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# Facilitating a smoother transition to Renewable Energy with AI (AI4Renewables)

Two-days of learning, fun and networking - with AI and sustainability enthusiasts from across the world

**Day 1- Social @ICLR 2022**

**25th and 27th April 2022 (11 am – 1 pm GMT)**

**Event Webpage:**
**https://www.ai4renewables.org**

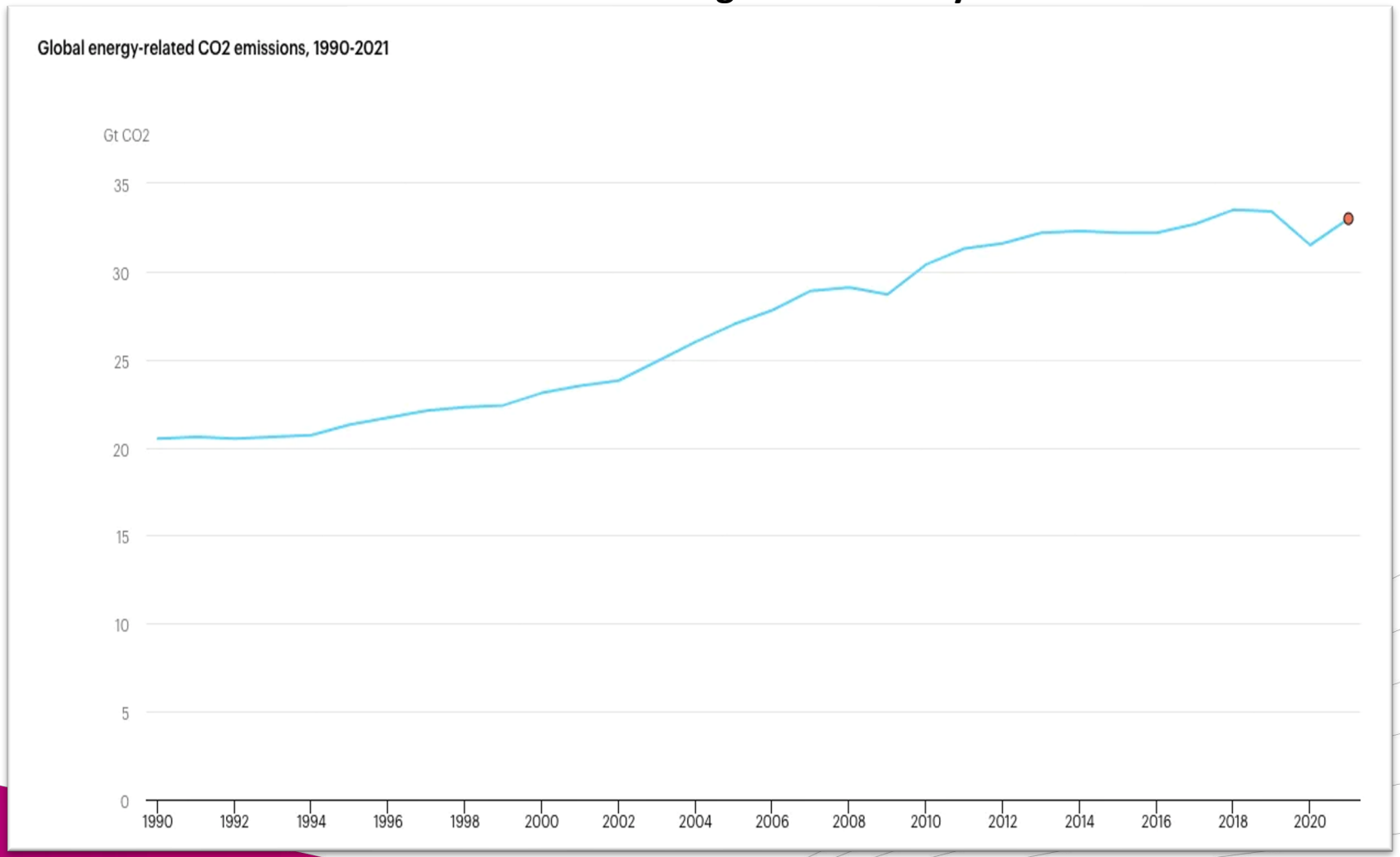


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# Introduction

In 2021, **the global energy-related CO2 emissions** rebounded to record numbers - **second-highest in history**!




