CEPI aisbl
250 Avenue Louise, Box 80
B-1050 Brussels, Belgium
Tel +32 2 627 49 11
Fax +32 2 646 81 37
www.cepi.org
www.paperonline.org
www.cepi-sustainability.eu
www.paperforrecycling.eu

cepi confederation of european paper industries

Regulatory and Market Aspects of Demand-Side Flexibility

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Abstract from CEPI response to CEER public consultation

Background

The Council of European Energy Regulators (CEER) has recently launched the public consultation "C13-PC-71: Regulatory and Market Aspects of Demand-Side Flexibility".

Below an abstract from the CEPI response to main questions raised by CEER on:

1. main opportunities and benefits for demand-side flexibility;
2. main barriers to the emergence/functioning of demand-side flexibility;
3. most important 'preconditions' necessary for the emergence/functioning of demand-side flexibility

CEER Consultation Questions

1. What do you see as the <u>main opportunities and benefits</u> for demand-side flexibility in existing/future markets and network arrangements? How would you prioritise these?

<u>1.1 Existing markets</u>

The pulp and paper industry has already engaged, where possible, in demand-side programmes.

Mechanical pulping, an electro-intensive process, can be used for "peak shaving" programmes. It can react at reasonably short notice, like as short as 15 minutes and, depending on the frequency and schedule of interruptions, up to one hour. However, these are indicative figures, which need to be carefully assessed at mill level, as they will vary in function of the trade-offs between benefits from balancing the electricity system, the need to meet paper demand, and the overall economic impact that balancing the grid would have on the production process.

In some countries, paper production also participates in “valley filling” programmes: the whole industrial process is shifted to the night or to the weekends to optimise baseload electricity production. Example of this can be found, for instance, in Austria or Belgium. In Norway there are also provisions for flexibility markets where industry can participate. In this case, the transmission operator asks for bids.

The potentials for further exploring “peak shaving” or “valley filling” programmes are however limited. Beside auxiliary processes, the paper making process has little margins of flexibility when it comes to demand-reduction programmes. Moreover, most of the energy required from the sector (steam and electricity) are generated on-site, therefore mostly off the grid.

There is however quite some untapped potential if the market will develop flexible solutions for absorbing excess electricity supply at critical times (see next paragraph).

1.2 Future markets

One of the main criticalities of the electricity system is how to properly integrate electricity generated from “variable”, or “non-programmable” renewable energy sources (NP RES), like wind and solar, at a time of low or no demand. Curtailing these sources is particularly inefficient, as they produce at zero marginal prices. While most of R&D programmes are focussing on energy storage, the pulp and paper industry is in a rather unique position to potentially providing solutions to

- efficiently absorbing excess of electricity supply,
- while creating vale for the EU economy,

Most importantly, all this could be already delivered with current technologies.

To explain how this would be possible, few words on the pulp and paper industry are necessary.

CEPI represents 959 mills located in 18 European countries. According to our latest figures, in 2011 the European pulp and paper industry consumed 111 TWh of electricity, of which 57 TWh (52%) produced on-site via co-generation units. In 2011 the sector also consumed 557 TJ, or 155 TWh-equivalent, of heat, all on-site generated.

Combining the two figures for on-site generation, the sector generated and consumed about 212 TWh of energy in 2011. This is all energy sitting outside the energy system boundaries. To put these figures into context, it is worth noticing that in 2011 total European electricity production from wind and solar was about 223 TWh.

What would happen if, at a time of excess of electricity supply, the sector would ramp up electricity demand by ad-hoc moving form off to on the grid? It would absorb the peak of cheap electricity supply while maintaining the industrial output unchanged. Meaning more value per kWh, less primary energy consumption, less carbon emissions. In one word: a more competitive industry.

In most cases technology is already available and deployable. For instance, it would be sufficient to install an extra, highly-efficient electric boiler. With the support of additional RDI projects, more options could be envisaged in the near future, whereby electro-technologies could be used in the drying process.

The geographical distributions of mills in Europe allows for cost-effective absorption of excess electricity produced by decentralised energy sources, substantially reducing the need to costly investments in grid extensions.

Last but not least, this cost-effective measure will also reduce the need for additional costs to remunerate unused thermal capacity for electricity generation (so-called Capacity Remuneration Mechanisms – CRM), as the impact of NP RES on the running hours of conventional power plants will be largely mitigated.

Regulatory barriers are the main reason for not making this a reality. Without addressing this aspect first, it will be impossible for any mill operator to start any cost-benefit analysis to assess how to adapt a mill operation in a way that would deliver on-site financial benefits.

