



Energy
Transitions
Commission

***ETC 2024/25 Work Programme:
Highlights, Strategy Recap, and look
ahead to 2025***

*ETC Representatives Meeting
19th September 2024*

ETC impact Highlights so far this year



ETC 2024 work programme

Extending our influence in the global climate debate

Disseminating ETC insights & recommendations



Leveraging existing knowledge



Informing the influencers



Delivering action through future COPs

Ambition and format of NDCs



COP 29, 30, 31



Building the clean energy system faster

Main reports

Power system transformation – barriers to clean electrification

Grids



Energy storage & flexibility



Shorts

Offshore wind



Power demand growth



Energy productivity

Buildings decarbonisation



Road transport



HTA sectors (MPP)



Energy Productivity across the economy



Building the ETC regional network



Supporting the MPP



Supporting the ETC members

ETC member engagement highlights in 2024 so far

6 Key meetings

- 1x Commissioners' Meeting 
- 2x Representatives' Meetings 
- 1x EU strategy meeting 
- 2x Comms Club Meetings 

10 Expert workshops

- 1x Ambition and format of NDCs 
- 6x Buildings decarbonisation 
- 1x Grids 
- 1x Energy storage & flexibility 
- 1x Road transport 

2 Reports produced




And 3 in process...

Grids build note

Road transport productivity

Buildings decarbonisation

4 Webinars




- Streamlining planning and permitting
- Securing clean energy technology supply chains




3 Regional trips



India-Indonesia



Brazil



Canada



Repackaging and amplifying ETC insights so far in 2024

Beating the drum on Clean Electrification across new regions and audiences

What If We Get This Transition Right?
22 April 2024 | 12:00 - 1:15PM ET

Speakers:
Teresa Kramarz, Assistant Professor, University of Toronto
Elena Pravettoni, Clean Power Lead, Energy Transitions Commission
Bentley Allen, Transition Pathway Principal, The Transition Accelerator

9th annual Sustainability Week
March 4th-6th 2024 (London and virtual)
New for 2024: Energy Transition Summit

THE GLOBE AND MAIL
‘Faster and cheaper than we dared think possible’: Why a global leader in the energy transition is still feeling optimistic

ETC global mid-century vision
The 2021-22 gas crisis exposed vulnerabilities in the EU's energy security due to dependence on fossil fuels. Disruptions and shifting global gas flows caused a supply and demand bottleneck, raising consumer prices despite stable production costs.

How to reach net-zero: Planning & Permitting

British Institute of Energy Economics Future of Energy Lecture 2024
Lord Adair Turner
17:00-19:00, Thursday 16 May, Royal Society
Register at www.biee.org

Pre-EU election, we prepared EU Energy Security factsheet leveraging existing analysis post-Ukraine

EU Energy Security Factsheet
May 2024

Energy Security in the EU

Overview

- The 2021/22 gas crisis exposed vulnerabilities in the EU's energy security due to dependence on fossil fuels. Disruptions and shifting global gas flows caused a supply and demand bottleneck, raising consumer prices despite stable production costs.
- Meanwhile, economies of scale have made renewables the cheapest way to generate electricity, even accounting for increased needs for energy storage, stronger electricity grids and flexibility mechanisms.
- Wind and solar surpassed fossil fuels as the main source of electricity generation for the first time in 2022, and have continued to do so since.
- Looking forward, renewable energy is more likely to deliver secure and affordable energy than fossil fuels. Not only are renewables free of carbon, they are also less vulnerable to physical and economic disruption: once installed, renewable energy relies on wind and sunshine.
- A successful transition to renewables requires strong policy leadership and continued investment in clean technologies, setting quantified long-term targets, streamlining permitting, expanding the grid and securing a sustainable supply chain for critical materials are all essential.

The recent energy crisis was driven by overdependence on fossil fuels.

The 2021/22 gas crisis was triggered by a confluence of unique events, but highlighted key structural weaknesses in EU energy security. Although the resulting cost increase has sometimes been attributed to the energy transition, it is actually a primarily fossil-fuel crisis.

In 2021, news coverage and renewed global commitment due to higher gas prices in Asia and Latin America meant that EU and global gas demand rose faster than supply, creating a tight market. This supply and demand bottleneck was exacerbated by an early switch to gas heating due to low coal and oil supplies. In parallel, a long-term phase-out of coal and nuclear in the EU power sector, and EU supply issues due to shifts and disruption in global gas flows. Following the invasion of Ukraine by Russia, the EU ceased payments for Russian gas from Belarus, its largest supplier, radically reducing supply, and pushed to higher priced imported Liquefied Natural Gas (LNG).

Electricity Market Design which links price to the cost of gas transferred this volatility to electricity. Despite government subsidies being in place for its purchase, costs were passed on to consumers. Although the cost of producing gas did not increase, the cost to the consumer increased dramatically: EU consumers paid around €230 billion more in 2022 than in previous years.

the concrete and feasible steps needed to advance the energy transition within Europe in time to remain close to a 1.5°C pathway. We hope that these factsheets can strengthen the debate for the energy transition to continue further adapting these EU factsheets to a specific Member state. Please reach out for opportunities to collaborate.

Who we are Publications Blog Members Login

What are the key messages?
Click the images below to download the factsheets

Renewables can deliver energy security in the EU
The 2021 gas crisis exposed vulnerabilities in the EU's energy security due to dependence on fossil fuels. Disruptions and shifting global gas flows caused a supply and demand bottleneck, raising consumer prices despite stable production costs. The EU responded with the Fit for 55 package, and investment surged in solar and wind power, reducing reliance on fossil fuels. With economies of scale making renewable electricity generation and storage more affordable, it is becoming clear that renewables can offer both energy security and affordability.

However, strong policy leadership and continued investment in clean technologies are necessary to manage the transition and knock down remaining barriers: streamlining permitting, expanding the grid, and securing a sustainable supply chain for critical materials are all essential.

Leveraging our reputation to spur conversation on the scale up of Finance

Financing the Transition: How to Make the Money Flow for a Net-Zero Economy
EU Policy Factsheet
May 2024

Financing the energy transition in the EU

Overview

- Low-carbon finance in the EU must be rapidly scaled-up to deliver the energy transition and limit global warming. Continued investment in clean technologies is essential to meet the EU's climate goals.
- To achieve this, the EU and other global leaders need to strengthen international frameworks, including the G20, to ensure that the EU's energy transition is supported by global investment flows.
- The EU's long-term climate strategy, outlined in the European Climate Law, is the EU's blueprint for a net-zero economy. It sets out the EU's long-term climate strategy, including the EU's climate goals and the EU's climate policy framework.
- Climate finance, including the EU's climate finance framework, is essential to support the EU's energy transition. Public EU funds are complementary to the EU's climate finance framework, but of investment is one that is essential to support the EU's energy transition.
- Despite its success, the EU's climate finance framework is not sufficient to support the EU's energy transition. Low-carbon finance in the EU must be rapidly scaled-up to deliver the energy transition and limit global warming.

Low-carbon finance in the EU must be rapidly scaled-up to deliver the energy transition and limit global warming.

The EU's energy transition is essential to meet the EU's climate goals. Continued investment in clean technologies is essential to meet the EU's climate goals. The EU's long-term climate strategy, outlined in the European Climate Law, is the EU's blueprint for a net-zero economy. It sets out the EU's long-term climate strategy, including the EU's climate goals and the EU's climate policy framework.

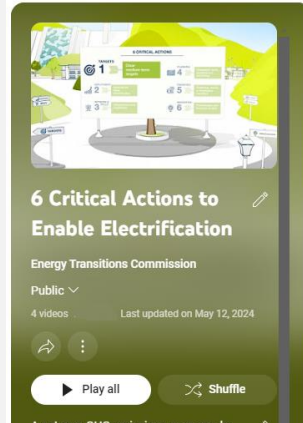
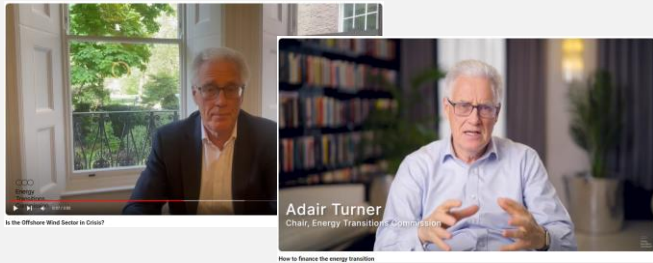
SustainableViews
Navigating ESG policy and regulation

Climate Capital Live
Overcoming roadblocks to implementation
13-14 March 2024

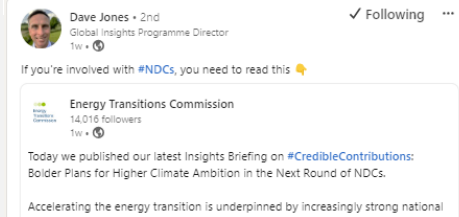
Climate Investment Summit

Informing the influencers and reaching new audiences so far in 2024

Expanding digital storytelling beyond news programmes, via explainer series and developing talking head videos



