

Climate Change 2022

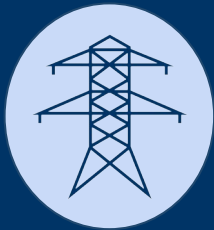
# Mitigation of Climate Change



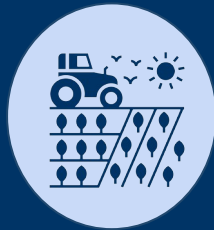
There are options available **now** in every sector that can at least **halve** emissions by 2030



## Demand and services



Energy



Land use



Industry



Urban



Buildings



Transport

## Energy

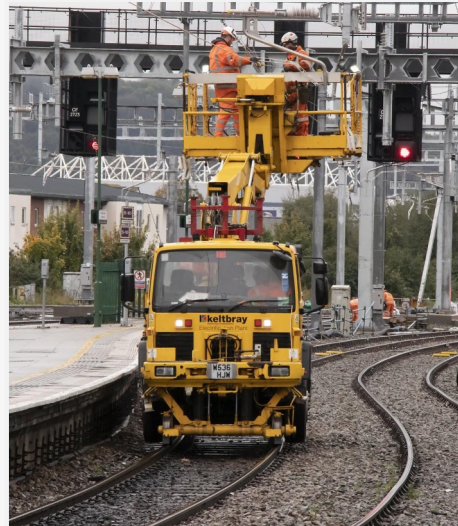
- **major transitions** are required to limit global warming
- reduction in fossil fuel use and use of carbon capture and storage
- low- or **no-carbon** energy systems
- widespread **electrification** and improved energy **efficiency**
- **alternative fuels**: e.g. hydrogen and sustainable biofuels



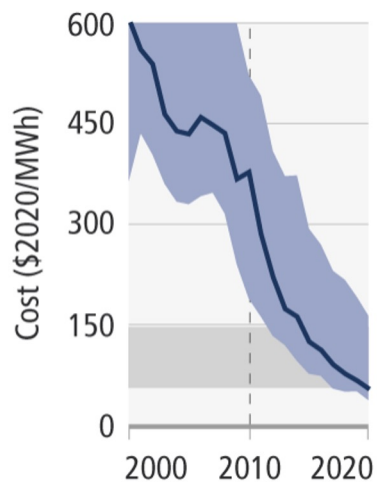
[Portland General Electric CC BY-ND 2.0, Harry Cunningham/Unsplash, Stéphane Bellerose/UNDP in Mauritius and Seychelles CC BY-NC 2.0, IMF Photo/Lisa Marie David, Tamara Merino CC BY-NC-ND 2.0]

## Transport

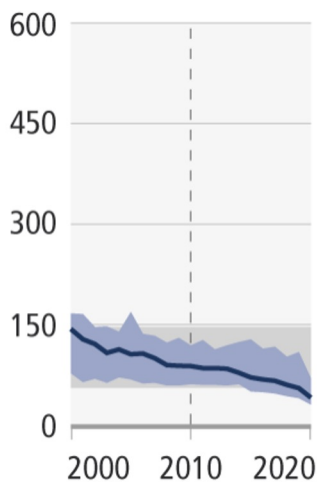
- **reducing demand and low-carbon technologies** are key to reducing emissions
- **electric vehicles:** greatest potential
- **battery technology:** advances could assist electric rail, trucks
- **aviation and shipping:** alternative fuels (low-emission **hydrogen** and **biofuels**) needed
- Overall, substantial potential but depends on **decarbonising the power sector.**



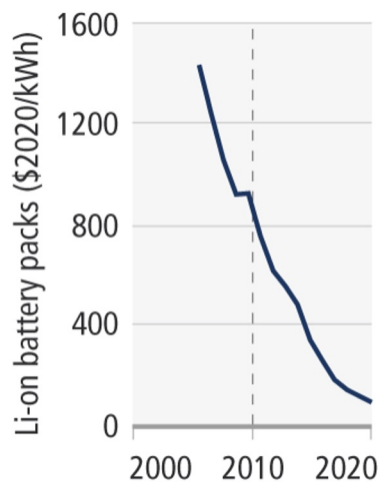
### Photovoltaics (PV)



### Onshore wind



### Batteries for passenger electric vehicles (EVs)

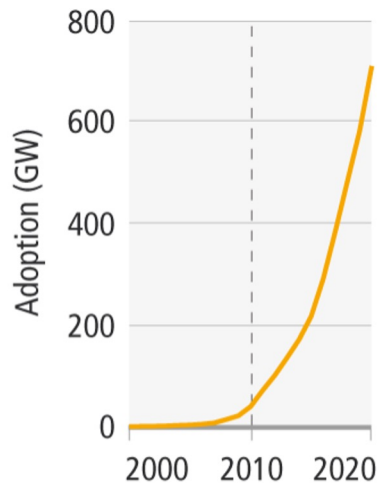


— Market cost

- - - - AR5 (2010)

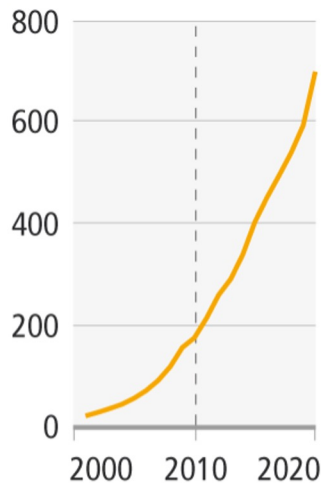
In some cases, costs for renewables have fallen below those of fossil fuels.

