



## Technical Note

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| Date: 4 March 2022    | Phone: N/A                              |
| Ref: SCC SIL          | cc: N/A                                 |

Subject: Technical Note - SCC SIL Energy and Carbon Assessment Results for March Cabinet paper

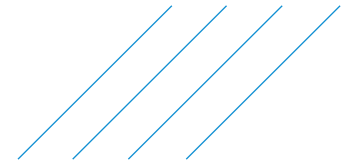
### Background

The energy and carbon assessment results presented in this technical note are based the proposed energy strategies for the Manor School, Horley Library and Coveham Hostel sites and the following key assumptions.

The energy and carbon baselines for all the sites are based on the Part L 2013 natural gas fuel baselines.

### Key Assumptions

- Baseline energy and carbon outputs are based on Part L 2013 Notional Buildings with natural gas boilers
- “Proposed Strategy” energy and carbon outputs are based on LETI guidance, Air Source Heat Pumps (ASHPs) and Photovoltaics (PVs)
- Estimated PV capacity: Manor School – 74.1 kWp, Horley Library – 74.1 kWp, Coveham Hostel - 71.7 kWp
- Assessment period – 29 years (until 2050)
- Price of carbon - £95 per tonne
- Average Energy Prices during the assessment period: Electricity – circa 15.49 p/kWh, Gas – 4.84 p/kWh
- Average Carbon Factors during the assessment period: Electricity – circa 0.43 CO<sub>2eq</sub>/kWh, Gas – 0.184 CO<sub>2eq</sub>/kWh
- Indicative price for electricity export from PV – 5 p/kWh
- Estimated electricity export proportion – 60%



## Energy and carbon Assessment Results

### Manor School Site

Carbon assessment outputs on projected average carbon factors between 2022-2050

|  | CO <sub>2</sub> emissions (tonnes/year) |             |       |
|--|---|-------------|-------|
|  | Regulated                               | Unregulated | Total |
| Total CO <sub>2</sub> Emissions Baseline | 12.97                                   | 0.92        | 13.88 |
| Proposed Strategy with ASHP and PV       | -1.11                                   | 0.92        | -0.19 |

|  | Regulated Energy CO <sub>2</sub> savings |      | Regulated and Unregulated Energy CO <sub>2</sub> savings |
|--|--|------|--|
|  | Tonnes per annum                         | %    | %  |
| <b>Total cumulative savings over baseline</b>  | 14.08                                    | 109% | <b>101%</b>  |
|  | Tonnes CO <sub>2</sub>                   |      | Tonnes CO <sub>2</sub>                                   |
| <b>Cumulative CO<sub>2</sub> savings</b>       | <b>32.2</b>                              |      | <b>5.6</b>   |
| <b>Cost saving from avoided cost of carbon</b> | <b>£3,061</b>                            |      | <b>£529</b>  |

### Energy assessment results

| Type                 | Baseline Energy (kWh) | Actual Energy (kWh) | Baseline Energy Cost (£) | Actual Energy Cost 1 (£) | Actual Energy Cost 2 (£) |
|----------------------|-----------------------|---------------------|--------------------------|--------------------------|--------------------------|
| Unregulated          | 625,479               | 625,479             | £96,897                  | £96,897                  | £96,897                  |
| DHW                  | 567,155               | 264,301             | £27,467                  | £40,945                  | £40,945                  |
| Lighting             | 108,589               | 109,435             | £16,822                  | £16,953                  | £16,953                  |
| Aux Energy           | 18,575                | 182,469             | £2,877                   | £28,267                  | £28,267                  |
| Space Heating        | 1,448,407             | 232,566             | £70,146                  | £36,028                  | £36,028                  |
| Elec generated by PV | -                     | -1,545,241          | -                        | -£239,383                | -£142,110                |
| <b>Total</b>         | <b>2,768,205</b>      | <b>-130,990</b>     | <b>£214,210</b>          | <b>-£20,293</b>          | <b>£76,980</b>           |

Note:

\* Energy Cost 1 - the PV cost savings are based on the assumption that there is no PV electricity export from the site (indicative to show maximum possible benefit)

\*\* Energy Cost 2 - the PV cost savings are based on the assumption that there is 60% PV electricity export from the site (more realistic estimate)