Leveraging social networks and collaborating with communications partners



Broadening our media reach - outside climate & internationally

THE GLOBE AND MAIL

'Faster and cheaper than we dared think possible': Why a global leader in the energy transition is still feeling optimistic

The Telegraph

CHINA DAILY

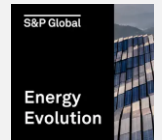
New Delhi Times

New Delhi Times

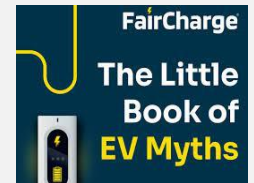
THE TIMES

The night that James Norton told me to turn off the lights

CORRIERE DELLA SERA



Expanding our reach to new audiences and interest groups – including via podcasts



Global Infrastructure Investor Association

ETC 2025 work-programme – discussion with ETC Representatives



In our 2024 work-programme we proposed a two year work-programme across the following areas

1

Building the clean energy system faster

Analytical programme

2

Building the ETC regional network

Regional programme

3

Extending our influence in the global climate debate

Communications programme

4

Delivering action through future COPs

5

Supporting the MPP

MISSION
POSSIBLE
PARTNERSHIP

6

Supporting the ETC members

We are now just over 1/3 of the way through this work and we want to:

- Share overview of where we plan to focus over next 15 months
- Share reflections after our Commissioners meeting discussions
- Discuss prioritisation, any additional areas.

We discussed this with Commissioners at June '24 ETC meeting – and have integrated into our proposed plan for 2025



▪ Discussions on:

- State of the transition
- ETC work programme 2024-25
- Power systems balancing
- Energy productivity

▪ Key debates on:

- Global clean energy supply chains
- Financing the transition
- The role of carbon credits

▪ Input across multiple topics, including:

- white hydrogen,
- geothermal energy,
- power demand as a key focus,
- the importance of social buy-in, & 'who pays',
- importance of power systems optimization,
- reflections on buildings,
- global climate objectives (1.5 vs. 1.7C)
- cautionary reflections on short term oil and gas growth



ETC Commissioners discussed three key transition topics in June 2024

Supply chains:

Trade of low carbon technologies

- Key issues included factors risking slowing the transition and impact of trade instruments.
- Importance of assessing the benefits and risks of local supply chain policies was highlighted.
- Agreement on requirement of fact-based principles to guide the debate.

Next steps: Taking insights into conversation with WTO. ETC to explore integration into work programme, with a possible briefing note in **2025 Q1**.

Financing the Transition:

Insights for NDCs and NCQGs

- Key issues discussed: implications of rising real interest rates, the lack of progress on reform of climate development finance, challenges of higher cost of capital and geopolitical tensions, and MDB reforms.
- Commission recognised need for clarity ahead of discussion on the New Collective Quantified Goal on finance and Nationally Determined Contributions at COP29

Next steps: ETC to produce a “**repackaging**” of ETC insights on **finance** in Oct'24, a month ahead of **COP29**.

Carbon credits:

Role scope 3 in Carbon markets

- The evolving debate on corporate carbon credits, building on recent controversy at the SBTi – in particular carbon credits in the context of scope 3 emissions
- Relevant to ETC's work on carbon markets and finance.
- Agreement on need for clarity on debate, and opportunity to accelerate corporate action towards key areas (e.g. removals)

Next steps: ETC submission to SBTi Standard consultation, “**repackaging**” **ETC insights on finance and carbon removals** covering role of corporate decarbonisation (incl, Scope 1 & 2 vs. 3 action) highlighting importance of the “area under the curve”. **Q1 2025**.



Last year we proposed a two year work-programme

1

Extending our influence in the global climate debate

Analytical programme

2

Building the ETC regional network

Regional programme

3

Extending our influence in the global climate debate

Communications programme

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Delivering action through future COPs

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Supporting the MPP

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Supporting the ETC members



In our 2024 workplan we outlined the 2 year plan

2024

2025 →

Power system transformation – an interconnected set of issues

Transmission & distribution grids

Building decarbonization

Energy storage & flexibility

Shorts, e.g.

Offshore wind

Power demand growth

The role of nuclear in net-zero power systems

Power Market design 2.0 – consumer pricing

Electrifying industrial heat

Economic impact of the ET

Investment, costs & affordability

Implications for growth, externalities & industrial policy

Regional Programmes, e.g.

Indonesia – solar + grids

Power in China, India, Europe, Canada...

Energy productivity

Shorts, e.g.

Transport

Role of energy productivity

Beyond power and H₂ – the role of emission-free molecules and 'defossilizing' carbon

The role of low-carbon molecules across sectors

Sourcing fossil-free carbon (recycling carbon, DAC, bioresources)

Shift forward into 2024 if resources allow

'Beating the drum' – ongoing

Shorts, e.g.

Ambition and format of NDCs

Short form & tailored content

Taking the messages out – media, events

Partnership building

2024 – major focus on everything to do with electricity

2025 – 3 areas: carbon molecules, economic impacts & further power

2024

2025 →

Power system transformation

Transmission & distribution grids

Building decarbonization

Energy storage & flexibility

Shorts, e.g.

Offshore wind

Power demand growth

Energy productivity

Shorts, e.g.

Transport

Role of energy productivity

Regional Programmes, e.g.

Indonesia – solar + grids

Power in China, India, Europe, Canada...

Repackaging existing insights

Financing the transition: Insights for NDCs and NCQGs

'Beating the drum' – ongoing

Shorts, e.g.

Ambition and format of NDCs

Power systems transformation

The role of low-carbon baseload in net-zero power systems: nuclear and geothermal

Power Market design 2.0 – consumer pricing

Electrifying industrial heat

Beyond power and H₂ – the role of emission-free molecules and 'defossilizing' carbon

The role of low-carbon molecules across sectors

Sourcing fossil-free carbon (recycling carbon, DAC, bioresources)

Economic impact of the energy transition

Investment, costs & affordability

Implications for growth, externalities & industrial policy

Trade of low carbon technologies – local vs. global supply chains

Carbon credits: Role of scope 3 emissions in carbon markets

Others - tbc

Short form & tailored content

Taking the messages out – media, events

Partnership building

Bringing forward into 2024

2025 analytical work-programme



1. Publishing 2024 insights (Q1 focus)

1. Managing the **system balancing** challenge
2. Building and optimising **girds**
3. The role of **energy productivity** across the economy



2. Carbon molecules - role of emission-free molecules and 'defossilizing' carbon

- The role of **low-carbon molecules** across sectors (how far power + H2 derivatives can go)
- **Sourcing fossil-free carbon** (recycling, DAC, bioresources)

Starting in September 2024 with additional support from QCF



3. Economic impacts of the Transition

- Investment, **costs & affordability**
- Implications for **growth**, externalities & industrial policy
- **Trade** of low carbon technologies – local vs. global supply chains



4. Power system transformation – further deep dives

- The role of **nuclear & geothermal** in net-zero power systems
- Power Market design 2.0 – **consumer** pricing
- Electrifying **industrial heat**

Repacking existing ETC insights:

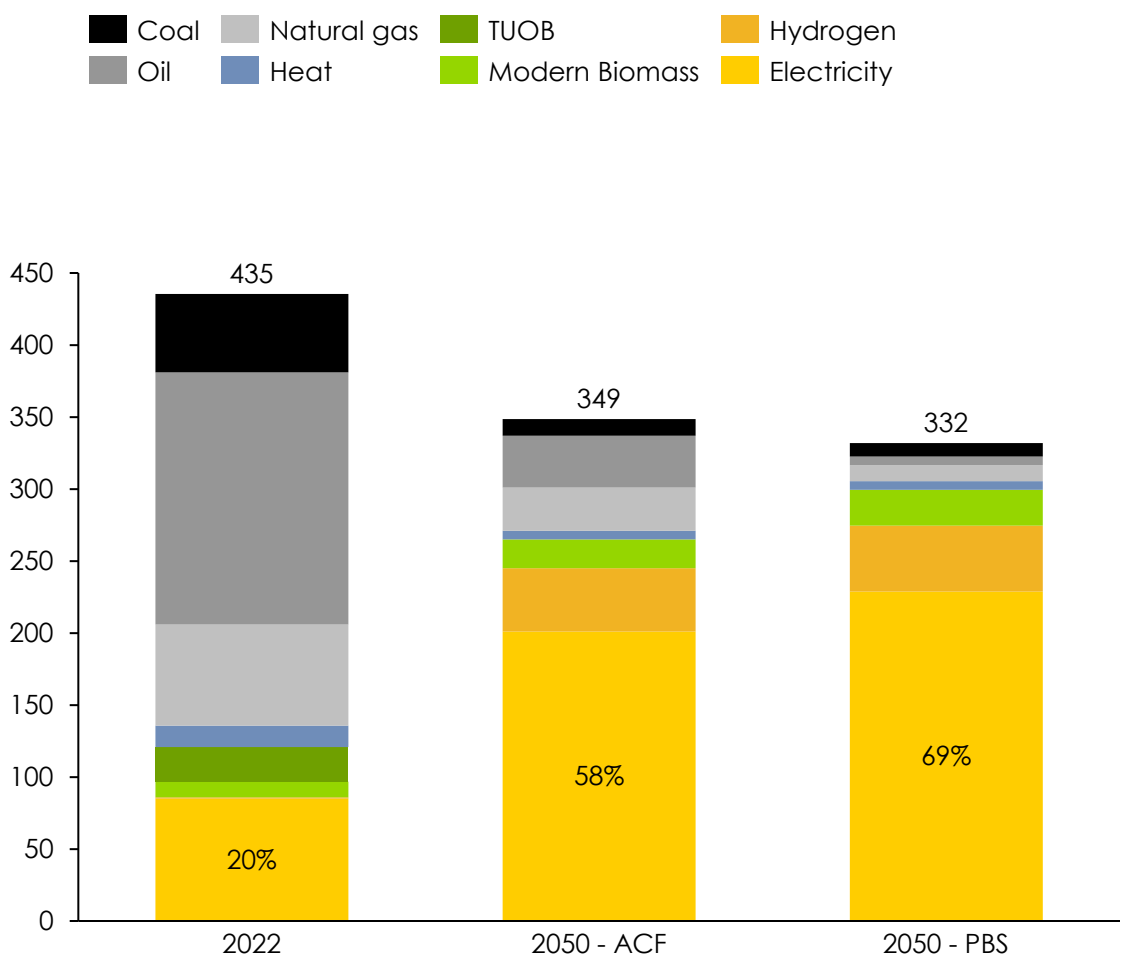
Carbon credits: Role of scope 3 emissions in carbon markets

Others - tbc

Clean electrification will be the most important driver of decarbonisation...

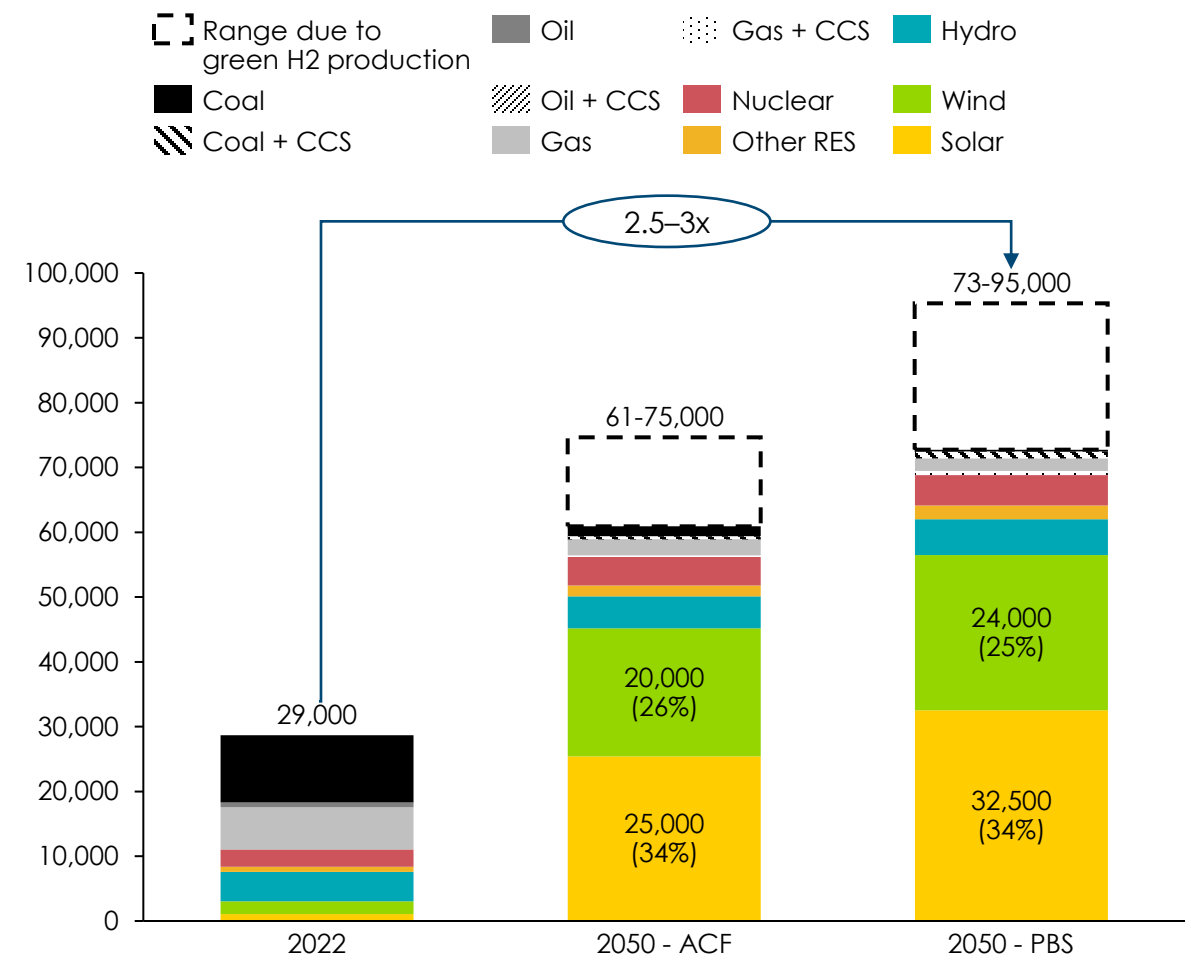
Electricity will need to go from 20% → 55-70% by 2050

Final Energy Consumption, EJ



Power generation will be dominated by wind and solar

TWh

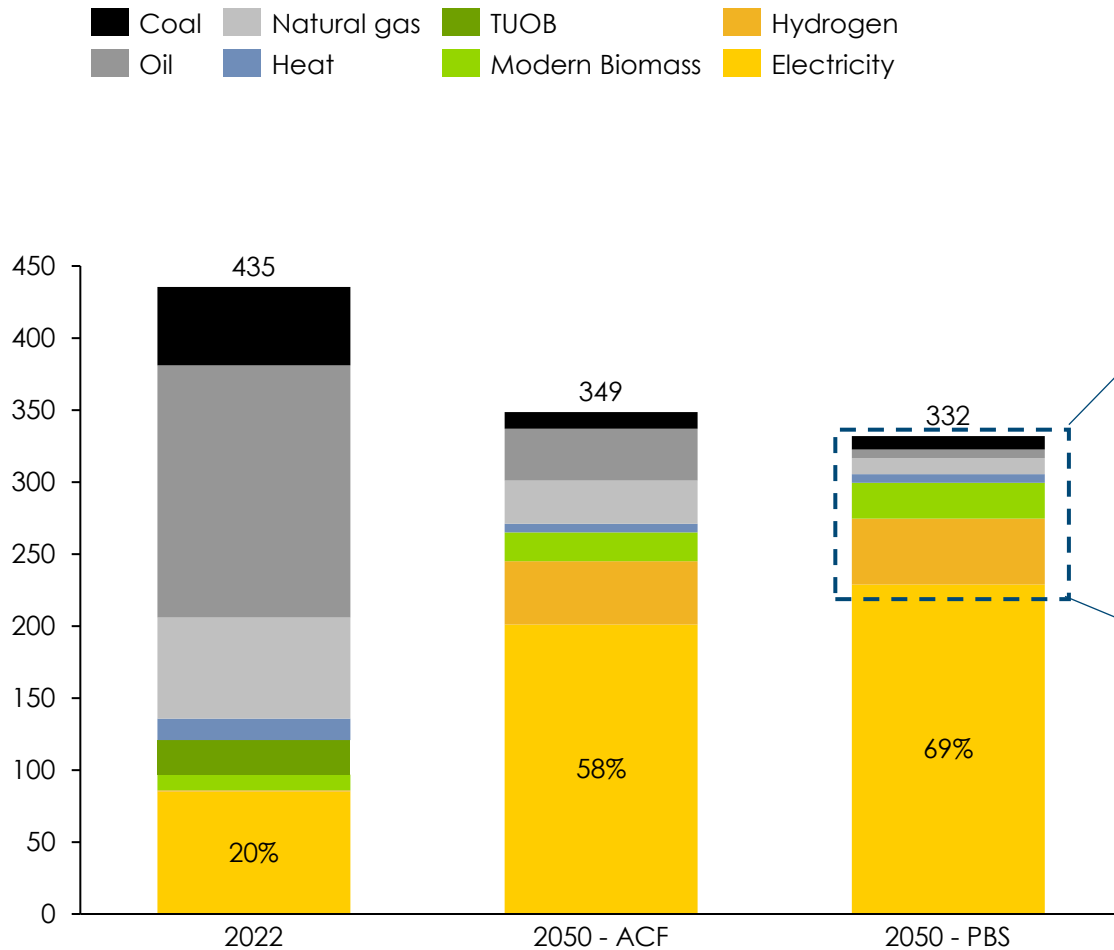


Note: ACF = Accelerated but Clearly Feasible; PBS = Possible but Stretching. Wood products and pulp and paper excluded from modern biomass
 Source: ETC (2023), *Fossil fuels in transition*.

