

Tackling Climate Change – Renewable Gases and Liquid Fuels from Waste



LondonClimateChangeAgency

Allan Jones MBE

Chief Executive Officer

London Climate Change Agency Ltd

London Climate Change Agency



□ Practical delivery agency implementing climate change projects in:

- Energy
- Water
- Waste
- Transport



Municipal company 100% owned by the London Development Agency

LONDON
DEVELOPMENT
AGENCY



LCCA – funding public/private sector



The London Climate Change Agency is financially supported by the LDA and the following private sector Founding Supporters:-

- BP
- Lafarge
- Legal & General
- Sir Robert McAlpine
- Johnson Matthey
- City of London Corporation

Support has also been provided by:

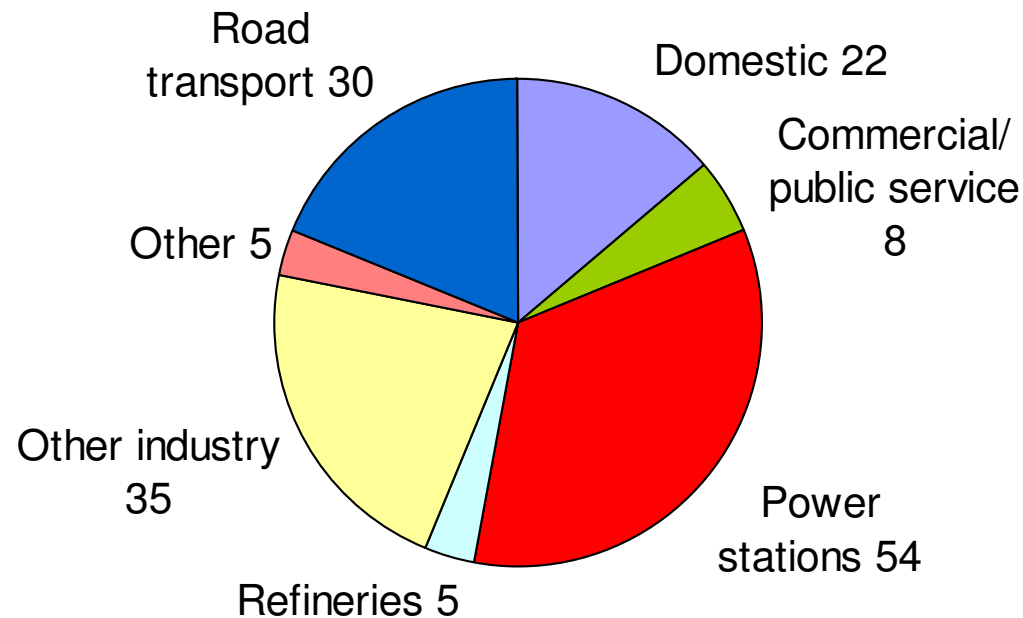
- Carbon Trust
- KPMG
- Energy Saving Trust
- Rockefeller Brothers Fund
- The Climate Group
- Greenpeace

UK CO₂ emissions

The Greenhouse Gas Programme



UK emissions in 1990 (MtC) by emission sources



Emissions expressed in terms of weight of carbon emitted. In terms of weight of CO₂ emitted, the figures should be multiplied by 44 and divided by 12. Most of the figures in these charts are based on constant emission factors.

Centralised power generation

□ Thermal Efficiencies of UK Power Stations ⁽¹⁾

- Coal 36%
- Gas 46%
- Nuclear 38%



□ Grid Losses ⁽²⁾

- Transmission 2%
- Distribution 7%



(1). DTI Digest of UK Energy Statistics

(2). Ofgem

Mayor's Climate Change Action Plan

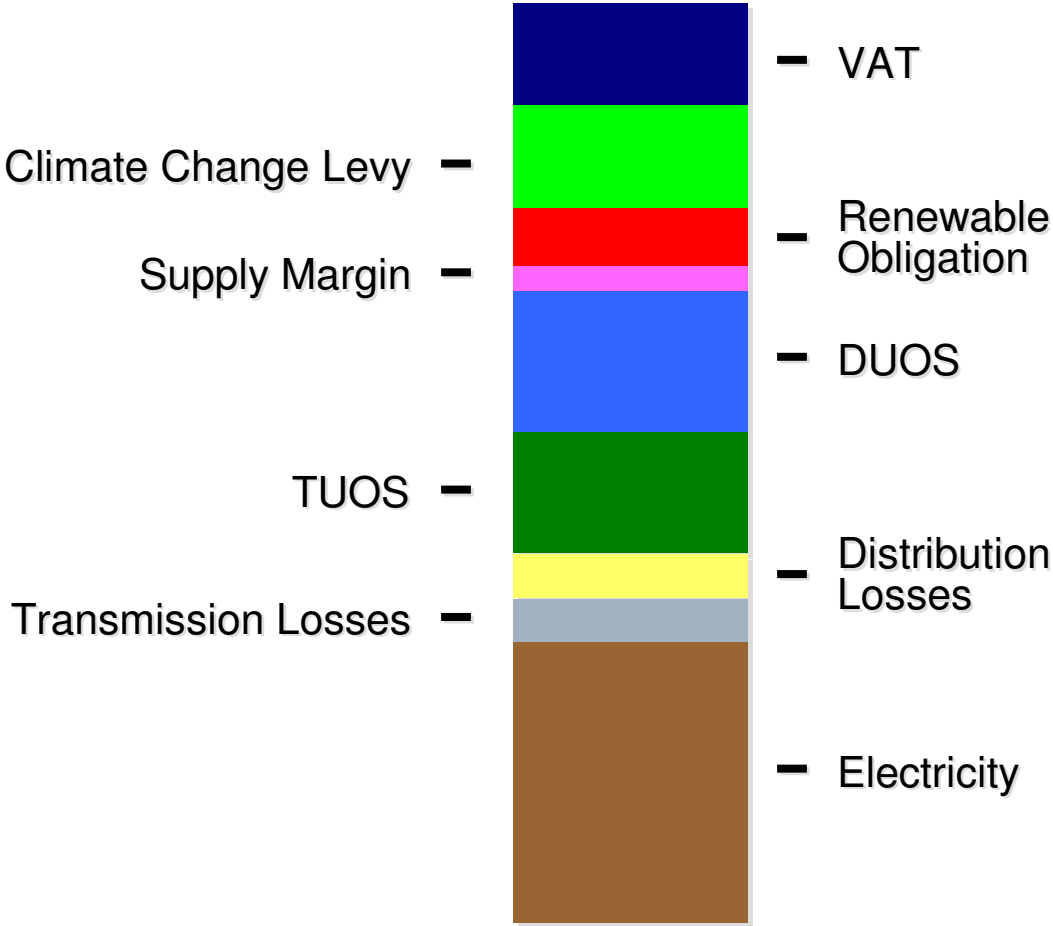


- 60% Reduction in CO₂ Emissions by 2025
 - Existing Homes
 - Green Homes Programme
 - Existing Commercial & Public Sector
 - Better Buildings Partnership, Green Badging, Lobbying, etc
 - New Build and Development
 - Revised London Plan, London Boroughs, Housing Strategy, etc
 - Energy Supply
 - Decentralised Energy, On Site Renewables, Large Scale Renewables, Carbon Sequestration, etc
 - Ground Based Transport
 - Aviation
 - The Mayoral Group
 - 'Show by Doing'