Reference: International Energy Agency (IEA), March 2022

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# Introduction

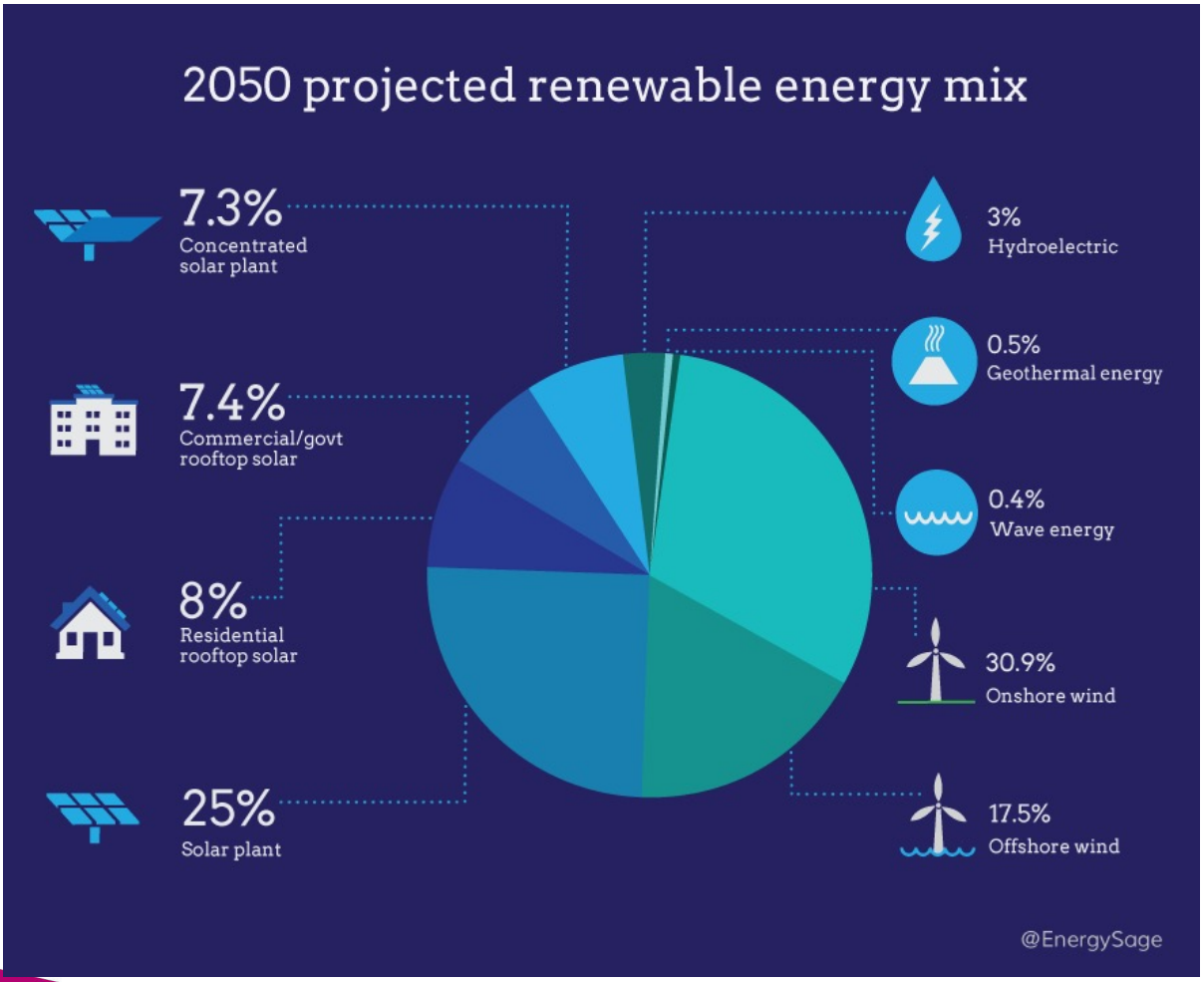
- To prevent a recurrence of this **dire phenomenon**, **electricity from renewables** must underpin our future energy system.
- According to the International Renewable Energy Agency (IRENA), **renewable energy can immediately, and significantly facilitate reduction in global CO2 emissions**.
- Interestingly, the **share of electricity in final energy consumption is only set to grow**, scaling exponentially from around current 20% to a **whooping 50% in 2050.**

