

12^{ÈME} COLLOQUE ANNUEL DU CLUB STOCKAGE



saft



Dunkerque, Grandpuits, Carling, Anvers, ... :
Stockage d'énergie en France et Belgique
par Saft et TotalEnergies



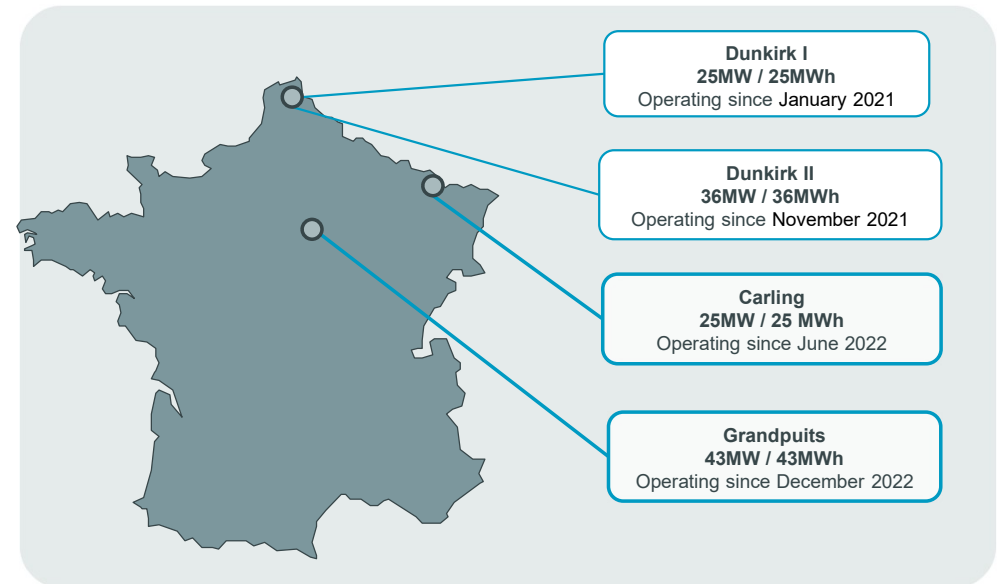
TotalEnergies

12^{ème} colloque annuel du Club Stockage – 05/10/2023

atee Club Stockage
ASSOCIATION TECHNIQUE
ENERGIE ENVIRONNEMENT
d'Energies



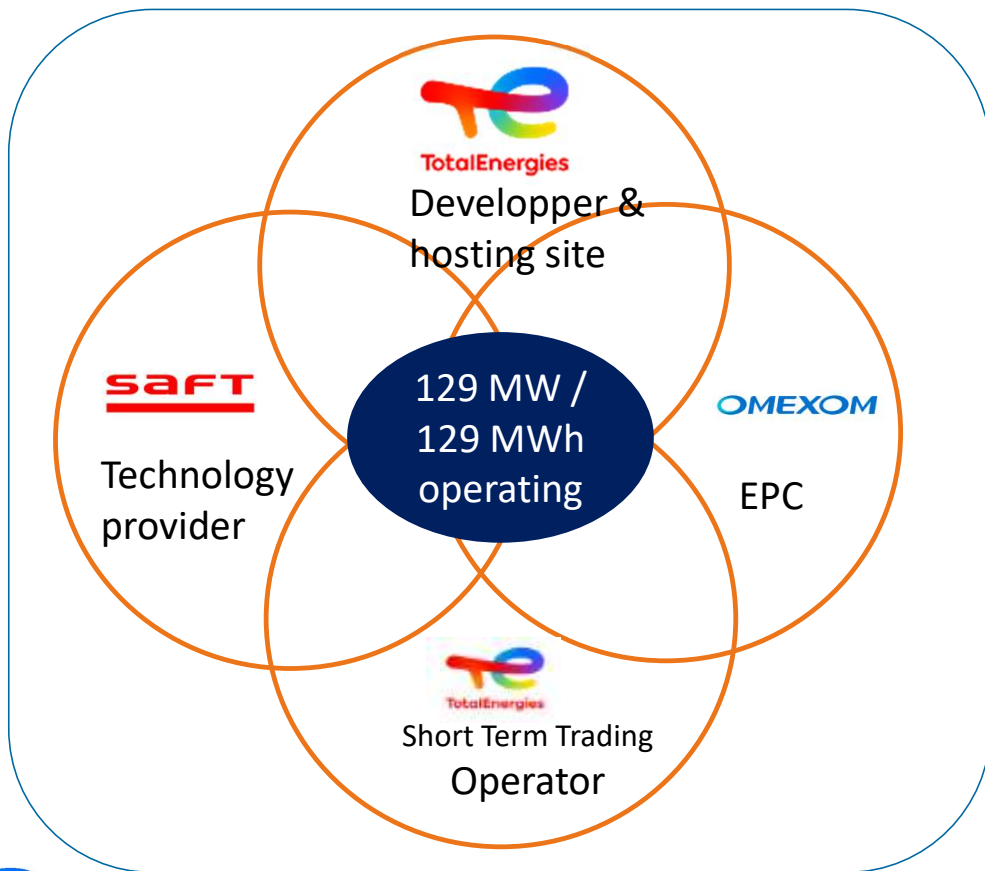
A First in France 129 MW storage tender won



