Appendix - Summary of Regional Deviations from the RLCECM

Supplement to "Review of approaches adopted in regional renewable energy capacity assessments when following the Regional Renewable and Low Carbon Energy Capacity Methodology"

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Report for the Department of Energy and Climate Change

NNFCC Project 11-030

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The NNFCC

The UK's National Centre for Biorenewable Energy, Fuels and Materials
The NNFCC is committed to the sustainable development of markets for biorenewable products. We promote the benefits of biorenewable energy, fuels and materials for enhancement of the bioeconomy, environment and society.

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Commercial Scale Wind

140. The Ministry of Defence (MoD) were consulted upon for areas where wind turbines cannot be installed or are unlikely to be permitted. But no data was forthcoming from the MoD.

- This is considered to have little or no impact on the results for Commercial Scale Wind as it is understood from this work that there are no applicable MoD areas in the North West region.

Plant Biomass: Managed Woodland

141. The RLCECM approach suggested assessing the existing and potential future amount of biomass available in the region by either using the Forestry Commission Woodfuel Resource Tool or the National Inventory Woodlands and Trees. The North West study was able to draw upon information and experience from the Regional Woodland Officer for the Forestry Commission.

- This is considered to be an improvement on the original methodology.

142. The RLCECM approach suggested that the managed woodland biomass resource for heat should apply standard calorific values of woodfuel categories of 18 GJ/odt (for low grade timber, and stem wood >14cm diameter and conifer stumps); and 12.5 GJ/odt (stem wood l<14cm diameter, branches, tips and foliage). The Forestry Commission Regional Woodland Officer suggested using calorific values for all woodfuel categories of 18 GJ/odt.

- This is considered to have little or no impact on the managed woodland results.

143. The RLCECM approach suggested that the managed woodland biomass resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. The Forestry Commission Regional Woodland Officer suggested using plant availability of 45%

- It is accepted that plant availability of 80% is too high and was a mistake in the original methodology. However, 45% is potentially still too high and could derive an over estimated finding for the capacity for heat from the managed woodland resource.

144. The RLCECM approach requires that woodfuel that is uneconomic to harvest is excluded from the managed woodland resource. The Forestry Commission Regional Woodland Officer suggested 50% would be uneconomic to harvest.

- This is considered to be a reasonable estimate and has little or no impact on the managed Woodland results.

Plant Biomass: Energy Crops

145. The RLCECM approach required reporting the existing areas of established SRC, miscanthus and SRF. The North West study was unable to gain access to data from the Rural Payments Agency; furthermore Natural England confirmed that no applications were made under the Energy Crops Scheme for either 2009 or 2010.

- The assumption used in the report that there is no reliable data for existing energy crops could have a significant consequence and underestimates the potential of energy crops in this region. However, there is considered to be little or no impact on the energy crop results; as the low scenario based on the existing areas of established energy crops was not used.

146. The RLCECM approach suggested three scenarios (high, medium and low) for estimating the amount of land available for growing energy crops. It is acknowledged in the methodology that the high scenario is neither possible nor desirable due to other uses of the land, most notably for food production. Therefore, this scenario is only theoretical. Spatial data could not be found to map for the medium scenario; and it was not possible to complete the low scenario as this was based on the existing areas of established energy crops. Instead the used DEFRA's Agricultural and horticultural survey, GAEC12 land, was used to complete the medium scenario.

- This is considered to have little or no impact on energy crop results, as only the medium scenario was used and not the low scenario based on the existing areas of established energy crops.

147. The RLCECM approach suggested that the energy crops biomass resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. The Forestry Commission Regional Woodland Officer suggested using plant availability of 45%

- It is accepted that plant availability of 80% is too high and was a mistake in the original methodology. However, 45% is potentially still too high and could derive an over estimated finding for the capacity for heat from the energy crops resource.

Plant Biomass: Waste Wood

148. The RLCECM approach suggested consulting the Forestry Commission for data and estimates of the amount of biomass waste from sawmills, or to carry out a regional level assessment. The Forestry Commission Regional Woodland Officer provided this data and estimates.

