

| Project Reference | B12020 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Project Title | Characterisation of Biomass Feedstocks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Team | Forest Research and E.ON (Technologies) Ratcliffe Ltd. [now Uniper] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Deliverable | D11 - updated datadase (data from Phase 2: variations 1, 2, 3 and 4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Submission Date | 15/12/2016 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Version | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spreadsheet Details | <table border="1"> <thead> <tr> <th>Title</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Workbook details</td> <td>Summary description of workbook</td> </tr> <tr> <td>Biomass incl pellets</td> <td>Laboratory analysis of feedstock characteristics and site characteristics. This tab contains the full results of analysis of all the biomass samples and also soil properties, where relevant</td> </tr> <tr> <td>Provenance data</td> <td>For each sampled site, this worksheet summarises general site management, crop details and detailed soil properties. 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This tab contains the full results of analysis of all the biomass samples and also soil properties, where relevant | Provenance data | For each sampled site, this worksheet summarises general site management, crop details and detailed soil properties. Where relevant this also includes soil analysis data, and also sufficient experimental details to provide a summary of the relevant variables. | Treatment codes | Codes used to describe the samples actually collected (STUDY, SITE, HARVEST/SAMPLING TIME, STORAGE, PLANT PART, LOCATION WITHIN SITE, WILLOW VARIETY) used to summarise the factors investigated in the designed sampling framework | Fuel characteristic descriptors | Expanded description of the variables listed in 'Biomass incl pellets' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Misc field data | Site details at the time of Miscanthus sample collection in Study 1 | Misc in-field var field data | Site details at the time of Miscanthus sample collection in Study 2 | Misc site descriptors | Expanded description of the variables listed in 'Misc field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Willow SRC field data | Site details at the time of willow SRC sample collection in Study 1 | Willow SRC in-field var data | Site details at the time of willow SRC sample collection in Study 2 | Willow site descriptors | Expanded description of the variables listed in 'Willow SRC field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Poplar SRC field data | Site details at the time of poplar SRC sample collection in Study 1 | Poplar SRC site descriptors | Expanded description of the variables listed in 'Poplar SRC field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Conifer SRF field data | Site details at the time of conifer SRF sample collection in Study 1 | Conifer SRF site descriptions | Expanded description of the variables listed in 'Conifer SRF field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Poplar SRF field data | Site details at the time of poplar SRF sample collection in Study 1 | Poplar SRF site descriptors | Expanded description of the variables listed in 'Poplar SRF field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Historic pellet data | Laboratory analysis of historic wood pellets | Historic pellet descriptions | Expanded description of the variables listed in 'Historic pellet data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | Costs | Summary of costs for various establishment steps for <i>Miscanthus</i> , willow SRC, poplar SRC, poplar SRF, and conifer SRF | Sample, chip, dispatch dates | Dates of field sampling, chipping and dispatch to E.ON/Uniper |
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| Fuel characteristic descriptors | Expanded description of the variables listed in 'Biomass incl pellets' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Misc field data | Site details at the time of Miscanthus sample collection in Study 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Misc in-field var field data | Site details at the time of Miscanthus sample collection in Study 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Misc site descriptors | Expanded description of the variables listed in 'Misc field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Willow SRC field data | Site details at the time of willow SRC sample collection in Study 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Willow SRC in-field var data | Site details at the time of willow SRC sample collection in Study 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Willow site descriptors | Expanded description of the variables listed in 'Willow SRC field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poplar SRC field data | Site details at the time of poplar SRC sample collection in Study 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poplar SRC site descriptors | Expanded description of the variables listed in 'Poplar SRC field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conifer SRF field data | Site details at the time of conifer SRF sample collection in Study 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conifer SRF site descriptions | Expanded description of the variables listed in 'Conifer SRF field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poplar SRF field data | Site details at the time of poplar SRF sample collection in Study 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poplar SRF site descriptors | Expanded description of the variables listed in 'Poplar SRF field data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Historic pellet data | Laboratory analysis of historic wood pellets | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Historic pellet descriptions | Expanded description of the variables listed in 'Historic pellet data' (Field sub-category, Field name, Units or options, Field descriptions, and Additional notes) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Costs | Summary of costs for various establishment steps for <i>Miscanthus</i> , willow SRC, poplar SRC, poplar SRF, and conifer SRF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sample, chip, dispatch dates | Dates of field sampling, chipping and dispatch to E.ON/Uniper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Feedstocks | <i>Miscanthus</i> , willow SRC, poplar SRC, poplar SRF, and conifer SRF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies | <ol style="list-style-type: none"> To examine the impact of climate zone, soil type, harvesting time, and storage on <i>Miscanthus</i>, willow SRC, poplar SRC, poplar SRF and conifer SRF To examine the variation between and within fields of <i>Miscanthus</i> and willow SRC To examine the feedstock characteristics of willow SRC and poplar SRF leaves To examine the feedstock characteristics of <i>Miscanthus</i> before and after pelleting <p>V1. To examine the impact of harvest time on <i>Miscanthus</i> characteristics V2. To examine the impact of harvest time on willow characteristics V3. To examine the impact of varieties on willow characteristics V4. To examine the impact of storage time on <i>Miscanthus</i> characteristics</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Purpose | To present in a systematic way the sites sampled, the conditions at the time of sampling, the laboratory analyses of both the feedstock characteristics and soil through which feedstock variability and the factors explaining feedstock variability can be investigated | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Restrictions | At ETI's discretion | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assumptions | Samples represent commercial crops | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quality Assurance | Samples of Sitka spruce harvested when ca. 15-years old from forests managed for longer rotation lengths is representative of conifer short rotation forest crops For C, H, and N, each value is an average of 2 replicates (these would be within the repeatability of the method specified in the standard), elsewhere values are a single measurement point. Data were scanned as each set of analysis was added to the master file and in a small number of cases samples were reanalysed. Finally, all feedstock characteristics were reviewed objectively to flag outliers using Genstat or R to list all points that lay beyond two standard deviations of the mean; there were obvious differences for many characteristics depending on the plant part therefore the analyses to flag outliers was done separately for the trunks, tops/branches and bark of the conifer SRF and the trunks and tops/branches of poplar SRF. The lists of statistical outliers were then scrutinised and any that showed a systematic pattern – indicating that the sample was contaminated in some way – or were markedly different from the project team's expectation or other values were marked to be excluded from further analysis by colouring the cell pink in the master data file. All remaining outliers were accepted as 'true' data and marked for inclusion in all further analysis by colouring the cell green. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Presentation of 'missing' values | <p>For sheets 'Biomass incl pellets', 'Soil', and 'Historic pellet data'</p> <ul style="list-style-type: none"> Red text denotes values at or less than level of detection Pink cell fill denotes that values have been excluded as outliers Green cell fill denotes values flagged as statistical outliers but retained Light grey cell fill indicates that analysis was not included in the study design In Study V4, dark grey cell fill indicates that the samples were not collected. <p>For all field data and in-field data</p> <ul style="list-style-type: none"> Those cells that do not contain data because there was never any intention to have data, such as soil information for stored samples, are indicated in grey cell fill Where data should be in a cell but was not recorded or is missing for some other reason are indicated with a dash. Where the cell has not been used for some other reason, e.g. the comments column if there is no comment, or where there is space for up to three stools, or multiple stems, but one stool and/or stem was sufficient, the additional cells have been left blank. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |