFE/Load



Source: Modernizing GHG Accounting Rules and Climate Leadership Programs May 2024

WHAT ISSUES ARE UNDER DEBATE?

Currently there is no universal definition of 24/7 CFE with many of the rules not yet agreed



**GRANULARITY**

- Should matching be 15 minutes, 30 minutes, 1 hour or another duration?



**ACCEPTABLE SHARE OF CFE**

- What share of time matched CFE is acceptable? 80%? 90%? 100%?



**IMPACT ON RESIDUAL PROFILES**

- What are the rules for partial sales and purchases?
- What about additionality?



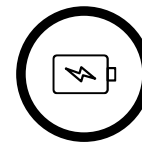
**DEMAND DRIVERS**

- What carbon free energy attributes do consumers want?
- Interaction with RE100, scope 2 emissions reporting, green hydrogen and carbon border adjustment mechanisms?



**LOCATIONAL LIMITS**

- Are there limits for locational supply and demand?
- How are interconnectors included (flow vs capacity limits)



**BATTERIES**

- How will batteries be treated?

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# Granular Energy provides an all-in-one software tool for green energy and energy certificate management for energy companies



We provide energy companies with the tools they need to manage their energy certificates and green offers



Portfolio management, automated allocations and reporting at scale across multiple time granularities



Create higher value offers for customers



Improve efficiency in day-to-day operations



Prepare for changing standards and regulations

Our platform is used by over **30** energy companies in **10** countries including supporting the largest 24/7 clean energy programs in the world



October 27, 2023

**Good Energy opens hourly renewable energy matching for its business customers**

By *Lena Dias Martins*



**SSE boosts CPPA reporting through half-hourly energy mapping**

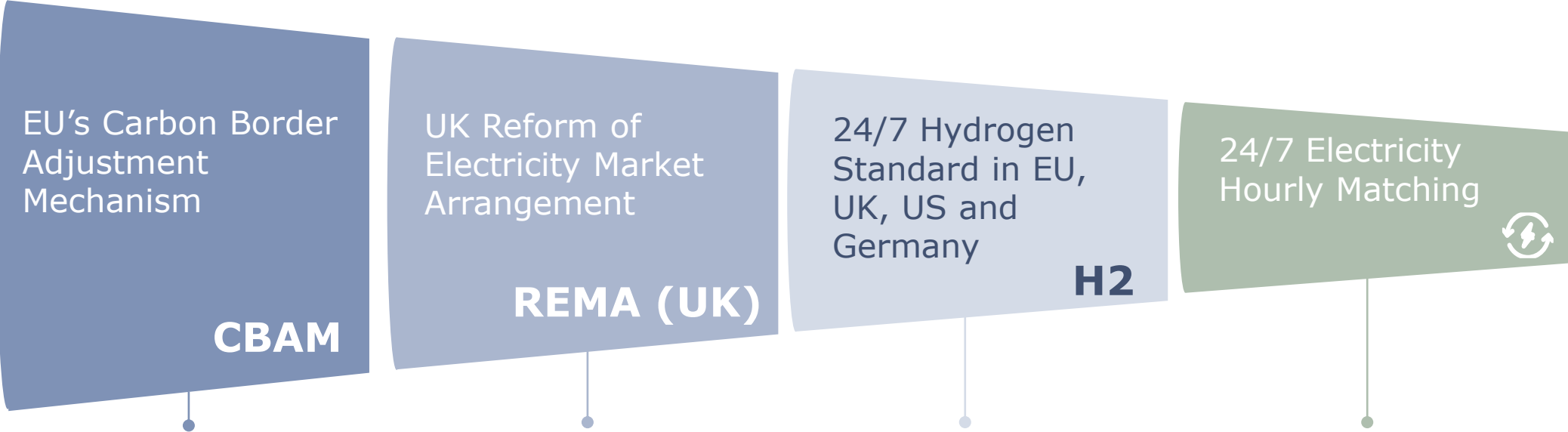


**Winner:**

**Free Electrons Start-up of the Year 2023**

(global competition that received 500 applications from start-ups)

# Regulations around the world are driving 24/7 CFE as a part of greater market energy reform and decarbonisation



CBAM extends carbon pricing to imported goods including electricity and hydrogen  
CBAM is in the transitional phase and could evolve to include hourly matching of green hydrogen production

REMA includes a review of the UK certificate system (REGOs) and is considering hourly matching (see previous whitepaper from Nord Pool, AFRY and Granular Energy)

Green H2 projects are creating need for definition of green electricity, and this will include time matching

Regulations in the US and Ireland include requirements for 24/7 carbon free electricity

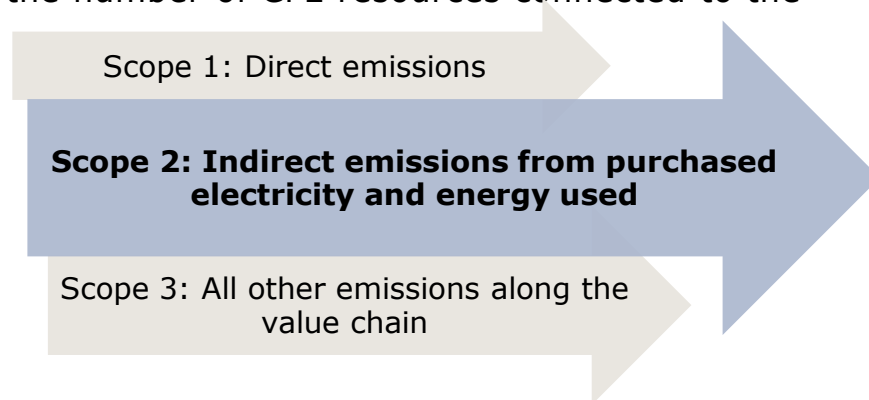
# 142 Signatories have collaborated in working towards 24/7 Carbon-Free Energy, driven by consumer preference and social influence