Animal Biomass: Wet Organic Waste

149. The RLCECM approach suggested using data from ADAS and Defra figures. The ADAS Manure Management Database (MMDB) was not available for use. Instead data was extracted on the number of livestock multiplied by a manure facture (i.e. amount of manure per head per year) and use of bedding data (per head) from Defra Agricultural and Horticultural survey.

- This is considered to have little or no impact on wet organic waste result.

Biogas (EfW): Landfill Gas

150. The RLCECM approach suggested using either the Environment Agency's Waste Management Licence Data, or the OFGEM RO Register to assess the available resource from landfill sites. The Environment Agency's Waste Management Licence Data was not forthcoming in time for the publication of the North West report.

- This is considered to have little or no impact on landfill gas result, as the OFGEM RO Register was used.

Biogas (EfW): Sewage Gas

151. The RLCECM approach suggested using data from the water utility companies to assess the available resource from sewage treatment sites. The water utility companies were not forthcoming with data.

- This is considered to have little or no impact on sewage gas result, as the OFGEM RO Register was used.

Microgeneration: Solar

152. The RLCECM approach suggested using CLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of roofs suitable for solar systems. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

Microgeneration: Heat pumps

153. The RLCECM approach suggested using CLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of buildings suitable for heat pumps. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

North East Deviations from RLCECM approach

Commercial Scale Wind

154. The RLCECM approach suggests using OS Strategi®, or Multi Agency 'MAGIC' database, and consulting the MOD to exclude areas where wind turbine developments are unlikely to be permitted.

- The North East assessment considered the commercial scale wind resource results to be high. Whilst the RLCECM approach deals with a significant amount of detail and considers a significant number of spatial parameters, there are still a number of detailed issues at the 'local level'.

155. The onshore wind assessment was also run with OS Address Point data instead of settlement polygons as designated in OS Strategi® to reflect the potential constraints posed by scattered rural properties.

- This is considered to be an improvement on the original methodology.

Plant Biomass: Managed Woodland

156. The RLCECM approach suggests using the Woodfuel Resource Tool, available from the Forestry Commission, to assess the volume of woodfuel in the region and existing and potential future feedstock. The North East assessment was increased to account for areas of woodland under 2ha which were not included in the Woodfuel Resource tool.

- This is considered to be an improvement on the original methodology.

157. The RLCECM approach requires that woodfuel that is uneconomic to harvest, and woodfuel that will or could go to alternative markets, be excluded from the total woodfuel resource. The North East report assumes that 7.95% of the woodland resource will be available for biomass energy use, in line with the 7.95% that is currently used for biomass energy.

- It is not clear from the report what percentage is considered to be uneconomical to harvest. This has a potential impact on the managed woodfuel resource finding.
- In addition, given that the managed woodfuel resource assessment is expected to result in a larger resource availability than is currently utilised, assuming that 7.95% of the woodland resource will be available for biomass energy use, in line with the proportion that is currently used could under estimate the managed woodfuel resource finding.

Plant Biomass: all categories

158. The RLCECM approach suggested that the managed woodland and energy crop resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. The North East assessment has used a plant availability factor of 50% for managed woodlands, waste wood, and agricultural arisings (straw); and a plant availability factor of 50% for energy crops. These plant availability factors

are taken from the Yorkshire and Humber Renewable and Low Carbon Capacity Study.

- It is accepted that plant availability of 80% is too high and was an oversight in the original methodology. However, 50% is potentially still too high and could derive an over estimated finding for the generation of heat from the energy crop resource.
- It would be preferable to see evidence for the proportion of typical plant availability factors by the distribution of plant category.

Plant Biomass: Energy Crops

159. The RLCECM approach required reporting the existing areas of established SRC, miscanthus and SRF. The North East study was able to attain figures from the Rural Payments Agency and Natural England, but not the data itself.

