Energy Research Partnership
Energy Technologies Matrix

Where the whole row is blank for a particular technology/application, then no input has been received from appropriate experts. In a few cases individual cells in a row are blank with the rest of the row being completed; then, either there is insufficient information to apply the criteria or the criteria is not

Key to column criteria at bottom.

			Position on Innovation Chain				Essential						Barriers and Enablers											Other consideratios			
SECTOR	TECHNOLOGY AREA	TECHNOLOGY/APPLICATION	Res	Dev	Dem	Dep	GHG	SoS	Fpov.	Mkts	Mksize	Strat.	Env.	Econ.	Soc.	TecRsk	Reg.	Time	Cost	Invest	Export	EUlink	Stdrds	Strgth	Intl.	Matls	C&I
CARBON ABATEMENT TECHNOLOGIES	CO2 Capture	Pulverised coal + Scrubbing																									
		Pulverised coal + Oxy-fuel																									
		IGCC + precombustion capture																									
		Advanced GT cycles - hydrogen																									
		Advanced GT cycles - oxyfuel																									
		Industrial processes																									
		Novel cycles																									
	Higher efficiency conversion processes	Pulverised coal ASC/USC																									
		Fluidised bed combustion																									
		Gas turbines																									
	CO2 transport and storage	Off-shore																									
		On-shore																									
		Transmission																									
		Monitoring, leakage & remediation																									
	Products from fossil fuels	Hydrogen production																									
		Coal to products (liquids & chemicals)																									
		Gas to products (liquids & chemicals)																									
WIND	Onshore	Life extension of existing fleet																									
		New blade design																									
		New generator design																									
	Offshore	Resistance to marine environment																									
		New blade design																									
		New generator design																									
		Access and egress																									
		Floating platforms																									
		Fixed platforms																									
	Transmission	Convertor development																									
		Offshore energy parks																									
MARINE	Wave	Offshore																									
		Shoreline																									
	Currents	Tidal current																									
		Barrage systems																									
		Lagoons																									
		Ocean currents																									
DISTRIBUTED GENERATION	Wind	Domestic																									
		Commercial/industrial																									
	Heat pumps	Domestic/commercial																									
		Geothermal																									
	Chp	Biomass																									
		Organic Rankine cycle																									
		Internal combustion																									
		Microturbines (<50kW)																									
		Stirling engines																									
		Fuel cells																									
	Small hydro																										

SECTOR	TECHNOLOGY AREA	TECHNOLOGY/APPLICATION	Res	Dev	Dem	Dep	GHG	SoS	Fpov.	Mkts	Mksize	Strat.	Env.	Econ.	Soc.	TecRsk	Reg.	Time	Cost	Invest	Export	EUlink	Stdrds	Strgth	Intl.	Matls	C&I
BIOENERGY	Feedstocks	Current energy crops eg willow,rape etc																									
		Novel energy crops eg algae																									
		Current forestry&agricultural sources																									
		Industrial residues-already in use																									
		Other residues- not currently used																									
		Other wastes- not currently used																									
	Electricty	Dedicated																									
		Cofiring																									
		Chp																									
	Heat	Domestic																									
		Community heating																									
		Commercial/industrial																									
	Biofuels and chemicals	Biofuels - 1st generation																									
		Biofuels - 2nd generation																									
		Biorefineries																									
		Gasification																									
		Pyrolysis																									
		Molecular engineering																									
SOLAR	Photovoltaic	Crystalline silicon																									
		Thin films																									
		New materials (other than Si)																									
		Incorp'n into bldgs & system integ'n																									
	Solar Thermal, domestic and industrial	Concentrated solar																									
		Hydrogen prodn																									
		Domestic Hot water																									
NUCLEAR FISSION	Existing (Generation II) Plant	Magnox																									
		AGR																									
		LWR																									
	Near Term (Gener'n III Plant)	Advanced LWR																									
	Long Term (Generation IV Plant)	High Temperature Reactor																									
		Fast Reactor																									
		Heat Application																									
		Integral LWR																									
NUCLEAR FUSION	Existing R&D Facilities	JET																									
		MAST – Spherical Tokamak																									
	Future Facilities	ITER / IFMIF																									
		LASER Fusion																									
	Demonstr'n / Commercial Plant	DEMO																									
NUCLEAR DECOMMISSIONING & WASTE MANAGEMENT	Waste Management (Generation II plant)	Encapsulation																									
		Interim Storage																									
	Waste Management (Generation III plant)																										
	Decommissioning	Site Remediation																									
	Disposal	Deep Geol Disposal-ILW & HLW																									
		Near-surface for LLW																									
NETWORKS	Electricity	Decentralised generation																									
		Intermittent generation																									
		Active Dist Network management																									
		Electricity bulk storage																									
		Life extension																									
		Environmental impact																									
		Elec transmission undergrounding																									
		Demand user participation																									
		Efficiency improvement-networks																									
	Gas	Life extension																									
		Efficiency improvement																									
		Environmental impact																									
		Gas quality																									
		LNG production and transport																									
		Gas bulk storage																									
	Hydrogen	Storage																									
		Centralised																									
		Distributed																									
	Heat	Storage																									
		Pipelines																									