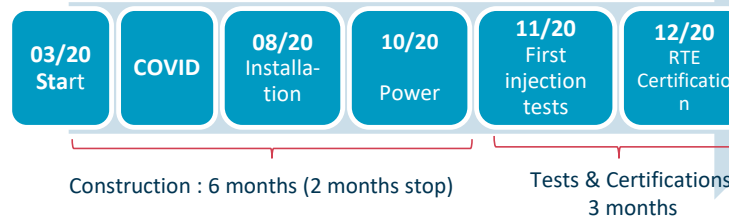
Revenue streams :
Ancillary services (FCR) (70%)
Capacity market (30%)



A Winning Team



Dunkirk I



15 January 2021 :
First utility-scale battery supporting the grid in France



Requirements

Operational Requirements

- Operation 24/24
 - 4h bidding blocks for FCR
 - 25 data points to RTE every 10 seconds
- Penalties in case of non-fulfilment
- Planning of multiple services
 - Evolving in future
- Management of multiple sites

Technical Requirements

- Enhanced Safety
- Flexibility
- High reliability and availability to secure revenues
- Replicability
- Cost competitiveness

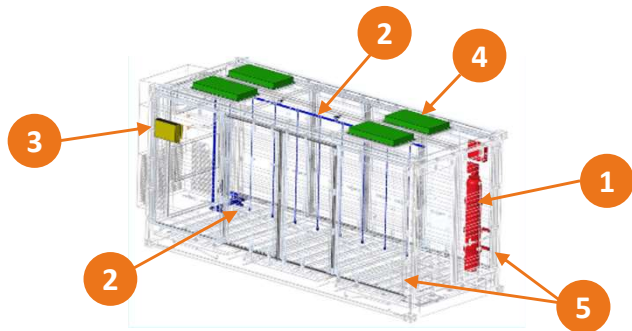
Solution for Dunkirk I



- 25 MW – 25 MWh
- 11 Intensium® Max High Energy
- 3 PCS containers
- 1 LV/MV transformer

State-of-the-art safety approach to guarantee safe operations & interventions

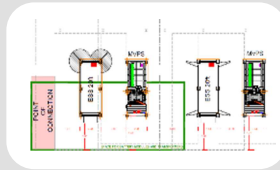
IHE safety barriers design



IHE full scale testing



UL9540A cell, module, system testing



Customer site layout clearance



Safety driven and differentiated IHE design:

- 1 Base gas FSS to suppress electrical fires
- 2 Water FSS to extinguish battery fire
- 3 Pressure relief vents for hot gas expulsion
- 4 Blast panels
- 5 10 cm rockwool inside IHE structure for thermal insulation



Full scale abusive test during product development phase



UL9540A cells, module, system levels tests



Customer site level **3 meters minimum clearance** between IHE-LFP containers and PCS/transformer