160. The RLCECM approach suggests three scenarios (high, medium and low) for estimating the amount of land available for growing energy crops. It is acknowledged in the methodology that the high scenario is neither possible nor desirable due to other uses of the land, most notably for food production. Therefore, this scenario is only theoretical. Spatial data was not available to map for medium scenario, but figures were available from Rural Payments Agency and Natural England for the medium and low scenarios.

Plant Biomass: Waste Wood

161. The RLCECM approach suggests consulting the Forestry Commission for data and estimates of the amount of biomass waste from sawmills, or to carry out a regional level assessment. The North East study was able to use unpublished data from the Forestry Commission instead.

Animal Biomass: Wet Organic Waste

162. The RLCECM approach suggests using data from ADAS and Defra figures. The ADAS Manure Management Database (MMDB) was not available for use. Instead data was extracted from the on the number of livestock multiplied by a manure facture (i.e. amount of manure per head per year); use bedding data (per head) from Defra Agricultural and Horticultural survey.

- This is considered to have little or no impact on wet organic waste result.

Biogas (EfW): Landfill Gas

163. The RLCECM approach suggested using either the Environment Agency's Waste Management Licence Data, or the OFGEM RO Register to assess the available resource from landfill sites. The Environment Agency's Waste Management Licence Data was not forthcoming in time for the publication of the North East report.

- This is considered to have little or no impact on landfill gas result, as the OFGEM RO Register was used.

Biogas (EfW): Sewage Gas

164. The RLCECM approach suggested using data from the water utility companies to assess the available resource from sewage treatment sites. The water utility companies were not forthcoming with data.

- This is considered to have little or no impact on sewage gas result, as the OFGEM RO Register was used.

Yorkshire and Humber Deviations from RLCECM approach

Commercial Scale Wind

165. Issues considered but not included in the assessment of the commercial wind energy resource include;

166. Green belt: Planning decisions on wind farm applications where the Green Belt has been a material consideration have varied depending on whether exceptional circumstances were demonstrated. It is not clear where Green Belt policy will present a constraint on wind energy development, and this will need to be assessed on a case by case basis.

- This is considered to have little or no impact on the results for Commercial Scale Wind

167. Local nature conservation designations (local nature reserves): These have not been included as a constraint in accordance with national planning policy.

- This is considered to have little impact on the results for Commercial Scale Wind

168. Electromagnetic links, such as radio links and microwave links

- These have not been included as a constraint due to:

  (i) lack of accurate data on the location and physical characteristics of links;

  (ii) any buffer zones that should be maintained from links will be variable depending on negotiations with telecoms operators, who should be consulted during the planning of specific wind turbine sites

- This is considered to have little or no impact on the results for Commercial Scale Wind

169. Air traffic control and radars (CAA and MoD) coverage zones: These areas were not constrained since there are already a number of wind farms located within these areas and a mitigating solution is likely to be found in the short to medium term to prevent degradation of performance. The MoD have been contacted for further advice but have not supplied any additional information.

- This is considered to have little or no impact on the results for Commercial Scale Wind

170. Precision Approach Radars coverage zones (MoD): These areas were not constrained since there are already a number of wind farms located within these areas and a mitigating solution is likely to be found in the short to medium term to prevent degradation of performance. The MoD have been contacted for further advice but have not supplied any additional information.

- This is considered to have little or no impact on the results for Commercial Scale Wind

171. Tactical training areas (MoD): These areas were not constrained since there are already a number of wind farms located within these areas and a mitigating solution is likely to be found in the short to medium term to prevent degradation of performance. The MoD have been contacted for further advice but have not supplied any additional information.

- This is considered to have little or no impact on the results for Commercial Scale Wind

172. Air defence radars (MoD): Defence radars require clear line of sight to operate effectively. However, these areas were not constrained since there are already a number of wind farms within line of sight of these radars and a mitigating solution is likely to be found in the short to medium term to prevent degradation of performance. The MoD have been contacted for further advice but have not supplied any additional information.