...but there will still be a significant role for molecules as energy vectors

Electricity will need to go from 20% → 55-70% by 2050

Final Energy Consumption, EJ
















Role of Molecules:

- **30-45% of overall Final Energy Demand**, of which:
 - 10-15% is **hydrogen or derivatives**
 - 5-10% is **biomass-derived carbon**
 - 10-25% is **fossil carbon**

Note: ACF = Accelerated but Clearly Feasible; PBS = Possible but Stretching. Wood products and pulp and paper excluded from modern biomass
 Source: ETC (2023), *Fossil fuels in transition*.

Molecules will likely be essential in aviation, chemicals, fertilisers, shipping; for other sectors electrification will likely dominate

Carbon molecules

Likelihood of role	Potential Application	Current Fossil Fuel Demand ¹			Sector power demand in 2050 Final and Intermediate	Share of electricity in FED in 2050
		Coal	Gas	Oil		
Most likely role for molecules	Aviation 			5.5 mb/d	5,000 TWh	
	Shipping 			5 mb/d	1,000 TWh	
Some role, depending on costs vs. electrification	Plastics and Petrochemicals 	230 Mtce	500 bcm	17 mb/d	2-10,000 TWh	
	Fertilisers/Ammonia 					
	Iron / Steel-making 	900 Mtce	100 bcm		9,000 TWh	
Minimal role – electrification wins	Other industry 	750 Mtce	600 bcm	4 mb/d	7,000 TWh	
	Power, Road Transport, Buildings 	4,000 Mtce	3,000 bcm	67 mb/d	35-40,000 TWh	

Most likely role for molecules

Some role, depending on costs vs. electrification

Minimal role – electrification wins

¹ Demand is for direct use of fossil fuels.
Source: Systemiq analysis for the ETC; ETC (2023), *Fossil Fuels in Transition*.



What kind of molecules, from where, is still an open question

Likelihood of role

Potential Application

Options for low-carbon molecules

Most likely
role for
molecules

Aviation



- Biofuels (HEFA-based or other e.g., from gasification)
- Synthetic fuels enabled by carbon streams (likely from point-source or direct-air capture) and low-carbon hydrogen
- Potential for continued use of fossil-based jet fuel together with carbon removals

Shipping



- Low-carbon hydrogen to make ammonia
- Methanol – requires both low-carbon hydrogen and additional carbon atoms

Plastics and Petrochemicals Fertilisers/Ammonia



- Low-carbon hydrogen in combination with...
- ... carbon atoms from multiple potential sources: bio-based and recycled feedstocks, from fossil fuels, or captured carbon

Iron -making



- Low-carbon hydrogen for use in direct reduction of iron
- ... but also multiple options for recycling of carbon and hydrogen rich off-gases
- ...and carbon capture may make iron making a source of carbon for other sectors

Other industry



- Some role for bioenergy or hydrogen in combustion for provision of mid/high-temperature heat

Power, Road Transport, Buildings



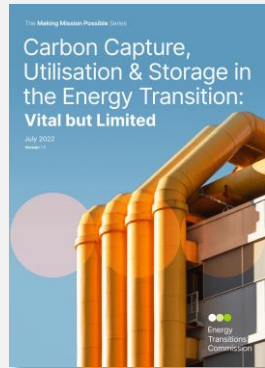
- Small role for molecules in:
 - Storage (low-carbon hydrogen)
 - Balancing (low-carbon hydrogen or bioenergy)
 - Heavy-duty trucking (low-carbon hydrogen >> bioenergy)

Some role,
depending on
costs vs.
electrification

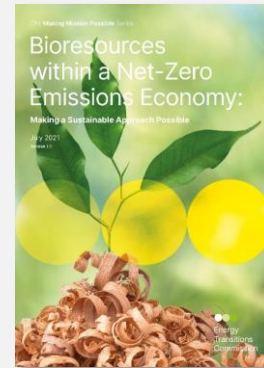
Minimal role –
electrification
wins

¹ Demand is for direct use of fossil fuels.
Source: Systemiq analysis for the ETC; ETC (2023), *Fossil Fuels in Transition*.

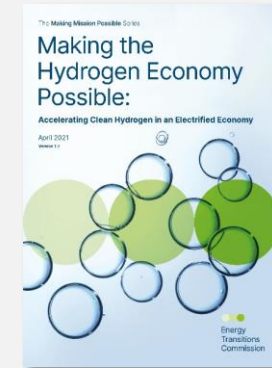
Previous ETC reports have assessed the relative role of role of CCUS, bioresources and hydrogen



- CCUS is vital but limited:
 - Where **alternatives are technically limited** (e.g., Cement process emissions)
 - To provide **least-cost decarbonisation** in key sectors and geographies where CCUS is competitive
 - To provide some **carbon removals**
- Enabling **transport & storage infrastructure** will be crucial – CCUS clusters could be important
- Most recent ETC analysis estimates **7-9 GtCO₂ of CCUS**, of which 4-5 GtCO₂ is point-source applied to fossil fuels and 3-4GT CO₂ is DAC



- Use of Bioresources faces **strong land use competition** and **sustainability constraints**
- A “prudent” estimate of sustainable biomass supply would be **40-60 EJ in 2050** – could rise up to 120 EJ in a “max. potential” scenario
 - Producing 50 EJ/yr could need **~2.8 million km² of land** (~8% of agr. land)
- Use of biomass should be **prioritized for sectors where alternatives are limited:**
 - Pulp and paper, timber
 - Plastic feedstocks
 - Aviation
 - Some high/mid-temperature heat



- **Green hydrogen** could be competitive with grey by 2030s (though latest progress slow)
- **Blue hydrogen** will also have a role – competitiveness depends strongly on cost of gas and availability of CCS
- Priority should be to **displace existing ~95 Mth₂ of grey hydrogen demand first**, then expand into wider sectors
- Enabling **transport & storage infrastructure** will be crucial
- Most recent ETC analysis estimates **350-600 Mth₂ of demand in 2050**, with greatest role in chemicals, steel, aviation and shipping

Source: ETC (2021), *Bioresources within a net-zero emissions economy*; ETC (2021), *Making the hydrogen economy possible*; ETC (2022), *Carbon capture, utilisation and storage in the energy transition*; ETC (2023), *Fossil fuels in transition*.

Carbon molecules in the zero-emission economy: work programme

1. How large a role can and should direct electrification play in a zero emission economy?

- Develop an **extreme scenario** which identifies how much of the economy could **in principle be electrified** if zero carbon electricity were available at a very low cost and on the required scale; also **balance with constrained scenario**
- A revised version of our **Possible but Stretching scenario** which describes the optimal role of electricity

2. The role of hydrogen and non-carbon H₂ derivatives

- Develop an **updated set of scenarios for the role of hydrogen (incl. white H₂)**, exploring in particular the balance between hydrogen and non-carbon H₂ derivatives relative to carbon and hydrocarbon molecules in different sectors

3. The potential to recycle and reuse carbon molecules

- Developing another **extreme scenario to explore how close to total recycling** of all carbon molecules it would be possible to get, and with what implications for the primary supply of new carbon still required to support a prosperous global economy
- Produce **a range of less extreme plausible scenarios** for carbon source demands in a zero emission economy

4. Sources of primary carbon: costs and sustainability

- Assess whether there is a case for **increasing or decreasing our past estimates** of potentially sustainable bioresource supply
- **Engage with Brazil's distinctive view point** by establishing an ETI Brazil effort to assess the optimal decarbonisation path within Brazil's specific conditions

Phase 3 and 4 will get to the heart of the molecules question

The potential to recycle and reuse carbon molecules

Assessment of:

- Combined energy and materials system demand for carbon molecules
- Linear vs. circular systems
- Novel recycling processes – including mechanical recycling, depolymerization, gasification & pyrolysis
- Relative energy requirements, costs and emissions implications.

Output: high and low recycling scenarios to understand volume of low-carbon molecules that may be required.