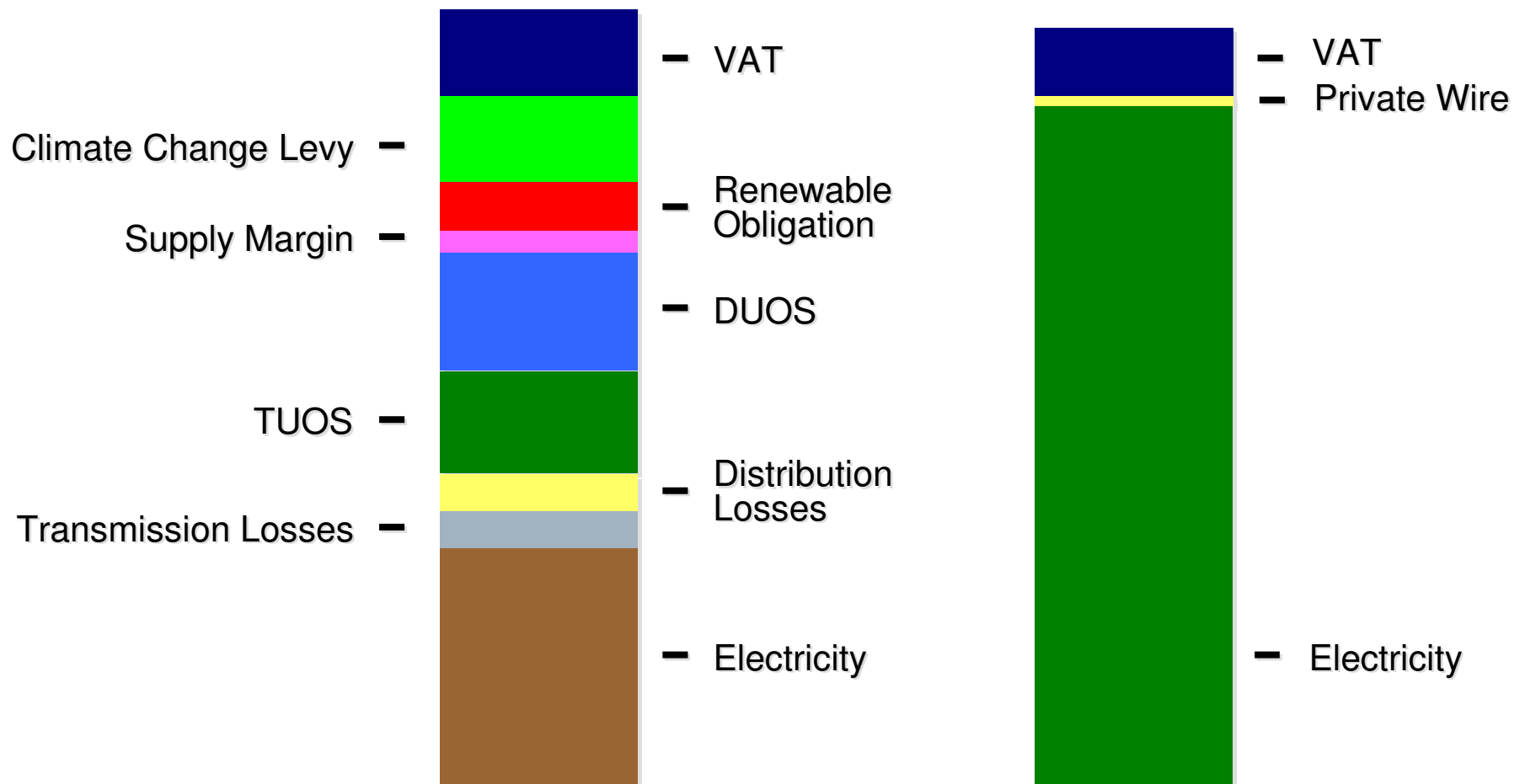
Energy Supply

- ❑ Centralised energy – 75% of London’s CO2 emissions – 35M tonnes (+15% growth by 2025)
- ❑ Decentralised energy in London:
 - 25% off the grid by 2025
 - 50% off the grid by 2050
- ❑ Renewable fuels and transport – 2M homes
- ❑ Large scale renewables, inc. offshore & marine
- ❑ Carbon capture and sequestration
- ❑ Future proofing for renewable hydrogen economy

Grid supply price



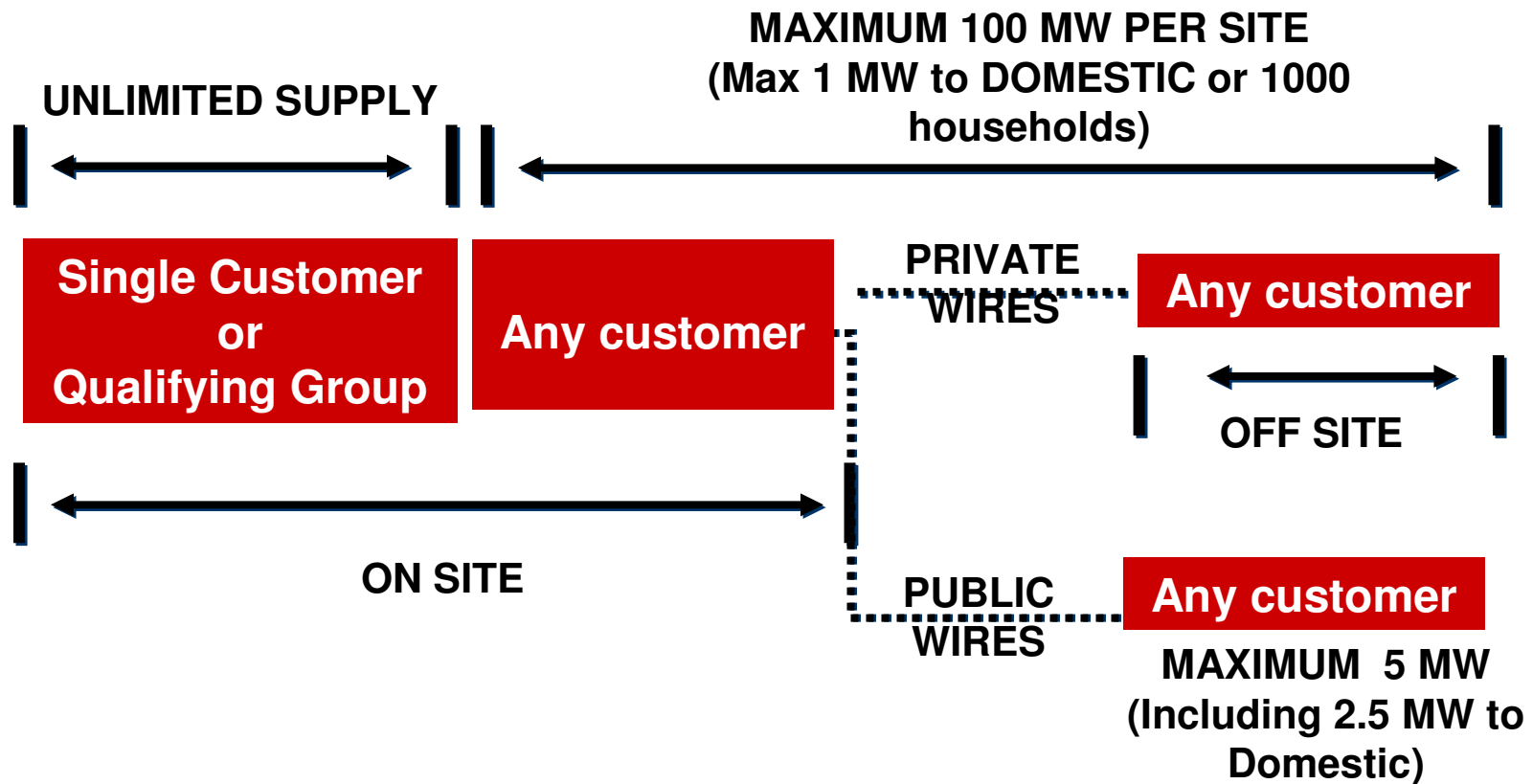
Grid supply price and private wire supply price



