INEVITABLE POLICY RESPONSE | Quarterly Forecast Tracker
Global progress against IPR policy scenarios

Quarterly Forecast Tracker

Update of global energy/land policy and technology developments

Q2 2022

June 30, 2022

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Quarterly Forecast Tracker Net Results still finely balanced on total impact

QFTs track momentum and level of ambition on energy and land transition policy and technology developments. These are related to the IPR **Forecast Policy Scenario** (FPS) which results in 1.8°C of warming and are also put in the context of the **Required 1.5°C Policy Scenario (RPS)**

It is evident that there is **still positive momentum** with somewhat increased ambition in terms of developments **reinforcing a 1.8°C pathway**. From COP 26 to end of June 2022 we track 85 policies of impact with 68 confirming our forecast, 11 that provide evidence of increased ambition and 6 with less. We have introduced a Just Transition lens this quarter again generally confirmatory – see accompanying LSE paper

In terms of net impact, we note that on policy the EU edges in the positive direction longer term, China has been somewhat positive, but the US has not moved ahead, and recent policies and proposals in Brazil are likely to increase deforestation. An accompanying IPR paper by Kaya Advisory examines how the re-election of 'Lula' da Silva would make an end to illegal deforestation activity by 2030 (if not well before) and the achievement of net zero emissions from the Brazilian Amazon possible.

On technology developments, including deployment, there have been positive trends particularly on EV deployment which accounted for 10% of sales in 2021 (outpacing IPR outlook of 5%).

Offsetting this short term has been the security crisis brought on by the Ukraine War leading to use of more fossil fuels in power. The long-term issue is whether this gets "locked in". In Q1[1] we addressed this in terms of potential overbuild of capacity for security reasons but with emissions trajectories still manageable through capacity utilization.

Finally, the world economy is slowing short term, which would result, in itself, in lower growth in emissions.

Overall while there are still significant challenges, we believe developments are confirmatory of FPS 1.8°C while falling well short of RPS 1.5°C

1. IPR QFT Q1 2022 available at: https://www.unpri.org/download?ac=16232

PRI commissioned the Inevitable Policy Response in 2018 to advance the industry's knowledge of climate transition risk, and to support investors' efforts to incorporate climate risk into their portfolio assessments.

A research partnership led by Energy Transition Advisers and Vivid Economics conducts the initiative's research in collaboration with Kaya Advisory for the Quarterly Forecast Tracker (QFT) project.

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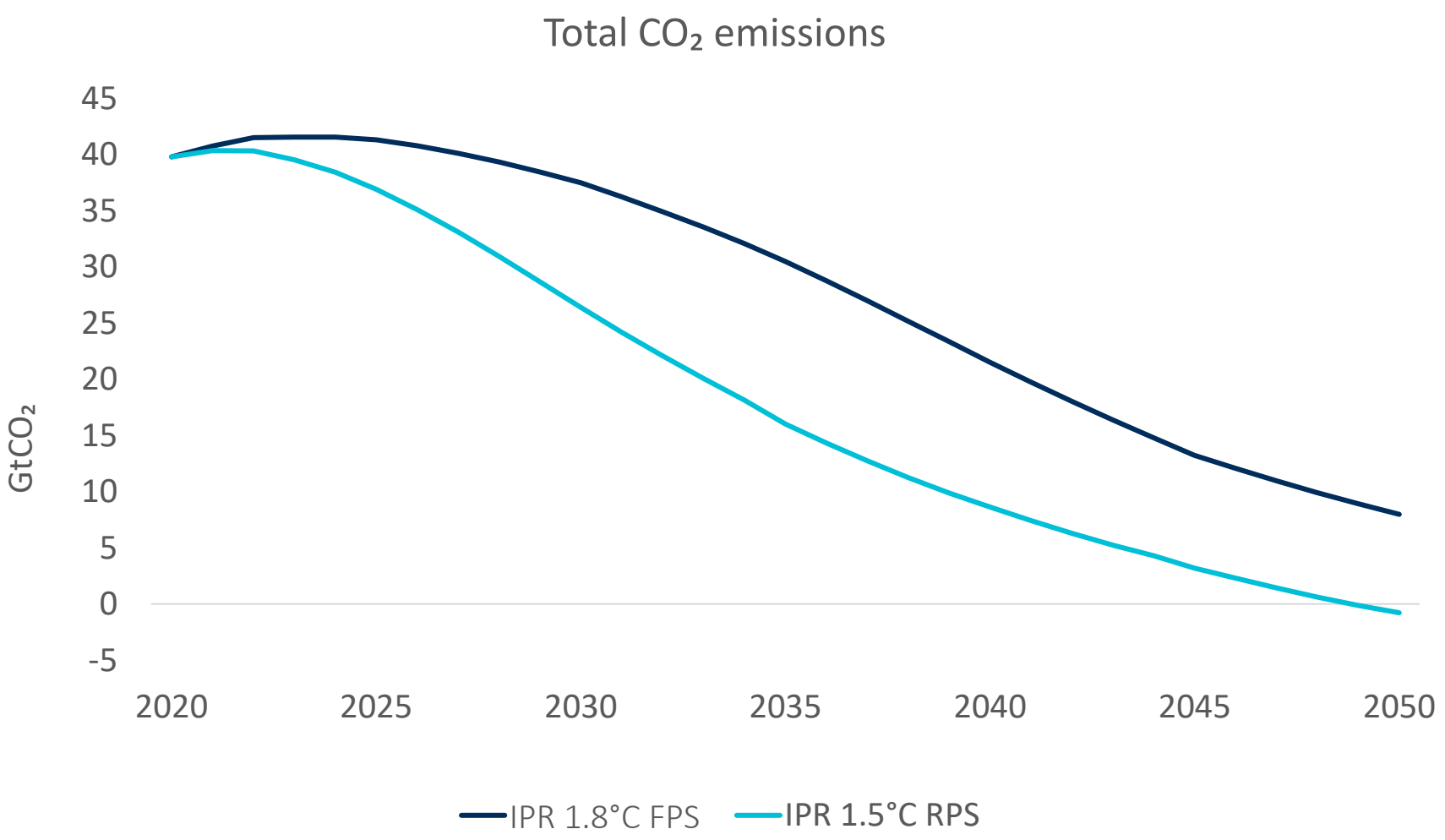
IPR has developed high-conviction policy-based forecasts of forceful policy responses to climate change and implications for energy, agriculture and land use, across two scenarios

Please see the IPR Home Page on the PRI website for further details

Scenario	Policy Forecast Details	Open Access Database
IPR 1.8°C Forecast Policy Scenario (FPS) • Models impact of forecasted policies on the real economy • Global emissions fall by 80% by 2050, aligned with warming below 2C (1.8°C)	IPR 1.8°C FPS Policy Details IPR 1.8°C FPS Energy and Land Use System Results Summary *See Appendix for summary of key FPS forecasts*	IPR FPS 2021 Value Drivers
IPR 1.5°C Required Policy Scenario (RPS) • Required policies to align to a **1.5°C objective** building on the International Energy Association's Net Zero scenario and deepening analysis on policy, land use, emerging economies and value drivers	IPR 1.5°C RPS Energy and Land Use System Results including Policy Details *See Appendix for summary of key RPS requirements*	IPR RPS 2021 Value Drivers

IPR has published a set of publicly available outputs from the 1.8°C FPS and 1.5°C RPS that offer significant granularity at the sector/country level, allowing investors to assess their own climate risk across 4,000+ variables

The IPR FPS (2021) results in total CO_2 emissions (land and energy) equating to 1.8°C. The IPR 1.5°C RPS requires emissions below zero by 2050



- IPR 1.8°C FPS sees emissions rising **in the short term** through 2025/6 before they start declining. RPS declines slightly by 2025
- IPR forecasts policy action **before 2025** that drive momentum from then through to 2050
- When we assess **quarterly policy developments in the QFTs** we do this against **these longer-term outcome forecasts**

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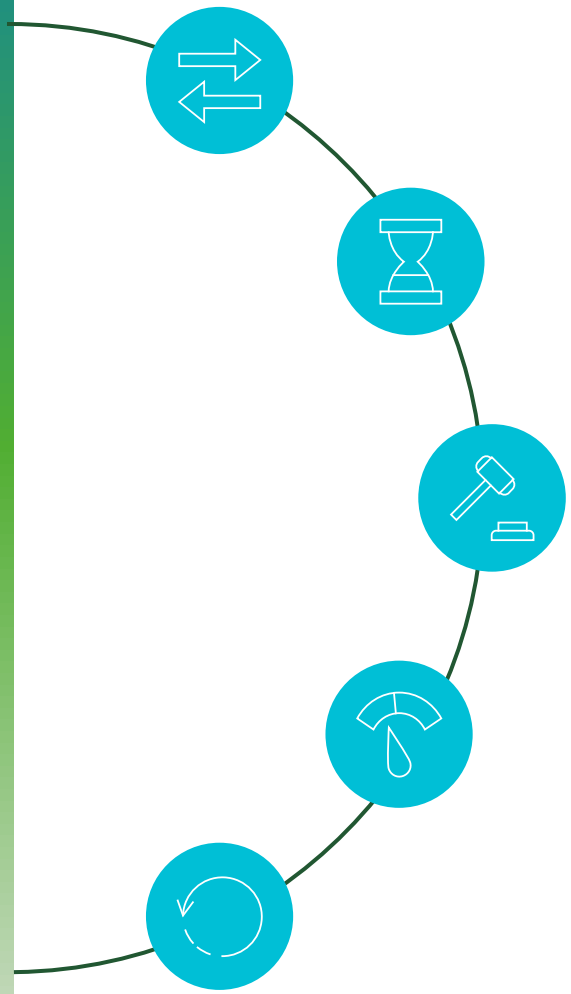
In 2022, Quarterly Forecast Trackers (QFTs) assess how policy developments could impact IPR scenarios



QFTs assess quarterly global policy, technology and land use developments which drive the energy and land transition

Recent IPCC Sixth Assessment Reports (AR6) reinforce IPR and express the urgency of immediate policy action, finding climate change already causing widespread adverse impacts, some irreversible, and that a 1.5°C climate objective is achievable but will require an immediate action across all sectors, countries and levels of government

As realities of climate change become increasingly apparent, it is **inevitable** that governments at national and international levels **will be forced to act more decisively** than they have so far

Energy Security has emerged as a central driver since the war in Ukraine

IPR uses the SSP2* **GDP outlook**; we do not attempt to adjust for cyclical developments (e.g. COVID). Whether the war in Ukraine affects the fundamental SSP2 outlook remains to be seen.

