IPCC Special Report on Global Warming of 1.5°C

Bindu N. Lohani

AIT

February 2023

Frequently Asked Questions (FAQs)

- 1. **WHY ARE WE TALKING ABOUT 1.5 DEGREE C**

  - PARIS AGREEMENT IN 2015 : THE CENTRAL AIM OF WHICH INCLUDES EFFORTS TO LIMIT TO GLOBAL RISE TO 1.5 DEGREE C

- 2 **HOW CLOSE ARE WE TO 1.5 DEGREE C**

  IF THE CURRENT WARMING RATE CONTINUES ,THE WORLD WOULD REACH HUMAN NDUCED GLOBAL WARMING OF 1.5 DEGREE C BY 2040. HUMAN INDUCED WARMING REACHED APPROXIMATELY 1.0 DEGREE CABOVE PRE-INDUSTRIAL LEVEL IN 2017

- **3. WHAT KIND OF PATHWAYS LIMIT WARMING TO 1.5 DEGREE C AND ARE WE ON TRACK**

  THERE IS NO DEFINITE WAY TO LIMIT GLOBAL TEMPERATURE TO 1.5 DEGREE C ABOVE PRE-INDUSTRIAL LEVEL. THE SPECIAL REPORT IDENTOFIES TWO MAIN CONCEPTUAL PATHWYAS TO ILLUSTRATE INTERPRETATIONS :

  ONE : STABILIZES GLOBAL TEMPERATURE ATJUST BELOW 1.5DEGREE C

  ANOTHER : SEES GLOBAL TEMPERATURE TEMPORARLY EXCEED1.5 DEGREE C BEFORE COMING BACK DOWN

FREQUENTLY ASKED QUESTIONS (FAQS)

- **4. WHAT DO ENERGY SUPPLY AND DEMAND HAVE TO DO WITH LIMITING WARMING TO 1.5 DEGREE C**

  TO STABILIZE GLOBAL TEMPERATURE AT ANY LEVEL" NET CO2 " EMISSONS WOULD NEED TO BE REDUCED TO "ZERO "(THIS MEANS THE AMOUNT OF CO2 ENTERING THE ATMOSPHERE MUST EQUAL THE AMOUNT THAT IS REMOVED0

  NOTE : EMISSIONS WOULD NEED TO DECLINE RAPIDLY ACROSS ALL AREAS OF MAIN SECTORS INCLUDING BUILDINGS ,INDUSTRY,TRANSPORT , ENERGY,AGRICULTURE ,FORESTRY & OTHER LANDUSE

FAQs

- **5. WHAT ARE THE LIKELY IMPACTS OF 1.5 DEGREE C AND 2 DEGREE C OF WARMING**
  - **LIMITING TO 1.5 DEGREE C THAN 2 DEGREE C REDUCES THE RISKS OF**

--EXTREME. HEAT(BY 2.6 TIMES)

-- HEAVY RAINFALLS

--CORAL REEF DAMAGE (99 % TO 70-90%)

-- FISHERIES DECLINE (BY HALF)

-- SPECIES LOSS (3 TIMES)

-- SEA FREE ARTICS , NOS OF ICEFREE SUMMERS (10 TIMES , ONE IN 100 YEARS FROM ONE IN 10 YEARS)

RISKS ASSOCIATED WITH WARMING ARE SUBSTANTIALLY LOWER AT 1.5 DEGREE C THAN 2 DEGREE C

10 Things You Need To Know*

1. Limiting warming to 1.5˚C requires major and immediate transformation.

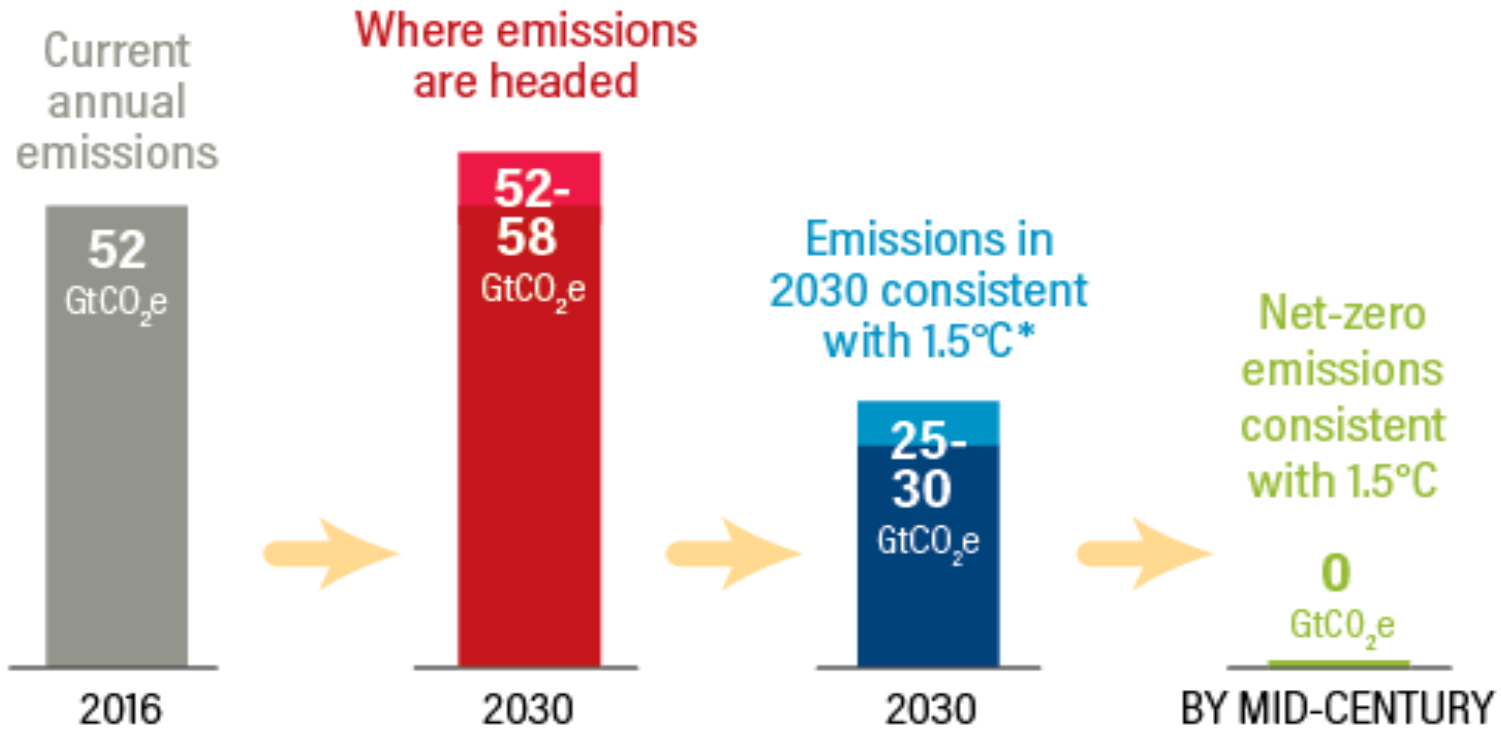
- annual emissions need to be **about half (1/2) that is (25-30GtCO_2e/yr on average) by 2030 to limit to 1.5°C in temperature**
- behavior and technology will need to shift across the board in order to achieve these emission reduction
- for example, by 2050, renewable are projected to supply 70-80% of electricity in 1.5°C pathway

