Regional Comparative Advantage methodology

As our main dataset, we used the 2019 Office of National Statistics (ONS) export value data for goods and services, broken down by sector and ITL2 region.[i] [ii] We worked out export value per capita for each sector and ITL2 region, and ranked the regions according to this (see below).

As some of the sector categories in the exports data were broad – for example, the 'nonmanufacturing' category grouped SIC 07 categories A, B, D, E and F together – we used 2019 business size and location data to get a more granular overview of what the key sectors were in each region.[iii] We loosely mapped key net zero industries onto the existing SIC 07 categories, and using the business size and location data calculated the number of businesses in each subsector as a percentage of the total number of businesses in that broader category represented in the export data. We then compared this information across ITL2 regions. This revealed, for example, that North Scotland had a high concentration of mining and quarrying businesses within the broader 'non-manufacturing' goods category.

We also undertook qualitative analysis of UK regions' net zero potential, drawing upon mapping of transport assets, offshore wind, hydrogen and CCS sites; current net zero economic hotspots; and future net zero sites identified in the *Levelling up white paper,* the *Net zero strategy* and other publications.[iv] Finally, we researched the UK's largest industrial clusters, as identified in the Industrial Cluster Challenge, to get a better understanding of which industries were present, and where.

Table 1: Export value per capita, ranked by sector for ITL2 regions, services

ITL2 Region	Non-manufacturing[v]	Manufacturing	Transportation and storage	Accommodation and food service activities	Information and communication	Financial and insurance activities	Real estate, professional, scientific and technical activities[vi]	Administrative and support service activities	Other service industries	Wholesale and motor trades	Retail (excluding motor trades)	All industries (excl. travel)	Key subsectors and features[vii]
Bedfordshire and Hertfordshire	15	4	14	24	14	28	9	8	16	5	10	14	Vauxhall motors, Luton. Strength in professional, scientific and technical services
Berkshire, Buckinghamshire and Oxfordshire	9	15	15	1	4	15	4	4	4	3	4	5	BMW, Oxford. Strength in professional, technical and scientific services.
Cheshire	14	5	25	28	18	5	10	7	23	24	24	11	North West industrial cluster spans this region.
Cornwall and Isles of Scilly		29	27	19	38	39		40	38	33	40	39	Floating offshore wind (FLOW) sites in Celtic Sea, critical raw materials extraction and geothermal sites.

Cumbria			5		32	34	32	39	36	27	38	32	Rampside gas terminal. Offshore wind sites and possible geologic carbon storage in Morecambe Bay. Green hydrogen hub planned in Barrow-in-Furness
Derbyshire and Nottinghamshire	23	32	39	26	21	32	23	31	13	22	17	38	Toyota/Suzuki at Burnaston.
Devon		33	16	8	37	36		34	34	28	34	37	Access to FLOW sites in Celtic Sea. Appledore port.
Dorset and Somerset	19	24	33	25	31	12	29	23	18	31	22	33	Potential tidal power site in West Somerset.
East Anglia	24	18	21	21	7	18	5	19	21	12	27	13	Strengths in professional, scientific and technical services. High proportion of grade 1 agricultural land, offshore wind sites in the North Sea. Bacton gas terminal. Rothamsted Research Centre and John Innes centre (agritech).
East Wales		8	36		23	7	22	30	15		26	19	North West and South Wales industrial clusters span some of this region. Possible tidal energy sites eg Tidal Lagoon Cardiff. Glyn Rhonwy Pumped Hydro project in Llanberis.
East Yorkshire and Northern Lincolnshire	10	13	19	22	39	38	33	17	35	32	35	36	Humber industrial cluster: Lindsey and Humber Refineries, Theddlethorpe Gas Terminal, DRAX, Velocys SAF project (planned). Geological carbon storage in North Sea.
Eastern Scotland	11	11	23	6	9	3	16	16	12	18	7	9	Grangemouth industrial cluster and oil refinery. Markinch CHP biomass plant. Green finance in Edinburgh. ATME 'megafactory' producing EV batteries announced in Dundee. James Hutton institute and Agri-Epi (agritech) in Dundee and Edinburgh.
Essex	8	30	17	29	24	26	15	25	11	15	16	29	Strengths in construction and water supply, sewerage, waste management and remediation activities.
Gloucestershire, Wiltshire and Bath/Bristol area	12	9	28	3	10	8	14	9	22	7	13	12	Cyber valley. Wind blades research hub. Bristol city LEAP (including heat network project). Cellular agriculture manufacturing hub led by university of Bath.
Greater Manchester	16	28	12	18	19	10	13	15	6	9	9	15	Greater Manchester/ Daikin retrofit partnership.