*. Shared Socioeconomic Pathways: Middle of the road scenario follows a path in which social, economic, and technological trends do not shift markedly from historical patterns. the world

Cyclical Economic Growth Trends

- IPR leverages the **Shared Socioeconomic Pathways: Middle of the road scenario** (SSP-2) outlook for economic growth out to 2050; where scenario, social, economic and technological trends do not shift markedly from historical patterns
- IPR does not attempt to adjust for future cyclical developments
- Having said that, it is worth looking at developing trends
- As noted in Q1, the return of inflation due primarily to COVID and the Ukraine war's impact on supply chains is causing significant uncertainty about GDP forecasts in the next 1-2 years as central banks react
- The IMF has forecast lower growth in 2022 and 2023 and warned of risk of global recession[1]
- Any slowdown will result in lower emissions growth
- As noted in the Q1 Tracker this could at least offset some of the short-term shift towards coal/gas in the power sector
- Long term SSPs may need to be revised and if so, this would imply revisiting and updating assumptions under IPR scenarios at a future date

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1. https://www.weforum.org/agenda/2022/05/global-recession-economy-economics-imf-davos-2022/#:~:text=Speaking%20in%20Davos%2C%20the%20IMF's,to%20avoid%20a%20global%20recession.&text=%22We%20are%20experiencing%20a%20crisis,now%20the%20war%20in%20Ukraine.

The war in Ukraine: The implications for energy and climate policy

We express our sympathies with all those suffering in this war

As in Q1, for IPR Forecasts we continue see 3 meta developments at this stage:

1. **Reinforcement of medium** (3-5 Years) and **long term** IPR renewable energy and Green Hydrogen policies and sector forecasts

2. **Short term** (1-2 Years) **energy supply crisis for EU** with many uncertainties, local gas and coal use and sourcing of Fossil Fuel supplies outside of Russia which points at least short term to an all of the above approach – a security back up could leave fossil fuels in the system longer

3. **To achieve current forecasts, policy makers will need to avoid lock in of actual generation or high-capacity utilization of these fossil fuel assets.** Energy security will come at a cost but there does not have to be a trade-off with climate policy.

For the **IPR Forecast Policy Scenario (FPS)** this means that the **fossil fuel sector supply dynamics will need reassessing** e.g. split between piped natural gas and LNG, geography of origin etc.

But we **do not see any divergence from trend in demand side sectors**, if anything in **medium term** an eventual acceleration towards more green outcomes*

Link to Q1 2022 paper: Ukraine War: The new geo-politics of energy and implications for climate policy

* Recent green index report for example finds financial market interests converging with EU decarbonization power sector in context of Russia-war in Ukraine: https://www.1in1000.com/russia-ukraine-war

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The Q2 Quarterly Forecast Tracker (QFT) continues to confirm long term policy forecasts, with some evidence of acceleration in technology deployment/ innovation

This second QFT update covers the period from **mid April 2022 to end of June 2022.** In addition to tracking momentum in policy and technology developments, we introduce tracking the increasing importance of **Just Transition concepts** in international policy-making

Policy:

- Most announcements this quarter are confirmatory including G7 commitments towards 100% clean power with evidence of slight acceleration in renewable power ambition and policies in China
- In the US in Q1 we pointed to a tougher short-term outlook for renewables deployment. While implementation of the Uyghur Forced Labor Prevention Act bill could increase scrutiny around product sourced from outside regions of concern (Xinjiang), the announcement to pause restrictions on solar imports from Cambodia, Malaysia, Thailand and Vietnam could relieve some pressure. The outlook for the US midterm elections will be tackled in Q3.
- Brazil is the only region where announcements continue to present a challenge with some recent proposed legislation (e.g. bill to redraw Amazon borders) if passed would impact the effort to end net deforestation by 2030, which IPR considers critical for achieving a Paris-aligned pathway – see accompanying IPR paper on Brazil

Technology/ Sector Developments:

- Multiple announcements confirm or suggest an acceleration in innovation, technology adoption, and costs
- EV sales are increasingly rapidly, exceeding IPR forecasts for growth in certain regions; charging infrastructure will need to grow at pace
- China experienced some grid constraints in accommodating renewables, underscoring importance of grid investment
- Brazil continues to experience high deforestation levels

Just Transition:

- An accompanying paper by the LSE finds recent developments in international policy-making confirm that the Just Transition has become a critical concept in international policy-debates, with growing awareness that JT elements are crucial for effective and lasting implementation.
- In many cases, Just Transition elements in policies are absent or could be considerably stronger but could feature more prominently as policies shift to implementation phase

Brazil faces a turning point at the October election

In October 22 Brazil will hold elections for the president and National Congress. This is a particularly crucial election given the negative trends for deforestation under President Bolsonaro and the more positive stand that opponent and former President Lula takes. An accompanying IPR paper by Kaya Advisory explores this. The conclusion is that an end to Net Deforestation by 2025 as required in the 1.5C RPS looks virtually unattainable. If Lula is elected, this leaves open the door to an end to illegal (90%+ of activity) deforestation and net zero emissions when combined with afforestation by 2030 as forecast in the 1.8C FPS. We note a number of private sector initiatives which are working to end commodity-driven deforestation.

In Q2 there was some continued evidence of stagnation or deceleration of policy action

- While the government published a decree that establishes higher fines for illegal deforestation, which will send a stronger signal to violators these provisions are not anyway being enforced. A proposed bill to redraw Amazon borders, if ratified, could increase deforestation
- Deforestation continued to reach record levels during the month of April
- Together these could impact IPR forecasts for deforestation end dates

Brazil announced the launch of a sectoral carbon market, with more details to emerge

Link to IPR Q2 2022 special paper: Can Lula save the Amazon? A Brazil Policy Analysis - by Kaya Advisory

There is evidence of increased ambition for renewables deployment in China although coal buildout remains strong; EV deployment in 2021 outpaced forecasts

China reported a 1.4% decrease in CO_2 emissions in Q1 2022, the third quarter in a row of falling emissions

- Previous declines in emissions have been followed by strong rebounds resulting from strong government stimulus. IPR 1.8°C FPS forecasts Chinese emissions peaking in 2025

Clean Power: In Q2 there was a slight acceleration in its clean power policy, providing clear implementation and financing plans to support it

Renewables: Wind, solar and nuclear combined are set to surpass hydropower for total generation this year. Wind and solar appear on track to meet 2025 targets set by China, which is in line with coal consumption and emissions peaking by 2025

Electric vehicles (EVs) – EV output more than doubled in January-April compared with 2021, while auto production overall fell. Electric trucks have seen strong deployment in China

Coal – Even so, construction of new coal plants is set to expand after the State Council, China's cabinet, announced plans to invest Rmb10bn ($1.5bn) to support coal power generators and increase power generation in May. High energy demand from heatwaves in Summer 2021 resulted in power rationing which China will want to avoid in 2022. China is expected to overbuild power systems for security reasons as it switches to clean energy

Technology/sector developments: multiple announcements confirm or suggest an acceleration in innovation, technology adoption, and costs

Clean Power: At a global level, wind capacity increased in line with FPS forecast. In Q2, the UK built the first ultra-efficient high-pressure electrolyser and the US continues to invest in increasing clean power capacity. There are announcements around improved solar wafer technologies.
Previous investments in capacity are starting to pay off and are already resulting in decreasing cost of renewable power generation

Hydrogen: Hydrogen strategies continue to grow across the globe. In the EU, patent filings for hydrogen production keep growing. Since 2005, they have increased on average 18% yearly

Transport: Electric vehicles are increasing their sales globally with deployment exceeding IPR forecasts in certain regions (e.g. Germany/China).

Low-carbon agriculture: The building of the world's largest bioreactors for producing cultivated meat has been announced in the US; IPR scenarios are ambitious on take up of cell-based meat, especially in the US and Europe.

Land use and forestry: Brazil continues to experience high levels of deforestation in the Amazon.

The Just Transition is a key element in the Inevitable Policy Response

- The Grantham Research Institute at the London School of Economics has been working with the UN PRI commissioned Inevitable Policy Response (IPR) on the climate transition since 2019.
- In 2022, we published a report analysing the growing incorporation of the Just Transition in climate policies by governments, businesses and financial institutions, and outlining its emergence as a key factor shaping how IPR global forecasts play out across sectors and technologies.
- In an accompanying paper, we are now taking an in-depth look at the policies reflected in the IPR Quarterly Forecast Tracker, assessing to what extent they integrate the Just Transition.

