

## HV/LV Generation tariffs principles paper

This paper has been prepared to enable discussion on the high level principles that EDF Energy Networks believe will offer an appropriate signal when developing 'charges' for generators connected at HV and LV for using/supporting the electricity distribution network. The use of the term charges is interchangeable and also covers payments.

This paper has been prepared to share with all LDNOs, Ofgem and other interest parties in order to progress the common development of HV and LV generation charges.



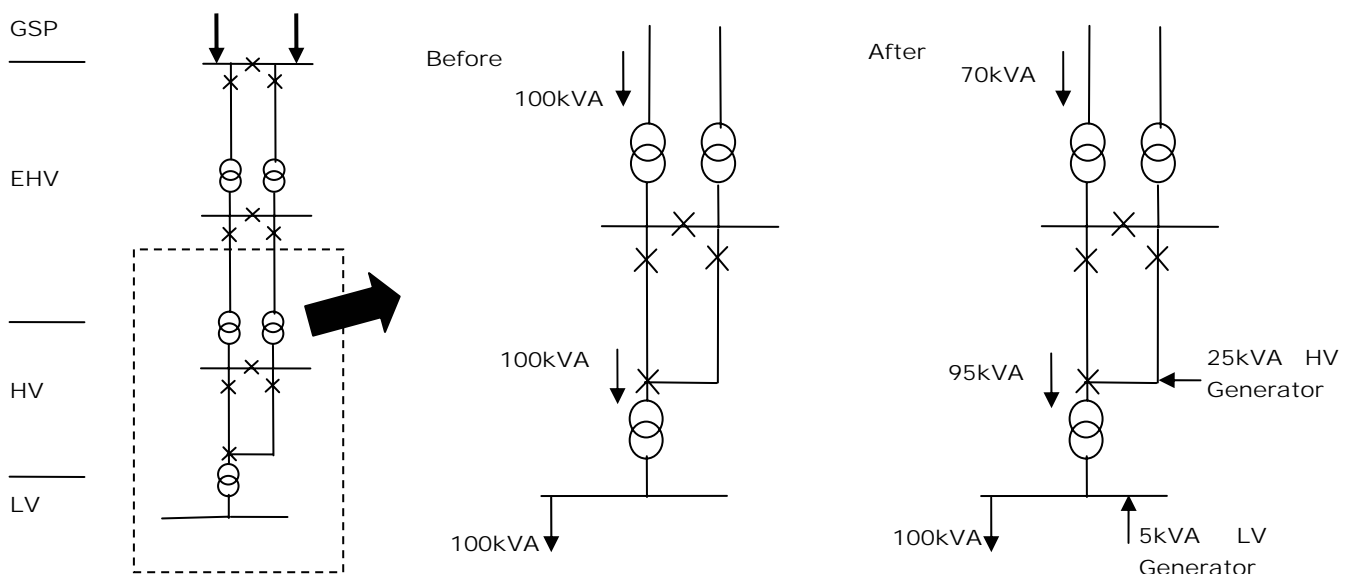
### High level Principles and assumptions for HV and LV generation connections

This paper covers the current view of the expected development of HV and LV connected generation over the next 5 – 10 years. Generation connected at EHV and their subsequent charges is outside the scope of this paper and is dealt with in a separately using power flow modelling.

- Network infrastructure is paid through demand use of system charges.
- The network will continue to be demand dominated.
- Appropriately sized and sited generation will offset the need to reinforce the network for demand users.
- BERR is committed to tackling the barriers currently preventing widespread take-up of low carbon distributed energy possibly through better incentives and regulation.
- HH metered unit based STOD tariffs offer the most cost reflective signal and should be established as a prerequisite where a payment is made to generators in all except the smallest of domestically connected technologies.
- Generation will be absorbed at the voltage level of connection and will not invert to a higher voltage level.
- Distribution losses will reduce.
- EDF Energy Networks is keen to establish innovative charging solutions.
- Cost or benefit given to generators should be based on offset (reinforcement) cost only.

#### Principles Context

The following schematic diagrams are provided to illustrate a very simplistic offset presented by generation on demand dominated networks. In reality network power flows are far more complex.



No allowance is made in this example for network losses

The schematic diagram shows a LV demand of 100kVA. Prior to any distributed generation being connected the demand is met through upstream power flows. After distributed generation is connected the original upstream power flows reduce. The connection of the distributed generation will therefore potentially offset the need to provide reinforcement of the network as the growth of demand increases.

