

# Imagining Net-Zero Teesside: Actors, Networks, and Expectations

BIEE

September 22, 2023



BUSINESS  
SCHOOL



# Researcher Team

- **Benjamin K. Sovacool (PI):** Professor of Energy Policy (SPRU - Science Policy Research Unit), University of Sussex Business School
- **Professor Frank Geels:** Professor of System Innovation, University of Manchester
- **Dr. Marfuga Iskandarova:** Research Fellow in Innovation, Policy and Industrial Decarbonization (SPRU - Science Policy Research Unit)
- **Dr. Kyle S. Herman:** Research Fellow in Advanced Energy Studies (SPRU - Science Policy Research Unit)



# Overview

## Tees Valley Industrial Cluster



### Teesside industrial cluster:

- Significant industrial restructuring in the last half century (Warren, 2018; Chapman, 2005).
- includes a diversity of industrial emitters spanning steel, cement, energy, petrochemicals, fertilisers, energy production, and pharmaceuticals.
- a geographically well-defined industrial cluster (Gough & Mander, 2022).

# Overview

- Framework and theory:
  - Sociology of Expectations, hype cycles, cluster networks
- Findings:
  - Industrial reorientation, cluster rejuvenation, novel collaborations
  - Scaffolding of projects poses risks
  - Funding risks (public and private)
  - Technological risks (hype cycles)

Data: 65 semi-structured interviews, 30 site visits (7 Teesside), automated content analysis and extraction  
Network centrality analysis

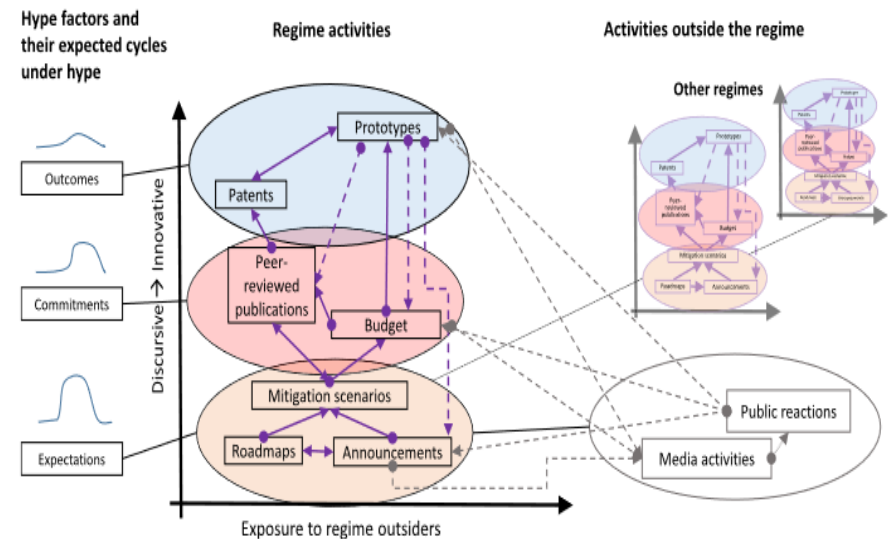
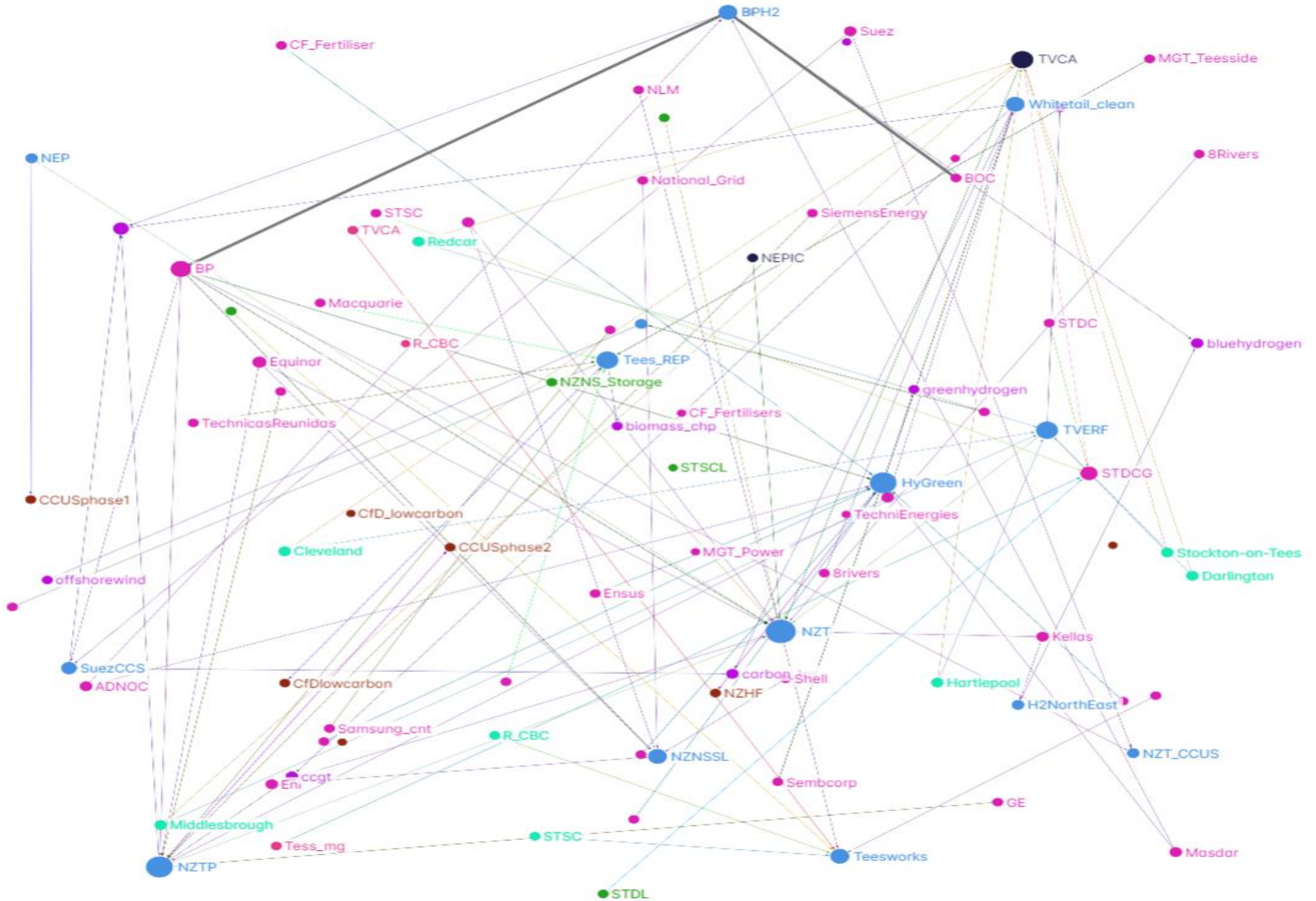