2. The scale of the required low-carbon transition is unprecedented

- the report finds that if the 1.5˚C goal is to be met, **investments in low-carbon energy technology and energy efficiency will need increase by roughly a factor of five (5)by 2050 compared to 2015 levels**

Source: WRI*

The World Is Not on Track to Limit Temperature Rise to 1.5°C



Notes: *on average, no or low overshoot.

WORLD RESOURCES INSTITUTE

3. **"Limiting warming to 1.5˚C" can mean different things—with different results**

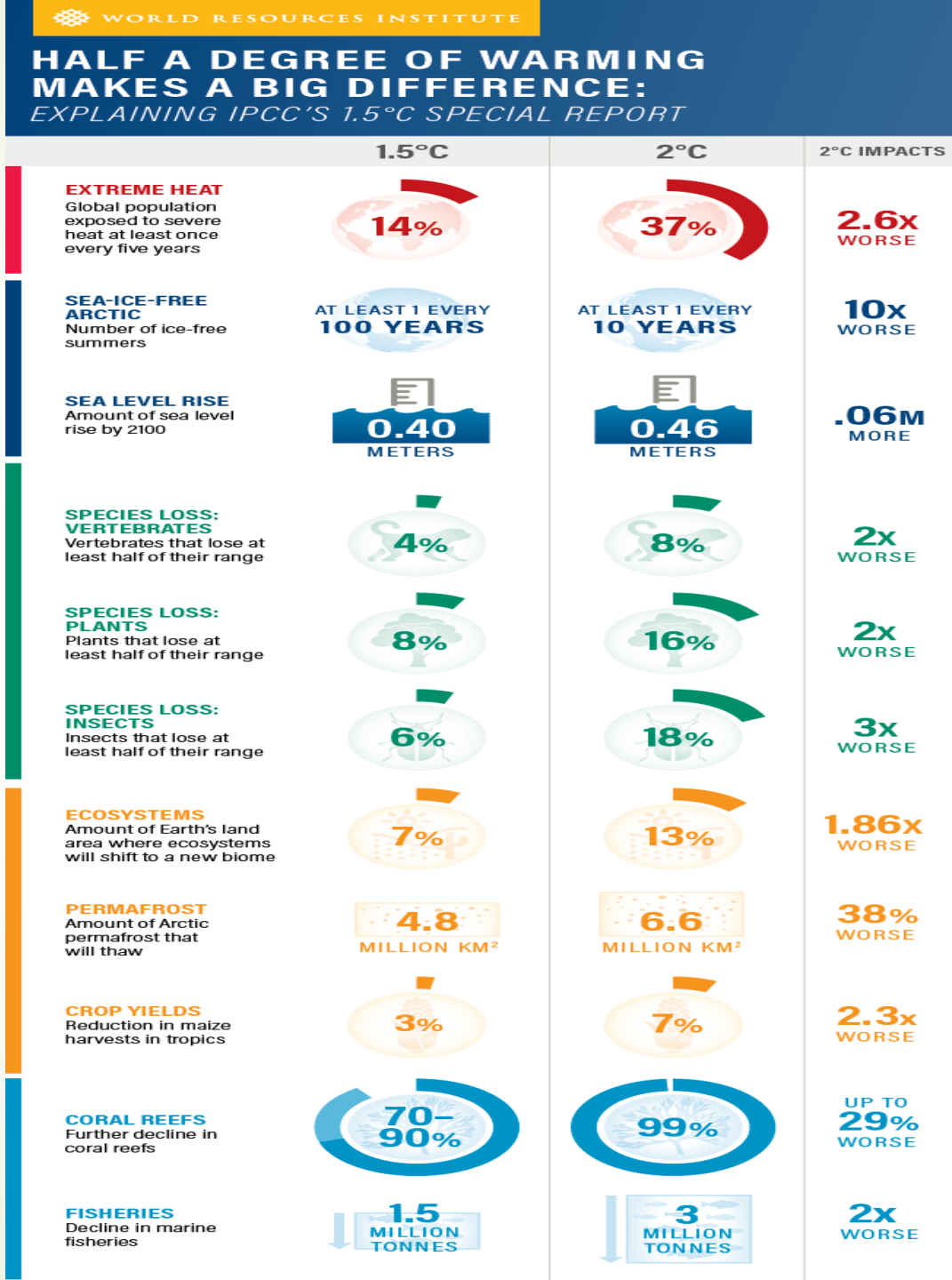
- the majority (81 out of 90) of the modeling scenarios for limiting warming to 1.5˚C exceed this temperature threshold before dropping back down. The results of these scenarios are very different from those that never overshoot 1.5˚C
- if the 1.5˚C goal is exceeded for many years at a significantly higher temperature, irreversible impacts, such as species extinction, may result even if warming is eventually brought down to 1.5˚C.
- the impacts of 1.5˚C of warming will also depend on the chosen emissions-reduction activities.

