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Stimulation and Integration of DER: some EU-general and UK-specific issues

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Conclusions

1. **Use GO consistently for all conceivable policy applications warranting proof of generation attributes**
2. **Set out to reform DER - notably RES-E - stimulation policies consistent with EU-wide harmonisation of support policies towards single European electricity market**
3. **German Feed-in Law as EU harmonisation paradigm is a dead-end street**
4. **Generic RPS for *all* eligible RES-E generation technologies *PLUS* MS- and technology-specific support for higher-cost eligibles is a strong contender**
5. ***Current RO nor proposed RO reforms with technology banding stand a chance to trigger European-wide replication***
6. **Appropriate reform of RO has the potential for the UK to lead by example toward European-wide harmonisation**

Broad EU policy framework
Guiding “pillars”of EU energy policy

- Three guiding principles
  - A cost-competitive Europe (“Lisbon Agenda”)
  - Ensure security of energy supply (SoES)
  - Mitigate adverse environmental impacts of energy production and use

Broad EU policy framework
Expansion to four "pillars" might be considered

- Concerning environment: tendency to focus myopically on Global Warming
  - In integrated assessments mitigation of localised impacts tend to get "undersnowed"
  - "Dirty" options such as coal-fired power plants with CSS tend to score unduly high in indicative long-term public planning documents
- **For consideration: separate pillars**
  - **Mitigate Climate Change**
  - **Mitigate localised environmental impacts**

Broad EU policy framework
New 2020 EU targets are key policy drivers

Greenhouse gas emission reduction

- EU Kyoto target **-8% reduction in 2008-2012** compared to 1990 emissions
- CO2 emission reduction in **2020: -20%** (**or even -30%** pending post-Kyoto outcome)

Renewables

- **2010 target: 12% RES** in total primary energy supply (**21% RES-E** in total electricity consumption; **5.75% renewable fuels** in automotive fuels consumption)
- **2020 target: 20% RES** in total primary energy supply (**10% renewable fuels** in automotive fuels consumption; no details about RES-E but **implication > 30% RES-E**)

Energy efficiency

Indicative 2020 target: 20% energy saving by 2020 compared to baseline

Broad EU policy framework
EU legislation I

- Renewables (RES-E) Directive 2001/77/EC
  - Definition of renewables
  - Indicative RES-E (consumption) targets for year 2010
  - Mandates RES-E guarantees of origin, governed by subsidiarity
  - Subsidiarity regarding RES-E support mechanisms
  - Mandates streamlining of authorisation procedures
  - Mandates level playing field regarding grid access
  - Periodic monitoring and evaluation reporting

Commission anticipates new RES Directive toward ultimo 2008 !!!

Broad EU policy framework
EU legislation II

- Electricity Market Directive 2003/54/EC mandates
  - one internal electricity market
  - disclosure of origin of suppliers' electricity
    - generation mix and environmental impact
    - ex post; *governed by subsidiarity*
- CHP Directive 2004/8/EC
  - Subsidiarity regarding CHP support mechanisms
  - Mandates among others CHP guarantees of origin, governed by subsidiarity

DER stimulation ≡ Carbon reduction policy ???

Case for dedicated RES-E market support

Externalities RES-E include:

- √ **EU energy supply security (less imported fossil fuels)**
- √ **Improved expected portfolio price risk – price combination**
- √ **Mitigation of GHG emissions by the EU power sector**
- √ **Mitigation of localized pollutant emissions + destructive mining**
- √ **Comparative advantage for EU in sunrise sustainable technology industry**
- √ **Improved quality of life in rural and isolated regions**

DER stimulation ≡ Carbon reduction policy ???
Case for dedicated RES-E market support

- **RES-E promotion is certainly NOT merely an option to be subsumed under Climate Change mitigation policy !!!**

- **Strong case for dedicated policy support with dedicated mandatory targets**

- Measuring cost effectiveness: **additional cost of policy support in £ / MWh** rather than myopic yardsticks (e.g.: £ / tCO2)

Policy integration
Coherence with major EU policy issues

- RES-E support ↔ Single European market
- RES-E support ↔ Achieving a competitive Europe
  - Longer term view warranted (dynamic economic efficiency)
- RES-E support ↔ Security of Energy Supply
  - Includes impact of RES-E on grid operations
- RES-E support ↔ Sustainable low carbon development
- RES-E support ↔ Minimize adverse localised impacts
- RES-E support ↔ Intra-EU regional coherence

Policy integration
Disclosure of generation attributes (I)

- Required for myriad purposes (e.g. verification of RES-E , CHP-E, 'electricity product labels', RES-E target compliance)
- Accordingly, verification needed of diverse claims (e.g. claims by suppliers, official statistics, Corporate Social Responsibility reports)
- Yet….. data sets referring to RES-E quantities for different purposes should be:
  1) **Reliable**
  2) **Transparent**
  3) **Mutually consistent**

This is a key issue for facilitating (voluntary) demand-driven support for RES-E from the market

Policy integration
Disclosure of generation attributes (II)

- Electricity Market Directive (2003/54/EC) demands ex post supplier (electricity mix) portfolio disclosure
- Label model and verification system NOT specified
- Should consumers have something to choose (disclosure of suppliers' products)?
- Should consumers be enabled to choose to-day's products instead of yesterday's supplier portfolios (ex ante product portfolio disclosure)?
- Should labels and verification be standardized in a reliable and transparent way?

