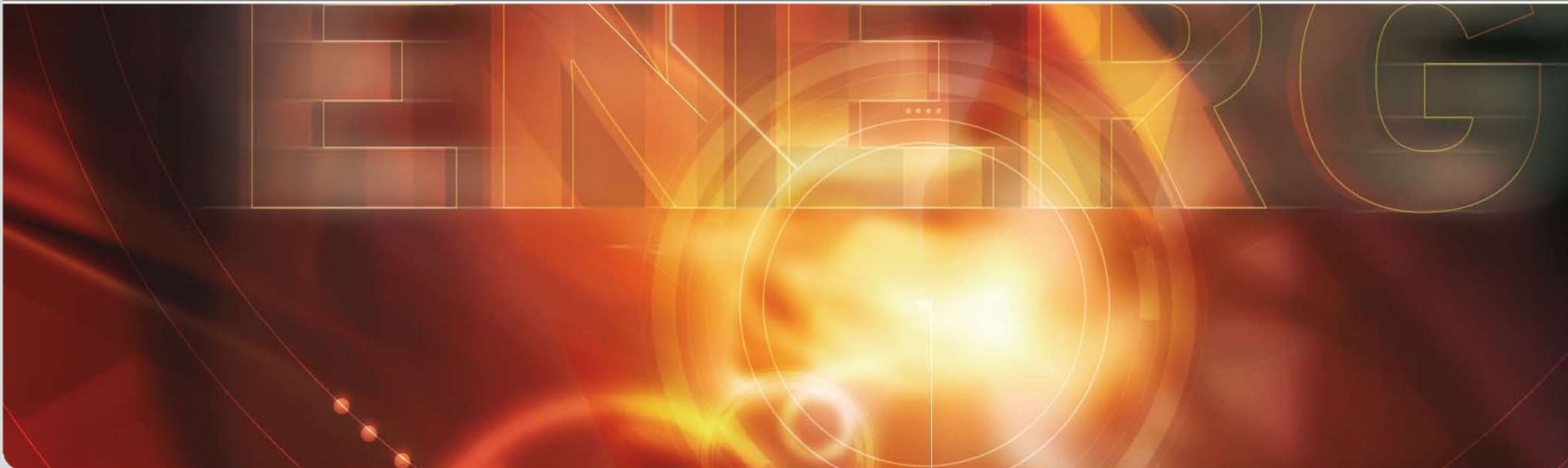# Technology Assessment

Prof. Dr. Armin Grunwald

United Nations, Presentation to **2023-2024 CSTD Intersessional Panel**, October 22, 2024

The ambivalence of technology

Science and technology

- make health, prosperity, growth, mobility, and development for many people possible

- dissolve previous limitations of the range of human intervention and open up new opportunities for shaping the world

but also

- create accumulating, unintended effects (climate change, pollution, social tension …)

- often solve problems while burdening future generations with new problems

→ **Need for orientation for harvesting the benefits of technology while minimizing or preventing negative consequences**

