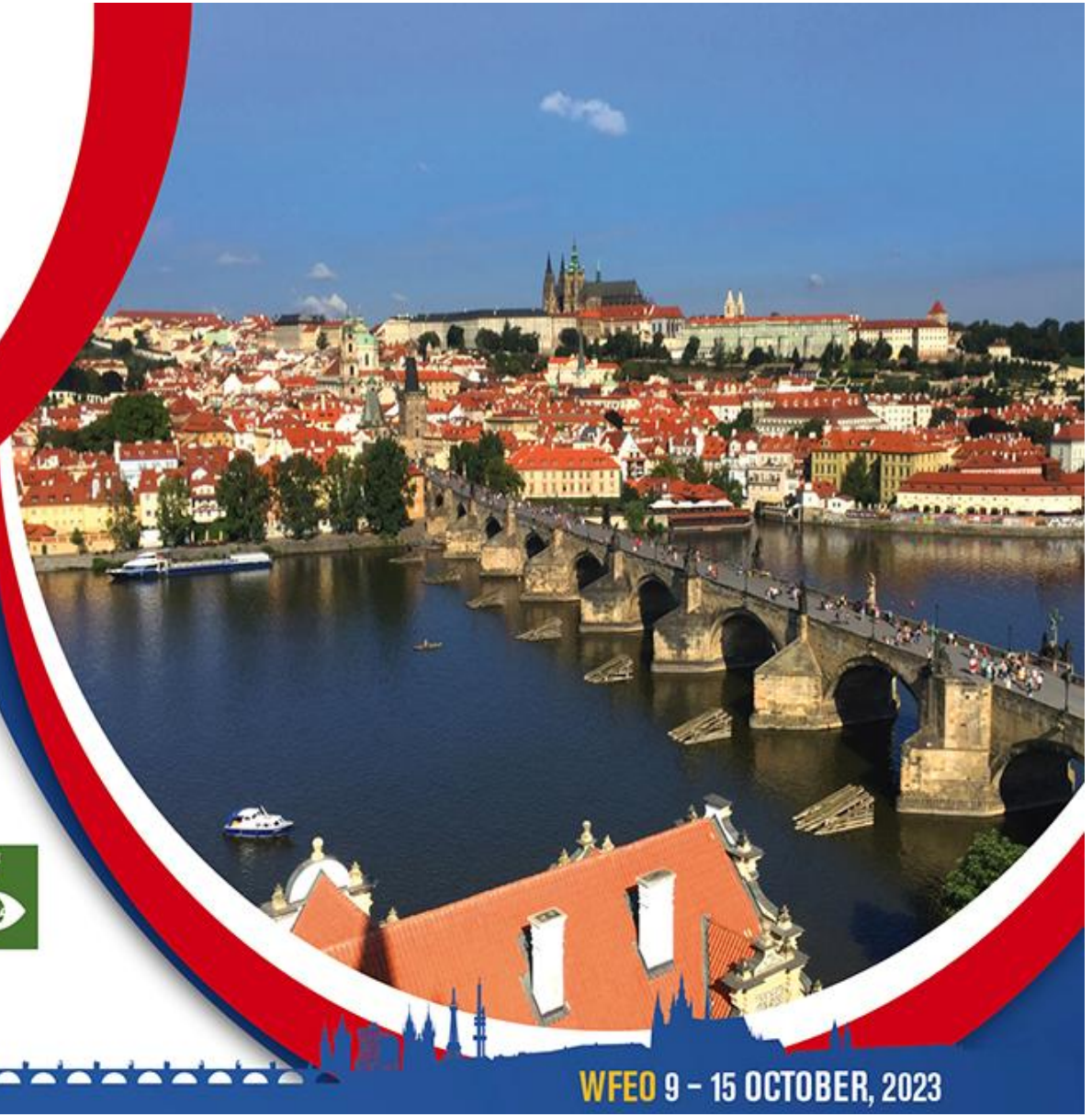
WEC 2023

7TH WORLD ENGINEERS CONVENTION

PRAGUE, CZECH REPUBLIC

11 - 13 OCTOBER, 2023



THEME:

ENGINEERING FOR LIFE - BREAKTHROUGH TECHNOLOGIES AND CAPACITY DEVELOPMENT FOCUSED ON UN SDGS:

www.wec2023.com

WFEO 9 - 15 OCTOBER, 2023

7th World Engineers Convention WEC 2023

- **9.-10., 14.-15. 10. 2023**
- **Valné shromáždění GA WFEO - ČSVTS, Novotného lávka 5**
- **11.-13. 10. 2023**
- **Vědecký kongres - Konferenční centrum Praha**

Hlavní témata kongresu – cíle udržitelného rozvoje OSN


WFEO PRESIDENT
José Manuel Pereira Vieira


Global challenges for water management


PANEL SESSION
CEZ GROUP
PANEL SESSION
CEZ GROUP

15 plenárních přednášek světových vědeckých kapacit z USA, Austrálie, Číny, Německa, Francie, Itálie, Portugalska, Nizozemska, Nigérie, Slovenska a České republiky

Jack Dangermond (USA)
GIS and the Geographic Approach –
Digital Infrastructure for Building a Sustainable Future

Josef Michl (USA/Czech Republic)
Porphene Synthesis, as a New Type of Tunable 2-Dimensional Polymer for Nano electronics

R. Paul Singh (USA)

Novel Approaches to Manage Water Use in the Food Industry to Support Circular Bio-Economy

Marlene Kanga (Australia)

Enabling our Sustainable Futures Beyond 2030: What it Will Take, What is Being Done

Serkan Saydam (Australia)

Can Humanity Extract Space Resources Sustainably and Ethically?

Chen Xuedong (China)

Design and Maintenance Technology Progress of China Pressure Equipment

Mustafa Shehu (Nigeria)

Energy Situation in Africa - Opportunities and Challenges

Selvaraju Ramasamy (FAO - United Nations, Italy)

Food Security and Achieving SDG2 – Science, Technology and Innovation (STI) for Sustainable Agrifood Systems

Fiammetta Diani (EUSPA – EU, Italy)

How Space Data and Services contribute to a more sustainable future

José Vieira (Portugal)

Water and Engineering. The Role of Engineers in Solving Global Water Problems

Jean Eudes Moncomble (France)

Energy: a challenge but also an asset for achieving the SDGs

Jean Eudes Moncomble (France)

Energy: a challenge but also an asset for achieving the SDGs

World Federation of Engineering Organizations
Fédération Mondiale des Organisations d'Ingénieurs

