

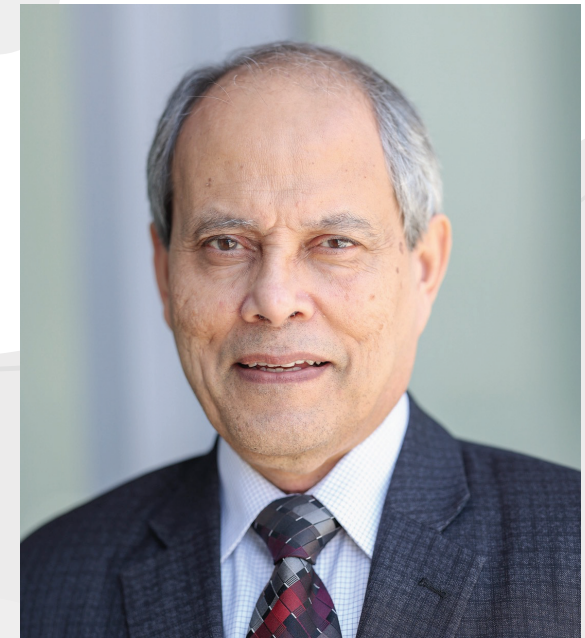
IEEE's role in Climate Change Mitigation & Resilience



Prof. Saifur Rahman

2023 IEEE President & CEO

www.srahman.org



Invited Talk

IEEE Kerala Section 40th Anniversary Celebration
Trivandrum, India, 10 December 2023

Let us make IEEE a more successful and resilient global technical organization



With support from a broad spectrum of IEEE members, I have been elected as the 2023 President and CEO of IEEE. I am looking forward to working with IEEE members in all 10 regions of the world.

Saifur Rahman

Joseph R. Loring Professor of Electrical and Computer Engineering Virginia Tech

Arlington, Virginia, USA

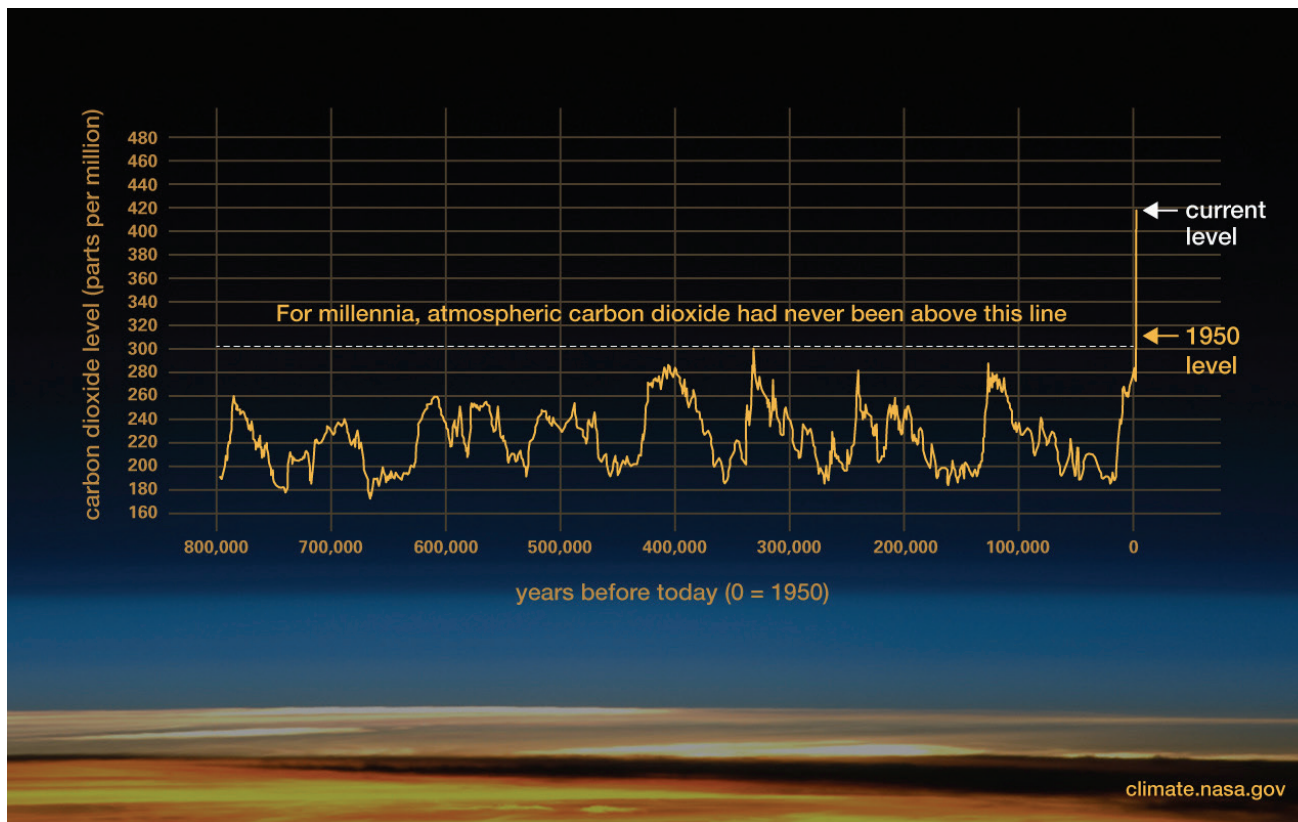
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Promote Clean-tech Solutions for Climate Sustainability