Generic grid integration
Grid access and permitting issues

- In many MS implementation of RES-E investment projects are severely impeded by cumbersome approval procedures
- In some MS RES-E is granted priority access (Germany), while in some other MS TSO/DSO authorities seem to impose lengthy and opaque authorization procedures
- Penalty regulations imposed on intermittent RES-E generators for system unbalance costs also vary appreciably among MS
- Divergencies in grid integration reinforce the fragmentation of the EU RES-E market
- … and blur transparency on effectiveness of support mechs

Generic grid integration issues
DER and RES-E: evolving trends

- The **contribution of DER** (distributed generation, flexible load and storage devices) **and large-scale RES-E technology** is no longer a marginal trend

- But is affecting the whole T&D system

- Requires changes in several areas, such as
  - network operation (passive ↛ active network mgmt)
  - regulation (ignoring DER ↛ allowing for DER impacts)

Generic grid integration issues
Evolving high shares of intermittents

High wind (shares > 20%) may generate:

- Excess surpluses beyond export capacity
- Higher balancing and reserve costs
- Lower electricity market prices
- And hence exercise a downward pressure on:
  - Supply company revenues
  - Generation capacity value and adequacy
  - Profitability of other inflexible generation with high start-up costs

  ↳ Reduced investments in baseload???

Generic grid integration issues
Enabling more intermittent DER/RES-E

Demand Responses
- Time of use tariffs, spot market based pricing, real time pricing
- Interruptible contracts
- Automatic load control

Trade
- Storage systems such as batteries, compressed air, pumped hydro etc
- Heat storage or other types
- Better predicting tools RES e.g. regarding wind resources in the next hours/day
- Virtual power plants VPP to offer DER services to energy, regulation and reserves wholesale markets

Network operations
- Dynamic islanding **CHECK!!!**
- Virtual power plants VPP to offer DER services to provide ancillary services to DSOs (DNOs)
- Active network management; adopting innovative network regulation and charges include planning (location) expansion of DER, DER for ancillary services etc
- Innovative grid codes, load balancing rules etc **CHECK!!!**
- Adaptation of regulatory framework

Generation alternatives
- Procedures for reserve capacity
- Develop more flexible controllable generation and load capacity