Hampshire and Isle of Wight	5	10	2	23	5	20	7	5	17	6	23	6	Solent industrial cluster and Fawley oil refinery. Vestas wind turbine manufacturing site and proximity to offshore wind sites. Strengths in construction and water supply, sewerage, waste management and remediation activities.
Herefordshire, Worcestershire and Warwickshire	26	12	20	15	8	27	27	18	37	14	28	27	Cyber valley.
Highlands and Islands		1	3	27	29	29		24	19	25	3	10	Oil terminals in Shetland and Orkney Islands, offshore wind sites. Hydrogen and integrated maritime transition projects in Orkney. Early heat pump adopter. Pentland Firth tidal power project. Glen doe, Coire Glas and Cruachan pumped hydro storage schemes. Green steel mill and circular energy transition facility planned at Ardersier port.
Inner London - East	7	35	11		2	2	3	3	9		2	2	Strengths in construction and electricity, gas, steam and air conditioning supply; professional, scientific and technical services.
Inner London - West	4	31	4	2	1	1	1	1	1	1	1	1	Strengths in electricity, gas, steam and air conditioning supply; both real estate and professional, technical and scientific services. Centre for Professional Innovation
Kent	2	26	8	17	35	24	30	32	31	11	21	26	Strengths in construction; water supply, sewerage, waste management and remediation activities; and agriculture. Grain LNG terminal could be a possible hydrogen cluster site, but no access to CCS. Growing Kent Medaway cluster.
Lancashire			37		34	35	31	29	26		39	25	
Leicestershire, Rutland and Northamptonshire		25	13		30	16		22	32	16	33	21	
Lincolnshire		16	40		27	40		28	40		20	40	High grade agricultural land and access to England’s ‘energy coast’.

Merseyside		20	9	7	22	19	25	10	5		6	16	Heart of North West Industrial cluster. JLR/Ford, Vauxhall, Bentley. Burton Point gas terminal, Stanlow refinery, Fulcrum BioEnergy SAF project (planned).
North Eastern Scotland	1	7	6	5	12	33	2	6	2	10	25	3	Strengths in mining and quarrying (oil extraction); agriculture; and professional, technical and scientific activities. St Fergus Gas terminal. Fixed and floating offshore wind. Geologic carbon storage in North Sea.
North Yorkshire	27	23	35	13	26	13	19	27	33	13	18	31	Tees valley industrial cluster spans this region. Quorn HQ in Middlesborough and CPI in Redcar.
Northumberland and Tyne and Wear	13	17	26	14	17	14	20	12	20	20	32	22	Britishvolt (Blyth) and Envision gigafactories (Sunderland). Nissan in Sunderland. Smulders offshore wind turbine manufacturing.
Outer London - East and North East	28		22		28	37	34	37	24		31	28	
Outer London - South	3		32		13	21	17	14	14		8	24	Strengths in construction.
Outer London – West and North West	18	27	1	12	3	31	11	2	7	2	11	4	
Shropshire and Staffordshire	25	19	29	9	11	30	8	35	3	23	5	17	
South Yorkshire	29	36	31	30	25	17	24	21	27	30	30	35	Steel cluster near Sheffield including an electric arc furnace in Rotherham.
Southern Scotland		2	30	31	40	23		38	39	19	36	30	
Surrey, East and West Sussex	20	14	7	10	6	11	6	11	10	4	12	7	Proximity to Rampion offshore wind farm.
Tees Valley and Durham	22	3	34	16	36	22	26	20	29	26	37	23	Teesside industrial cluster and gas terminal. Alfanar Energy Ltd sustainable aviation fuel project. Quorn HQ in Middlesborough and CPI in Redcar.
West Central Scotland	6	34	10	4	15	4	12	13	8	17	15	8	Strengths in construction, water supply and electricity, gas, steam and air conditioning supply. Dalzell steel works.

