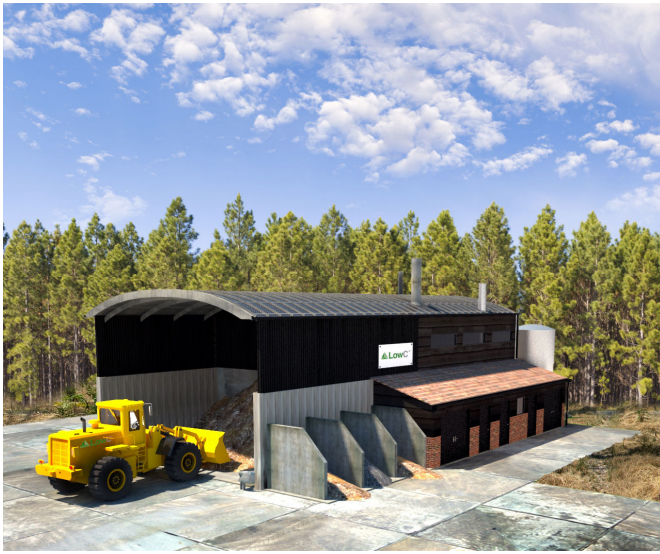


## Arbor ElectroGen

Biomass-Fuelled Combined Heat and Power (CHP)



### CARBON BENEFITS

- Taking the Arbor ElectroGen 500 as an example – annually, it will produce around 4,000 MWh of electricity and 6,000 MWh of heat saving a staggering **3,000 tonnes** of carbon emissions (approximate) – from just 3,400 tonnes of renewable fuel – in comparison with grid gas and electricity equivalent output.
- To put it into context – using domestic Solar PV – you’d need around 3,500 homes and an investment of around £35million to reach the same level of carbon savings that the Arbor ElectroGen offers for around **10%** of the capital cost.
- Both the electricity and heat produced can be used as renewable inputs into Part L and BREEAM.
- Code for Sustainable Homes - Code level 5 & 6 homes become achievable.

### LOWC COMMUNITIES LTD

LowC is an organisation that understands how to integrate renewable energy generation into the built environment – whether it’s domestic, commercial or industrial.

By understanding a building or community’s operational heating, hot water, cooling and electrical demand and satisfying it with the most cost-effective form of low-carbon energy, LowC has managed to break down the barriers that have, until now, prevented the wider uptake of renewable energy generation technology and prevented Low Carbon communities from happening.

The renewable energy market is dominated by technologies and approaches which deliver low carbon heat only, or deliver very limited renewable electrical outputs against the demands of typical buildings. High-volume, onsite electrical generation is often driven by fossil fuel such as gas for CHP units which, as a result of their fuel inputs, have a comparatively small impact on carbon reduction.

Whilst the bulk of the delivery of the UK’s built environment continues to focus on producing renewable heat to meet the demands of planning requirements, the LowC Arbor ElectroGen targets renewable electricity - a commodity that, if supplied from the National Grid, is highly-

### INTRODUCTION

Arbor ElectroGen is a proven, biomass-fuelled combined heat and power system (CHP) that delivers cost-effective, low-carbon heat and power for a variety of applications. Now available in the UK and Ireland from LowC Communities Ltd, the Arbor ElectroGen range offers exceptional operational performance, with incredibly-low carbon emissions.

Fuelled by ‘woody’ biomass, it is ideal for customers that have an on-site biomass resource - such as woodland, or easy access to a local feedstock. The feedstock creation follows a few simple steps by taking newly cut, ‘small round wood’ or similar, chipping to the required specification (much larger than traditional heat only biomass boilers), drying in the warm extract air from the plant space which is used in the gas cooling process.

The Arbor ElectroGen system produces little or no visible smoke plume from its flue, virtually no particulates, virtually zero NO<sub>x</sub>, and CO<sub>2</sub> emission levels that are 93% lower than that of an equivalent natural gas-fired CHP system.

### COMMERCIAL BENEFITS

- As an advanced gasification technology it qualifies for double Renewable Obligation Certificates.
- The 130 model also qualifies for Renewable Heat Incentive as it falls within the <200 kW<sub>th</sub> band.
- When installed such that the electricity generated can be connected to either the grid or a private network and the heat can be distributed via a District Heat Network then the generated output can have a sale value.
- Levy Exemption Certificates are applicable.
- With a CHPQa QI of over 105 the technology will receive ECA support.
- The technology supports the position associated with the Carbon Reduction Commitment Energy Efficiency Scheme.

carbon - intensive as a result of both the fossil fuels used and the efficiency of distribution. Furthermore renewable heating is being generated which offsets the need for gas or oil heating fuels being required onsite for heating purposes.

### LOWC’S SERVICES AND PRODUCTS

- LowC focuses on low and zero-carbon solutions for the built environment, delivering improved returns and enhanced shareholder value by reducing costs, complying with new regulations and responding to market demands for improved environmental performance.
- Working with clients to optimise returns on their investment in renewable energy technologies, LowC services include energy financing contracts and RESCO services, as well as utilities management and supply optimisation.
- LowC offers capital sale, project management, installation and commissioning of renewable energy solutions.
- Management for the physical integration of renewable energy equipment into existing infrastructure.
- Agri ElectroGen from LowC provides a bio-liquid alternative to the ‘woody’ biomass route to renewably-fuelled CHP.