SECTOR	TECHNOLOGY AREA	TECHNOLOGY/APPLICATION	Res	Dev	Dem	Dep	GHG	SoS	Fpov.	Mkts	Mksize	Strat.	Env.	Econ.	Soc.	TecRsk	Reg.	Time	Cost	Invest	Export	EUlink	Stdrds	Strgth	Intl.	Matls	C&I
TRANSPORT	Vehicles - all surface Transport m	Advanced ICEs and drivetrains																									
		Fuel cells																									
		Hybrids																									
		Electric drive, batteries and storage																									
		Hydrogen																									
		Vehicle design, electronics & control																									
	Fuels	Conventional																									
		Biofuels																									
		New fuels																									
	Transport system	Design including freight logistics																									
		Demand Management																									
		Passenger logistics																									
	Roads	Infrastructure																									
		Telematics																									
	Rail	Electric																									
		Diesel																									
		Advanced propulsion systems																									
		Infrastructure																									
		Mass Passenger Transit (light rail)																									
		Road/rail integration																									
	Water	Propulsion systems																									
		Inland																									
		Ocean																									
	Aviation	Aerodynamics																									
		Advanced propulsion systems																									
		Novel designs																									
		Operations and logistics																									
DEMAND SIDE	Building design and controls Exisiting	Design optimisation																									
		Building fabric																									
		Heating, cooling and lighting																									
		Domestic appliances																									
		Control and energy management																									
	Building design and controls New and Emerging	Design optimisation																									
		Building fabric																									
		Heating, cooling and lighting																									
		Domestic appliances																									
		Control and energy management																									
	Industrial processes Exisiting	Process intensification																									
		Process control																									
		Combustion technologies																									
		High efficiency process plant																									
	Industrial processes New and Emerging	Process intensification																									
		Process control																									
		Combustion technologies																									
		High efficiency process plant																									

Criterion	Assessment: Red	Amber	Green
Impact - GHG reduction (UK)	Significant negative	Limited impact	Significant positive
Impact - Security of Supply (UK)	Significant negative	Limited impact	Significant positive
Impact - Fuel Poverty (UK)	Significant negative	Limited impact	Significant positive
Impact - Competitive Markets (UK)	Significant negative	Limited impact	Significant positive
Size of a mature UK & global market	Small (~ few MW.eqv)	Medium	Large (GW.eqv
Fit with government technology strategy	Strategy discourages	Strategy neutral	Strategy recommends
Environmental impact (other than GHG)	Significant negative	Limited impact	Significant positive
Wider economic impact (ie broader than GHG)	Significant negative	Limited impact	Significant positive
Societal -planning/ policy/ public acceptability	Significant negative	Limited impact	Significant positive
Scientific or technical risk	High risk	Medium	Low Risk
Regulatory or fiscal incentives	Barriers in place	None present	Clear incentives
Timescale to commercial deployment	20+y	10-20y	0-10y
Costs to commercial deployment (to GW scale)	High cost	Medium	Low cost
Market willingness to invest	Low	Medium	High
Ulitimate export potential	Small (~ few MW eqv)	Medium	Large (GW eqv)
Link with EU energy policy priorities	No alignment	Some correlation	Well aligned
Availability of appropriate international standards	Not covered	Some definitions	Already exist
Strength of UK R&D w.r.t. internat'l capabilities	No sig. capability	Recognised capability	Key internat'l contib'n
Prominence in internat'l energy policies	Does not feature	Limited visibility	Key in no. of countries
Availability of appropriate materials technologies	Requires sig. development	Some dev. required	Already exist
Availability of C&I and monitoring	Requires sig. development	Some dev. required	Already exist