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Summary: Just Transition assessment and implications for achieving IPR 1.8C FPS

Importance of JT considerations in energy/land transition policy

- Understanding, recognition, and implementation of the need for a JT is moving in the right direction among policy-makers in many key regions
- Although engagement is often relatively weak, it is there and we are cautiously optimistic that it is likely to become stronger over time
- This is likely to contribute to ensuring the lasting implementation of recent policy announcements, confirming the credibility of progress towards achieving the IPR 1.8°C FPS
- Achieving a no overshoot **1.5°C RPS pathway** will require a considerable step up in Just Transition considerations

Assessment of JT elements in 30 key QFT developments

Country	No. policies assessed as high risk for Just Transition	No. Policies with weak Just Transition Elements	No. Policies with moderate Just Transition Elements	No. Policies with strong Just Transition Elements	Total No. Policies Assessed by Country
US				9	9
China		3			3
EU			2	2	4
Germany		2		1	3
UK			2		2
Brazil	3	1			4
Canada				2	2
South Africa			1	1	2
Australia		1			1
Total	3	7	5	15	30

Link to IPR Q2 paper: [An assessment of Just Transition elements in the Inevitable Policy Response – By LSE]

Grantham Research Institute on Climate Change and the Environment
Centre for Climate Change Economics and Policy

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Policy developments are scored using a 10-point scale to indicate magnitude and direction of impact on IPR scenario forecasts

A 10-point scale applied to policy developments to indicate impact on IPR 1.8°C FPS policy forecasts (implications for the 1.5°C RPS policy forecasts can also be drawn)

- 0-1 indicates **increasing evidence for deceleration** in policy forecast
- 2-4 indicates **evidence for deceleration** in policy forecast
- 5 indicates **no change** in policy forecast
- 6-8 indicates **evidence for acceleration** policy forecast
- 9-10 indicates **increasing evidence for acceleration** in policy forecast

A similar 10-point scale is applied to energy/land technology developments

Scale	Details	Impact on policy forecast
0	Evidence for significant deceleration in policy forecast	Potential for 10+ year downgrade
1	Evidence for large deceleration in policy forecast	Potential for 10-year downgrade
2	Evidence for moderate deceleration policy forecast	Potential for 5-year downgrade
3	Evidence for small deceleration in policy forecast	Potential for <5-year downgrade
4	Some evidence for marginal deceleration in policy forecast	Monitor developments
5	Confirmatory (reinforces and increases probability of 1.8°C FPS)	Does not change forecast
6	Some evidence for marginal acceleration in policy forecast	Monitor developments
7	Evidence for small acceleration in policy forecast	Potential for <5-year upgrade
8	Evidence for moderate acceleration in policy forecast	Potential for 5-year upgrade
9	Evidence for large acceleration in policy forecast	Potential for 10-year upgrade
10	Evidence for significant acceleration in policy forecast	Potential for 10+ year upgrade

Greater likelihood of 2.3°C IEA STEPS[1] scenario

1.8°C IPR FPS

Greater likelihood of 1.5°C IPR RPS scenario

* The IEA's 'Stated Policy Scenario' or STEPS reflects current policy settings based on a sector-by-sector assessment of the specific policies that are in place, as well as those that have been announced by governments around the world

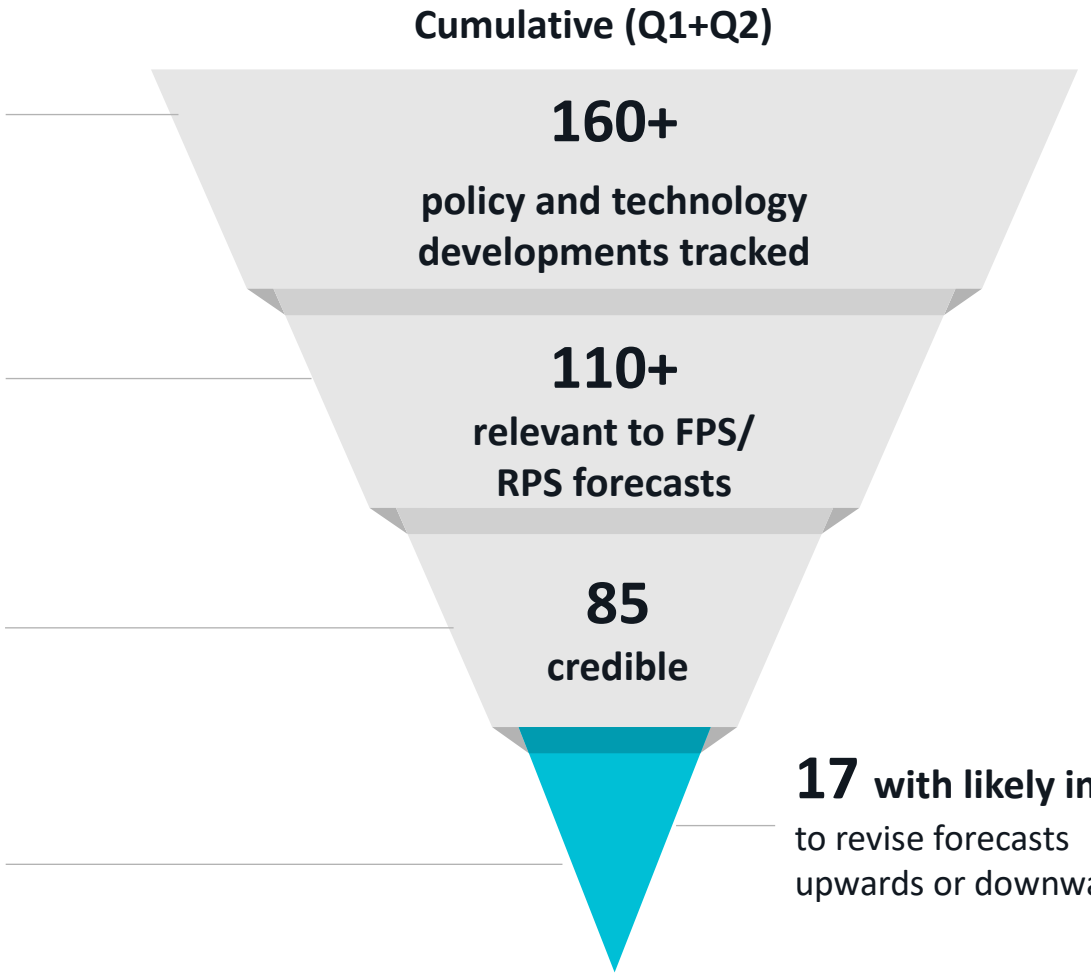
IPR QFT assessment adopts a multi-step approach to assessing key policy and technology developments impacting 1.8°C FPS and 1.5°C RPS

1. **Track/compile** announcements between October 2021 – June 2022 [COP 26 and post-COP 26 developments]

2. Determine **relevancy** to IPR FPS and RPS forecasts:
   - Confirmatory/reinforce forecasts
   - Signal acceleration or deceleration of policy relative to forecasts

3. Assess **credibility** of announcement
   - Less credible: off or on-the record statement
   - Credible: Public position on direction of travel
   - More Credible: Published strategy, or enacted legislation

4. **Score impact** of development on RPS and FSP forecast (see previous slide)



Sources for announcements/developments provided on slides 54-55

INEVITABLE POLICY RESPONSE

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Between COP 26 and June 2022, majority of energy/land policy & technology developments mostly show confirmation of IPR Forecasts

Greater likelihood of 2.3°C IEA STEPS* scenario ← **1.8°C IPR FPS** → **Greater likelihood of 1.5°C IPR RPS scenario**

	Significant deceleration	Large deceleration	Moderate deceleration	Small deceleration	Marginal deceleration	Confirmatory (increased probability of 1.8°C FPS)	Marginal acceleration	Small acceleration	Moderate acceleration	Large acceleration	Significant acceleration	
Score	0	1	2	3	4	5	6	7	8	9	10	Total
Global					1	11	3					15
US				1	2	12						15
China						7	3					10
EU						7						7
Germany						4	2					6
France							1					1
UK						5		1				6
Brazil					2	5	1					8
India						3						3
Indonesia						3						3
Canada						1						1
Nigeria						2						2
South Africa						1						1
Saudi Arabia						2						2
South Korea						1						1
Japan						2						2
Australia						2						2
Total				1	5	68	10	1				85

i. This assessment covers the period from COP 26 to mid-June 2022

ii. The IEA's 'Stated Policy Scenario' or STEPS reflects current policy settings based on a sector-by-sector assessment of the specific policies that are in place, as well as those that have been announced by governments around the world

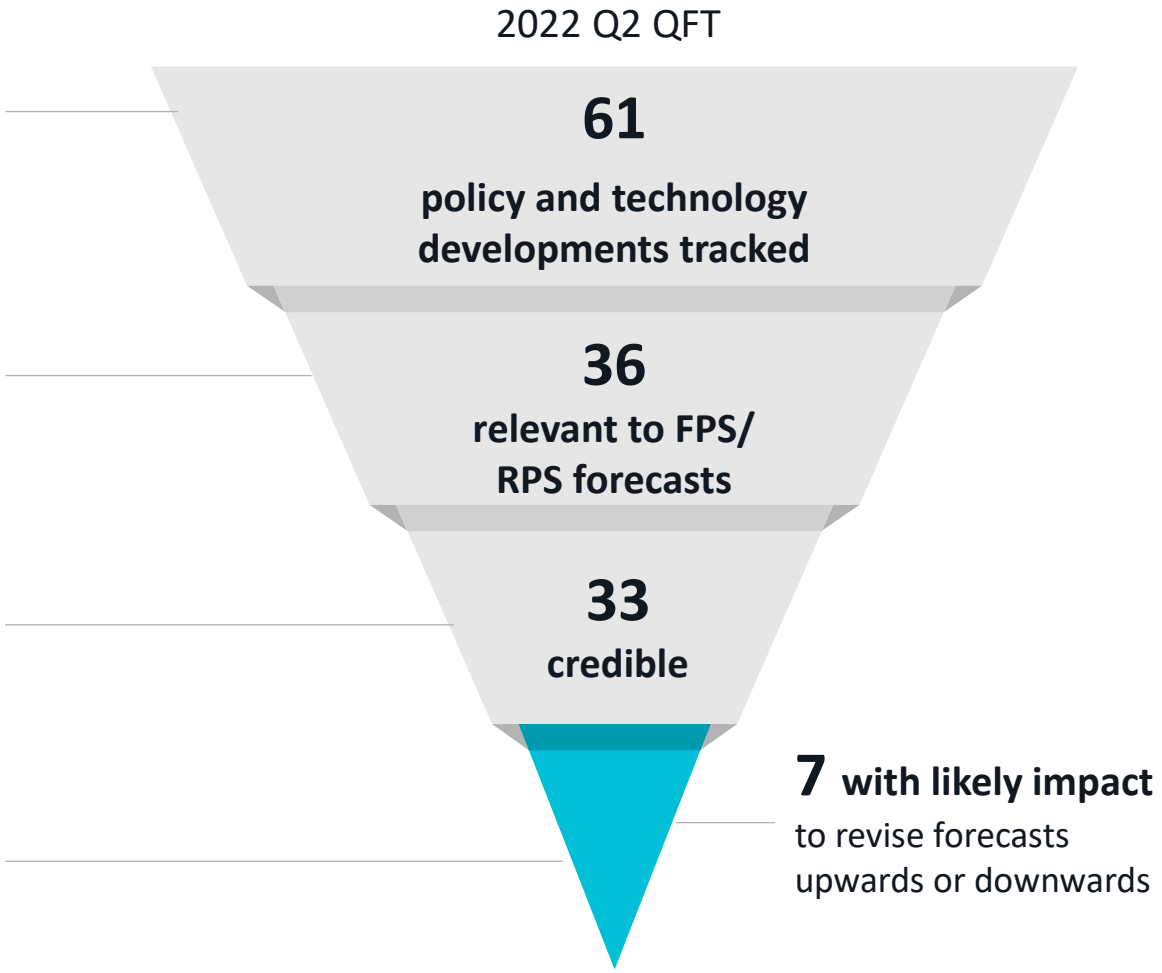
IPR QFT In Q2

1. **Track/compile** announcements between April 2022 – June 2022

2. Determine **relevancy** to IPR FPS and RPS forecasts:
   - Confirmatory/reinforce forecasts
   - Signal acceleration or deceleration of policy relative to forecasts