## DATA

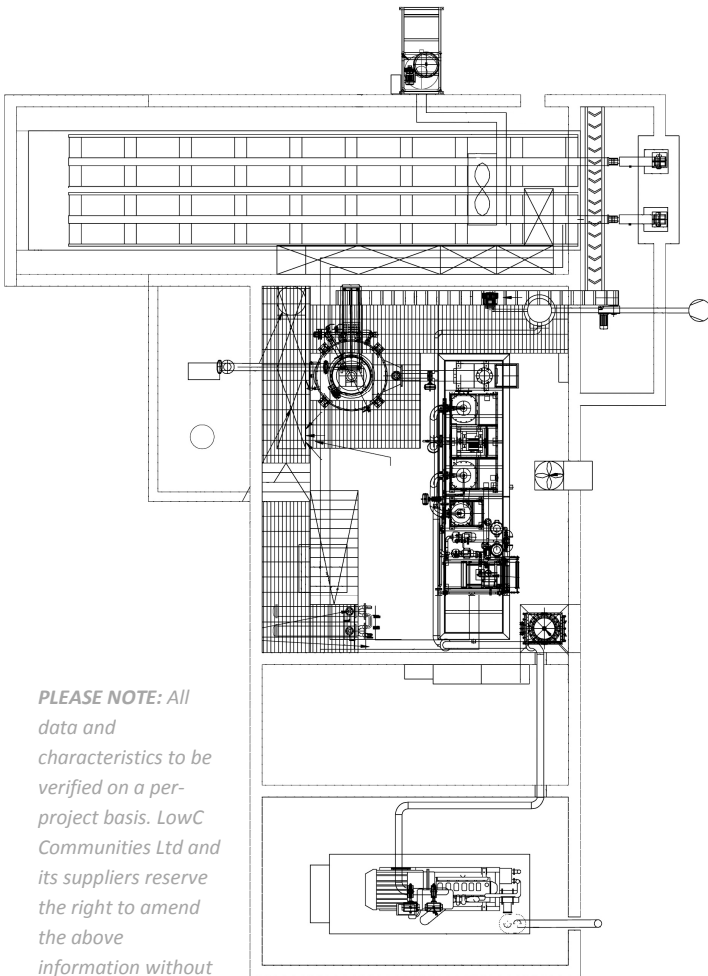
Model	Electrical Output kW	Heating Output kW	Fuel Input Kg/hr	Moisture Content % (dry)	Calorific Value kWh/kg	Ash kg/hr	7-day Chip Storage m <sup>3</sup>	Size Without Chip Storage m	Area Without Chip Storage m <sup>2</sup>
Arbor130	130	150	111	15	4.5	3.3	199	12 x 12	144
Arbor250	250	325	213	15	4.5	6.4	382	12 x 12	144
Arbor500	500	750	425	15	4.5	12.8	764	15 x 15	225

## EXAMPLE - Based on 8,000 hours of operation per year including a District Heat Network and Private-Wire installation

Model	Fuel (dry) T/a	Fuel (green) T/a	25 T Trucks / av. wkg. week	Elec. MWh/a	Heat MWh/a	CO <sub>2</sub> Saved vs. Grid T/a
Arbor130	888	2,202	2	1,040	1,200	700
Arbor250	1,704	4,226	4	2,000	2,600	1,400
Arbor500	3,400	8,432	7	4,000	6,000	3,000



## TYPICAL LAYOUT PLAN



*PLEASE NOTE: All data and characteristics to be verified on a per-project basis. LowC Communities Ltd and its suppliers reserve the right to amend the above information without notice. E&OE.*

## FUEL CHARACTERISTICS

- Virgin wood
- Fresh 'green wood' (SRW) at 65% MC can be accommodated prior to chipping and drying using waste heat from the gasifier
- Moisture Content for process 15%
- Calorific Value 4.5 kWh /kg
- Length of chip 40 – 200 mm
- Depth of chip – no less than 20 mm
- Fines under 40 mm long max 10% by volume
- Chemical composition when dry
  - Carbon 40 – 50%
  - Hydrogen 5 - 6%
  - Oxygen 38 – 45%
  - Volatile wood components 60 – 83%

## GAS CHARACTERISTICS

- Heating Value of Gas : 5 MJ/m<sup>3</sup>
- Temperature of Gas : 40°C
- Pressure of Gas : 15 mbar
- Dust in Gas : 10 mg/Nm<sup>3</sup>
- Estimated Gas Contents:
  - CO : 20%
  - H<sub>2</sub> : 12%
  - C<sub>2</sub>H<sub>4</sub> : 2%
  - CmH<sub>2</sub>n : 0,5%
  - CO<sub>2</sub> : 6,5%
  - N<sub>2</sub> : 59%

## EMISSIONS CHARACTERISTICS

- The Arbor ElectroGen system produces little or no visible smoke plume from its flue, ~ 1 mg/m<sup>3</sup> fine solids, < 100 ppm CO and 50 ppm NO<sub>x</sub>. It does produce water vapour and CO<sub>2</sub>. The CO<sub>2</sub> emission levels are approx 93% lower than that of an equivalent natural gas-fired CHP system.