

System Flexibility Update from National Grid NTS

Transmission Workstream, 6th August 2009

Summary

Following the presentation given at the System Flexibility workshop held at Ofgem on 24th June, National Grid NTS requested further feedback from the industry. We are pleased to report that we have received such feedback from a number of industry participants and the purpose of this note is to share the feedback more widely with the industry in the hope that further thinking may be stimulated.

During July we have held one bilateral meeting and engaged in correspondence with a number of parties, the main points of which are summarised in this note. We have a further meeting scheduled in August at which an industry participant has offered to share with us the conclusions of a previous study they had commissioned in this area. If any other parties wish to meet either on a bilateral or group basis during August then we remain happy to do so. Please direct any such requests or any other feedback to Phil Hobbins philip.hobbins@uk.ngrid.com, tel: 01926 653432.

Work is continuing within National Grid to bring together the 'indicators to be investigated' as stated on our notes of the June workshop and we are still aiming to be in a position to hold another workshop in September to present the results to the industry. However the precise timing of the workshop will depend to some extent on the additional feedback that we receive.

A further update will be issued to the September meeting of the Transmission Workstream.

Feedback received to date

Regarding our request for information on CCGT gas demand at varying output levels, one participant considered that the CCGT fleet that would be required to provide flexibility in the 2020 'gone green' scenario would be rather different to that in operation today due to many of the existing CCGTs approaching the end of their operational lives by then. Therefore it might be more appropriate to discuss what is possible with turbine manufacturers rather than look at the operational characteristics of the current fleet.

A participant suggested that minimum stable generation levels may be around 50% of maximum but that operating in this mode may adversely affect efficiency by around 10% - going from high 40's% to high 30's%. This participant suggested that information on minimum stable generation may be available from the electricity market's BM reports.

A participant considered that some of the older CCGTs may have to close under the Industrial Emission Directive (IED) by 2015 or be operating under a 20,000 running hours exemption regime, like some of the current coal plant under the LCPD scheme. There was uncertainty regarding whether such plant may generate more or less flexibly towards the end of their lives, depending on whether operators want to sweat the assets or preserve them for as long as possible.

A participant commented that the 'gone green' 2020 scenarios in the workshop presentation were interesting and at first sight seem to show CCGT demand being less diurnal than it is now which would imply less contribution to linepack depletion. However the issues raised about what level of spinning reserve or generation that will be required are relevant since there seemed to be periods where there is no flexible (i.e. coal / gas) generation on the system at all, which would seem to be untenable, from a system operation (electricity) perspective.

National Grid responded to these observations with its view on the '4 days in September' scenario within the workshop slide pack:

12th Sept 2021: wind generation is relatively stable but helpfully increases a bit around 'morning pick up' which limits the amount of ramp up required from CCGTs coincident with domestic gas switch on, hence linepack depletion is limited.

13th Sept 2021: high and stable wind generation throughout the day therefore a relatively small amount of CCGT gas take is required, hence limited linepack depletion.

14th Sept 2021: high wind generation again but wind drops at 'morning pick up' requiring CCGTs to ramp up coincident with domestic gas switch on, hence linepack depletion could be large.

15th Sept 2021: sustained wind drop off throughout the day, again requiring significant CCGT ramp up to meet morning and evening demands.

In response, the participant understood this perspective but looked at them slightly differently given that linepack depletion to 2200 has to date been the greatest concern and led to the 'flow flex' product definition. In this context the participant observed that 14th and 15th September 2021 have significant levels of CCGT generation after 2200 which will probably lead to minimal flex usage even offsetting the lack of generation in the morning, under the 'flow flex' definition. The participant also considered that whether these are day on day changes or within day changes is relevant, linked into to what extent is wind generation predictable, such that a fall in wind generation could be anticipated x hours ahead and therefore gas nominated to flow at entry even prior to CCGT demand picking up. The participant appreciated that these are initial simple merit order scenarios and that more work will need to be done to understand the interrelated issues and the linkage and interaction between the electricity and gas networks.

The example days from the 'gone green' scenario presented at the System Flexibility Workshop were reviewed with another participant who thought it would be useful to show how different these generation scenarios are from where we are today and also to show what the various CCGT contributions in the scenarios mean in terms of gas demand.