### Photovoltaics (PV)



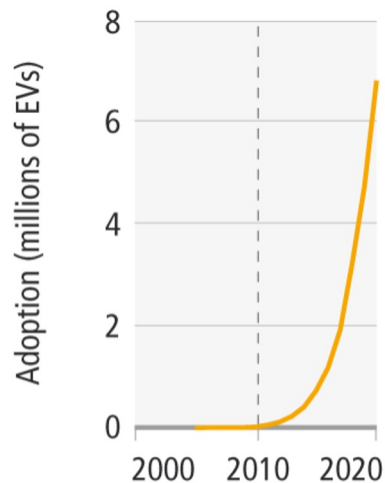
Share of electricity produced in 2020: 3%

### Onshore wind



Share of electricity produced in 2020: 6%

### Batteries for passenger electric vehicles (EVs)



Share of passenger vehicle fleet in 2020: 1%

— Adoption (note different scales)    Fossil fuel cost (2020)

Electricity systems in some countries and regions are already predominantly powered by renewables.

# Buildings

- buildings: possible to reach net zero emissions in 2050
- action in this decade is critical to fully capture this potential
- involves retrofitting existing buildings and effective mitigation techniques in new buildings
- zero energy and **zero-carbon** buildings exist in new builds **and retrofits**



## Industry

- using materials more **efficiently, reusing, recycling, minimising waste**; currently **under-used** in policies and practice
- **basic materials**: low- to zero-greenhouse gas production processes at **pilot to near-commercial** stage
- achieving **net zero** is challenging







## Cities and urban areas

- sustainable production and consumption of goods and services
- **electrification** (low-emission energy)
- enhancing **carbon uptake and storage** (e.g. green spaces, ponds, trees)



There are options for existing, rapidly growing *and* new cities.



## Demand and services

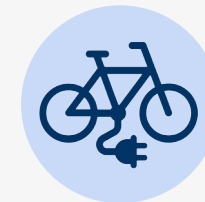
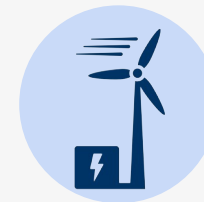
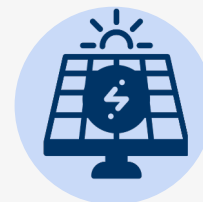
- potential to **significantly bring down global emissions** by 2050
- walking and cycling, electrified transport, reducing air travel, and adapting houses make large contributions
- **lifestyle changes** require **systemic changes** across all of society
- **some** people require additional **capacity, energy and resources** for human wellbeing



## Technology and Innovation

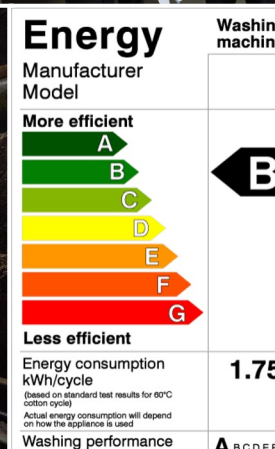
- investment and policies **push forward low emissions** technological **innovation**
- **effective decision making** requires assessing potential benefits, barriers and risks
- **some options** are technically **viable**, rapidly becoming **cost-effective**, and have relatively **high public support**. Other options face barriers

**Adoption of low-emission technologies is slower in most developing countries, particularly the least developed ones.**

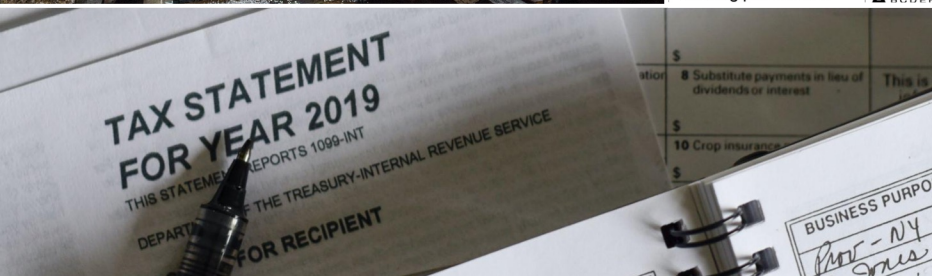




# Policies, regulatory and economic instruments



- regulatory and economic instruments have **already proven effective** in reducing emissions
- **policy packages** and **economy-wide packages** are able to achieve **systemic change**
- ambitious and effective mitigation requires **coordination across government and society**



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## Increased evidence of climate action



Some countries have achieved a **steady decrease** in emissions **consistent** with limiting warming to **2°C**.



**Zero emissions targets** have been adopted by at least **826 cities** and **103 regions**

“ The evidence is clear:  
The time for action is now

# Climate Change 2022

## Mitigation of Climate Change

