

ECHO₂

Rainbow
Bee Eater



www.rainbowbeeeater.com.au



SDA Engineering



Rainbow Bee Eater

AusIndustryTM
BUILDING BUSINESS · POWERING PRODUCTIVITY

Single purpose Australian owned company. 2007 Origins.

'Develop and supply modular 'biomass to energy systems' with benchmark cost, environmental and social benefits

Australian manufacture, installation, commissioning by high reputation engineering partner SDA Engineering

10 years development - support from SDA, AusIndustry, GISA and other government and industry supporters - potential world best in class - RBE owned patent pending - no known barriers to up-scaling 10X or more

First public release of ECHO2 information was at the Loxton Research Centre Bioenergy Forum on 21 July 2017

Introducing *ECHO*₂

Renewable Energy from organic residues

Base Load, Low Cost, Low Emissions

Suitable for any business or community using
a few hundred kW of energy

2007 Origins: 'find a system'



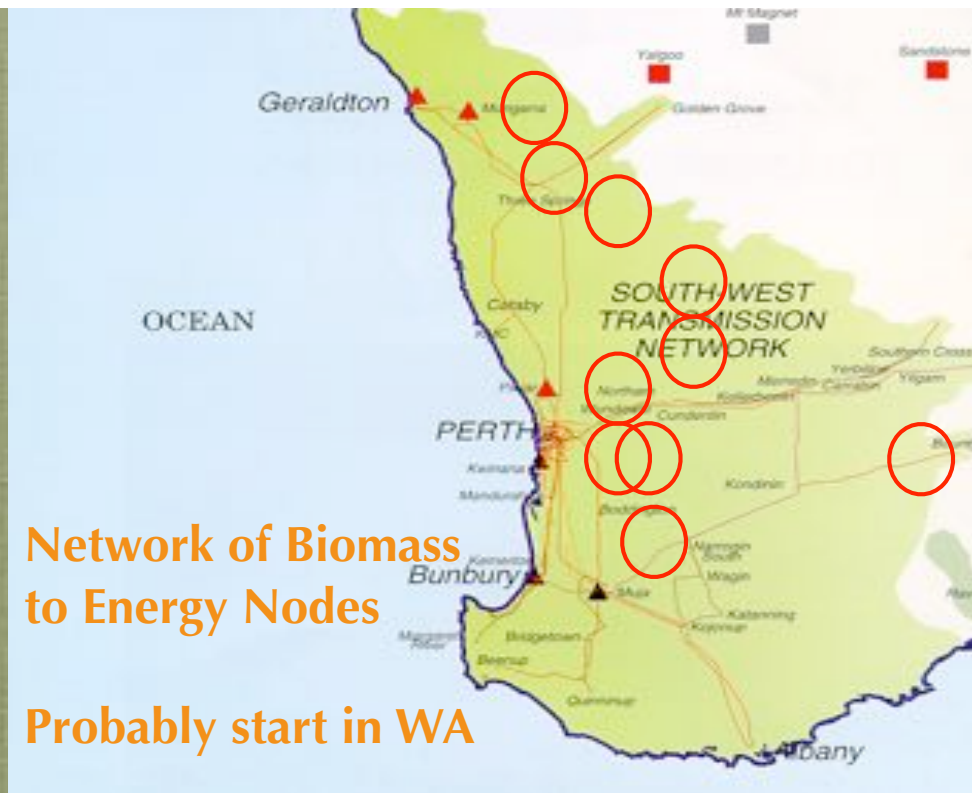
Ian
sustainable land use
biomass residue
regional jobs
which biomass to energy system?



Peter
energy intensive
offset carbon risk = jobs
many biomass residues not valued
which business model?
which biomass to energy system?

2007 ORIGINS

'offset aluminium industry carbon risk'



what is our ideal system?

1. utilises low value residues
2. not reliant on subsidies to build or operate
3. automated and on demand
4. uncomplicated, quiet, safe
5. affordable, 2 to 8 year capital return
6. very low emissions, very carbon negative