Monetization of the battery

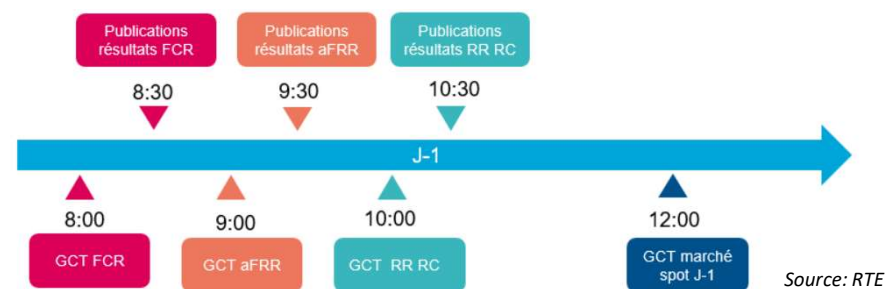
Capacity Mechanism – AOLT contract

- AOLT: Long-term tender
 - Tender organised by RTE and DGEC in 2020 to provide a long-term price signal in order to foster investments
- It guarantee a fixed-price on the French capacity mechanism for 7 years. There are 2 contracts:
 - 2021-2027: 29 k€/MW
 - 2022-2028: 28 k€/MW
- In exchange of this guaranteed price, the awarded capacities must be available every « PP2 » days (days where the grid is constrained) on the ancillary service markets

AOLT is a floor revenue for the battery

Ancillary services to the grid

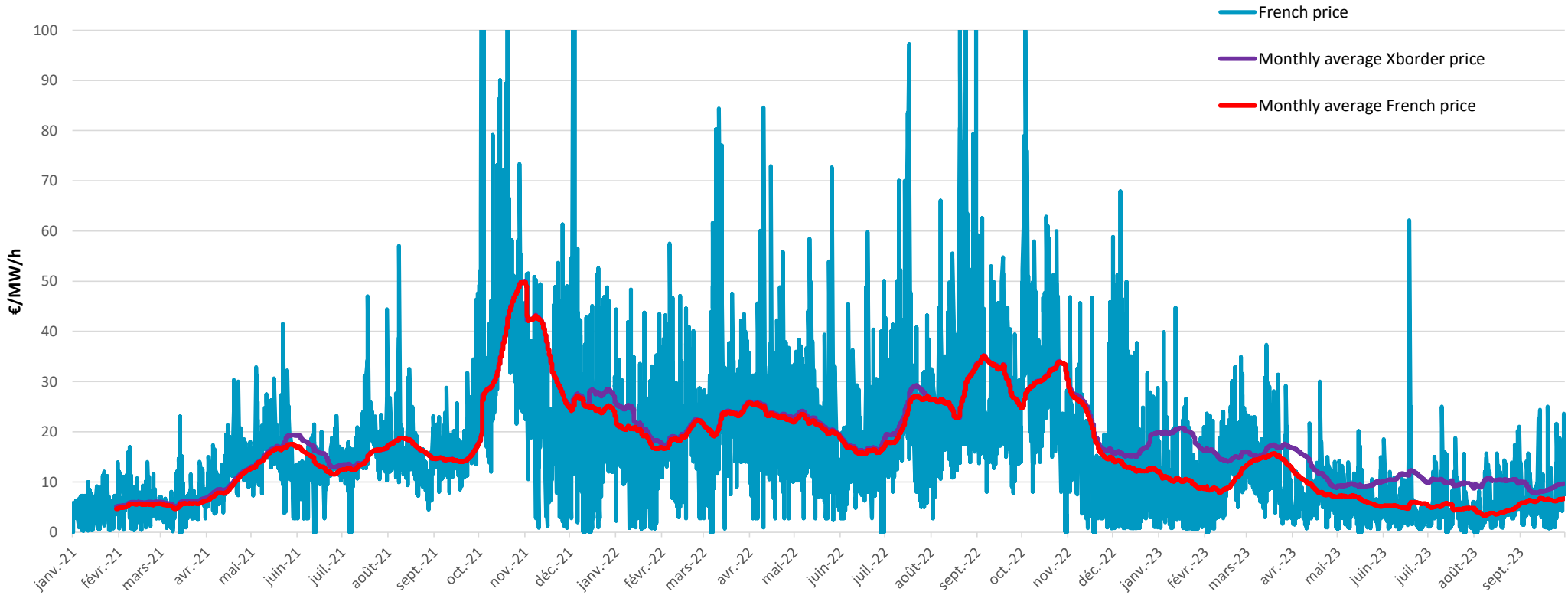
- The production assets' engagement is determined every day on all the markets thanks to tenders which are organised as follow:



- In order to maximise a revenue, an asset which can participate to all market segments must define its arbitrage value in its bids
- For now, FCR is the most profitable market
 - The engagement rate on the FCR market is 100%

Ancillary services are merchant revenues exposed to the market

Volatile revenue from FCR in Europe



Source: www.regelleistung.net



Storage projects in Belgium

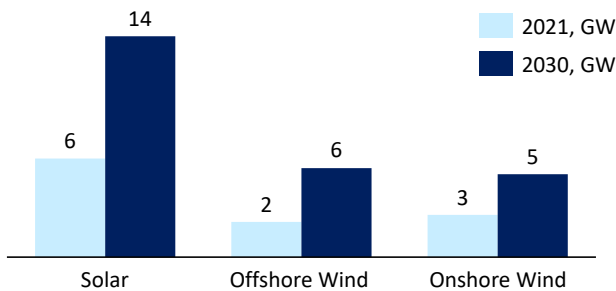




TotalEnergies in Belgium exposed to increasing imbalance risks

- 1 Growing imbalance cost/risk across different geographies and GRP portfolios
- 2 Require an **adequacy** between short flex exposure and **sources of flexibility**

25 GW of RES expected by 2030 in Belgium



Storage in an integrated model



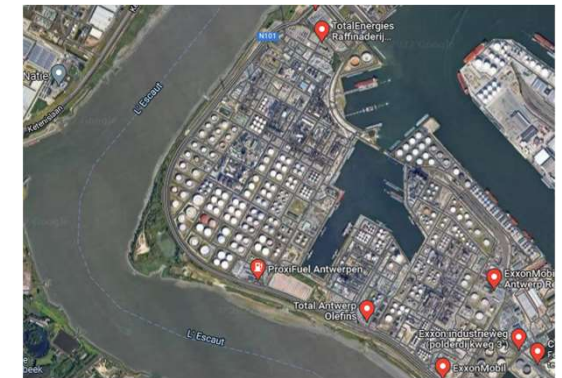
Storage as insurance to mitigate imbalance risk

- 1 Storage revenues are **short term trading** strategies, seizing opps on high **volatile** markets, with multi-asset strategy
- 2 The revenues of fast **storage are correlated** to the imbalance market volatility
- 3 A battery is therefore seen as an **insurance** to mitigate PGE imbalance costs

