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SECURITY OF SUPPLY SECURED BY MARKET FORCES: DIFFERENT STAGES AND WELFARE PROSPECTS IN RELATION TO DANISH AND NORDIC CONDITIONS

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Security of supply in electricity markets has been seen as a critical test for the functioning of the markets. This has been especially relevant for the existing spot and futures markets, and less explicit for the quality aspect of electricity, which has only to a marginal extent been covered by markets. This paper describes the possible steps and some necessary conditions for establishing markets for security of supply services in a Danish and Nordic perspective.

Concern has been raised that market prices are not sufficiently high to secure new generation capacity and especially the peak power resources does not seem to be attractive without some capacity payments. Construction of such markets in an efficient way has been broadly discussed in literature, but the linkage with grid investment is less covered.

There are several possible benefits of having the security aspect covered by a market instead by regulation. First step is to secure that a given level of security is satisfied at the least costs. To have this marginal cost in generation, transmission and distribution have to be at comparable levels. The argument is that consumers have identical cost of disruptions (Value Of Lost Load, VOLL) whether due to generation capacity constraints, capacity/ fault in transmission lines or faults in distribution equipment. Costs have to be equal across sectors operating in competitive markets and sectors that are directly regulated. If the regulator itself is demanding security of supply services from all three parts of the power sector the simplest form of a market would be implemented. This would not result in the optimal level of security as the final demand for security would not be reflected, only the regulators estimation of costs. If it is possible to reduce the public good property of security of supply a market might lead to a more correct level of security, but the largest benefits would be associated with possible differences in VOLL among customers.

Secondly the possibility of individualised security of supply exists. To the degree it is possible to exclude customers this would imply that different degrees of security can be supplied to customers with different costs of lost load. Examples of this possibility exist, but it is not a widespread practise in the liberalised power markets of today. The linkage to the flexible demand element in the existing power markets are discussed, which share the property of having to individually affect the load of customers. If mechanisms are in place to have individual customers adjust their load with a warning time the step to having individual interruption is also possible.

Special emphasis is given to relating the possible markets to the actual disruptions in Denmark, both the actual numbers and duration using different continuity of supply indices.

As a majority of disruptions (frequency) are related to distribution grid faults the cost of reducing these faults relative to the cost of maintaining the capacity reserves that secures that almost no load has been lost due to capacity constraints is questioned. Would an integrated market for security services transfer resources from capacity reserves to distribution grid infrastructure? Finally is the question of the supply of electricity to all residential customers at the same regional rate in line with having different prices for

security of supply services to the same residential customers? As it is now, the security of supply is varying among the consumers without this being reflected in any difference in payments (and in the Danish case without compensation).