3. Assess **credibility** of announcement
   - Less credible: off or on-the record statement
   - Credible: Public position on direction of travel
   - More Credible: Published strategy, or enacted legislation

4. **Score impact** of development on RPS and FSP forecast (see previous slide)



Sources for announcements/developments provided on slides 54-55

INEVITABLE POLICY RESPONSE

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Between mid-April 2022 and mid-June, majority of energy/land policy & technology developments mostly show confirmation of IPR forecasts

Greater likelihood of 2.3°C IEA STEPS** scenario | 1.8°C IPR FPS | Greater likelihood of 1.5°C IPR RPS scenario

	Significant deceleration	Large deceleration	Moderate deceleration	Small deceleration	Marginal deceleration	Confirmatory (increased probability of 1.8°C FPS)	Marginal acceleration	Small acceleration	Moderate acceleration	Large acceleration	Significant acceleration	
Score	0	1	2	3	4	5	6	7	8	9	10	Total
Global					1	4	1					6
US						7						7
China						1	2					3
EU						5						5
Germany						2	1					3
France												0
UK						2						2
Brazil					1	3	1					5
India												0
Indonesia												0
Canada												0
Nigeria						1						1
South Africa												0
Saudi Arabia												0
South Korea												0
Japan												0
Australia						1						1
Total					2	26	5					33

i. This assessment covers the period from mid-April to mid-June 2022

ii. The IEA's 'Stated Policy Scenario' or STEPS reflects current policy settings based on a sector-by-sector assessment of the specific policies that are in place, as well as those that have been announced by governments around the world

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Global policy announcements/developments (1/2)

G7 foreign ministers committed in May 2022 to cooperative climate action via Climate Clubs, a full decarbonised electricity sector by 2035 and to end international fossil fuel financing. These developments reinforce an outlook for a 1.8°C pathway but further policies and institutional arrangements are required to deliver on these.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Global	Net zero targets	Net Zero Tracker report on 'Net Zero Stocktake 2022' reports that national net zero targets set in domestic legislation or policy documents has grown from covering 10% of global emissions in 2020 to 65% in June of 22.	**1.8°C FPS:** A wave of announcements in 2020 to be followed by announced from the US, India, and Australia	Confirmatory; the setting of and progress towards meeting long-term targets is a key driver of likelihood of further policy action in key sectors driving the energy and land transition	5 Confirmatory
	Cross-cutting	In May, G7 sets ambition for open, cooperative international **Climate Club** to promote ambitious climate action to accelerate decarbonisation, share best practices on mitigation efforts and outcomes and address carbon leakage[1]	**1.8°C FPS:** Multiple including: • G7: 100% new zero carbon production facilities from 2040	Confirmatory - reflects ambition for levelling playing field for climate policies, focusing on emissions intensive traded goods, sectoral strategies including the Hydrogen Action Pact which could lead to common green standards and R&D cooperation, promoting international cooperation to support leap frogging in certain countries To be managed as an intergovernmental forum co-hosted by IMF, WB, OECD	5 Confirmatory
	Clean Power	In May 2022, G7 Ministers of Climate, Energy and the Environment commit to achieving predominantly **decarbonised electricity sectors by 2035** at a meeting in Berlin[1]	**1.8°C FPS:** • Policy to deliver 100% clean power by **2035**: France, Canada • Policy to deliver 100% clean power by **2040**: UK, US • Policy to deliver 100% clean power by **2045**: Germany, Italy, Japan	Statement could signal a 5-10 year accelerated timeline for power sector decarbonisation in the US, UK, Germany, Italy and Japan for example, it requires further policies to deliver upon objectives No date set for exiting coal and leaves door open for abated fossil fuels	5 Confirmatory

Global policy announcements/developments (2/2)

The G7 is developing a JTEP partnership with India to support its decarbonization

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Global	**Fossil fuels including coal phase outs**	G7 ministers also commit to **end fossil fuel financing internationally** by the end of 2022, at Berlin meeting in May[1]	**1.8°C FPS** • Policy signals (bans, EPS, carbon pricing) and market reforms end new coal build from 2020 in first mover countries, by 2025 in Tier 2 countries and by 2030 in Tier 3 countries • No policy forecast for oil/gas phaseouts	Full support in G7 to end taxpayer funding for oil, gas and coal projects overseas could shift approximately US$33bn a year from fossil fuels to clean energy sources according to analysts	5 Confirmatory
	Multiple including **Clean Power** **Net zero targets**	The US and Germany are expected to propose a G7-India partnership at the G7 Summit taking place in Germany the last week of June[2] The partnership would aim to pool resources from G7 partners and multi-lateral development banks to: • Reduce India's carbon intensity through renewable power generation • Support industrial and transport decarbonization.	**1.8°C FPS:** • Policy to deliver 100% clean power by **2060**: India • Net Zero by 2060: India	Confirmatory; international finance to support decarbonization in power and difficult to abate sectors	5 Confirmatory

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Australia policy announcements/developments

Australia's election outcome puts country on track with 1.8°C FPS outlook for emissions reductions and sector decarbonisation pathways

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Australia 	**Multiple including** **Net zero targets** 	Australia's Labor party won the federal election late in May[3] Early in June, the climate minister committed to legislate stronger emission reduction targets by 2030[4] (43% reduction on the 2005 baseline vs. previous target of 26-28% reduction) and affirmed previous government's net zero target by 2050 Other than legislating the targets, the minister promised a AUD20b upgrade to the electricity grid, cuts to electric vehicle taxation, changes to the carbon markets safeguard mechanism, and a review of Australia's debated carbon offset scheme	**1.8°C FPS:** Net zero by 2050	More ambition on the part of Australia likely to emerge with the new government and to be impactful It is important to note, however, government policy, legislation, and implementation plans will need to emerge	**5** Confirmatory

Brazil policy announcements/developments (1/2)

Brazil decree announcing national carbon market is promising but limited details to date, including potential for inclusion of agriculture and forestry

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Brazil 	**Carbon pricing** $	The last week of May, Brazil's president signed a decree announcing the creation of a national carbon market[5] • Limited details have been shared on the functioning of the market. Sectors will be invited to set their own emission goals provided the targets collectively deliver on the Paris Agreement. • The proposal would not create a cap-and-trade scheme, and some have criticised it for not creating a clear obligation on companies	**1.8°C FPS:** US$45 by 2030	• Confirmatory but no evidence to date of an acceleration in policy ambition. The decree entered into force immediately after being published however does not establish a carbon market but rather provide a set of guidelines for developing future instruments that would regulate a carbon market • More regulation in the form of legislation or decrees is expected to clarify some of the points that have remained open and to address the non-mandatory nature of the decree (e.g. mechanisms for operating, price setting to be defined by Ministry of Environment) • The carbon market will be sectoral, with the potential to include forestry	5 Confirmatory

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Brazil policy announcements/developments (2/2)

Proposed laws could accelerate deforestation but are unlikely to be approved until October's election. A new decree that establishes higher fines for illegal deforestation and illegal logging could provide some protection.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Brazil 	**Land use and forestry** 	In late April, a bill was proposed to redraw Amazon borders to exclude the state of Mato Grosso, which decreases percentage of native vegetation required, leading to higher deforestation[6]	**1.8°C FPS:** • End net deforestation by 2030 • Deliver afforestation at scale by 2033	The proposal is being discussed in the lower house of the Congress and it is unlikely to be approved until after the election. According to analysis by the Forest Code Observatory, a group of civil entities that monitor forest legislation, the measure could expand forest loss by at least 10Mha. The risk is that if this bill passes it could have knock-on effects on other Amazon states, which may be encouraged to promote similar bills. Moreover, in the context of rising food prices and the need to expand agricultural production there will be intense lobby from agribusiness to pass it	4 Monitor developments
		On May 24th, the Brazilian government published a decree that establishes higher fines for illegal deforestation including related to logging, burning fishing and hunting. It also introduces higher fines on repeat offenders and changes the rules for "reconciliation" hearings between offenders and environmental agencies by placing a time limit on an offender's ability to engage with the process before judicial hearing[7]	**1.8°C FPS:** • End net deforestation by 2030 • Deliver afforestation at scale by 2033	First concrete step Brazil government has made regarding forestry since committing to ending illegal deforestation by 2028 at COP 26 This will send a strong signal to violators, with fines currently being uncollected due to government staff shortage	5 Confirmatory