# 24/7 Carbon Free Energy is gaining traction as policies drive compliance

## SCOPE 2 EMISSIONS AS A DRIVER OF CFE

- Scope 2 emissions are at the forefront of large energy consumers decarbonisation efforts as they become increasingly under pressure to reduce their environmental impact
- Ahead of the GHG Protocol revisions in 2025, several workshops were held in 2022-23 to discuss moving to hourly matching for scope 2 emissions, with many in favor of the revision which closed some loopholes seen with annual matching
- Hourly matching would quickly drive demand for clean energy, supporting the development of new mechanisms to increase the number of CFE resources connected to the grid



## PREVENTING GREENWASHING

Green claims are being heavily scrutinized in Ireland and the EU, with 24/7 CFE a solution to providing proof of green practices:



In 2024, the EU parliament approved a directive to regulate greenwashing by preventing companies from claiming green practices and neutral environmental impacts without proof



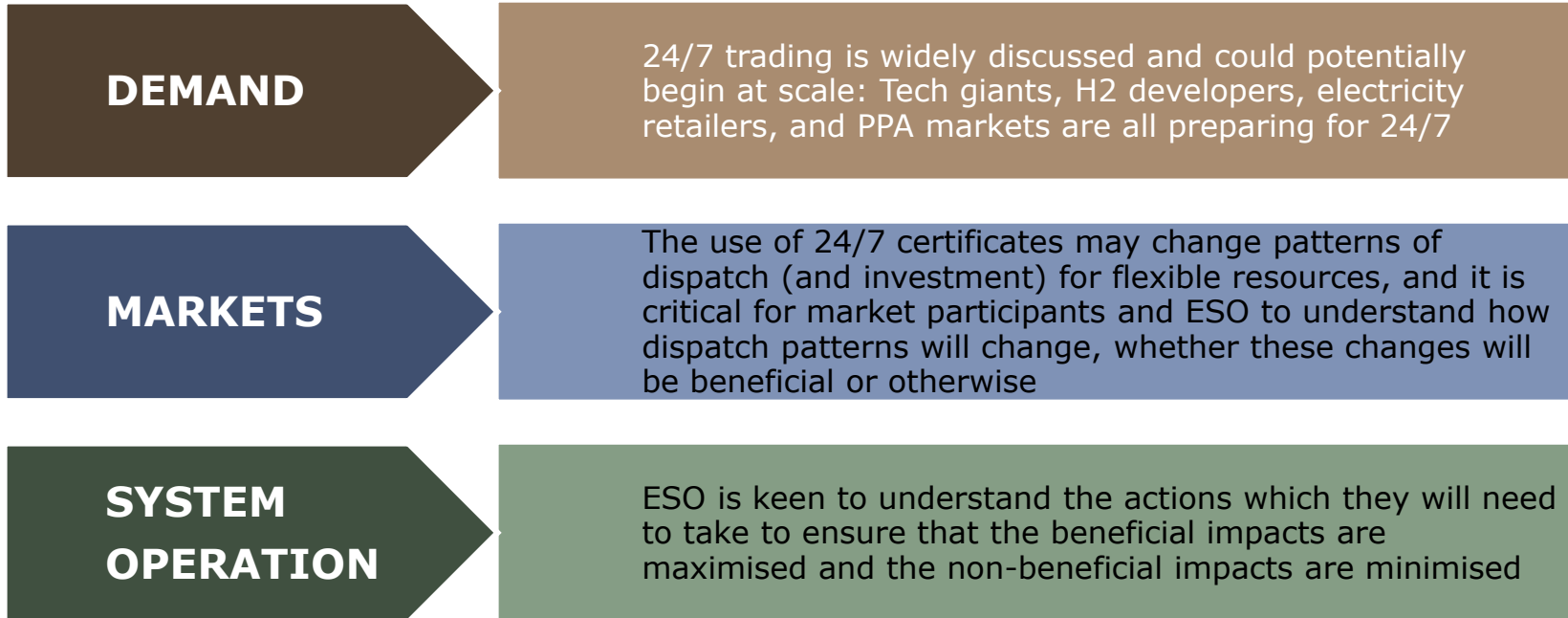
The Advertising Standards Authority of Ireland (ASAI) and Competition and Consumer Protection Commission (CCPC) already currently upholds complaints on greenwashing making Ireland the first country to push back against it

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# Why is 24/7 CFE trading important for ESO?



# The project objectives are to deliver insight about how 24/7 CFE trading can influence the market and to evaluate the impacts on system operation

## PROJECT KEY OUTPUTS

1

### **SPEED AND SCALE OF UPTAKE**

Scenario modelling will give insight of feasible timescales for up-take of 24/7 CFE trading. Scenarios will be developed to, for example, consider the speed of up-take by different types of electricity consumer (including electrolysis), different consumption patterns, timing of market design impacts (zonal versus nodal), etc.

2

### **IMPLICATIONS FOR ESO**

There could be both positive and negative impacts to the ESO of 24/7 CFE trading. The implications for scheduling, dispatch and system operation will be explored, along with the associated impacts on ESO forecasts, processes, etc.

3

### **IMPLICATIONS FOR OTHER MARKET PARTICIPANTS**

Analysis will support ESO in understanding how market participant behaviour could change. We will explore the degree to which 24/7 CFE trading may change asset operation and could provide additional value streams, for instance in storage or renewables, e.g. RES with lower output but greater diversity in timing of production

4

### **HOW ESO CAN INFLUENCE THE OUTCOMES**

There are many elements to consider to deliver the optimal outcome from the ESO's perspective. We will collaborate with the ESO to define key objectives (e.g. coordination of supply and demand with CFE instruments, treatment of CO2 emissions, management of transmission constraints etc.) and consider ESO response to the development of a 24/7 market including support for specific aspects of the arrangements.