West Midlands	21	21	24	11	20	9	21	33	28	8	19	20	Black Country industrial cluster. JLR and BMW. Electric vehicle battery gigafactory planned near Coventry airport. Energy systems catapult HQ in Birmingham.
West Wales and The Valleys		6	38		33	25	28	36	25	29	29	34	South Wales industrial cluster. Herbrandston gas terminal, Pembroke Refinery, Tata steel, Ford. Access to fixed and floating offshore wind. Lanzatech SAF project planned in Port Talbot.
West Yorkshire	17	22	18	20	16	6	18	26	30	21	14	18	

Table 2: Exports ranked by sector for ITL2 region, goods

ITL 2 Region	Non-manufacturing production[viii]	Manufacturing	Wholesale and motor trades	Retail (excluding motor trades)	Transportation, storage, accommodation, food service activities, information and communication[ix]	Financial and insurance activities, real estate, professional, scientific and technical activities[x]	Other service industries	All Industries	Key subsectors and features
Bedfordshire and Hertfordshire		16	10		4	3		11	Vauxhall motors, Luton.
Berkshire, Buckinghamshire and Oxfordshire		27	5		7	2		15	BMW, Oxford.
Cheshire	5	1	14	12	8	12	19	3	Strengths in agriculture and water supply. North-West industrial cluster spans this region.
Cornwall and Isles of Scilly	6		38	22				40	Strengths in agriculture; mining and quarrying; and electricity, gas, steam and air conditioning supply. Floating offshore wind (FLOW) sites in Celtic Sea, critical raw materials extraction and geothermal Sites.
Cumbria		12	37	24		22		20	Rampside gas terminal. Offshore wind sites and possible geologic carbon storage in Morecambe Bay. Green hydrogen hub planned in Barrow-in-Furness.

Derbyshire and Nottinghamshire		4	7	6	19			5	Toyota/Suzuki at Burnaston.
Devon		31	8	21	29		25	32	Access to FLOW sites in Celtic Sea. Appledore port.
Dorset and Somerset		21	33	8	25	14		29	Potential tidal power site in West Somerset
East Anglia	11	22	18	16	12	11	9	26	High proportion of grade 1 agricultural land, offshore wind sites in the North Sea. Bacton gas terminal. Rothamsted Research Centre and John Innes centre (agritech).
East Wales		3	35		30		8	8	North West and South Wales industrial clusters span some of this region. Possible tidal energy sites eg Tidal Lagoon Cardiff. Glyn Rhonwy Pumped Hydro project in Llanberis.
East Yorkshire and Northern Lincolnshire	9	2	27	25	31	16	10	7	Humber industrial cluster: Lindsey and Humber Refineries, Theddlethorpe Gas Terminal, DRAX, Velocys SAF project (planned). Geological carbon storage in North Sea.
Eastern Scotland	10	14	29	23	1	21	18	4	Strengths in accommodation and food services and information and communication. Grangemouth industrial cluster and oil refinery: carbon captured to be piped to Aberdeen for storage. Markinch CHP biomass plant. Green finance in Edinburgh. ATME 'megafactory' producing EV batteries announced in Dundee. James Hutton institute and Agri-Epi (agritech) in Dundee and Edinburgh.
Essex		29	21		10		14	31	
Gloucestershire, Wiltshire and Bath/Bristol area	13	5	23	10	17	13	15	9	Cyber valley. Wind blades research hub. Bristol city LEAP (including heat network project). Cellular agriculture manufacturing hub led by university of Bath.
Greater Manchester	15	33	17	3	14	23	12	34	
Hampshire and Isle of Wight	18	17	2		11		5	6	Solent industrial cluster and Fawley oil refinery. Vestas wind turbine manufacturing site and proximity to offshore wind sites.
Herefordshire, Worcestershire and Warwickshire		6	12	9		19		10	Cyber valley.

