ARKHITEKTON
ENERGY
The Arkhitekts of Global Change

BIOMASS CHP · 5 MWE TO 20 MWE

Arkhitekton Energy Biomass Power & Heat

Forestry residues, crop residues and waste wood turned into power and heat for industrial sites and heat networks – with a route to syngas and green fuels using CFH gasification. Fully funded, in a joint venture with the host.



5–20 MWe
electrical output

~1.5 MWth
heat per MWe for host sites

85%
of build funded by the EPC partner

£0
capital from the host

THE TECHNOLOGY

What a biomass scheme looks like

The technology we fund, build and operate – and how a typical Arkhitekton Energy scheme is laid out on site.



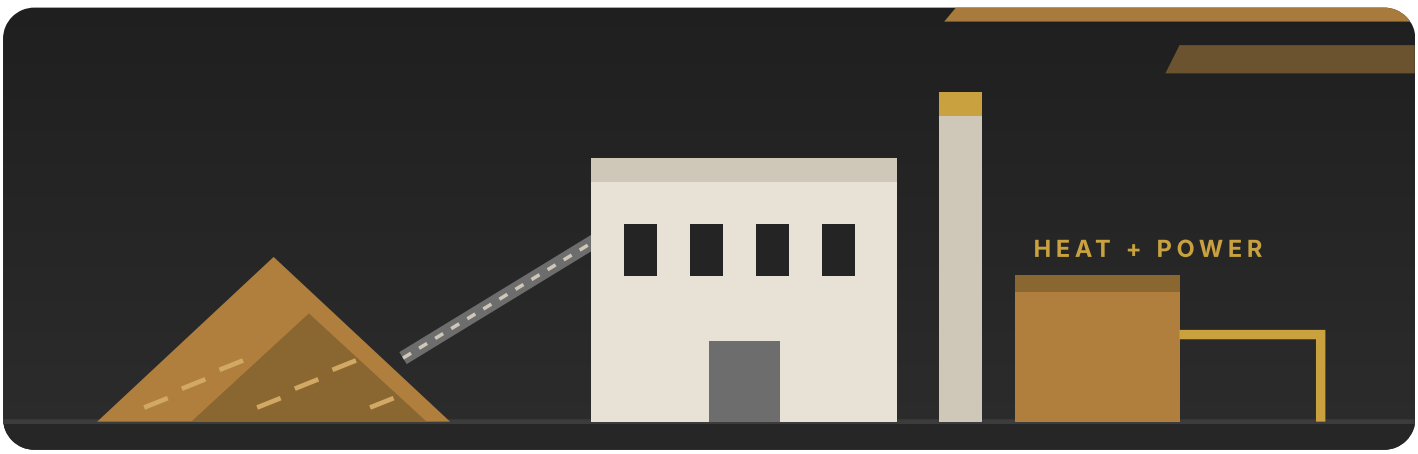
Biomass power and heat station



Wood chip fuel



Forestry residues and roundwood



Typical biomass scheme layout – Arkhitekton Energy illustration

WHY BIOMASS, WHY NOW

Firm, renewable power and heat

Biomass runs whenever it is needed, so it complements wind and solar. Combined heat and power gets the most from every tonne: industrial sites and heat networks get low-carbon heat, and the project sells power by private wire or to the grid.

~8,000
operating hours a year

~75%
total efficiency in CHP mode

10–15 MJ/kg
feedstock energy range

123 kt
CO2 avoided a year (20 MW reference)

What makes the Arkhitekton approach different

- **Fully funded** – our EPC partner finances 85% of the build; the 15% balance is guaranteed
- **Joint venture with the landowner** – a 50/50 project company, land secured at Heads of Terms
- **Fixed-price turnkey EPC** with a UK Tier 1 civils partner and a full bond package
- **Takes difficult feedstock** – CFH gasification handles bales and lump material over a metre long

Who it is for

- **Industrial sites** with steam or hot-water demand
- **Heat networks** needing a low-carbon heat source
- **Forestry and estate owners** with residues
- **Waste wood processors** looking for an outlet

THE ARKHITEKTON FUNDING MODEL

85%
of the build financed by our EPC partner

15%
from a UK funding partner, guaranteed in full

50/50
joint venture with the landowner

£0
capital or borrowing for the landowner

For the landowner

Long-term, index-linked rent and half the profit – with no capital, no borrowing and no development risk.

