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The role of bioenergy in meeting 2050 emissions targets

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ETI10 | TEN YEARS
OF INNOVATION
2007—2017

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What is the ETI?

- Public-private partnership
- Set up to identify and accelerate the development and demonstration of an integrated set of low carbon technologies

ETI members



CATERPILLAR®



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Business, Energy
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Pioneering research
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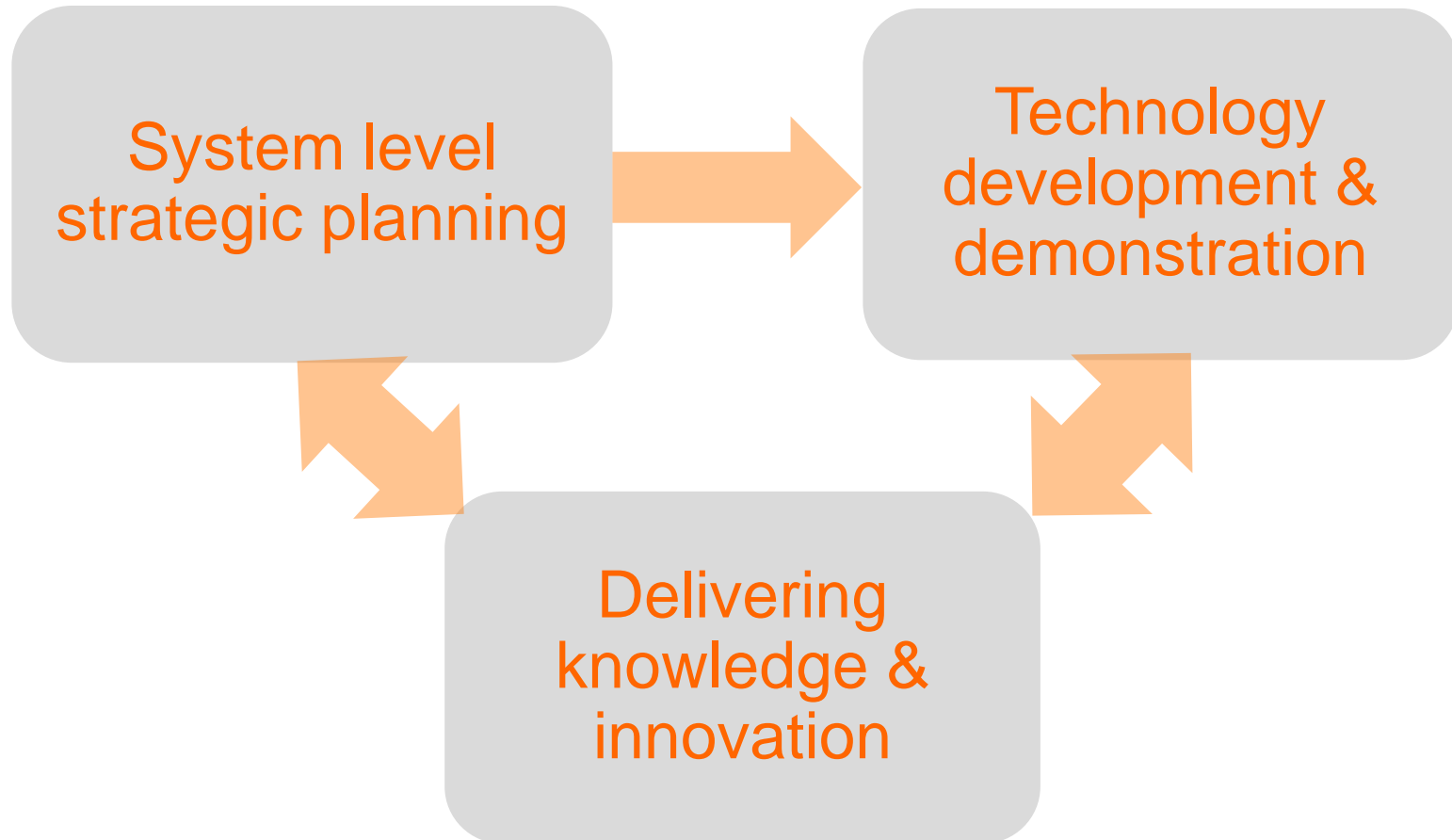
Innovate UK

ETI programme associate

HITACHI
Inspire the Next



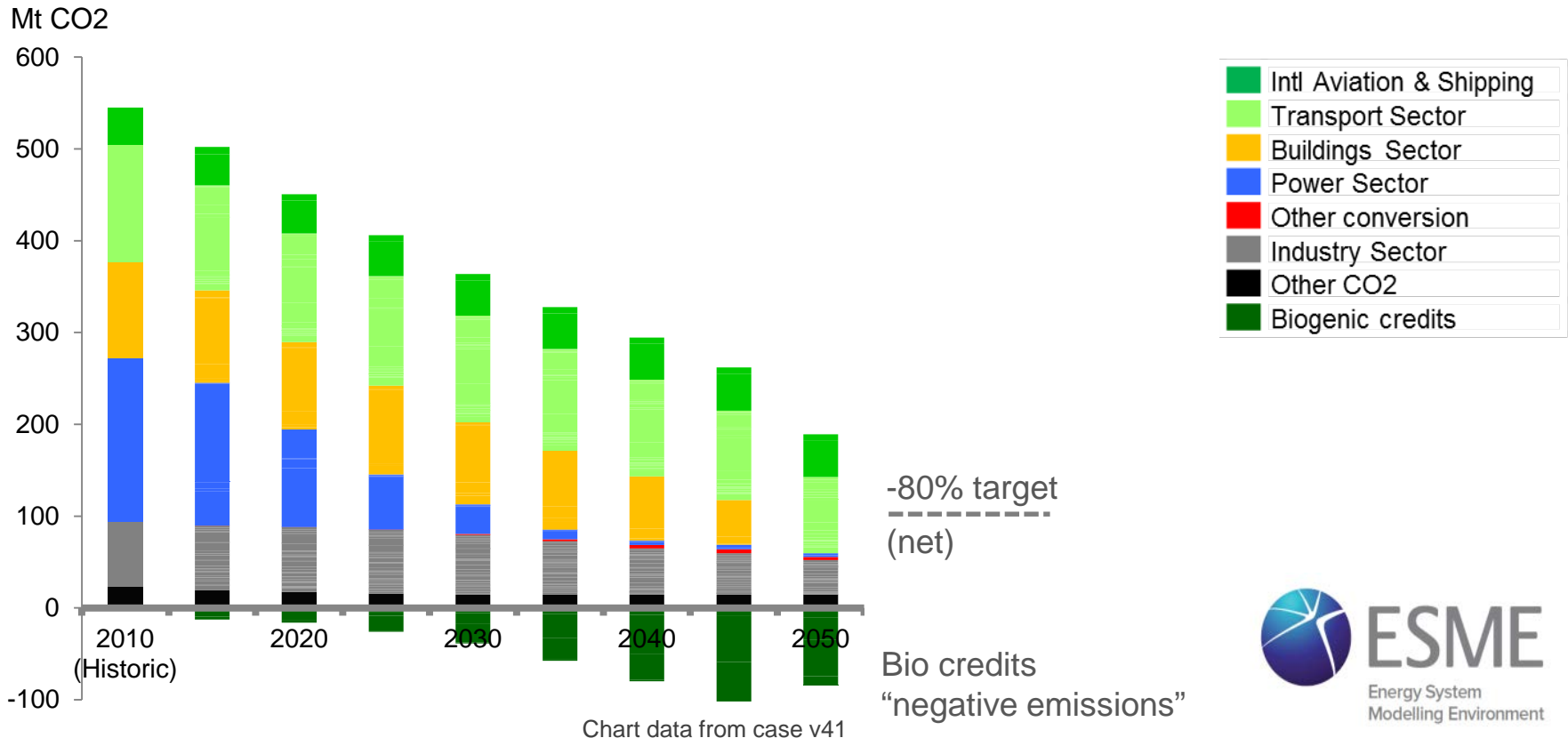
What does the ETI do?





ETI's 'ESME' model indicates an important role for bioenergy and CCS in the UK

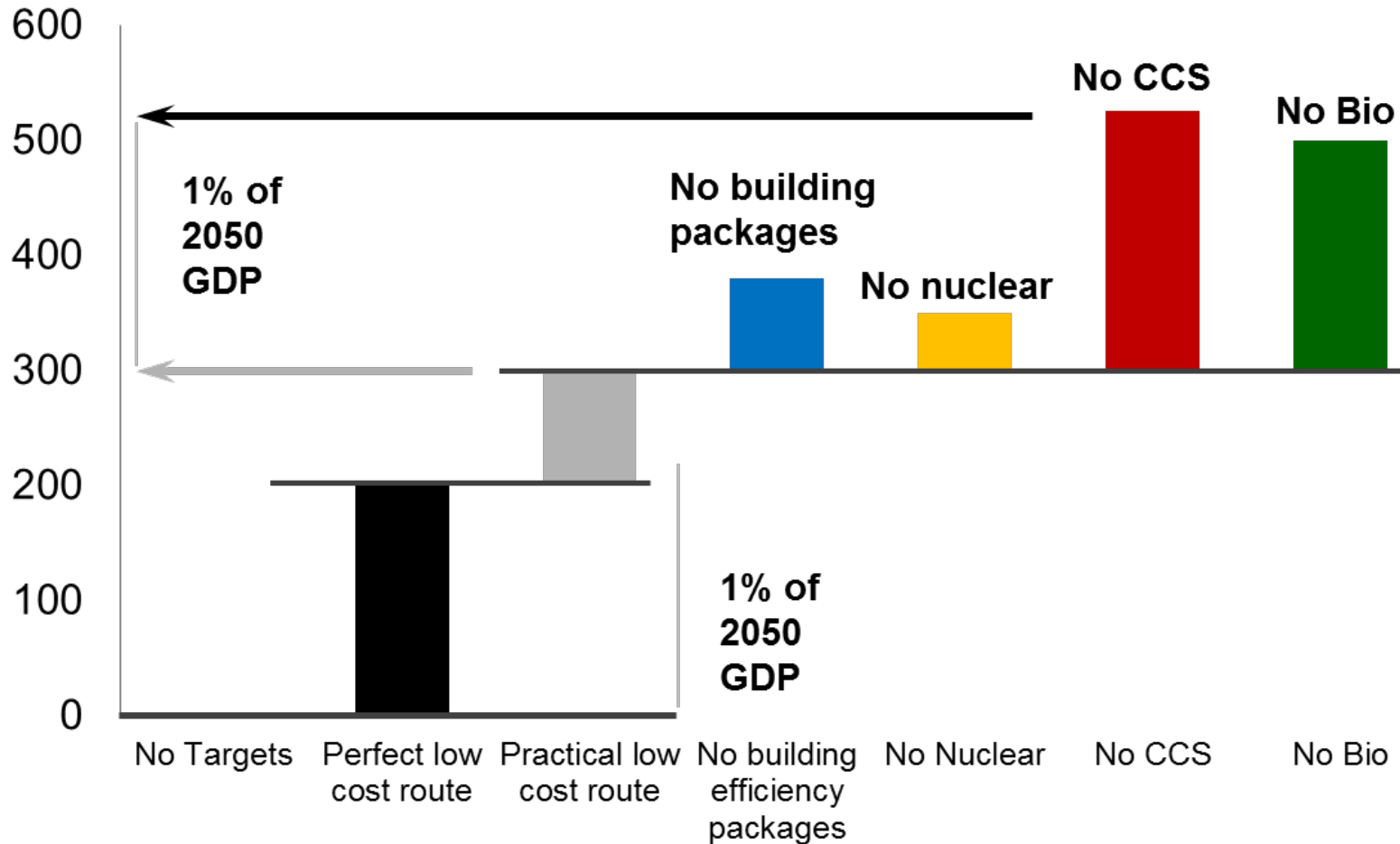
Negative emissions from bioenergy with CCS offset the need for expensive interventions elsewhere in the energy system.





ETI's 'ESME' model indicates an important role for bioenergy and CCS in the UK

Additional cost of delivering 2050 -80% CO₂ energy system
NPV £ bn 2010-2050





ETI Bioenergy Programme – key questions

What scale of negative emissions could be realised through bioenergy deployment in the UK?



What would be the best ways to use this bioenergy in the future UK energy system?



What are the right combinations of feedstock, pre-processing, and conversion technologies?

BVCM


Bioenergy Value Chain Model
Optimising Bioenergy



Advanced Waste Gasification

BioFIP

Biomass Feedstock Improvement Process



Enabling policy, regulatory and market frameworks. Understanding public perception



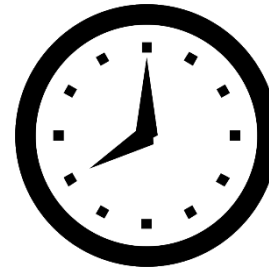
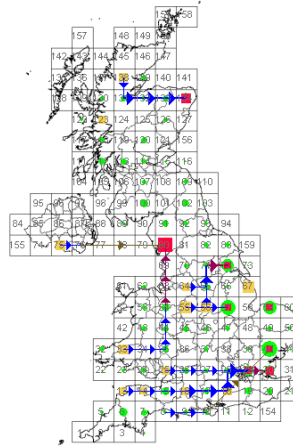
The Bioenergy Value Chain Modelling (BVCM) Project

What is the most effective way of delivering a particular bioenergy outcome in the UK, taking into account the available biomass resources, the geography of the UK, time, technology options and logistics networks?

93



69



£
CO₂

BVCM

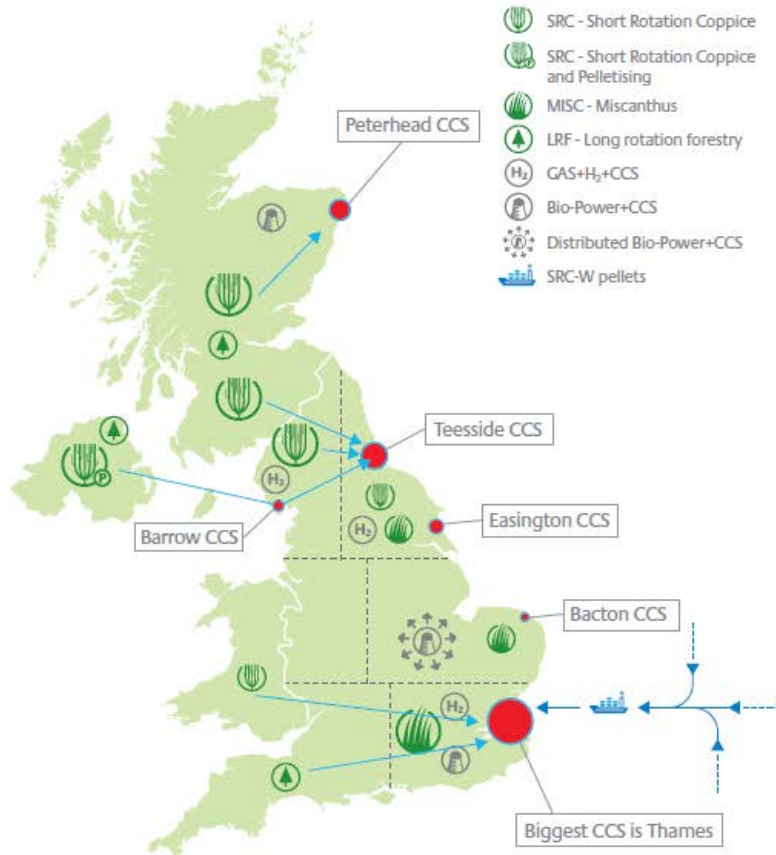
Bioenergy Value Chain Model
Optimising Bioenergy



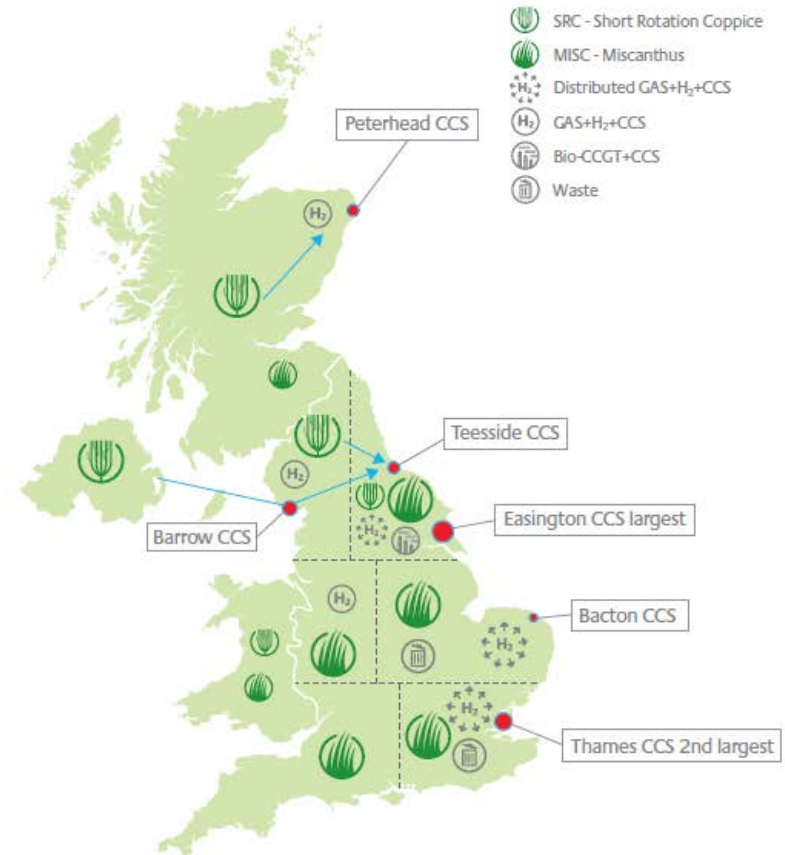


BVCM enables the bioenergy sector to be modelled under different conditions

Summary diagram of system differences between scenarios with imports



Summary diagram of system differences between scenarios without imports





Key insights from BVCM



Gasification – Scenario Resilient



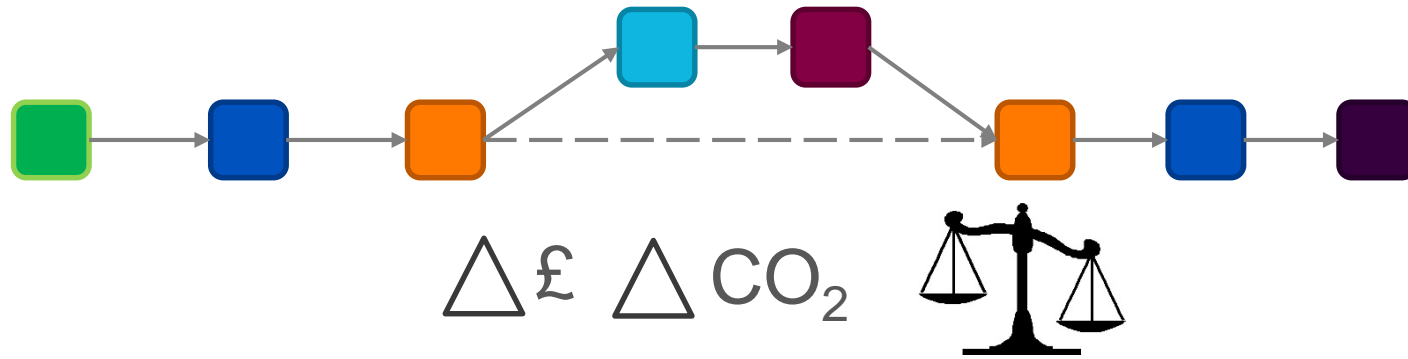
Planting 2nd generation energy crops and forestry