4. **A 1.5˚C limit to warming is not safe for all…**

- significant climate impacts already occur at 1.5˚C, especially in regards to low-lying areas, human health and oceans
- the impacts will hit the poor and most vulnerable the hardest due to loss of livelihoods, food insecurity, population displacement, health effects and more

5. **…but risks associated with warming are substantially lower at 1.5˚C than 2˚C.**

Source: WRI



6. Emissions will need to reach net-zero around mid-century

- the sooner emissions peak before 2030 and the lower the level at which they do so, the less daunting the challenges will be
- the critical role of short-lived but highly potent climate pollutants, such as methane and hydrofluorocarbons (HFCs) must be addressed

7. All 1.5˚C emissions pathways rely upon carbon removal to some extent

- we will need to focus efforts not only on reducing emissions, but also removing and storing carbon from the atmosphere
- ***carbon removal is necessary for both moving to net-zero emissions and for producing net-negative emissions to compensate for any overshoot of 1.5˚C***
- feasibility and sustainability of carbon removal could be enhanced if a portfolio of carbon-removal approaches is pursued i.e. different levels of carbon removal (ranging from 100-1,000 GtCO2 over the 21st century for scenarios with limited or no overshoot

8. What Kind of Pathways Limit Warming to 1.5°C and Are We on Track?

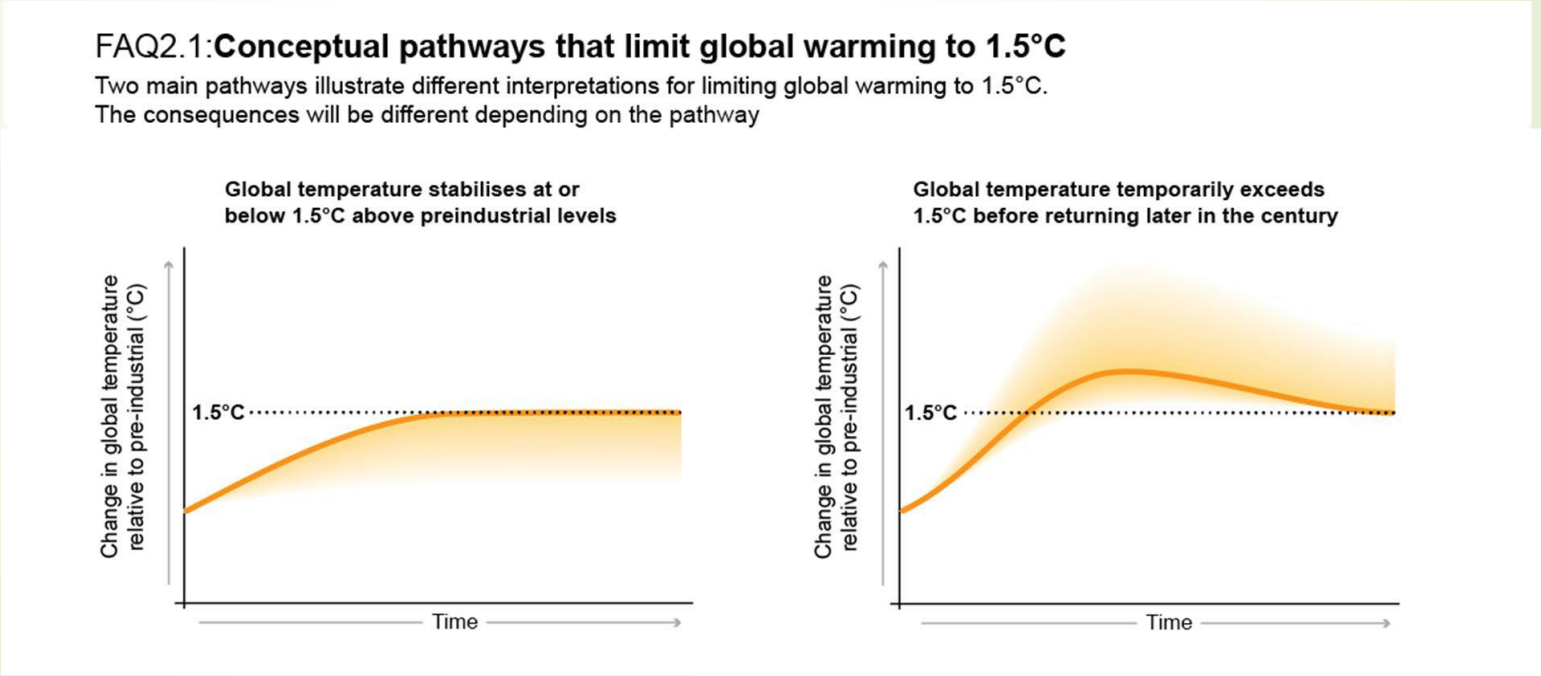
Two main pathways for limiting global temperature rise to 1.5°C a

These are:

Stabilizing global temperature at, or **4 just below, 1.5°C (left)**

and

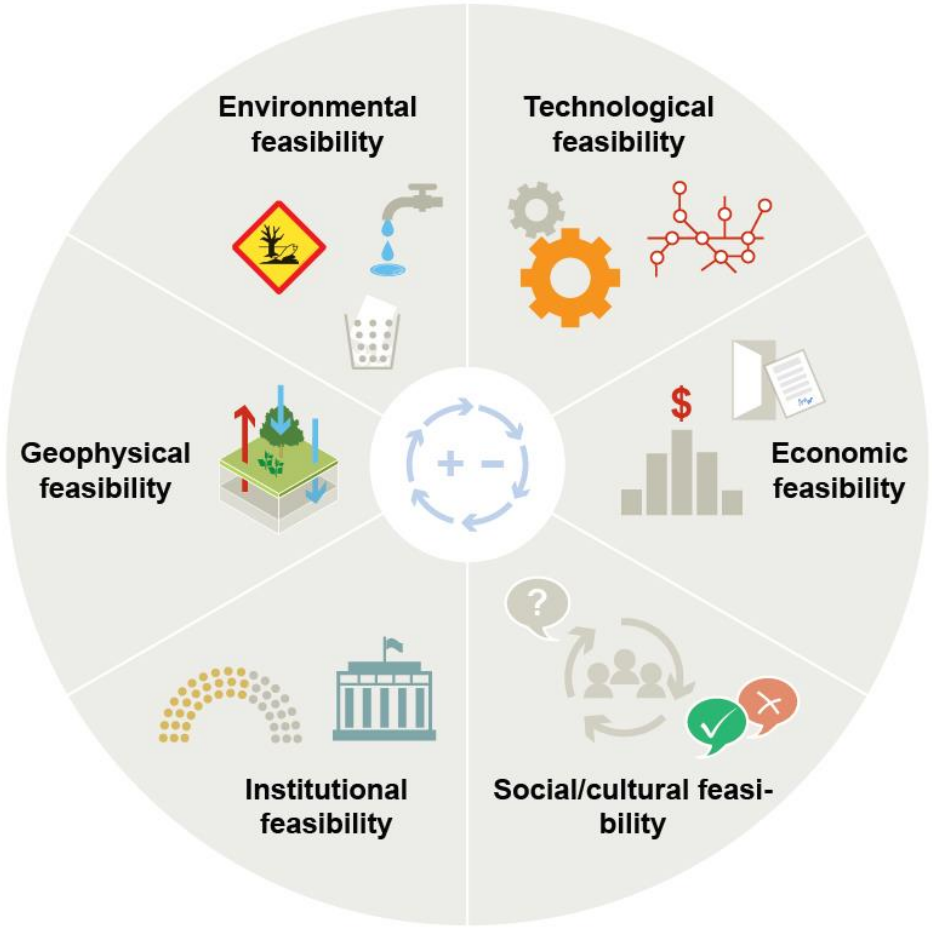
global temperature temporarily ***exceeding 1.5°C before coming back down 5 later in the century (right)***.



