ECN

Note

Petten, 7 October 2014

ECN-N--14-028

Department Policy Studies

From Adriaan van der Welle

To Interested stakeholders

Copy to Sander Fijn van Draat, Paul Koutstaal, Koen Schoots

Subject **Temporary tasks for grid operators and transfer to commercial parties; which conditions are needed? An assessment framework applied to energy storage**

Background

In EZ (2014c)[1] the Minister of Economic Affairs expresses his intention to 'expand the new law to include a basis which, by means of an Order in Council, enables assigning additional tasks to grid operators for a limited period of time in the framework of the energy transition, for example in the field of energy storage'. 'Points of departure are that these tasks need to be directly related to the grids, must be regulated (fixed tariffs), should not be socialised automatically, and must not result in a legal monopoly, but also allow market parties to address this task.'

This intention resulted from an elaborate (internet) consultation procedure with stakeholders (EZ, 2014a; EZ, 2014b)[2] [3] in which the organisation of the power sector and tasks of the grid operator therein was one of the topics addressed. Moreover, the regulatory authority ACM (Authority for Consumers & Markets) consulted stakeholders about Sustainability in Energy Regulation (ACM, 2013b; ACM, 2014)[4] [5], also addressing the division of roles among the grid operators and commercial parties.

This discussion is also taking place at the European level. On assignment of the European Commission, DG Energy, ECN and Ecorys (2014)[6] have examined five Smart Grid services to find out to what extent a role for DSOs or market parties is obvious based on monopolistic and competitive characteristics of the services. With regard to charging points for electric vehicles, it was advised that if DSOs are to take on this role, it should only be done on a temporary basis and there should be a clear exit strategy. The responses to this study showed that there is a need for indicators to establish in which cases a temporary task for grid operators can be left to the market. During the research, however, it became clear that the transfer of a temporary task from grid operators to the market cannot be separated from the considerations that surround the allocation of all tasks, for a definite or for an indefinite period, to either commercial parties or grid operators. Therefore, this note aims to find answers to the following questions: When is it useful to allocate a (temporary) task to grid operators?; When can grid

1 EZ (2014c), Kamerbrief wetgevingsagenda STROOM [Letter to Parliament on legislative agenda STROOM], 18 June 2014.
2 EZ (2014a), Consultatiedocument STROOM [Consultation document STROOM], January 2014.
3 EZ (2014b), Consultatieverslag STROOM [Consultation Report STROOM], June 2014.
4 ACM (2013b), Consultatiedocument Duurzaamheid in energietoezicht [Consultation document on Sustainability in Energy Regulation], 22 October 2013.
5 ACM (2014), Visiedocument Duurzaamheid in energietoezicht [Vision Document on Sustainability in Energy Regulation], 9 April 2014.
6 ECN & Ecorys (2014), The role of DSOs in a Smart Grids environment, ECN-O--14-031, Amsterdam.

operators transfer temporary tasks to the market?; And which indicators can be used to establish the latter for the energy storage case?

Assessment framework

Social welfare analysis is key in determining whether temporary tasks can be assigned to grid operators as well as for evaluating the transfer of grid operator tasks to the market. Social welfare in this case relates to public interests that are linked to the energy transition, on the one hand, and innovation and freedom of choice for consumers on the other.

The starting point of social welfare analysis is that a task can be best left to commercial parties to prevent market distortion, unless there is a need for public intervention due to market failure, for example because of external effects. Depending on the extent of market failure, there are usually many different public interventions to address this, with involvement of either commercial parties or regulated grid operators.

In the context of the above mentioned assignment, ECN and Ecorys (2014) constructed a framework for the assessment of monopolistic and competitive characteristics of smart energy services on the basis of social welfare analysis. Moreover, competition policy, like the ban on restrictive agreements (e.g. cartels) in ACM (2013a)[7] derived from EC (2004)[8], defines similar criteria to assess whether restrictive agreements generate objective economic benefits that outweigh the negative restriction of competition. These criteria are frequently applied for competition cases in many economic sectors. Although the ban itself does not play a role in the allocation of tasks to grid operators, the criteria for evaluating exceptions from the ban are relevant for assessing if a temporary task for grid operators and the transfer of such a task to commercial parties at a later stage will enhance social welfare.

The ACM distinguishes four criteria for exception from the ban on restrictive agreements:
1. Improving the production or distribution of goods or contribute to promoting technical or economic progress
2. Consumers must receive a fair share of the resulting benefits; the benefits of the improvements resulting from economic and technical progress should be sufficiently passed on to the consumers.
3. Indispensability of restrictions; they must be indispensable to the attainment of the objectives, consequently practically feasible, less competition distorting alternatives should be absent.
4. No elimination of competition; will there be sufficient competition left?