Climate Change and CO₂ Emissions

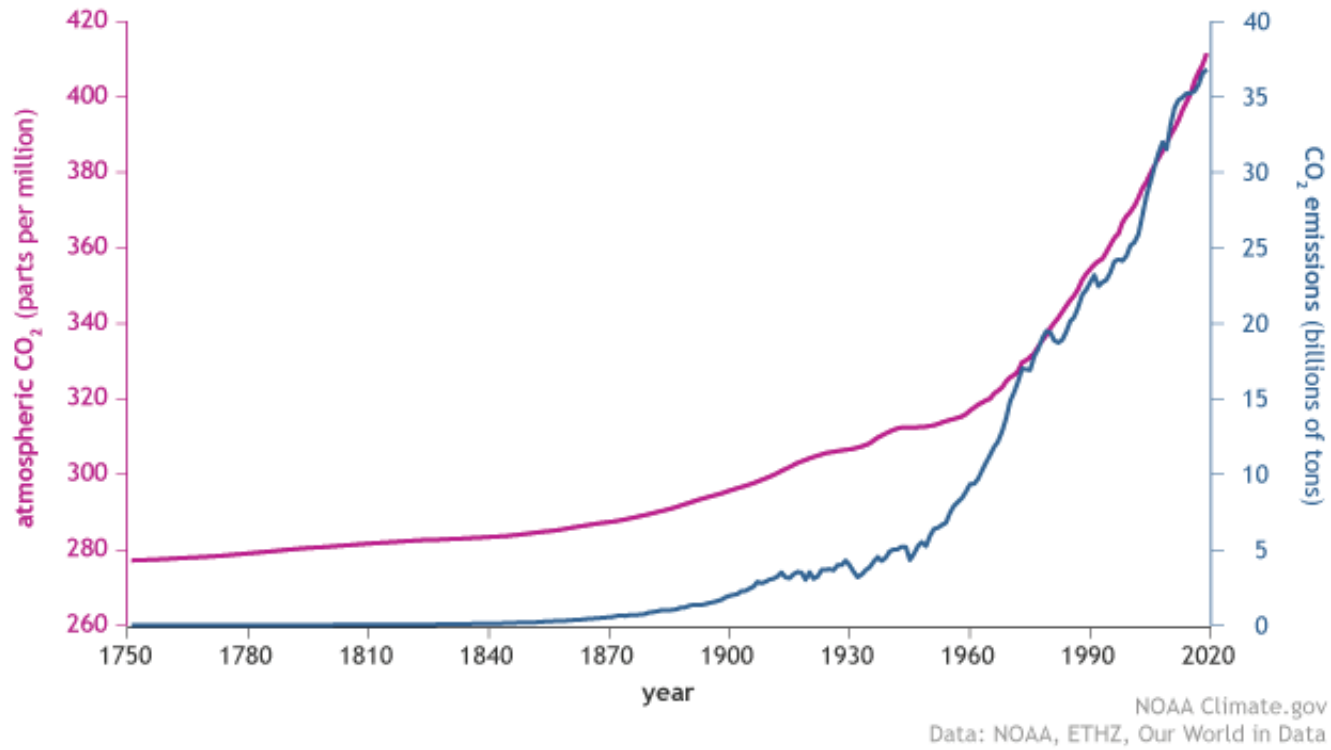
History of CO₂ Emissions



Source: NASA

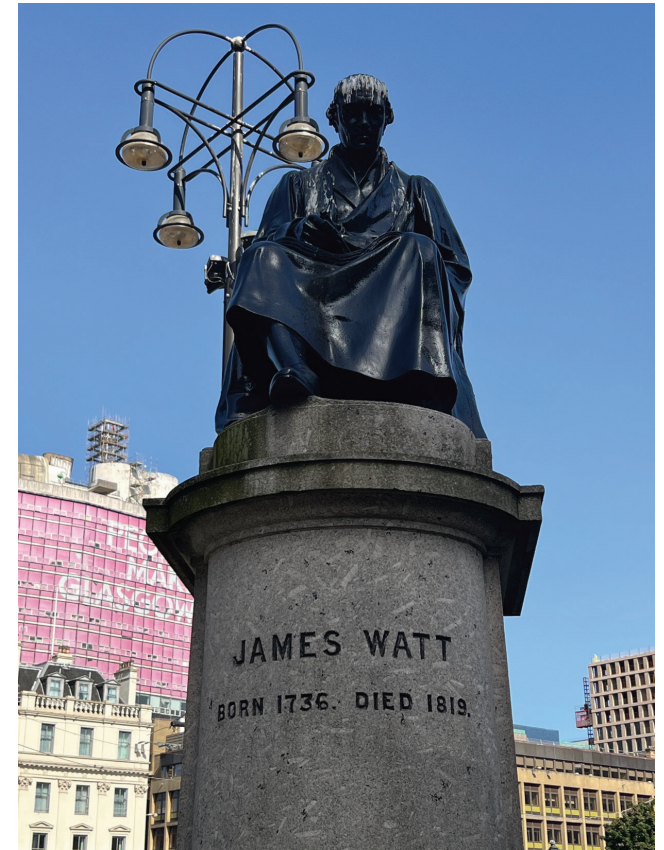
https://climate.nasa.gov/climate_resources/24/graphic-the-relentless-rise-of-carbon-dioxide/

