IEEE Rising Stars
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Keynote Speech

Climate Change
IEEE's Role in Bringing Technology to Meet the Challenge

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What is Carbonization?
For millennia, atmospheric carbon dioxide had never been above this line.

Source: NASA
Source: State of the Planet
https://news.climate.columbia.edu/2021/02/25/carbon-dioxide-cause-global-warming/
Impacts of Carbonization
Temperature rise since 1850

Global mean temperature change from pre-industrial levels, °C

Source: Met Office


Temperature rise of 1.5 – 2.0 °C = Point of No Return
Visible Impacts of Climate Change
Florida, China and Africa
Hurricane Isabel struck the Mid-Atlantic region of USA between Sept. 18-19, 2003.
Flooding in Pakistan – August 2022

Source: https://www.npr.org/sections/pictureshow/2022/08/30/1119979965/pakistan-floods-monsoon-climate

China
Hurricane Sandy
New York, New Jersey 2012
Droughts in 2022

Dry river bed in **Italy** (Po River) due to worst drought in 70 years, June 2022

The Jialing Riverbed at the confluence with the Yangtze River is exposed due to drought on August 18, 2022 in Chongqing, **China**.
Wildfires in the US

July 2021 - The Dixie fire burned close to a million acres in California’s Lassen county over three months and became the first fire to cross the Sierra Nevada. Photograph: Noah Berger/AP

Peaks glowing with thousands of spot fires on June 13, 2022 in Flagstaff, Arizona. Schumacher/The Republic
Wildfires in Europe - Summer of 2022

Southwestern France, July 17, 2022

Central Portugal, July 13, 2022

Brandenburg, Germany, August 2022

Greece, July 2022

Northern Spain, June 2022

Central Italy, July 2022

“The number of wildfires in 2022 in the EU have nearly quadrupled the 15-year average”

Source: CNN according to Copernicus, EU Earth observation program
Siberia: Wildfires in June 2020 and June 2021
2008 China Snowstorm
Electrification to Reduce Fossil Fuel Use
Electric Vehicle

Heat Pump as opposed to oil/gas furnace
Reduce Carbon Emissions from Electricity Production

1. Use less electricity, energy efficiency
2. Use low carbon fossil fuel power plants
3. Use H₂ & other storage technologies
4. Promote more renewables
5. Accept some nuclear
6. Promote cross-border power transfer
IEEE at UN Climate Change Conference
Global Alliance of Universities on Climate
Presentation at GAUC
Partnership with International Renewable Energy Agency (IRENA)

*Energy Transition Education Network*
Speakers at the IRENA Panel
IEEE’s Role in Education/Training/Research

Energy Transition Education Network
In Collaboration with the World Federation of Engineering Organizations and Engineering Institute of Canada
WFEO/EIC/IEEE Participants at COP27
Energy Day (15 Nov 2022) at COP27
Collaboration with Industry

Webinar: Uniting to Tackle Climate Change Through Electrification

Date: Wednesday, October 19th @11:00am EDT

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So, What is the bottom line?

- Efforts in the electric power sector by replacing fossil fuel with renewables and nuclear will help.
- But if emission from the transportation sector continues to rise, the power sector contributions will not be enough.
- Large scale Electric Vehicle deployment will help, but question remains – how will the EV be powered?
IEEE Climate Change Website

https://climate-change.ieee.org
As the world’s largest organization of technical professionals, IEEE has both the opportunity and the responsibility to assist in organizing the response of engineers, scientists, and technical professionals across the world to address the causes, mitigate the impact, and adapt to climate change.

IEEE’s scholarly publications, conference proceedings, technical standards, and other materials help foster the exchange of technical knowledge and information for the critical climate issues that our planet faces today.
THANK YOU!

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