

# ECECP Workshop Notes: Green Power Trading in EU and China

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## Opening remarks

### Octavian Stamate: councillor for climate and energy in China

- Commented on the current State of EU and China and compared dynamics of recent developments.
- Mentioned the new paper - 'Towards the better integration of resources' 2020 – ECECP platform is implementing joint statement
- EU and China have both committed to clean energy targets, under tough conditions e.g., Russia
- EU energy ministers (2 days ago) proposed new measures for energy in the EU – provided a framework for solidarity in addressing the gas crisis, over the next months.
- Alleviate this impact of consumers' energy bills. 2. Accelerate green energy transition. 3. Preserve green market for EU state. 4. Don't increase gas consumption. 5. Remain consistent with the changes taking place in the electricity market.
- Current market design is being limited by current climate (crisis, wars etc.) – no longer fit for purpose.
- Structural reforms of electricity market will take place that are functional and bring balance – decoupling the green electricity market from the rest.

### Anders Hove opening remarks

### PPP by Monique Voogt (SQ Consultant) – Green Power Markets (and the Netherland perspective)

#### Overview of green power markets (at a glance)

- Liberalisation of electricity market since 1996
- Voluntary market booming, actors established REC's/EECs
- Renewable electricity Directive 2001, legally introducing RECs
- 2009 Directive establishing Guarantees of Origin (GoOs)
- 2018 REDII Directive made GoOs obligatory for RES-E claims

#### GoOs prices have been low, but market is steadily increasing

- Lower supply of GoOs from lower hydro production in Norway
- Changes in regulation and consumer views in spur demand
  1. Tightening regulation on disclosure and origin of supply
  2. Increasing corporate reporting and move to 'dark green' and 'local'
  3. Subsidies RES-E reducing; buyers shifting to GoOs
- GoO prices fluctuate across Europe

#### Recent developments and challenges

- Development of EU taxonomy regulation
- Adopted June 2020
- Sets technical screening criteria to identify sustainable economic activities against 6 environmental objectives
- Applies to 10 financial market participants, large companies and EU and member states
- Assumed impact:
  1. Improve quality of environmental reporting and claims, help combat (accusations of) greenwashing
  2. Direct investment toward sustainable projects
  3. Increase demand for dark green GoOs and Green PPAs
- Renewables part of the solution, as some consumers bills are going down
- Grid congestion threatening further growth RES-E
- Power networks are increasingly challenged
- High increase of variable renewable energy
- Strong reduction in thermal production capacity (and nuclear)

- Increased electricity demand (from rapid electrification)

**This limits renewable power growth:**

- New production capacity increasingly is put on a waiting list (e.g., solar plants, wind plants, cant be connected to grid). Some of these projects have fixed subsidies which they lose due to delays
- Planning new capacity is challenged; producers are facing increased risk

**Addressing grid congestion -**

- Supply side solutions
  - Increase cross-border capacity
  - Increase storage
  - Increase flexible peaking units

The European Network of Transition System Operators for Electricity published 10-year plan in July 2022

- Plans will result in, e.g., avoiding 31 Mton of CO2 emission per year and saving 9 bn euros of generation costs per year
- Increase efficiency of grid use
  - Adapt transmission charging
  - Offer non-guaranteed grid capacity
  - Connect solar parks at lower load
  - Increase battery use
  - Digitalisation, smart EV charging

**Further elaboration into Potential Solutions:**

- Changing producers network connection costs: currently producers pay until nearby substation – increasing producer tariff to real cost level would increase efficiency of network use and lower consumer costs
- Connect PV at lower load: topping off connection at 70% of max load reduces income of solar panels by 2%
- Increase Battery Use: peak production PV/wind and peak electricity demand do not coincide – use batteries to increase flexibility and economics of variable renewable electricity production. Pros and cons when it comes to this solution. E.g., household level – smaller batteries less efficient; consumers could use stored power for gaming at power market rather than lowering congestion – this shifts costs to households not owning PV/batteries.
- Offer non-guaranteed grid capacity: grid connections are at peak and yet this level is used a few days/hours a year. Inefficient as large share of grid capacity is reserved but not actually used. Self-production or batteries can help lower consumer costs
- Smart charging, digitisation – smart charging of EV's can save costs and EV's can function as 'mini-batteries'. Digitisation can also improve demand side response opportunities and flexibility of services.

