



IEA Technology Collaboration Programme
on Energy Efficient End-Use Equipment



Power Electronic Conversion
Technology Annex PECTA

PECTA – A current Energy Efficiency Initiative of the International Energy Agency (IEA)

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Swedish Energy Agency

iea-4e.org

Background – goals of relevance on the global level

The Sustainable Development Goals (SDG) or Agenda 2030



The Paris agreement on max 1.5 C



Background – goals of relevance on the EU level

EU goals to 2030:

Supply of energy:

At least 32% share for renewable energy of the Primary energy supply

End use:

At least 32.5% improvement in energy efficiency

Reduction of CO₂-emissions

At least 55% cuts in greenhouse gas emissions (from 1990 levels)

All this achieved by a wide range of policies on the EU level. The Green deal and the Green recovery emphasis and sustain this more than before.



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4E PECTA – Power Electronics Conversion Technology Annex

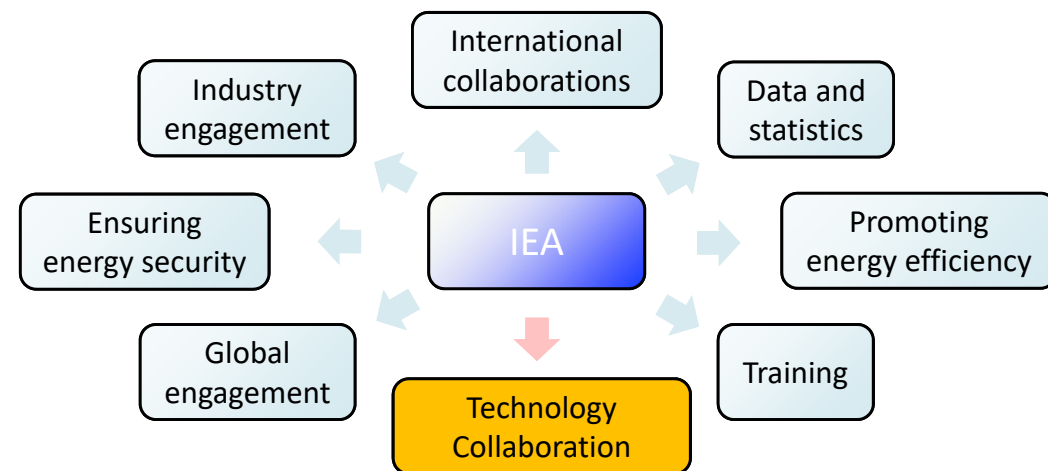
Introduction of the IEA and the TCPs

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What is the International Energy Agency (IEA)?

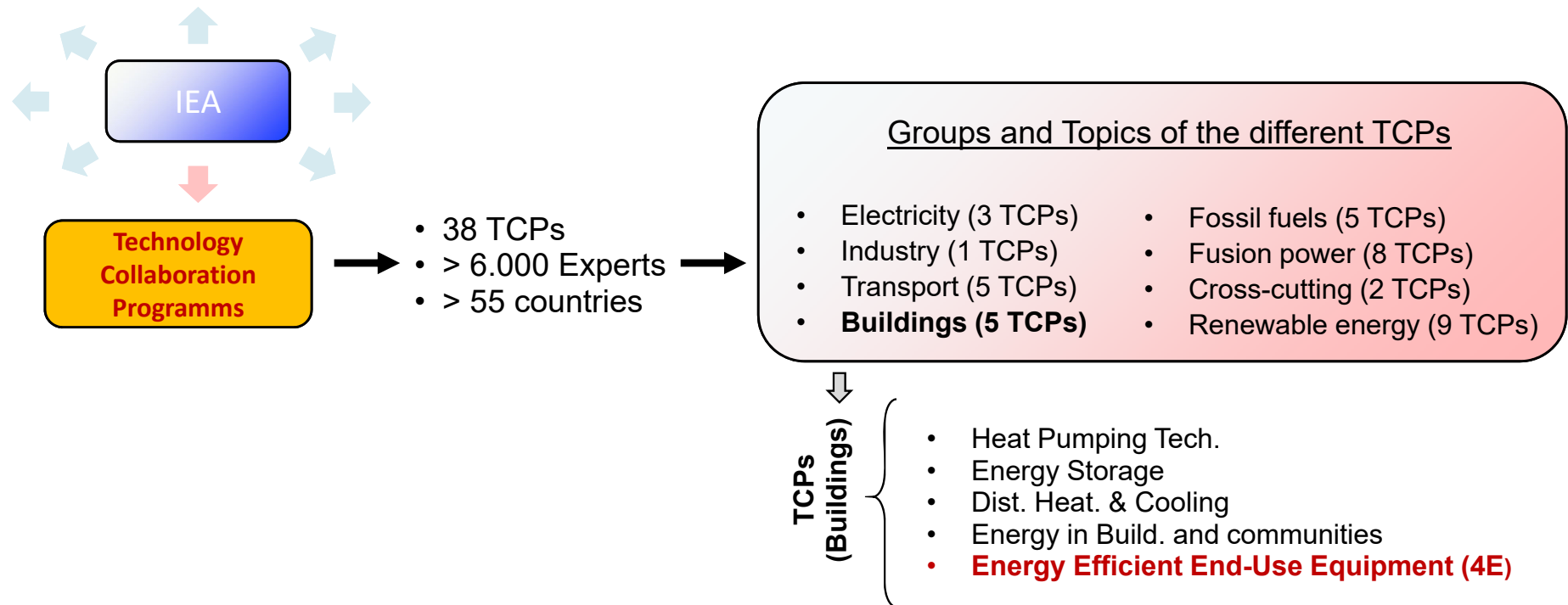
Introduction of the International Energy Agency IEA