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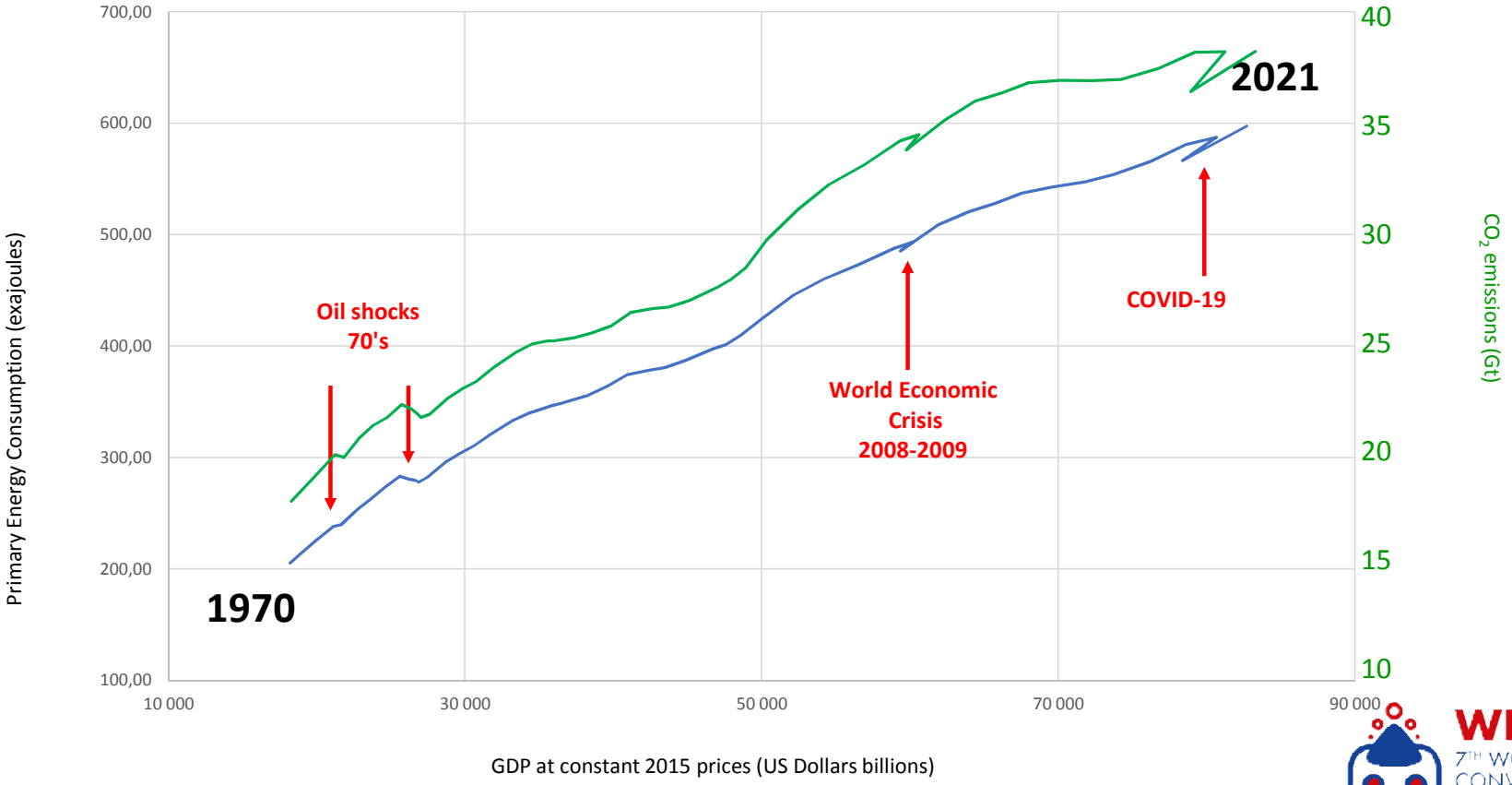
Energy: a challenge but also an asset for achieving the SDGs

Jean Eudes MONCOMBLE
Chair of Committee on Energy
World Federation of Engineering Organizations (WFEO)

