TEES VALLEY COMBINED AUTHORITY

Delivering a Low Carbon Transition in the Tees Valley

London
2-5-18
Mark Lewis

TEES VALLEY COMBINED AUTHORITY

The Tees Valley faces a significant challenge on Carbon Emissions:

- Its current economic base includes industries which are intensive emitters of CO_2.
- CO_2 emissions are significantly above the UK average - around 9.2 tonnes of CO_2 per head

The Industrial Cluster

- Makes a big contribution to UK economy & exports via UK's 5th largest port
- Includes over 30% of the UK's chemicals and process industry
- Has UK's largest Hydrogen Production and Storage network

Reducing emissions will benefit existing operations & provide growth opportunities

The Teesside Collective

The group is made up of five large industrial companies:

- **BOC – UK's largest hydrogen plant**
- **CF Fertilisers – UK's largest ammonia plant – 35% of UK fertilisers**
- **Lotte Chemical UK – PET for 15bn plastic bottles**
- **Sembcorp – global industrial utilities – in planning for 1GW CCGT**
- **SABIC – UK's world scale ethylene cracker – upgraded to run on ethane**

& includes NEPIC the regional process industry cluster organisation

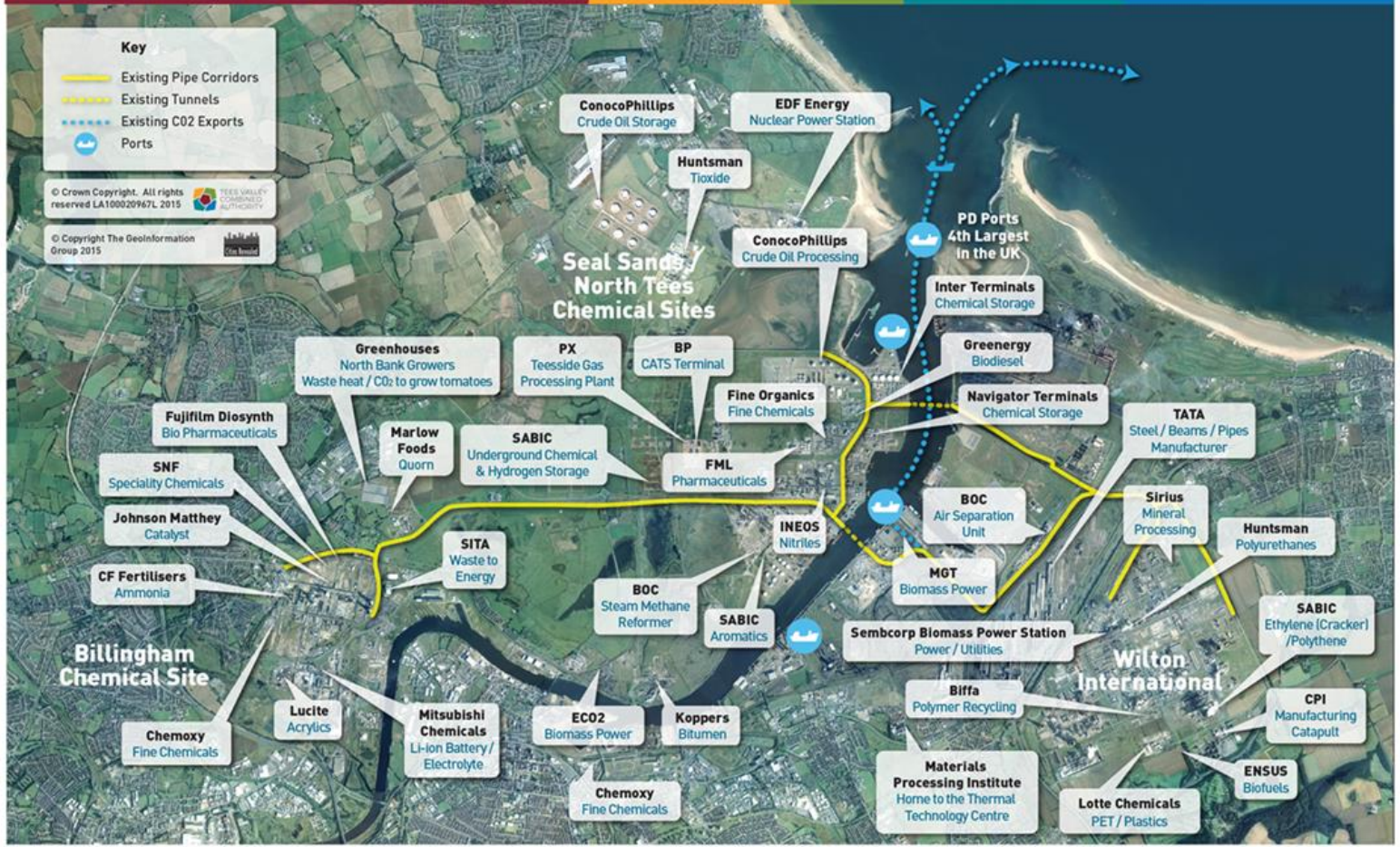
"I want to say sincerely how impressed I am by the work done by Teesside Collective. They have made an exceptionally powerful case as to why they want to be the first place to move forward with this technology."

Claire Perry, Minister of State, Department for Business, Energy and Industrial Strategy

TEES VALLEY COMBINED AUTHORITY | Department for Business, Energy & Industrial Strategy | BOC A Member of The Linde Group | CF | سابك sabic | LOTTE CHEMICAL UK | sembcorp | nepic

Tees Valley Integrated Complex

TEES VALLEY COMBINED AUTHORITY



TEES VALLEY COMBINED AUTHORITY

The vision

A Hub for energy intensive manufacture

Low or zero carbon energy
Carbon utilisation and abatement options
Carbon capture transport, storage& infrastructure

Enabling growth & limiting future emissions.