- **Foundation:** 1974 (oil-shock)
- **Executive Director:** Dr. Fatih Birol
- **Mission:** advocates policies that enhance the reliability, affordability and sustainability of energy.
- **Areas of interest** (incomplete):
 - Renewable energy systems (RES)
 - Energy efficiency
 - Clean energy technologies
 - Electricity systems and markets
 - Access to energy **etc.**
- **Areas of work:**
Different activities and focus areas
- **Link:** <https://www.iea.org/>



What is an IEA Technology Collaboration Program?

TCP: Technology Collaboration Program. Funded by member states in the IEA, run under the IEA but as mainly independent programs.





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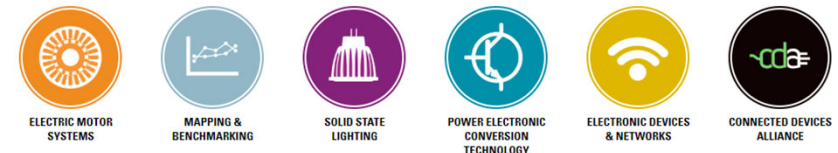
4E PECTA – Power Electronics Conversion Technology Annex

The TCP 4E and PECTA

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The IEA TCP on Energy Efficient End-use Equipment – IEA 4E

- **4E: Energy Efficient End-Use Equipment**
- **14 Countries and the EU-Commission** are currently member of the 4E TCP (Countries: AU, AT, CA, CHN, DK, FR, JP, KOR, NL, NZ, CH, SWE, UK, US)
- Policy makers and assigned experts meet and discuss policies for energy efficiency
- 4 Annex at the moment established:
 - EMSA: Electric Motor Systems Annex
 - EDNA: Electronic Devices and Networks Annex
 - SSL: Solid State Lighting Annex
 - **PECTA: Power Electronic Conversion Technology Annex**
- **Link:** <https://www.iea-4e.org/>



- **PECTA: Power Electronic Conversion Technology Annex**
- One of four Annexes under the TCP 4E umbrella
- Four Countries are currently active member (CH, AT, SWE, DK)

Main goals

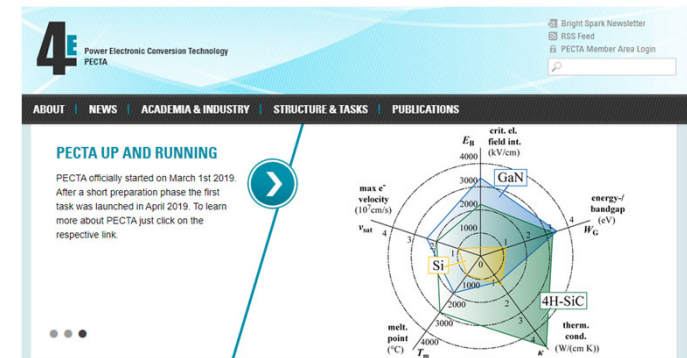
To understand the *drivers* and *barriers* for a wide dissemination of WBG-based material in power electronics.

Governments can then design policy programs that

- Sustain the drivers, and
- Lower the barriers

You can help here!