9.

FAQ4.1: **The different feasibility dimensions towards limiting warming to 1.5°C**

Assessing the feasibility of different adaptation and mitigation options/actions requires consideration across six dimensions.



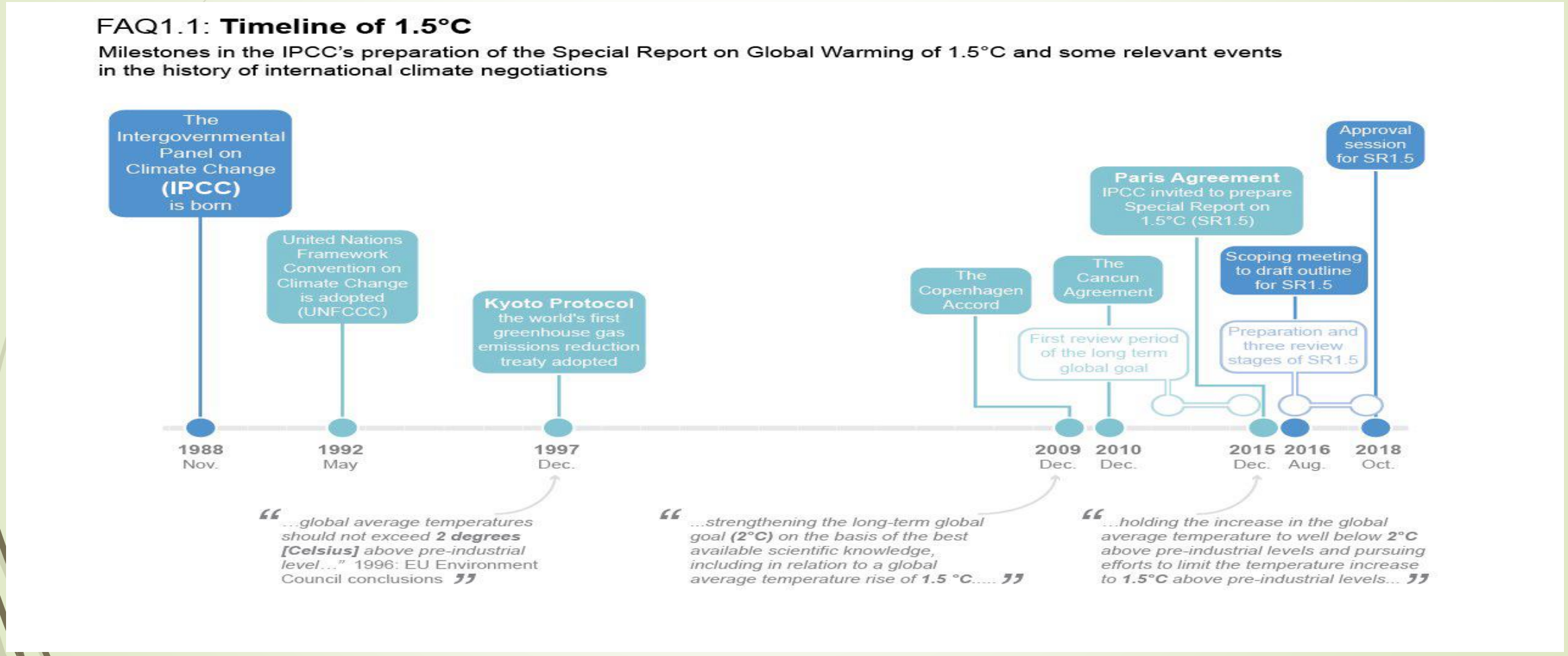
10 Everyone – countries, cities, the private sector, individuals — will need to strengthen their action, without delay

- without transformation in society and rapid implementation of ambitious emissions cuts, limiting warming to 1.5˚C while achieving sustainable development will be exceedingly difficult, if not impossible
- even if countries fulfill their current national climate goals and make deep emissions cuts after 2030, warming would still very likely exceed 1.5˚C, given the challenges associated with dropping emissions to net-zero well before 2045
- ***therefore, all countries and non-state actors will need to strengthen their contributions without delay***

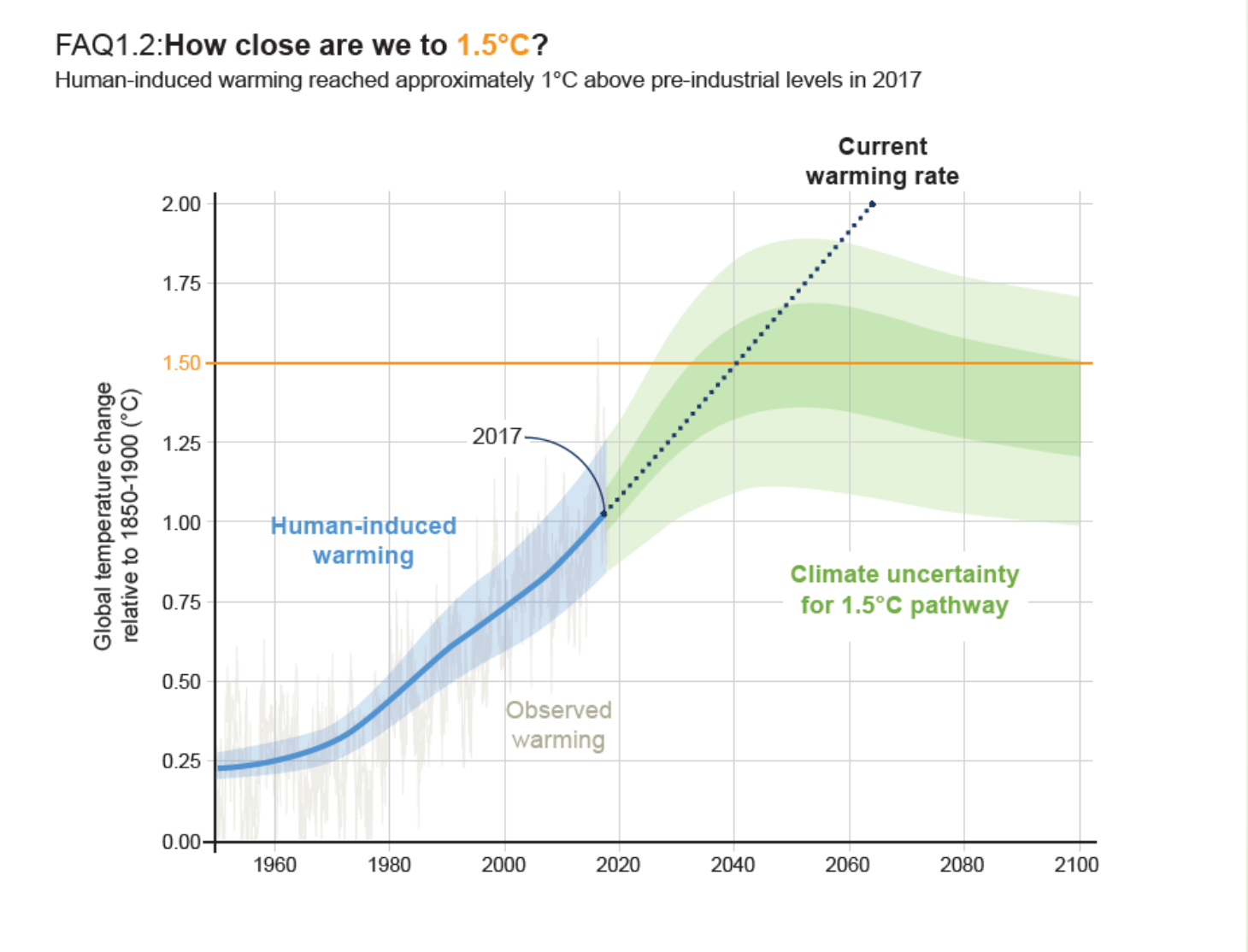
- ***FAQs with Additional Information***