**Kia Marie Jerichau, Energinet (Denmark green power trading) – Balancing – Challenges & Opportunities**

- Danish transmission operator: working towards high level of green energy and renewables and high reliability and affordable price
- 7000km of transmission lines in Denmark – connected to Sweden, Norway, German, the Netherland and soon the UK
- Very dependent on everything going on around them and also the green energy production
- Aiming for 70% CO2 reduction by 2030

**What they are seeing:**

- In the future, expecting less thermal power and thermal power adequacy
- Increasing internal bottleneck in the grid
- Inflexible classical consumption
- Increasing demand & costs for ancillary services
- Buy reserve capacities in the day ahead market – buy and sell before you know the day price, then you can trade in the intraday market 1 hour before opening – then you have the balancing market in this time period. Finally, balancing reserves help decrease bottlenecks
- Proactive balancing is the target
- Response time when it comes to production plants is critical – can you turn it up or down easily, depending on demand? How long can the unit provide the service? What is the cost?
- Electrolysis is the key to green energy solutions
- Problem: need for balancing reserves is rising with the share of renewable energy.

### Dual solution:

1. need to look at balancing in much more dynamic way – buying imbalances more dynamically, will mean there are less deficits/reserves making the system more efficient.
  - Forecasting is also very important – prognosis of consumption, wind, solar, sharing reserves with neighbours etc. This will mean better quantity of reserves can be bought.
2. Capacity reserves from renewables – if we can use renewable reserves, as forecasting gets more reliable, can lead to more flexibility.

### Alberto Prototschnig – PPP – Green Power Trading in the EU

- Commented on reshaping short term markets – will still need a short-term signal

### Presentation:

- EU met and overachieved renewable target in 2020 – 22.1% (target was 20%)
- Some countries did not e.g., France, but EU as a whole did
- Renewable Certificates Trading
- Going forward much more ambitious targets: for 2030 aiming for 45%
- Important that a holistic, most cost effective approach to deliver target is implemented
- Assumption that greening electricity is cheaper than greening gas or hydrogen - but we don't know for sure?
- Guarantees of Origin – 1. Promote equalisation of the marginal cost of greening, 2. Accounting renewable energy production and consumption. 3. Verifying compliance with renewable targets, 4. Ensuring additionality requirement to produce renewable hydrogen
- Guaranteed of Renewable Origin – the same as standard, but for renewable energy
- Any energy consumer would be able to prove the renewable nature of the energy they consume
- Additionality requirement for production of renewable hydrogen: Renewable hydrogen should be produced using renewable electricity which is additional to what is necessary to meet renewable target in final energy / electricity consumption

### Li Ma (SPERI) – The key problem and mechanisms for the market

- Status Quo for electricity market establishment in China
  1. Power market reform in China started quite early – in 1980s already started. 1997 China was starting to separate ministries and power generation.
  2. 2015 – new round of power reform.
- Multi-layered market system – all levels need to be integrated (e.g., local, regional, national)
- Demand and supply need to be better balanced
- Since doc9 was announced: 30 provincial markets have been established and are trading. Inter-provisional markets also exist, and markets cover all sort of auxiliary services
- Steep increase in renewable energy production and consumption in recent years.
- No subsidy for wind and solar, due to market orientated transactions, pricing for renewables can adapt fully

### Key issues in Chinese Market

- incomplete market mechanisms → hindrance to some revenue from the market
- -Transferring energy between provinces would make market more efficient
- -Price caps will gradually be cancelled to allow markets to self-regulate
- -In the future, green certificates, will be centralised and unified so that users can prove how much e.g., wind power, they have purchased.
- -Currently, distributing power has become more important than ever. But not well established. Market access needs to be introduced. Varied of trading needs to increase as well – wholesale market and long-term markets are part of these discussions.
- -Supporting policies for local trading are needed – dispatchment and supply of the energy is also a challenge. (Safety also a concern)

**3 ways for consumers to buy energy** - Direct transaction: user can buy directly from power grid; proxy transaction: you go through the state grade as a proxy for purchase; Full-amount purchase

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How are wind and solar bases being used/will be used? What is planned?