1.3 Existing network arrangements

In almost all CEPI countries, existing network arrangements act as a barrier against the absorption of excess supply of electricity.

The only exception is Norway. There, already since 1999, the government promoted the installation of electric boilers on industrial sites (although other incentives were already earlier in place). The rationale was to absorb seasonal excess of hydro electricity generated. The boilers are activated in remote by the network operators.

In exchange for this flexibility, industrial operators have a significant reduction in grid charges. While the usual tariff for the transmission grid (Statnett) is 170 NOK/kW (about 20 €/kW) in 2013, the tariff for flexibility load is 43 NOK/kW (about 5 €/kW). In addition there are distribution charge and taxes. Since 2010 the flexibility grid fee is open for all that can offers to decouple the load either by remote control or at 15 minutes or 2 hour notice.

For customers with remote control, the grid operator can move the load from day to night. The grid operators are very satisfied with this system. The possibility to decouple load has proven to save the grid from collapse. The use of flexible load in periods with excess of electricity stabilizes the grid.

We strongly encourage national regulators to urgently use the Norwegian example as a best practice case for promoting and valuing flexibility markets in their own countries.

2. What do you see as the main barriers to the emergence/functioning of demand-side flexibility? How would you prioritise these?

2.1 Legislative barriers/difficulties

In many cases, the industry is subject to stringent energy efficiency targets. In case of demand side flexibility, deliberately stopping CHP units would negatively impact the industry performance.

To promote energy efficiency programmes while incentivising demand side flexibility, it should be clearly stated in the legislation that importing electricity from the grid would be done in order to absorb the load from NP RES, such as wind and solar. Therefore the electricity imported should be counted as 100% energy efficient.

2.2 Regulatory barriers/difficulties

This is the key barrier for demand-side flexibility in absorbing excess electricity supply from NP RES.

Currently, network tariffs and network charges (including levies and taxes) are set in a way that discourages industries from accessing the grid.

This approach is in principle correct, as it tends to promote stable and predictable demand from big energy users.

However, in this context, the network operator needs a service to balance the network. A service the industry is ready to provide. But here is the paradox: instead of being remunerated for such a service, industry would have to pay for offering it, to the benefit of the network operator.

In Germany, for instance, should a paper mill decide to import electricity from the grid, it would face additional costs up to more than 70 €/MWh.

Moreover, a mill has a very flat power consumption profile, like i.e. 7000 (or 7500 or 8000) full load hours a year. On this basis, it enjoys a reduced grid fee, i.e. in Germany it pays only 20% (or 15% or 10%) of the normal fee. Normal grid fee depends on local grid operator and might be between 5 to 11 €/MWh. When taking additional load from the grid, the profile will no longer be flat and the 7000 hours threshold might not be reached anymore. As a consequence, the mill would have to pay the remaining 80 to 90% of the grid fee.

A proper regulatory framework should incentivise both the “off-the-grid” baseload demand, and the flexibility to bring “on-the-grid” ad hoc electricity demand to help matching the excess of electricity generation from NP RES.

2.3 Market barriers/difficulties

It should be clear that RES balancing is not an industry prerogative. Industry can be part of the solution, and is willing to do so, provided there is a business case supporting it.

Industry lacks crucial information to build a proper business case. There should be some sort of guarantee on the minimum yearly number of hours one should reasonably expect to be called for balancing the market.

This minimum number of hours should be provided by the regulator and/or network operator and should be the founding element of any contractual agreement.

Moreover, commodity prices will have to be extremely low (or even negative) to compensate for the loss of revenues from CHP/green certificates or other support schemes. In fact, if commodity prices would be on the level of the fuel used normally, it would just be equal costs for steam generation, but no compensation for lost electricity generation.

Energy supply contracts may need to be adapted to incorporate this additional flexibility.

3. For each of the barriers identified above, please describe the most important 'preconditions' necessary for the emergence/functioning of demand-side flexibility

To promote demand side flexibility in absorbing excess of NP RES supply, the following minimum preconditions would be required:

- Removal of regulatory barriers to create extra demand for electricity at a time of need: no extra costs (tariffs, levies, taxes) when participating in DSF programmes

- Maintain current incentives for on-site generation

- DSF to be compatible with energy efficiency targets: 100% energy efficiency for electricity taken from the grid when participating in DSF programmes

- Need for regulators/network operators to guarantee a minimum yearly amount of hours a paper mill should reasonably expect to be called when participating in DSF programmes.

Lastly, participation in DSF programmes would require significant changes in the way industry operates, both from a technological and industrial processes perspective. Support for Research, Development and Innovation would be needed.

For more information, please contact Nicola Rega at n.rega@cepi.org