Avoiding emissions of 80MtCO2;
Adding £39 billion to UK GVA up to 2050
Putting into practice the UK's Clean Growth Strategy

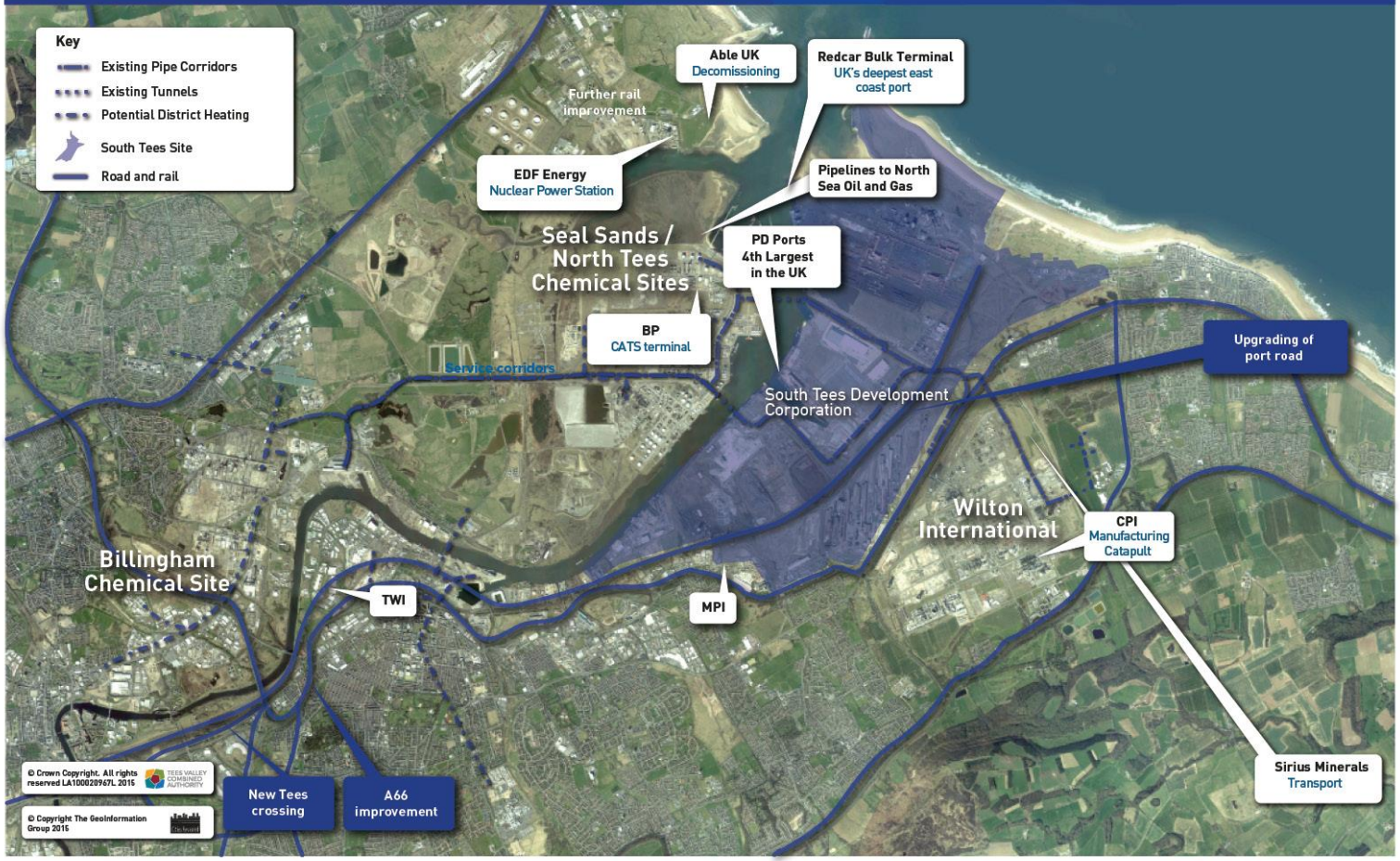
TEES VALLEY COMBINED AUTHORITY

Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

Enabling infrastructure

TEES VALLEY COMBINED AUTHORITY



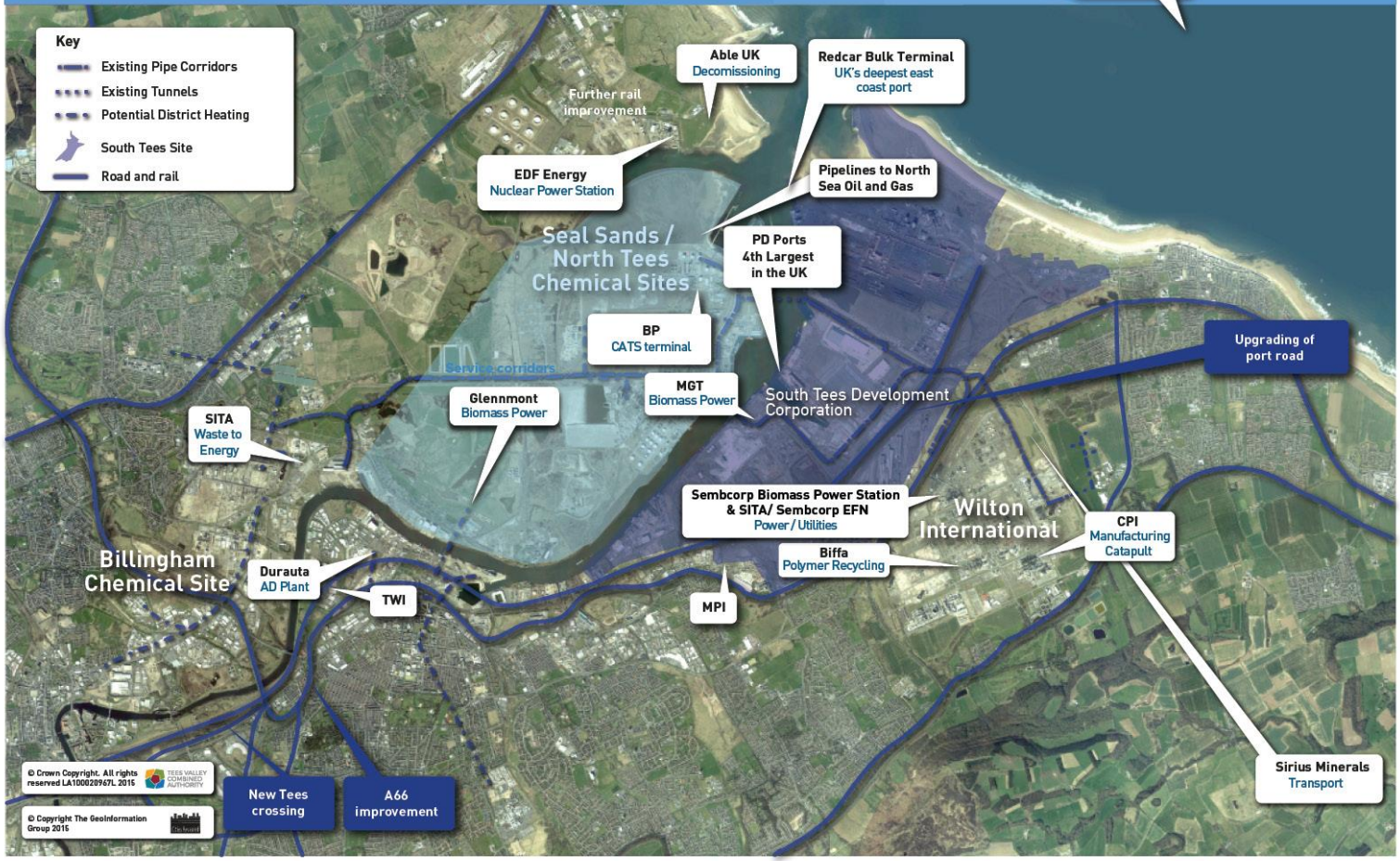
1 0 1 2 3 4 km

TEES VALLEY COMBINED AUTHORITY

Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

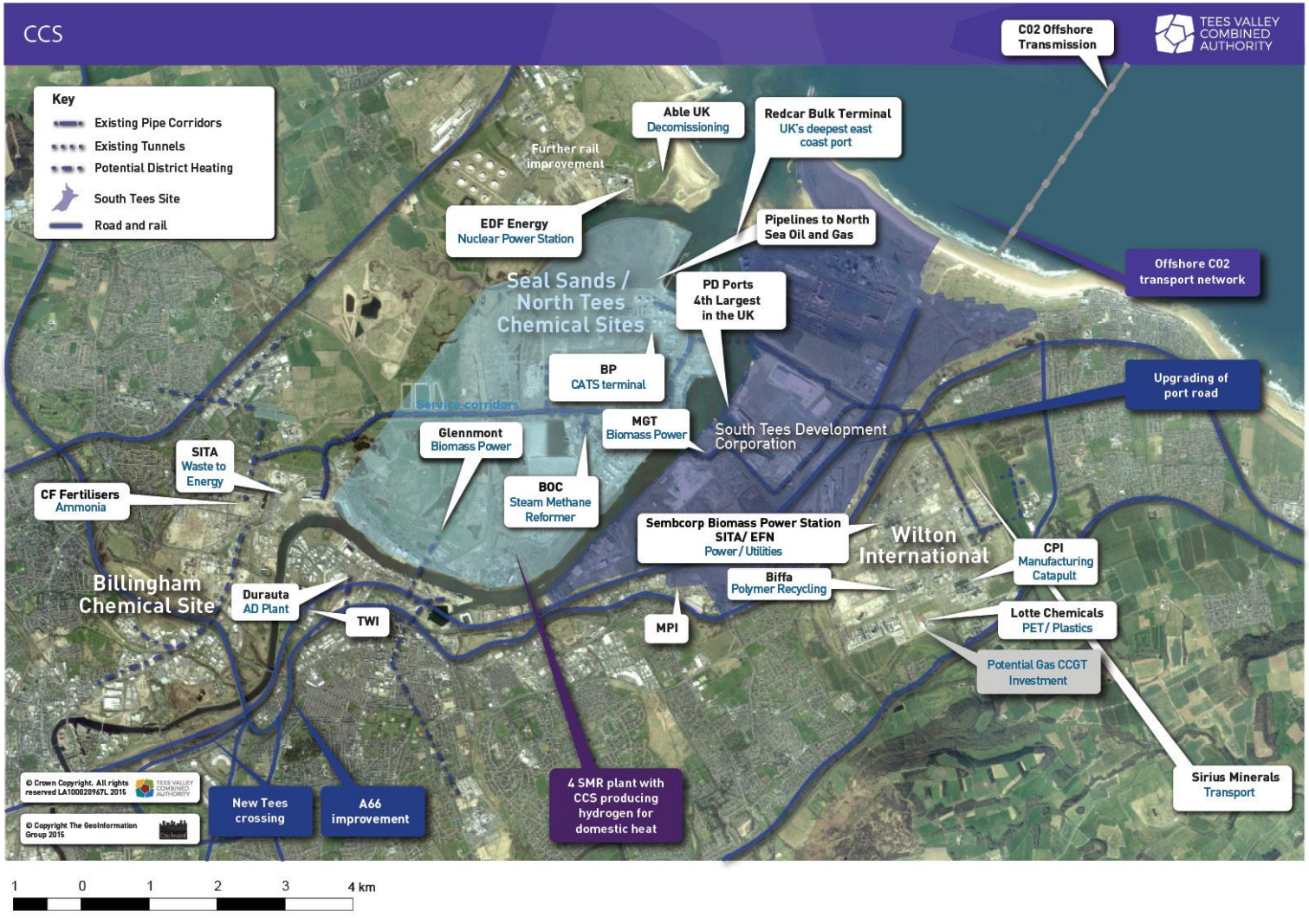
Waste and biomass



TEES VALLEY COMBINED AUTHORITY

Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