October 2023

Link Energy –GDP (Worldwide) with CO_2



Jean Eudes Moncomble
Chair, WFEO Committee on Energy

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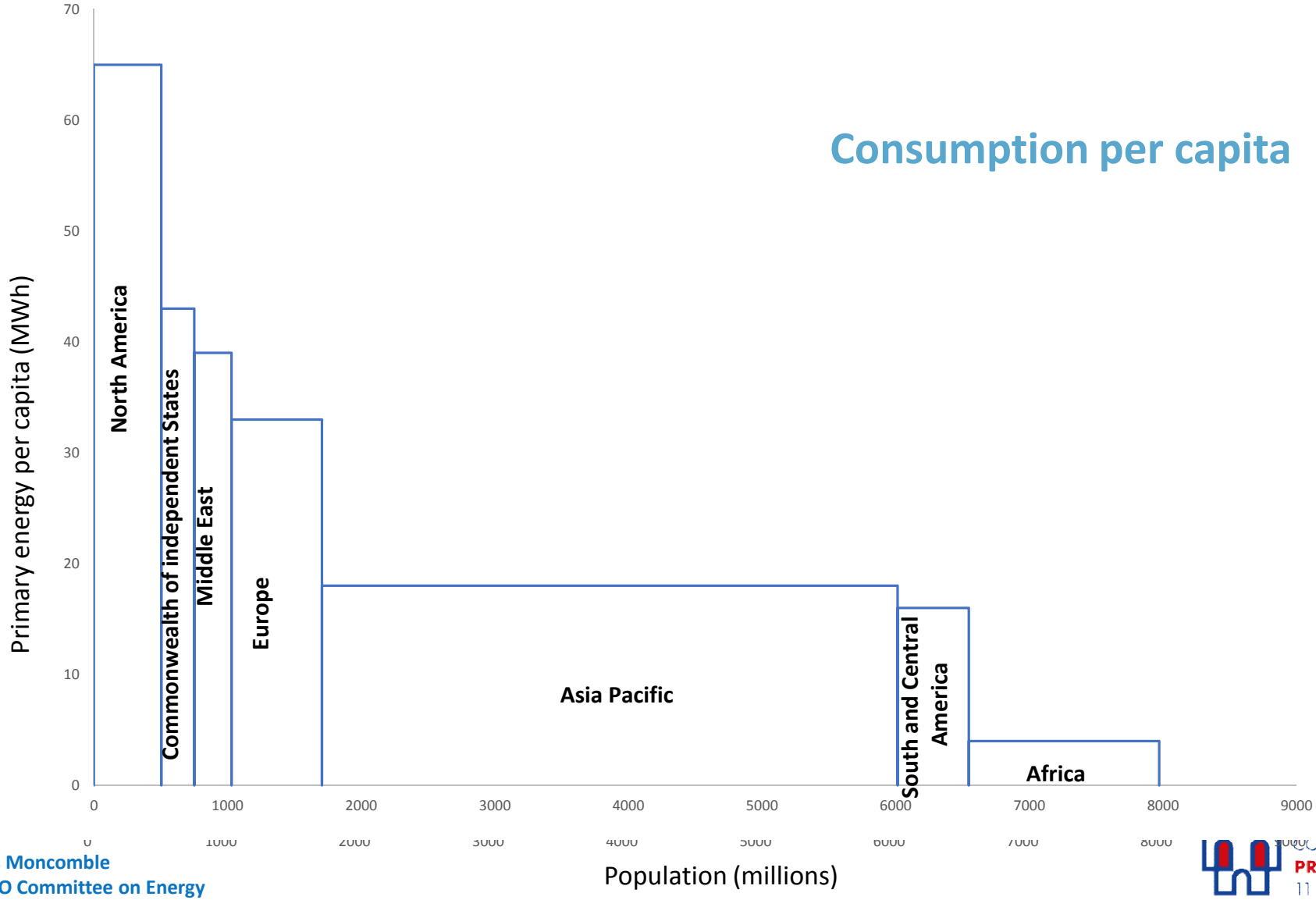
Consumption per capita



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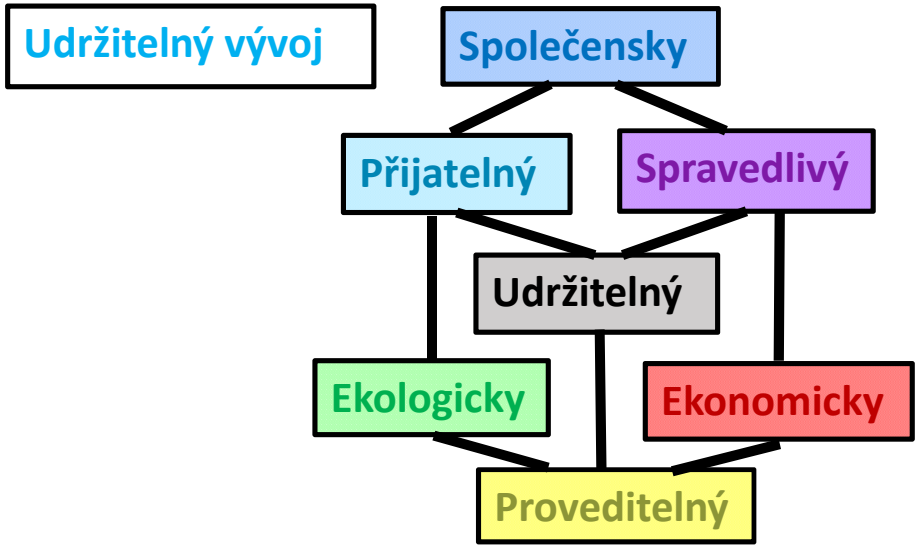
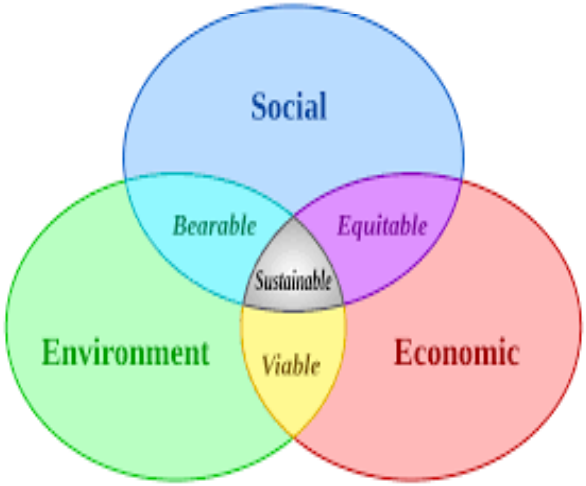
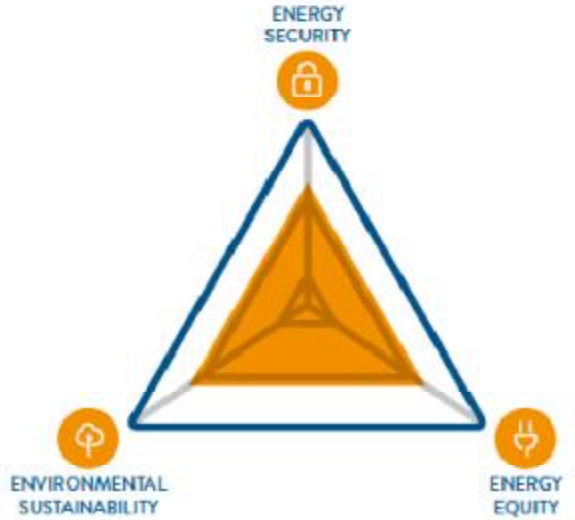