Supply Exemptions Order 2001



Generation: per site max 50 MW, or 100 MW with secretary of State Approval



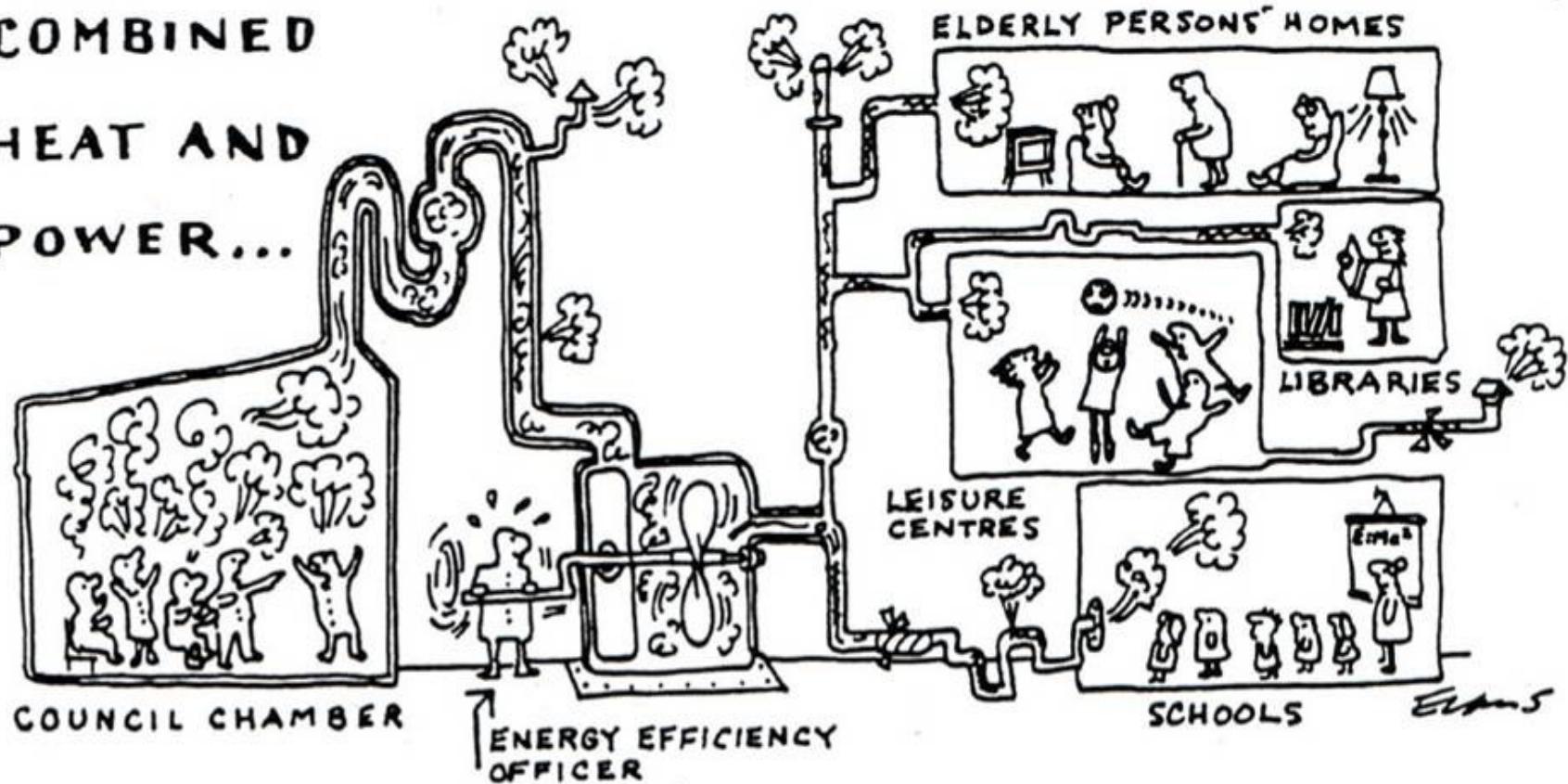
Source: Based on Department of Trade and Industry, Electricity Directorate