- This is considered to have little or no impact on the results for Commercial Scale Wind

173. Shadow Flicker: Some sources recommend that a distance of up to 10 rotor diameters from homes should be maintained to avoid shadow flicker. This has not been applied as a constraint in this study because it can usually be mitigated and is unlikely to affect the rate or scale of wind farm deployment.

- This is considered to have little or no impact on the results for Commercial Scale Wind

174. Areas of non-designated peat: We do not have a dataset that enabled us to spatially identify these areas

- This is considered to have little or no impact on the results for Commercial Scale Wind

<u>Plant Biomass: Managed Woodlands</u>

175. The RLCECM approach suggested that the managed woodland resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. A capacity factor of 30% has been used in the East of England report to estimate the likely installed capacity of wood fuel plant for heat production, and 50% and 80% for heat and electricity production respectively from CHP plants.

- This is considered to be an improvement on the RLCECM approach.

<u>Plant Biomass: Energy Crops</u>

176. The RLCECM approach suggested that the energy crop resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. A capacity factor of 50% has been assumed in the East of England report to estimate the annual heat output based on installed capacity for energy crops. This is based on AECOM experience of conducting feasibility studies for CHP schemes and reflects the fact that not all heat output will be used.

- Although this is considered to be an improvement on the RLCECM approach, 50% is potentially still too high and could derive an under estimated finding for the capacity for heat from the energy crops resource.

177. The Yorkshire and Humber study was unable to find and data relating to areas of energy crops grown in the region and thereby considers that no energy crops are currently grown. However, there is currently around 5,700 hectares grown in Yorkshire and Humber for use by Drax alone[1].

- This has a relatively small impact on the energy crop resource finding.

178. The report suggests that a constraint to growing energy crops is the cost of establishment and will inhibit uptake; yet does not take into account the grants available to subsidise establishment costs[2].

Plant Biomass: Waste Wood

179. The RLCECM approach suggested that the energy crop resource for heat for all biomass categories, apply plant conversion efficiency of 80% and plant availability of 80%. A capacity factor of 50% has been assumed in the East of England report to estimate the annual heat output based on installed capacity for waste wood. This is based on AECOM experience of conducting feasibility studies for CHP schemes and reflects the fact that not all heat output will be used.

- Although this is considered to be an improvement on the RLCECM approach, 50% is potentially still too high and could derive an under estimated finding for the capacity for heat from the waste wood resource.

[1] Rob Wood, Biomass Buyer for Drax Power

[2] Energy Crops Scheme as managed by Natural England

West Midland Deviations from RLCECM approach

Commercial Scale Wind

180. The Ministry of Defence (MoD) were consulted upon for areas where wind turbines cannot be installed or are unlikely to be permitted. But no data was forthcoming from the MoD.

- This is considered to have little or no impact on the results for Commercial Scale Wind as it is understood from this work that there are no applicable MoD areas in the North West region.

Plant Biomass: Managed Woodland

181. The RLCECM approach suggested assessing the existing and potential future amount of biomass available in the region by either using the Forestry Commission Woodfuel Resource Tool or the National Inventory Woodlands and Trees. The West Midlands study was able to draw upon information and experience from the Regional Woodland Officer for the Forestry Commission.

- This is considered to be an improvement on the original methodology.

182. The RLCECM approach suggested that the managed woodland biomass resource for heat should apply standard calorific values of woodfuel categories of 18 GJ/odt (for low grade timber, and stem wood >14cm diameter and conifer stumps); and 12.5 GJ/odt (stem wood l<14cm diameter, branches, tips and foliage). The Forestry Commission Regional Woodland Officer suggested using calorific values for all woodfuel categories of 18 GJ/odt.

- This is considered to have little or no impact on the managed woodland results.

183. The RLCECM approach suggested that the managed woodland resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. The 80% availability was considered to be unrealistically high; this was the expert view provided by Forestry Commission during discussions for the North West resource capacity assessment. A 45% capacity factor figure was chosen as it was taken as a median of figures provided by the Carbon Trust[3], and no evidence was found to suggest that the other two Carbon Trust figures would be more applicable.