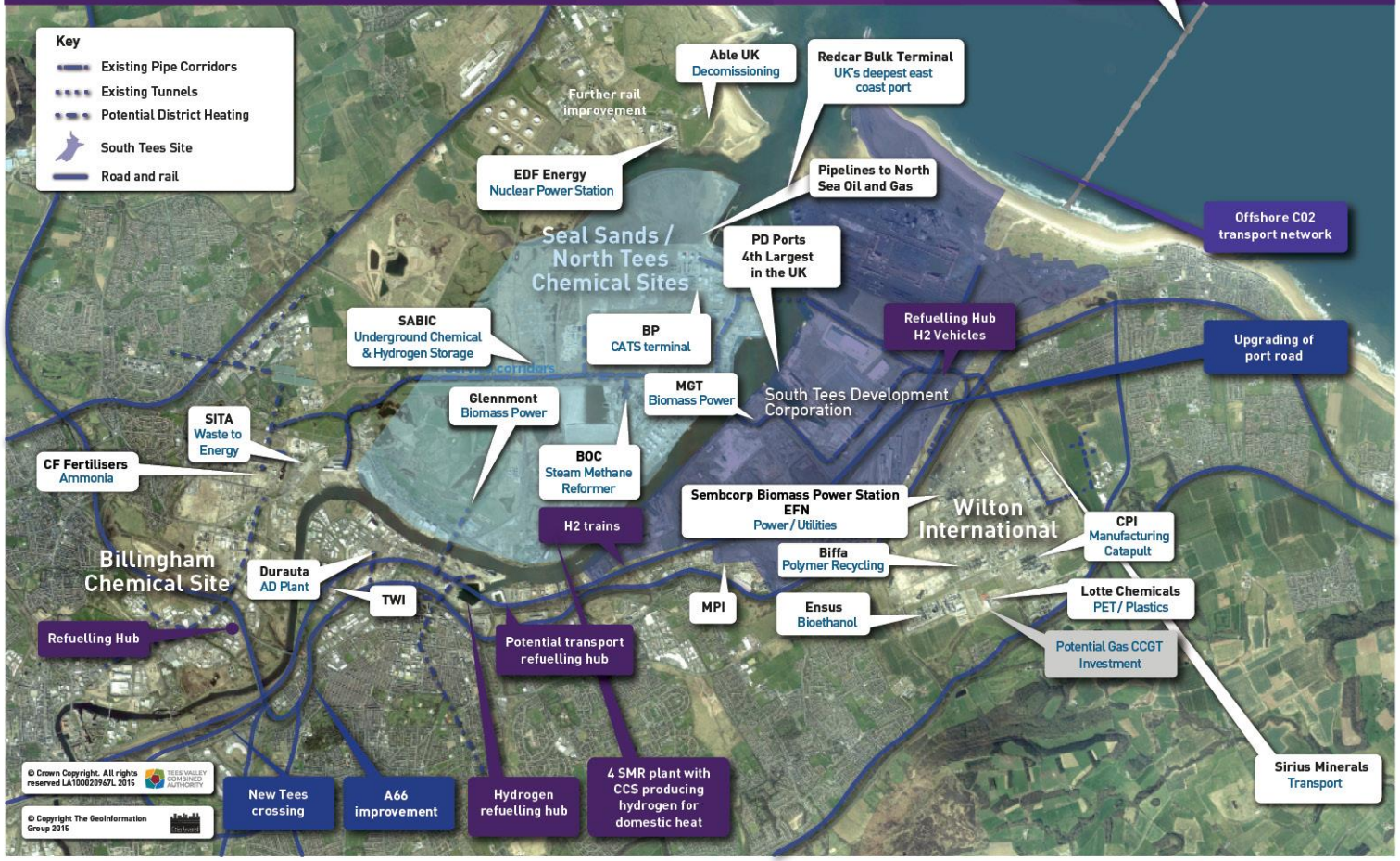

CCS
TEES VALLEY COMBINED AUTHORITY
C02 Offshore Transmission
Key
Existing Pipe Corridors
Existing Tunnels
Potential District Heating
South Tees Site
Road and rail
Further rail improvement
Able UK Decomissioning
Redcar Bulk Terminal UK's deepest east coast port
EDF Energy Nuclear Power Station
Pipelines to North Sea Oil and Gas
Offshore C02 transport network
Seal Sands / North Tees Chemical Sites
PD Ports 4th Largest in the UK
BP CATS terminal
Upgrading of port road
Service corridors
MGT Biomass Power
South Tees Development Corporation
Glennmont Biomass Power
SITA Waste to Energy
CF Fertilisers Ammonia
BOC Steam Methane Reformer
Sembcorp Biomass Power Station SITA/ EFN Power / Utilities
Wilton International
CPI Manufacturing Catapult
Biffa Polymer Recycling
Billingham Chemical Site
Durauta AD Plant
TWI
MPI
Lotte Chemicals PET/ Plastics
Potential Gas CCGT Investment
Sirius Minerals Transport
© Crown Copyright. All rights reserved LA100020967L 2015
© Copyright The GeoInformation Group 2015
New Tees crossing
A66 improvement
4 SMR plant with CCS producing hydrogen for domestic heat
1 0 1 2 3 4 km

