Chris Brown

From: Tracy Armitage
Sent: 21 June 2010 09:35
To: Chris Brown
Subject: FW: electricity supply and North norfolk development

From: Mould, Steve [mailto:Steve.Mould@edfenergy.com]
Sent: 17 June 2010 11:39
To: Tracy Armitage
Subject: RE: electricity supply and North norfolk development

Tracy,

Having read Peter's original letter I would say that this gives a good overview of our 132kV and 33kV network, and some of the constraints faced in terms of development of the surrounding areas. I have re-evaluated the existing situation though, as the network has changed since 2006.

The first point that I'd like to reiterate, is the timescales that each voltage level requires in terms of reinforcement. As Peter said, there are a handful of Grid sites (132kV – 33kV) within the area, which would take 3-4 years if any replacement or reinforcement was required. At the next voltage level down, the Primary substations (33kV – 11kV) will usually take around 2 years to carry out any work that's required. Finally, the most common type of substation is the distribution substation (11kV – 415v), which is what is used to distribute power to the majority of homes, offices and commercial premises. A new housing development may require a distribution substation (depending on the number of houses), and this work may take up to 12-18 months. Obviously, it is dependant upon the specific area, network load and new load being connected. One of the main restrictions with this type of work is obtaining a site for the new substation (often it useful to work with the developer to try and get a location within their development), and also obtaining consents for the required cable route. As you'll probably be aware, some roads are subject to a 3 year restriction before they can be excavated (if they are newly laid) and further restrictions if they have recently been excavated. These types of restrictions can add significant time to completion of jobs.

My comments are based on the 33kV and 132kV networks. It is relatively safe to assume that any work required at 11kV can be done within 12-18 months, which should really tie in with the development phase of most properties. At the time of application for a new load, studies will be carried out to determine exactly what reinforcement work/new connection work is required. To consider the existing 11kV network in relation to the sites mentioned is a huge task, and one which wouldn't be undertaken at a speculative stage. This is partly due to the timescales involved, but also because the network evolves over time. We could identify a certain amount of work is required to meet your proposed loads, only for this to have changed considerably by the time a formal application is made.

Therefore, it is better to take a high level view and consider constraints on the 33kV and 132kV networks. The first point I'd like to stress is that there is a 33kV 'ring' that supplies Primary substations at West Beckham, Cromer, Knapton, North Walsham, Aylsham and Salle. As Peter suggested, this part of the network is currently running close to its maximum rating. If we therefore consider your proposal of 550 houses at North Walsham, currently there is a transformer upgrade at North Walsham that will result in sufficient capacity to more than meet you increased load requirements. The limiting factor is the 33kV overhead lines out of North Walsham that aren't of sufficient rating to transfer the full capacity of the transformers at the site. However, there is sufficient capacity currently to meet you proposals.

North Walsham is located at the centre of the 33kV 'ring' which can lead to the situation where even though North Walsham has spare capacity, the network at the start of the ring can begin to overload as the overall load on the ring increases. Because there is on-going development across North Norfolk, as well as natural load growth, there will be a point in the not too distant future, where sections of this ring will need to be reinforced. So at the moment I can say that there is sufficient network capacity to meet your proposals at North Walsham, but this may change as/when other developers use up the available capacity.

The second point I would like to emphasis is that I have considered the domestic loads that you have mentioned, but cannot consider other areas of development until the size and types of business that are being encouraged are known. The network is affected by the size of the load that is placed on to it, but also the type of load. Rapid changes in voltage and current (caused by heavy machinery, arc welders etc.) have a negative

effect on the network, and reduce the overall load that can be met. These types of load therefore require specific network studies to determine whether they can be accommodated, and reinforcement can be required to accommodate these loads that otherwise wouldn't have been expected. Therefore, whilst I can say that the domestic loads you mention can be met, commercial and industrial loads would need to be considered on a case by case basis. As a bare minimum, we would need to consider the anticipated total load, even if the type of load is unknown. This would be preferable than stating the size of the site, unless you can give a realistic figure of 'X' kVA per hectare for example.

The other towns you asked me to consider also generally appear to have sufficient network capacity to meet the domestic development proposed. The notable exception is Cromer, which as Peter mentioned, is limited by the switchgear rating. There is a small amount of capacity left at the site (which would meet your load requirements), but this may be taken at any point by other projects. If this were the case, a switchgear change would take approximately 2 years to complete.

Finally, in answer to the specific questions in your original e-mail:

Please can you indicate whether there is any head room - As mentioned above, there is currently sufficient head room to meet your domestic proposals throughout North Norfolk.

What level of development could be allowed without further investment – As above, this varies throughout the region but your current domestic proposals can be met.

The trigger points for new investment – The main constraints are:

- The 33kV ring from Salle out to North Walsham and back to Salle via Cromer. With relatively small amounts of increased load, this ring will require reinforcement. This work will take approximately 2 years, depending how difficult any required cable routes are to obtain. The first area to need reinforcement would be the Salle – Aylsham overhead line. To give you an idea of what would be required, this would involve laying circa 9kM of 33kV cable. Total cost would be in the region of £2m, but would be apportioned (see later).
- There is limited capacity available at Cromer due to the switchgear. This work will take approximately 2 years to complete; a provisional start date for this work is currently 2014, but may be subject to change.
- The overhead line between North Walsham and North Walsham switching station (Scarborough Hill) will need reinforcing in order to export the full transformer capacity from North Walsham. This work isn't required in the short term and when it is, will take 12-18 months to complete.

What will need doing – See above

How will it be funded and who will pay – Payment for reinforcement work is dependant upon a number of factors. Generally, the customer who triggers the reinforcement requirement will pay a proportion of the work. This factor is based on the amount of capacity they require, and is divided by the amount of capacity that is added to the network. This isn't a hard and fast rule; it is easier to comment once the scope of work and reason for the reinforcement is known. As an example, consider the Salle – Aylsham cable mentioned above. The addition of the cable to the network may add 40MVA of capacity. If the developer who triggered this reinforcement had requested 4MVA of capacity, they would pay 4/40th of £2m i..e. £200k.

I hope the above is helpful. I'm sorry I can't be more specific but hopefully the above information should be a good starting point.

Regards,

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