Financing of wind power projects in France & Germany

Role of guarantees of origin (GOs) in the financing of wind power projects in France

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STRATEGY
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In France, due to the current regulatory framework, Guarantees of Origins (GOs) are still to date a marginal source of funding for Renewable Electricity projects for developers

In France, 2 situations must be distinguished when considering the Guarantees of Origins

Plant benefitting from a public support 1)

- **The plant cannot generate GOs for itself**
- **No additional value can be considered in the developer's Business Plan (BP)**

Starting 2019, the French government started to sell GO from these plants, through auctions, in order to reduce the public support financing the RE development (FiT, CfD)

> 95% of Wind power plants in France

powernext

is responsible for the GO register in France

Every account holder can sell GOs through traders, broker, OTC or EEX

Plant without public support 1)

- **The plant can generate and value GOs**

< 5% of Wind power plants in France

For most RE plants, GO's value can not be taken into account by developers in France
The value of GO's was low until know, which minimized the consequences of this regulatory framework and explain the historical lack of willingness to value GO's

NB : This situation is different from other countries, where the GO is owned by the generator, and not linked to the public support:

The UK : The ROC system creates value for GOs

The US : Investment Tax Credit / Production Tax Credit do not require the assignment of original guarantees

1) Public support = Either "contrat d'obligation d'achat" (FiT) OR "contrat de complement de rémunération" (CfD)

However, in the long run, the guarantees of origin should take on a more important role in the assessment of the value of wind power plant by its developer

2 evolutions shall increase the interest in GOs

1 Offer : new types of offer

a **Offer from greenfield plant without public support**
- PPA from developers
- *Ex : SNCF, Metro, Boulanger, etc.*

b **Offer from existing plant exiting the public support schemes**
- End of Feed-in Tariffs for the oldest plants have some useful lifetime remaining
- *In France, for wind power plants: 2 GWs until 2022, +1 GW/year from 2023 [1)]*

2 Demand : increasing demand in quality and quantity

a **Quantity: Increased demand for green electricity sources**
- From B2C and B2B consumers
- *Illustration: Powernext results → 7 TWh over 4 tender sold over 7 TWh auctioned in France*

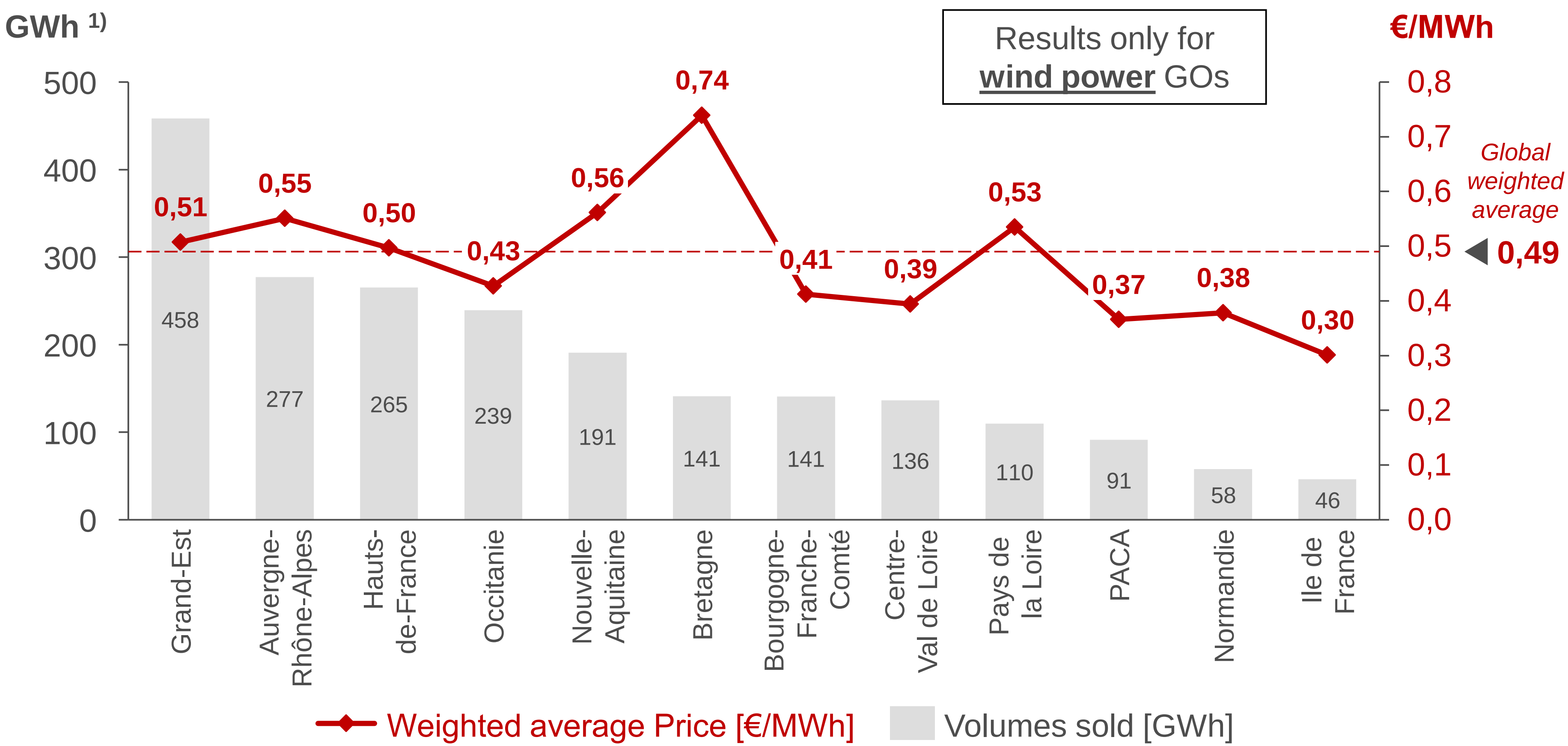
b **Quality: consumers are becoming more aware of the limits of the GOs and require:**
- “Additionality”
- National and/or Local
- Sometimes technology specific
- Bundle contract : GO + Energy