Example of ambivalence: energy consumption for growth and welfare

Global primary energy consumption by source

Primary energy is calculated based on the 'substitution method' which takes account of the inefficiencies in fossil fuel production by converting non-fossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.
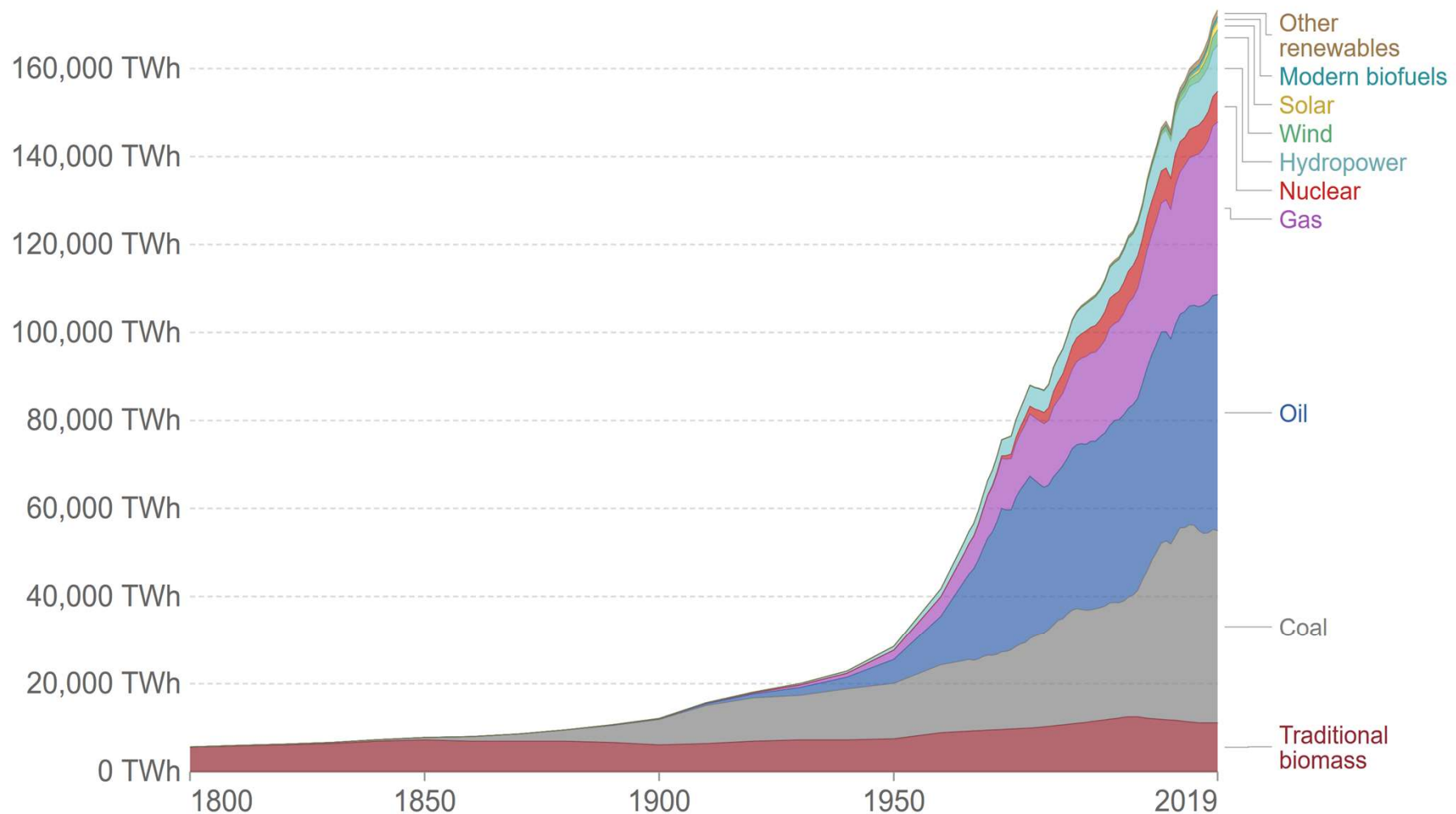
Motivations of TA

- growing influence of science and technology on life and policy-making in almost all policy fields → needs for scientific policy advice

- accumulating, uninteded consequences of technology since the 1960s (environment, nuclear weapons, tensions, vulnerabilities) → ambivalence

- social and moral conflicts around technology (nuclear, biotech, privacy and surveillance, military, medical technologies …)

- contributions to a global sustainable development (climate change, loss of biodiversity, microplastics, equity, …)

→ **Mission of TA: providing orientation for responsibly shaping technology and making good use of its outcomes**

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History of Technology Assessment

- Office of Technology Assessment at the U.S. Congress (OTA) as first TA institution founded in 1972

- first European TA institutions in the 1980s; foundation of the European Parliamentary Technology Assessment Network EPTA in 1990

- diversification of TA: participatory TA since the 1980s; TA as contribution to shaping technology since the 1990s

- global TA network founded in 2019 (members from 27 countries, including also countries from Global South)

- Related notions: impact assessment, technology futures assessment, ELSI studies (ethical, legal, social implications), RRI (responsible research and innovation), science & technology studies (STS) ….

Trinity of TA practice

- TA as **policy advice**: parliamentary TA, strategic advice to supranational bodies, national ministries and authorities