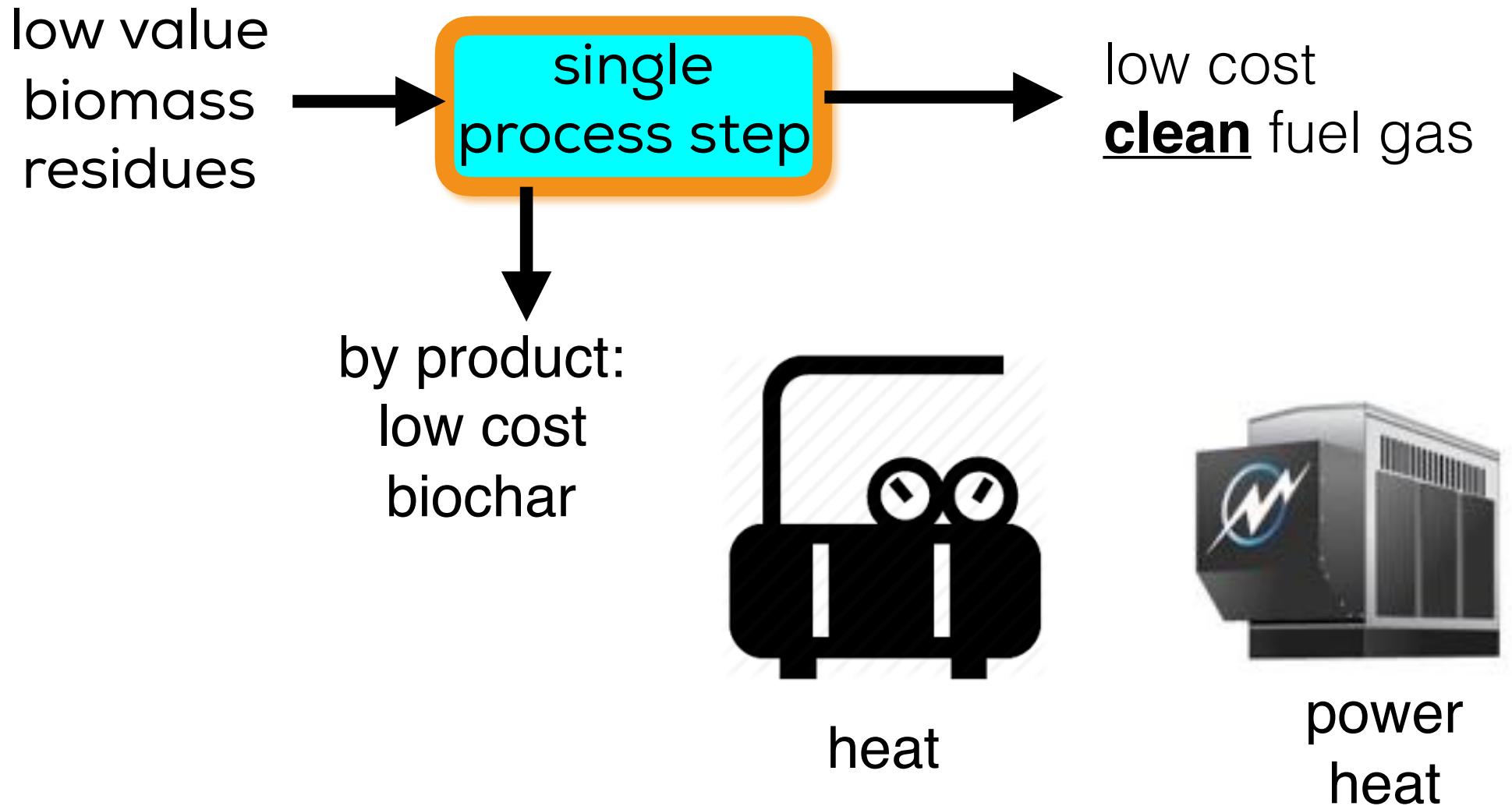
2008 - 2014 global technology search & testing



no existing system passed our 6 tests

1. utilises low value residues ✓✓✓XXX
2. not reliant on subsidies to build or operate XX✓✓XX
3. automated and on demand ✓✓✓XXX
4. uncomplicated, quiet, safe ✓✓XXX✓
5. affordable, 2 to 8 year capital return XXXX✓✓
6. very low emissions, very carbon negative ✓✓✓XXX

what enables an ideal system?



2014 - 2016 'develop ECHO₂'





