Energy Conversion Cluster

Area: approx. 7.5 ha | **Green Energy:** Pyrolysis - Plasma Gasification - CHP - ORC - Solar Energy - BESS

The Energy Conversion Cluster is designed to convert non-recyclable and residual waste into useful energy. It combines advanced thermal conversion and renewable systems to transform residual streams into electricity, thermal energy and other valuable energy outputs for the ADS ECO complex.

01 **Residual waste**

02 **Thermal conversion**

03 **Power island**

04 **PV + BESS**

Integrated energy conversion campus concept

Strategic role: energy security, landfill diversion and ESG value

Final sizing depends on feedstock testing, environmental permitting and EPC technology selection.

Indicative structure for partner discussions. Subject to legal, technical and financial due diligence.

Strategic Role and 7.5 ha Site Program

A multi-functional cluster that integrates thermal conversion, renewable energy, storage, power distribution and environmental monitoring.

Indicative land-use envelope

- Thermal halls – 1.4 ha
- Gas cleaning – 0.8 ha
- CHP + ORC – 0.8 ha
- PV / BESS / substation – 2.1 ha
- Feedstock buffer – 1.1 ha
- Safety roads + utilities – 1.2 ha

01 Energy backbone
Supplies dispatchable power.

02 Residual valorization
Routes non-recyclable streams.

03 Grid-ready platform
Combines internal use with export capacity.

04 ESG reporting base
Creates transparent performance data.

Design principle: keep thermal conversion, gas cleaning, power island and BESS physically separated by safe access lanes while sharing SCADA, utilities and environmental systems.

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Feedstock Acceptance and Pre-Processing

Only compatible, pre-checked residual streams should enter the conversion system. Quality control protects performance, safety and emissions compliance.

01 Residual RDF

Dry non-recyclable refuse-derived fuel from smart sorting; controlled for size and moisture.

02 Plastic / rubber rejects

Contaminated or mixed polymer streams unsuitable for direct recycling, routed mainly to pyrolysis.

03 Organic residuals

Only screened, non-feed and non-compost residuals with controlled moisture and contamination.

04 Industrial residues

Non-hazardous combustible packaging rejects and selected bulky fractions.

05 Exclusions

Hazardous, radioactive, explosive, pressurized cylinders and untreated medical waste.

06 Preparation systems

Shredding, drying, metal removal, bunker mixing, dosing and batch traceability.

Indicative modular capacity

Phase 1: 80-120 t/day residual conversion. Expansion: 180-260 t/day through additional lines, subject to feedstock audit and permitting.

Integrated Conversion Process Flow

The cluster connects residual feedstock, pyrolysis, plasma gasification, gas cleaning, CHP, ORC, solar energy, BESS and ESG reporting into one operating chain.

Integrated thermal conversion and green-energy chain

Residual waste is converted into syngas, electricity, useful heat and stable recovered outputs.

Thermal conversion and green-energy chain

ADS ECO
CIRCULAR FUTURE

Energy Conversion Cluster | Area: approx. 7.5 ha

Pyrolysis and Plasma Gasification Packages

Two complementary thermal platforms process different residual fractions and feed a common gas cleaning and power-generation island.

01 Advanced pyrolysis module

Feedstock
plastic rejects, rubber, dry RDF fractions and carbon-rich residues

Thermal range
approx. 400-750 °C in oxygen-limited reactor conditions

Outputs
pyrolysis gas, condensable oil fraction, char/carbon output

Core equipment
shredder, dryer, metering, reactor, condensers, gas handling, flare

Controls
temperature, residence time, feed moisture, gas composition and batch data


Pyrolysis Gas


Pyrolysis Oil


Biochar / Carbon


Flare System

02 Plasma gasification module

Feedstock
RDF rejects, residual combustible fractions and selected non-recyclable streams

Thermal envelope
approx. 1,200-1,600 °C local plasma zone; final profile by supplier

Outputs
conditioned syngas, inert vitrified/ mineral fraction, recovered metals if applicable

Core equipment
reactor, oxygen/steam control, slag handling, gas cooling and cleaning

Controls
feed homogeneity, gas quality, pressure, slag discharge, CEMS and interlocks


Syngas


Vitrified Slag


Recovered Metals


Gas Cleaning

Technology decision should be based on feedstock lab tests, emissions basis, supplier guarantees and lifecycle economics.

Lab tested feedstock | Emission compliance | Supplier performance | Lifecycle economics

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ADSECO
ECO-INDUSTRIAL CIRCULAR ECONOMY COMPLEX

Energy Conversion Cluster
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Syngas Cleaning, CHP and ORC Heat Recovery

Gas quality and heat recovery define the bankability of the energy island. The system should be designed for stable power, useful heat and transparent emissions data.