CO₂ in the atmosphere and annual emissions (1750-2019)



Source: State of the Planet

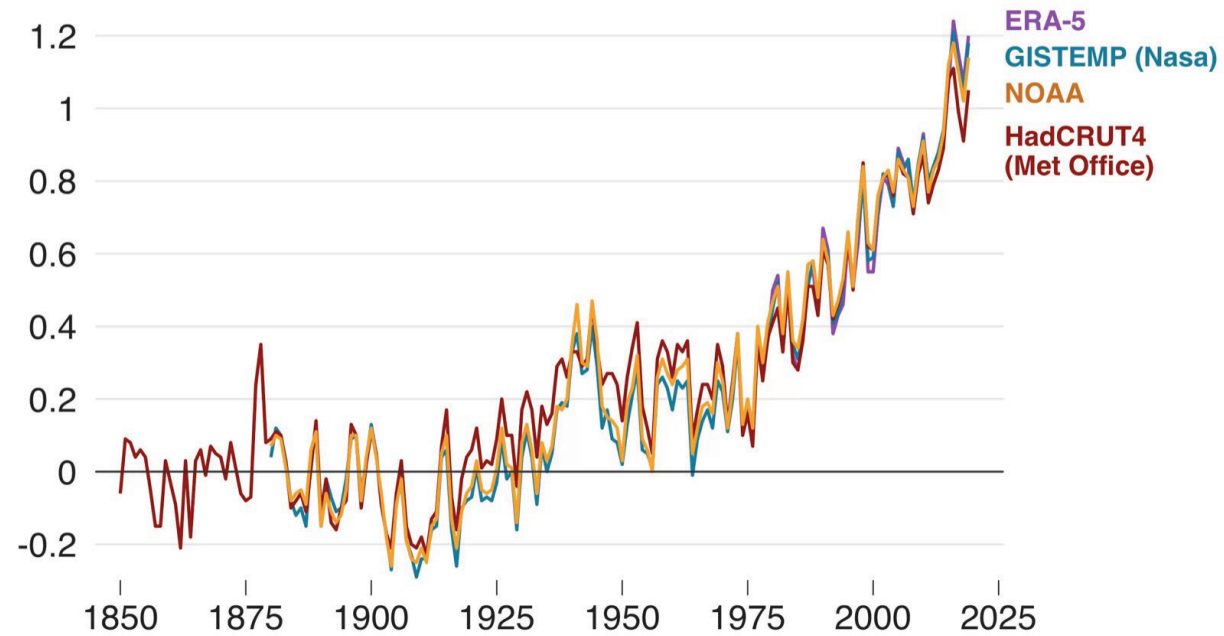
<https://news.climate.columbia.edu/2021/02/25/carbon-dioxide-cause-global-warming/>