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ECHO₂ Prototype

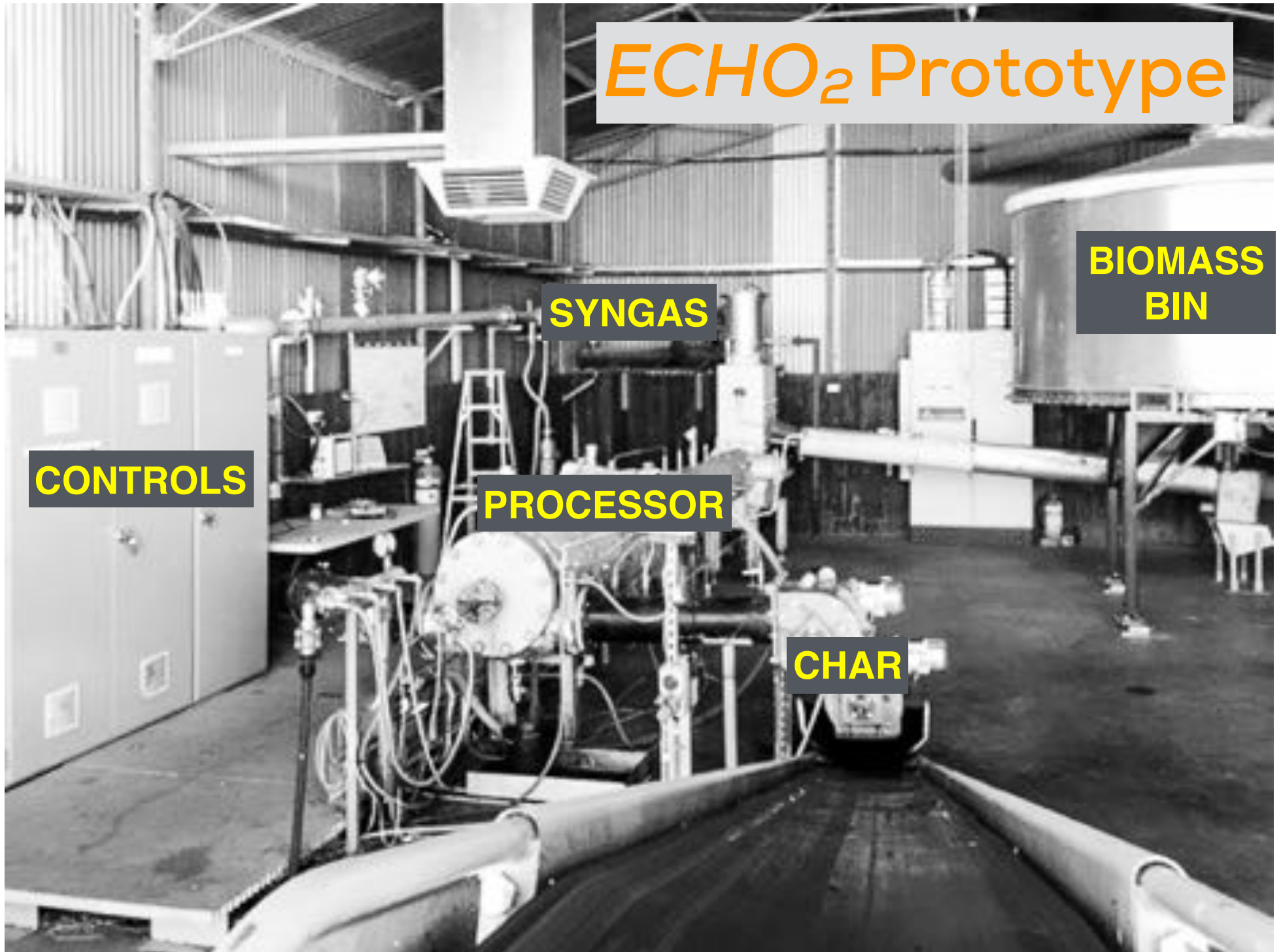
**BIOMASS
BIN**

SYNGAS

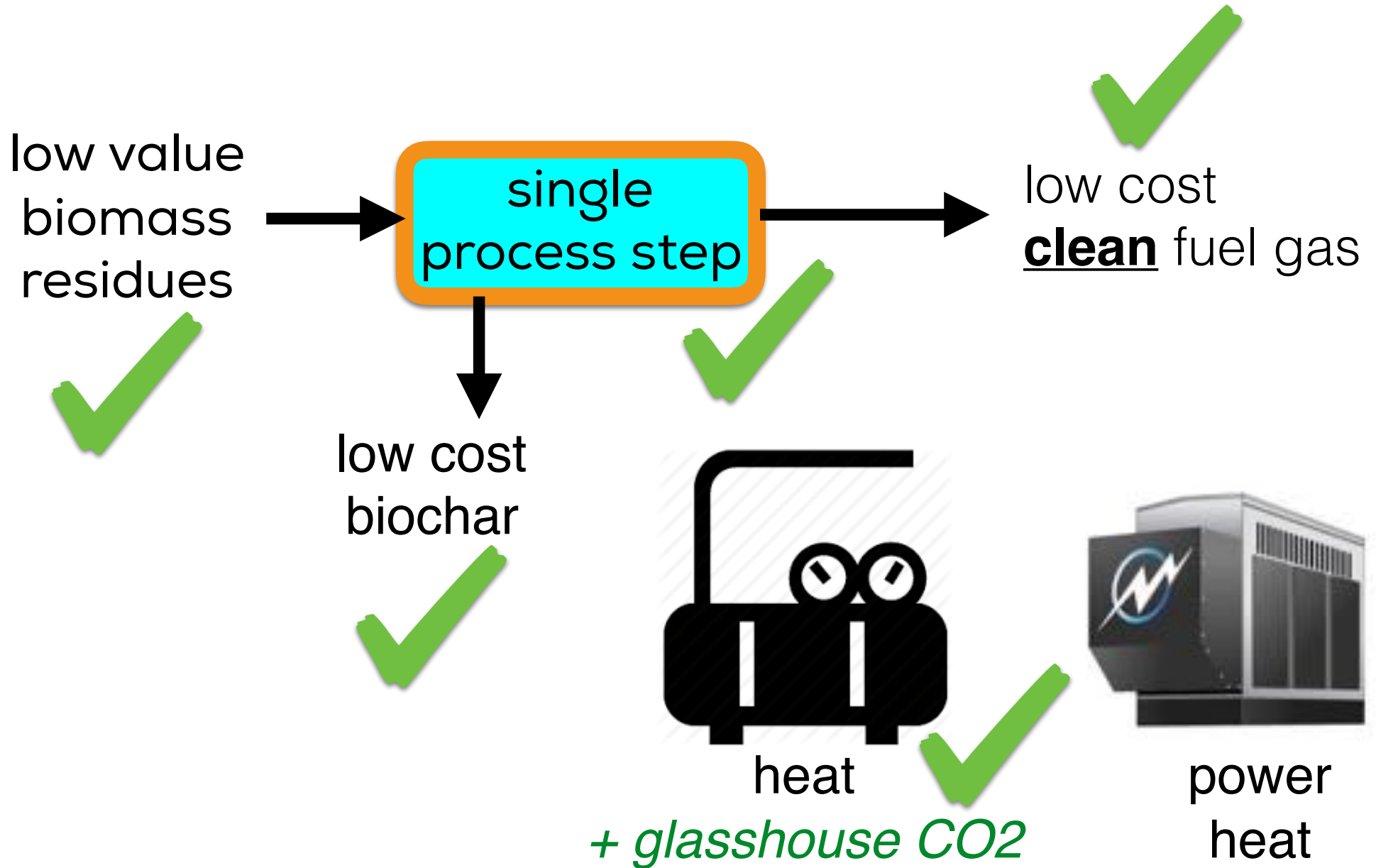
CONTROLS

PROCESSOR