01 Cyclone
coarse particulates

02 Quench
temperature control

03 Scrubber
acid gas control

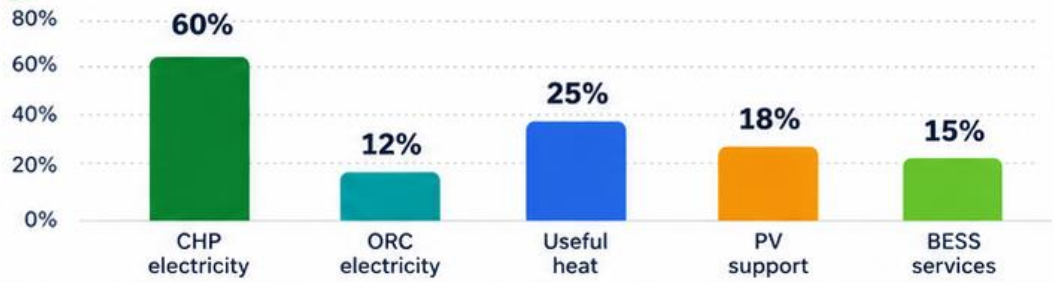
04 Filtration
polishing and carbon

05 CEMS
continuous monitoring

Indicative power island

CHP / gensets	2 x 3.5 MW-class modular units or equivalent phased packages
Electricity	approx. 55–60 GWh/year at mature operation
ORC recovery	1.5–2.0 MW, approx. 10–12 GWh/year from recoverable heat
Useful heat	drying, buildings, agro-processing and low-temperature industrial uses

Indicative energy contribution logic



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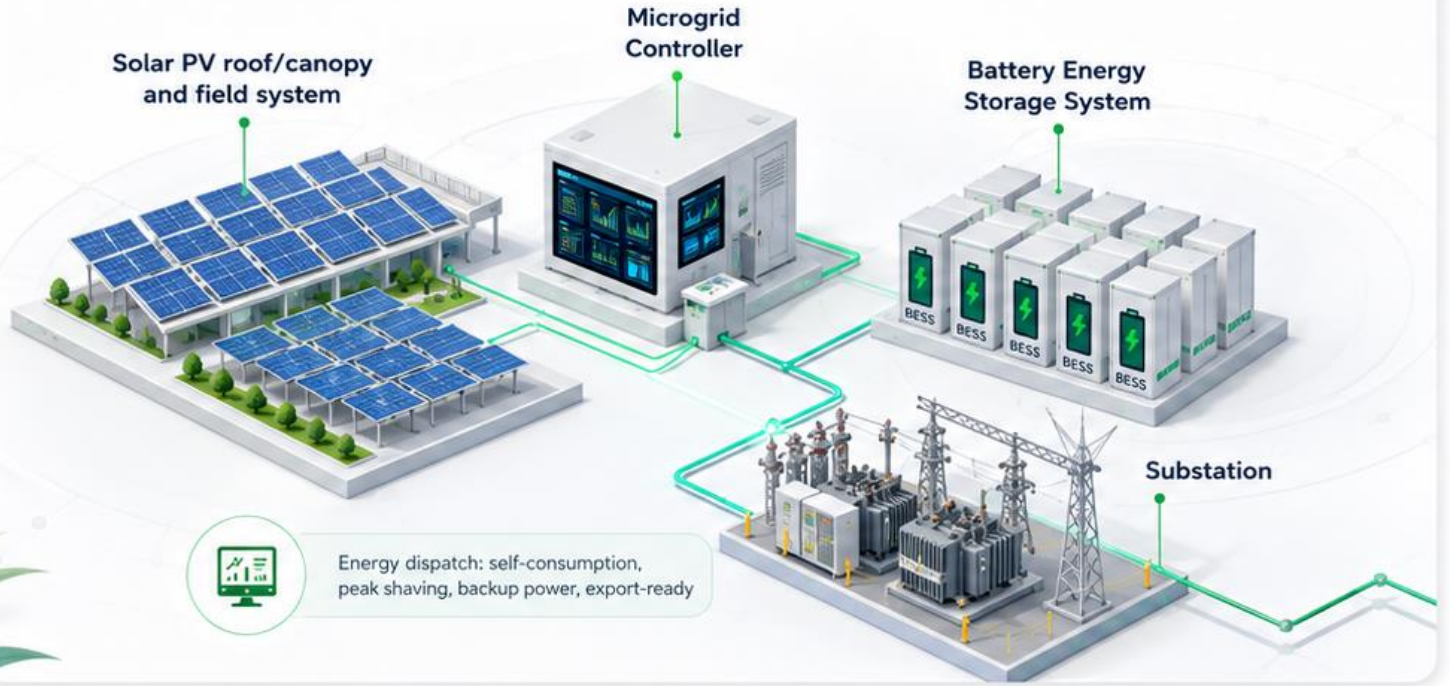
Solar PV, BESS and Microgrid Integration

Solar and storage improve resilience, reduce peak demand and support site-wide power quality for the ADS ECO complex.

PV + BESS + power island integration

The cluster combines thermal generation with solar and storage for resilient green-energy operation.