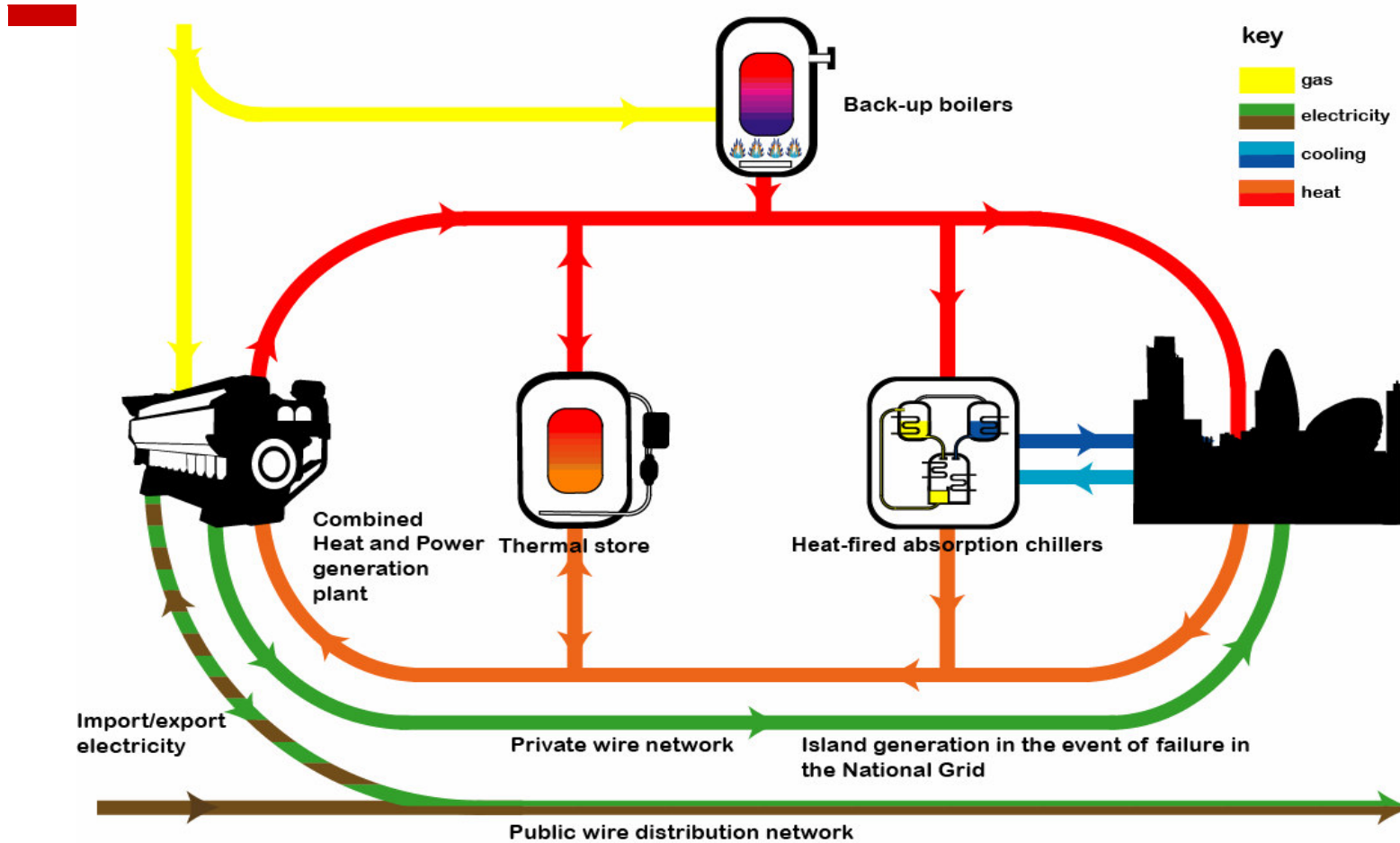
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Decentralised energy system

COMBINED
HEAT AND
POWER...



Trigeneration - Combined Cooling Heating and Power



Barkantine CHP District Energy Scheme



Examples of New Decentralised Energy in London



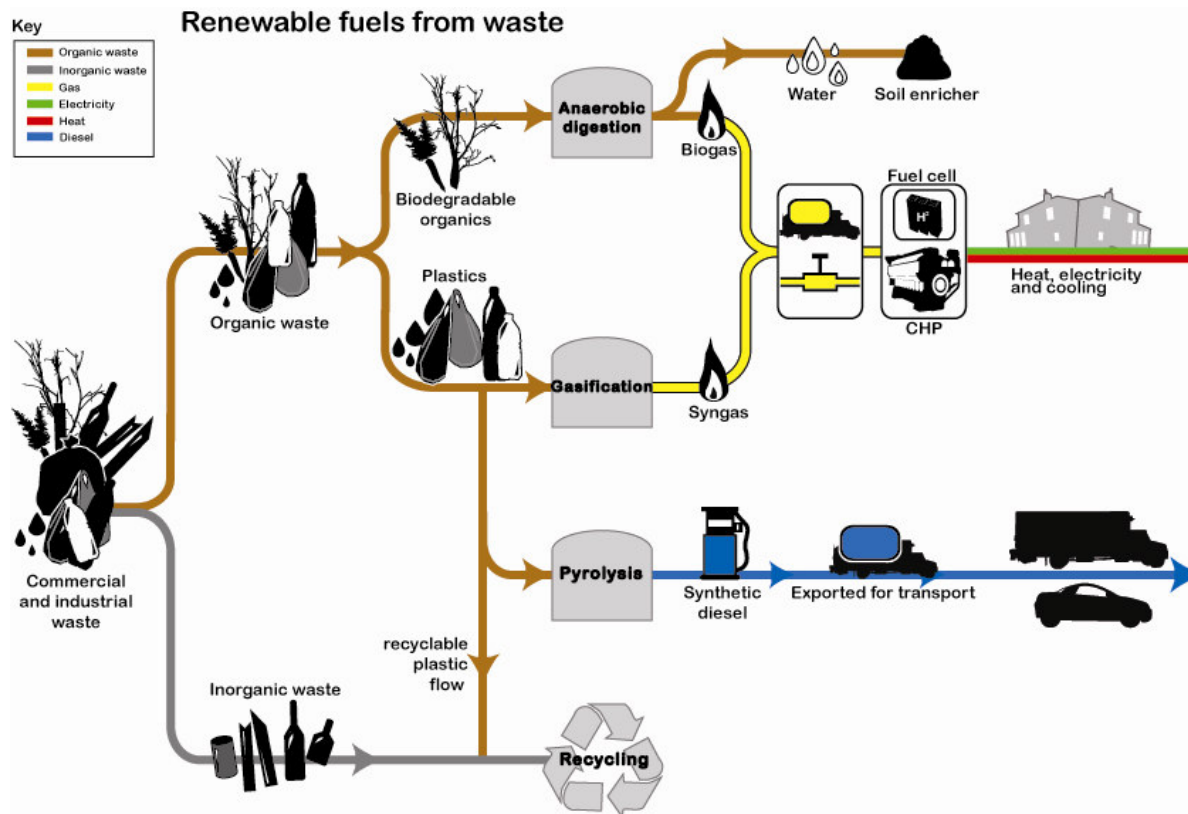
- Procurement, including:
 - Elephant & Castle
 - Greenwich Peninsula
 - Kings Cross Central
 - London 2012/Stratfield City
 - New Wembley
- Advice, including:
 - BAA Heathrow Airport – East Terminal
 - Berkeley Homes Developments
 - English Partnerships Developments
 - London Underground Trigeneration Cooling
 - Brent Cross/Cricklewood