- **FAQ 1.1: Why Are We Talking about 1.5°C?** 1
- 2
- ***Summary:*** *Climate change represents an urgent and potentially irreversible threat to human societies* 3 *and the planet. In recognition of this, the overwhelming majority of countries around the world* 4 *adopted the Paris Agreement in December 2015, the central aim of which includes pursuing efforts to* 5 *limit global temperature rise to 1.5°C. In doing so, these countries, through the United Nations* 6 *Framework Convention on Climate Change (UNFCCC), also invited the IPCC to provide a Special* 7 *Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global* 8 *greenhouse gas emissions pathways.*

FAQ1.1, Figure 1: A timeline of notable dates in preparing the IPCC Special Report on Global 5 Warming of 1.5°C (blue) embedded within processes and milestones of the United Nations 6 Framework Convention on Climate Change (UNFCCC; grey), including events that may be relevant 7 for discussion of temperature limits.

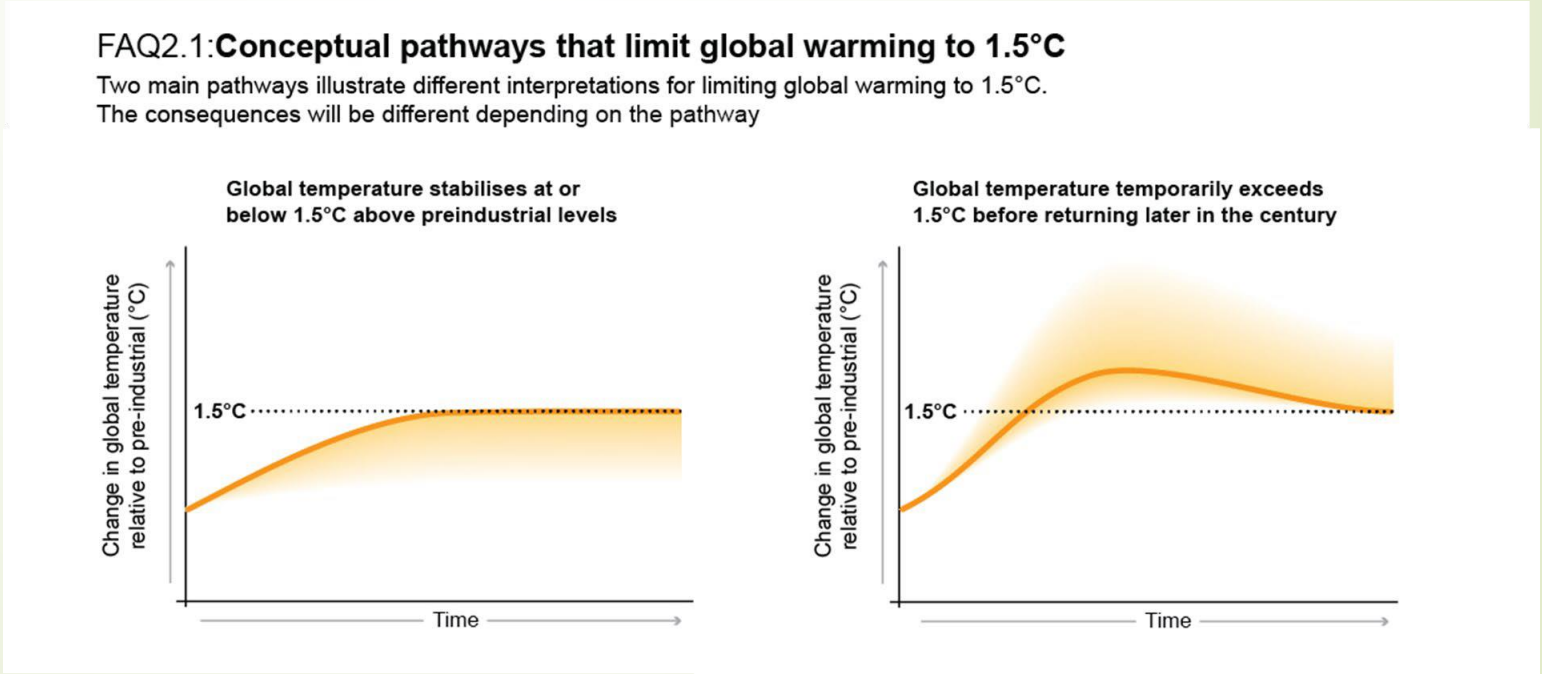


Human-induced warming reached approximately 1°C above pre-industrial levels 2 in 2017. At the present rate, global temperatures would reach 1.5°C around 2040. Stylized 1.5°C 3 pathway shown here involves emission reductions beginning immediately, and CO2 emissions 4 reaching zero by 2055.