Highlands and Islands	2	24	36		13		22	18	Strengths in mining and quarrying (oil extraction), agriculture. Oil terminals in Shetland and Orkney Islands, offshore wind sites. Hydrogen and integrated maritime transition projects in Orkney. Early heat pump adopter. Pentland Firth tidal power project. Glen doe, Coire Glas and Cruachan pumped hydro storage schemes. Green steel mill and circular energy transition facility planned at Ardersier port.
Inner London - East	3	38	22	2	9	8	4	21	Strengths in construction and electricity, gas, steam and air conditioning supply; information and communication; professional, scientific and technical activities.
Inner London - West	14	23	1	1	3	1	1	1	Strengths in information and communication; finance and insurance
Kent		35	20			6	3	35	Strengths in professional, scientific and technical; finance and insurance. Grain LNG terminal could be a possible hydrogen cluster site, but no access to CCS. Growing Kent Medaway cluster.
Lancashire		15	32		27	27		23	
Leicestershire, Rutland and Northamptonshire	12	25	9	5	24	18	16	27	
Lincolnshire		32	25			29	20	36	High grade agricultural land and England's 'energy coast'.
Merseyside	8	20	34	19	23	26	21	28	Heart of North West Industrial cluster. JLR/Ford, Vauxhall, Bentley. Burton Point gas terminal and Stanlow refinery, Fulcrum BioEnergy SAF project (planned).
North Eastern Scotland	1	9	3	4	2	4	2	2	Strengths in mining and quarrying (oil extraction), agriculture; accommodation and food service activities; professional, technical and scientific activities. St Fergus Gas terminal. Fixed and floating offshore wind. Geologic carbon storage in North Sea.
North Yorkshire		34			26	28		37	Tees valley industrial cluster spans this region. Quorn HQ in Middlesborough and CPI in Redcar. Ilke modular homes factory Knaresborough.

Northumberland and Tyne and Wear		11	28	18	28	20		17	Britishvolt (Blyth) and Envision gigafactories (Sunderland). Nissan in Sunderland. Smulders offshore wind turbine manufacturing.
Outer London - East and North East		37	31	20				38	
Outer London - South			19	13				39	
Outer London - West and North West	17	36	6	7	5	7	7	22	Strengths in information and communication; financial and insurance
Shropshire and Staffordshire		13	24		16		13	19	
South Yorkshire		28			18	25		33	Steel cluster near Sheffield including an electric arc furnace in Rotherham.
Southern Scotland		19	15			17	24	24	
Surrey, East and West Sussex	4	26	4	11	6	5	6	12	Strengths across a broad range of non-manufacturing activities; information and communication; professional, scientific and technical activities; and financial and insurance activities. Proximity to Rampion offshore wind farm.
Tees Valley and Durham		8	26			9		14	Teesside industrial cluster and gas terminal. Alfanar Energy Ltd sustainable aviation fuel project in Teeside industrial cluster. Quorn HQ in Middlesborough and CPI in Redcar.
West Central Scotland	16	18	30	15	21	24	11	25	
West Midlands	7	7	16	17	15	15	23	13	Strengths in construction and water supply and electricity, gas, steam and air conditioning supply. Black country industrial cluster. JLR and BMW. Electric vehicle battery gigafactory planned near Coventry airport. Energy systems catapult HQ in Birmingham.
West Wales and The Valleys		10	11		22		17	16	South Wales industrial cluster. Herbrandston gas terminal, Pembroke Refinery, Tata steel, Ford. Access to fixed and floating offshore wind. Lanzatech SAF project planned in Port Talbot.
West Yorkshire		30	13	14	20	10		30	

[i] Office for National Statistics (ONS), 2019, 'Dataset: subnational trade in services', https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/datasets/subnationaltradeinservices .

[ii] Office for National Statistics (ONS), 2019, 'Dataset: subnational trade in goods', https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/datasets/subnationaltradeingoods

[iii] ONS, 2019, 'Dataset - UK business: activity, size and location', https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation

[iv] Publications we drew on include: ECIU, 2023, *Mapping the Net Zero Economy;* Oxford Economics, 2021, *UK Green Growth Index*; Onward, 2022, *Green Jobs, Red Wall*; The Productivity Institute regional insight papers, www.productivity.ac.uk/research/type/insight-papers/

[v] SIC 07 categories A,B, D, E, F have been merged.

[vi] SIC 07 categories L and M have been merged.

[vii] We used 2019 business size and location data to further break down some of the merged categories, such as non-manufacturing goods and services. We have mentioned other key geographical and regional strengths for each region based on desk research.

[viii] SIC 07 categories A,B,D,E, F have been merged.

[ix] SIC 07 categories H, I, J have been merged.

[x] SIC 07 categories K, L, M have been merged.