LCCA Projects

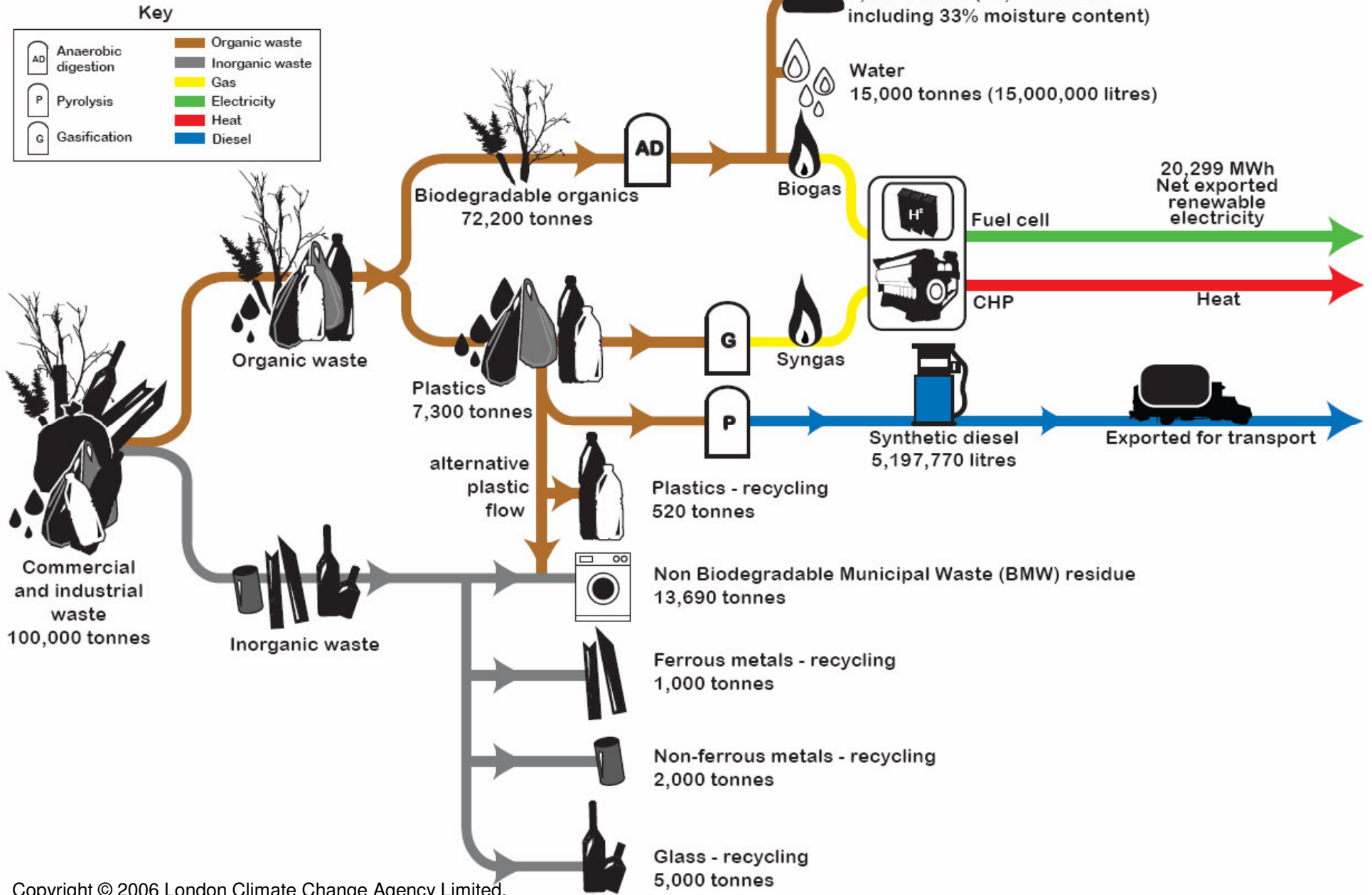
- London Transport Museum – Photovoltaic Project
- Palestra – Photovoltaic and Building Integrated Wind Turbines
- City Hall – Photovoltaic Roof and Solar Shading
- Palestra – Fuel Cell CHP Trigeneration Study
- In Progress:
 - Better Buildings Partnership
 - City Hall – Fuel Cell CHP Study
 - Thames Gateway – Decentralised Energy Study
 - Biomass and Waste Fuels Supply Chain Study
 - Biomass and Waste Fuels – Energy Production & Carbon Factors Studies
 - Renewable Energy Lighting Columns – Demonstration Projects
 - Schools Demonstration Project
 - LED Lighting
 - LDA Development Projects
 - Water Action Plan
 - Renewable Gases/Liquid Fuels Projects:
 - London Remade
 - Park Royal
 - Advanced Plasma Power Gasification

Renewable Gases and Fuels from Waste

- If all of London's landfill waste were instead turned into renewable gases it could power up to two million homes.
- Decentralised energy can become zero emission through extracting gases and liquid fuels from waste



Waste to energy



Large scale renewable energy projects



□ **Current**

- Ford Dagenham, London's First Wind Park - 3.6MW

□ **Near Future**

- On Shore Wind Turbines – 50MW +
- Off Shore Wind Farms – 1500MW +
- Marine Current Turbines 1MW each

□ **Future Potential**

- Thames Barrage/Renewable Energy Scheme
- Municipal Waste
- Commercial Waste
- Sewage Waste
- Biomass Waste
- Macro Decentralised Energy and Low Carbon Zones



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LDA Development Projects

- 'Show by Doing'
- Decentralised Energy Team
 - Gallions Park Zero Carbon Development
 - Albert Basin
 - Royal Docks
 - Dagenham Dock Sustainable Industrial Park
 - Silvertown Quays
- Future proofing towards a renewable hydrogen energy economy