Sources of primary carbon: costs and sustainability

Assessment of:

- Latest technological developments and cost trends in point source carbon capture (CCS) in different applications.
- Latest technological developments and potential future costs trends in direct air capture of CO₂ (DAC).
- The potential to extract and use bioresources in a cost effective and truly sustainable way. Where the concept of sustainability needs to cover: full life-cycle carbon emissions, local biodiversity impacts, competition with other uses of land including food production and local community impacts.

Output: revised vision of low-carbon molecule use in a net zero energy system.

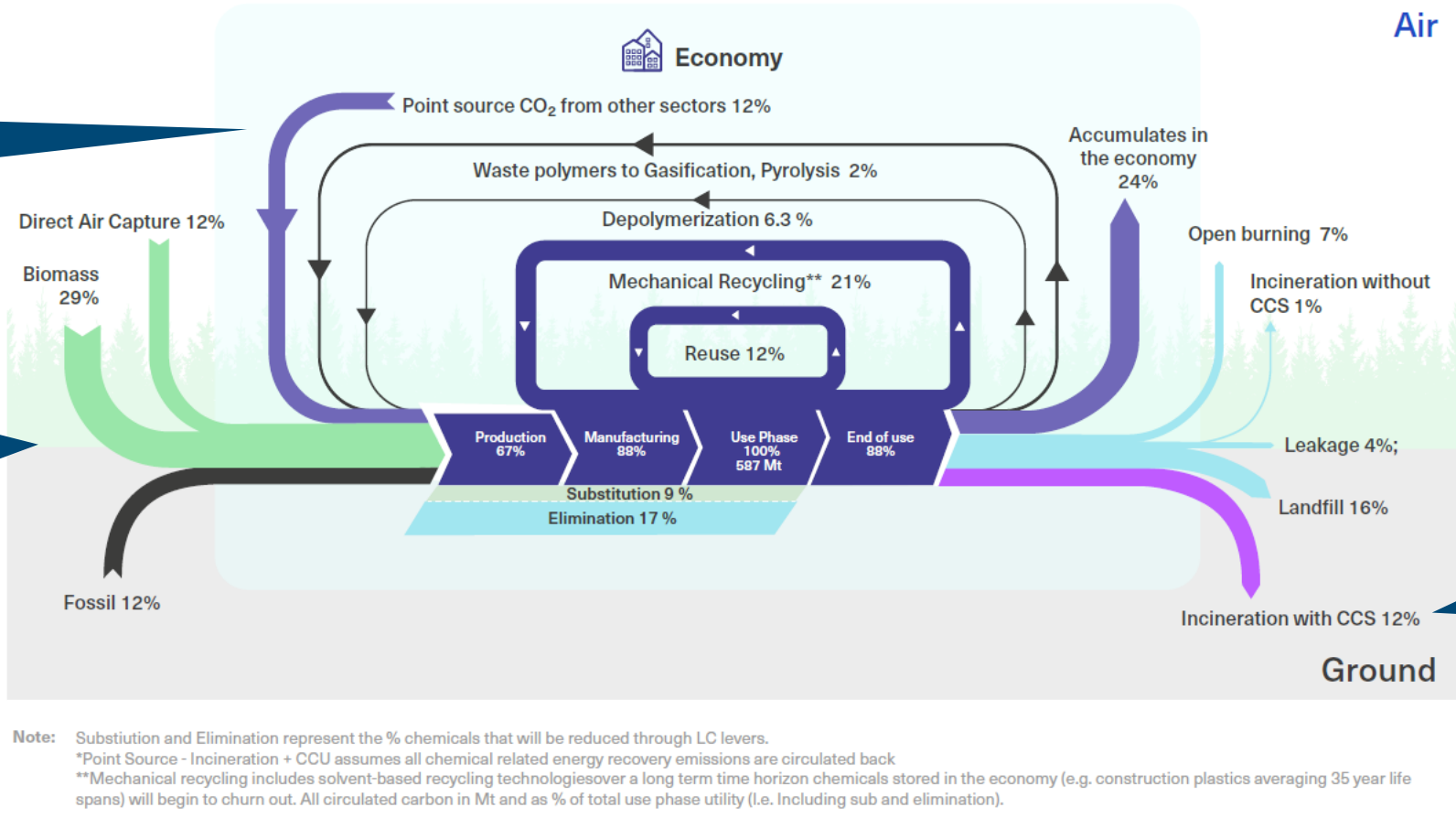


Carbon capture offers an opportunity to “recycle” carbon atoms

Figure 22: Flow of chemical industry carbon from feedstock to end-of-life – LC-NFAX Scenario 2050

Increasingly, sourcing carbon feedstocks from the atmosphere can charge the chemicals system and has potential for generating negative emissions

2050 Low Circularity – NFAX Scenario



Multiple avenues for recycling of carbon-intensive molecules

Range of potential input sources for carbon atoms

Utilisation of captured carbon from incineration could be another input stream

Innovation could free up land, increase the potential for recycling and reduce the energy inputs needed for molecular transformations

Synthetic biology / precision fermentation > synthetic meat

- Huge theoretical potential to reduce food land use, given inherent inefficiency of both photosynthesis and cattle based conversion of vegetable to meat protein
- Challenges of cost-competitiveness and consumer acceptance

Bioreactors/ microbial biocatalysts (e.g. Lanzatech)

- Reducing energy demands for multiple variants of molecular transformation
- Enabling lower cost conversion of waste, residues and CO₂ streams into ethanol, other fuels, chemicals

Chemical recycling

- Depolymerization (via e.g. catalytic cracking – breaking down long hydrocarbons)
- Feedstock recycling (via e.g. pyrolysis or gasification)
- New catalysts significantly reducing required energy inputs

Electrochemical technologies

- e.g CO₂ electrolysis (“Twelve”) reducing cost of CO₂+H₂ synthesis into jetfuel

How fast can these technologies develop and cost-reduce?

What implications for balance between:

- **Continued fossil fuel use + CCS**
- **Sustainable bioenergy supply and bioenergy applications**
- **Continuous recycling of carbon atoms**



2025 analytical work-programme



1. Publishing 2024 insights (Q1 focus)

1. Managing the **system balancing** challenge
2. Building and optimising **girds**
3. The role of **energy productivity** across the economy



2. Carbon molecules - role of emission-free molecules and 'defossilizing' carbon

- The role of **low-carbon molecules** across sectors (how far power + H2 derivatives can go)
- **Sourcing fossil-free carbon** (recycling, DAC, bioresources)



3. Economic impacts of the Transition

- Investment, **costs & affordability**
- Implications for **growth**, externalities & industrial policy
- **Trade** of low carbon technologies – local vs. global supply chains



4. Power system transformation – further deep dives

- The role of **nuclear & geothermal** in net-zero power systems
- Power Market design 2.0 – **consumer pricing**
- Electrifying **industrial heat**

Starting in September 2024 with additional support from QCF

Repacking existing ETC insights:

Carbon credits: Role of scope 3 emissions in carbon markets

Others - tbc

In Mission Possible and Making Mission Possible we considered the impact of the transition on consumers by sector

Economic impacts of the transition

Incremental decarbonisation costs will reduce conventionally measured living standards attainable in 2050 by less than 1%.






But important specific distributional effects need to be recognised:

- **Residential cooling:** negligible incremental cost, given the potential to deliver zero-carbon electricity at costs equal to or below the cost of fossil fuel-based systems.
- **Road transport:** Electric vehicles are or will be lower cost than fossil cars, while road freight costs will be broadly unchanged. Cost and feasibility of initial EV adoption will vary significantly by specific location and use patterns.
- **Residential heat:** Decarbonising residential heat could have a significant impact on living standards for specific households.
- **Multiple sectors with negligible impact.**
- **Industrial sectors:** For heavy industry sectors, consumer incremental costs will be very small as intermediate products account for a small proportion of the cost of final goods or services.
- **Long-distance aviation:** Decarbonising long-distance aviation will probably require a significant increase in ticket prices versus business as usual.