TEES VALLEY COMBINED AUTHORITY

Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

Hydrogen

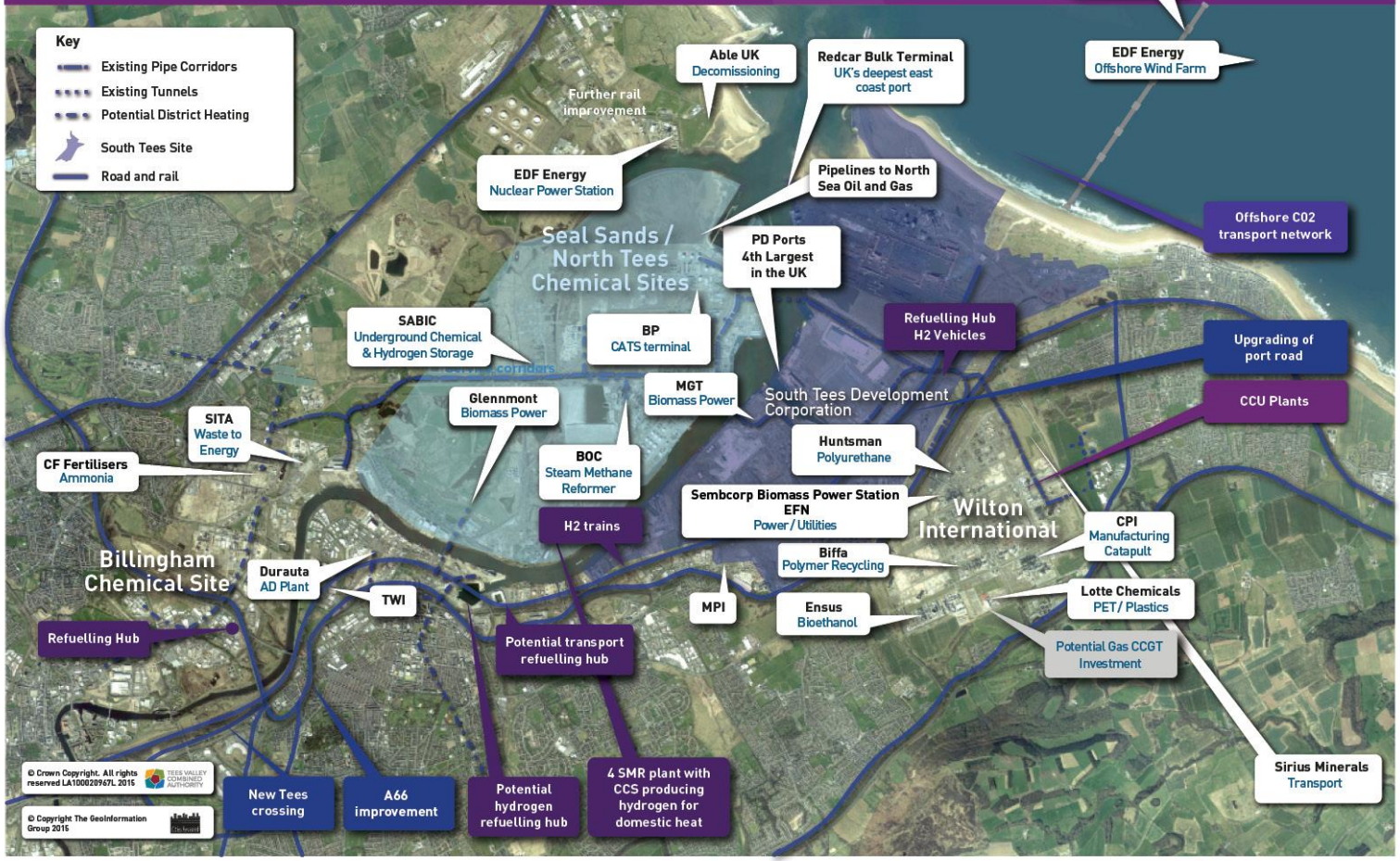

TEES VALLEY COMBINED AUTHORITY
Key
Existing Pipe Corridors
Existing Tunnels
Potential District Heating
South Tees Site
Road and rail
C02 Offshore Transmission
Able UK Decomissioning
Redcar Bulk Terminal UK's deepest east coast port
Further rail improvement
EDF Energy Nuclear Power Station
Pipelines to North Sea Oil and Gas
Offshore C02 transport network
Seal Sands / North Tees Chemical Sites
PD Ports 4th Largest in the UK
SABIC Underground Chemical & Hydrogen Storage
BP CATS terminal
Refuelling Hub H2 Vehicles
Upgrading of port road
MGT Biomass Power
South Tees Development Corporation
Glennmont Biomass Power
SITA Waste to Energy
CF Fertilisers Ammonia
BOC Steam Methane Reformer
Sembcorp Biomass Power Station EFN Power / Utilities
Wilton International
H2 trains
CPI Manufacturing Catapult
Biffa Polymer Recycling
Billingham Chemical Site
Durauta AD Plant
TWI
MPI
Ensus Bioethanol
Lotte Chemicals PET/ Plastics
Refuelling Hub
Potential transport refuelling hub
Potential Gas CCGT Investment
Sirius Minerals Transport
© Crown Copyright. All rights reserved LA100020967L 2015
© Copyright The GeoInformation Group 2015
New Tees crossing
A66 improvement
Hydrogen refuelling hub
4 SMR plant with CCS producing hydrogen for domestic heat
1 0 1 2 3 4 km