- E.g., in desert lots of solar and wind – transmission integrate the energy. Either local integration (work with local storage) and with transmission through the country to the East side to the country. (And increasingly the north in the future)
- Need a well-designed power mechanism of the energy – will put them as one entity to compete with other energy. So, all energy will be incorporated into one market (one possibility)

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### **Dr Chen Zheng PPP – Innovate the market mechanism, develop a green economy**

#### **Anders Hove - Global Trends in Green power markets and voluntary markets**

- Innovation was important at beginning / foundation of green power markets
- Mandatory or voluntary? Markets work in same environment. Risk that voluntary markets will take credit of policy regulations etc. Risk of double counting.
- US Green markets: growth in mandatory and voluntary markets (voluntary markets are smaller). But as R&D prices have come down, markets have grown
- Who buys renewable energy on a regular basis? Technology sector = 42% of all renewable energy bought, e.g., Google, amazon, etc.,
- Germany largest importer, Norway largest exporter
- Important to integrate hydrogen into the market
- Nuclear is too expensive compared to wind and solar (and public is not in favour of it)
- Companies strongly favour additionality
- Public increasingly concerned about Green Washing – companies that simply buy a volume of ‘green’ credits that cover their power use.
- Companies that rely on RECs may be overestimating their benefit
- This has led companies, such as Google, to achieve 100% targets and prove their green credentials

#### **Panel Discussion**

**Yan Xu** : Green power transaction in the South of China overview. 5 provinces were discussed

**Q:Why is there a premium for renewable energy even if there has been an increase in coal use?**

**Tim Mennel**: In the market, overall, coal price is higher, but for green power there is also a rise in cost. Momentum is the same. Green power now is mainly about wind and solar without any subsidies - now very little supply in market. e.g. Guangdong project, wind and solar projects all in market now, so for users there is an undersupply. Premium over coal for this reason.

- 2 instruments are existing at the same time:
- PPAs are much better suited to provide additionality – would like to incentivise additional investment and for PPA the investor has guarantee long term investment
- In GoO market there is lots of uncertainty.
- Voluntary markets – all sort of developments, that may not satisfy banks. However, both systems can coexist. Important to avoid double counting. e.g., wind farms should not be able to participate in both types of markets (PPAs and GoOs).

**Q: Did renewable PPA also go up in cost? Or are they just taking advantage of current energy crisis and the state of the markets?**

**Peter-Philipp Scierhorn**:

- Generally, wind solar and PPA have also increased, due to inflation, and because the increase in spot market prices. 50 % this year – but not as much as conventional energy markets.
- Are renewable PPAs getting shorter to take account of fluctuating markets? Not at the moment.

**Mr Dong**:

Answering first question:

- For the Beijing exchange – from the reaction of the markets, everything looks good.
- Domestically, green power trading is concentrated on wind and solar with solar being the lion share. From user side, numerous companies have purchased green

**What does a green power trade look like? Are green power purchases monthly contract, a yearly contract? Is it a PPA or more of a green certificate?**

- Mainly medium and long-term transactions. Green power trading at the moment, will soon introduce green certificates with the 1 mg/h unit.

**Q. In the green power market what % of electricity does the green market represent?**

Yan Xu -

- For green power share in market, southern China is around 400 billion including hydro, wind and solar, and thermal, and this features as the lion share
- 2 billion against 400 billion – that is the proportion

**Question from Beijing**

***Is there a way to separate to separate the green subsidies and do they enter the green market all at once or are there differences?***

- China North and South are similar to each other
- In EU, there is no difference between subsidies or non-subsidised in market integration.
- Large scale installation today, because all those installations have to participate in the market. Subsidies get a market premium on top determined by auction premiums. 15 years ago, tariffs were granted and many have still have not expired in many cases – this type of support mechanism also exists for small scale installations e.g., small scale households to sell their electricity to the grid, but this is being phased out due to market changes, so extra electricity is remunerated.

**Peter-Philipp Scierhorn:**

- As far as GO is concerned, wind and solar is considered 1 unit of energy produced. But mandatory that electricity fed in is exclusively from renewable generation.
- But have to be careful, because if is stored (energy storage) it affects the renewable nature of the energy which could mean it no longer qualifies. Almost a disincentive to store energy and install more storage.
- Green power trading schemes are also impacted by this – but need to be adapted so that in the future renewable energy can be the dominant energy in the market.

***Cross-border transaction? Are they mainly in the local markets or cross border when it comes to PPAs?***

**Peter-Philipp Scierhorn:** Cross-border PPAs are also being signed.

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