5

### **MARKET DESIGN INTERACTIONS**

Considerations are needed to other aspects of market design such as a potential move to a zonal or central dispatch market, and the extent to which a 24/7 CFE traded product could provide a suitable CFD complement. We will evaluate design features that best support the development and adoption of 24/7 CFE trading, and how ESO could interact with the scheme to maximise benefits.

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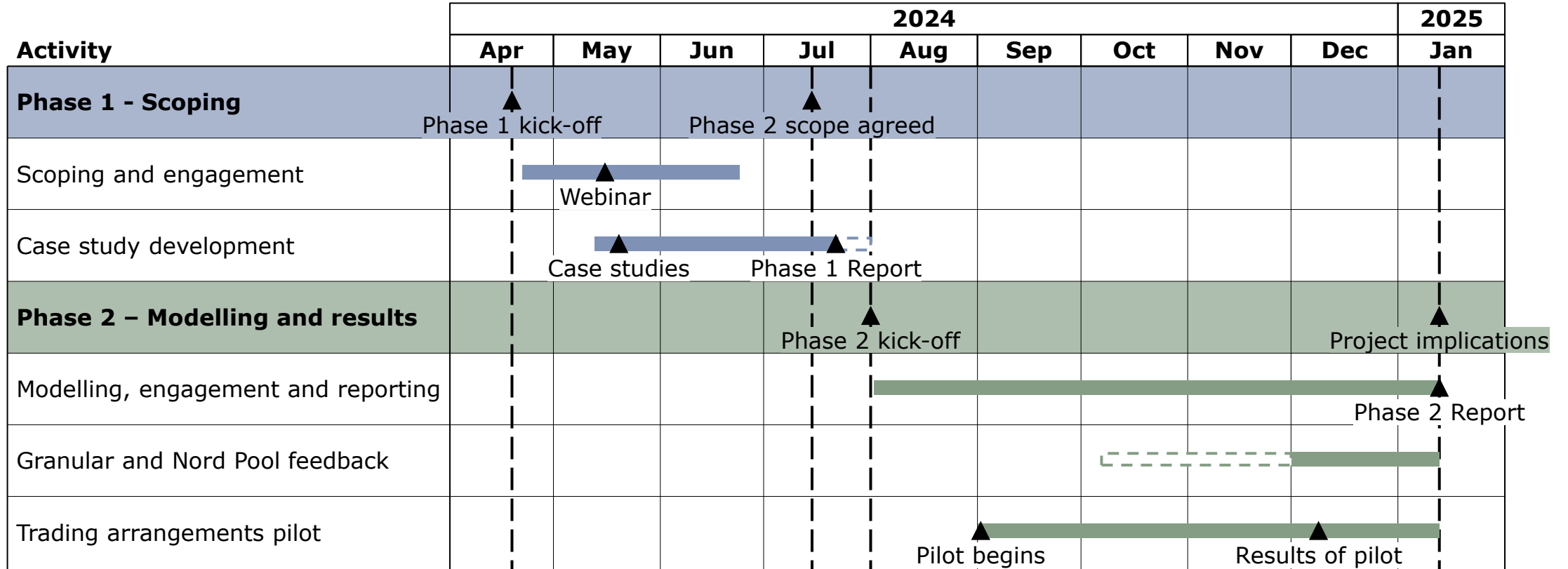
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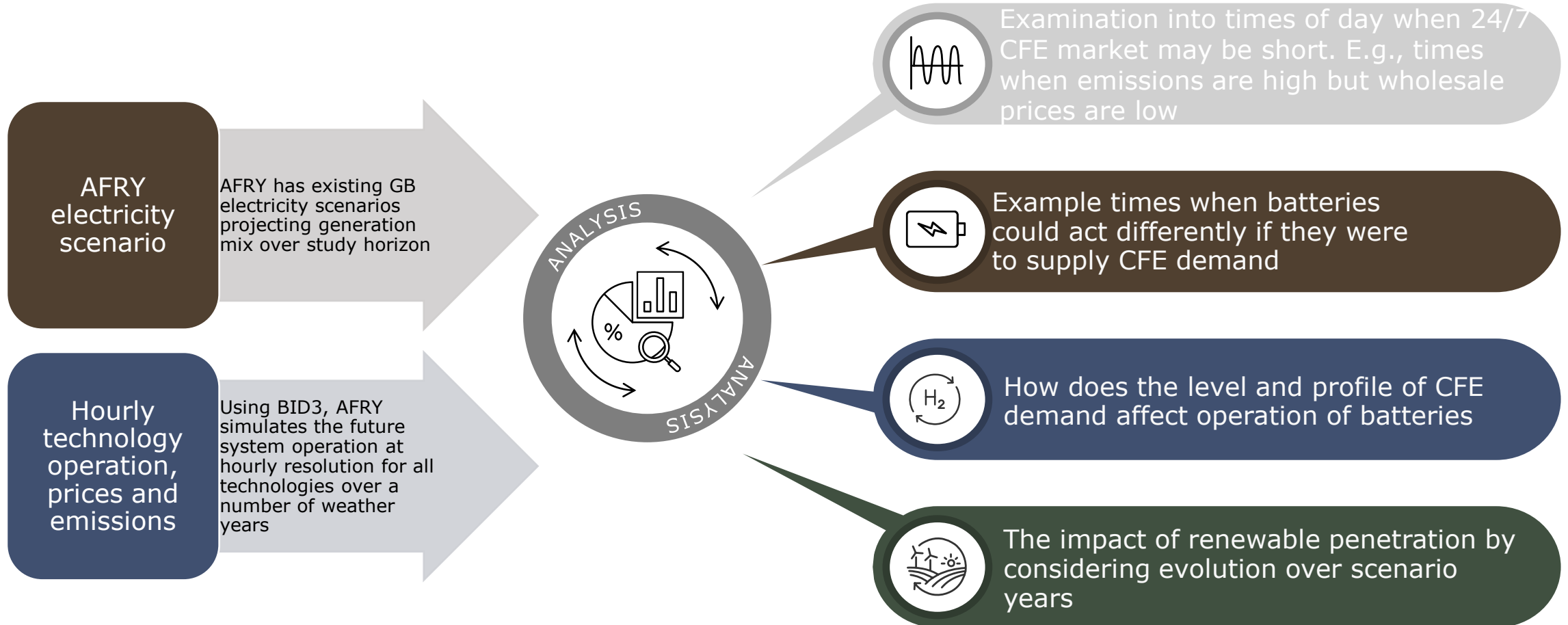