- It is accepted that plant availability of 80% is too high and was a oversight in the original methodology. However, 45% is potentially still too high and could derive an under estimated finding for the capacity for heat from the managed woodland resource.
- The 45% capacity factor figure provided by the Carbon Trust guide applies to biomass for service heat applications rather than general occupancy buildings.

[3]Carbon Trust Biomass heating a practical guide for potential users, pg 43 (2009).

184. The RLCECM approach required that woodfuel that is uneconomic to harvest is excluded from the managed woodland resource. The Forestry Commission Regional Woodland Officer suggested 50% would be uneconomic to harvest.

- This is considered to be a reasonable estimate and has little or no impact on the managed Woodland results.

Plant Biomass: Energy Crops

185. The RLCECM approach required reporting the existing areas of established SRC, miscanthus and SRF. The North West study was unable to gain access to data from the Rural Payments Agency; furthermore Natural England confirmed that no applications were made under the Energy Crops Scheme for either 2009 or 2010.

- It is not clear from the report whether information on plantings for 2010 and 2009 was used or not.

186. The RLCECM approach suggested three scenarios (high, medium and low) for estimating the amount of land available for growing energy crops. It is acknowledged in the methodology that the high scenario is neither possible nor desirable due to other uses of the land, most notably for food production. Therefore, this scenario is only theoretical. Spatial data could not be found to map for medium scenario; and it was not possible to complete the low scenario as this was based on the existing areas of established energy crops. Instead DEFRA Agricultural and horticultural survey, GAEC12 land, was used to complete the medium scenario..

- This is considered to have little or no impact on energy crop results, as only the medium scenario was used, and not the low scenario based on the existing areas of established energy crops.

187. The RLCECM approach suggested that the energy crops biomass resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%.

- It is accepted that plant availability of 80% is too high and was a oversight in the original methodology. However, the report does not specify which plant availability figure was used for energy crops.
- It is likely to be 45%, in line with the North West report. However, as for the North West report, 45% is potentially still too high and could derive an under estimated finding for the capacity for heat from the energy crops resource.

Plant Biomass: Waste Wood

188. The RLCECM approach suggested consulting the Forestry Commission for data and estimates of the amount of biomass waste from sawmills, or to carry out a regional level assessment. The Forestry Commission Regional Woodland Officer provided this data and estimates.

Animal Biomass: Wet Organic Waste

189. The RLCECM approach suggested using data from ADAS and Defra figures. The ADAS Manure Management Database (MMDB) was not available for use. Instead data was extracted from the on the number of livestock multiplied by a manure facture (i.e. amount of manure per head per year); use bedding data (per head) from Defra Agricultural and Horticultural survey.

- This is considered to have little or no impact on wet organic waste result.

Biogas (EfW): Landfill Gas

190. The RLCECM approach suggested using either the Environment Agency's Waste Management Licence Data, or the OFGEM RO Register to assess the available resource from landfill sites. The Environment Agency's Waste Management Licence Data was not forthcoming in time for the publication of the North West report.

- This is considered to have little or no impact on landfill gas result, as the OFGEM RO Register was used.

Biogas (EfW): Sewage Gas

191. The RLCECM approach suggested using data from the water utility companies to assess the available resource from sewage treatment sites. The water utility companies were not forthcoming with data.

- This is considered to have little or no impact on sewage gas result, as the OFGEM RO Register was used.

Microgeneration: Solar

192. The RLCECM approach suggested using DCLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of roofs suitable for solar systems. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

Microgeneration: Heat pumps

193. The RLCECM approach suggested using DCLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of buildings suitable for heat pumps. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

East Midland Deviations from RLCECM approach

Commercial Scale Wind

194. The Ministry of Defence (MoD) were consulted upon for areas where wind turbines cannot be installed or are unlikely to be permitted. Although no data was forthcoming from the MoD, they did confirm in conversation that there were no applicable areas.