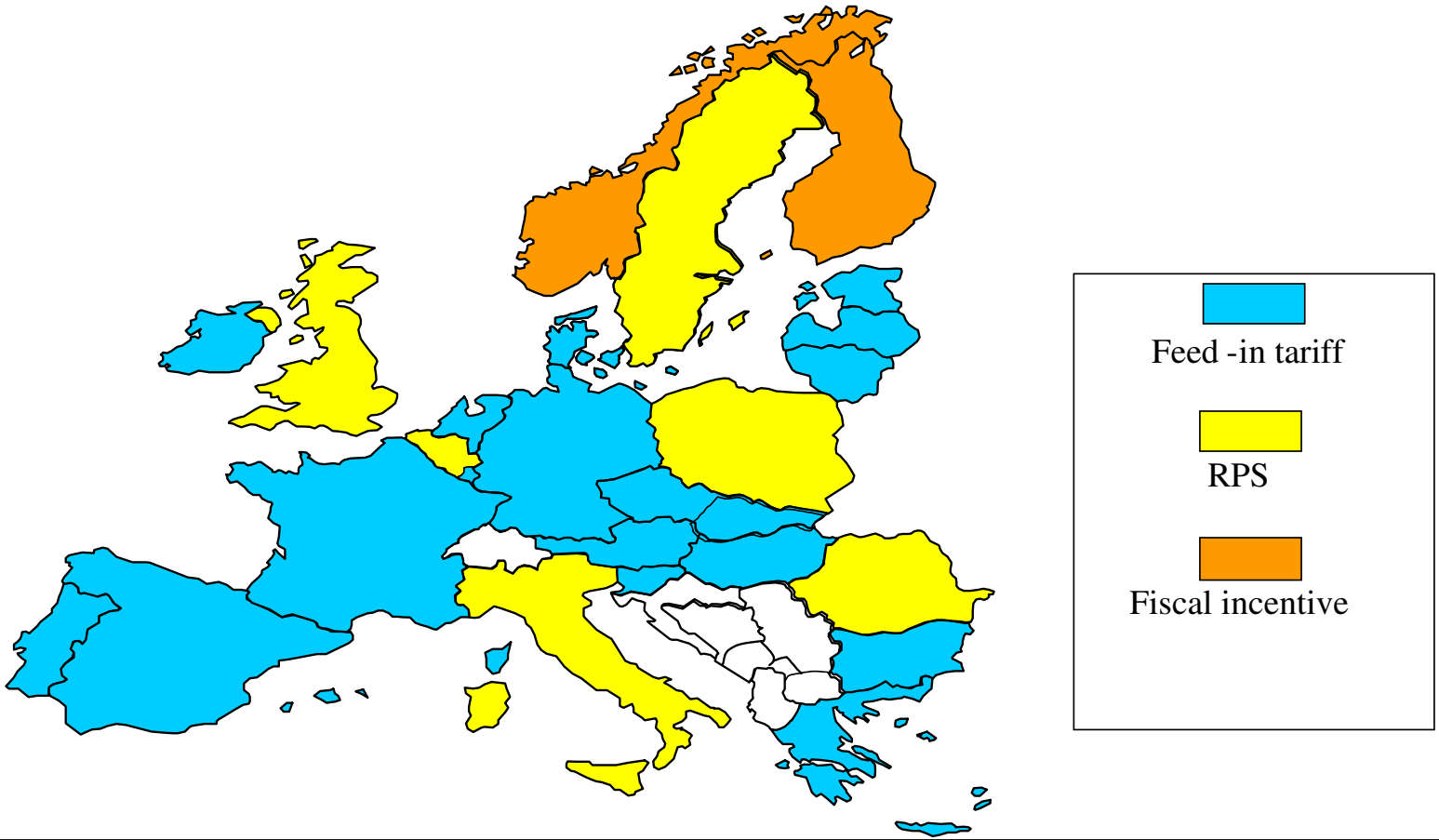
Stimulation of RES-E in Europe

Instruments

- **DIRECT**
  - **FIT**: Preferential feed-in tariffs / premiums for RES-E
  - **RPS**: Renewables Portfolio Standard on power suppliers (or producers)
  - RES-E procurement **tenders / contracts for difference**
  - **Investment incentives** (subsidy, fiscal credits, sub-market interest rates, etc.)
  - **Energy tax rebates** to RES-E suppliers
- **INDIRECT**
  - Enabling voluntary **additional** demand for "green" electricity
  - Warrants **reliable** generation attributes disclosure

Stimulation of RES-E in Europe

Overview



Stimulation of RES-E in Europe

Comparing FIT with RPS support systems

Feed-in tariffs

- Very effective in stimulating new investment (++)
- Uncertainty on achieving set target (-)
- Certainty to investors (+)
- Asymmetric information problem / vested interests in high tariffs (-)
- May lead to market imperfections (-)
- Cost effectiveness (-)
- Perceived as simple yet in German practise very complicated (- -)
- Balancing costs hidden (-)
- Incompatible with Single EU Market (- -)
- Grandfather of FIT once approved (-)

Design considerations

- FIT can be differentiated (time, region)

RPS

- induces cost minimisation (++)
- potentially very effective (trade benefits, achieving set quantity) (++)
- uncertainty to investors (-)
- little practical experience in EU (-)
- perceived as complex (-)

Design considerations

- Minimum GC prices can improve certainty to investors
- Targets need to be realistic and slightly demanding
- Specific treatment higher-cost technology (diversity) warranted
- Market size important
- Credibility enforcement important

Stimulation of RES-E in Europe
German FIT as EU harmonisation paradigm -1-

The German Feed-In Law (EEG) is:

- Basically a protectionist infant industry policy
- Consumer interests are subordinated
- Claimed to be administratively simple
- Yet extremely burdensome for TSOs and suppliers in practice
  - Horizontal+vertical equalisation FIT expenses
  - Horizontal+vertical equalisation balancing and reserve cost
- Too complex for EU-wide application

Stimulation of RES-E in Europe

German FIT as EU harmonisation Paradigm -2-

- Total costs **much higher** than officially disclosed
- Social costs of priority grid access increasingly burdensome
- EU-wide application warrants exactly same tariff differentiation rules all over Europe
- Otherwise incompatible with Single European Market rules
- Yet same tariff differentiation rules politically inhibitively difficult given the national differences in lobby interests