... Including in industrial sectors, international shipping and long distance aviation

Economic impacts of the transition

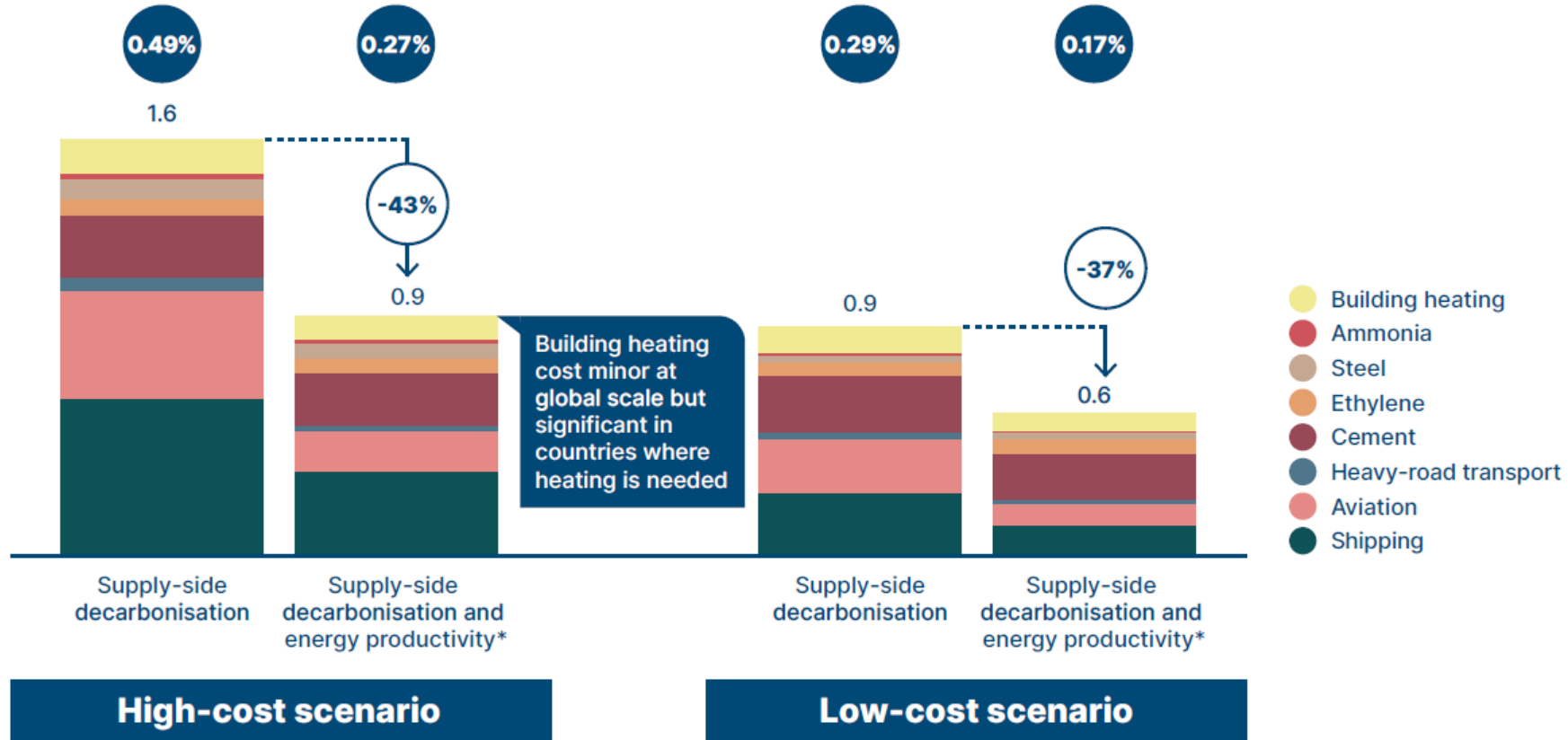
	Impact on intermediate product cost US\$ / % price increase		Impact on final product cost US\$ / % price increase	
 Plastics	+\$500 per tonne of ethylene	+50%*	+\$0.01 on a bottle of soda	<1%
 Steel	+\$120 per tonne of steel	+20%	+\$180 on the price of a car	+1%
 Cement	+\$100 per tonne of cement (+\$30 per tonne of concrete)	+100% (+30%)	+\$15,000 on a \$500,000 house	+3%
 Shipping	+\$4 million on typical bulk carrier voyage call per annum	+110%	+\$0.03 per kilogram of imported sugar	<1%
 Aviation	+\$0.3-0.6 per litre of jet fuel equivalent	+50-100%	+\$40-80 on a 6,500-km economy class flight	+10-20%



And consider total impact of the transition on overall consumer living standards in 2050...

Total cost of decarbonisation
Trillion US\$ per year, 2050

X% Share of global projected GDP, 2050



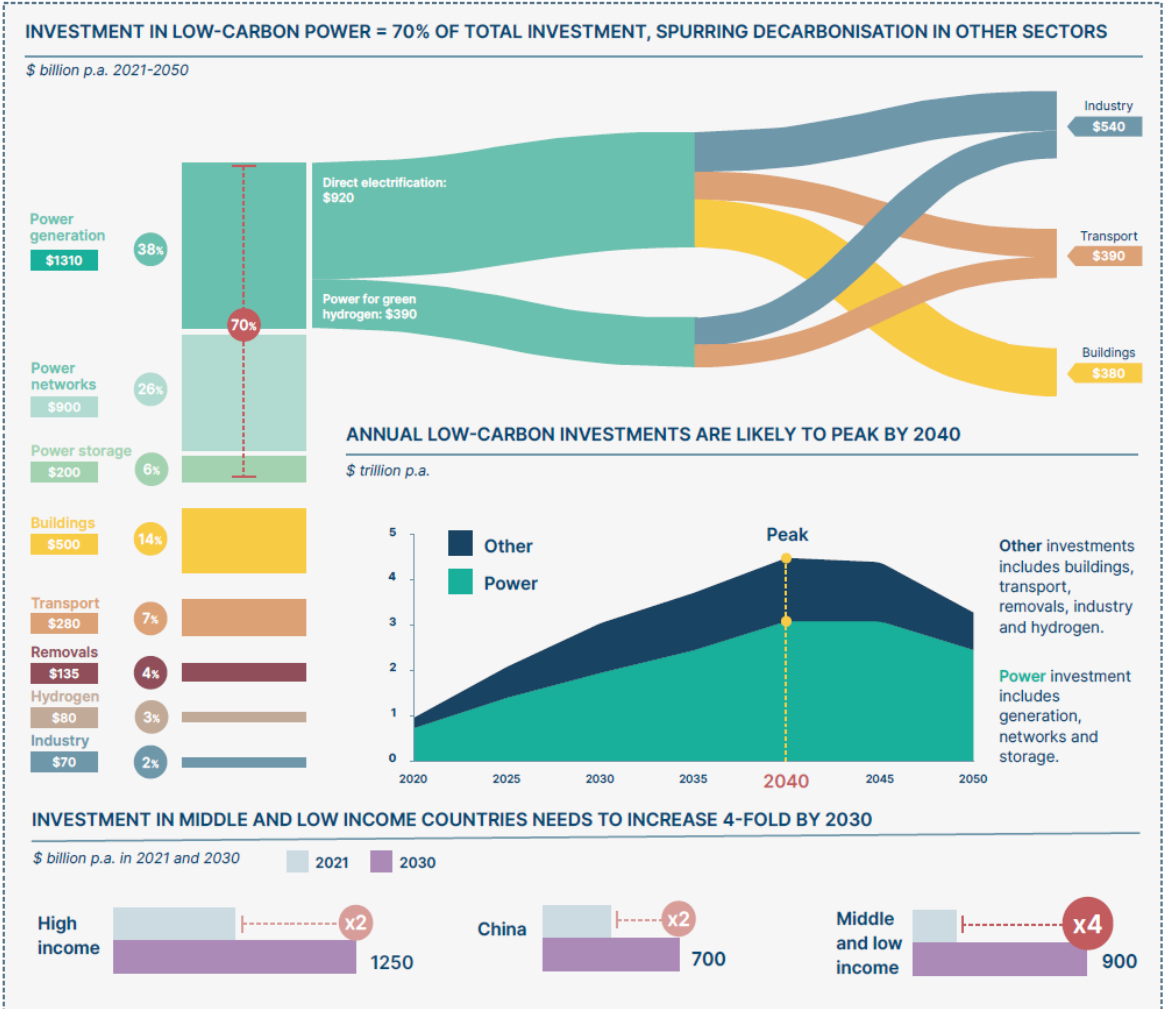
NOTE: The term "energy productivity" covers energy efficiency, material efficiency and service efficiency.