ONE GALLIONS







2012 London Olympics

ODA sustainable development strategy

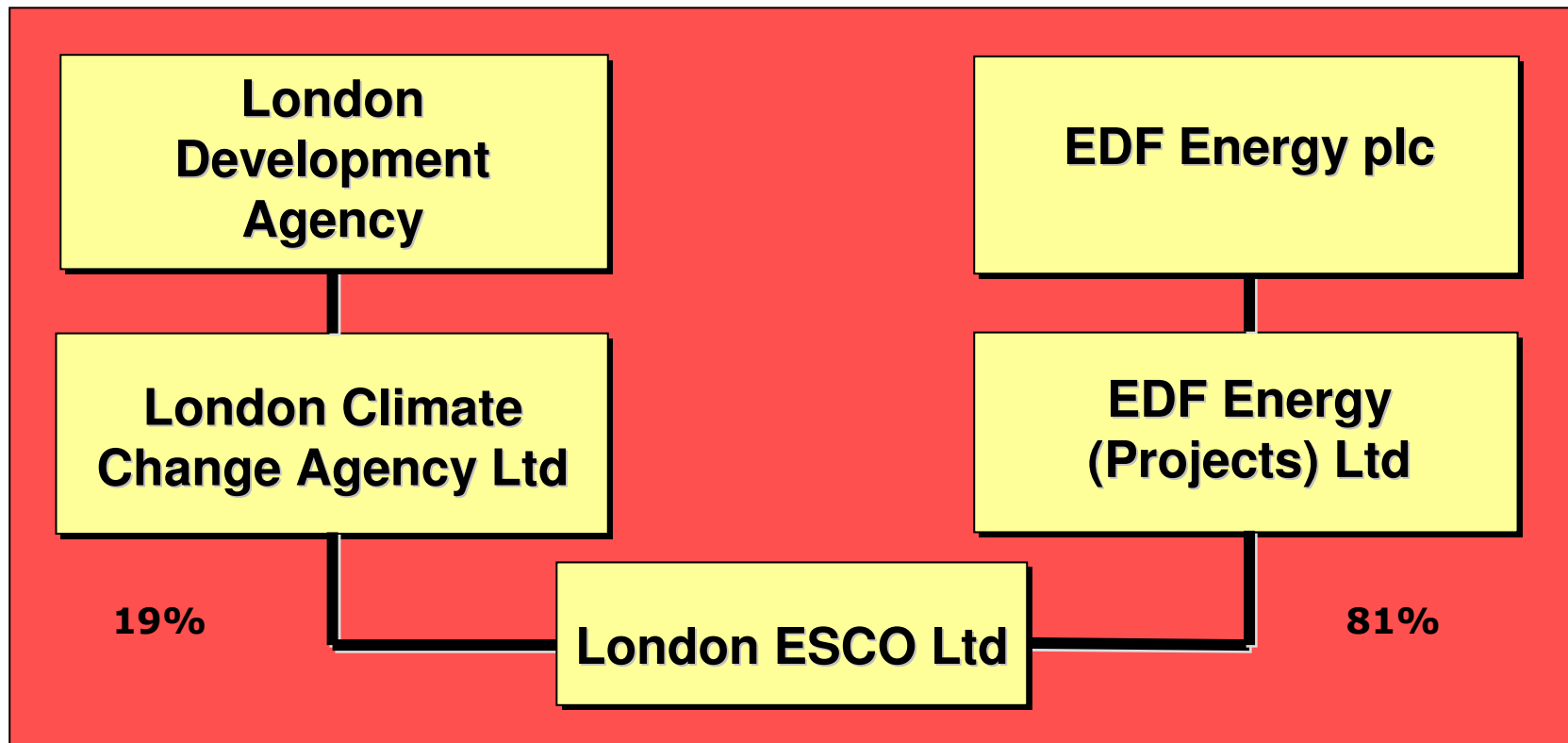


- Climate Change
 - 50% reduction in CO₂ emissions by 2013
- Energy Efficiency
 - Olympic Village 25% more energy efficient
 - Permanent venues BREEAM Excellent rating
 - CCHP (Trigeneration) 20-25% CO₂ emission savings
- Renewable Energy
 - 20% of Olympic Park & Village Energy Demand
- Water
 - 40% reduction in potable water consumption
 - 20% reduction for residential development

London ESCO

- ❑ Established as a Public/Private Joint Venture Energy Services Company between the London Climate Change Agency Ltd and EDF Energy plc
- ❑ Pan London ESCO that Designs, Finances, Builds and Operates Decentralised Energy Systems
- ❑ 50 Pipeline Projects in both New and Existing Development

London ESCO Ltd – Company structure

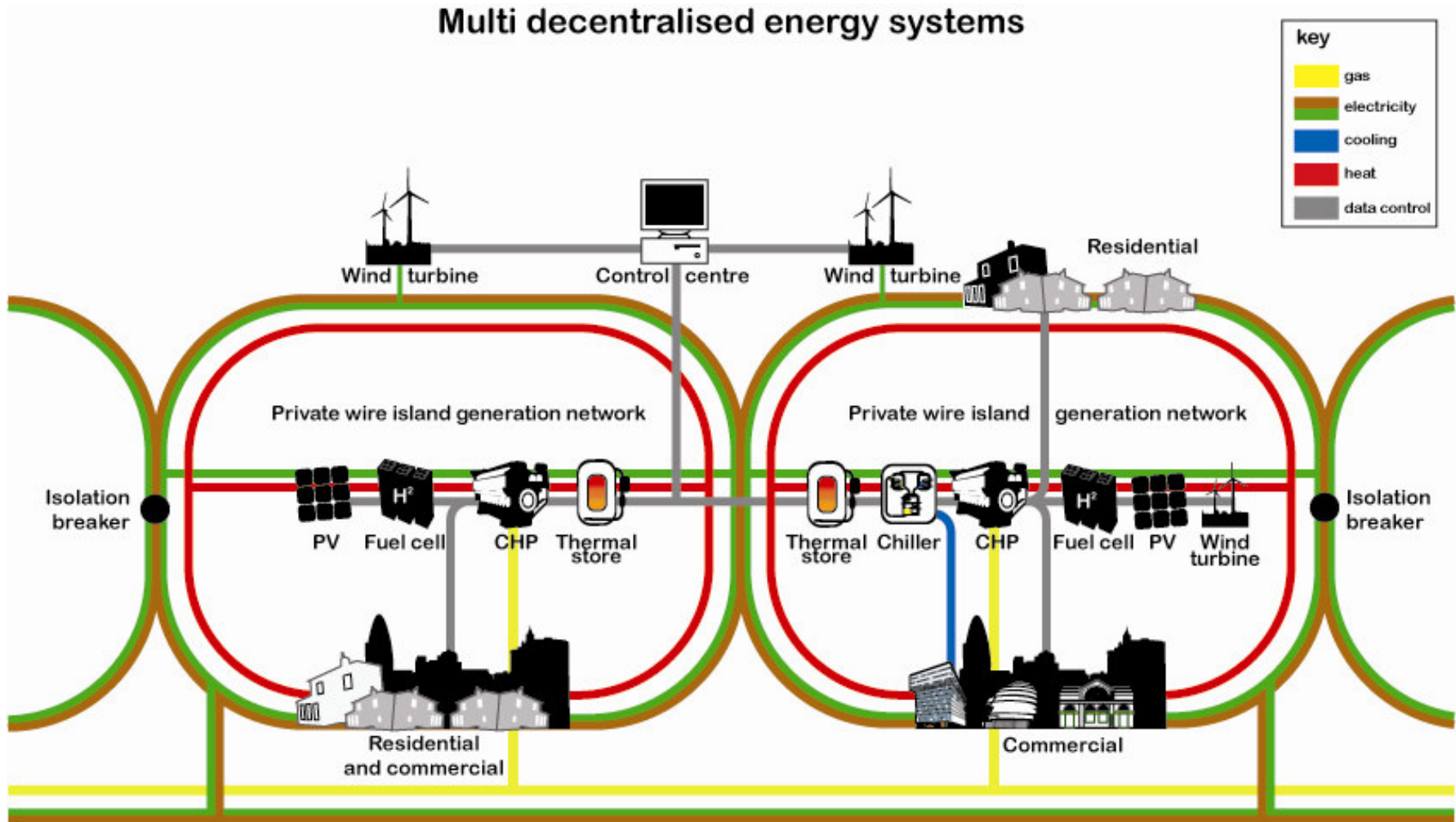


London ESCO – Operating Plan 2007 and 2008 Projects








- ❑ Initial 9 projects, including new and existing development
- ❑ CHP trigeneration and cogeneration
- ❑ Renewable Energy
- ❑ Fuel Cell CHP
- ❑ Estimated Reduction in CO2 Emissions by 310,000 tonnes pa
- ❑ £200 million Investment