Using the assessment framework

We have opted to apply the assessment framework of ACM (2013a) to the case of energy storage, since EZ (2014c) mentions energy storage as an example of a temporary task.[9] The ECN & Ecorys

7 ACM (2013a), Position Paper Mededinging & Duurzaamheid [Position Paper on Competition & Sustainability], draft, July 2013.

8 EC (2004), Communication from the Commission, Notice, Guidelines on the application of Article 81(3) of the Treaty, OJ EU C101/97-118.

9 Other examples are difficult to find. ECN and Ecorys (2014) recommended that market parties should take a role in the electric vehicle charging infrastructure and energy efficiency services to prevent market distortion, an alternative solution being a temporary role for DSOs. However, the Dutch government has already decided that the electric vehicle charging infrastructure is not a task for grid operators such as DSOs anymore. Besides, energy efficiency services are not directly linked to the grids, which is one of the points of departure for task allocation in EZ (2014c), and therefore cannot constitute a temporary task for grid operators.

(2014) framework has been used as a supplement to assess the indispensability of restrictions. Consequently, we will apply the four criteria for exception from the ban on restrictive agreements to energy storage.

Technical and economic progress

A temporary task for grid operators should focus on creating a solid business case for the service or technology: raising confidence in sufficient market potential by creating added value and an acceptable payback period for new investments. There is no general rule of thumb that states when a technology has sufficiently matured (for example at a certain penetration rate) to transfer it from grid operators to market parties,[10] so specific business cases need to be looked into. In other words, the task of energy storage can be transferred to market parties if they are able to realise a positive business case. Across the lifetime of the energy storage facility, the expected trade benefits for the commercial party should exceed the total costs. The expected benefits depend on the difference between expected peak and off-peak prices with deployment of the storage facility, and the extent to which the facility is utilised.[11] The expected costs include the investment costs and the operational and maintenance (O&M) costs of the energy storage facility.

A positive Net Present Value (NPV) could serve as indicator of a positive business case, i.e. the extent to which discounted expected revenues exceed the discounted expected costs. In calculating the NPV, the discount rate used should include project specific risks of storage; in addition to the risks of cost overruns, for example due to a development and construction period that is longer than anticipated, there are also risks with regard to the benefits, such as for example the risk of stranded assets. The profitability of flexibility options such as storage, which, depending on the technology deployed, can have a lifetime of several decades, strongly depends on the expected development of the share of renewable energy in electricity generation. The share of renewables in electricity generation, in turn, is closely linked to government policy. This adds a political risk to the expected market development with regard to demand for flexibility, which makes it more risky for market parties to invest. Therefore, stable and consistent government policy for renewable energy is very important to curb the risk of stranded assets.

Alternative indicators include the internal rate of return (IRR) and the payback period of the investment. Once a certain threshold has been reached, the task could be transferred to market parties. However, grid operators can influence the attainment of this threshold through the investment volume in energy storage; each investment reduces the difference between peak and off-peak prices and hence the NPV, the IRR and the payback period.[12] That is why the threshold value should vary according to an additional criterion such as for example the realisation of a certain number of projects. As more projects are realised by grid operators, the threshold value should be lowered accordingly.

---

10 Source: Interview with ECN learning curves and innovation expert Koen Schoots.

11 It should be noted that the expected revenue of grid operators equals the extent to which energy storage avoids grid reinforcements. For transfer to market parties, however, the revenue for market parties is leading. The main revenue of energy storage is the trading income for market parties. This is also acknowledged by grid operators. Moreover, the deployment of a storage facility by grid operators also influences the market, because part of the electricity production penetrates the market at a different time than without the storage facility, changing the pricing. This implicit purchasing and selling of energy does not relate well to the observation that energy purchase is not a task of grid operators, unlike the purchase of grid losses (EZ, 2014b). Moreover, it discourages the deployment of alternative flexibility options such as the regulating capability of generation units and demand response.

12 In other words, the indicator is not entirely exogenous to grid operators.

Consumers receive a fair share of the benefits
Storage is one way to prevent a lack of available flexibility in case of a rapid transition to a sustainable energy system ('lock-in' risk). Energy users will reap the benefits of preventing such a lock-in situation, for example a higher security of supply and possibly a lower energy price.