German Feed-In Law as European harmonisation paradigm is a dead-end street

UK RES-E stimulation and integration
The present Renewable Obligation - 1-

- Sets out to incentivise renewable generation into the electricity market at lowest consumer cost
- Obligation on suppliers to source an increasing proportion of electricity from renewable sources
- Buyout price to curb consumer costs to target off-take times the buyout price
- RPI used as inflation escalator of buyout price
- Buyout fund recycled on a pro-rata basis to those suppliers that have presented ROCs
- NO dedicated approach for promising higher-cost renewable technology

UK RES-E stimulation and integration
The present Renewable Obligation - 2 -

- Recycling mechanism leverages volatility by a factor {1 / (1 -/- target under-compliance rate)}
- Market dominated by a few integrated suppliers
- ROC price fetched by affiliated RES-E genertors is leveraged upward
- Recycling mechanism provides pervert incentive to undercomply the set target

Drawbacks include:

- Potential volatile future cashflows presents financing hurdle to independent generators

UK RES-E stimulation and integration
The present Renewable Obligation - 3 -

Drawbacks include:

- Lack of certainty of target achievement
- Recycling mechanism is likely to increase the financial cost per MWh RES-E realised
- ROC price volatility compounded £ financing hurdle to independent generators compounded
- No allowance for technology diversity and non-synchronised technology development paths

Present RO unsuitable for EU-wide replication

UK RES-E stimulation and integration
Proposed Renewable Obligation reforms- 1 -

Main differences with present RO:

- Technology banding with grandfather (protection of ROC/MWh rights)
- Headroom mechanism pumping the obligation size up to 20% triggered by target over-compliance
- Removal of buyout price escalation after 2015
- “Ski-slope” mechanism obliging ROC redeeming parties to contribute to Buyout Fund at times of target over-compliance

UK RES-E stimulation and integration
Proposed Renewable Obligation reforms- 2 -

Drawbacks additional to present RO include:

- Further deteriorates scheme transparency without certainty of improved target compliance
- Volatility of ROC revenues per MWh generated by higher-cost technology compounded by recycling mech multiplied by the ROC/MWh factor
- At odds with financing requirements for higher-cost technology to more stable pattern of expected future cashflows
- Assumption of appropriate classification of technology and value assignments to ROC/MWH factors is illusive
- If assumption of public-sector officers with perfect technology development foresight proves false indeed, free riding is likely to be rife

Proposed RO too complex for EU-wide replication

UK RES-E stimulation and integration
OFGEM's response -1-

- OFGEM suggest to go for long-term contracts for difference or feed-in-tariffs
- Contract for differences to re-introduce tendering
- Differences with the erstwhile NFFO include:
  - Firm log-term contracts *with non-delivery penalties*
  - Sales to the market (no fixed procurement)
  - Subsidy (1-way contracts) for the difference between contract price and wholesale price

UK RES-E stimulation and integration
OFGEM's response -2-

- Feed-in tariffs are recommended by reference to DG TREN prepared Commission Communication
- Graph from this Communication suggests that, broadly, feed-in tariff schemes are highly effective and low-cost whereas for RPS (Quota/TGC) would hold the opposite.
- Furthermore a list of "generally acknowledged" advantages and disadvantages of applying FIT is shown

Suggestions on reform of Renewable Obligation
Assessment of OFGEM's response

- We already presented our views on Feed-in tariffs
- We would not suggest a Contracts for Difference system. Drawbacks include:
  - Tendering does not provide a stable market
  - Discourages project developers and local industry because of stop-go character
  - Great dependency in the UK of independent generators from a few incumbent suppliers for PPA's
  - Latter will negotiate high implicit reward for balancing responsibility
  - Free riding therefore likely to be rife
  - Fixed contract price inhibit scrapping before contract expiration when fast technology development renders existing plants obsolete

Suggestions on reform of Renewable Obligation

Our suggestions (1)

1. **Use GO consistently for all conceivable policy applications warranting proof of generation attributes**
   - **Merge Guaranties of Origins system with ROC system**

2. **Set out to reform DER - notably RES-E - stimulation policies consistent with EU-wide harmonisation of support policies towards single European electricity market**

3. **German Feed-in Law as EU harmonisation paradigm is a dead-end street**

Suggestions on reform of Renewable Obligation
Our suggestions (2)

4. Generic RPS for *all* eligible RES-E generation technologies *PLUS* MS- and technology-specific support for higher-cost eligibles is a strong contender
   - With (somewhat higher) Buyout Price but revenues to be used as freely disposable central government revenues
   - Feed-in premiums for higher-cost technology with annual maximum quota per category (first come, first served)

5. ***Current RO nor proposed RO reforms with technology banding stand a chance to trigger European-wide replication***

Suggestions on reform of Renewable Obligation
Our suggestions (3)

6. Appropriate reform of RO has the potential for the UK to lead by example toward European-wide harmonisation

THANK YOU !

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