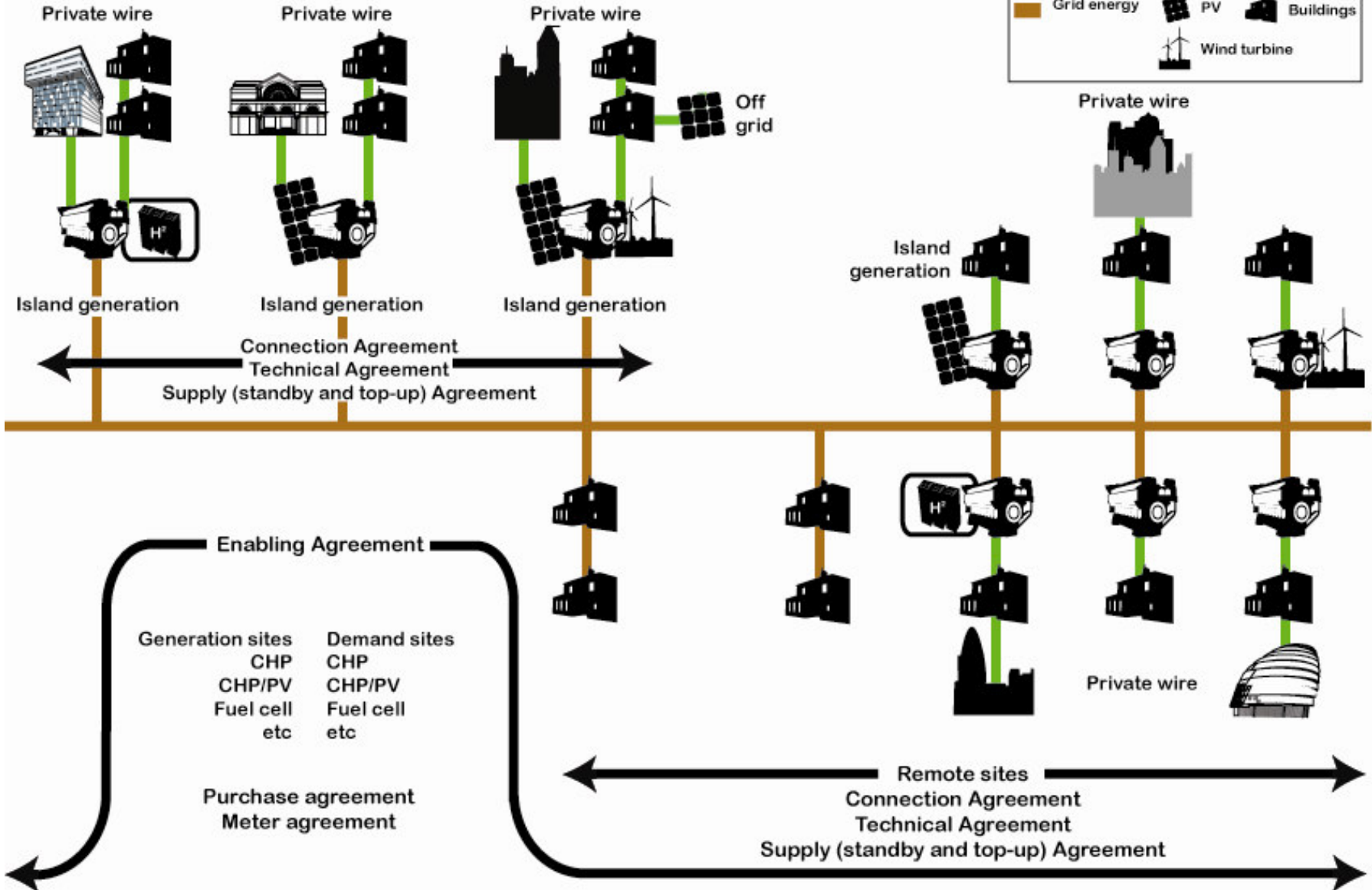
Low Carbon Zones – Macro Decentralised Energy Systems