Link: <https://pecta.iea-4e.org/>



Workplan (Phase 1)

- **Task 1:**
Efficiency Potential in Power Electronic Applications
- **Task 2:**
Roadmaps for Power Devices

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PECTA Phase 1 – Work & Results

PECTA Phase 1 – work and results

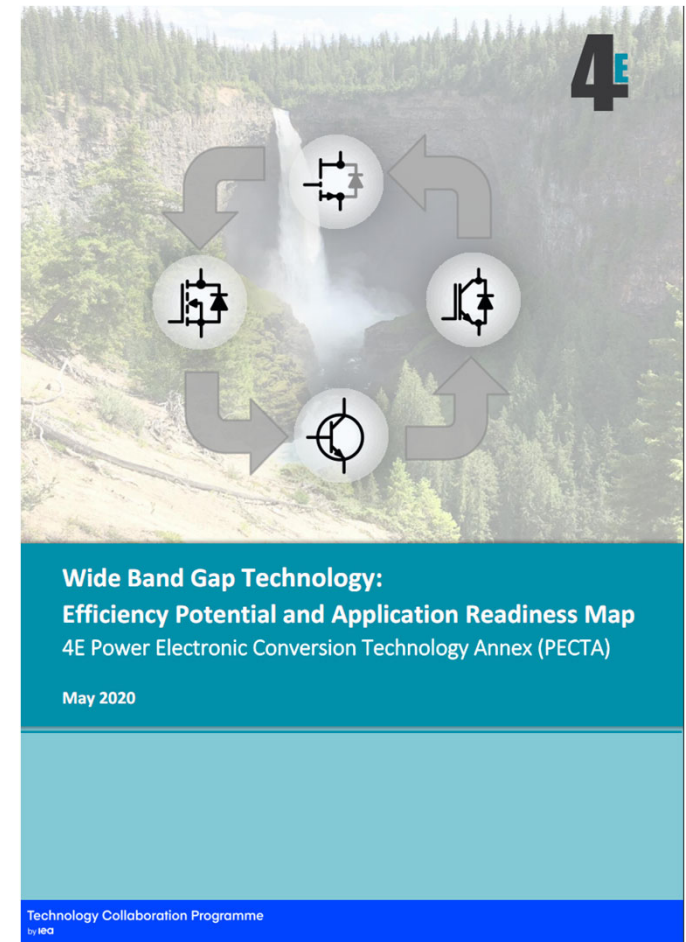
- **Publication**

Wide Band Gap Technology: Efficiency Potential and Application Readiness Map

Officially released: May, 2020, pages: 100

- **Outline**

- Introduction
- Applications in Focus
- Advantages of WBG in the Applications
- Existing Roadmaps
- Application Readiness Map
- WBG-Technology Challenges
- Potential Energy Savings for Selected Applications
- Exploring Policies for WBG Technology
- Key Findings and Outlook