Impacts of Carbonization

Temperature rise since 1850

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



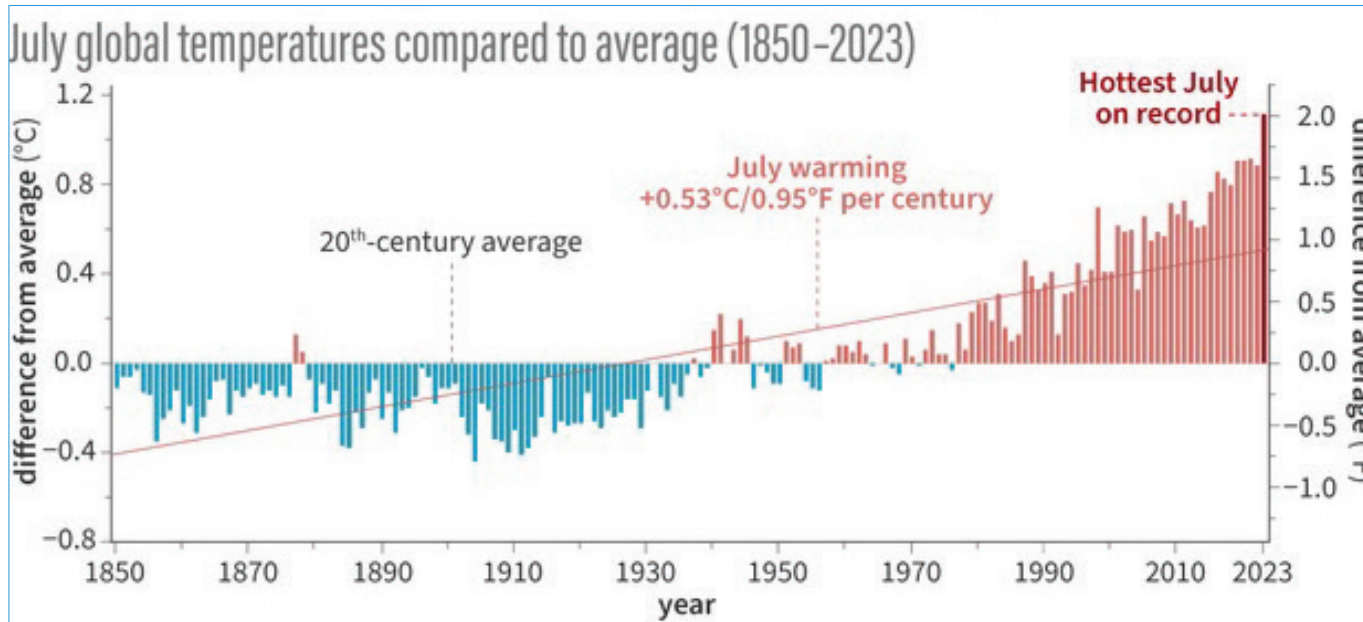
Source: Met Office

BBC

Source: <https://www.bbc.com/news/science-environment-51111176>

Temperature rise of 1.5 – 2.0 °C = Point of No Return

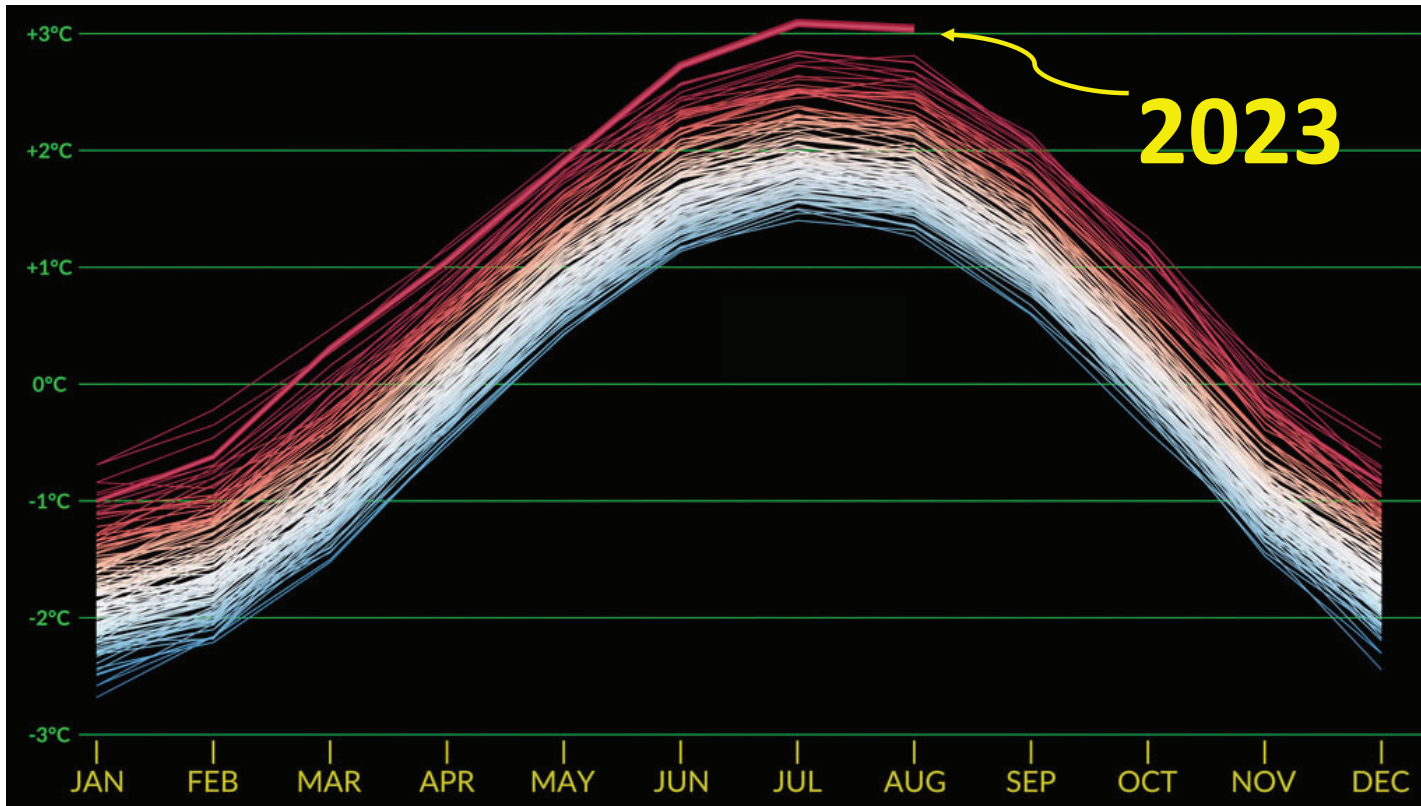
Global Climate Summary for July 2023



July temperatures compared to the 20th-century average for each year from 1850 through 2023, which set a new record for the hottest July. NOAA Climate.gov image, based on data from NOAA National Centers for Environmental Information.

The July global surface temperature was 1.12°C (2.02°F) above the 20th-century average of 15.8°C (60.4°F), making it the warmest July on record. This marked the first time a July temperature exceeded 1.0°C (1.8°F) above the long-term average.

July 2023 was 0.20°C (0.36°F) warmer than the previous July record from 2021. July 2023 marked the 47th-consecutive July and the 533rd-consecutive month with temperatures at least nominally above the 20th-century average.



Monthly temperature anomalies from 1880 to August 2023 measured with respect to the baseline period 1951-1980.

This graph includes the seasonal cycle showing that June 2023, July 2023, and August 2023 were each consecutively the warmest month on record.

Climate-change Impacts



Pethi Belaid/Agence France-Presse — Getty Images



Flooding in Delhi



Source: BBC News



Source: Reuters

Flooding in Bangladesh



Flooding in Pakistan – August 2022



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



Source: <https://www.nytimes.com/2022/09/07/briefing/climate-change-heat-waves-us-europe.html>

Beijing



Floods inundate a village in Baoding city, Hebei province, on 02 August 2023.