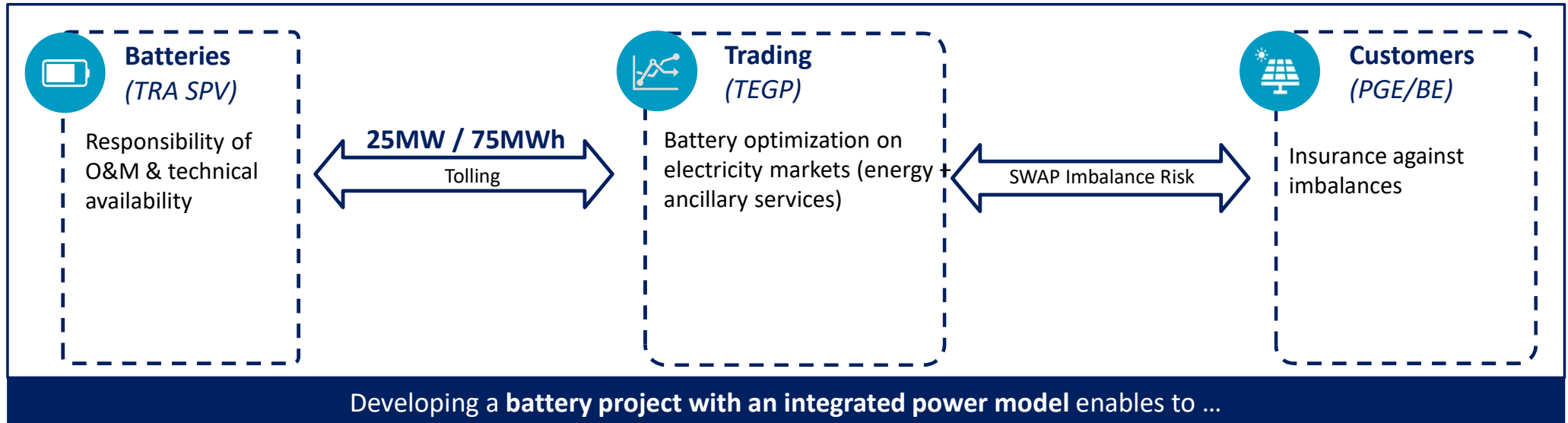


Fast track development & strategy

- 1 Take advantage of TotalEnergies industrial **available land and HV grid connection capacities**
- 2 Belgium is an historical place for TotalEnergies with available premises



A battery project in an integrated power model



Secure commercial expansion
and profitability

25 MW / 75 MWh 3h

BESS Project

COD: Q4 2024



Project overview : ANTWERP

OVERVIEW

- › **Area :** 7500 m²
- › **Investment** >30m€
- › **Revenues** Merchant : Ancillary services & Energy arbitrage
- › **Technical Features** EPC: OMEXOM
BESS Supplier: SAFT

PROJECT STATUS

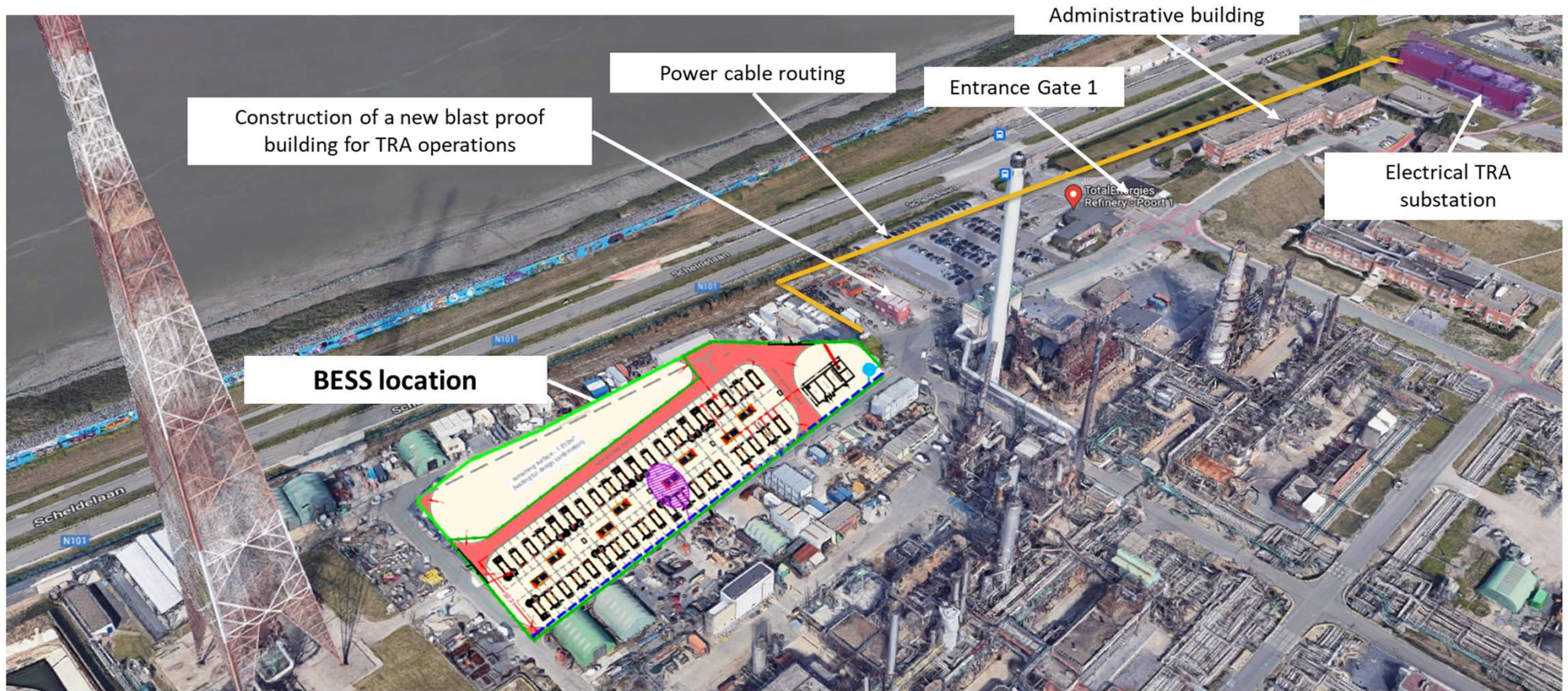
Land	Secured (TE Anvers refinery)
Grid connection	Secured (thru refinery connection)
Permitting	Granted (Env., Construction & Connection)
Construction	Procurement & civil works started