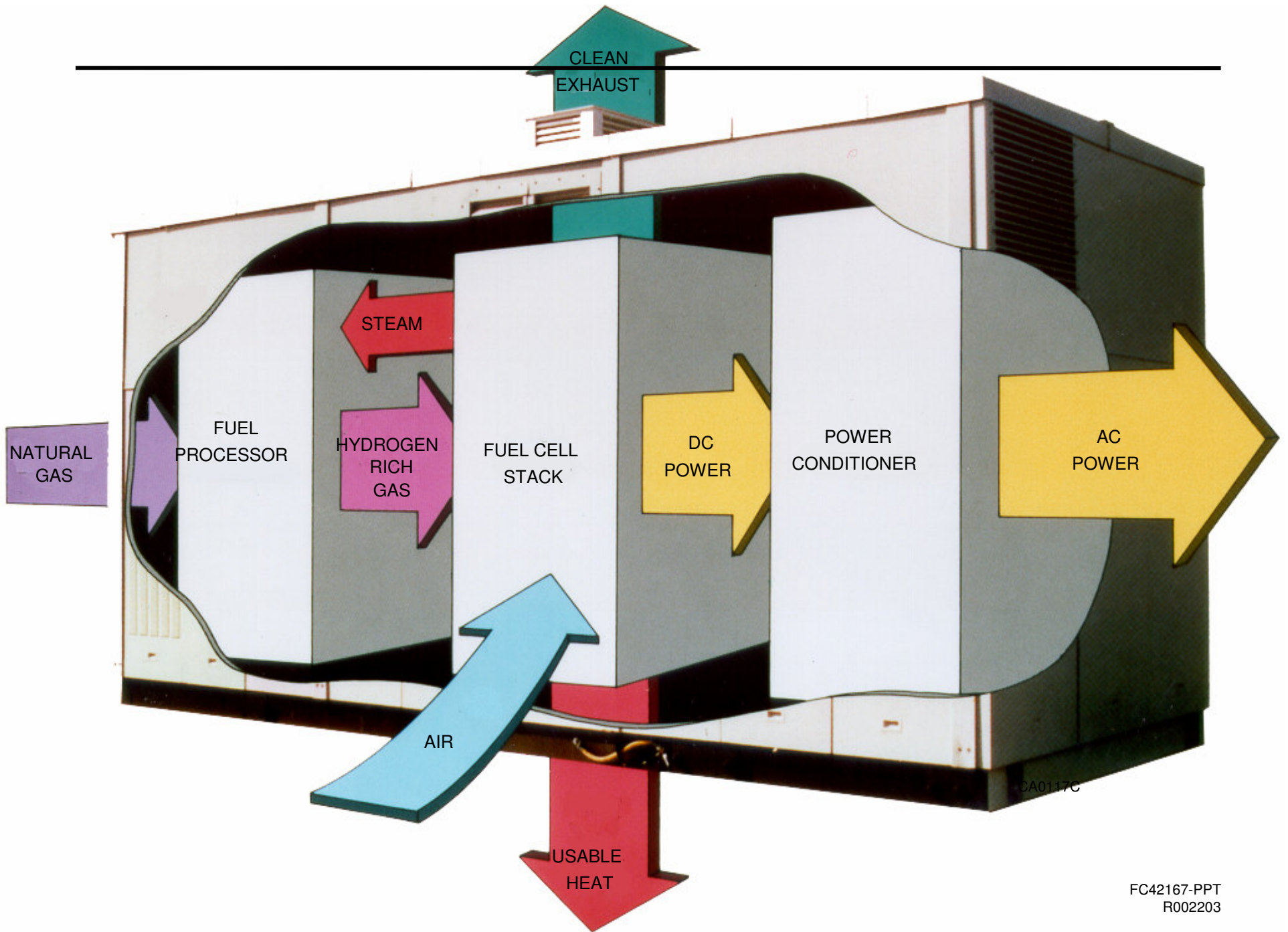


London Energy Internet

Key

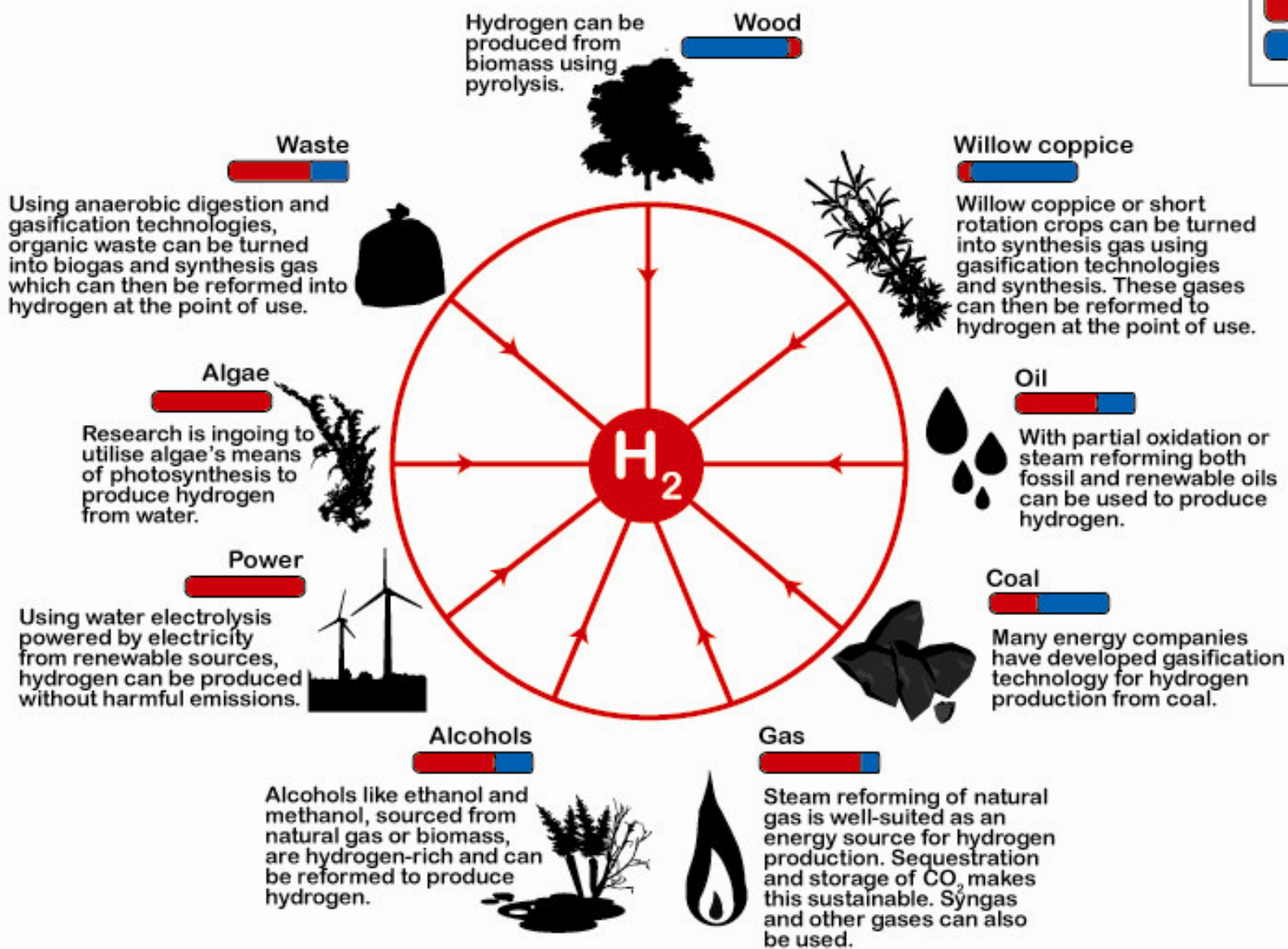
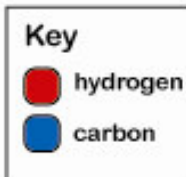
- Low carbon energy
- Grid energy
-  CHP
-  Fuel cell
-  PV
-  Buildings
-  Wind turbine



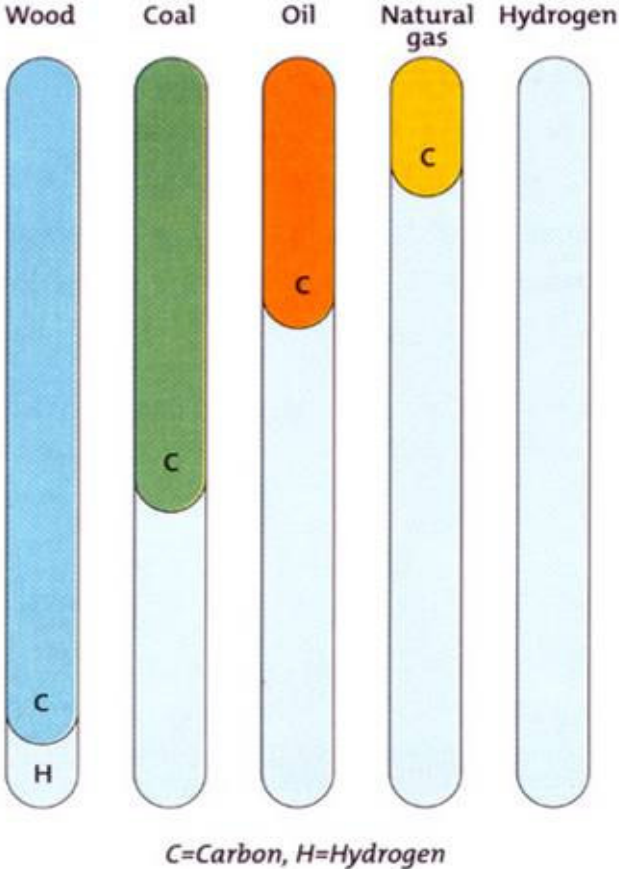




Hydrogen Sources



The Hydrogen to carbon ratio in different energy sources



100% renewable hydrogen economy