PROJECT OVERVIEW

The project team is currently working on the Phase 1 scoping study, to support modelling and a trading pilot which will be undertaken in Phase 2

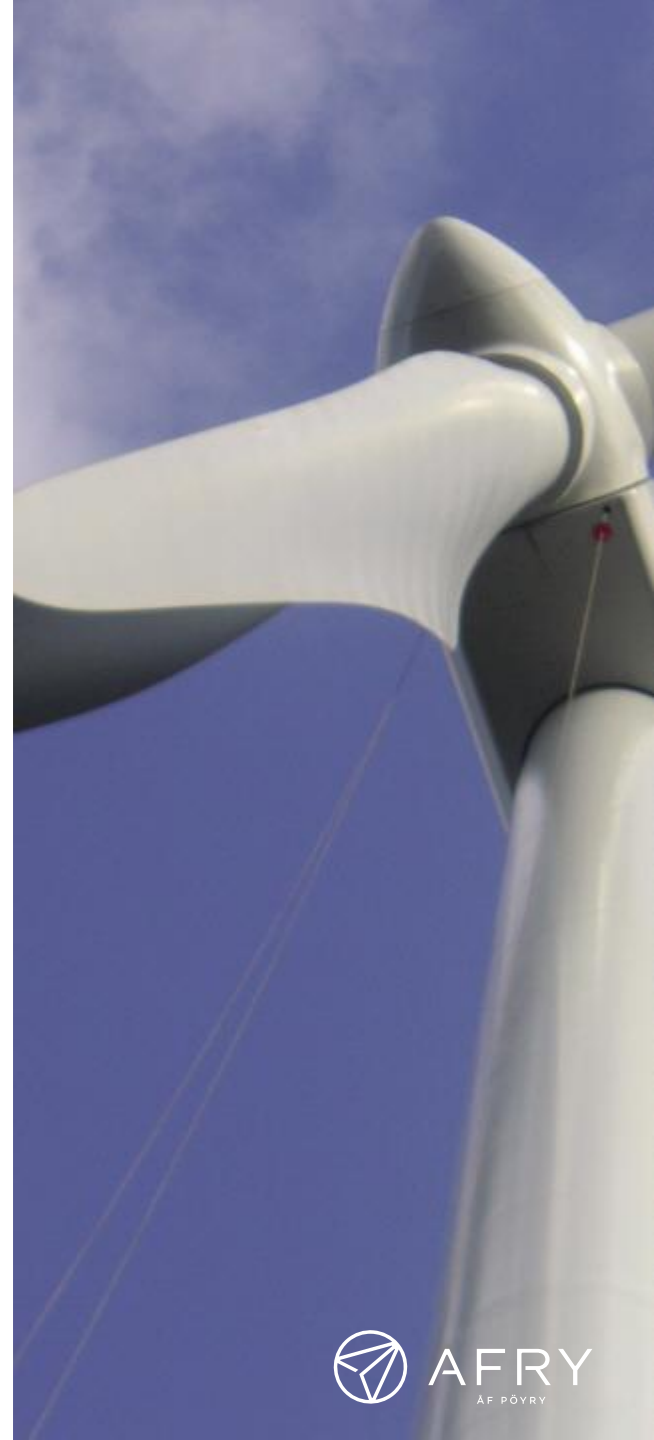
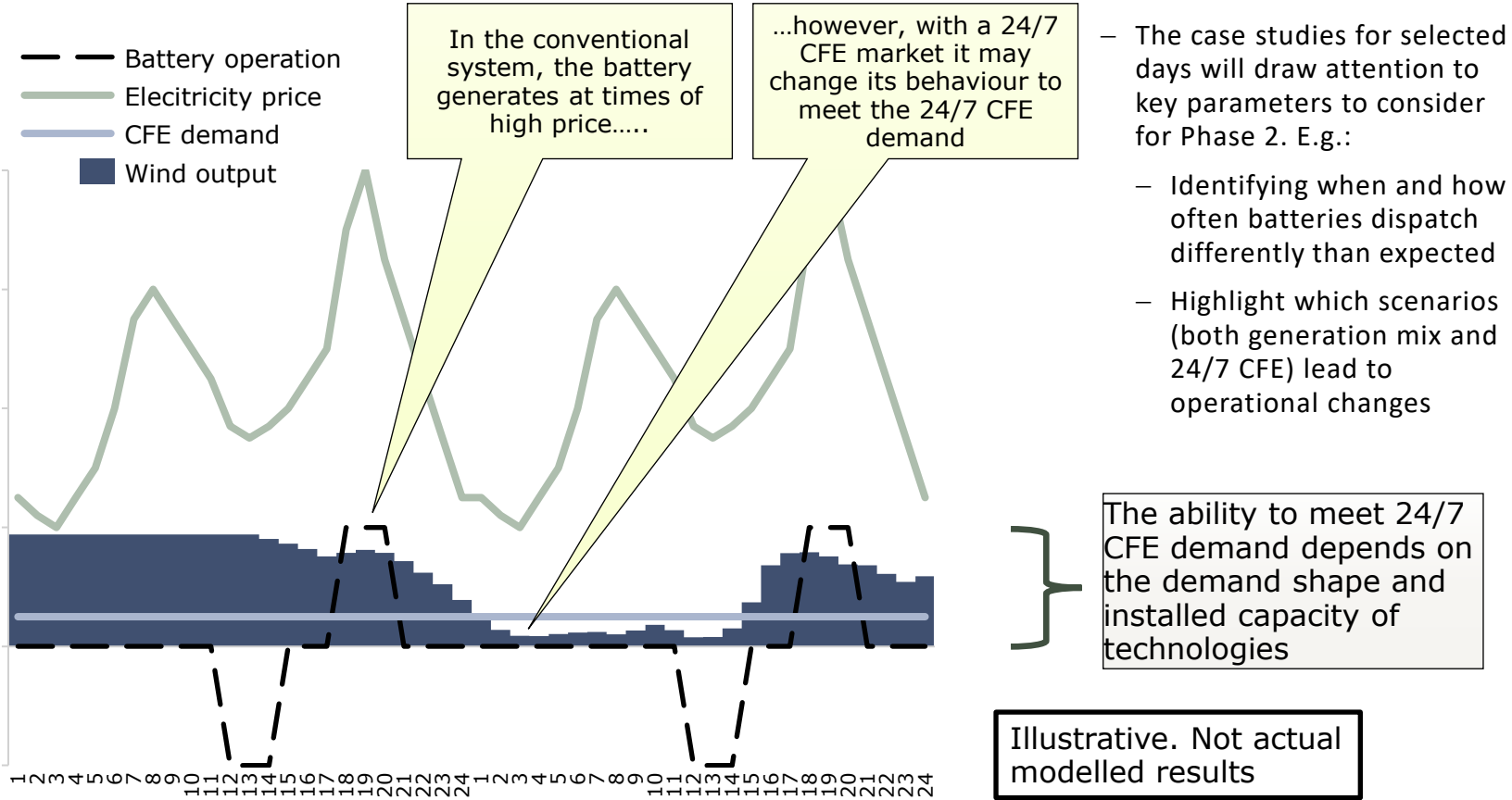