A participant highlighted National Grid's consultation "Operating the Electricity Networks in 2020" which provides a useful backdrop to the electricity system issues which then links into how gas may be required. The participant thought that responses to this consultation will provide further insight into the operational issues facing generators.

In an LNG context, one participant believed that supplies are available or are capable of short term development if the market price is right and therefore the important thing is to ensure that market signals continue to be the primary driver of participants' behaviour.

In a high wind generation world as contemplated by 'gone green', we shared a concern with a participant about the possible effects on the gas system of a widespread drop off in wind coincident with high electricity demand, particularly how accurately and with what leadtime could such a drop off be forecast and whether this would be sufficient to enable gas to be nominated in to avoid substantial linepack depletion as CCGTs ramp up. The participant thought that UKCS sources would be unlikely to be able provide this level of flexibility but that storage and new LNG terminals could. The participant thought that LNG is likely to have pretty reliable supply capability for the UK, ie. future scenarios of either no gas in the tanks or LNG terminals flowing at maximum deliverability with a system requirement to increase flow are extreme. We explained that from our UK perspective, LNG is a source of supply that is still in its infancy and the variable flows from Grain to date had informed our views expressed at the workshop. We said we would take away the participant's views in this area and seek to validate them. It was agreed with this participant that that after this coming winter, operational experience with Milford Haven flows in addition to Grain should enable us to form a clearer view.

A participant supported the view expressed at the workshop to forecast relevant indicators out to 2015 due to the greater uncertainty associated with a 2020 timeframe.

A participant thought that in order to avoid confusion we need to be clear about our 'reference point' ie. are we intending to ultimately make recommendations based on the Government vision, the 'gone green' scenario or a scenario that is less ambitious in terms of the growth of renewables?

A participant thought that the size, frequency and cost of historic NG system actions should be reported and used as a benchmark from which to monitor these areas going forward. Also we need to understand the causes of actions - what is generating the requirements for flexibility, which in the view of one participant is likely to be driven more by offtakes from the system rather than supplies. The participant was not averse to the idea of targeting the costs of such actions to those causing them.

A participant asked us whether we thought that entry capacity substitution and our CCS proposals may exacerbate any future system flexibility issues. We accepted that the development of any system flexibility initiatives should consider such effects. National Grid's CCS project team are working with other parts of National Grid to make sure that an aligned approach is taken in terms of network analysis and assessing any residual impact. Some of the initial analysis is contained within the recently published CCS consultation document. National Grid's CCS Project Team would be happy to receive any specific concerns or comments regarding CCS impacts at CCS@uk.ngrid.com or alternatively contact Alison Beach on 01926 654122.

In terms of capacity substitution arrangements, again, we acknowledge the need to take such regime changes into account when considering future system flexibility requirements. Substitution will of course not change the size and location of our assets, therefore its effect on flexibility is limited to the extent that it will change patterns of supply. It is possible that substitution may result in a migration away from the current well distributed pattern of supplies towards a scenario that concentrates gas supplies into fewer locations, in which case there would be an impact on the amount of system flexibility available. Equally, it is possible that substitution has a beneficial impact in terms of the amount of system flexibility available.

Another participant posed a series questions for consideration regarding the scope of the review and the expected Ofgem consultation:

1. The need to define what flexibility is and what will create a concern going forward? Is it within a day/ hourly vs intra-day or balancing vs engineering issue?
2. The participant was unclear whether this is an issue in the short term and considered that more analysis will need to be done to show if there are issues for this winter that merit addressing.
3. The participant thought that it could be a medium to long-term issue and agreed with National Grid that a review in light of changing gas imports and demands alongside intermittent electricity generation as a result of the renewables obligation was merited. The participant thought that more information was required to monitor / identify problem.
4. The participant considered that there was a need to identify system requirements with what the future Electricity and Gas systems might look like in 2015 through some scenario planning in line with renewables and CO2 reduction targets.
5. The participant asked about the relationship / interaction with Ofgem's Project Discovery.
6. The participant thought that it would be useful if National Grid could update how system flexibility has been used since the last review under Mod 513 in 2004 to see what the issues are now and in order to get an idea of what they might be in future.

7. The participant asked if National Grid / Ofgem could clarify how much of the flexibility issues can be resolved through Price Controls investment and whether industry mechanisms are necessary.