The amount of power flow that is offset, as shown in the schematic, has not been adjusted to account for the energy that is saved through reduced distribution losses. In practice the offset would be adjusted for losses.

### Network Planning Vs Charging Signal

A network planner looking at demands at a point on the network is unlikely to see or be able to disaggregate small scale distributed generation from the underlying demand. Therefore it is often difficult to establish the level generation that is supporting the network at the time of peak demand and whether any benefit or allowance should be given.

However, we should consider generation in the same manner as demand, where similarly at an individual level it would be difficult to measure one persons demand effect on the network planning requirements, yet we establish charges for demand users. From a charging perspective we need to establish an appropriate charging signal to trigger activity which will in the longer term provide benefits, even if in the short term it is inconceivable that any benefit would ever arise.

### Offset Principles

The offset principles will consider the cost that potentially will be saved through a long term view on the avoidance or deferment of future reinforcement expenditure. The consideration will need to allow for the support provided by generation at times when demand peaks.

### National Grid Exit Points

The cost of providing the network connections to the National Grid is determined through the exit charges paid. This amount can be expressed as a £/kW charge based on demand delivered. In the short term there are no savings if demand is reduced. However, long term exit charge savings will be made if demand growth is reduced as generation is connected.

- Credit to generation.
- £/kW charge used as proxy to offset benefit.
- Generation output increased for losses reduction.
- Credit value aligned to generators production at time of system demand.

### EHV Network Assets

The cost of providing future reinforcement to EHV assets is calculated using the proposed power flow simulation model. This provides marginal cost/benefit signals for 5 usage time bands at the point of exit from the EHV network to the HV/LV network. We would use these in a similar way to the 5 usage time bands of demand cost.

### Assets above voltage of connection

The cost of providing future reinforcement to the network above the voltage of connection would be offset in demand dominated networks. The modelling will therefore place credits based on the cost of reinforcement due to demand used in the charging model.

### Assets at voltage of connection

Future reinforcement savings could materialise at the voltage of connection. However, these costs would depend on even dispersion of generation along the voltage of connection. Assuming

this will happen to some degree then it will be appropriate to apportion some offset benefit to generators.

### Generation Costs

The current generation price control has an incentive to encourage DNOs to connect generators. This provides a mechanism to recover the network investment costs which materialise through the connection of generators. Those costs caused by generators and forming part of the incentive will be added to the generation allowed revenue and recovered for generators.

These costs include capital expenditure on generation driven shared use assets and operation and maintenance on generation driven assets.

### Generation Tariffs

The cost signals provided need to reflect the times when the network needs to be supported. Our current demand tariffs, and the generation tariffs which we are currently consulting on, use 5 usage time bands to present a cost reflective signal. We would plan to continue this approach for all HH metered tariffs and we need to consider ways of encouraging <100kVA sites to fit HH metering to ensure they receive a more beneficial, although cost reflective, signal.

For NHH metered tariffs we would need to consider the generation technology and the metering time bands when creating a tariff. Those NHH metered sites with suitable STOD type time bands should receive a better signal for generating at times of demand network peak. Suitable average production profiles in HH detail will need to be sourced for each generation technology in order to allocate an appropriate unit rate signal and the use of providing benefit through a fixed charge should be avoided.

### Allowed Revenue

Due to the current separation of the demand and generation allowed revenues, the cost/benefit given to generators will always net to an overall charge. In order to provide a suitable benefit signal the transfer of benefit will need to be made from demand users to generation users.

This could be achieved by calculating the amount of demand benefit by modelling the generator tariffs without any revenue scaling (modelled reinforcement costs). This level of benefit could then be transferred from demand allowed revenue to generation allowed revenue. This transfer could be in total or it could be shared with demand to make an allowance for the possibility of whether the benefit will materialise.

This transfer will mean that demand users will be charged more so that generators can be paid. However it should be remembered that the concept should reduce the future need to reinforce and therefore, in the long term, reduce the cost to demand users. This transfer would equate to a negligible cost to each of the millions of demand users but seen as a tangible benefit to the smaller number of generators.

### Network Losses

Generators connected at HV/LV will continue to receive losses benefit on their metered production, as if the production is absorbed locally. The loss factor used to increase generation metered production will be at the same average loss value as the factor used to increase demand metered consumption.

Loss factors are used in settlements to increase metered consumption/production to grid supply point equivalent. Therefore, the generator is able to sell more energy than was actually produced by receiving the equivalent of the energy losses saved.