# Phase 1 analysis will identify areas of circumstances where a 24/7 CFE market would lead to different operation of 24/7 CFE assets



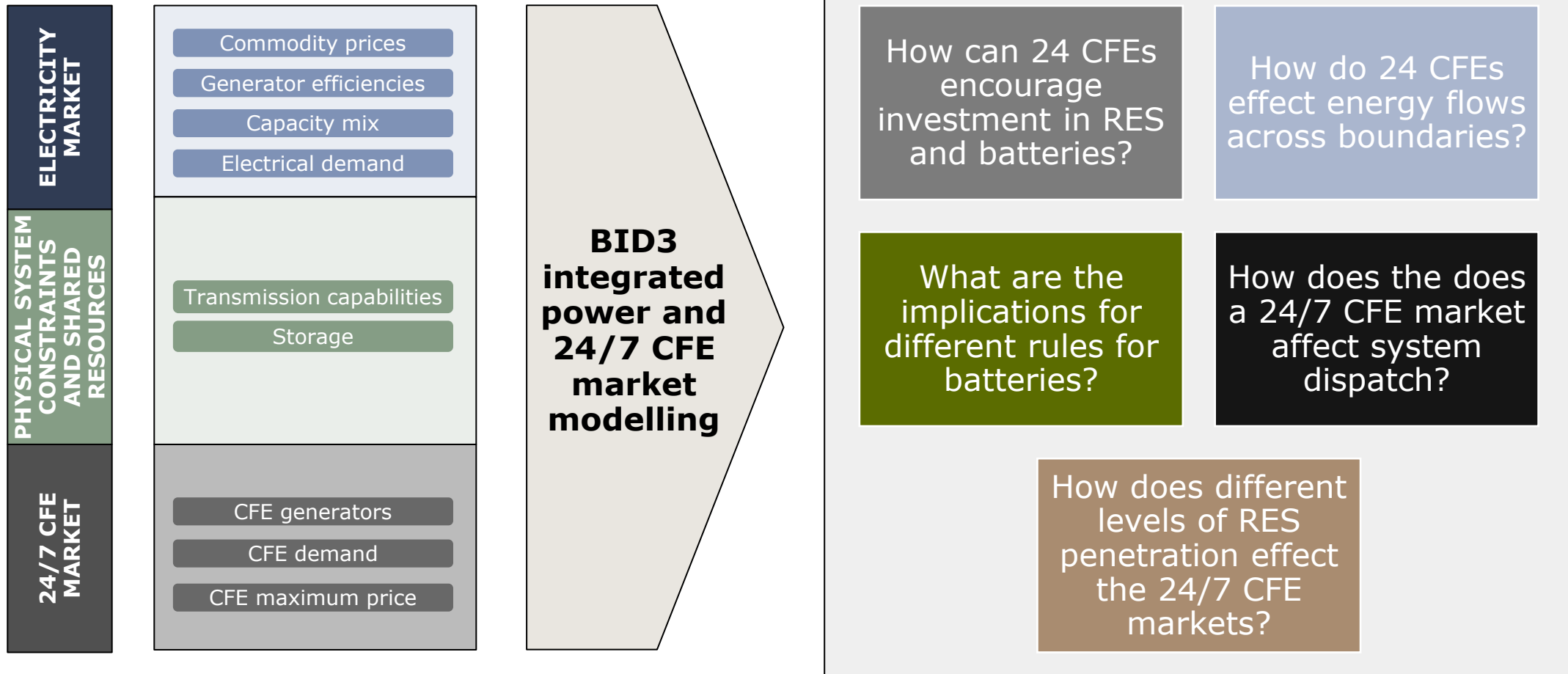
# The case studies from Phase 1 will highlight scenarios for investigation in Phase 2