China policy announcements/developments

China policy documents issued in June confirm ambitious plans for clean energy production, which are aligned to 1.8°C FPS forecasts. There is potential for China to overachieve on targets, but this will depend on utilisation of fossil fuel capacity.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
China 	**Clean Power** 	• In June, the National Development and Reform Commission released three major high-level documents, confirming plans for expanding renewable power and green financing support under its ongoing 14th Five-Year Plan (covering 2021 to 2025)[7] • Plans describe an indicative 2025 renewable energy generation target of 3,300 TWh, accounting for 50% of the increase in the country's increase in electricity consumption • The transition will be driven by an increase in wind and solar installed capacity to 1,200 GW, confirming NDRC's previous target, and raising the share of non-fossil fuel consumption to 25% of the energy mix by 2030 • The NDRC and NEA also published an underlying implementation plan for the new strategy and the Ministry of Finance released a statement announcing it would create a financial policy framework to support the shift to new energy	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2050 **1.5°C RPS:** Strong policy signal to deliver 100% clean power by 2040	• This plan has been jointly issued by nine ministry-led central government agencies • Potential for these targets, which are indicative and not binding, to be overachieved, based on renewables growth in recent years and planned projects, particularly in provincial development plans • Target focuses on non-fossil fuel energy consumption (e.g. broader than power sector); current stated target is 60% clean power by 2030; overachievement of targets could put China on track to decarbonizing grid much earlier (e.g. closer to 1.5C RPS)	6 Monitor developments

European Union policy announcements/developments (1/2)

EU continues to face delays and challenges to expansion of the ETS as part of Fit for 55. Final RePower EU plan reinforces I.8°C FPS outlook but questions remain over achievability of ambitious targets.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
EU	Carbon pricing	As of mid-June, EU lawmakers are falling behind schedule in reform of EU ETS[8,9,] which includes proposals to introduce pricing in the buildings/transport sectors. On June 8, the Parliament failed to reach an agreement on the Plenary where a vote was scheduled for a position on the EU ETS reform and related CBAM proposal	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2045	• Confirmatory, but with potential risk of delayed timelines • Council has yet to reach agreement on their position which is required before negotiations between the Commission, Parliament and Council can commence. Related votes (e.g. on CBAM and climate social fund) may also need to be postponed.	5 Confirmatory
	Multiple including Clean Power Low carbon buildings	In May, EU **published its final RePower EU plan to reduce fossil fuel** energy imports from Russia[10]: • Increase Fit for 55 renewable target from 40% to 45% • **EU Solar Strategy** to double PV capacity by 2035 and install 600 GW by 2030 • 10M tonnes of domestic renewable hydrogen capacity by 2030 • Rollout contracts for differences to support uptake of green hydrogen • Increase energy efficiency target from 9% to 13% • 5M heat pumps in five years	**1.8°C FPS:** Various including • **Coal phase out:** Strong policy signal that coal generation to be made unlawful or unprofitable by 2030 • **Clean power:** policy to deliver 100% clean power by 2045	• Proposals discussed in Q1 QFT as largely confirmatory/reinforcing of IPR; some aspects appear ambitious or unrealistic (given current supply chains) • New finance has been committed (210Bn Euros before 2027, most redistributed from recovery funds) • **Solar Strategy** lays groundwork for legislative initiative expected mid-September banning product made by forced labour (e.g. solar material from China's Xinjiang region), reinforcing narrative around friendshoring but raising questions on feasibility of meeting solar target	11 Confirmatory

European Union policy announcements/developments (2/2)

EU continues to face delays and challenges to expansion of the ETS as part of Fit for 55. Final RePower EU plan reinforces I.8°C FPS outlook but questions remain over achievability of ambitious targets.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
EU	Clean Power	On May 18th, at the North Sea Summit, Germany, Denmark, Belgium and the Netherlands pledge to increase their installed capacity of wind energy by 10x[11] • The four EU countries plan to reach at least 65 GW of offshore wind capacity by 2030 • By 2050, they will seek to reach 150 GW	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2045	Confirmatory, these plans would contribute significantly towards the wind capacity needed to meet the 1.8°C FPS forecast for the EU	5 Confirmatory
	ICE bans	In early June, the EU Parliament approved a proposal which requires automakers to cut CO_2 emissions by 100% by 2035, effectively banning the sale of ICE vehicles. Governments of EU member nations will need to ratify the legislation before it can come into force. Previously EU lawmakers had endorsed a 55% reduction in CO_2 from automobiles in 2030 compared to 2021	**1.8°C FPS:** 100% ZEV sales from 2035	Confirmatory	5 Confirmatory

Germany policy announcements/developments

Germany's preparation for increased renewable power generation and renewed ambition to invest in carbon capture and storage confirm its ability to meet the 1.8°C FPS Forecast of delivering 100% clean power by 2045

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Germany	Clean Power	Germany aims to fulfil 80% of its electricity needs from renewable sources by 2030; as part of this goal, onshore wind will need to reach a capacity of 115 GW • On June 8th, a package of measures was introduced increasing the amount of land designated for onshore wind power from 0.8% to 2%[12]	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2045	Confirmatory	5 Confirmatory
	Clean Power Clean Industry	On May 19th, the Economy Ministry announced a rehaul of its carbon capture and storage law to be expected later this year[13]: • Storage is expected to reside under the North Sea • Government is considering financial support for initial projects through CCfD (carbon contracts for difference) • This is still far from a holistic strategy, which would be coupled with the country's hydrogen strategy	**1.8°C FPS:** • **Clean power:** strong policy signal to deliver 100% clean power by 2045 • **Clean industry:** 100% new zero carbon production facilities from 2040	Confirmatory	5 Confirmatory

United States policy announcements/developments

Recent announcement to pause restrictions on solar imports improve renewables deployment outlook for US. Government has increased permitted renewable capacity on public lands and California released its strategy to achieve carbon neutrality by 2045.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
US 	Clean Power	In June, the US announced it will pause solar tariffs for two years on Cambodia, Malaysia, Thailand and Vietnam to protect existing solar jobs at risk due to supply chain constraints. This will run parallel to an ongoing investigation on these four countries on dumping.[14]	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2040	• In Q1, IPR signaled a potential downgrade of its 2021 forecast for power sector decarbonisation in the US as import bans could lead to contraction in US market • IPR is now changing its outlook for the US back to confirmatory; this policy sustains the rollout of solar in the near term while enabling build up of domestic manufacturing capacity	5 Confirmatory
		On April 20th, the Biden administration announced an increase in the permitted renewable capacity on public land by 10GW on top of the existing 12GW.[15] The target out to 2025 is higher, with the US Bureau of Land Management announcing plans to greenlight 29 GW of new utility-scale solar on public land by that year.	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2040	This would increase permitting but does not reflect firm renewables plans	5 Confirmatory
		In the first week of May, California released a plan to reach carbon neutrality by 2045 by cutting oil and gas use in the state by 91% and using CCS. The key focuses are buildings (80% of appliances and heating must be electric by2030 and 100% by 2035) and transport (all new cars must be zero emission by 2035, trucks by 2040 ad 10% of air fuel must be met with hydrogen and batteries by 2045)[16] The strategy is not final and must be approved by political appointees.	**1.8°C FPS:** Strong policy signal to deliver 100% clean power by 2040	This strategy confirms known/existing strategies/targets already in place	5 Confirmatory

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Technology developments: Renewables and hydrogen

In the US, renewables costs continue to fall, supporting administration ambition for a largely decarbonized power sector by 2035 and infrastructure funding begins to be distributed to clean tech sectors including batteries and CCUS. China experienced some grid constraints in accommodating solar output.

Region	Region	Development	2021 IPR Forecast	Impact on forecast	Impact score
Multiple technologies	**US**	Biden administration have begun distributing $2.25bn for CCS as part of the Bipartisan Infrastructure Law[17]	**1.8°C FPS:** • Extensive deployment of CCUS and electric vehicles, energy storage • Industrial BECCS to reach 1.8 MT by 2030	Confirms forecast 2021 IPR Forecast involves substantial innovation across all key transition technologies driven by public and private R&D and innovation	5 Confirmatory
		US Department of Energy offers USD 3bn to build up battery supply chain[17]			5 Confirmatory
Wind and Solar		Costs of renewables falls as installed capacity decreases (wind levelized costs fall to an average of $32/MWh while utility-scale solar costs fall to $34/MWh)[18]	**1.8°C FPS:** • Policy to deliver 100% clean power by 2040 • Wind to reach 254 GW of capacity by 2030	Confirms 2021 IPR forecast that policy will face stronger incentive to deploy low-carbon generation at scale where cost competitive with fossil generation	5 Confirmatory
Wind and Solar	**China**	12% wind power in inner Mongolia and 10% solar power in Qinghai curtailed due to grid constraints[19]	**1.8°C FPS:** • Wind capacity to increase by 222% 2021-2030	Confirmatory – grid challenges are part of the IPR 2021 policy forecast As noted in Q1 QFT, China's national power market plans should support integration of renewables by enabling cross-province trade	5 Confirmatory
	Brazil	Brazil has almost 16GW installed solar capacity[20]	**1.8°C FPS:** • Wind capacity to reach 6 GW by 2022	Outpaces forecast; signalling a slight acceleration in policy and adoption	6 Monitor Developments

Technology developments: Renewables and hydrogen

Hydrogen strategies advance across major economies and electrolyser innovation continues to grow in the EU and UK.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Hydrogen	EU	Patent filings for hydrogen production technologies have grown on average by 18% each year since 2005, shoes IRENA and European Patent Office report, Innovation trends in electrolysers for hydrogen production[21]	**1.8°C FPS:** • Cost reduction across all major clean energy technologies • Hydrogen power generation capacity in Western Europe to start building up in 2031 and reach 114 GW by 2050	Confirms forecast; IPR 1.8°C FPS assumes innovation in electrolysers	5 Confirmatory
	UK	First ultra-efficient high-pressure electrolyser currently being tested in UK, supported by government Net Zero Innovation Portfolio[22]	**1.8°C FPS:** • Cost reduction across all major clean energy technologies • Hydrogen power generation capacity in Western Europe to start building up in 2031 and reach 114 GW by 2050	Confirms forecast; IPR 1.8°C FPS assumes innovation in electrolysers	5 Confirmatory

Technology developments: Electric vehicles

EV sales increased significantly in 2021, exceeding nearer term outlook for deployment due to a combination of subsidies, phase out policies, and increased availability of models. Achieving ICE phase out policies, as early as 2030 in certain IPR countries, will remain challenging