CHAR



does $ECHO_2$ = our ideal system?





CO₂

SUN

ORGANIC
RESIDUES

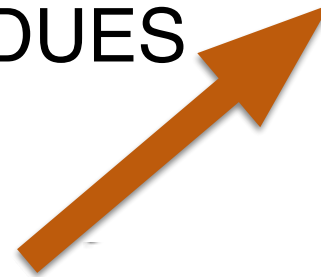
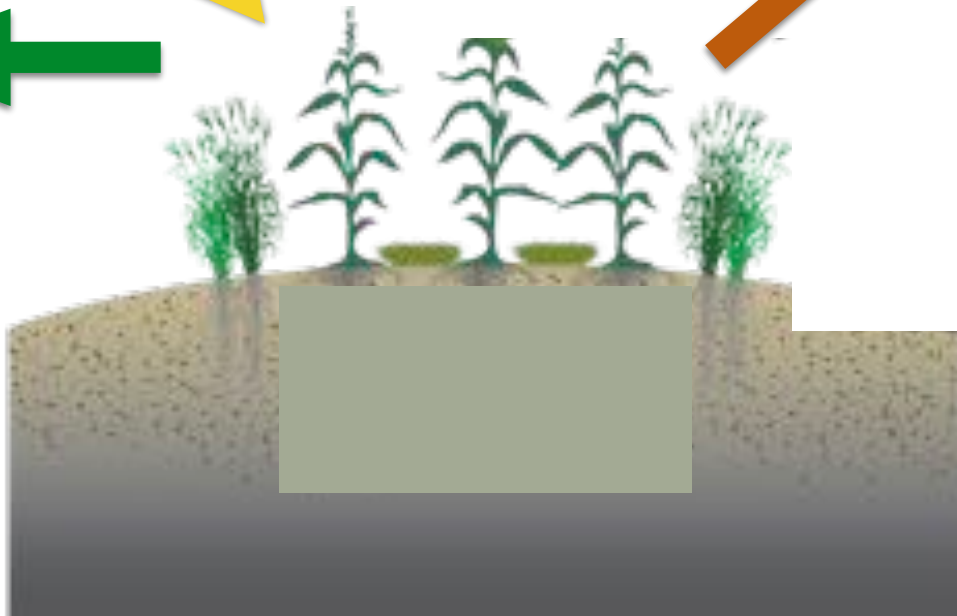
ELECTRICITY
HEAT COOL
on demand