Source: <https://www.cnn.com/2023/08/04/china/china-northeast-hebei-beijing-flooding-recovery-intl-hnk/index.html>



Zhuozhou, north China's Hebei Province, 02 August 2023

Source: <https://english.aawsat.com/world/4466926-beijing-records-heaviest-rainfall-least-140-years-causing-severe-flooding-and-21>

Brazil



Aerial view of the area affected by an extratropical cyclone in Rio Grande do Sul State, Brazil (AGENCIA RBS/AFP via Getty Images) **Sept 2023**

Greece



A vehicle crosses a flooded road in the city of Volos, central Greece (AFP via Getty Images) Sept 2023



Cars in a flooded road in the city of Volos, central Greece (AFP via Getty Images) Sept 2023

Libya



Thousands of Lives Lost

Droughts in 2022



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

<https://idsb.tmgrup.com.tr/ly/uploads/images/2022/07/08/217454.jpg>

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



<https://image.cnbcfm.com/>

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](#)

Opportunities of Decarbonization in the Electric Power Supply Industry

Source: IEEE Spectrum, Jan 2023



Reduce Carbon Emissions

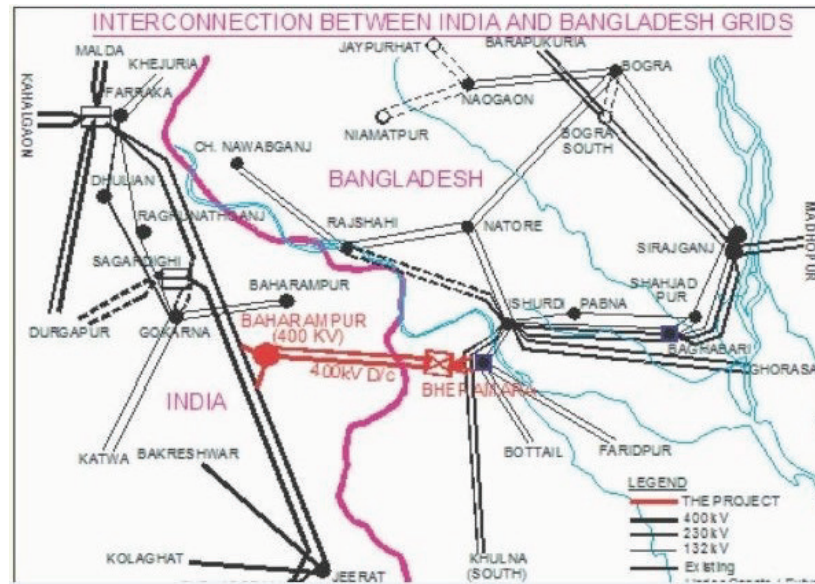
1. Use less electricity, energy efficiency
2. Use low carbon fossil fuel power plants
3. Use H₂ & other storage technologies
4. Promote more renewables
5. Accept some nuclear
6. Promote cross-border power transfer

Cross-border Power Transfer

- As we are in this fight together, our solutions should be collaborative to secure better outcomes for all countries, regardless of location
- The International Energy Agency (IEA) has identified three main modes of cross-border energy integration:
 - Bilateral
 - Multilateral
 - Unified



Bangladesh-India Interconnection (HVDC link)



Bangladesh-India 400 KV Double-Circuit 1,000 MW Line

Allows Bangladesh to buy cheaper electricity
and solar electricity when available

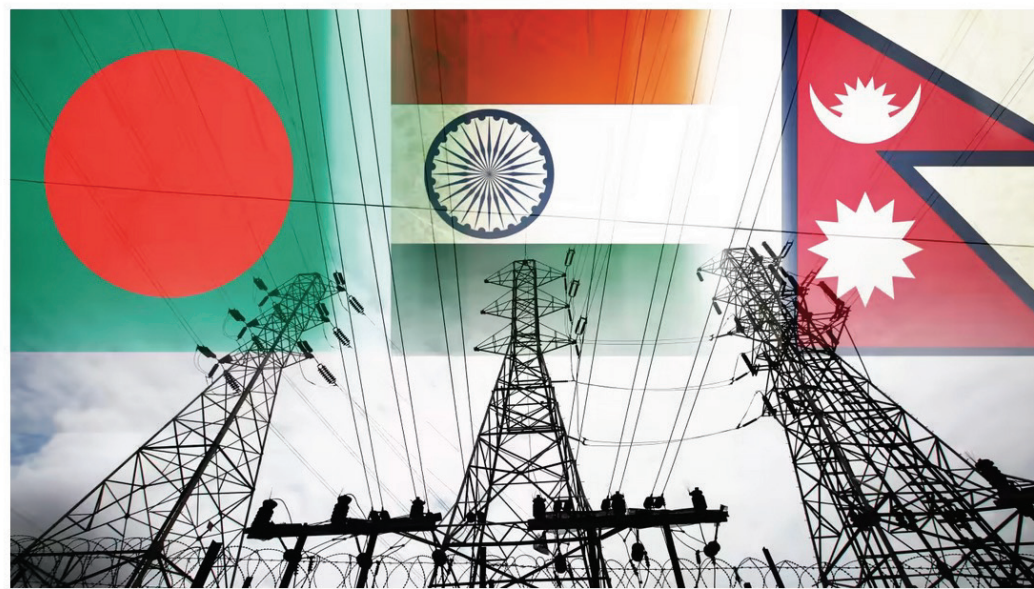
Nepal, India reach 'milestone' deal on trade, transmission of electricity