For funders

Fixed-price EPC, URDG 758 guarantees, insurance and step-in rights – structured for institutional due diligence.

For offtakers

Steam or hot water below the host's current cost, plus renewable power by private wire or to the grid.

Reference plant data supplied by our technology partner (outside the UK); UK economics differ.

THE RANGE

One plant, several products

We size each plant to the host's heat demand and the feedstock available locally.

Plant	Electrical	Heat	Fuel a year	Typical host
Site CHP	5 MWe	~7.5 MWth	~47,000 t	Factories, food and drink
Industrial CHP	**10 MWe**	**~15 MWth**	**~94,000 t**	**Paper, chemicals, heat networks**
Regional plant	20 MWe	~30 MWth	~190,000 t	Industrial parks, large networks

Inside every project

FUEL

- Covered fuel store
- Screening and conveying
- Moisture management

CONVERSION

- Grate boiler or CFH gasifier
- Clean, tar-free syngas option
- Ash to reusable aggregate

POWER AND HEAT

- Steam turbine or gas engine
- Heat exchangers for steam or hot water
- Private-wire connection

EMISSIONS

- Flue gas cleaning
- Continuous monitoring
- Within permitted limits

What biomass becomes

1. **Power**
   Electricity by private wire or to the grid.
2. **Heat**
   Steam or hot water for host sites.
3. **Methanol**
   Green methanol via CFH gasification.
4. **Hydrogen**
   Syngas shifted to high-purity hydrogen.
5. **Gas**
   Substitute natural gas for the grid.

SITING AND THE LANDOWNER

Built where heat is needed

CHP works best next to a heat user. We site plants on industrial land beside the host, with good road access for fuel deliveries.

Industrial sites

Factories with year-round steam or hot-water demand.

Heat networks

Town and campus networks needing a low-carbon heat source.

Forestry hubs

Sawmills and estates with residues on the doorstep.

What we look for

Criterion	What works	Why it matters
Heat demand	Year-round steam or hot water	Heat sales lift efficiency and revenue
Fuel	Contracted supply within ~50 miles	Cost and certification
Area	2–5 ha	Fuel store, plant and access
Access	HGV route for fuel deliveries	About 20–25 deliveries a day at 20 MWe
Land use	Industrial	Permits and planning

The joint venture with the landowner

- **Heads of Terms early** – land secured by lease or purchase before the project is funded
- **50/50 project company** – the landowner and Arkhitekton Energy share net cash after costs, debt and tax
- **Site rent**, index-linked, from the start of construction
- **Heat at a discount** to the host's current cost

Planning and consents

- Planning permission
- Environmental permit, including emissions limits
- Network operator connection or private-wire contract
- Biomass sustainability criteria and fuel certification
- Traffic and air quality assessments

FUNDING AND RETURNS

85% EPC finance, 15% equity, 50/50 with the landowner

The same funding model as every Arkhitekton Energy programme. Our EPC partner finances 85% of the project cost, repaid from project revenue. The remaining 15% is provided by a UK funding partner and covered in full by an advance payment guarantee.

Size	Project cost	EPC finance (85%)	Equity (15%)	Value to landowner a year	Landowner share, 20 yrs
5 MWe	£25.0m	£21.2m	£3.8m	£0.23m	£17.5m
10 MWe	**£48.0m**	**£40.8m**	**£7.2m**	**£0.60m**	**£37.5m**
20 MWe	£90.0m	£76.5m	£13.5m	£1.60m	£82.3m

10 MWe – first full year of operation

£10.8m
revenue

£5.20m
EBITDA after fuel and operating costs

£4.20m
EPC finance debt service

£1.00m
net cash, split 50/50

~23%
equity IRR, payback ~6 years

What the landowner receives

- **50%** of net distributable cash every quarter, open-book
- **£100k a year** site rent, index-linked
- Cash share rises to about **£3.91m a year** on a 10 MWe once the EPC loan is repaid
- **Discounted heat** – steam or hot water below the host's current cost
- No capital, no borrowing, no development risk for the landowner