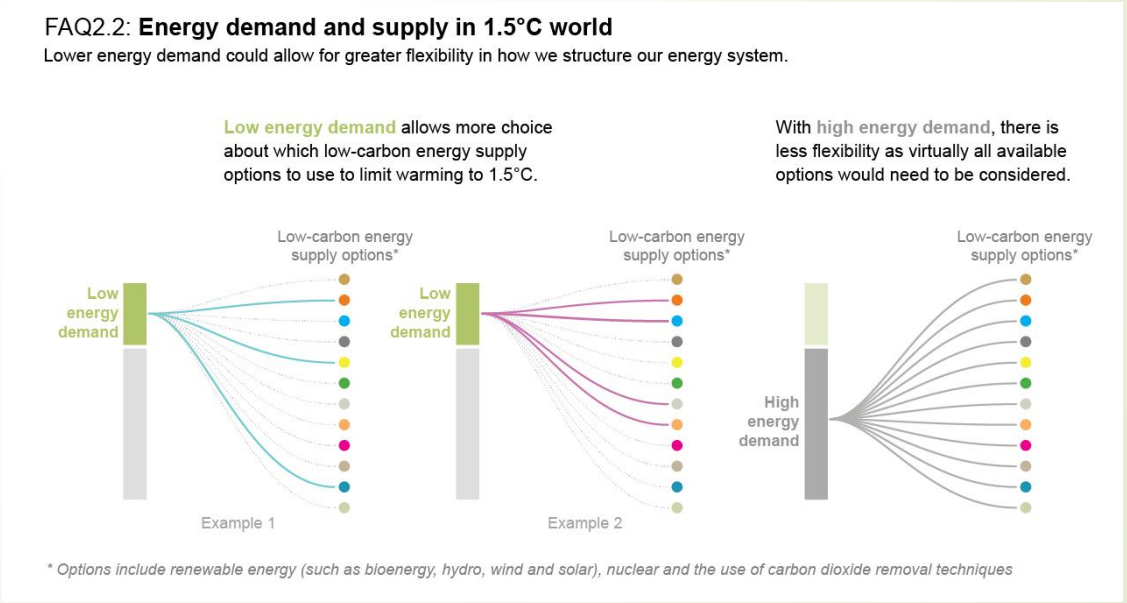
- **FAQ 2.1:** What Kind of Pathways Limit Warming to 1.5°C and Are We on Track?
- ***Summary****: There is no definitive way to limit global temperature rise to 1.5°C above pre-industrial* 3 *levels. This Special Report identifies two main conceptual pathways to illustrate different* 4 *interpretations. One stabilizes global temperature at, or just below, 1.5°C. Another sees global* 5 *temperature temporarily exceed 1.5°C before coming back down. Countries' pledges to reduce their* 6 *emissions are currently not in line with limiting global warming to 1.5°C.*

FAQ2.1, Figure 1: Two main pathways for limiting global temperature rise to 1.5°C above pre-3 industrial levels are discussed in this Special Report. These are: stabilizing global temperature at, or 4 just below, 1.5°C (left) and global temperature temporarily exceeding 1.5°C before coming back down 5 later in the century (right). Temperatures shown are relative to pre-industrial but pathways are 6 illustrative only, demonstrating conceptual not quantitative characteristics.



-
- **FAQ 2.2:** What Do Energy Supply and Demand Have to do with Limiting Warming to 1.5°C? 1
- 2
- ***Summary****: Limiting global warming to 1.5°C above pre-industrial levels would require major* 3 *reductions in greenhouse gas emissions in all sectors. But different sectors are not independent of* 4 *each other, and making changes in one can have implications for another. For example, if we as a* 5 *society use a lot of energy, then this could mean we have less flexibility in the choice of mitigation* 6 *options available to limit warming to 1.5°C. If we use less energy, the choice of possible actions is* 7 *greater – for example, we could be less reliant on technologies that remove carbon dioxide (*CO2) 8 *from the atmosphere.*

FAQ2.2, Figure 1: Having a lower energy demand increases the flexibility in choosing options for 2 supplying energy. A larger energy demand means many more low carbon energy supply options 3 would need to be used.

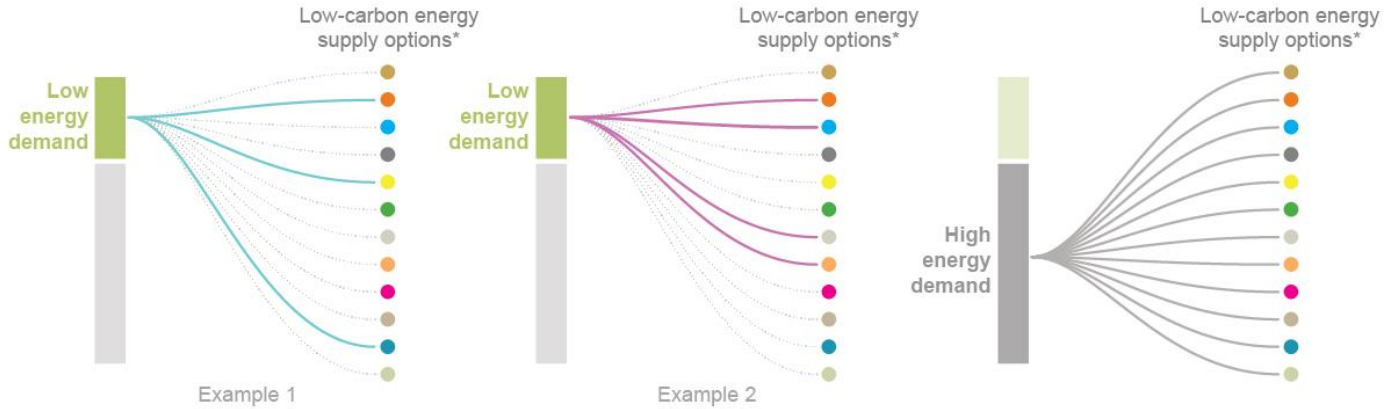


FAQ2.2: **Energy demand and supply in 1.5°C world**

Lower energy demand could allow for greater flexibility in how we structure our energy system.

Low energy demand allows more choice about which low-carbon energy supply options to use to limit warming to 1.5°C.

With **high energy demand**, there is less flexibility as virtually all available options would need to be considered.