- This is considered to have little or no impact on the results for Commercial Scale Wind as it is understood from this work that there are no applicable MoD areas in the East Midlands region.

Plant Biomass: Managed Woodland

195. The RLCECM approach suggested that the managed woodland and energy crop resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. The Forestry Commission Regional Woodland Officer suggested using plant availability of 45%, based on a typical capacity factor for service applications in the Carbon Trust "Biomass heating a practical guide for potential users", pg 43 (2009).

- It is not clear from the East Midlands report the reasons for selecting the 45% capacity factor which relates primarily to "service heat applications".
- It is accepted that plant availability of 80% is too high and was a mistake in the original methodology. However, 45% is potentially still too high and could derive an over estimated finding for the generation of heat from the energy crop resource.
- It would be preferable to see evidence for the proportion of typical capacity factors by the distribution of plant category.

196. For waste wood, the East Midlands report uses 60% capacity factor, referencing DECC's Digest of UK Energy Statistics, 2010, Table 7.4

- The capacity (load) factor in DECC's Digest of UK Energy Statistics, 2010, Table 7.4 is for power generation, not heat.
- It is not clear from the East Midlands report whether the 60% capacity factor has been applied to the generation of heat, and if not what capacity factor has been used.

Animal Biomass: Wet Organic Waste

197. The RLCECM approach suggests using data from ADAS and Defra figures. The ADAS Manure Management Database (MMDB) was not available for use. Instead data was extracted from the on the number of livestock multiplied by a manure facture (i.e. amount of manure per head per year); use bedding data (per head) from Defra Agricultural and Horticultural survey.

- This is considered to have little or no impact on wet organic waste result.

Biogas (EfW): Landfill Gas

198. The RLCECM approach suggested using either the Environment Agency's Waste Management Licence Data, or the OFGEM RO Register to assess the available resource from landfill sites. The Environment Agency's Waste Management Licence Data was not forthcoming in time for the publication of the South East report.

- This is considered to have little or no impact on landfill gas result, as the OFGEM RO Register was used.

Biogas (EfW): Sewage Gas

199. The RLCECM approach suggested using data from the water utility companies to assess the available resource from sewage treatment sites. The water utility companies were not forthcoming with data.

- This is considered to have little or no impact on sewage gas result, as the OFGEM RO Register was used.

Microgeneration: Solar

200. The RLCECM approach suggested using CLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of roofs suitable for solar systems. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

Microgeneration: Heat pumps

201. The RLCECM approach suggested using DCLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of buildings suitable for heat pumps. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

East of England Deviations from RLCECM approach

Commercial Scale Wind

202. The same issues were raised as for Yorkshire and Humber (same contractor)

Plant Biomass: Managed Woodlands

203. Data from a Forestry Commission report suggests that in total there could be as much as 260,000 tonnes of wood fuel available from managed woodlands. Due to competing use and the practicalities of recovering the fuel and the economic viability of the resource this estimate has been reduced to 67,000 oven dried tonnes (odt) wood fuel availability per annum.

- This has a significant impact on the managed woodland resource finding.

204. The East of England report states: the DECC assessment used in this report identifies approximately 260,000 tonnes of wood per year from managed woodland and therefore this could be almost doubled if wood could also be collected from unmanaged woodland.

- If this is correct it would have a significant impact on the managed woodland resource finding, but it is not exploited or analysed further in the report.

205. The RLCECM approach suggested that the managed woodland resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. A capacity factor of 34% has been used in the East of England report to estimate the likely installed capacity of wood fuel plant for heat production, and 50% and 80% for heat and electricity production respectively from CHP plants.

- This is considered to be an improvement on the RLCECM approach.

Plant Biomass: Energy Crops

206. Issues considered but not included in the assessment of the energy crop resource include:

207. Public rights of way (PRoW): PRoW are not mapped as a constraint on energy crops because it is considered they can be located within areas of energy crop as with any other crop. The buffer zone is considered to be sufficiently small (a few metres) to cause negligible constraint on land availability.