Protections

- Fixed-price turnkey EPC with a UK Tier 1 civils partner
- **URDG 758** advance payment guarantee covering the 15% in full, plus performance (10%) and warranty (5%) guarantees
- Contractors' all-risks and third-party liability during the build
- Funders' step-in rights and a decommissioning reserve from year 10
- Option for the landowner to buy the plant at market value at the end of the term

Indicative base case: 8,000 hours a year, power £95/MWh, 1.5 MWth heat per MWe for 6,000 hours at £35/MWh, wood fuel £35/t, 20-year term. EPC finance 6% over 15 years; costs and revenue indexed at 2.5% a year. Subject to survey, planning, grid and offtake contracts.

EPC AND DELIVERY

Built turnkey, run by a UK operator

One fixed-price contract covers the fuel store, boiler or gasifier, turbine or engines, heat recovery and emissions control. UE Series turbines can be added where syngas is used for power.

EPC partner

China Haisum Engineering, part of China Poly Group and our primary EPC partner, designs, procures, builds and commissions the plant on a fixed-price turnkey contract – and provides 85% of the project finance.

UK Tier 1 civils partner

Groundworks, foundations, access, drainage, HV works and grid connection, built to UK standards inside the EPC contract price.

UK operator

A UK operator runs the plant around the clock with a site team, fuel procurement and emissions reporting to the regulator.

How a site is delivered

1 Survey
Heat demand, fuel, site and access screen.

2 Contract
Heads of Terms, JV, heat and fuel contracts.

3 Consent
Planning, permit and grid.

4 Build
Plant and fuel store – about 18–24 months.

5 Operate
Power and heat sold; income shared quarterly.

Performance guaranteed

- Output, efficiency and availability guaranteed at testing
- Emissions guaranteed within permit limits
- Long-term service agreements for key equipment
- Fuel supply contracts in place before close

Reporting

- Live dashboards for the landowner, funders and offtakers
- Quarterly open-book management accounts for the project company
- Annual independent performance and ESG audit
- Lender-pack reporting to institutional standards

TYPICAL PROGRAMME

2.5–3.5 years to operation

From signed Heads of Terms. Grid connection dates are set by the network operator and can extend the programme.

NEXT STEPS

Low-carbon heat and power for your site

Send us your site's location, heat and power demand and any fuel you produce or can source. We will come back with a site screen and an indicative heat price.

1

Site screen

Land, grid headroom, planning status and heat demand and fuel supply.

2

Heads of Terms

Lease or purchase agreed and the joint venture with the landowner signed.

3

Pre-app and grid

Planning pre-application, permits and network operator connection offer.

4

Sign and close

EPC contract, funding and guarantees in place; build starts.

Who we are looking to hear from

- Industrial sites with steam or hot-water demand
- Heat network operators and councils
- Forestry, sawmill and estate owners
- Waste wood processors

Also from Arkhitekton Energy

- **UD Series** modular Data Centres, 250 kW to 2 MW
- **UE Series** gas turbine generators, 2 MW to 112 MW
- **Waste to energy** – CFH green methanol, plastic recycling and EfW
- Solar, battery storage, wind, floating solar, hydro, hydrogen, bioethanol and biomass

Talk to Arkhitekton Energy

Arkhitekton Energy · Arkhitekton Energy Limited · Registered in England and Wales · Company no. 16859110 · Quadrant House, Floor 6, 4 St. Thomas More Square, London E1W 1YW
Chris Baldwin · Major Projects Director · chrisb@arkhitekton-energy.com · 07342 299986
Michael Morrison · Managing Director · michael@arkhitekton-energy.com · 07900 285837
Shane Jessop · Introducer Channel Director · shane.jessop@arkhitekton-construction.com · 07857 478006
www.arkhitekton-energy.com · Follow Arkhitekton Energy on LinkedIn

All figures are indicative and do not form an offer or a financial promotion. Projects are subject to survey, planning, grid connection, funder approval, contract and financial close.