    - Example: Office of Technology Assessment at the German Bundestag (TAB)
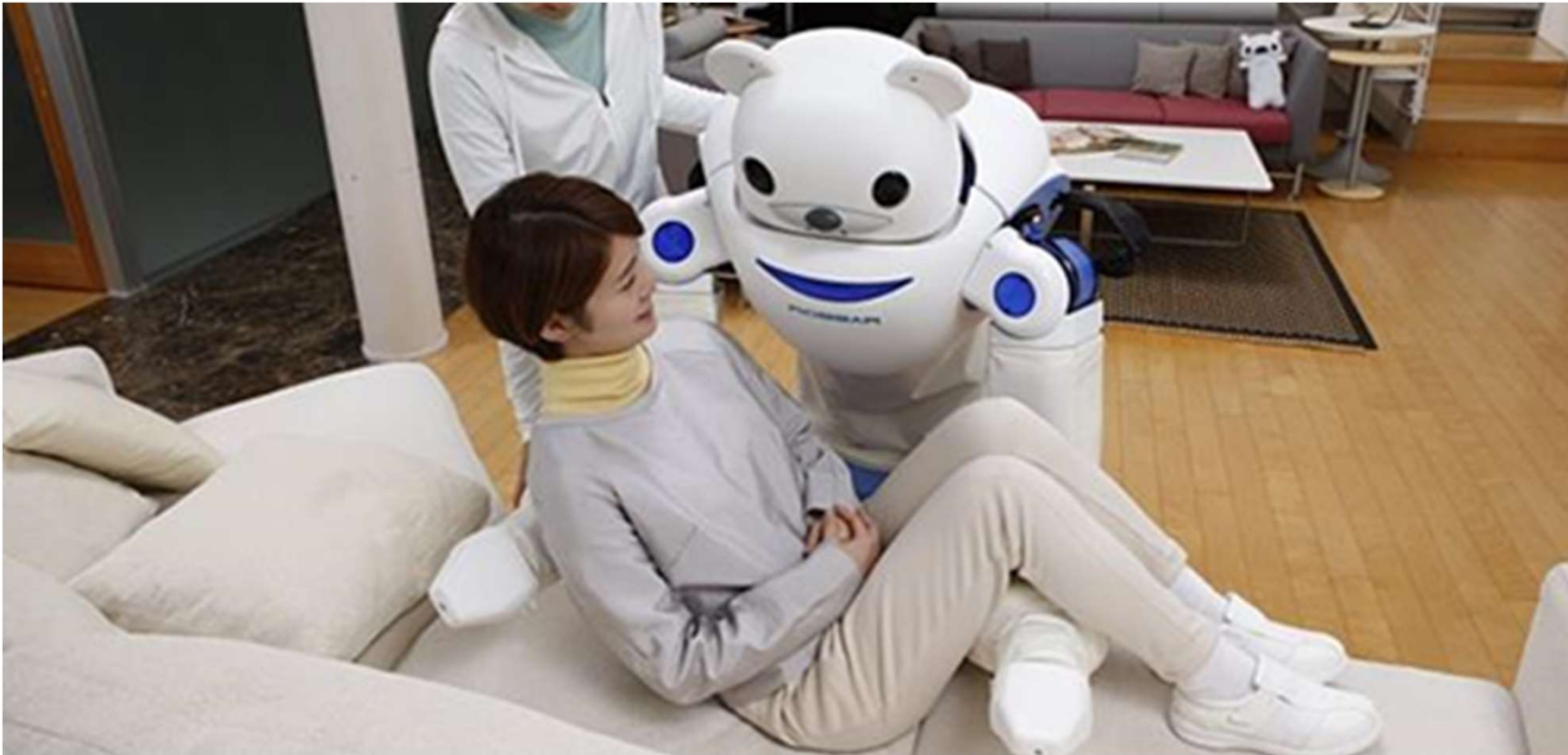
Trinity of TA practice

- TA as **policy advice**: parliamentary TA, strategic advice to supranational bodies, national ministries and authorities

  - Example: Office of Technology Assessment at the German Bundestag (TAB)

- TA as contribution to **public debate**: creating awareness, organising public events and debates, include citizens' views on new technology …

  - Example: Real-world labs on robots as artificial companions in human lifeworlds

Care Robots

Ethical question behind:
what do we understand by
„good care"?

Participatory approach needed:
- people needing care
- care personnel
- relatives

Trinity of TA practice

- TA as **policy advice**: parliamentary TA, strategic advice to supranational bodies, national ministries and authorities

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- TA as contribution to **public debate**: creating awareness, organising public events and debates, include citizens' views on new technology …

  - Example: Real-world labs on robots as artificial companions in human lifeworlds

- TA as **partner of engineering**: TA in direct cooperation with engineering projects

  - Example: TA as sustainability assessment of new technology in the field of ongoing urbanization

Urbanization

Constitutive Elements of TA

- problem-oriented research for advice → knowledge for action;

- anticipation needed: future technology, future consequences, future society – relation with TF

- analyses technology in its various social contexts (innovation, risk, perception, culture, ethics, regulation, economics etc.)

- inclusion with respect to stakeholders, citizens, people affected …

- close relation to the value dimension, e.g. in the form of ethical analyses or sustainability assessments;

- applies a thinking in alternatives concerning pathways to the future (instead of ‚science knows best')

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A metaphorical comparison

… researchers, along with stakeholders, act as the "cartographers" of different, viable policy pathways and their practical consequences by acting as the "mapmakers" of the future. They provide a guidebook with alternative options for policymakers (i.e. the "navigators" and the public). Such maps cannot replace travelling i.e., decision-making nor can they resolve all environmental policy conflicts, yet they can provide an important orientation in otherwise uncharted territory (Edenhofer/Kowarsch 2015, 63).