Reference: International Renewable Energy Agency (IRENA), 2019

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# The promise of renewable energy sources

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Reference: EnergySage, 2021

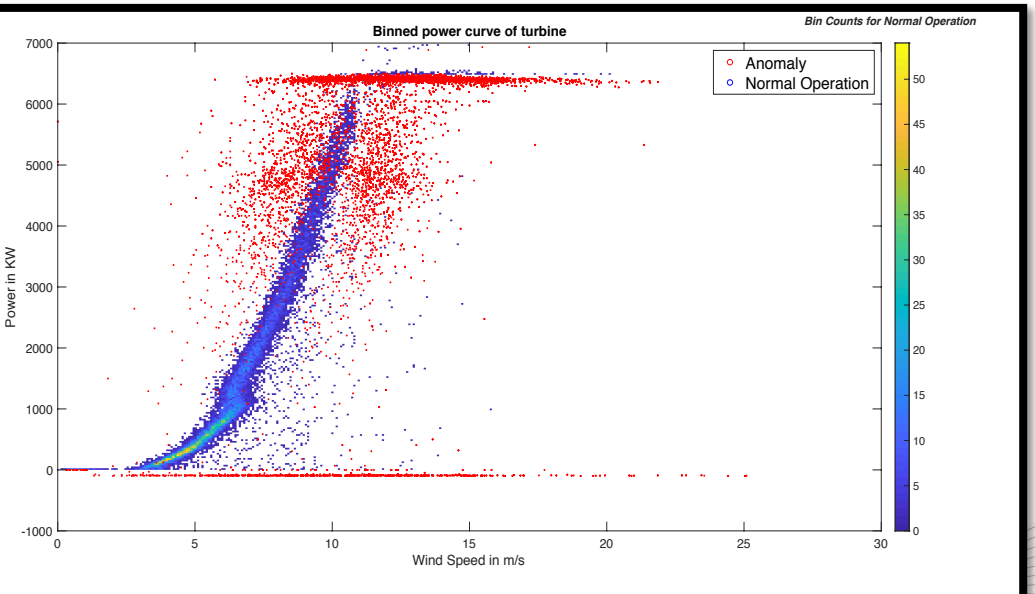
- **Wind energy** would potentially account for around 48.4% of renewables in the US by 2050!
- **Solar energy** is also promising, with around 47.7% of contribution to renewable energy mix in the US by 2050.
- **Majority of the energy demands can be met by wind and solar**, and remaining with geothermal heat and water.
- **Global installed wind capacity is predicted to grow** from **709GW in 2020** to **5.9TW in 2050.**

