

Introduction

About Doosan Babcock

Doosan Babcock is a global engineering organisation with over a century's experience in the energy sector and offices throughout the UK, Middle East and Europe. We provide engineering, aftermarket and upgrade services to thermal power, nuclear, oil and gas, petrochemical and process industries. Doosan Babcock was acquired by Doosan Heavy Industries & Construction in 2006, a subsidiary company of the Doosan Group of South Korea.

Doosan Babcock has continued to grow by offering superior value to customers and through investing in new technologies. Our extensive focus on research and development in the thermal energy sector has established Doosan Babcock as one of the world's leading providers of green energy solutions. Namely our development of advanced efficient boilers, biomass conversion technology, smart energy products and stationary fuel cells has confirmed us as a reliable, clean and green energy solutions provider.

Doosan Babcock has experience of developing heat networks in Europe and an interest in expanding this offering in the UK. Specifically developing heat networks powered by fuel cells in urban areas due to the dual strategic benefits fuel cells can provide to energy policy through lower carbon and air quality policy through ultra-low emissions of NOx and zero particulate emissions.

Answers to questions

We have provided comments to chapters 1, 3, 9 and 11

Chapter 1: Planning London's Future (Good Growth Policies)

Comment on 1.0.6:

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-1-planning-london-s-future-good-growth-policies>

We are supportive of the strategic framework for planners, planning applicants and decision-makers across the city and, we agree that growth in population, jobs and economic developments should consider wider impacts including poor air quality. However, this should not be limited to air quality issues as a result of car dependency and congestion but should also include air quality issues as a result of decentralised energy. We note this has been recognised in later chapters of the draft plan and have also commented on this at the relevant points.

Policy GG3 Creating a healthy city

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-1-planning-london-s-future-good-growth-policies/policy-gg3-creating>

Comment on 1.3.1:

We agree with the comments that the environment in which people live affect their health and that determinants of health can be shaped by the planning system with local authorities accordingly responsible for both planning and public health. As such, it is important that local authorities are given the relevant support and access to information which can help them to achieve this. Support with information on

available technology solutions, funding routes and networking with relevant partners is an important part of this approach.

Comment on 1.3.4:

We are supportive of an approach which tackles air quality issues in relation to road transport. We have highlighted later our response support for approaches which also tackles emissions from buildings as part of an overall approach in delivering better air quality.

Policy GG6 Increasing efficiency and resilience

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-1-planning-london-s-future-good-growth-policies/policy-gg6-increasing>

General comment:

We are supportive of the GG6 aim to seek to improve efficiency and resilience in line with ambitious proposals to become a zero-carbon city by 2050 and agree that this can be done through smarter planning with collaboration between public, private, community and voluntary sectors.

Chapter 3: Design

Policy D1 London's form and characteristics

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-3-design/policy-d1-londons-form-and-characteristics>

Comment on 3.1.3:

We are supportive of approaches which design out exposure to poor air quality and noise from internal and external sources. Technology solutions exist to support this, for example fuel cells are virtually zero pollution (NOx / SOx / PM / VOCs / CO) and low noise. There is also a need to make sure local authorities and developers have access to relevant information about available technologies and how they can meet the requirements of the London Plan.

Chapter 9: Sustainable Infrastructure

Policy SI1 Air Quality

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-9-sustainable-infrastructure/policy-si1-improving-air-quality>

General comment:

We are supportive of the proposals to address air quality within both the transport and buildings sector by ensuring that new developments must not lead to further deterioration of existing air quality.

Comment on 9.1.4:

The preliminary Air Quality Assessment (AQA) is necessary to understand the constraints and to inform the design process. We believe that, given the technologies available today that are low emissions, development proposals can incorporate innovative and health-beneficial solutions within cities such as London. The AQA process is a good approach to support this.

Comment on 9.1.9:

It is important to ensure a robust process for checking that all possible solutions to compliance are explored before mitigation or offsetting payments are used. Offsetting must be recognised as a last resort and not as a way of avoiding other measures. The installation of low emission technologies can help grow the market for these solutions and make them mainstream, driving further innovation and delivering long-term change, in a way that offsetting cannot.

Policy SI2 Minimising greenhouse gas emissions

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-9-sustainable-infrastructure/policy-si2-minimising-greenhouse-gas>

General comments on SI2:

We strongly support the Mayor's strong ambition for London to become a zero-carbon city by 2050 and providing an underlying strategy to achieve this within major development processes. We support the proposed energy hierarchy recognising the value of energy efficiency. Elsewhere in the plan the issue of air quality is addressed, and it is important that approaches to tackle greenhouse gas emissions and air quality are tackled together. To avoid tackling one issue but inadvertently adversely affecting the other.

Comments on 9.2.10:

In keeping with general comments we have provided in this section we support the list of minimum information to be provided in the energy strategies. This includes carbon dioxide emissions, air quality risks and future-proofing as well as other important requirements. Ensuring recognition is given to all areas should help to avoid a situation where one issue is tackled but another is inadvertently affected.

Policy SI3 Energy Infrastructure

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-9-sustainable-infrastructure/policy-si3-energy-infrastructure>

General comments:

We are very supportive of the heating hierarchy for Heat Network Priority Areas and are pleased to see fuel cells being recognised as preferential to low emission CHP, and ultra-low NOx gas boilers. There are strong investment drivers for a fuel cell over low emission CHP and ultra-low NOx gas boilers, however, currently a number of these social costs are not factored into many investment decisions. When considering the social cost of pollutants and carbon, fuel cell technology is more cost effective compared to gas and biomass CHP options. For many projects, however, the capital cost remains a barrier to market, but we believe this can be driven down given timely, collaborative and clear market signals to take advantage of economies of scale. The London Plan's approach provides such a signal. Further support alongside this to enable local authorities to access funding and carry out appropriate analysis of technology options would also be beneficial.