PV, BESS and microgrid control concept

01 Solar PV
Roof, canopy and field-mounted solar generation

02 BESS
Battery storage for balancing, backup and peak shaving

03 Substation
Grid interface, protection and power distribution

04 EMS / SCADA
Monitoring, dispatch, controls and energy optimization

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Safety, SCADA and Environmental Controls

CONTROL + SAFETY

The cluster requires integrated process control, fire protection, gas safety, emissions monitoring and digital audit trails.

Digital control, emissions monitoring and safety layer

01	02	03	04	05
Feedstock quality	Syngas stability	Power availability	Emission readiness	BESS state
92/100	88/100	95/100	90/100	82/100

SCADA · CEMS · Gas detection · Fire suppression · Predictive maintenance · ESG data and reports

Integrated control ensures safe operation, regulatory compliance, stable energy production and long-term asset protection.

01 Gas detection

Continuous monitoring of combustible and toxic gases across all critical areas.

02 Fire protection

Early detection, automatic alarms, suppression systems and safe evacuation.

03 Environmental

CEMS, emissions monitoring and compliance with environmental standards.

04 Operator safety

Procedures, training, PPE, interlocks and human-factor protection.

05 Cyber + data

Secure networks, role-based access, backup and audit trail integrity.

Safe operations · Regulatory compliance · Emission control · Asset protection · Operational reliability · Investor confidence

SUSTAINABLE BY DESIGN

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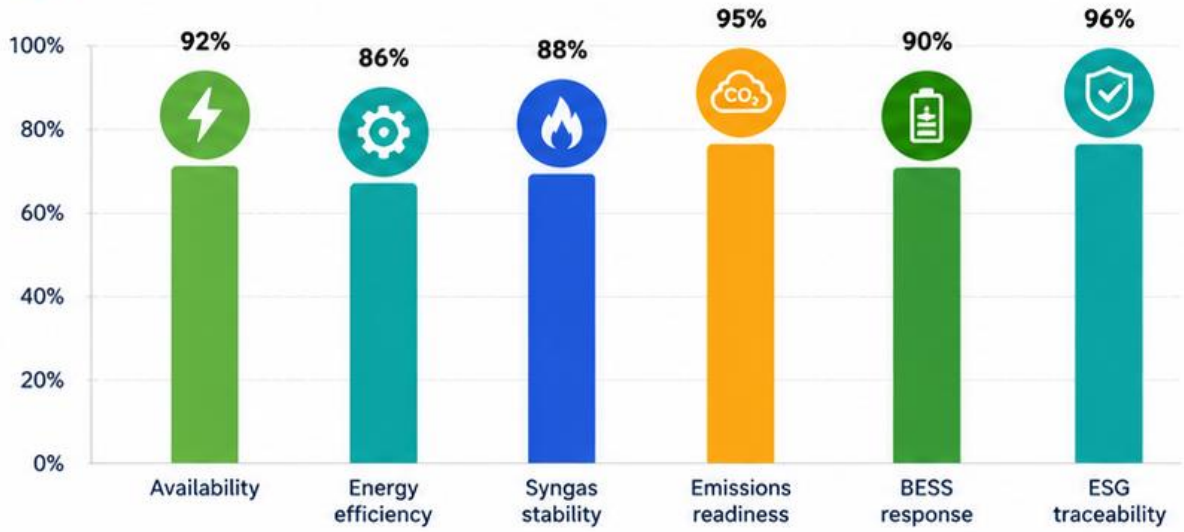
KPIs + ESG

Performance KPIs and ESG Contribution

Measurable indicators convert technical operation into investor-ready reporting, **environmental accountability** and bankable performance control.

OPERATIONAL READINESS DASHBOARD



ESG AND VALUE CONTRIBUTION

Landfill diversion	Reduced untreated disposal and methane pressure
Renewable integration	PV and BESS lower-carbon energy support
Traceable outputs	Batch data for feedstock, syngas, power and mineral output
Energy resilience	Internal power supply for all ADS ECO modules
Investor reporting	CEMS logs, energy balance, KPIs and ESG dashboard

CORE MESSAGE: RESIDUAL WASTE BECOMES CONTROLLED ENERGY VALUE WITH TRANSPARENT ESG PERFORMANCE DATA.

- Bankable performance
- Lower carbon impact
- Operational excellence
- Transparent reporting
- Investor confidence

Implementation Path and Partner Package

A structured route moves from feedstock validation to EPC delivery, commissioning and long-term O&M with clear performance guarantees.

1. **Feedstock audit**
   composition, CV, moisture and contaminants
2. **Technology fit**
   pyrolysis, plasma, CHP, ORC and PV/BESS supplier review
3. **Concept design**
   layout, utilities, HAZOP, emissions basis and permits
4. **CAPEX / OPEX**
   budget, energy balance, revenue and sensitivity model
5. **EPC package**
   procurement, construction, commissioning and acceptance tests
6. **O&M + ESG**
   operation, maintenance, KPIs, CEMS and reporting

ADS ECO Energy Conversion Cluster partner package

Define technology scope, performance guarantees, emissions limits, availability KPIs, feedstock specification, power and heat assumptions, grid interface, safety obligations and long-term O&M responsibilities.

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