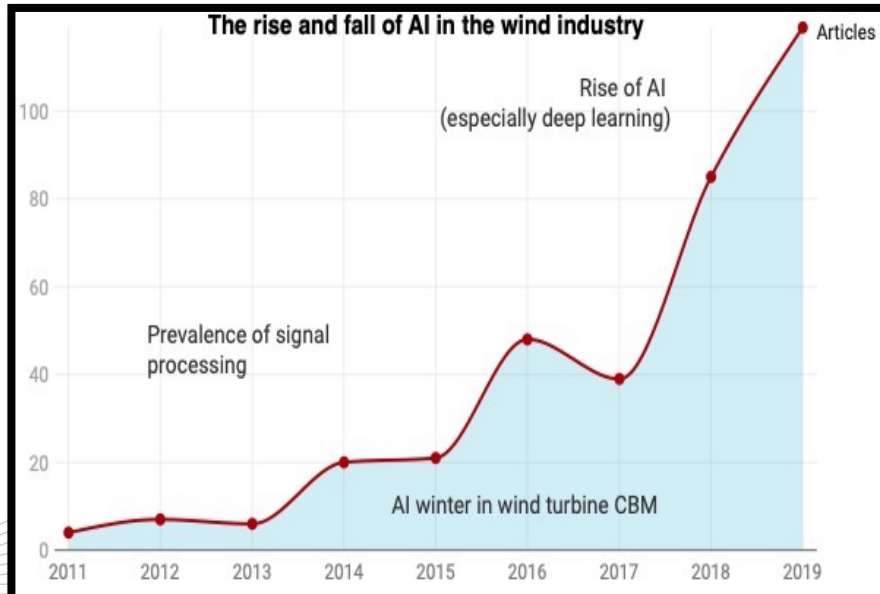
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# Challenges in transitioning to renewables

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- However,….. the **transition to renewable energy sources like wind energy doesn't come without hurdles** - being complex engineering systems, **wind turbines regularly suffer from operational inconsistencies and failures.**
- This leads to **high operations & maintenance (O&M) costs**, unexpected **downtimes**, energy **production short of full potential** etc.
- **Modern wind turbines presently have multiple SCADA sensors** which record information on parameters right from external environmental conditions (e.g. wind speed and direction) to more low-level details like rotor speed, gearbox oil temperature etc.
- **AI can help reduce O&M costs**, bring down downtimes and **increase availability** of energy systems **by learning from such data during Condition-based monitoring (CBM).**
- But sadly, the **focus on leveraging AI in the renewables domain is very limited** at present.