TA for Sustainability & Development

United Nations „Brundtland" Report 1987:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

→ human „needs" (not „wants")

→ ethical basis: justice between within generations

→ contributions from TA!

TA as sustainability assessment

- life cycle assessment (LCA) of technologies along the stages of mining raw materials, transports, production, usage, disposal → holistic considerations

- integrative assessments of ecological, economic, social, ethical, technological, cultural, … issues

- inclusive and participatory approaches and methods (recent example: project on green hydrogen partnerships between Germany and Global South countries)

- operable approaches to sustainability (indicator-based) for assessing technologies

- vast amount of case studies at different levels from local to global

TA in the Global South

- TA or TA-like activities are have already been implemented in many countries of Africa, Latin America, and Asia

- often in the context of technology policy, more seldom as participatory TA

- the implementation of TA must fit to the respective governance tradition, culture etc. – each country has to find out an own way to do it

- developing countries with little experience in using TA could start by performing a demand and context analysis, including comparisons to countries with some similarities

- UNCTAD and CSTD could (perhaps) offer some support

Perspectives of TA

- existing global TA network good point of departure but needs to be extended

- intercultural TA – TA across cultures beyond the Western TA model needed, adaptation of the TA idea to other cultures

- TA as resilience assessment, in particular for critical infrastructures)

- integration of TA ideas into industrial production

- TA in and for the sustainability transformation: TA as transformative research; engagement beyond advice
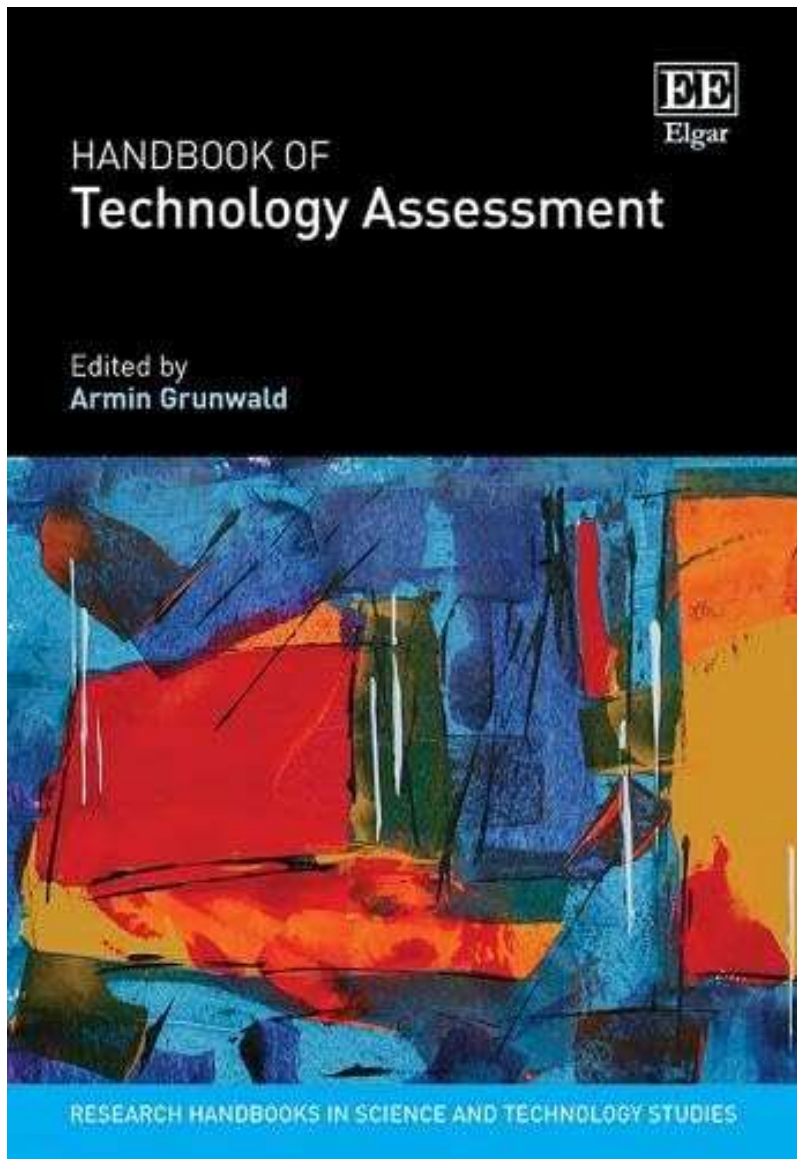
Thank you for your attention!

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