

UK typical power transmission and distribution costs

Could these kill your project?

The transmission element

- I have taken a very simplified approach
- According to the 06/07 annual accounts for NGC UK transmission, NGC carried 350TWh for an income of £2012m in 2007 i.e. NGC receives 0.66p per kW hour. With two years inflation to 2008/9 say 0.71p per kWh
- When purchasing the charge is about 0.2p per kWh dearer in the south west and about 0.2p per kWh cheaper in the North East . The reverse should apply when you sell. However you might find that your supplier takes a large slice

Distribution costs

- As far as practical the distribution areas were set up to give similar costs so figures from a fairly average one will be of the the right order of magnitude for most areas. I am using the old Southern Electricity's area 06/07 figures
- Prices of materials, transport and labour used on new distribution assets are rising sharply. Expect connection costs to increase perhaps double average inflation rates in the near term.

The distribution element and some rough assumptions

- ❑ In 2007 Southern Electricity received £425m for carrying 33.9TWh. i.e. 1.25p per kWh
- ❑ NGC 'Exit' Charges are included in this figure so a reduction of say 5% is necessary to avoid double counting. This gives a figure of 1.19p per kWh. As explained later, embedded generation will incur similar costs or higher ones
- ❑ Add 2 years inflation less OFGEM restriction – say 9% gives 1.3pence per kWh

The connection charge 1

- ❑ Connection charges vary greatly with location
- ❑ A typical connection charge for a 1MVA generator at 11kV is likely to be over £50000, possibly payable in advance
- ❑ There are many locations where a 1MVA generator is not acceptable at 11kV. Expect 33kv connections to start at over £250,000

Connection Charges 2

Financial risks

- ❑ The quotation may be months in production and the connection years in construction
- ❑ I have seen budget figures multiply by 5 when firm quotes were obtained
- ❑ Without a connection agreement early in your project you are taking a serious gamble

Connection charges 3 More risks and a stab at the cost per kWh

- ❑ DNOs may find wayleaves unobtainable
- ❑ Their network may not be able to absorb power where you want. A front end study is essential. It is advisable to allow a lead time of a year for quite modest schemes
- ❑ A £50k fee for a 1000kVA capacity is roughly equivalent to 0.7p/kWh if you have no restrictions on available energy. Low plant utilisation will make this number soar

A rough annual figure to finance the connection charge

- Number of kWh per annum from a one MVA generator = $1000 \times 0.9 \times 0.8 = 722\,500$ where 0.9 = power factor and 0.8 = annual load factor
- Capital charge is say £50000
- At 12% the charge is £6000pa
- Cost per kWh = $6000 \times 100\text{p} / 722\,500 = 0.7\text{p}$ per kWh

The total cost of power transportation per kWh

- ❑ NGC 0.71p/kwh
- ❑ DNO 1.3p/kwh
- ❑ Don't forget the connection charge!
Say 0.7p/kWh
- ❑ Total cost 2.7p/ kWh and +/- 0.2 p/kWh depending on where you are relative to the NGC zonal charges. You will have to negotiate with your supplier to get the reduction.

Does local generation save the DNO money?

- ❑ The distribution system was designed to distribute - NOT collect power. The extra flexibility will demand extra investment.
- ❑ Local generation increase the fault level. This may bring forward major investment at higher voltages as well as the export voltage
- ❑ In rural areas the voltage profile on the 11kV system is often a difficulty. A new long overhead line or cable may be necessary

Future costs

- As embedded generation increases, the DNO will have to stiffen the network to accept it
- Grid connections using BSPs will remain to ensure continuity of supply. Incidentally NGC usually demands 40 year contracts for new BSPs
- Some studies expect distribution costs to rise 40% when embedded generation nearly meets demand
- Extrapolation from existing distribution costs would give transportation costs for power of say 3.25p per kWh within say 15 years

Avoiding power transportation costs

- As the proportion of embedded generation increases so will the pressure to avoid subsidies in power transportation. Therefore: -
 - Look at any wheeze such as selling over the fence to neighbours or in cooperatives
 - Consider using 'private wires'
 - Enter partnerships with local authorities
 - Use power on site whenever possible
 - Locate/design plant to reduce connection charges
 - Think at the front end. Moving power is expensive and will get dearer.