Fig. 2. Summary schematic of the analytical framework. The present paper zooms in on the three hype factors on the left and their indicators (with coloured ellipses and lines). Solid lines indicate direct influence, dashed or dotted lines indicate delayed or indirect influence.

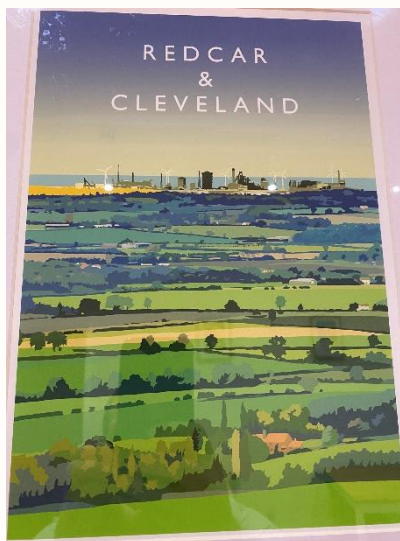
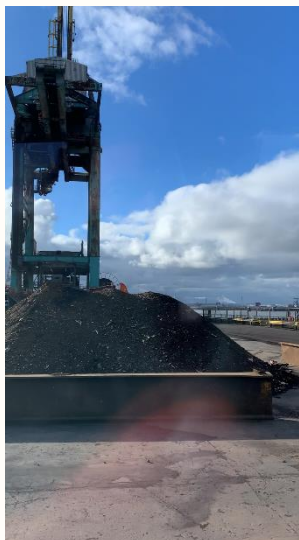
# Challenges in Complex Megaprojects

1. Technological
  1. Pipeline infrastructures and emitters
  2. Simultaneous CO2 and hydrogen pipeline construction
2. Actors and relationships
  1. Social fragmentation and lack of centralised coordination
  2. Partnerships, projects, collaborations
  3. Stakeholder consultation challenges
3. Institutional
  1. Misalignment between business models
  2. Financing and coordination with the Treasury
  3. Standards and Regulations
4. Lack of forward guidance to maintain confidence and momentum

# Clustering analyses



# Teesside Industrial Cluster



# Interviewees (October to Jan. 2023)

Respondent	Affiliation	Respondent	Affiliation
R01	Manchester University	R33	Airhive
R02	NECCUS	R34	Engaging Next Gen. Industry
R03	NECCUS	R35	University of Aberdeen
R04	Storegga	R36	Reliagen
R05	Herriot-Watt Uni.	R37	Suez Group
R06	Kellas Midstream	R38	Shell
R07	BGS	R39	green alliance
R08	Lanzatech	R40	SCCS
R09	Stanford University	R41	Vale
R10	North Sea Transition Authority	R42	Storegga
R11	Wales West Utilities	R43	Tees Valley
R12	SBH4	R44	ENSUS UK
R13	ECITB	R45	Innovate UK
R14	Carbon8	R46	VNZS, VitaBio Group
R15	Aker Solutions	R47	Oxford
R16	TuvSud	R48	British Geological Survey
R17	UCL	R49	Edinburgh University