SOURCE: SYSTEMIQ analysis for the Energy Transitions Commission (2020) based on McKinsey & Company (2018), *Decarbonization of industrial sectors: the next frontier* and Material Economics analysis for the Energy Transitions Commission (2018)

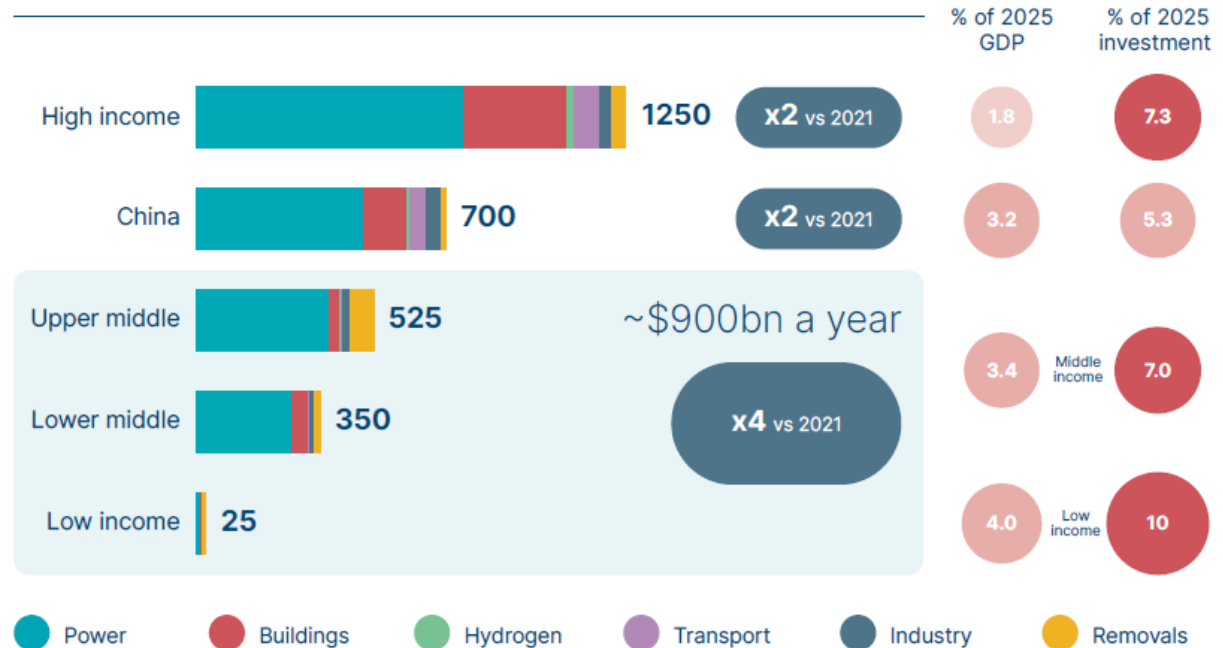


Last year we published our *Financing the Transition* report which focused on total investment needs...

Economic impacts of the transition



Estimated annual investment by region and sector, 2026–2030
 \$ billion p.a.



SOURCE: Systemiq analysis for the ETC (2023); SYSTEMIQ (2021), *Investments for green recovery and transformational growth 2020–30: Technical Note*; IMF (2022), *World Economic Outlook October 2022*.
NOTE: 2025 GDP projections based on GDP in market exchange rate terms. Total investment is assumed to grow in line with GDP.



Given increasing politization of net-zero, focus on the economic impacts of the transition (both costs & benefits) – on individuals, sectors & nations

Economic impacts of the transition

Leveraging our previous insights...



Presents an **assessment of the impact of the energy transition on consumer living standards**, drawing on our then-current assessment of technology costs and investment needs



Describes technically feasible pathways to a zero-carbon economy by mid-century and has considered the **relative economics of different technology options**



Estimates **the total investment needs** for the energy transition, by region and sector

... we propose to conduct an **integrated assessment of the impact of the energy transition** on economic growth, investment requirements and the implications for consumer living standards, including

- **An assessment of how the impact might vary by countries/regions at different stages of economic growth**
- **How it might vary by different income levels within countries**
- **Essential to engage effectively in increasingly polarised debates about the economic costs of the energy transition, jobs and the need for a “just transition”**

Current hypotheses:

- **We previously thought an ~80% reduction in emissions might have a ~1% impact on GDP. Now we think 100% might have low - or possibly no - impact.**
- **But that does not mean transition is costless – cost is needed to invest, which likely means less consumption or investment in other sectors of economy.**
- **Net jobs impact likely less than assumed – positive or negative – key issue is specific training and retraining needs.**

Similar debate growing around trade and supply chains, which could ultimately slow the pace or raise the costs of global decarbonization

Economic impacts of the transition

China is technological leader in range of vital clean technologies

- Partially due to subsidies and export pricing strategies
- Mostly due to China's excellent ecosystem of producers / suppliers

In ideal world...

- Technological progress and cost reductions benefit global transition
- Countries able to transition faster and at lower cost

In actuality...

- Geopolitical tensions resulting in tariffs and investment constraints
- Increased costs and slower pace for global transition

Country policies must

- Respond to legitimate desires to develop more diversified global supply chains and domestic employment
- Not undermine the energy transition by rejecting benefits of China's technological leadership and cost efficiency

ETC actions

- Engage with WTO
- Refine supply chain principles discussed with Commissioners
- Publish briefing Q1 2025?



2025 analytical work-programme



1. Publishing 2024 insights (Q1 focus)

1. Managing the **system balancing** challenge
2. Building and optimising **girds**
3. The role of **energy productivity** across the economy



2. Carbon molecules - role of emission-free molecules and 'defossilizing' carbon

- The role of **low-carbon molecules** across sectors (how far power + H2 derivatives can go)
- **Sourcing fossil-free carbon** (recycling, DAC, bioresources)



3. Economic impacts of the Transition

- Investment, **costs & affordability**
- Implications for **growth**, externalities & industrial policy
- **Trade** of low carbon technologies – local vs. global supply chains



4. Power system transformation – further deep dives

- The role of **nuclear & geothermal** in net-zero power systems
- Power Market design 2.0 – **consumer** pricing
- Electrifying **industrial heat**

Starting in September 2024 with additional support from QCF

Repacking existing ETC insights:

Carbon credits: Role of scope 3 emissions in carbon markets

Others - tbc

Power system transformation – rounding out critical issues & barriers to clean electrification – which focus areas to prioritise?

Power system transformation



Consumer power market design

Residential and commercial consumers should benefit from the high price certainty and low costs of renewable generation in a renewable-dominated power system

- Increase transition fairness and consumer buy-in
- Move away from gas setting the price for the whole market

Key outputs

- A summary of current power market design across countries
- **Assessment of options** for to adapt power market design

Role of low-carbon baseload



Role of nuclear

Nuclear energy will continue to be an important technology during the energy transition, potentially making up ~c.5-10% of electricity supply in 2050

- Revisit question of nuclear generation in a variable renewable dominated system – including costs, ability to run flexibly, and latest view on innovation
- Consider embodied carbon, water usage and waste disposal



Role of geothermal

Geothermal energy is expected to increase its relevance through novel technology adoptions that unlock more economic operations.

- Consider the role of geothermal energy for power and heat, and Enhanced Geothermal Systems (EGS) as a novel technology that can unlock more globally widespread operations.



Electrifying industrial heat

There is a growing consensus that much more industrial heat can be electrified than previously thought

- Both the 45% of industrial heat demand that is below 200°C but also potentially very high-temperature heat
- This reflects the falling cost of renewables, developments in heat pump and other technologies to reach higher temperatures

Critical link to low carbon molecules work

- Latest **technology perspectives**
- **Resource needs** (i.e. materials, fuels, water impact, etc.)
- **Risks and local environmental impacts**

- **Costs of geothermal relative to other low carbon technologies.**
- **System benefits (incl. heat provision, and flexibility)**
- **Risks and local environmental impacts**

- Outlining the **options** for decarbonising industrial heat
- The **interventions required** to address barriers to implementation



Last year we proposed a two year work-programme

1

Extending our influence in the global climate debate

Analytical programme

2

Building the ETC regional network

Regional programme

3

Extending our influence in the global climate debate

Communications programme

4

Delivering action through future COPs

5

Supporting the MPP

MISSION
POSSIBLE
PARTNERSHIP

6

Supporting the ETC members



Consolidating the ETC's growing regional network

	India	China	Europe	Australia	USA	Canada	Japan	Africa	ASEAN	Brazil
Est.	2017	2018	2018	2019	2020	2021	2021	2022	2023	2024
Knowledge Partner(s)	teri RMI	ENERGY FOUNDATION 能源基金会 RMI	SYSTEMIQ European Climate Foundation	MISSION POSSIBLE PARTNERSHIP Climateworks CENTRE	Duke NICHOLAS INSTITUTE for ENERGY, ENVIRONMENT & SUSTAINABILITY WORLD RESOURCES INSTITUTE RMI	The Transition Accelerator	IF 東京大学未来ビジョン研究センター Institute for Future Initiatives The University of Tokyo	WORLD RESOURCES INSTITUTE	IESR Institute for Essential Services Reform	SYSTEMIQ
Initiative	Energy Transitions India		Energy Transitions Commission	Australian Industry Energy Transitions Initiative	Energy Pathways USA	ELECTRIFYING CANADA AN INITIATIVE OF THE TRANSITION ACCELERATOR	CENTER FOR GLOBAL COMMONS	African Energy Dialogues	Potential for larger ASEAN initiative in 2025	
Insights										
									In-progress	In-progress