ECHO₂

FOOD

BIOCHAR

increases soil carbon
increases soil fertility
increases food production
or can be used as a fuel

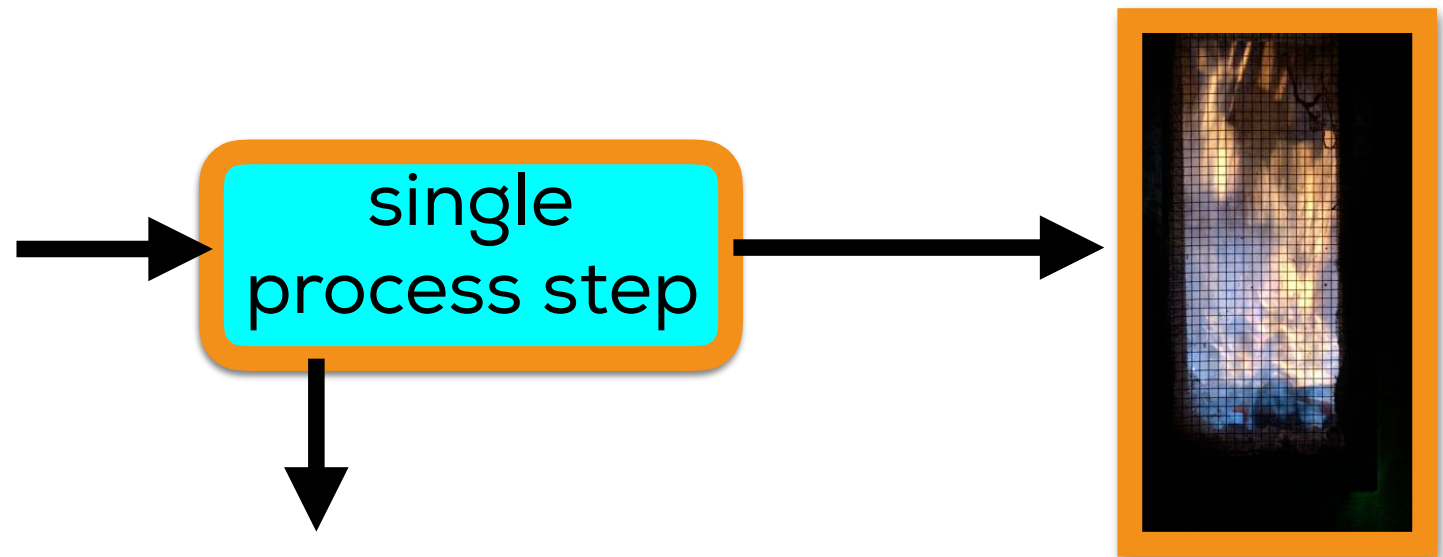


ECHO₂ and our checklist

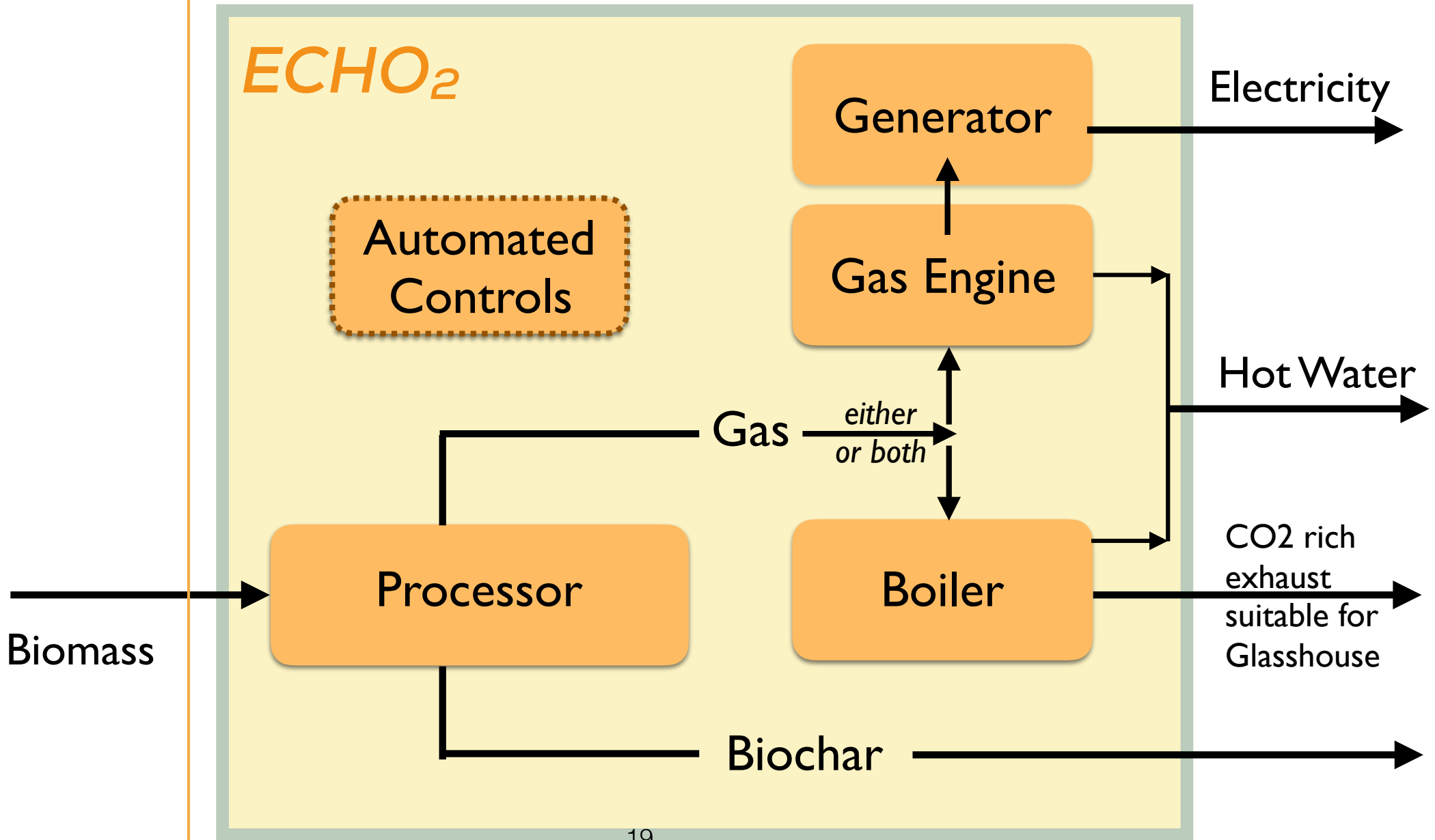
1. utilises low value residues ✓
2. not reliant on subsidies to build or operate ✓
3. automated and on demand ✓
4. uncomplicated, quiet, safe ✓
5. affordable, 2 to 8 year capital return ✓
6. very low emissions ✓ very carbon negative ✓

ECHO₂'s major point of difference?

single process step from biomass to clean fuel gas