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Light duty vehicles	Global	IEA Global EV Outlook 2022 finds electric car sales accounted for 10% of global car sales and model availability increasing 5x since 2015 due to a combination of durable funding support, phase out objectives, and increased number of models available[26]	**1.8°C FPS** • 5% share in 2021, growing to 18% share by 2025 • Tier 1 countries phasing out ICE vehicles by 2030, Tier 3 by 2045	This outpaces IPR outlook for EV deployment during the early 2020s and signals a slight acceleration	6 Monitor developments
	Germany	Share of new cars with alternative drive systems reaches 45% during the first quarter of 2022[27]	**1.8°C FPS:** • 12% of new car sales from alternative drive systems (BEV+H2+PHEV) in 2021, end sales of new fossil cars and vans from 2035	This outpaces IPR outlook for EV deployment in 2021 (e.g. 12% of new car registrations); developments in the trend need to be monitored.	6 Monitor developments
	China	Electric vehicles accounted for 22% of all vehicle registrations in China in 2022, with 17% of these being fully electric vehicles[28]	**1.8°C FPS** • 10% ZEV share in 2021 rising to X% by 2030 • Forecast to end sales of fossil fuelled light duty vehicles by 2035	This outpaces IPR outlook for EV deployment in 2021 (e.g. 10% of new car registrations) and signals a slight acceleration; however, it is important to note that achieving 100% EV sales by 2030 remains challenging	6 Monitor
Heavy duty vehicles	UK	UK government announced investment £200m in an extensive net zero emission road freight demonstrator program, taking the world's largest fleet of zero emission HGVs through UK Roads[29]	**1.8°C FPS** • 7% non-ICE trucks by 2030	Investment will help the UK start roll-out of net zero heavy duty vehicles, whilst gathering insights to refine preparation for heavy-duty charging infrastructure	5 Confirmatory

Technology developments: Agriculture, Land use and forestry

Cultivated meat capacity grows in the US. Brazil continues to experience high levels of deforestation in the Amazon and Nigeria targets forest protection.

Region	Sector	Development	2021 IPR Forecast	Impact on forecast	Impact score
Agriculture	**US**	US company Good Meat announced plans to build bioreactors that can grow >13K cultivated chicken/beef (to begin operating in 2024 and reach full capacity by 2030)[23]	**1.8°C FPS:** Nationwide market incentives to encourage farmers to reduce emissions from crop production and livestock from 2029	Confirmatory: FPS is ambitious on cell-based meat take up, especially in the US and Europe, with technology a key enabler for cell-based meat, in addition to achieving taste parity and consumer uptake	5 Confirmatory
Land use and Forestry	**Brazil**	Amazon deforestation reaches record for April at double the previous peak, following similar highs in January and February[24]	**1.8°C FPS:** End net deforestation by 2030, Deliver afforestation at scale by 2030	As noted in Q1, IPR anticipates no action against deforestation under current administration, however the situation is worth monitoring Deforestation and illegal activities likely linked to weakening of environmental institutions, including the Ministry of Environment, and enforcement/ compliance entities Brazil land use emissions accounts for ~57% of total Brazil GHG emissions, and ~11% of global land use emissions	4 Monitor developments
	Nigeria	Nigeria targets increasing forest cover to 25% of land area[25]	**1.8°C FPS:** End net deforestation by 2030, Deliver afforestation at scale by 2030	Confirmatory statement by government, including plans to expand protected areas through creation of National Parks	5 Confirmatory

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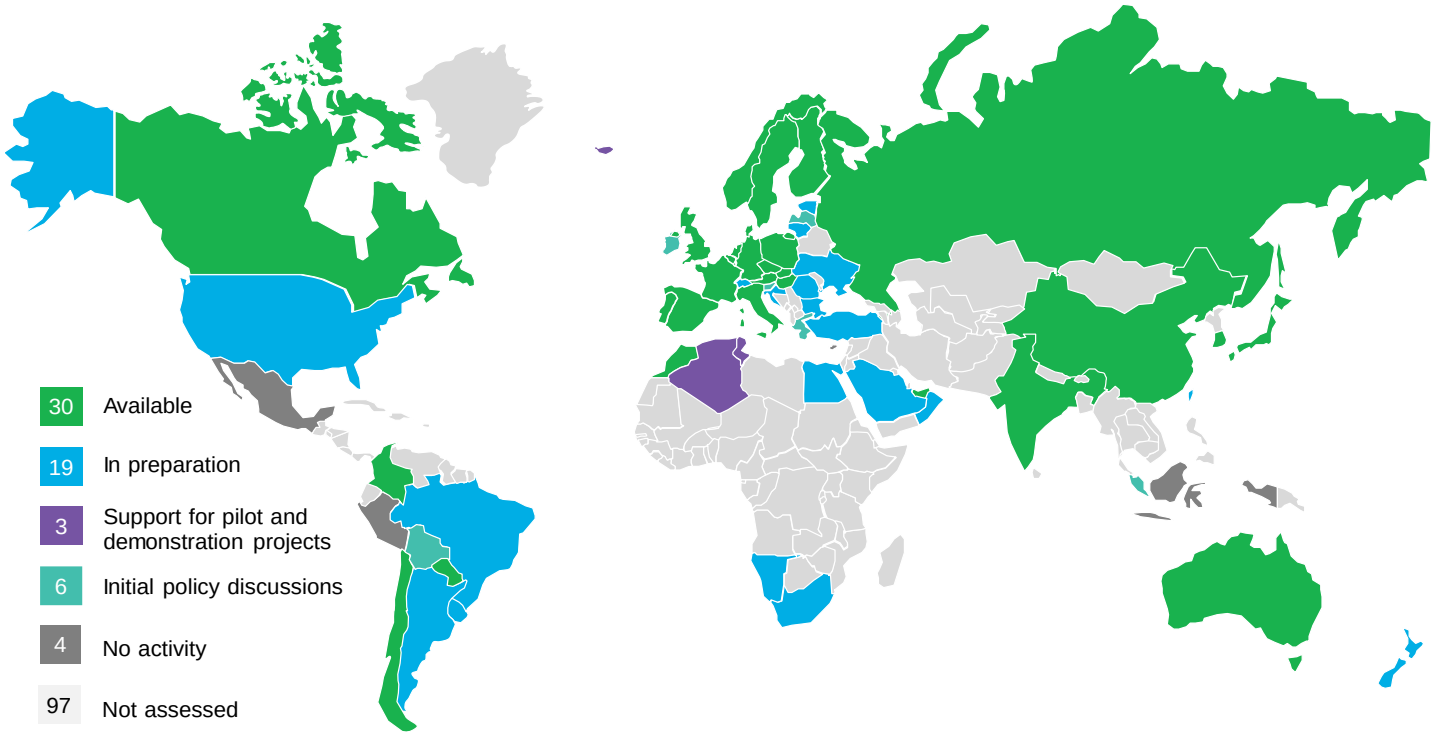
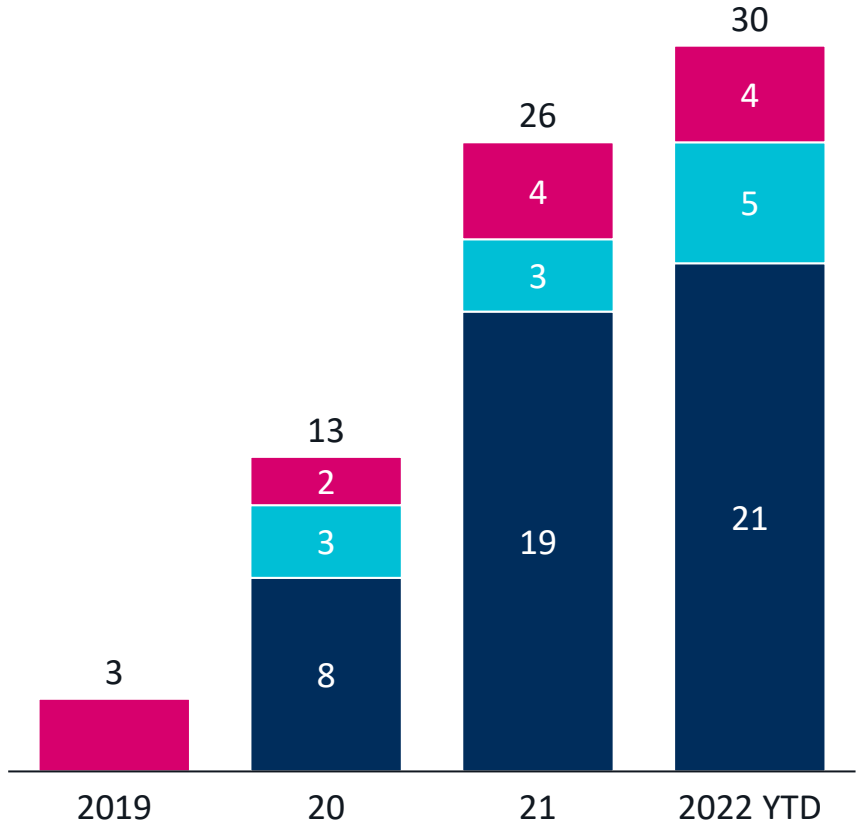
Technology developments: Hydrogen strategies continue to increase across the globe