TEES VALLEY COMBINED AUTHORITY

Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

CCU

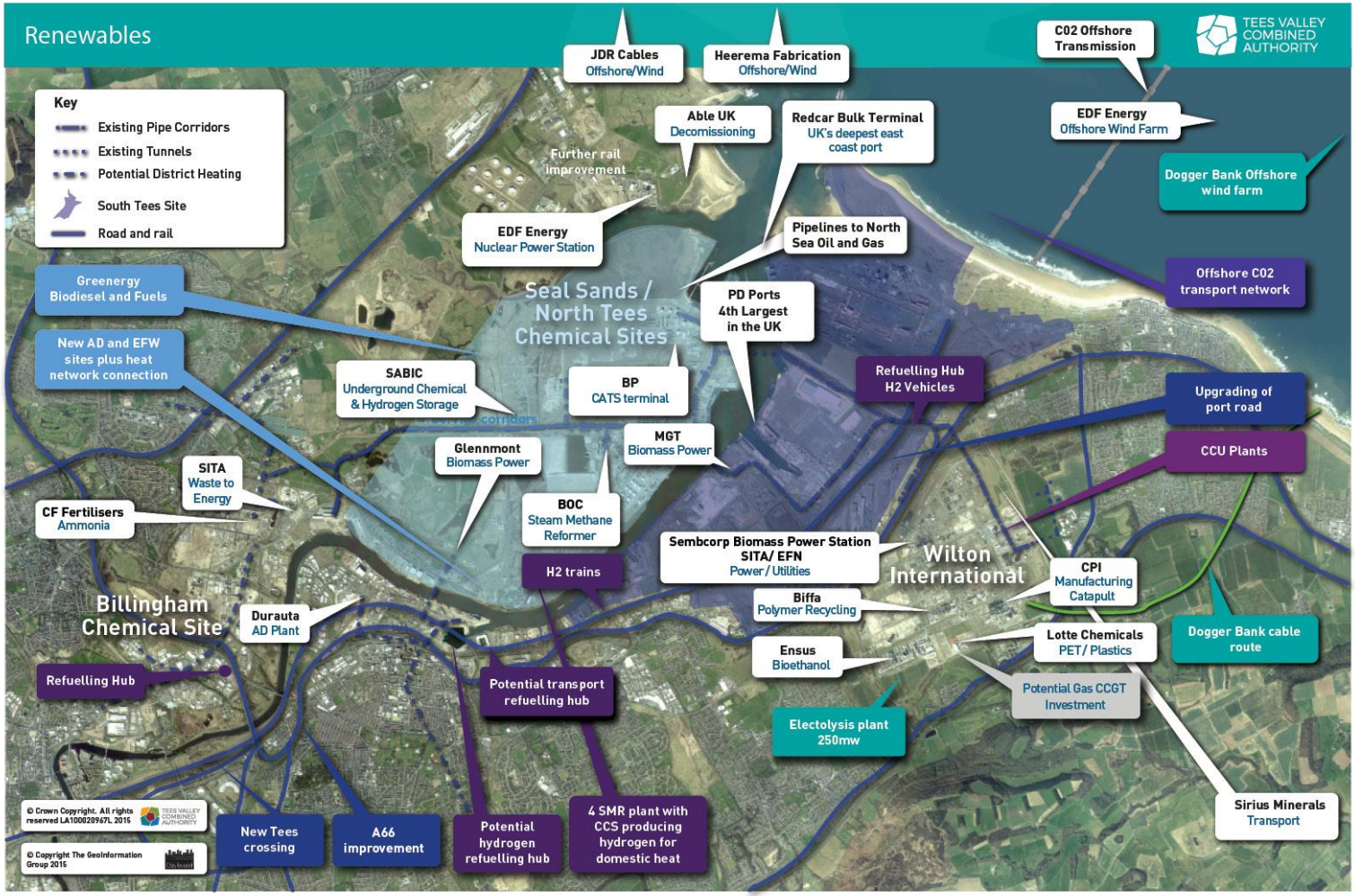

TEES VALLEY COMBINED AUTHORITY
Key
Existing Pipe Corridors
Existing Tunnels
Potential District Heating
South Tees Site
Road and rail
C02 Offshore Transmission
EDF Energy Offshore Wind Farm
Able UK Decomissioning
Redcar Bulk Terminal UK's deepest east coast port
Further rail improvement
EDF Energy Nuclear Power Station
Pipelines to North Sea Oil and Gas
Offshore C02 transport network
Seal Sands / North Tees Chemical Sites
PD Ports 4th Largest in the UK
SABIC Underground Chemical & Hydrogen Storage
BP CATS terminal
Refuelling Hub H2 Vehicles
Upgrading of port road
MGT Biomass Power
South Tees Development Corporation
CCU Plants
Glennmont Biomass Power
SITA Waste to Energy
Huntsman Polyurethane
CF Fertilisers Ammonia
BOC Steam Methane Reformer
Sembcorp Biomass Power Station EFN Power / Utilities
Wilton International
H2 trains
CPI Manufacturing Catapult
Billingham Chemical Site
Biffa Polymer Recycling
Durauta AD Plant
TWI
MPI
Ensus Bioethanol
Lotte Chemicals PET/ Plastics
Refuelling Hub
Potential transport refuelling hub
Potential Gas CCGT Investment
Sirius Minerals Transport
© Crown Copyright. All rights reserved LA100020967L 2015
© Copyright The GeoInformation Group 2015
New Tees crossing
A66 improvement
Potential hydrogen refuelling hub
4 SMR plant with CCS producing hydrogen for domestic heat
1 0 1 2 3 4 km

TEES VALLEY COMBINED AUTHORITY

Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

Renewables


TEES VALLEY COMBINED AUTHORITY
Key
Existing Pipe Corridors
Existing Tunnels
Potential District Heating
South Tees Site
Road and rail
JDR Cables Offshore/Wind
Heerema Fabrication Offshore/Wind
C02 Offshore Transmission
Able UK Decomissioning
Redcar Bulk Terminal UK's deepest east coast port
EDF Energy Offshore Wind Farm
Further rail improvement
Dogger Bank Offshore wind farm
EDF Energy Nuclear Power Station
Pipelines to North Sea Oil and Gas
Greenergy Biodiesel and Fuels
Seal Sands / North Tees Chemical Sites
PD Ports 4th Largest in the UK
Offshore C02 transport network
New AD and EFW sites plus heat network connection
SABIC Underground Chemical & Hydrogen Storage
BP CATS terminal
Refuelling Hub H2 Vehicles
Upgrading of port road
MGT Biomass Power
Glennmont Biomass Power
CCU Plants
SITA Waste to Energy
CF Fertilisers Ammonia
BOC Steam Methane Reformer
Sembcorp Biomass Power Station SITA/ EFN Power / Utilities
Wilton International
H2 trains
CPI Manufacturing Catapult
Billingham Chemical Site
Durauta AD Plant
Biffa Polymer Recycling
Dogger Bank cable route
Lotte Chemicals PET/ Plastics
Ensus Bioethanol
Refuelling Hub
Potential transport refuelling hub
Potential Gas CCGT Investment
Electolysis plant 250mw
© Crown Copyright. All rights reserved LA100020967L 2015
© Copyright The GeoInformation Group 2015
New Tees crossing
A66 improvement
Potential hydrogen refuelling hub
4 SMR plant with CCS producing hydrogen for domestic heat
Sirius Minerals Transport
1 0 1 2 3 4 km