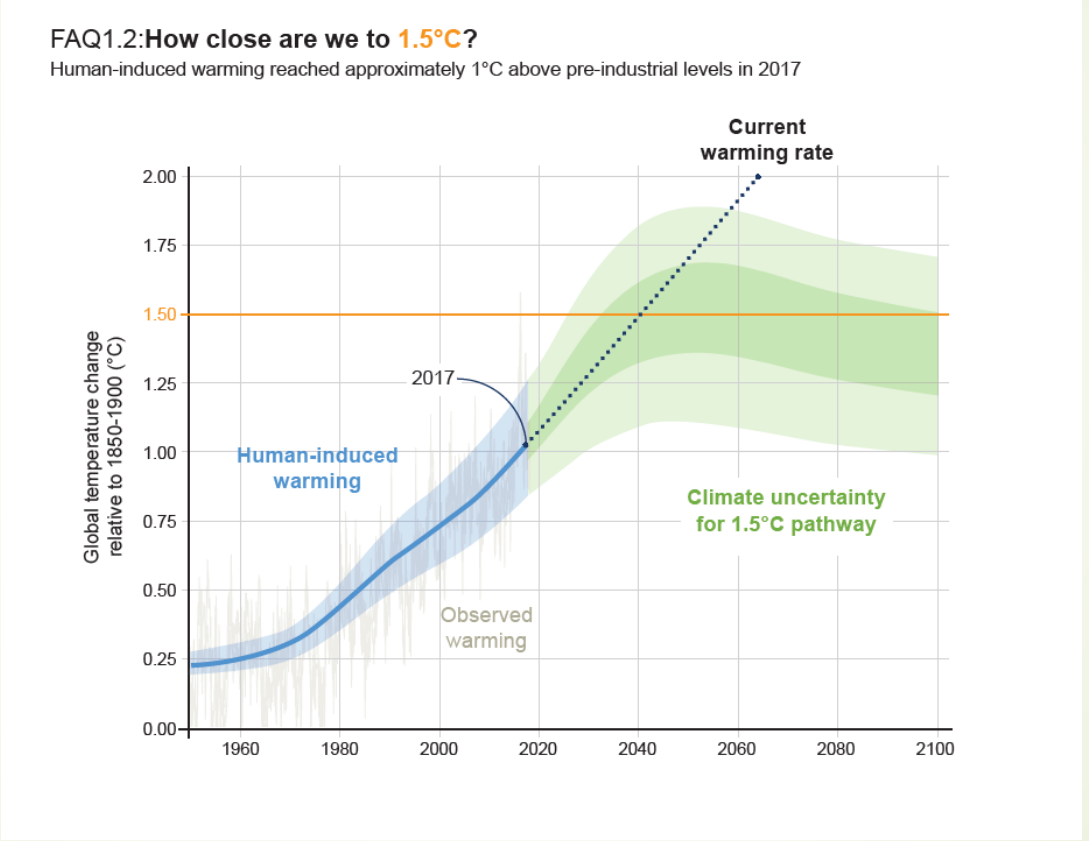


** Options include renewable energy (such as bioenergy, hydro, wind and solar), nuclear and the use of carbon dioxide removal techniques*

- **FAQ 1.2: How Close Are We to 1.5°C?** 1
- 2
- ***Summary:*** *Human-induced warming has already reached about 1°C above pre-industrial levels at the* 3 *time of writing of this Special Report. By the decade 2006–2015, human activity had warmed the* 4 *world by 0.87°C (±0.12°C) compared pre-industrial times (1850–1900). If the current warming rate* 5 *continues, the world would reach human-induced global warming of 1.5°C around 2040.*

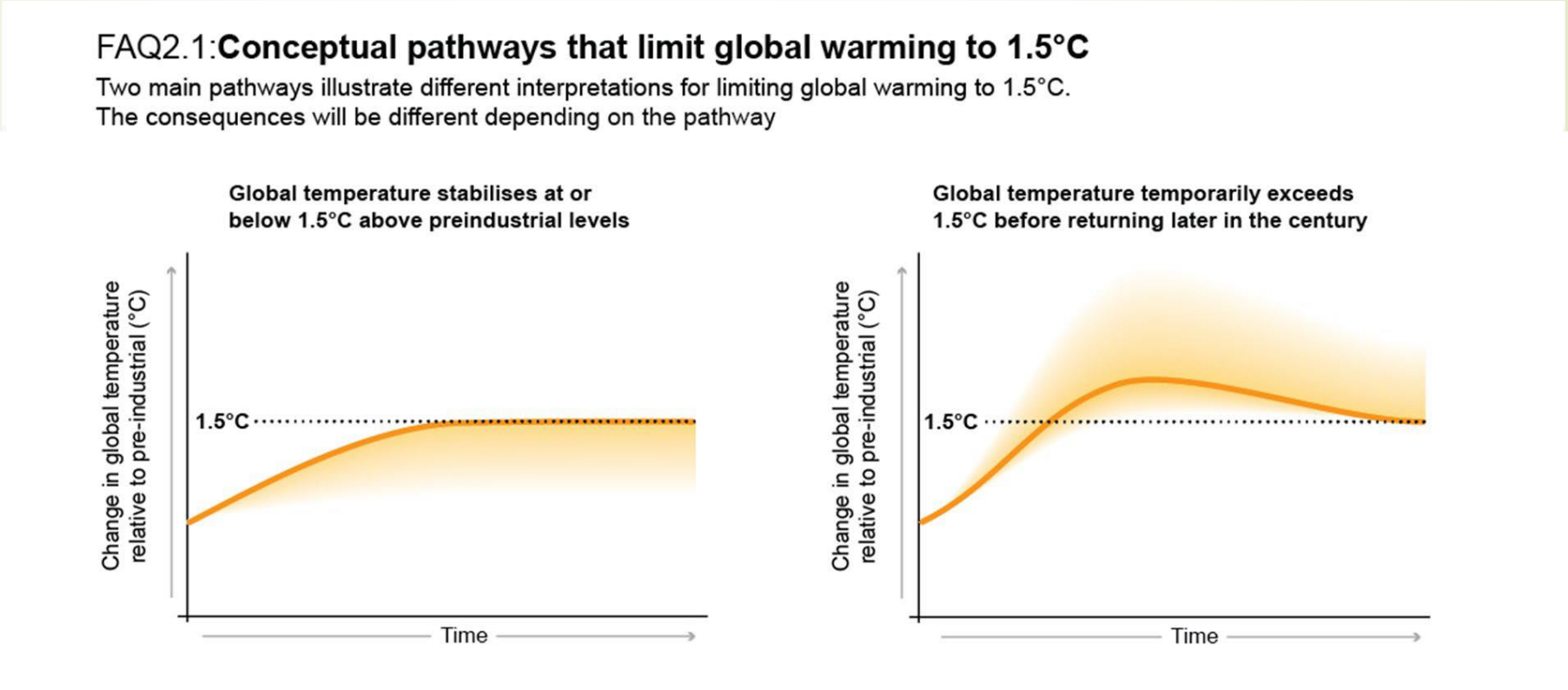
FAQ 1.2: How Close Are We to 1.5°C? 1

Summary: *Human-induced warming has already reached about 1°C above pre-industrial levels at the* 3 *time of writing of this Special Report. By the decade 2006–2015, human activity had warmed the* 4 *world by 0.87°C (±0.12°C) compared pre-industrial times (1850–1900). If the current warming rate* 5 *continues, the world would reach human-induced global warming of 1.5°C around 2040.*