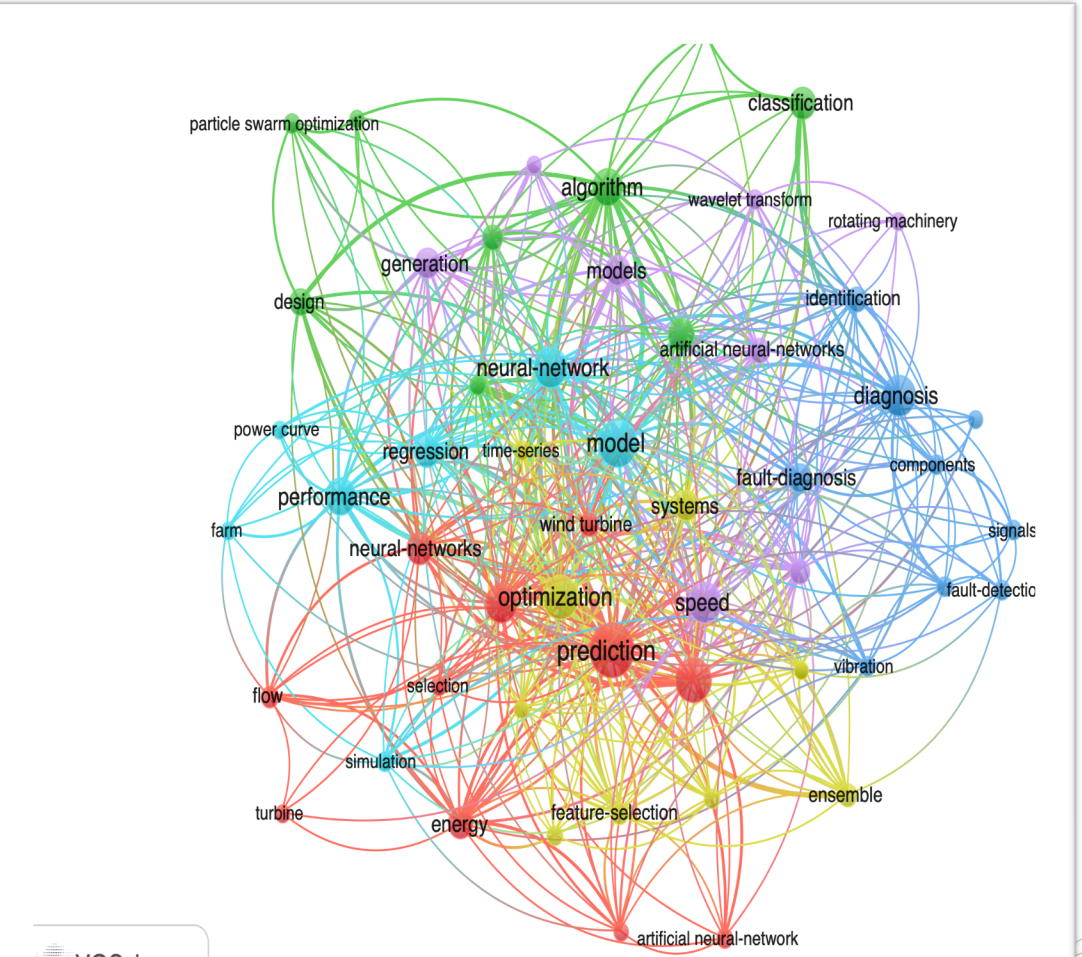



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# The multifaceted nature of AI in the wind energy domain

Reference: Chatterjee, J. and Dethlefs, N., "Scientometric review of artificial intelligence for operations and maintenance of wind turbines", Renewable and Sustainable Energy Reviews, 2021.






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# The goal behind the AI4Renewables social

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- Now that we know **that AI can, and is already being used with multiple perspectives in the renewables domain, we want to spread the word through this social!** Bring more AI and sustainability researchers in to join the promising efforts in facilitating a smoother transition to renewable energy with AI!
- The social will focus on **building a stronger community that is passionate about applying AI for improved availability and reliability of renewable energy sources.**

Day 1

A glance into the schedule – all times in GMT

**25 APRIL 2022**

| | |
|---|---|
| 11 a.m.-11.15 a.m. | Welcome and introduction to the event<br>**Dr. Joyjit Chatterjee and Dr. Nina Dethlefs** |
| 11.15 a.m.-12.40 p.m. | Panel discussion on AI4Renewables with the invited panellists<br>**All invited panellists - see here.** |
| 12.40 p.m.-1 p.m. | Open Q&A from audience to the invited panellists<br>**All audience** |

## Organisers



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@bda_hull



**Dr. Joyjit Chatterjee**
Data Scientist (KTP Associate) at Reckitt and University of Hull, UK

**Dr. Nina Dethlefs**
Senior Lecturer and Director of Research in Computer Science at University of Hull, UK

Please visit https://bda-hull.github.io for more insights on AI4Renewables and other sustainability-related projects being pursued by the organisers. We are always open to ideas and collaborations!

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# We are excited to be joined by wonderful experts today

## Eminent Panellists



**Dr. Natalia Efremova**
Lecturer in digital economy, Queen Mary University of London and CTO at Deep Planet, UK



**Clym Stock-Williams**
Manager of Performance Analysis and Improvements at Vattenfall, Netherlands



**Dr. Shruti Kulkarni**
Senior Data Scientist at Deloitte, Belgium



**Alexandra Klang**
Chairperson of the board, United Nations Association Malmö and Sustainability Consultant at Exceed, Sweden



**Dr. Ravi Pandit**
Lecturer in Instrumentation and AI at Cranfield University, UK

- The panel discussion would initially focus on **5 questions centered around the theme of this social.**
- We would request the panelists to share their views in around **3.5 minutes for each individual question.**
- The panelists would share their views based on their **significant personal experience and expertise in sustainability and/or AI.**
- After the panel discussion concludes, we will **have time for the audience to ask questions to the panellists.**

For detailed information about the panellists, please visit: https://www.ai4renewables.org

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# Let’s start with the panel discussion now!