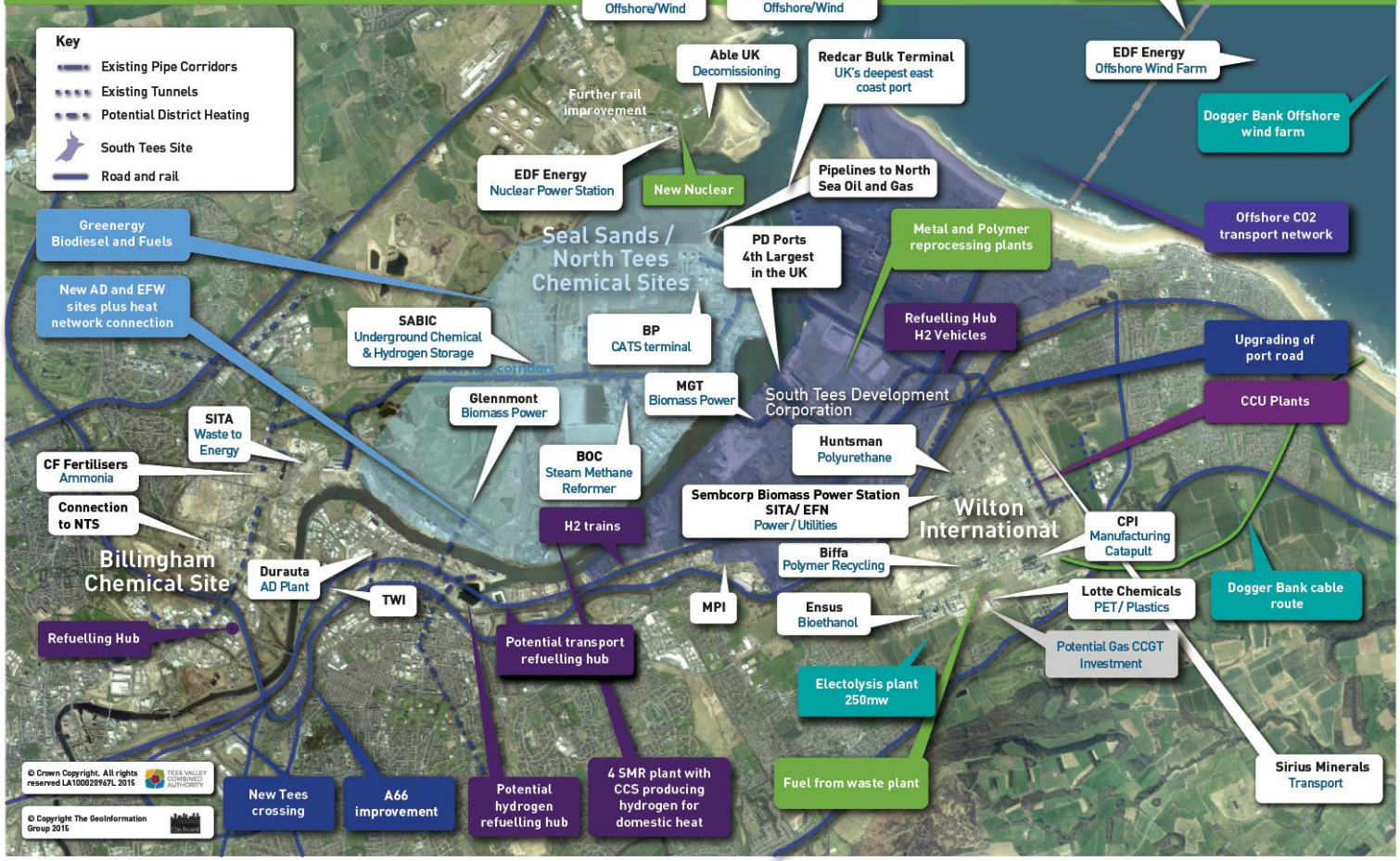
TEES VALLEY COMBINED AUTHORITY

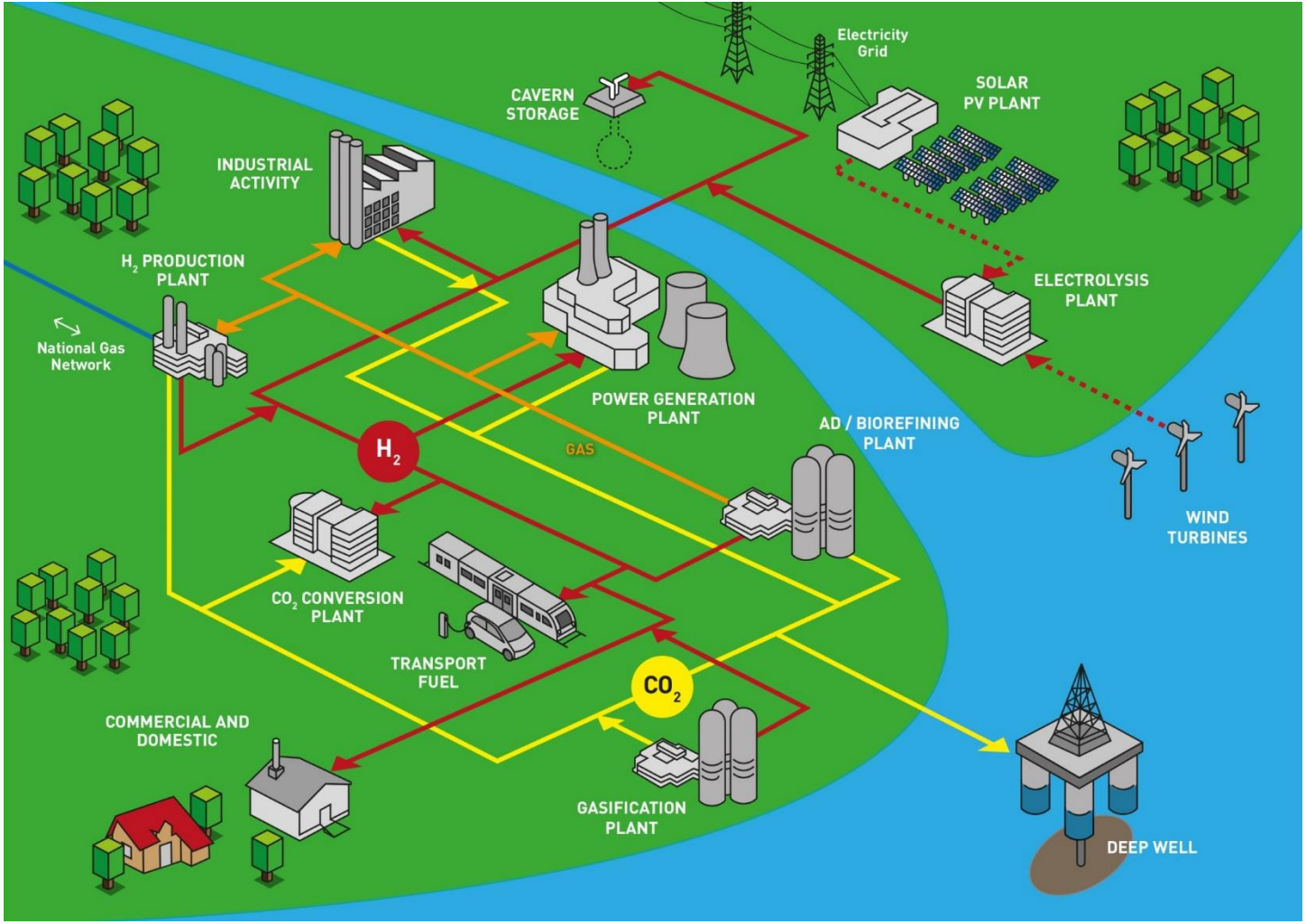
Meeting the Challenge

1	**Invest in our infrastructure** *Key investments in strategic road and rail infrastructure, and extension of heat and electricity networks*
2	**Growing energy from waste production** *Expand production of heat and power from waste, and develop processes to use waste to produce fuels and industrial inputs*
3	**Commercial development of CCS** *Develop CO_2 transport and storage network, for use by industrial plant and power stations*
4	**Low cost low carbon hydrogen for heat and transport** *Pilot projects for heat and transport, as region becomes 'hydrogen factory' for UK, coupled with CCS*
5	**Utilise carbon as a feedstock for new process industries** *Develop and scale up processes using CO_2 as a feedstock*
6	**Additional decarbonised energy through offshore renewables** *Use energy from North Sea offshore wind to power new industries*
7	**And ultimately to build on the strengths of the region** *Attract new industries that can use the wastes, feedstocks and energy produced in the region*

Building on new strengths

TEES VALLEY COMBINED AUTHORITY