Comment on 9.3.2:

We agree with the need to shift from natural gas as the main energy source to a more diverse range of low and zero-carbon sources, as well as increased decentralisation to enable more self-sufficiency. As the infrastructure develops, the development strategies need to be aware of the inadvertent risks of decentralisation. For example, increased emissions impacting air quality which the London Plan has

recognised. One policy area should not detrimentally affect the other and we are pleased to see the promotion of lower emission solutions as preferential heat sources.

Comments on 9.3.6:

With regard to available technologies which can achieve air quality limits, below is an analysis of systems emissions and levelized cost comparisons which contribute to this debate. Fuel cells offer the lowest emissions of NOx and low emissions of CO2. In addition, when considering the social cost of these emissions fuel cells are also more favourable. It is important that the Energy Planning Guidance document includes information on CHP and that this is kept update as technology changes. However, given that it is anticipated CHP cannot meet the standards required in areas exceeding air quality limits it would be useful to also include information on other available technologies which can meet these limits (such as fuel cells).

Figure 1 System emissions per unit of output and levelized cost comparison for fuel cells, gas CHP and biomass CHP (with RHI payments)

	CO2 gCO ₂ e/kWh of output	NOx mgNO _x /Nm ³ of input fuel	Market LCOE (£/MWh)	Social cost of NOx and CO ₂ in London (£/MWh)	Total 'Social' LCOE (£/MWh)
Biomass CHP	17.4	178 (assumed current)	£158	£249.6	£407.6
Biomass CHP (with RHI)		119 (MCPD compliant)	£74	£249.6 (based on current)	£323.2
Gas CHP	245	92-186 (assumed current)	£57.7	£171.9 (based on current)	£229.7
		95 (MCPD compliant)			
Fuel cells (year 0 - 0 units)	227	0.65	£81.3	£1.3	£82.6
Fuel cells (year 4 - 800 units) (dependent on policy support)			£57.3	£1.3	£58.6
<i>Source: Ecuity Economics (NOx emissions at 15% O₂, and dust emissions at 6% O₂) (Analysis based on circa 500kW system)</i>					

Policy SI4 Managing heat risk

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/london-plan/chapter-9-sustainable-infrastructure/policy-si4-managing-heat-risk>

General comments:

We are supportive of the strategic intent of the cooling hierarchy. We would like to highlight the synergies between heating and cooling requirements and the potential for efficient investment that could work well in producing heating and cooling. As highlighted in the section SI3, fuel cells can offer a low emission alternative for heating sources – they can equally provide the energy source for cooling requirements.

Ensuring that these synergies are identified at an early stage can avoid inefficient resourcing. An example is

provided below from a recent development taking place in Aberdeen which provides cooling, heating and power.

Project Profile – Aberdeen Exhibition & Conference Centre

Innovative Energy Centre Solution integrating power, heat, cooling and transport networks

Fuel Cell Solution:

Complete on-site Energy Centre including 3 fuel cells integrated with CHP engines and stores to provide heat, cooling and electricity to the hotels and conference centre.

Innovative solution including hydrogen production for H₂ bus fleet. Future proofing for hydrogen economy.

Project detail:

Total Project Cost	~£7 million
Lifetime	20 year fuel cell life
Equipment	3 x PureCell, heat store, cold store, electrolysers, peaking CHPs
Generation	‘Quad’ generation – cooling, heating, power & hydrogen
Network	Connected to the transport network – hydrogen buses
Total MW	1.38 MW

Chapter 11: Funding the London Plan

Comment on 11.0.2:

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-11-funding-london-plan/overview>

Addressing funding gaps and creating a supportive regulatory environment for private investment is an important component of the Draft London Plan. As outlined in earlier chapters, we are supportive of approaches to tackle carbon emissions and air quality and there are existing solutions, such as fuel cells, that can support to meet these ambitions. However, until these technologies reach scale, there is likely to be a higher cost requirement. We have specific experience of funding energy projects, including with local authorities who have the desire for lower emissions and carbon technologies but face challenges with raising required capital costs. As such, we are supportive of approaches which can help to tackle such issues and would be willing to provide confidentially further information and case studies on this particular area if this would be useful.

Comment on 11.1.42:

<https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/draft-new-london-plan/chapter-11-funding-london-plan/enabling-infrastructure>

We agree that heat networks are essential to meeting climate change targets, and we support the Mayor's exploration of increasing their deployment in London. Fuel cells are the best solution for heat networks as they bring all the benefits of efficient CHP with negligible impact on local air quality. Plus fuel cells are future proofed to run on hydrogen if / when available. Particularly important for heat networks which are likely to be in place for a number of decades and will need to adapt to available fuel sources in future.

Funding for heat networks can be a challenge. Therefore as well as innovative funding solutions, we agree with ambitions to decrease barriers in other areas, such as creating a level playing field for the treatment of district heating networks compared to other statutory utilities regarding access rights and business rates will be important.

Whilst newer technologies such as fuel cells may seem more expensive upfront, the long-term benefits especially when the social cost of NOx and CO2 is considered (see figure 1) must also be taken into consideration. Therefore approaches to heat networks which prioritise such technologies, for example in Chapter 9 of the draft London Plan in Chapter 9, are essential to drive deployment and drive down costs.