GOs are becoming progressively more important in France, even if the characteristics that have made them successful *(international, decoupled from energy)* now make them less credible to end customers

1) CRE - Délibération N°2019-192

The results of the recent French GOs auctions show a developing interest for local GOs, in line with the development of new local & green retail electricity offers developed by energy suppliers

CUMULATED RESULTS OF THE FRENCH WIND POWER GOs AUCTIONS, CORRESPONDING TO WIND POWER PRODUCTION UNDER PUBLIC SUPPORT SCHEME FROM THE MONTHS OF MARCH 2019 TO JUNE 2019 (4 MONTHS) [1)]



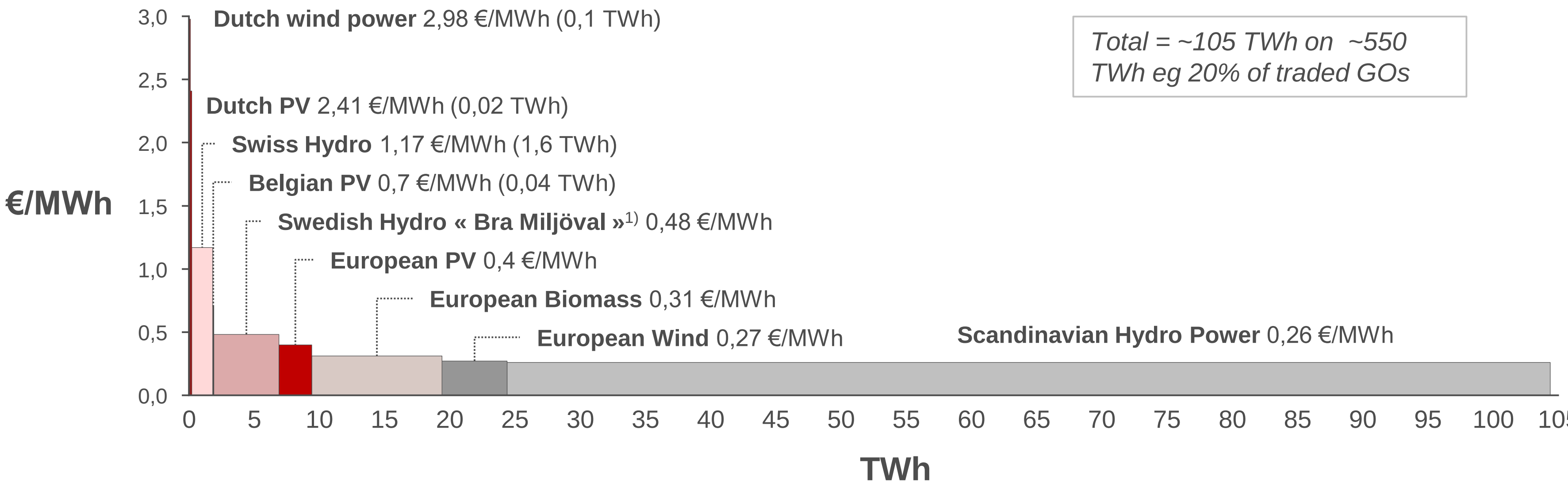
1) Cumulated sales of Wind power GOs corresponding to the production of wind power (included in the auctions) from March to June 2019 → **2,15 TWh**

Source: Powernext

This demand (and higher propensity to pay) for local/regional renewable power is also confirmed on historical average prices of GOs at European level, prices of GOs being very dependent from the country of origin

AVERAGE TRADING PRICES OF GOs (OCTOBER 2016 TO OCTOBER 2017)

Greenfact data[1] covers only 20% of GOs traded during this period of time



- The information contained within the GO (sector and country of production) allows the definition of several GO products. The construction of GO prices depends on the supply / demand balance for each product
- Between October 2016 and October 2017, GO prices varied on average between 0.26€/MWh for Scandinavian hydraulic GOs to 3€/MWh for Dutch wind GOs. These prices represent approximately 1% and 8% of wholesale electricity prices respectively in Norway (~ 25 € / MWh) and Dutch electricity (~ 35 € / MWh).
- Massively available Scandinavian hydraulic GOs with "no real" marketing value (except maybe for Scandinavian consumers) sets a GO floor price. On the contrary, some Dutch suppliers have developed Dutch green offers requiring the purchase of relatively rare national GOs, resulting in a significantly higher price.