Our engagement with the COP process has grown over the past 5 years

2021

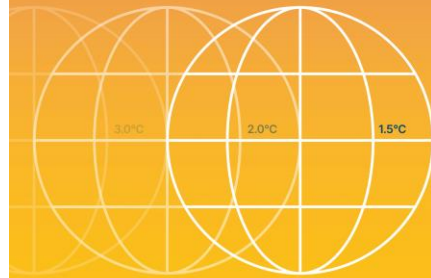


**UN CLIMATE
CHANGE
CONFERENCE
UK 2021**

IN PARTNERSHIP WITH ITALY

**Keeping 1.5°C Alive:
Closing the Gap in
the 2020s**

September 2021



Energy
Transitions



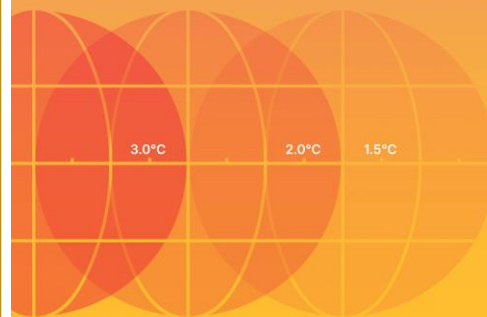
2022



The Keeping 1.5°C Alive Series

**Degree of Urgency:
Accelerating Action to
Keep 1.5°C on the Table**

November 2022



Energy
Transitions
Commission

Version 1.0

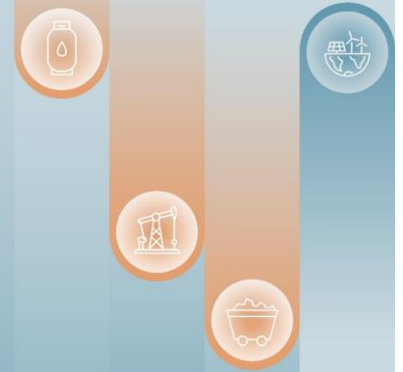
2023



**COP28
UAE**

**Fossil Fuels in Transition:
Committing to the phase
down in all fossil fuels**

November 2023



Energy

**COP28 Action Agenda:
Potential Impact to 2030**

Lord Adair Turner
Chair, Energy Transition Commission



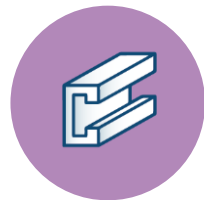
COP29, 30 & 31: 4 priorities to deliver action through future COPs



Delivering and increasing the COP28 commitments to triple RE capacity by 2030 informed by work on barriers to clean electrification



Further progressing the global debate about moving beyond fossil fuels, seeking to gain increasingly strong and specific commitments to the rapid phase-down



Supporting the work of the ITA, which is envisaged as a multi-COP initiative. Driven by MPP but with the ETC focused on identifying, and driving action on, implications for the wider energy transition (e.g., the scale of clean electricity or H₂)



Developing more ambitious and comparable NDCs in the next NDC ratchet – ensuring they reflect commitments made at COP26 and COP28, real economy action, and latest technological progress.



Proposed focus for COPs 29, 30 & 31



Partners:



Main area of focus:

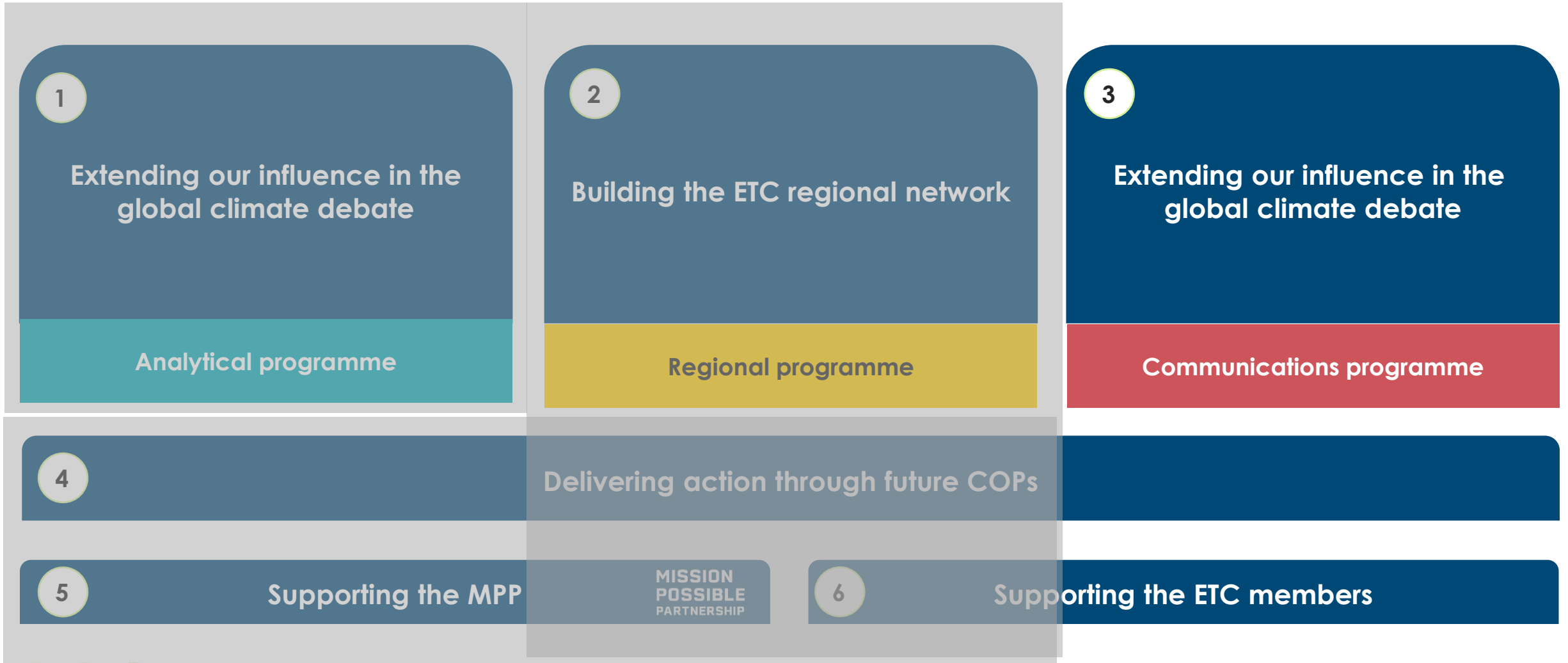


- Accelerating **rapid phase-down of fossil fuel** production and use, extending work at COP26 & COP28
- **Financing the transition** & placing the New Collective Quantified Goal ("NCQG") in context
- Exploring the opportunity of **interconnectors**

- Establish "ETI Brazil" programme to build partnerships and potentially impact the **system-wide vision for a Net-Zero Brazil**
- **Convene cross-sectoral working group** of stakeholders within Brazil to debate decarbonization pathway options and the impact on land use and resulting energy supply
- Position Brazil with the **global context** to understand the **opportunity to become a green supply chain leader**

- To accelerate successful delivery of **low-carbon industrial hubs** to provide a template for climate leadership to be replicated globally
- Major focus on **low-carbon power systems** in SEA, and **accelerating coal phase out**

Last year we proposed a two year work-programme



The climate debate is highly **politicised and polarised** as we move from ambition to action. **Disinformation remains rife and fuels the anti-net-zero narrative & back-tracking on commitments.**



**German minister threatens
'indefinite driving bans' on
weekends** **POLITICO**

**New Zealand to push through law to reverse ban
on oil and gas exploration** 

**Japan Must Curb Clean Power
Reliance, Warns Leadership
Candidate**

Bloomberg UK

ETC Communications 2-year Programme:

Pillar 1

Disseminating ETC reports

- **Broaden media presence:** focus on Tier 1 media and non-English international media.
- **Explainer content:** concise, informative, digital friendly.
- **Social media campaigns.**
- **Events:** increased presence in key sectoral and regional events.
- **Direct engagements:** structured and targeted outreach.
- **ETC Matters Newsletter:** valuable mailing list incl. journalists, climate activists, policymakers.

Pillar 2

Repackaging existing insights

- **To inform and explain:** dispelling myths, correcting misinformation, and explaining and re-explaining complex ideas.
- **Shorter, more digestible forms** (e.g., videos, social media posts, blogs)
- **Informing the debate** via timely op-eds and articles on international media platforms.
- **Spreading the word** at key climate events (e.g. New York Climate Week, Clean Energy Ministerial, COP).

Pillar 3

Informing the influencers and reaching new audiences

- Developing **broadcast opportunities.**
- Expanding **digital storytelling** (TED Talks, Talking heads videos)
- Leveraging **social media network.**
- **Audience specific** tailored content.
- Collaboration with **other communications partners** (e.g, Global Optimism, GSCC).
- Test **direct outreach** with high impact interest groups (NGO groups, University programmes).

Towards COP29 & COP30