FAQ 2.1: What Kind of Pathways Limit Warming to 1.5°C and Are We on Track? 1
2
Summary*: There is no definitive way to limit global temperature rise to 1.5°C above pre-industrial* 3 *levels. This Special Report identifies two main conceptual pathways to illustrate different* 4 *interpretations. One stabilizes global temperature at, or just below, 1.5°C. Another sees global* 5 *temperature temporarily exceed 1.5°C before coming back down. Countries' pledges to reduce their* 6 *emissions are currently not in line with limiting global warming to 1.5°C.*

FAQ2.1, Figure 1: Two main pathways for limiting global temperature rise to 1.5°C above pre-3 industrial levels are discussed in this Special Report. These are: stabilizing global temperature at, or 4 just below, 1.5°C (left) and global temperature temporarily exceeding 1.5°C before coming back down 5 later in the century (right). Temperatures shown are relative to pre-industrial but pathways are 6 illustrative only, demonstrating conceptual not quantitative characteristics.



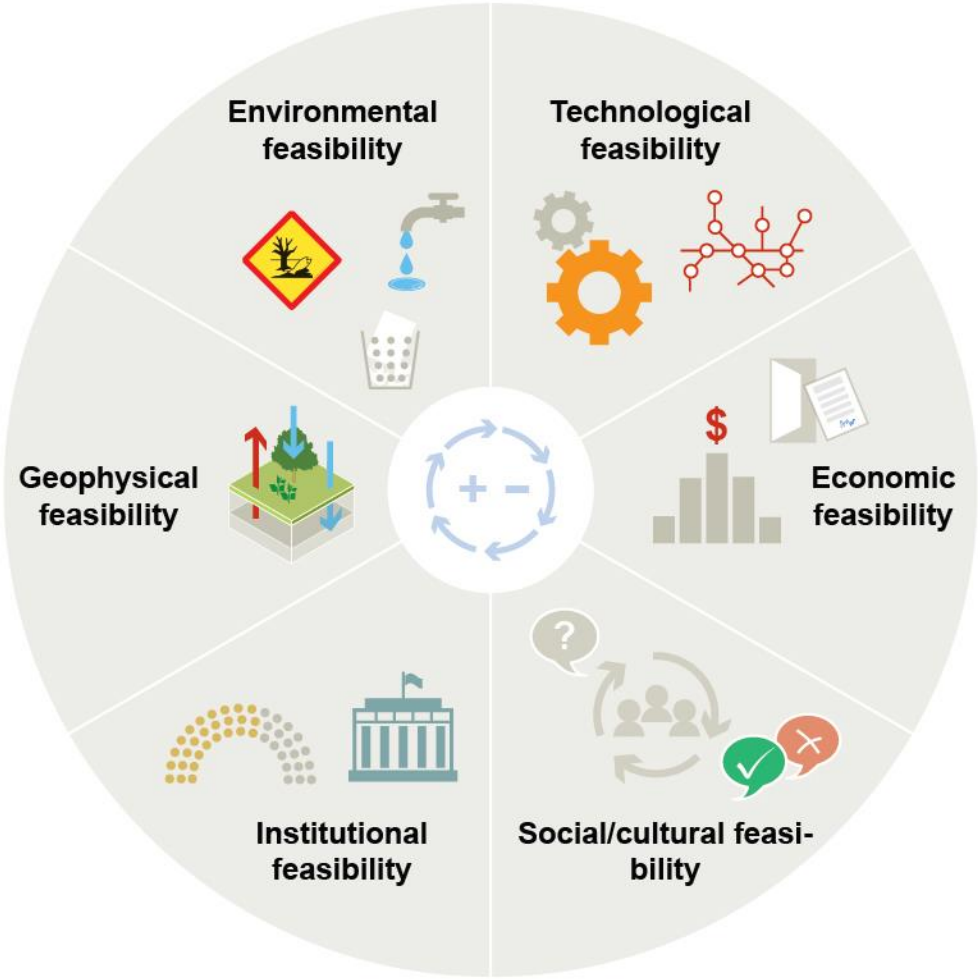
FAQ2.2, Figure 1: Having a lower energy demand increases the flexibility in choosing options for 2 supplying energy. A larger energy demand means many more low carbon energy supply options 3 would need to be used.

- **FAQ 3.1: What are the Impacts of 1.5°C and 2°C of Warming?** 1
- 2
- ***Summary****: The impacts of climate change are being felt in every inhabited continent and in the* 3 *oceans. However, they are not spread uniformly across the globe, and different parts of the world* 4 *experience impacts differently. An average warming of 1.5°C across the whole globe raises the risk of* 5 *heatwaves and heavy rainfall events, amongst many other potential impacts. Limiting warming to* 6 *1.5°C rather than 2°C can help reduce these risks, but the impacts the world experiences will depend* 7 *on the specific greenhouse gas emissions 'pathway' taken. The consequences of temporarily* 8 *overshooting 1.5°C of warming and returning to this level later in the century, for example, could be* 9 *larger than if temperature stabilizes below 1.5°C. The size and duration of an overshoot will also* 10 *affect future impacts.*

-
- **FAQ 4.1: What Transitions Could Enable Limiting Global Warming to 1.5°C?** 1
- 2
- ***Summary****: In order to limit warming to 1.5°C above pre-industrial levels, the world would need to* 3 *transform in a number of complex and connected ways. While transitions towards lower greenhouse* 4 *gas emissions are underway in some cities, regions, countries, businesses and communities, there are* 5 *few that are currently consistent with limiting warming to 1.5°C. Meeting this challenge would require* 6 *a rapid escalation in the current scale and pace of change, particularly in the coming decades. There* 7 *are many factors that affect the feasibility of different adaptation and mitigation options that could* 8 *help limit warming to 1.5°C and with adapting to the consequences.*

FAQ4.1: **The different feasibility dimensions towards limiting warming to 1.5°C**

Assessing the feasibility of different adaptation and mitigation options/actions requires consideration across six dimensions.



THANK YOU !!!

- ***Ref : IPCC SR 1.5 (0ctobwe ,2018)***