Countries with national hydrogen strategies



Increase in hydrogen strategies

Number of countries



Source: BNEF Global Hydrogen Strategy Tracker

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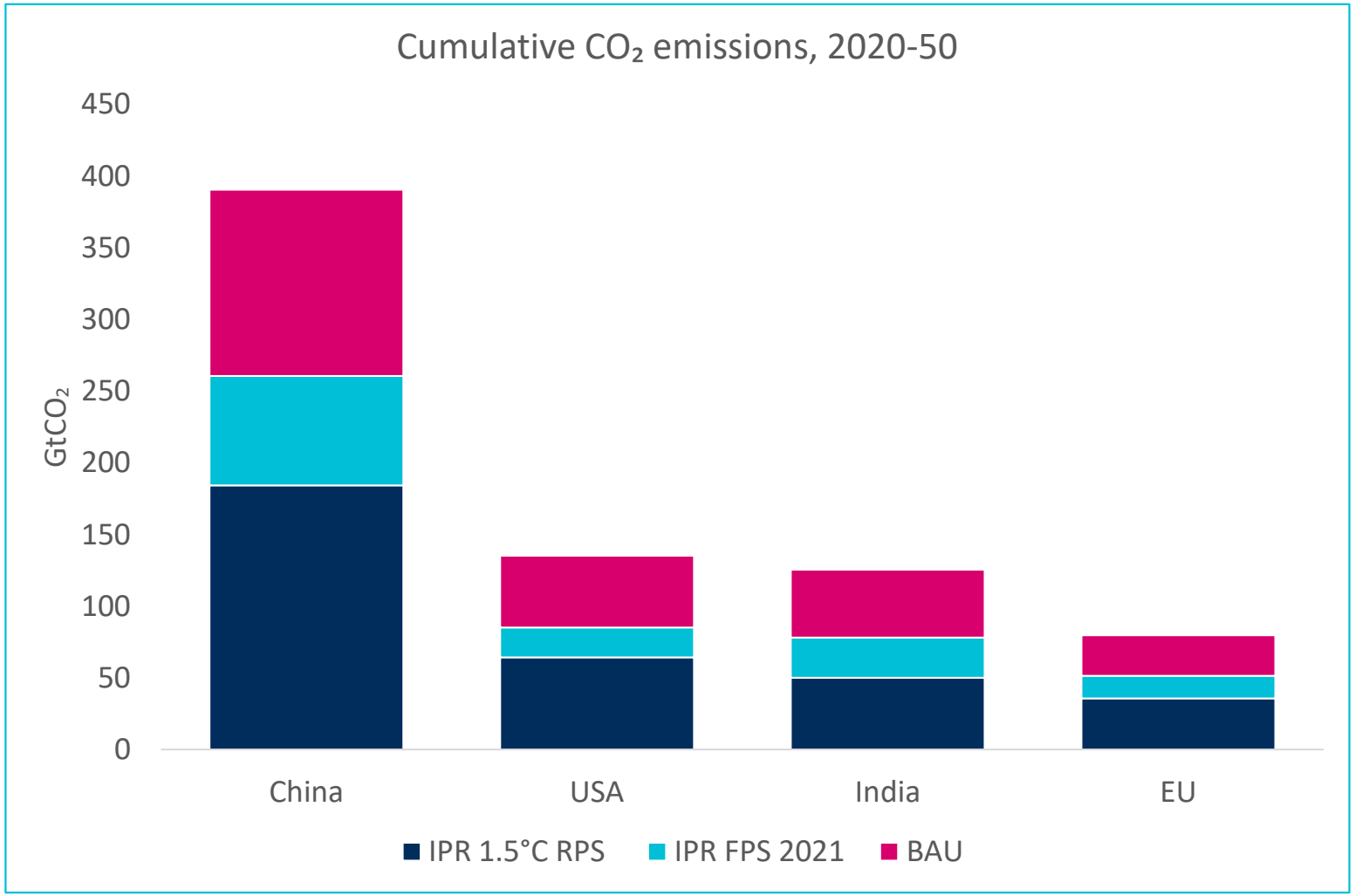
Embedded in the IPR FPS 2021 are substantial emissions reductions, additional reductions to achieve the IPR 1.5°C RPS will be challenging



- The IPR FPS 2021 represents a substantial reduction in emissions relative to a business-as-usual (BAU) scenario
- China's emissions are around 35% lower than under a BAU pathway
- The United States and India's emissions are around 40% lower
- The EU's emissions are around 35% lower
- Smaller additional reductions are needed to achieve the IPR 1.5°C RPS, though these will be more costly and challenging than those delivered under the IPR FPS 2021

Policies with the greatest 2020-2050 Gt reduction between IPR 1.5°C RPS and IPR FPS 2021

Rank	Policy	Country	IPR 1.5°C RPS vs IPR FPS 2021 Gt reduction
1	Coal phase out	China	40.0
2	End deforestation and NBS	Sub-Saharan Africa, South East Asia and Latin America	19.0
3	100% clean industry	China	19.0
4	Coal phase out	India	14.1
5	100% clean industry	India	8.3
6	100% clean industry	MENA	7.2
7	100% clean power	MENA	6.7
8	Fossil vehicle phase out	China	6.3
9	Coal phase out	Indonesia	5.4
10	100% clean industry	South East Asia	5.2

Reduction is also substantial for OECD countries e.g. for the United States accelerated 1.5°C RPS policies deliver:

- **20 $GtCO_2$ reduction beyond FPS across all policies**
- **4.9 $GtCO_2$ reduction beyond FPS for 100% clean industry policy**

Reduction is also substantial for methane and nitrous oxide emissions that result from accelerated 1.5°C RPS policies related to animal protein demand:

- **24 $GtCO_2eq$ reduction beyond FPS across all countries**
- **4.3 $GtCO_2eq$ reduction beyond FPS in India alone**

IPR 2021 top ten policy forecasts

Carbon pricing	**1.**	Carbon Border Adjustments Mechanisms (CBAMs) for carbon will become increasingly a policy option. This could lead the United States to announce a national carbon pricing system by 2025 and signal a strong carbon price path to reach a backstop of $65 by 2030.
	2.	The European Union's evolving commitments will deliver substantial carbon prices. By 2030, we expect EU policy to backstop an EU ETS carbon price of $75/tCO2 to ensure long-term action toward decarbonisation in heavy emitting sectors.
Coal	**3.**	In India, rapidly evolving Indian policy and prospects for market reforms and pricing has already ended further investment in new coal.
	4.	China will end construction of new coal fired power production after 2025, driven by new policies to facilitate its 2060 net zero target, geopolitical trends and risk considerations*
	5.	The United States will end all coal-fired power generation by 2035, through a combination of emission performance standards and carbon pricing at the Federal and State levels, combined with market forces.

Note: Emissions reduction are approximate and include come additional sector-specific CO_2 reduction such as energy efficiency

IPR 2021 top ten policy forecasts

Clean power	**6.**	The United States will implement a binding and credible 100% clean power standard for 2040 ending unabated fossil electricity generation.
Zero emission vehicles	**7.**	China, France, Germany, Italy and Korea will end the sale of fossil fuel cars and vans in 2035. Jointly these large markets will accelerate the auto industry transition to electric drive, and precipitate further policy action internationally.
Industry	**8.**	All major industrial economies including the US, Germany, Japan and China will require all new industrial plants, led by steel and cement, to be low-carbon by 2040, through a combination of emissions performance standards and carbon pricing.
Agriculture	**9.**	The US, Canada, Australia and other major agricultural producers will have comprehensive mitigation policy in place by 2025 to reduce emissions from production of crops and livestock.
Land use	**10.**	Major tropical forest countries will end deforestation by 2030, with domestic policy responding to international climate finance and corporate supply chain pressures.

INEVITABLE POLICY RESPONSE

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Instructions: how to read the following tables containing IPR policy forecasts

The following section provides an overview of the FPS and RPS forecasts for each country or region.

IPR 1.8°C Forecast Policy Scenario (FPS)

- Models impact of forecasted policies on the real economy.

IPR 1.5°C Required Policy Scenario (RPS)

- Required policies to align to a **1.5°C objective**

How to read the tables

Each table presents the **estimated time by which the forecast will be achieved for different countries or regions** around the world.

In the sample table below for Australia (AU), under the FPS coal will be phased out by 2040, whereas the RPS requires coal to be phased out by 2030.

Phase out of existing unabated coal

	Timeline								annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	RPS	FPS
Australia			RPS		FPS					10%	5%
Brazil				RPS		FPS				7%	4%
Canada		RPS	FPS							20%	10%
China				RPS		FPS				7%	4%
Central and South America				RPS		FPS				7%	4%
Eastern Europe			RPS		FPS					10%	5%
Eurasia						RPS			FPS	4%	3%

The final two columns show the annual reduction in coal necessary to achieve these targets.

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Q2 2022

To meet a global coal phase out of 2045, immediate policy action is required

Phase out of existing unabated coal

	Timeline								annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	RPS	FPS
Australia			RPS		FPS					10%	5%
Brazil				RPS		FPS				7%	4%
Canada		RPS	FPS							20%	10%
China				RPS		FPS				7%	4%
Central and South America				RPS		FPS				7%	4%
Eastern Europe			RPS		FPS					10%	5%
Eurasia						RPS			FPS	4%	3%
Gulf States						RPS			FPS	4%	3%
India						RPS			FPS	4%	3%
Indonesia						RPS			FPS	4%	3%
Japan				RPS		FPS				7%	4%
Middle East and North Africa						RPS			FPS	4%	3%
Russia						RPS			FPS	4%	3%
Saudi Arabia						RPS			FPS	4%	3%
South Africa				RPS	FPS					7%	5%
SEAO						RPS			FPS	4%	3%
South Korea				RPS		FPS				7%	4%
Sub Saharan Africa						RPS			FPS	4%	3%
United Kingdom		Both								20%	20%
United States of America			RPS	FPS						10%	7%
Western Europe			RPS		FPS					10%	5%

** reduction in coal generation as a share of 2020 levels*

INEVITABLE POLICY RESPONSE

Q2 2022

To meet 100% clean power by 2050, immediate policy action is required

100% clean power

	Timeline									annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	RPS	FPS
Australia					RPS		FPS			5%	3%
Brazil					RPS		FPS			5%	3%
Canada			RPS	FPS						10%	7%
China					RPS		FPS			5%	3%
Central and South America					RPS		FPS			5%	3%
Eastern Europe				RPS		FPS				7%	4%
Eurasia						RPS			FPS	4%	3%
Gulf States						RPS			FPS	4%	3%
India						RPS			FPS	4%	3%
Indonesia						RPS			FPS	4%	3%
Japan				RPS		FPS				7%	4%
Middle East and North Africa						RPS			FPS	4%	3%
Russia						RPS			FPS	4%	3%
Saudi Arabia						RPS			FPS	4%	3%
South Africa				RPS	FPS					7%	5%
SEAO						RPS			FPS	4%	3%
South Korea				RPS		FPS				7%	4%
Sub Saharan Africa						RPS			FPS	4%	3%
United Kingdom				RPS	FPS					7%	5%
United States of America				RPS	FPS					7%	5%
Western Europe				RPS		FPS				7%	4%