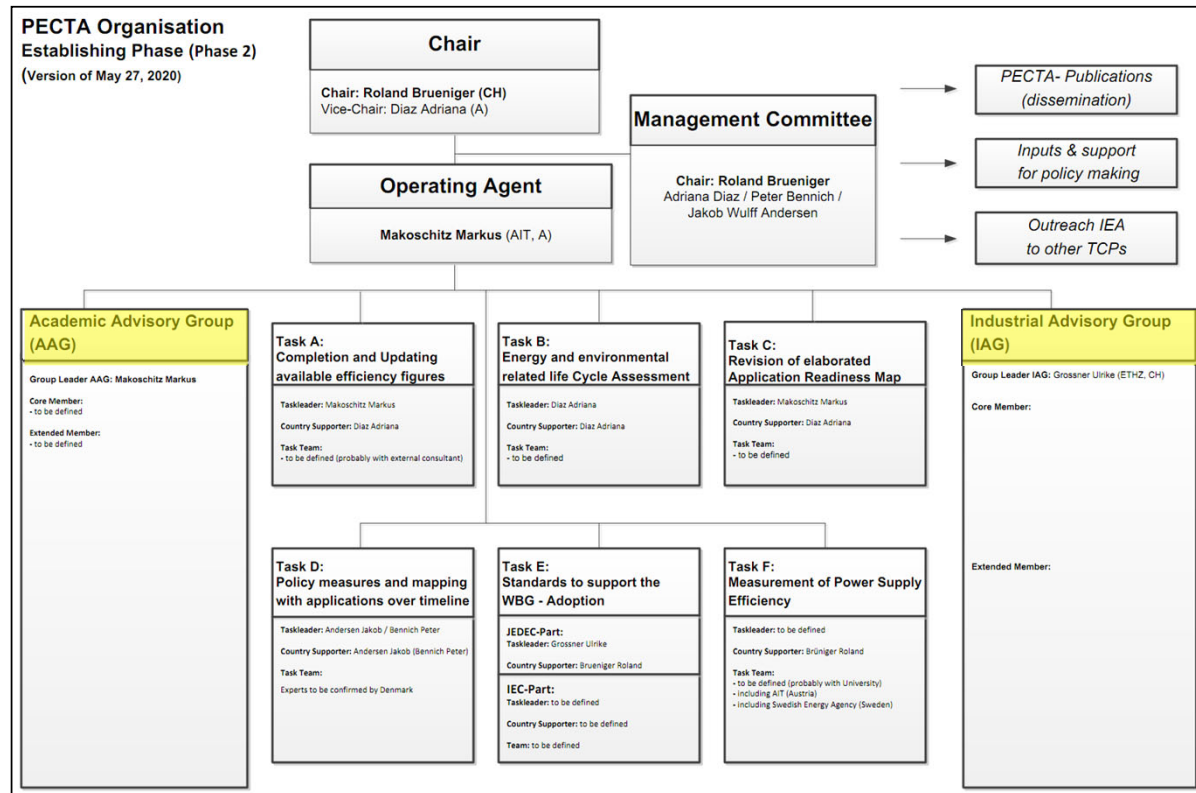


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PECTA Phase 2

PECTA Phase 2 – Established Phase (2020 – 2024)

- Organizational structure:**



PECTA Phase 2 – Established Phase (2020 – 2024)

- **Planned Tasks in Phase 2:**

- **Task A:** Completion and updating available efficiency figures
- **Task B:** Energy and environmental related life cycle assessment (LCA)
- **Task C:** Revision of elaborated application readiness maps (ARMs)
- **Task D:** Policy measures and mapping with applications on a timeline
- **Task E:** Standards to support the WBG-market entrance
- **Task F:** Measurement of power supply efficiency
- *Prel: Task G:* A global contest on the most energy efficient application using WBG... charging stations? PV-panels? Or what?



- **Task A:** Completion and updating available efficiency figures
 - Focus on relevant applications and updating efficiency figures.
 - In the foreground are the applications with high estimated potential (e.g. ICT and data centers)
- **Task B:** Energy and environmental related life cycle assessment (LCA)
 - Energy related to production of SiC and GaN should be investigated
 - Energy due to disposal of SiC and Gan should be investigated
 - Focus lies on compiling data available from literature or industry members to answer key questions (LCA of cell-phone charger etc.)
- **Task C:** Revision of elaborated application readiness maps (ARMs)
 - Update and/or revision of existing ARMs.
 - Industry advisory group should give feedback on their view.
 - Coordination with ECPE foreseen



- **Task D:** Policy measures and mapping with applications on a timeline
 - Mapping of possible policy measures and specific WBG applications on a timeline
 - Only policy measures that help in expediting the market entrance of WBG
 - Sorting of possible policy measures into categories to judge value / merit of each measure.
- **Task E:** Standards to support the WBG-market entrance
 - Current efforts: JEDEC, AEC etc.
 - PECTA supporting public organizations (IEC, JEDEC,...) as neutral platform to derive accepted global standards.
- **Task F:** Measurement of power supply efficiency
 - Search market for GaN-based power supplies (e.g. cell-phone-, laptop-chargers,...)
 - Compare them to Silicon-based counterparts
 - Elaborate on energy efficiency potential

PECTA – Contacts

Contacts

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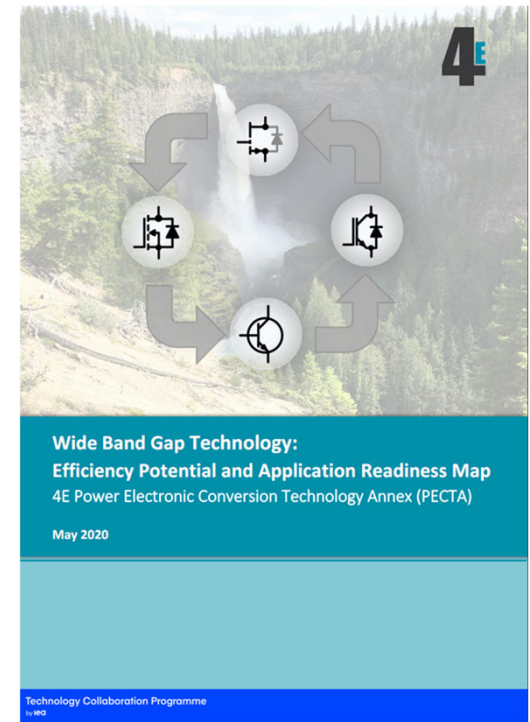
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