Comments on the information and submissions from interested parties at stage D3

There is a common thread running through the majority of concerns raised by interested parties in their submissions. Underlying points raised in areas such as technology, landscape, compulsory purchase, environmental impact is the question, "**why is it necessary to build such a large solar power station in this location?**"

It is not about solar power per se nor the suitability of constructing such a facility in this location – but simply about scale.

The Applicant argues that to be commercially viable a solar power plant has to be of this size but many far smaller facilities are already operating successfully, a testament to their sound economics.

The technological change from a power system predominantly based on fossil fuels to one focussed on renewable technologies and in particular solar power has wide implications and presents significant opportunities to re-think our whole approach to power generation. The economic constraints that necessitated the construction of large power stations close to an energy source no longer apply. **Solar power stations are inherently modular in construction and far more flexible in terms of site selection**, considerations that give them significant advantages over large centralised facilities.

In order to appreciate how these opportunities can be exploited it is useful to understand how the UK power system has evolved.

The 20th century saw the gradual transition of a highly localised power system based around small, mainly coal fired power stations to one where large generation facilities, coal, oil, nuclear and latterly gas fired plant, were linked to demand centres by a high voltage transmission network.

In the early to middle part of the 20th century, large cities and towns had one or more power stations, often centrally located close to rivers. As demand increased these power stations increased in size but remained centrally located, Bankside and Battersea being prime examples. Fuel was delivered by river or rail and emissions contributed to poor air quality.

By the early 1960's it was obvious that a change in approach was required. The delivered cost of fuel was high, environmental factors became a cause of concern and the growth in demand prompted a major re-think. A strategy was adopted whereby generating plant would be moved out of towns to be sited close to fuel sources and by major rivers, these power stations linked to demand centres by a new 400KV transmission system that would manage power flows across the country.

Ever larger coal fired plant was built in the North and Midlands, particularly in the Aire and Trent Valleys, oil fired power stations in the south, close to oil refineries. The intention was that in this way power flows in the distribution system could be balanced but the increases in oil prices in the 1970's rendered oil fired stations uneconomic. For most of their operational lives they operated at low load factors, as mid and low merit plant, coal fired

power stations and nuclear being primarily base load. Power flows were therefore predominantly north to south making the grid network unbalanced and harder to control, the length of the power lines between generation sources and demand centres also resulting in transmission losses.

Gas fired generation came to the market in the mid 1990's but again there were siting constraints as the plant needed to be close to gas lines and sources of cooling water. Hence many were built on land adjacent to existing generation facilities.

Solar Farms have no such restrictions and can be built in any location which has a convenient grid connection. The implications of this technological shift are far greater than any of the developments in the last century which were primarily based around building ever larger power stations whose operating principles were unchanged from Victorian times.

In the Botley West Submission the Applicant has simply justified the scale and location of the solar farm on the basis of the technologies it seeks to replace and the requirement to transmit large quantities of power over long distance without considering the advantages of other options that solar technology makes feasible. With fewer constraints, the increased site flexibility means **there is now no need to build large power generation facilities on prime agricultural land**

The outline design of the Botley West Solar Farm shows the modular nature of solar technology. Identical units with the same components are the "building blocks," generating alternating power that is supplied to a National Grid sub-station. There is no requirement that these "building blocks" should be close to one another.

Solar power is ideally suited to **the concept of distributed generation**. With no dependence of its geographical location on fuel source, no requirements for access to large amounts of cooling water, minimal emissions and the inherent modularity, solar generating capacity need not be localised but could be spread across the grid networks utilising both the high voltage national grid and local area networks. This would give a number of distinct advantages over a highly localised generation system:

1.1 Landscape and Community issues

- Landscape and visual impact issues of building a large solar farm such as Botley West in an environmentally sensitive location will have been discussed elsewhere. The largest solar farms have, to date, been built in China, India, the UAE and Spain, countries with a land mass significantly larger than in the United Kingdom
- Distributed generation requires smaller areas of land which could include brownfield sites
- The consequences of an emergency situation such as a fire or environmental discharge are far greater on large plant
- The economics of smaller scale sites can facilitate community involvement

1.2 Grid Operation

- By spreading generation across a number of sites the grid can be balanced
- Smaller sites would not necessarily be connected to the National Grid but to existing local area distribution systems which could be reinforced
- Brownfield sites such as areas of land previously used for manufacturing and service industries which have existing grid connections could be developed. Many such sites previously had their own generation capability
- By siting sources of power closer to demand centres transmission losses would be reduced

1.3 Security of Supply

- Large solar farms are hard to protect due to their extensive land area. Smaller sites are less vulnerable and the impact of lost generation would be more easily accommodated than the total loss of generation from a site of the size and scale of Botley West
- An unplanned outage affecting output from a large solar farm would be highly disruptive whereas lost output from a smaller site would be easier to accommodate
- Smaller sites would not require the heavy electrical equipment, switchgear, power transformers etc. needed for the Botley West sub-station. In the event of a significant failure the time to order and deliver a replacement component could be many months if not years

1.4 Planning and Construction

- The impact on the community during the construction phase would be lower with a smaller plant. For example, the planned timescale for construction of Botley West is 24 months. The Applicant's estimate of the number of solar panels required implies that on average over 85000 solar panels would need to be delivered to site each month together with associated equipment such as converters, transformers and cabling. The ability of the existing road infrastructure to cope with this demand is questionable
- If a distributed generation strategy were to be adopted then the smaller sites could be linked in to existing grid networks as an alternative to the National Grid. These would need to be reinforced but as the system and lines already exist planning issues would be simpler than building new power lines and in consequence reduce timescales

In summary, distributed generation based around solar generation on medium sized economically viable sites has distinct advantages. There is no need to build a solar power plant of the proposed size of Botley West in this location when other options exist.

It is recommended that, before any decision is made, the alternative of a solar power plant built in this location but smaller than currently proposed for Botley West should be considered.