** reduction in power CO2 emissions as a share of 2020 levels*

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Q2 2022

Light duty vehicles: new fossil vehicles must be phased out between 2030 and 2045 under RPS, five years earlier than under IPR FPS 2021 policies

Fossil vehicle phase out (light duty)

	Timeline									annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	RPS	FPS
Australia				RPS	FPS					7%	5%
Brazil					RPS	FPS				5%	4%
Canada			RPS	FPS						10%	7%
China			RPS	FPS						10%	7%
Central and South America				RPS	FPS					7%	5%
Eastern Europe			RPS	FPS						10%	7%
Eurasia					RPS	FPS				5%	4%
Gulf States					RPS	FPS				5%	4%
India				RPS	FPS					7%	5%
Indonesia				RPS	FPS					7%	5%
Japan				RPS	FPS					7%	5%
Middle East and North Africa				RPS	FPS					7%	5%
Russia					RPS	FPS				5%	4%
Saudi Arabia						RPS	FPS			4%	3%
South Africa				RPS	FPS					7%	5%
SEAO				RPS	FPS					7%	5%
South Korea			RPS	FPS						10%	7%
Sub Saharan Africa						RPS	FPS			4%	3%
United Kingdom			Both							10%	10%
United States of America				RPS	FPS					7%	5%
Western Europe			RPS	FPS						10%	7%

** reduction in fossil vehicle sales as a share of 2020 levels*

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INEVITABLE POLICY RESPONSE

Q2 2022

Heavy duty vehicles: new fossil vehicles must be phased out between 2035 and 2050 under RPS, five years earlier than under IPR FPS 2021 policies

Fossil vehicle phase out (heavy duty)

	Timeline									annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	RPS	FPS
Australia					RPS	FPS				5%	4%
Brazil					RPS	FPS				5%	4%
Canada					RPS	FPS				5%	4%
China				RPS	FPS					7%	5%
Central and South America					RPS	FPS				5%	4%
Eastern Europe				RPS	FPS					7%	5%
Eurasia						RPS	FPS			4%	3%
Gulf States						RPS	FPS			4%	3%
India					RPS	FPS				5%	4%
Indonesia					RPS	FPS				5%	4%
Japan				RPS	FPS					7%	5%
Middle East and North Africa					RPS	FPS				5%	4%
Russia						RPS	FPS			4%	3%
Saudi Arabia							RPS	FPS		3%	3%
South Africa					RPS	FPS				5%	4%
SEAO					RPS	FPS				5%	4%
South Korea				RPS	FPS					7%	5%
Sub Saharan Africa							RPS	FPS		3%	3%
United Kingdom				Both						7%	7%
United States of America					RPS	FPS				5%	4%
Western Europe				RPS	FPS					7%	5%

** reduction in fossil vehicle sales as a share of 2020 levels*

Q1 2022

Industry: the sector has a 30-year transition opportunity to net zero

100% clean industry

	Timeline									annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	>2060	RPS	FPS
Australia							RPS		FPS	3%	2%
Brazil								RPS	FPS	3%	2%
Canada							RPS		FPS	3%	2%
China								RPS	FPS	3%	2%
Central and South America								RPS	FPS	3%	2%
Eastern Europe							RPS		FPS	3%	2%
Eurasia								RPS	FPS	3%	2%
Gulf States								RPS	FPS	3%	2%
India								RPS	FPS	3%	2%
Indonesia								RPS	FPS	3%	2%
Japan							RPS		FPS	3%	2%
Middle East and North Africa								RPS	FPS	3%	2%
Russia								RPS	FPS	3%	2%
Saudi Arabia								RPS	FPS	3%	2%
South Africa							RPS		FPS	3%	2%
SEAO								RPS	FPS	3%	2%
South Korea							RPS		FPS	3%	2%
Sub Saharan Africa								RPS	FPS	3%	2%
United Kingdom							RPS		FPS	3%	2%
United States of America							RPS		FPS	3%	2%
Western Europe							RPS		FPS	3%	2%

** reduction in industry CO2 emissions as a share of 2020 levels*

INEVITABLE POLICY RESPONSE

Q2 2022

Buildings: new fossil heating systems must be phased out globally by 2040 under RPS, and by 2030 in regions with large heating needs

New fossil heating system phase out

	Timeline									annual reduction*	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	RPS	FPS
Australia			RPS	FPS						10%	7%
Brazil					RPS		FPS			5%	3%
Canada			RPS	FPS						10%	7%
China					RPS	FPS				5%	4%
Central and South America				RPS	FPS					7%	5%
Eastern Europe			RPS	FPS						10%	7%
Eurasia					RPS		FPS			5%	3%
Gulf States					RPS		FPS			5%	3%
India					RPS		FPS			5%	3%
Indonesia					RPS		FPS			5%	3%
Japan				RPS	FPS					7%	5%
Middle East and North Africa					RPS		FPS			5%	3%
Russia					RPS		FPS			5%	3%
Saudi Arabia					RPS		FPS			5%	3%
South Africa			RPS	FPS						10%	7%
SEAO					RPS		FPS			5%	3%
South Korea				RPS	FPS					7%	5%
Sub Saharan Africa					RPS		FPS			5%	3%
United Kingdom			RPS	FPS						10%	7%
United States of America				RPS	FPS					7%	5%
Western Europe			RPS	FPS						10%	7%

** reduction in fossil heating system sales as a share of 2020 levels*

Achieving 1.5°C RPS animal meat consumption reductions requires a shift in policy acceleration of five years compared to the IPR FPS 2021

	2020	2025	2030	2035	2040	Reduction in per capita meat consumption* 2020-2050 (%) IPR FPS 2021	IPR 1.5C RPS
Australia		RPS	FPS			42	51
Brazil		RPS	FPS			38	48
Canada		RPS	FPS			43	52
China				FPSRPS		35	45
Central and South America		RPS	FPS			34	45
Eastern Europe		RPS	FPS			40	50
Eurasia			RPS	FPS		30	42
Gulf States			RPS	FPS		25	37
India			RPS	FPS		0	14
Indonesia			RPS	FPS		18	31
Japan		RPS	FPS			40	50
Middle East and North Africa			RPS	FPS		28	39
Russia		RPS	FPS			36	46
Saudi Arabia			RPS	FPS		6	22
South Africa			RPS	FPS		-13	6
SEAO			RPS	FPS		20	33
South Korea		RPS	FPS			40	50
Sub Saharan Africa					FPSRPS	-13	6
United Kingdom		RPS	FPS			41	50
United States of America		RPS	FPS			42	51
Western Europe	RPS	FPS				40	50

*kcal per person

Large drop in SSA happens post 2035

INEVITABLE POLICY RESPONSE

Q2 2022

Ending deforestation by 2025 in 1.5°C RPS and 2030 in IPR FPS 2021 will require immediate policy action

Deforestation of natural forest halted through command and control policy

	End of deforestation			Change in forest cover 2020-2050 (m ha)	
	2020	2025	2030	IPR FPS 2021	IPR 1.5C RPS
Australia		FPSRPS		3	3
Brazil		RPS	FPS	12	16
Canada	FPSRPS			1	1
China		RPS	FPS	92	92
Central and South America		RPS	FPS	10	14
Eastern Europe		FPSRPS		4	4
Eurasia		RPS	FPS	1	2
Gulf States	FPSRPS			0	0
India		RPS	FPS	13	13
Indonesia		RPS	FPS	2	6
Japan	FPSRPS			0	0
Middle East and North Africa		RPS	FPS	-1	1
Russia		RPS	FPS	1	2
Saudi Arabia	FPSRPS			0	0
South Africa		RPS	FPS	0	1
SEAO		RPS	FPS	3	11
South Korea	FPSRPS			0	0
Sub Saharan Africa		RPS	FPS	0	15
United Kingdom	FPSRPS			1	1
United States of America		FPSRPS		17	17
Western Europe		RPS	FPS	11	12

Under IPR scenarios, carbon pricing and NDC commitments could combine to stop net deforestation by 2030

Countries/region like CAN, GCC, Japan, SA, SK, UK have virtually zero net deforestation

Q1 2022

Some countries achieve net zero CO_2 emissions on a territorial basis, while others require international carbon offsets to meet commitments

Contribution from each sector to total % change in CO2 emissions, 2020-50 and net zero year (territorial basis)

Group	Region	Power	Transport	Buildings	Industry	Land	Total	Net zero year
OECD	United States	-39%	-31%	-10%	-10%	-7%	**-100%**	2050
	EU	-30%	-27%	-14%	-14%	-10%	**-100%**	2050
	UK	-36%	-21%	-11%	-13%	-12%	**-100%**	2050
	Japan	-38%	-18%	-9%	-18%	-2%	**-89%**	not achieved
	Korea	-40%	-18%	-7%	-17%	-1%	**-87%**	not achieved
	Canada	-10%	-22%	-11%	-10%	-26%	**-89%**	2069
	Australia	-38%	-21%	-3%	-9%	-20%	**-94%**	2058
Non-OECD	China	-41%	-7%	-3%	-24%	-11%	**-91%**	2059
	India	-34%	-7%	-1%	-7%	-14%	**-66%**	2061
	Brazil	-3%	-10%	-1%	-5%	-81%	**-101%**	2050
	Russia	-24%	-10%	-5%	-9%	-7%	**-64%**	2087
	Indonesia	-19%	-14%	-2%	12%	-33%	**-57%**	2081
	South Africa	-42%	-11%	-5%	-9%	-8%	**-90%**	not achieved
	South East Asia	-21%	-15%	-1%	2%	-22%	**-60%**	not achieved
	MENA	-20%	-22%	-6%	8%	-4%	**-47%**	not achieved
	Central and South America	-16%	-19%	-4%	1%	-43%	**-83%**	2078
	Eurasia	-30%	-10%	-8%	-1%	-13%	**-69%**	2068
	Gulf States (GCC)	-26%	-21%	0%	1%	0%	**-50%**	not achieved
	South Asia	-18%	-4%	-3%	14%	-20%	**-29%**	2078
	Sub-saharan Africa	-3%	-3%	0%	8%	-59%	**-58%**	not achieved

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