1) Swedish Ecolabel

Source : Greenfact, OsloEconomics, E-CUBE Strategy Consultants analysis

BACK-UP

The GO electricity system is already European, bringing together 23 countries, representing a market size of ~600 TWh of RE in 2018, and allowing exchange GO without correlation with a physical flow (book and claim)

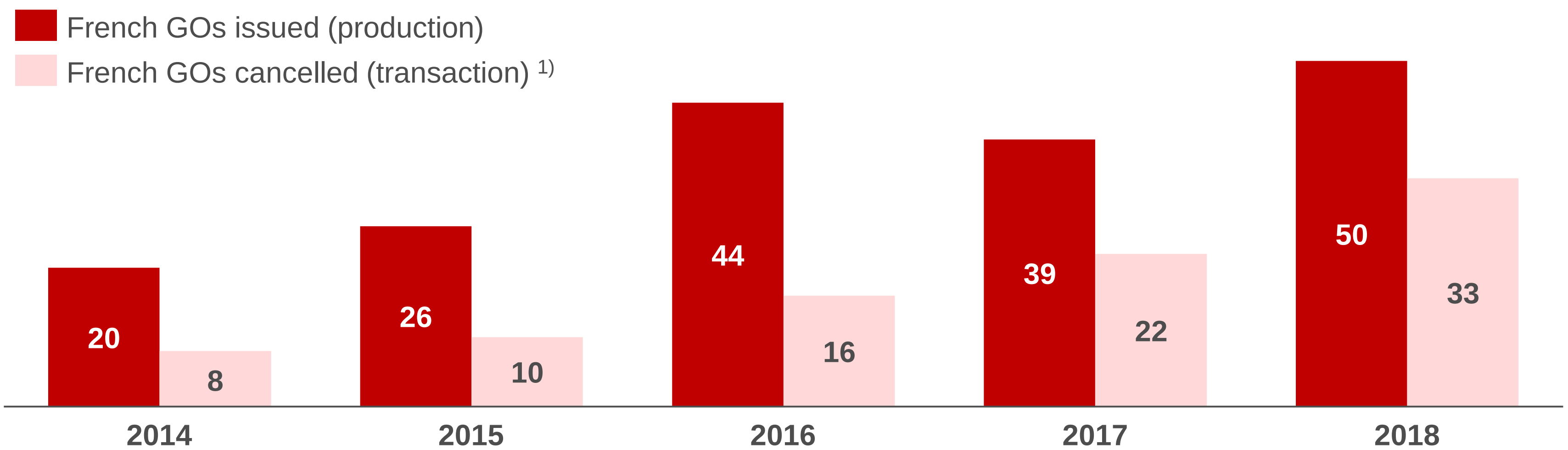
MAIN CHARACTERISTICS OF THE GO ELECTRIC MARKET IN EUROPE

Scope of validity	**23 european countries members of the Association of Issuing Bodies (AIB)**  **+ several countries in discussion to integrate the AIB**
Market size (2017)	▪ 2018 : RE GOs issued (production) = 593 TWh / RE GOs cancelled (transaction) = 520 TWh ▪ 2017 : RE GOs issued (production) = 530 TWh / RE GOs cancelled (transaction) = 470 TWh
Functioning	▪ Each state appoints a national registry manager. In France, Powernext plays this role of recording transactions (issue, transfer and cancellation). ▪ All registry account holders can electronically import and export GOs to and from other European countries. Transactions are not linked to a physical flow GOs are today mainly traded according to 3 (+1 not used) modes: over-the-counter, via a GO trader, via a GO broker or via EEX which has set up an exchange platform, but the volumes were zero in 2016/2017 (mainly due to excessive fees)

Source : AIB, analyse E-CUBE Strategy Consultants

At the French perimeter, the demand for electric GOs is still low compared to the national production, with a demand in French GO today still limited ...

VOLUMES OF FRENCH RE GO$_S$ ISSUED (PRODUCTION) AND CONSUMED (ie « CANCELLED » – IN TRANSACTIONS) - TWH



- Most French suppliers offer green offers, some of them even made the choice to offer only green offers, especially on the mass market.
- However, only 5% of electricity is covered by GOs and only 50% to 70% of the original guarantees are currently used in France, the rest being mainly exported. The weight of regulated tariffs (37% in volume) partly explains this low penetration rate: the exit of regulated tariffs customers towards green alternative offers should therefore increase the demand for G.
- In addition, "national" green offers are still marginal in France today but is yet developing. Only a few small players, offer local / national coverage of customer consumption

1) Excluding exported GOs

Source : AIB, CRE, légifrance, analyse E-CUBE Strategy Consultants