208. SPS cross compliance buffers have not been mapped due to the lack of a comprehensive spatial dataset.

209. Biodiversity impacts: Natural England has been consulted on whether block planting limits should be imposed in locations with national and international landscape designations. Natural England did not propose any limits in its response.

210. The report assumes that all energy crops will be used in CHP plant, to maximise efficiency of use. Electricity-only generation would result in large amounts of heat dumping.

- This is a reasonable assumption to add; it is considered to have little impact on the results for energy crop resource.

211. The RLCECM approach required reporting of the existing areas of established SRC, miscanthus and SRF; as well as suggesting three scenarios (high, medium and low) for estimating the amount of land available for growing energy crops. The East of England reports states that calculations were carried out in line with the RLCECM approach for the medium and low scenarios but that the results were not used because the Environment Agency; who are responsible for issuing water extraction licenses, considered that if a location map of current "over committed" abstraction was overlaid onto a map of potential land for energy crops, this would show very few areas without water stress. It is therefore unlikely that the Environment Agency would issue licenses for much of the land showing as potential for energy crops, meaning that the uptake could be even less than the 10% assumed for the medium scenario. The Environment Agency suggested that the most likely scenario for Energy Crops is a negligible change due to the water considerations. It is this scenario which is used for projections in the East of England report.

- This has a significant impact on the energy crop resource finding.

212. The RLCECM approach suggested that the energy crop resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. A capacity factor of 50% has been assumed in the East of England report to estimate the annual heat output based on installed capacity for energy crops. This is based on AECOM experience of conducting feasibility studies for CHP schemes and reflects the fact that not all heat output will be used.

- Although this is considered to be an improvement on the RLCECM approach, 50% is potentially still too high and could derive an under estimated finding for the capacity for heat from the energy crops resource.

<u>Plant Biomass: Waste Wood</u>

213. The RLCECM approach suggested that the energy crop resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%. A capacity factor of 50% has been assumed in the East of England report to estimate the annual heat output based on installed capacity for waste wood. This is based on AECOM experience of conducting feasibility studies for CHP schemes and reflects the fact that not all heat output will be used.

- Although this is considered to be an improvement on the RLCECM approach, 50% is potentially still too high and could derive an under estimated finding for the capacity for heat from the waste wood resource.

London Deviations from RLCECM approach

214. It has not been feasible to assess the adherences and deviations to the RLCECM approach for the London report as the report was not finalised at the original time of writing.

South West Deviations from RLCECM approach

Plant Biomass

215. The findings for the plant biomass technologies, and associated sub-groups was limited to the results provided by AEA, who were commissioned to report to the Environment Agency. Individual figures for installed capacity (MWe & MWth) of individual sub-categories for plant biomass are not provided as the authors of the report felt that the methodology did not provide enough parameters and assumptions to do so. Instead, fewer assumptions were necessary to produce figures for energy output (GWh) from each available feedstock.

- It is thereby difficult to compare findings.

216. The RLCECM approach suggests that the managed woodland and energy crop resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%.

217. It is accepted that plant availability of 80% is too high and was a mistake in the original methodology. Instead the South West Report uses more appropriate 20% plant availability. This is based on the largest proportion of anticipated use being for general occupancy heating with very little service or process applications.

- This is considered to be an improvement on the original methodology.
- It would still be preferable to see evidence for the proportion of typical capacity factors by the distribution of plant category.

Animal biomass: poultry litter

218. The RLCECM approach suggests assessing the existing and potential future amount of poultry litter generated in the region available for use for power generation. The South West report assumes no poultry litter is available, and that it all goes for soil nutrient management.

Micro-generation

219. Cumulative totals are used for both solar and heat pump technologies as there was no clear guidance how to separately account for these.