KEY MILESTONES



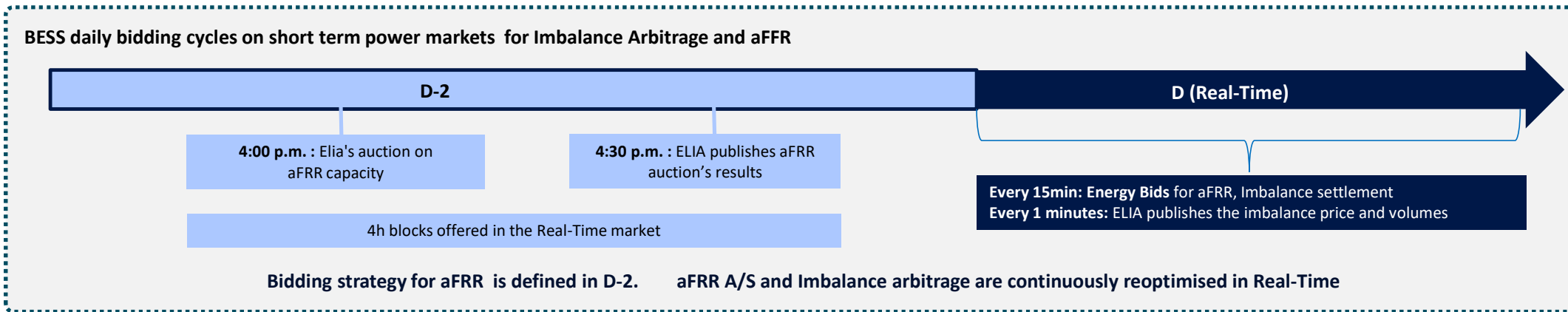
COD: Commercial Operation Date EOO: End of Operation Date

Technical description



BESS Revenues Modeling : Sources of revenues

	Revenue Streams	Description
Daily market revenues (realised by Trading)	Imbalance Arbitrage	Leveraging intraday Energy Markets to capture Imbalance price spreads
	Ancillary Services - aFRR	<p>Capacity Reservation (MW): Daily procurement on 4h blocks by ELIA to balance the grid up& down and replenish the primary reserve (FCR) when depleted. Currently 117MW contracted.</p> <p>Energy activation (MWh): Upward and Downward bids, every 15mins, currently activated by ELIA depending on their needs, will join the European platform PICASSO in the coming months. Possible to participate without being reserved on the Capacity reservation.</p>
Fixed annual revenues (contract SPV – Elia)	CRM	<p>CRM : Capacity Remuneration Mechanism</p> <p>Yearly revenue by ELIA in €/MW/year, in exchange for availability on the grid during specific days.</p> <p>Yearly auctions in Y-1.</p>



saft



Merci !

michael.lippert@saft.com



TotalEnergies

12^{ème} colloque annuel du Club Stockage – 05/10/2023

atee Club Stockage
ASSOCIATION TECHNIQUE
ENERGIE ENVIRONNEMENT
d'Energies