TY  
X

Respondent	Affiliation	Respondent	Affiliation
R18	BGS	R50	Honeywell
R19	ICL, Just Transition Scotland	R51	Sheffield University
R20	SWIC/Industry Wales, Baxter360	R52	BEIS (NZBI - Clean Heat)
R21	hydrogen centre / Uni S. Wales	R53	Low Carbon Contracts Company
R22	CT Energy, Southeast.	R54	Shell
R23	Tarmac	R55	Intercontinental Energy
R24	University of Strathclyde	R56	Scottish Parliament
R25	University of Strathclyde	R57	British Geological Survey
R26	Plansea	R58	Durham University
R27	Manchester Uni.	R59	retired British Steel
R28	Aker Solutions	R60	Helmholtz Centre, RIFS-Potsdam
R29	Carbon Trust	R61	BEIS
R30	Storegga	R62	Kellas Midstream (NEPIC)
R31	Renewables hydrogen alliance	R63	Sembcorp Energy UK (Wilton Int.)
R32	Just Transitions Committee,	R64	RWE



# Network analysis (nodes)

Type	Name	Type	Name	Type	Name
Cluster	EastCoastCluster	Firm	BOC	Firm	Exxon Mobil
Cluster	Scottish	Firm	BritishSteel	Firm	JohnsonMatthey
Cluster	SWIC	Firm	Hanson	Firm	Shell
Cluster	NetzeroNorthwest	Firm	MGTeesside	Firm	Storegga
Council	TVCA	Firm	NWG	Firm	TataSteel
Council	SOTBC	Firm	Tarmac	Firm	UK Steel
Council	DurhamCC	Firm	Suez	Firm	Confederation of British Industry,
Council	HartlepoolBC	Firm	Alpek	Firm	Carbon Engineering
Council	MiddlesbroughMF	Firm	AngloAmerican	Firm	PaleBlueDot
Council	NewcastleCC	Firm	EnSus	Firm	HarbourEnergy
Council	RCBC	Firm	NSMP	Firm	NSMP
Council	DBC	Firm	Venator	Firm	RyzeHydrogen
Firm	Sembcorp	Firm	CfFertilisers	Firm	ITMPower
Firm	8Rivers	Firm	Norsea CC	Firm	Axis
Firm	ZerodegreesWD	Firm	NZTpower	Firm	BakerRisk
Firm	Alfanar	Firm	Kellas	Firm	Cadent
Firm	NPT	Firm	Equinor	Firm	Inovyn
Firm	PetroNeos	Firm	SGN	Firm	Fichtner
Firm	PetroChina	Firm	Uniper	Firm	GlassFutures
Firm	TechnipEnergies	Firm	Opergy	Firm	NVFCL
Firm	Balfour Beatty	Firm	GreenFuels	Firm	OrbitalGasSystems
Firm	AkerCarbonCapture	Firm	Catagen	Firm	OtoSimon
Firm	AkerSolutions	Firm	China National Petroleum Corporation (CNPC)	Firm	PeelNRE
Firm	ABB	miniProject	bpH2Teesside	Firm	Penspen
Firm	Alstom	miniProject	NOFproject	Firm	Pilkington
Firm	Kent	Partnership	NorthernEndurance_P	Firm	PowerHouseEG
Firm	UnitedLiving	Partnership	NorthwestHydrogenAlliance	Firm	ProgressiveEnergy

Type	Name	Type	Name	Type	Name
Firm	Rinnai	Partnership	TEGEC	Plant	SkinningroveSW
Firm	Swgelok	Partnership	ASDBSEC	Plant	TeesREP
Firm	Viridor	Plant	NETPower-Wil	Plant	MiddlesConcrete
Firm	Worley	Plant	NOVAONE	Plant	TVerf
Gov-funding	UKRI	Plant	ScunthorpeSW	Project	TVERF
Gov-Industry	TeesValleyCA	Project	Carbon Capture Project	Project	TVHIP
Gov-Industry	HydrogenAdvisoryC	Project	H2transporthub	Project	THCO2
Gov-Industry	HydrogenHub	Region/City	Teesside	Project	bpH2Teesside
Ind-Trade	SteelConcil	Region/City	Humber	Project	H2Northeast
Ind-Trade	NECCUS	Region/City	York	Project	WhitetailCE
Ind-Trade	Associated British Ports	Region/City	Leeds	Project	NZT
Ind-Trade	Carbon Capture and Storage Association	Region/City	Port_Clarence	Project	NZTpower
miniProject	NetZeroTeesside	Region/City	Teessworks	Project	LHGF
Research	Teesside_Uni	Region/City	Redcar	Technology	BlueHydrogen
Research	NZTC	Region/City	Middlesbrough	Technology	GreenHydrogen
Research	USheffield	Region/City	Darlington	Technology	CCS
Research	AMRC	Research	RedcarEnergyCentre	Technology	CO2Transport
Research	Thyson	Research	NHTC	Technology	Cansolv_CO2
Technology	offshorestorage	Research	NZIIC	Trade	MTC
Technology	Aviation_Fuel	Research	NZIH	Trade	PeelPorts
Technology	Biocarbons_aviation	Technology	CarbonDioxideAvoidance	Technology	SustCons
Technology	HydroInfrastructure	Technology	HydrogenEconomy	Technology	CCUS