South East Deviations from RLCECM approach

Commercial Scale Wind

220. The Ministry of Defence (MoD) were consulted upon for areas where wind turbines cannot be installed or are unlikely to be permitted. Although no data was forthcoming from the MoD, they did confirm in conversation that there were no applicable areas.

- This is considered to have little or no impact on the results for Commercial Scale Wind as it is understood from this work that there are no applicable MoD areas in the South East Region.

Plant Biomass: Managed Woodland

221. The RLCECM approach suggests assessing the existing and potential future amount of biomass available in the Region by either using the Forestry Commission Woodfuel Resource Tool or the National Inventory Woodlands and Trees. The South East study also included arboricultural arisings as well.

- This is considered to be an improvement on the original methodology.

222. The RLCECM approach suggests that the managed woodland biomass resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%.

- It is accepted that plant availability of 80% is too high and was a mistake in the original methodology. Instead the South East Report uses more appropriate 20% plant availability.

Plant Biomass: Energy Crops

223. The RLCECM approach required reporting the existing areas of established SRC, miscanthus and SRF. The South East study was able to attain figures from the Rural Payments Agency and Natural England, but not to the data itself.

- As Natural England processed the data from RPA, this is considered to be an improvement on the original methodology.

224. The RLCECM approach suggests three scenarios (high, medium and low) for estimating the amount of land available for growing energy crops. It is acknowledged in the methodology that the high scenario is neither possible nor desirable due to other uses of the land, most notably for food production. Therefore, this scenario is only theoretical. Spatial data was not available to map for medium scenario, but figures were available from Rural Payments Agency and Natural England for the medium and low scenarios.

- As Natural England processed the data from RPA, this is considered to be an improvement on the original methodology.

225. The RLCECM approach suggested that the energy crops biomass resource for heat for all categories, apply plant conversion efficiency of 80% and plant availability of 80%.

- It is accepted that plant availability of 80% is too high and was a mistake in the original methodology. Instead the South East Report uses more appropriate 20% plant availability.

Plant Biomass: Waste Wood

226. The RLCECM approach suggests consulting the Forestry Commission for data and estimates of the amount of biomass waste from sawmills, or to carry out a regional level assessment. The South East study was able to use unpublished data from the Forestry Commission instead.

Animal Biomass: Wet Organic Waste

227. The RLCECM approach suggests using data from ADAS and Defra figures. The ADAS Manure Management Database (MMDB) was not available for use. Instead data was extracted from the on the number of livestock multiplied by a manure facture (i.e. amount of manure per head per year); use bedding data (per head) from Defra Agricultural and Horticultural survey.

- This is considered to have little or no impact on wet organic waste result.

Municipal Solid Waste (MSW) and Commerical & Industrial Waste (C&IW)

228. The RLCECM approach suggests using data from Defra quarterly waste figures. The South East study was able to use unpublished data from the South East of England Partnership Board.

- This is considered to be an improvement on the original methodology.

Biogas (EfW): Landfill Gas

229. The RLCECM approach suggested using either the Environment Agency's Waste Management Licence Data, or the OFGEM RO Register to assess the available resource from landfill sites. The Environment Agency's Waste Management Licence Data was not forthcoming in time for the publication of the South East report.

- This is considered to have little or no impact on landfill gas result, as the OFGEM RO Register was used.

Biogas (EfW): Sewage Gas

230. The RLCECM approach suggested using data from the water utility companies to assess the available resource from sewage treatment sites. The water utility companies were not forthcoming with data.

- This is considered to have little or no impact on sewage gas result, as the OFGEM RO Register was used.

Microgeneration: Solar

231. The RLCECM approach suggested using DCLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of roofs

suitable for solar systems. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

- This is considered to be an improvement on the original methodology.

Microgeneration: Heat pumps

232. The RLCECM approach suggested using DCLG Statistics, English Housing Survey (EHS), ONS data, and RSS new housing provisions to assess the number of buildings suitable for heat pumps. These data sets were not sufficient for the assessment. Data from Ordnance Survey was used instead.

    This is considered to be an improvement on the original methodology.