What do I get when I purchase
an ECHO₂ module?



Indicative Performance Specs

hot water	400 - 800	kW
electricity	100 - 200	kWe
biochar	~ 200	kg/hr wet basis
CO ₂	~ 250	kg/hr
biomass	500 - 600	kg/hr@15-25%MC nominally 5 - 15mm free of tramp material
footprint ~10m x 10m		

indicative single module specs, subject to feasibility study of customer requirements and biomass characteristics

biomass types with moisture content up to ~50% have been processed

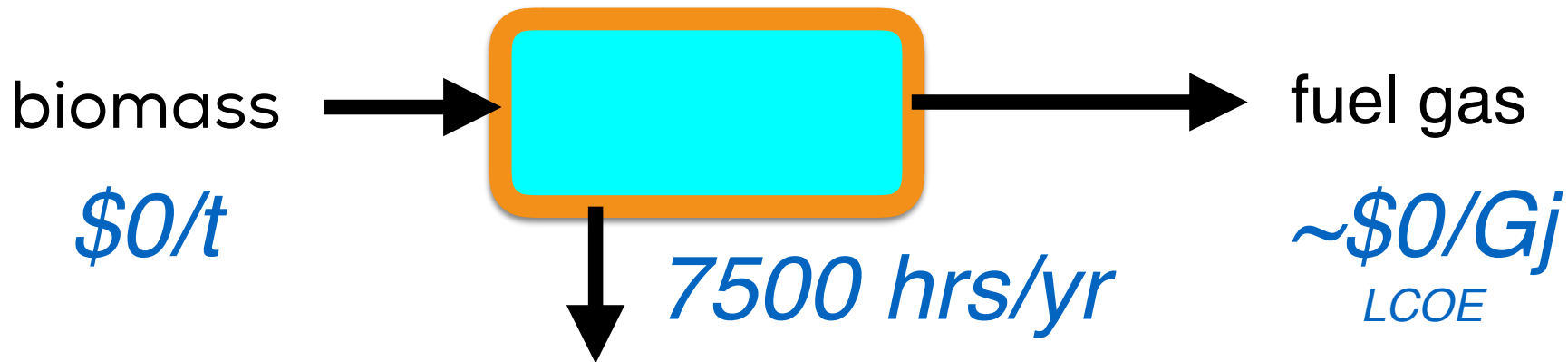
module comes with performance guarantee and warranty & service agreement