Value of Bioenergy with CCS



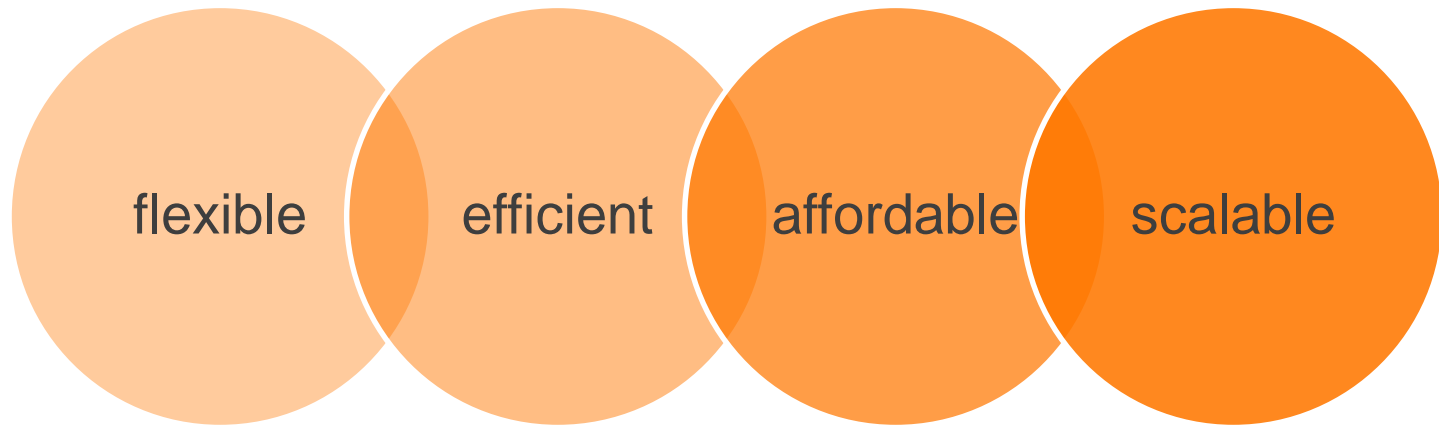
Techno-economic assessment of pre-processing indicates potential value in water washing



- Understand economic and environmental value of water-washing biomass
- Prototype plant will pre-treat different forms of biomass
- £2.2m Feedstock Improvement project will be led by biomass specialists Forest Fuels



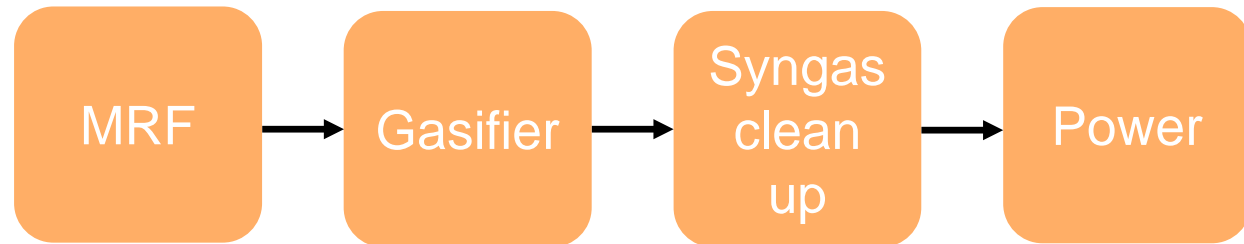
ETI analysis highlights gasification as a prominent, scenario resilient technology



Small scale (town) **waste gasification with syngas clean up** is a potentially important technology with near term deployment opportunities



ETI commissioned 1.5MWe demonstrator



- Followed FEED study and Business Plan competition
- Has to demonstrate high efficiency (net >25%) and availability (>80%)
- Includes syngas testing facility
- Commissioning March 2018





Key messages

- Whole systems analysis identifies scenario resilient technologies to inform research and development priorities
- Analysis indicates important role for bioenergy, particularly with CCS
- Water washing certain biomass types may be economically and environmentally beneficial
- Gasification is a scenario resilient technology – flexible, efficient, affordable and scalable



Thank you for listening



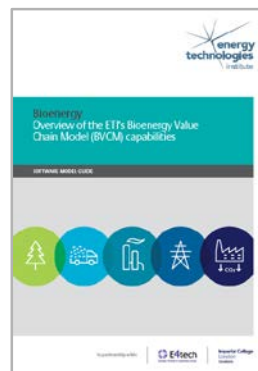
ETI Stakeholder Event – 10 years of Innovation: **21st – 22nd November**, Central Hall, London

ETI Publications:

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ETI ‘Knowledge Zone’ – outputs from ETI funded projects:

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