Nepal to be permitted to participate in real-time trade in the Indian market, an upgrade from existing day-ahead energy trade.



Import of Hydropower will Reduce
India's Dependency on Coal-fired
Power Stations

Source: Kathmandu Post



Bangladesh, India and Nepal are expected to soon finalize an agreement that would allow power sharing across Indian transmission lines. (Source photos by AP and Reuters)

Nepal needs to attract investment by developing a market outside
Nepal needs less electricity in summer than in winter
It is opposite in India and Bangladesh due to high air conditioning load

IEEE at UN COP28
Dubai, December 2023



IEEE's Involvement in COP28 Related Activities in Dubai



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STUDENT
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Climate Change



COP28 UAE

DUBAI 2023



Energy Transition

Rotary Pavillion - 1st Floor, Zone B7
Building 89, near COP28 Health Pavilion

December 5th - 11:00am



Speaker 1



President UAE Association of Energy Clubs



President of IEEE



CEO Huawei



IEEE Participation at COP28 in Dubai





*Advancing Technology
for Humanity*

Clean-tech Solutions for Climate Sustainability

Climate Change

IEEE: Enabling Innovation and Technology Solutions

<https://climate-change.ieee.org>

IEEE Climate Change Program

<https://climate-change.ieee.org>



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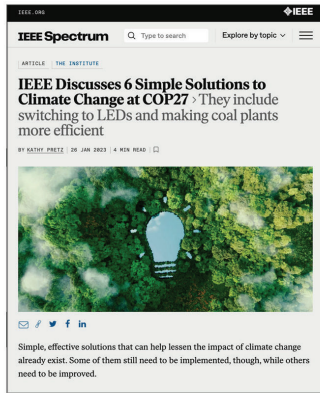


IEEE: Enabling Innovation and Technology Solutions

<https://climate-change.ieee.org>

Ecosystem for IEEE's Climate Sustainability Work

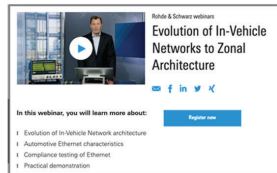
IEEE Spectrum: Climate Change News Feed; Podcasts; Features; Archives; Journal Watch Posts (Xplore); The Institute (Engineers of Climate Change); Coverage of Conferences and Standards



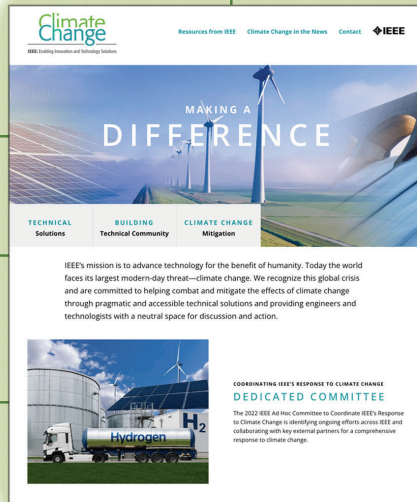
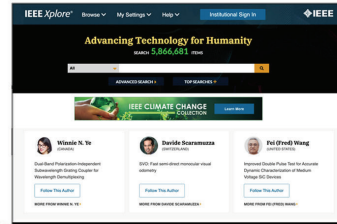
Social Media



Sponsored Content From Industry



Xplore: Engineers to Follow; Journal Watch Articles (free); Climate Change Articles



