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Delivery and establishment of the first UK commercial scale plant to deliver ultra clean syngas

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Agenda

- What is ETI
- Background
- Waste Gasification Project
- Summary
- Lessons learnt
- ETI knowledge



What is the ETI?

- The ETI is a public-private partnership between global energy and engineering companies and the UK Government.
- Targeted development, demonstration and de-risking of new technologies for affordable and secure energy
- Shared risk

ETI members



CATERPILLAR®



Rolls-Royce



Department for
Business, Energy
& Industrial Strategy



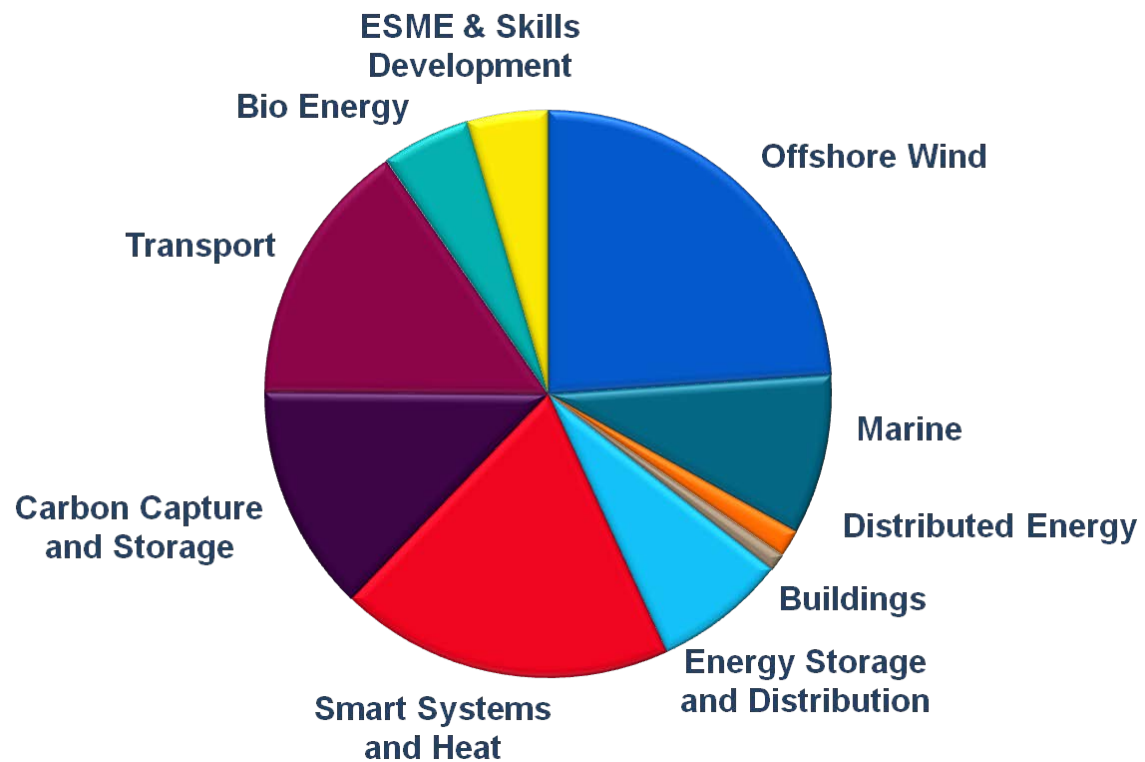
Innovate UK
Technology Strategy Board

ETI programme associate

HITACHI
Inspire the Next



ETI invests in projects at three levels



Nine Technology Programme areas

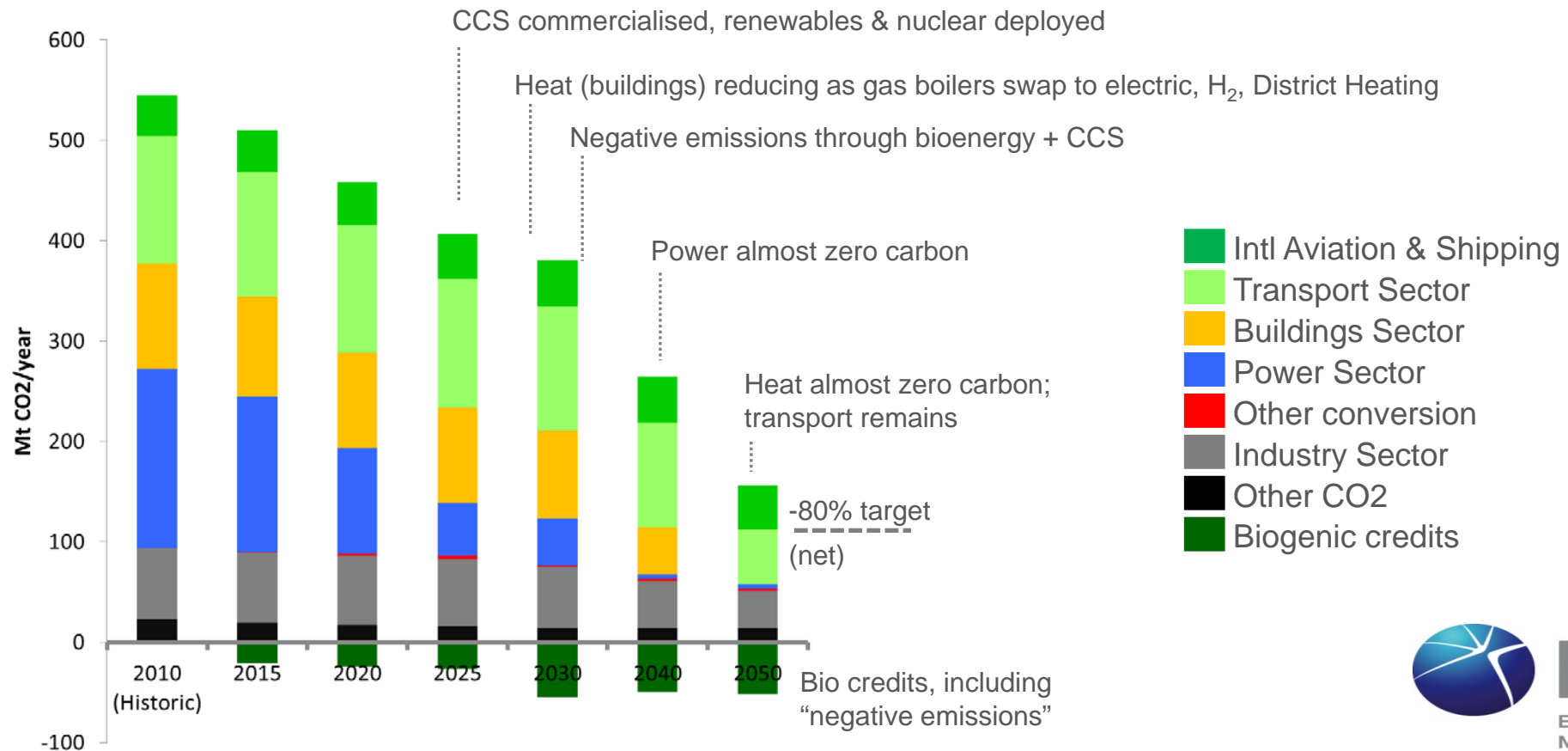
Delivering...

- New knowledge
- Technology development
- Technology demonstration
- Reduced risk



A route to meeting - 80% CO₂ for the UK

Power now, heat next, transport gradual – cost optimal



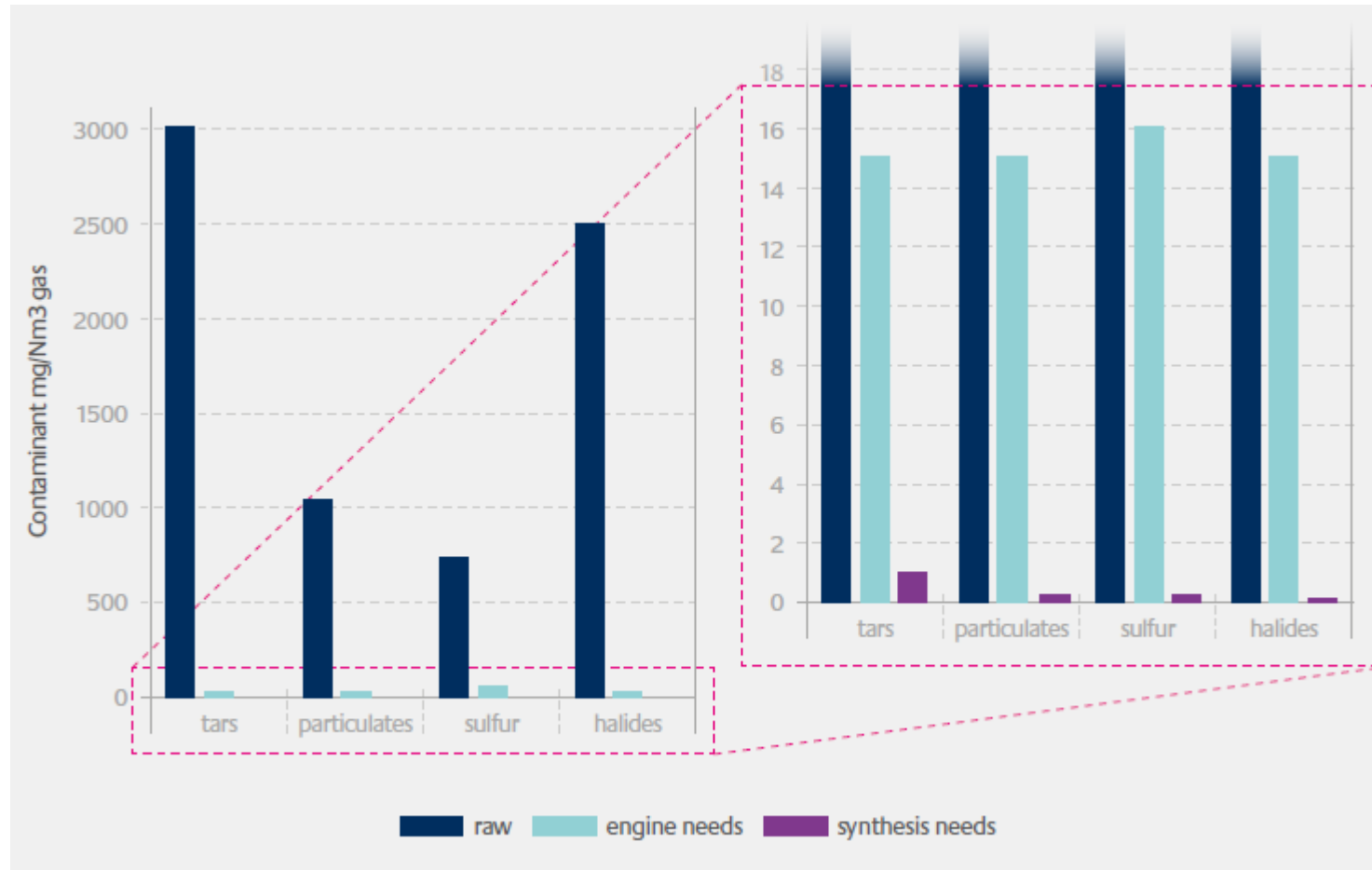


Benefits of gasification can only be realised if the raw syngas is cleaned up

- Power
 - Small scales (5-10MWe) at higher efficiencies because we can use engines
 - less benefit at >20MWe (as steam becomes efficient)
 - Reduced local impact
 - Easier to use waste heat
 - Reputation (ref. ETI social science research)
- Fuels and chemicals
 - Raw syngas unacceptable – must be ultra-clean
 - Variety of vectors including for HDV and aviation
- Learning through power and fuels



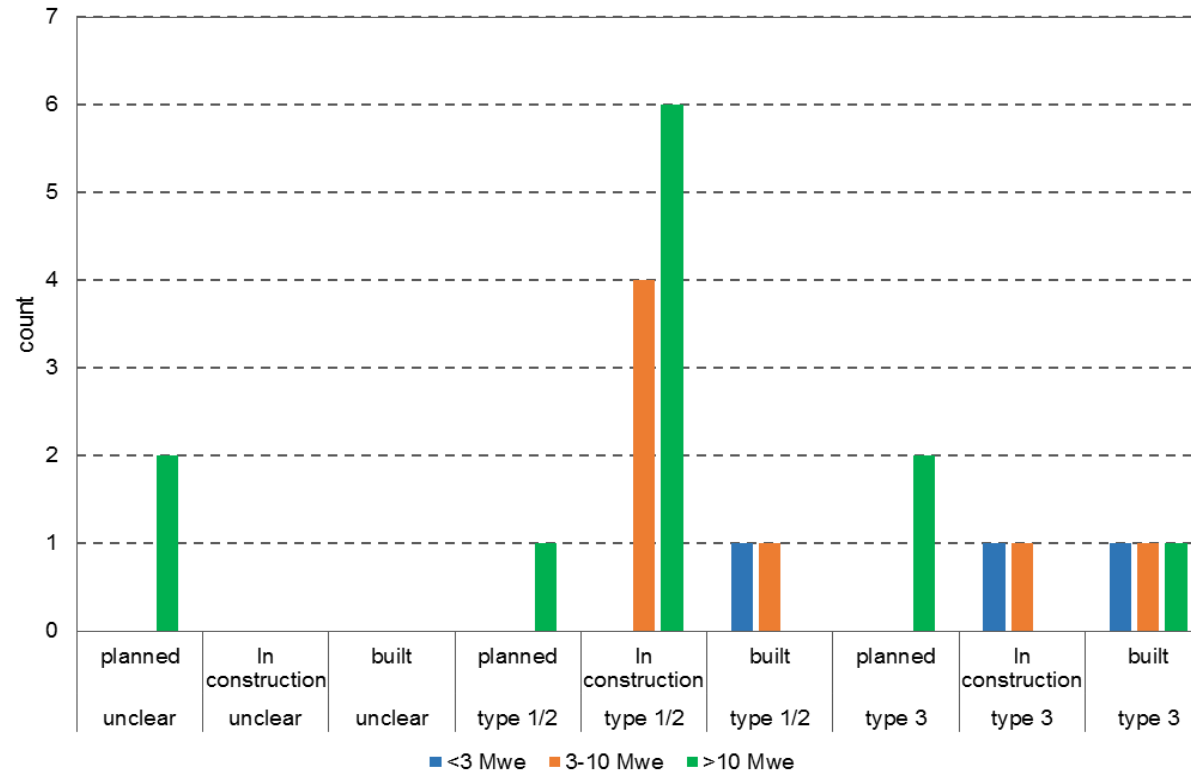
Syngas clean-up is challenging





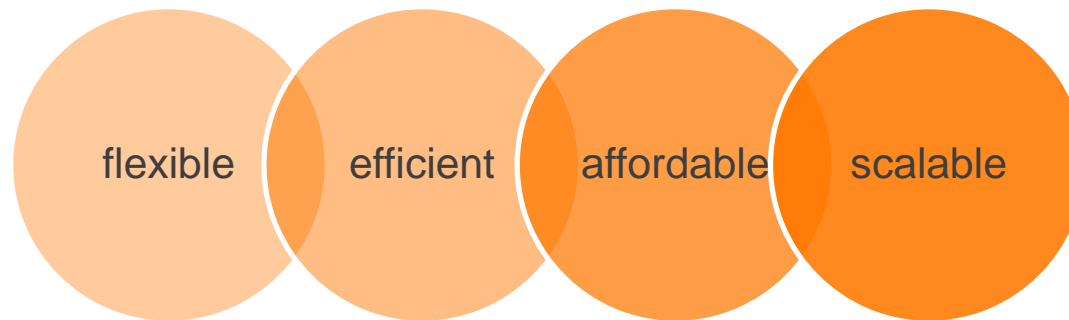
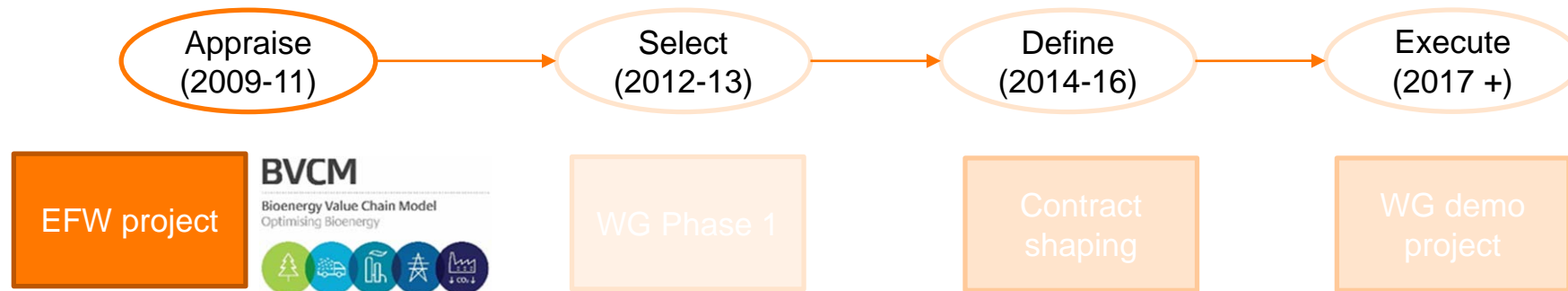
ETI project and current gasification landscape in UK

- Type 1
 - No gas cleaning
- Type 2
 - Gas cleaning but no tar removal
 - Improved steam boiler efficiency & reliability
- Type 3
 - Gas cleaning & tar removal
 - Allows syngas use in engines, gas turbines, chemical synthesis





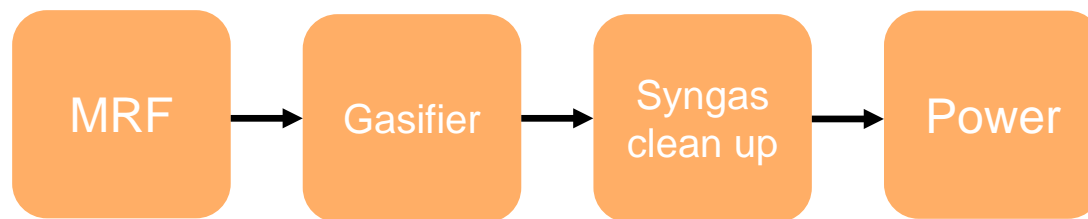
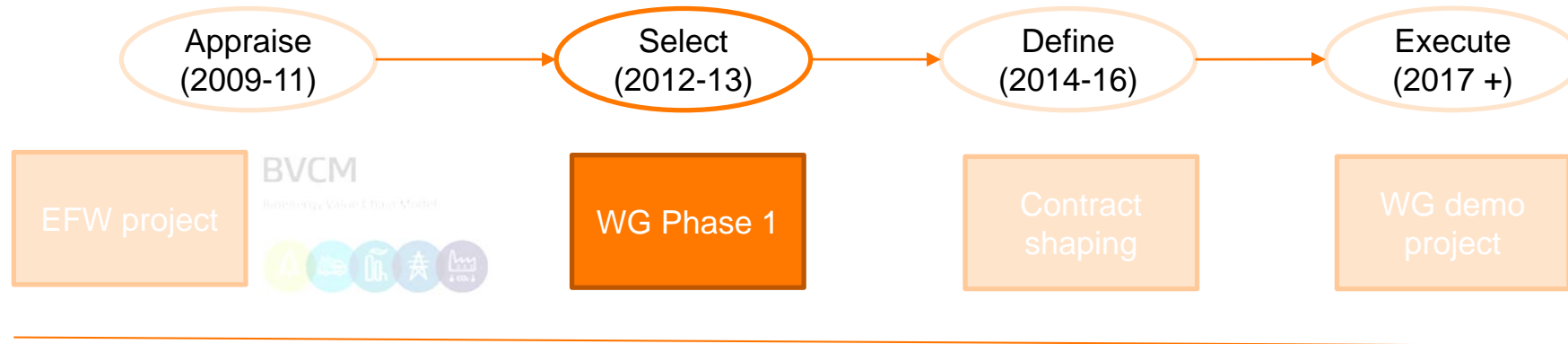
ETI analysis highlights gasification as a prominent, scenario resilient technology



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



Phase 1 waste gasification project

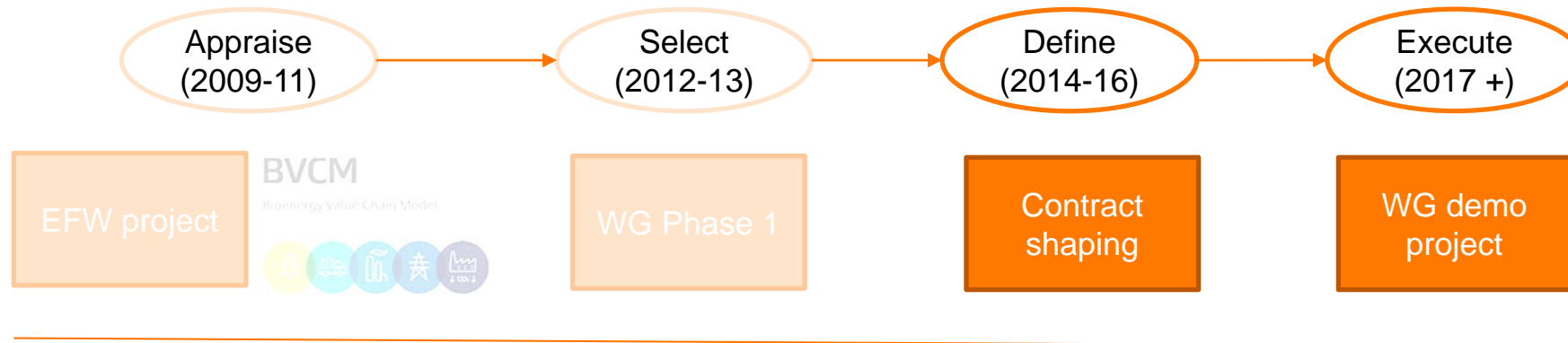


Competition – 3 designs

- FEED study and Business Plan
- Has to demonstrate high efficiency (net >25%) and availability (>80%)



Phase 2 waste gasification project - demonstrator



- Commissioned construction of a 1.5 MWe demonstration project
- Feedstock – mix of C&I and MSW
- Fluimax pressurised fluidised bed gasifier with a high temperature treatment to produce a high quality, hydrogen rich syngas
- Power generation via a specially adapted syngas engine
- Will incorporate unique syngas testing facility
- Commissioning 2019 2020 – followed by feedstock testing





Summary

- ETI, bioenergy and gasification
 - Both fundamentally important to achieving UK decarbonisation targets
- Most important UK resources and resilience
 - Wastes + others, both imported and indigenous
 - Variety drives technology choices
- Why is ultra-clean syngas important?
 - Only way that the benefits of gasification can be realised
- ETI project progress and key lessons learnt
 - Commissioning in 2019
 - Insights paper: <http://www.eti.co.uk/insights/>





Some key lessons learned to date

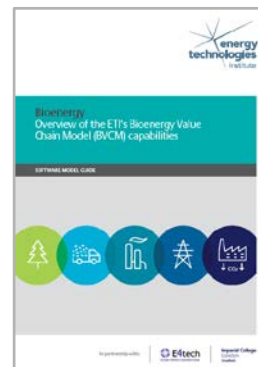
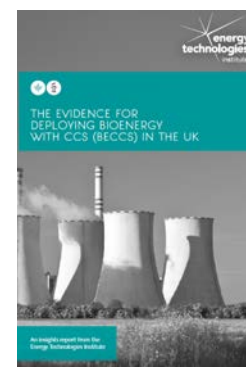
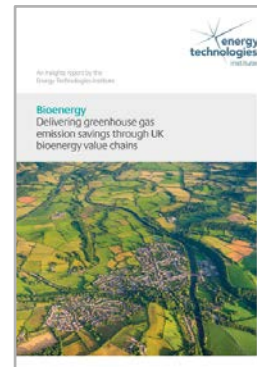
- Gasification offers a number of benefits in the UK setting
 - Flexible in feedstock and outputs - resilience
 - Comparable/better efficiencies compared with other technologies, especially at smaller scales
- Gasification of wastes and use of syngas in an engine is technically feasible
 - ETI's targets are achievable
- Potential to be cost competitive with other sources of renewable power
 - scope to reduce costs as experience is gained (especially procurement costs).
- To build confidence in financing and delivering, UK policies should be designed as an integrated programme of stages
 - Support needed beyond FOAK
- Careful and considered approach to scale up is needed
- HSE management needs to be well led – Chartered IOSH level
- Structured / staged approach to Project Management – challenge to bring in different types of Project Management at the RIGHT stage(s)
- Financing / legal – need careful and ongoing management



ETI knowledge

ETI Publications:
<http://www.eti.co.uk/library>

ETI Knowledge Zone:
<http://www.eti.co.uk/programmes/bioenergy>





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