## Horley Library Site

Carbon assessment outputs on projected average carbon factors between 2022-2050

|  | CO <sub>2</sub> emissions (tonnes/year) |             |       |
|--|---|-------------|-------|
|  | Regulated                               | Unregulated | Total |
| Total CO <sub>2</sub> Emissions Baseline | 13.0                                    | 0.9         | 13.9  |
| After use of renewable energy            | -1.1                                    | 0.9         | -0.2  |

|   | Regulated Energy CO <sub>2</sub> savings |      | Regulated and Unregulated Energy CO <sub>2</sub> savings |
|---|--|------|--|
|   | Tonnes per annum                         | %    | %  |
| <b>Total cumulative savings over baseline</b> | 14                                       | 109% | <b>101%</b>  |
|   | -1.1                                     | -    | <b>-0.2</b>  |
| Cumulative CO <sub>2</sub> savings            | Tonnes CO <sub>2</sub>                   |      | Tonnes CO <sub>2</sub>                                   |
| Cost saving from avoided cost of carbon       | 33.2                                     |      | 5.7  |
| <b>Total cumulative savings over baseline</b> | <b>£3,159</b>                            |      | <b>£539</b>  |

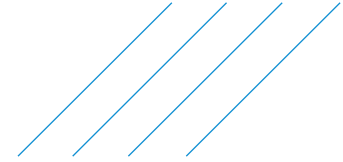
## Energy assessment results

| Type                 | Baseline Energy (kWh) | Actual Energy (kWh) | Baseline Energy Cost (£) | Actual Energy Cost 1 (£) | Actual Energy Cost 2 (£) |
|----------------------|-----------------------|---------------------|--------------------------|--------------------------|--------------------------|
| Unregulated          | 625,479               | 625,479             | £96,897                  | £96,897                  | £96,897                  |
| DHW                  | 567,155               | 264,301             | £27,467                  | £40,945                  | £40,945                  |
| Lighting             | 108,589               | 109,435             | £16,822                  | £16,953                  | £16,953                  |
| Aux Energy           | 18,575                | 182,469             | £2,877                   | £28,267                  | £28,267                  |
| Space Heating        | 1,448,407             | 232,546             | £70,146                  | £36,025                  | £36,025                  |
| Elec generated by PV | -                     | -1,543,201          | -                        | -£239,067                | -£141,923                |
| <b>Total</b>         | <b>2,768,205</b>      | <b>- 128,971</b>    | <b>£214,210</b>          | <b>-£19,980</b>          | <b>£77,164</b>           |

Note:

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\*\* Energy Cost 2 - the PV cost savings are based on the assumption that there is 60% PV electricity export from the site (more realistic estimate)



## Coveham Hostel Site

Carbon assessment outputs on projected average carbon factors between 2022-2050

|  | CO <sub>2</sub> emissions (tonnes/year) |             |       |
|--|---|-------------|-------|
|  | Regulated                               | Unregulated | Total |
| Total CO <sub>2</sub> Emissions Baseline | 10.6                                    | 0.6         | 11.3  |
| After use of renewable energy            | -0.7                                    | 0.6         | -0.1  |

|  | Regulated Energy CO <sub>2</sub> savings |      | Regulated and Unregulated Energy CO <sub>2</sub> savings |
|--|--|------|--|
|  | Tonnes per annum                         | %    | %  |
| <b>Total cumulative savings over baseline</b>  | 11.4                                     | 107% | <b>101%</b>  |
|  | -0.7                                     | -    | <b>-0.1</b>  |
| <b>Cumulative CO<sub>2</sub> savings</b>       | <b>Tonnes CO<sub>2</sub></b>             |      | <b>Tonnes CO<sub>2</sub></b>                             |
| <b>Cost saving from avoided cost of carbon</b> | <b>22.4</b>                              |      | <b>3.2</b>   |
| <b>Total cumulative savings over baseline</b>  | <b>£2,127</b>                            |      | <b>£306</b>  |

## Energy assessment results

| Type                 | Basline Energy (kWh/y) | Actual Energy (kWh/y) | Basline Energy Cost (£) | Actual Energy Cost 1 (£) | Actual Energy Cost 2 (£) |
|----------------------|------------------------|-----------------------|-------------------------|--------------------------|--------------------------|
| Unregulated          | 434,669                | 434,669               | 67,337                  | 67,337                   | 67,337                   |
| DHW                  | 788,967                | 404,800               | 38,210                  | 62,710                   | 62,710                   |
| Lighting             | 109,240                | 109,667               | 16,923                  | 16,989                   | 16,989                   |
| Aux Energy           | 28,449                 | 43,799                | 4,407                   | 6,785                    | 6,785                    |
| Space Heating        | 854,595                | 191,031               | 41,388                  | 29,594                   | 29,594                   |
| Elec generated by PV | -                      | -1,257,413            | -                       | -194,794                 | -115,640                 |
| <b>Total</b>         | <b>2,215,920</b>       | <b>-73,447</b>        | <b>168,265</b>          | <b>-11,378</b>           | <b>67,776</b>            |

Note:

\* Energy Cost 1 - the PV cost savings are based on the assumption that there is no PV electricity export from the site (indicative to show maximum possible benefit)

\*\* Energy Cost 2 - the PV cost savings are based on the assumption that there is 60% PV electricity export from the site (more realistic estimate)