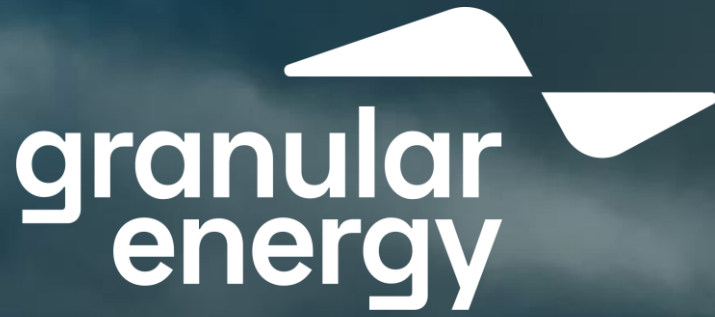
## CASE STUDIES FOR TYPICAL DAYS – SAMPLE OUTPUTTING





# In Phase 2, AFRY will perform a first of a kind analysis into the impacts of a 24/7 CFE market on the GB system





X

**NORD  
POOL**

Developing a centralized market for Granular Energy Certificates

**NORD  
POOL**

# NORD POOL AT A GLANCE

- Nord Pool offers day-ahead and intraday trading, clearing and settlement services and data services
- ~ 400 customers from 20 countries trade on Nord Pool's markets
- Power exchange in 16 European countries (NEMO)
- 5 additional Serviced markets
- ~150 employees, 36 nationalities, offices in Oslo, Stockholm, Helsinki, London and Brussels



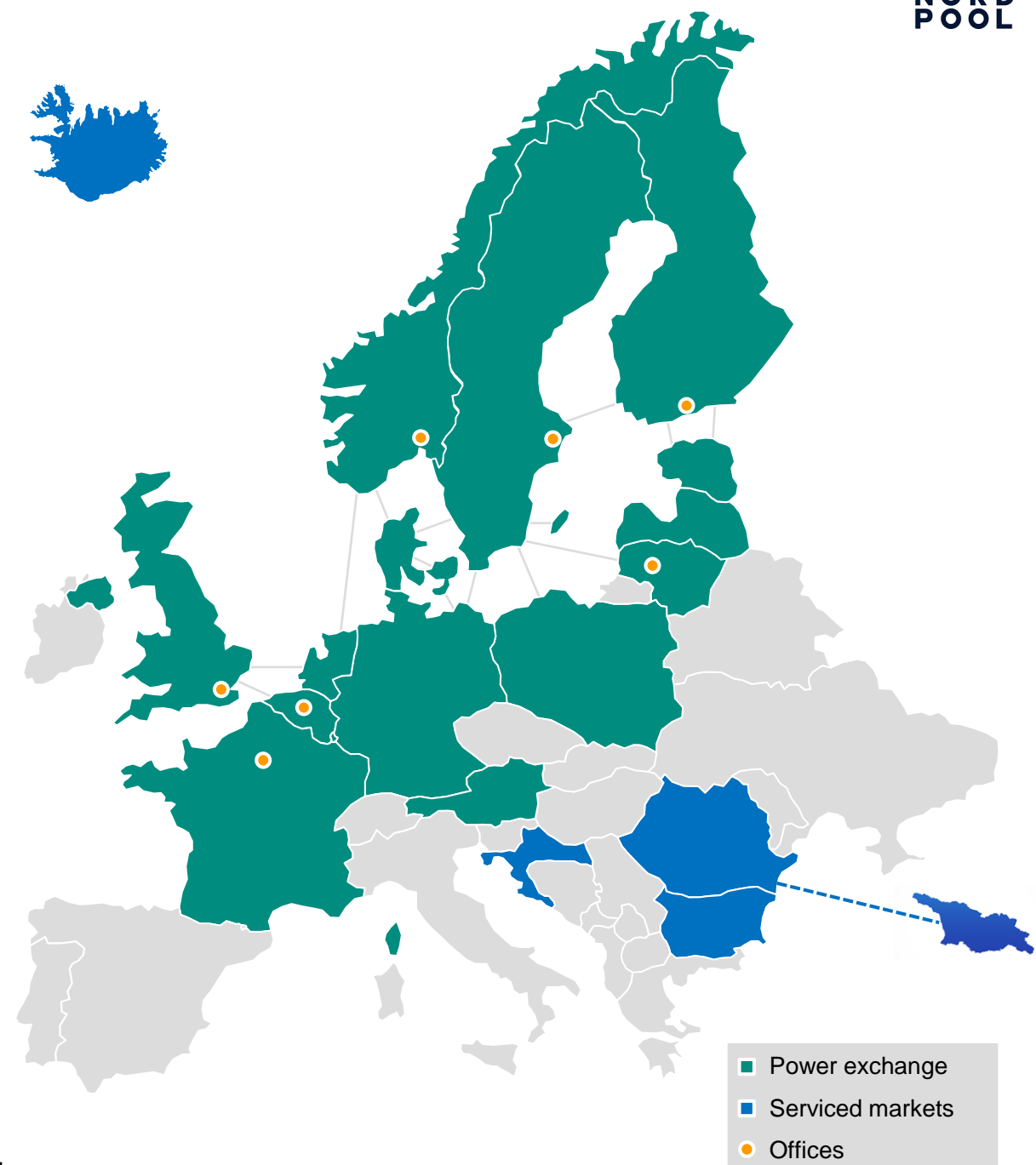
1030 TWh  
day-ahead



74 TWh  
intraday



400+  
customers





# Nord Pool and Granular Energy role in the project

**To run a trial auction**, complementing the current framework on the European integrated electricity market, with ambitions to:

- establish a price reference for hourly clean energy
- maximize liquidity and increase access to granular certificates for large and small players
- provide needed market signals for buyers, sellers, and risk managers
- yield additional revenues for flexibility (e.g. storage, demand-response)

## **The objectives**

- Prove that a market signal can arise and learn about the price dynamics of this market
- Define and trial different options for exchange rules: collateral requirements and margining,
- settlement (e.g. penalties for failure to deliver)
- Assess interest of participants in traded products (technology, location, etc.)

## **The long-term ambition:**

accelerate the transition to clean energy by closing the gap between traditional power markets and certificate markets

## **Next steps:**

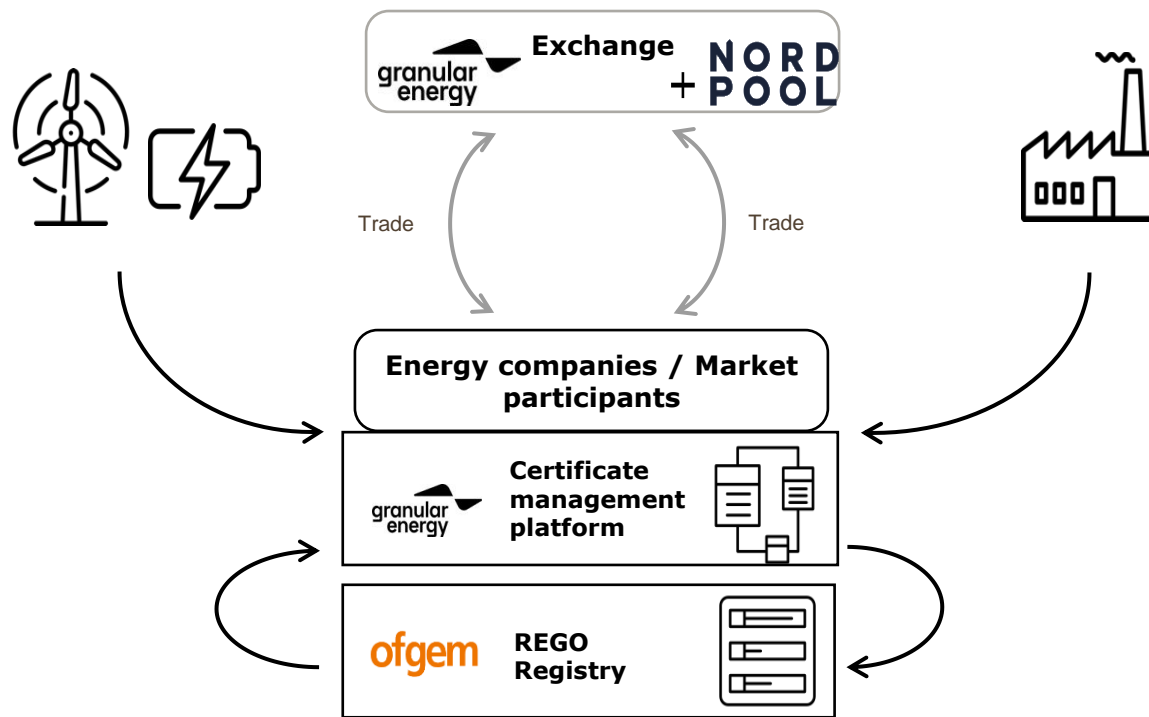
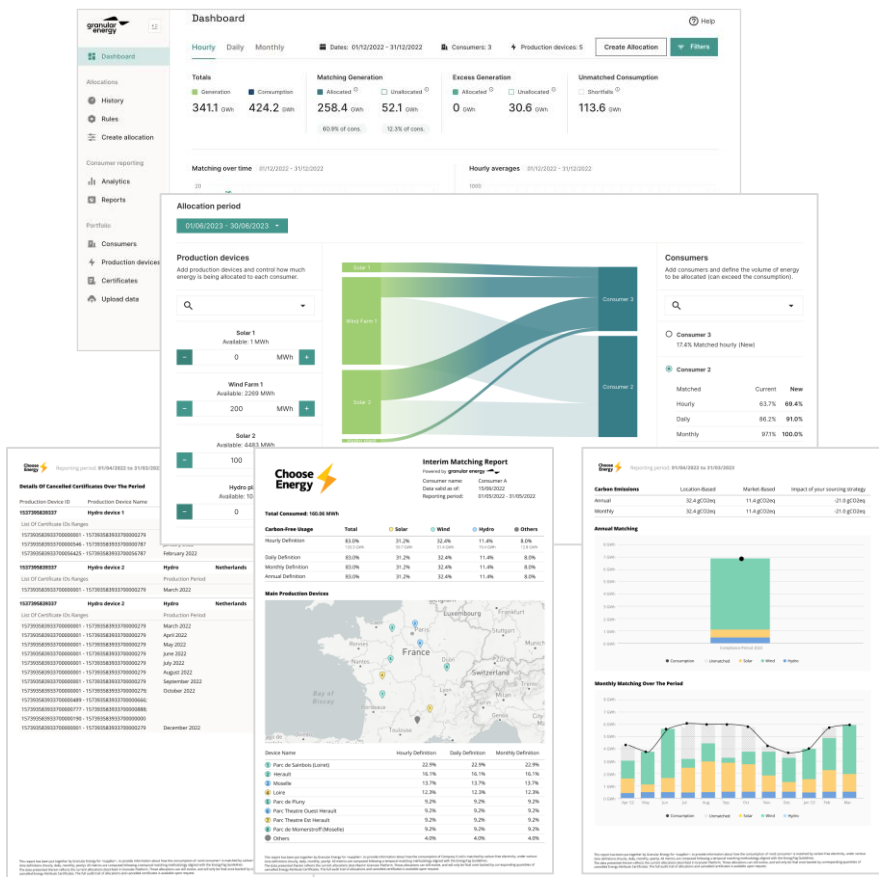
- Phase 1 – survey to inform market design (summer 2024)
- Phase 2 – simulation of market-mechanism (Q3/Q4 2024)

**Contact:** [sebastian.porter@granular-energy.com](mailto:sebastian.porter@granular-energy.com)



PROJECT OVERVIEW

In Phase 1 illustrative market arrangements can be scoped and agreed, to be further developed into a full pilot for Phase 2

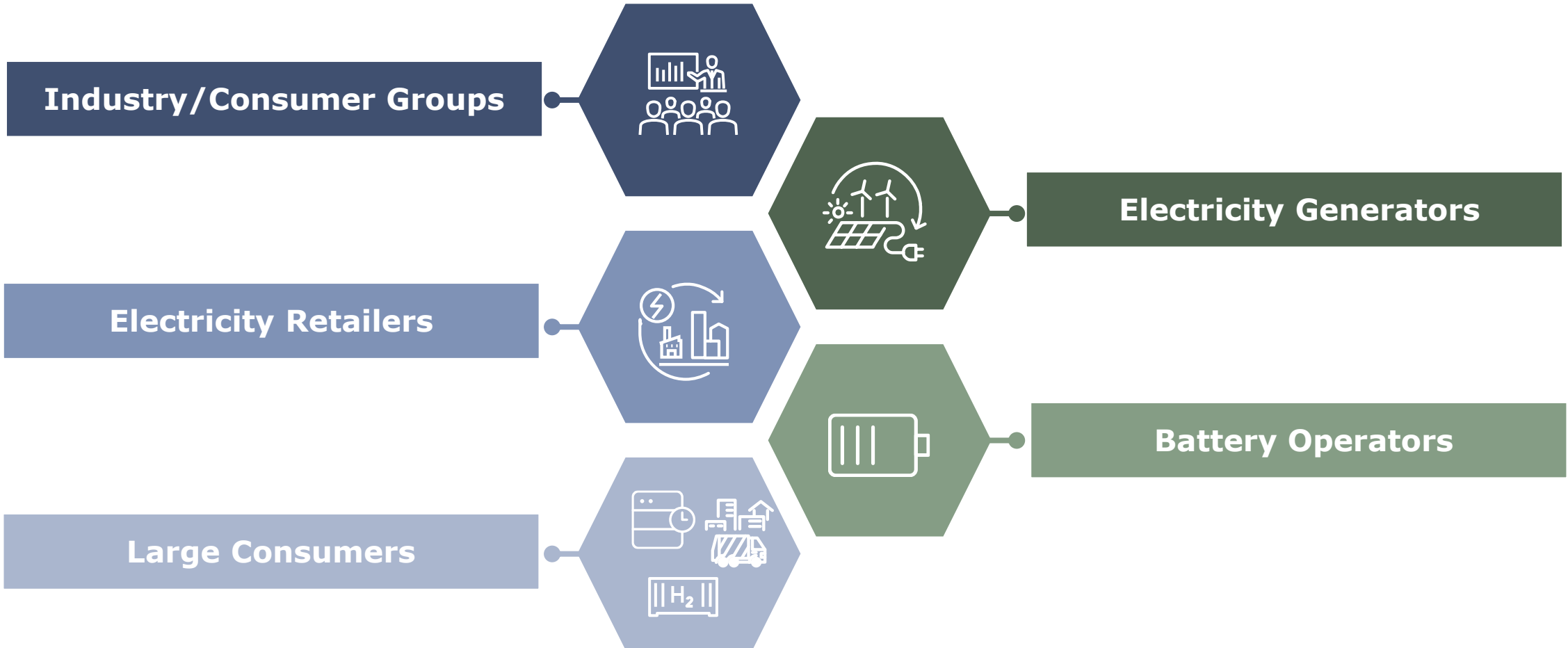


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We are currently in the process of identifying stakeholders to take part in a survey on 24/7 CFE

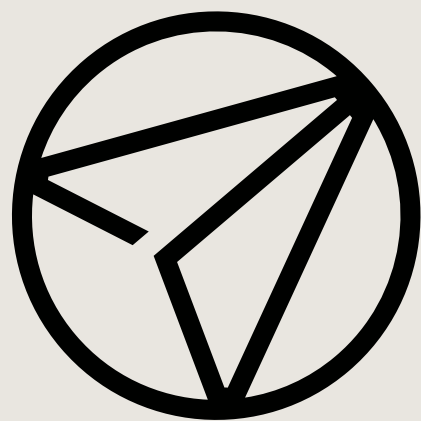


## Stakeholder engagement will inform analysis undertaken in Phase 2

- Currently we are in the process of designing the stakeholder engagement questionnaire
- Key feedback areas we want input on for phase 1:
  - Level of awareness
  - Importance to business goals
  - Fit with sustainability strategy
  - Drivers of uptake
  - CFE attributes that are important to stakeholder
  - Level of compliance required
- We are also looking for companies who are wanting to engage in a trading simulation in Phase 2
- Kicking off stakeholder engagement ~ 3 June

**To get involved email [kerryanne.shanks@afry.com](mailto:kerryanne.shanks@afry.com)**





AFRY

ÅF PÖYRY