What are the indicative
economics?

24 x 7 operation free biomass



vs \$150/MWh & \$10/Gj



biochar
@ \$100/t
revenue



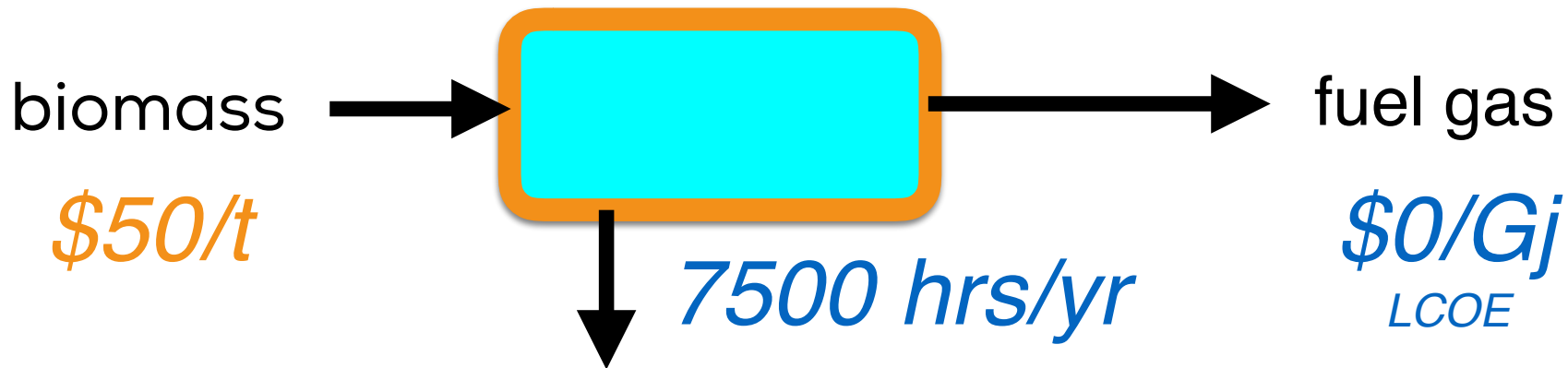
$\sim \$0/MWh$
LCOE

+ jobs per module
local 3 - 5 FTE
national 3 - 5 FTE

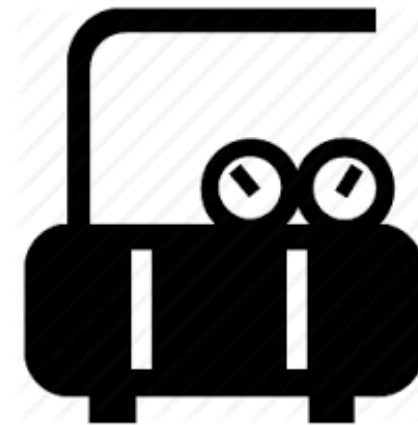
24 x 7 operation
\$50/t biomass



vs \$150/MWh & \$10/Gj



biochar
@ \$200/t
revenue



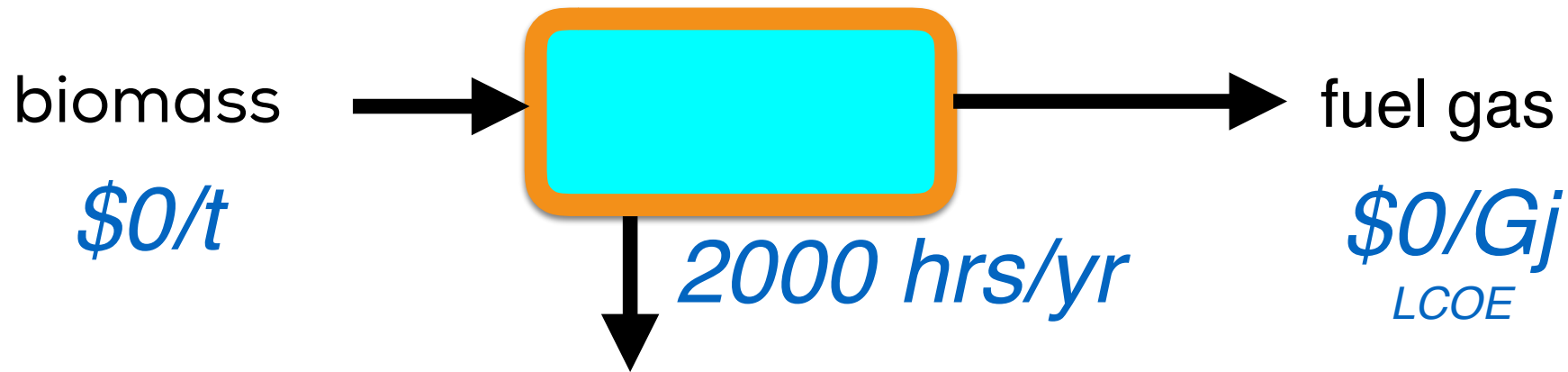
\$10/MWh
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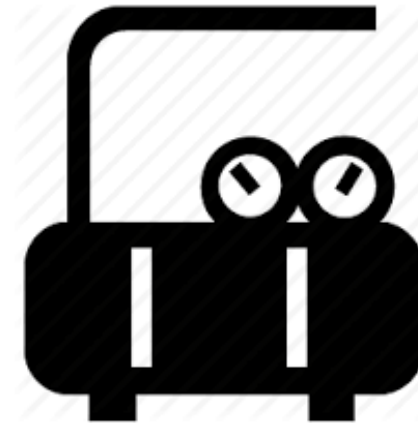


vs \$250/MWh & \$25/Gj

40 hour week operation free biomass



biochar
@ \$200/t
revenue



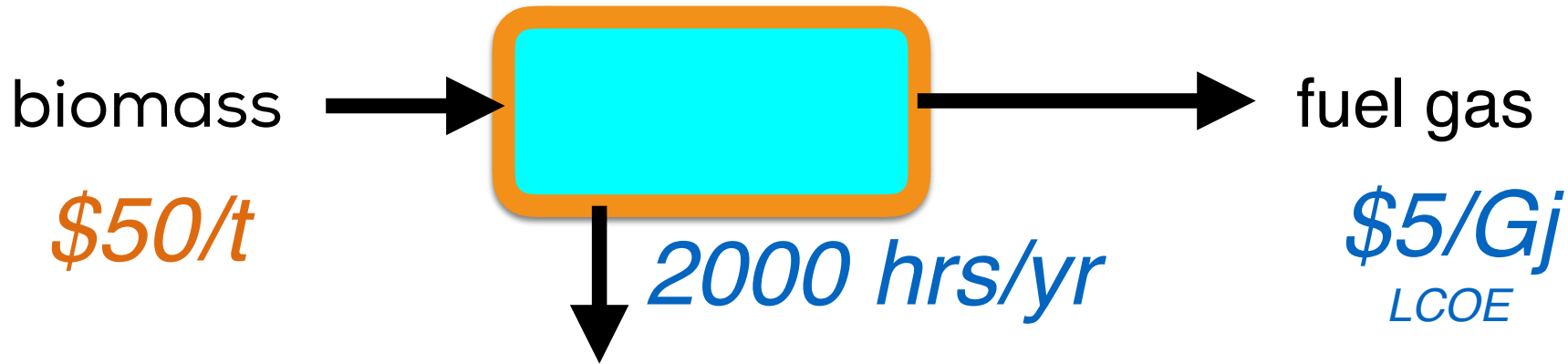
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LCOE

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vs \$250/MWh & \$25/Gj

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ECHO₂

Availability

- **The First ECHO2 module** will be installed at **Holla Fresh**, an innovative hydroponic grower of herbs based in Mt Gambier South Australia. Heat, electricity and glasshouse CO₂ enrichment will be produced from biomass residues supplied by **Van Schaik's Bio Gro** an innovative supplier to the horticulture sector.

- **Commercial demonstration modules are now available** on a 'make to order' basis

- **ECHO₂** is proudly developed, designed and manufactured in **Australia**



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- **Government support may be available** to assist customers with 'first of a kind' applications

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