Climate Technologies Sustainability Initiative

Low-C Emissions Energy Technologies Workshop Introduction

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FDC Emerging Technology Maturity Model

Past Initiatives In Steady State

Ideation  Incubation  Launch  Steady State

OU & FD  NIC  OUs

OU(s): Organizational Unit(s)
FD(C): Future Directions (Committee)
NIC: New Initiative Committee
FDC Current Initiatives: Incubation to Steady State

Phase 1: Coordinate across IEEE OUs
Phase 2: Implementation
Phase 3: Launch
Steady State
NEW INITIATIVE! A collaboration between IEEE TAB and IEEE-SA

- In-person and virtual workshops to identify gaps between needs and available technologies
- White papers and technology roadmapping focus in 2023
- Recruiting volunteers – Sign-up today!
IEEE Mission

IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity.
The Goal: Long-Term Sustainability of the Planetary Biosphere

The most urgent problem is the level of greenhouse gases in the atmosphere – we need:

- **Mitigation**
  - Prevention of further elevation of GHG levels in the atmosphere
  - Technology to measure impacts & transition energy systems

- **Adaptation**
  - Adaptation to the current and future impacts of global warming
  - Technology to prevent and contain environmental disasters

- **Restoration**
  - Regeneration of the Earth’s ecosystems
  - Technology to reduce GHG towards pre-industrial levels

Global greenhouse gas emissions and warming scenarios:
- Each pathway comes with uncertainty, marked by the shading from low to high emissions under each scenario.
- Warming refers to the expected global temperature rise by 2100, relative to pre-industrial temperatures.

<table>
<thead>
<tr>
<th>Annual global greenhouse gas emissions in gigatones of carbon dioxide-equivalents</th>
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<tbody>
<tr>
<td>150 Gt</td>
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<tr>
<td>100 Gt</td>
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<tr>
<td>50 Gt</td>
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Greenhouse gas emissions up to the present:

- **Current policies** 2.5 – 2.9 °C
  - Emissions with current climate policies in place result in warming of 2.5 to 2.9°C by 2100.

- **Pledges & targets (2.1 °C)**
  - Emissions if countries deliver on reduction pledges result in warming of 2.1°C by 2100.

- **2°C pathways**
- **1.5°C pathways**

![Graph showing greenhouse gas emissions and warming scenarios](image-url)
Carbon is essential for life – too much greenhouse gas in the atmosphere is catastrophic to life!
Planet Positive 2030
Strong Sustainability by Design - Compendium

- Guiding Principles
- Metrics / Indicators
- Economics / Regulation
- Global Methodologies
- Ecosystems:
  - Forests and Trees
  - Rivers and Lakes
  - Towns and Cities
  - Ocean and Coasts
  - Farmlands and Grasslands, Mountains and Peatlands
- Human Wisdom and Culture
- Sustainability Commons
- The Arts
- ... others may be added

IEEE SA Planet Positive 2030
Goal for this workshop

Examine 6 topic areas to lay the foundation for technology roadmapping

▸ 2050 net Zero emissions goal for energy systems
  - Barriers
  - Opportunities
  - Technology gaps
  - Roadmap to close gaps
  - Technology standards requirements

▸ Points to consider
  - Requirements for different geographic areas
    • Regional variations in needs, barriers, opportunities
  - Electrification
  - Circular economy
    • How do new technologies fit into reuse/recycle etc
    • Design for circular economy – standards etc

▸ Refer to the Planet Positive 2030 “Strong Sustainability by Design” for guidance on critical questions
Workshop Structure

- Introduction
- Briefings: 6 topics + PES roadmap
- Goals: Road to NetZero in 2050 – The role and challenges of the power industry
- Break
  - Break-out session 1: Current maturity status for each topic
  - Break-out session 2: Challenges and Opportunities for each topic
- Group reports
- Lunch – provided if you have signed up
- Break-out session 3: Outlook for each topic
- Break
- Wrap-up