Jobs From IEEE Job Site



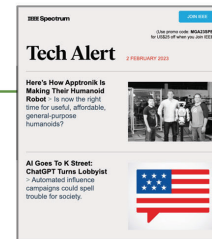
Conferences



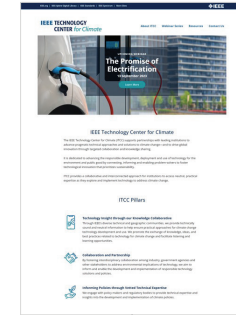
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Newsletters



IEEE Technology Center for Climate



IEEE Climate Change newsletter



IEEE Technology Center for Climate

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Webinar Series

Empowering The Green Tech Revolution: From Design to Deployment

ITCC provides a platform to catalyze connections and ideas. Our upcoming and recent series with Reuters, *Empowering The Green Tech Revolution: From Design to Deployment* showcases the value of our approach in bringing leaders and experts together in thought-provoking, community, and partnership-building events. The webinar series explores how technology contributes to climate goals and sustainability.

EPISODE ONE

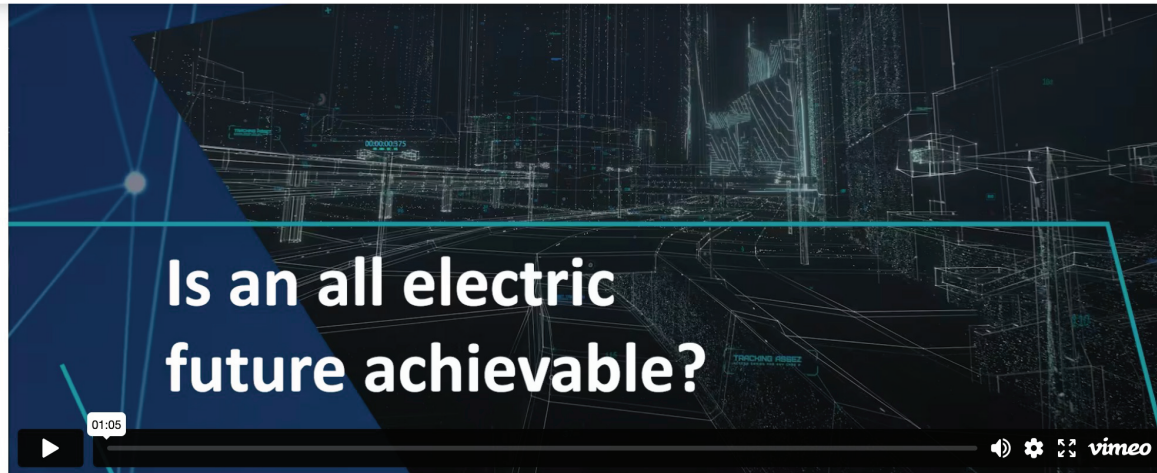
The Promise of Electrification

13 September 2023

Participation in a Topical Webinar with Doutora

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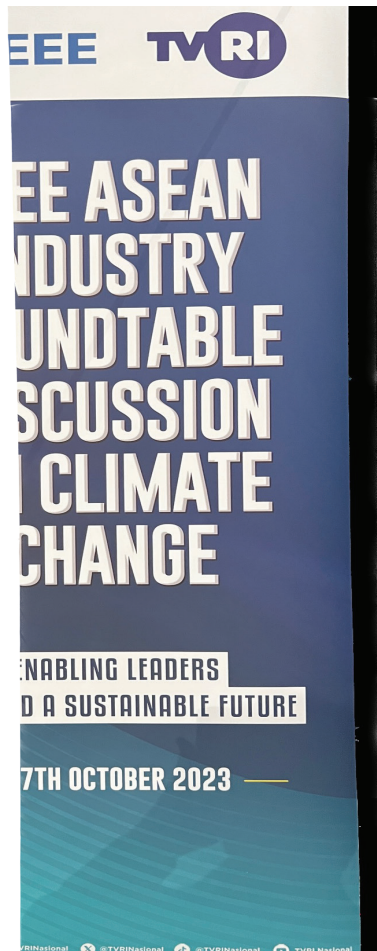
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Panel

- Saifur Rahman, 2023 IEEE President and CEO
- Katharina Tomoff, Global SVP, Environment, Social & Governance (ESG), DHL Supply Chain
- Francisco Laverón Simavilla, Iberdrola Direction of Energy Policies Head of Energy Policy, Iberdrola
- Moderator: Ursula Woodburn, the Cambridge Institute for Sustainability Leadership Europe

Regional Level Engagement on Climate Change





Thank you

web: www.srahman.org