Indispensability of restrictions
Dutch policymakers assume that in the longer term storage is necessary due to an increasing need for flexibility in the energy system. This can be questioned for two reasons. First, there are also other flexibility options such as the regulating capability of power plants and demand response of energy users. At the moment, the Netherlands is among the countries with the lowest price variability in electricity markets in the EU. As soon as price variability increases, all flexibility options will become more profitable. There is no reason to assume that other flexibility options will not be developed (further) by commercial parties. Moreover, stimulating a specific flexibility option is at odds with the policy principle of technology neutrality. Therefore a generic stimulation of flexibility supply is a more obvious choice rather than promoting the development of energy storage specifically. Second, many energy storage technologies are currently not yet commercially viable. Given the limited volume of the Dutch electricity market, it is not very likely that promotion of energy storage in the Netherlands can substantially accelerate the cost reduction of storage technologies worldwide.

However, should policy makers decide that energy storage is necessary, this will necessitate demonstrating that public intervention is required because market parties cannot achieve a positive business case due to market failure. One reason for public intervention is the problem of coordination: storage offers benefits to both market parties and grid operators; however, in the current situation the parties are not encouraged to take into account additional benefits that a storage facility may have for other parties ('positive external effect'), preventing the business case from materialising. Another more general reason is the need to overcome the potential lock-in risk of a lack of flexibility in the transition to a sustainable energy system by stimulating innovation.

The next question is whether public intervention can be only achieved by giving grid operators a (temporary) task. The answer is no. The characteristics of energy storage do not point towards a natural monopoly and hence an exclusive role for grid operators. Moreover, commercial parties can also be encouraged to create a market that internalises the positive external effect. Examples include subsidies, market competition (an auction with performance obligations), or research that is partly funded by government means. Involving commercial parties offers at least two benefits. First of all, the private involvement in a market can be increased step by step along the innovation cycle of a new technology or service while at the same time decreasing subsidies, so that market involvement increases as solutions approach commercial maturity. In contrast, when allocating a temporary task to grid operators it is difficult to facilitate gradual private involvement due to the absence of a level-playing field between grid operators and commercial parties. Secondly, the phase-out of the temporary tasks of grid operators is complicated. Among others, transferring all storage facilities of grid operators to a commercial player could lead to an incumbent with a near-monopoly. On the other hand, involving commercial parties also has disadvantages, as new types of policy mechanisms to stimulate the private sector to invest in energy storage can entail significant administrative burden.

No elimination of competition

Competition is not formally obstructed if temporary tasks for grid operators are not granted legal monopoly and market parties can also take on this task. However, a temporary task for grid operators still create an uneven playing field between regulated grid operators and commercial parties, due to financing benefits of the former, given their lower risk profile (lower default risk). As a result, entry of private parties will be very limited or non-existent. At the same time, in view of the expected negative net benefits of an investment in energy storage it is unlikely that, without a temporary task for grid operators, market parties would actually invest in energy storage, especially because they have the option of investing in other, more viable flexibility options in which the benefits for other parties play a less important role in the business case.

Conclusions

Both in the allocation of temporary tasks to grid operators and the transfer of tasks from grid operators to the market, social welfare analysis is the logical instrument to determine which type of market organisation best serves societal interests. The criteria that are deployed in competition policy for assessment of exception from the ban on restrictive agreements can be used to apply the social welfare analysis to issues regarding the division of roles between grid operators and commercial market parties. Applying these criteria to the energy storage case shows that assigning a temporary role to grid operators does not fulfil the criterion of indispensability of restrictions. Technology neutral stimulation of flexibility supply is more obvious than promoting the development of a specific flexibility option such as energy storage. Should policy makers decide that stimulating energy storage is the desired option, a lock-in risk and a coordination problem may require public intervention, but the characteristics of energy storage do not suggest a natural monopoly and hence do not warrant an exclusive role for grid operators.

Instead, commercial parties can be stimulated to innovate and to facilitate a market for storage services, or more generally flexibility services. Their involvement has two clear advantages compared to a temporary role for grid operators. First, it prevents the risks of concentrating excessive market share at a single commercial incumbent when transferring a temporary role from grid operators. Second, private involvement in the provision of energy services such as storage can increase step by step with the innovation cycle of a new technology or service so that subsidies can gradually diminish once the technology or service approaches commercialisation. A disadvantage of the market-based approach is the administrative burden of new types of policy mechanisms to stimulate the private sector to invest in energy storage. It is up to the policy makers to weigh these advantages and disadvantages.

If policy makers decide that grid operators should obtain a temporary role in energy storage, indicators are needed for the transfer of the temporary role to commercial market parties. There is no general rule for establishing the most suitable point in time for this transfer, so that only the specific business case for commercial parties can serve as a standard. There are a number of potential indicators for a viable business case, including the NPV, IRR, or the payback time of the investment. Once a certain threshold has been reached, the task should be transferred to market parties. Since grid operators can influence the attainment of this threshold through the investment volume in energy storage, the threshold value should vary with the realisation of a certain number of projects. As more projects are realised by grid operators, the threshold value should be lowered accordingly.