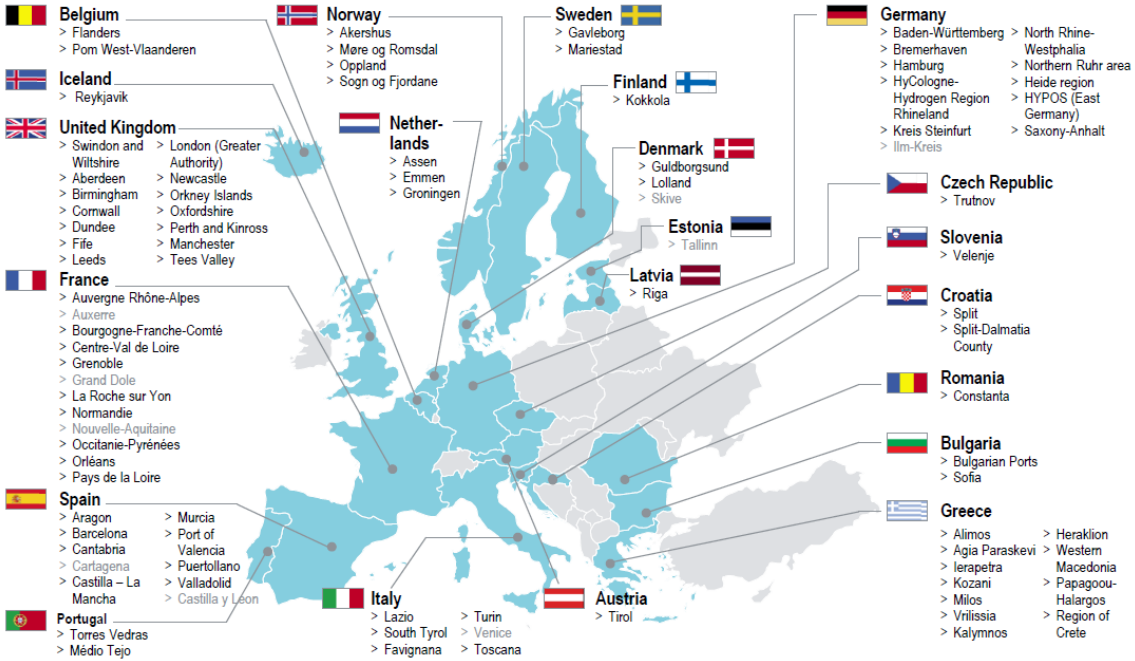



Electricity Grid
CAVERN STORAGE
SOLAR PV PLANT
INDUSTRIAL ACTIVITY
H_2 PRODUCTION PLANT
ELECTROLYSIS PLANT
National Gas Network
POWER GENERATION PLANT
AD / BIOREFINING PLANT
H_2
GAS
WIND TURBINES
CO_2 CONVERSION PLANT
TRANSPORT FUEL
CO_2
COMMERCIAL AND DOMESTIC
GASIFICATION PLANT
DEEP WELL

TEES VALLEY COMBINED AUTHORITY

The Low Carbon Competition

90+ Regions from 20+ countries now form part of the project – And the coalition keeps on growing



TEES VALLEY COMBINED AUTHORITY

Clean Growth Contribution

- **Opportunities to :**
  - **Deploy CCUS**
  - **Decarbonise Heat**
  - **Decarbonise industrial production**
  - **Reduce transport emissions**
  - **Support clean power**

TEES VALLEY COMBINED AUTHORITY

Teesside Today

- ✓ **CCUS**
  - ➢ **Pre FEED engineering complete**
    - ➢ **three capture sites**
    - ➢ **onshore transportation network**
    - ➢ **offshore pipework**
  - ➢ **Business Case published**
  - ➢ **Economic Impact Assessment undertaken**
  - ➢ **Proposed funding mechanism published**
  - ➢ **Network an adopted PCI**
- ✓ **Hydrogen – commitment to H21 development**
- ✓ **Developing Hydrogen Transport case**

TEES VALLEY COMBINED AUTHORITY

Thankyou