Sustainable development

WORLD ENERGY COUNCIL

Availability
Accessibility
Acceptability



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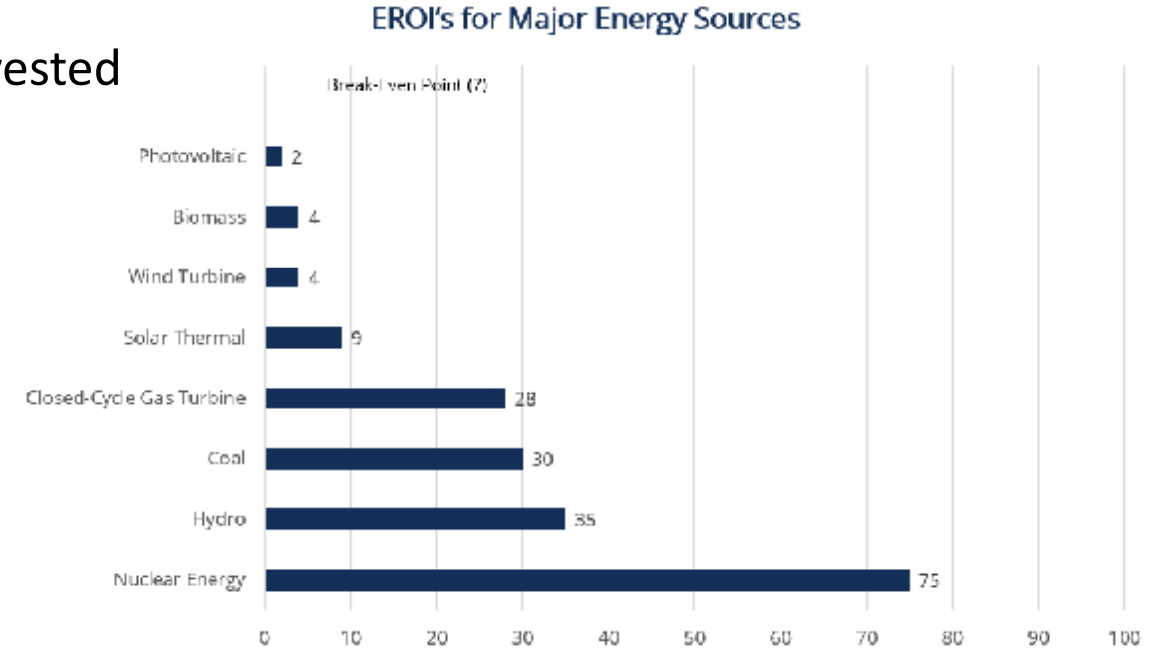
Two « new » ideas to precise what is sustainable (1/2)

Energy Returned On (Energy) Invested

ERO(E)I

$$EROI = \frac{Delivered\ Energy}{Used\ Energy}$$



Source: CFI

Jean Eudes Moncomble
Chair, WFEO Committee on Energy

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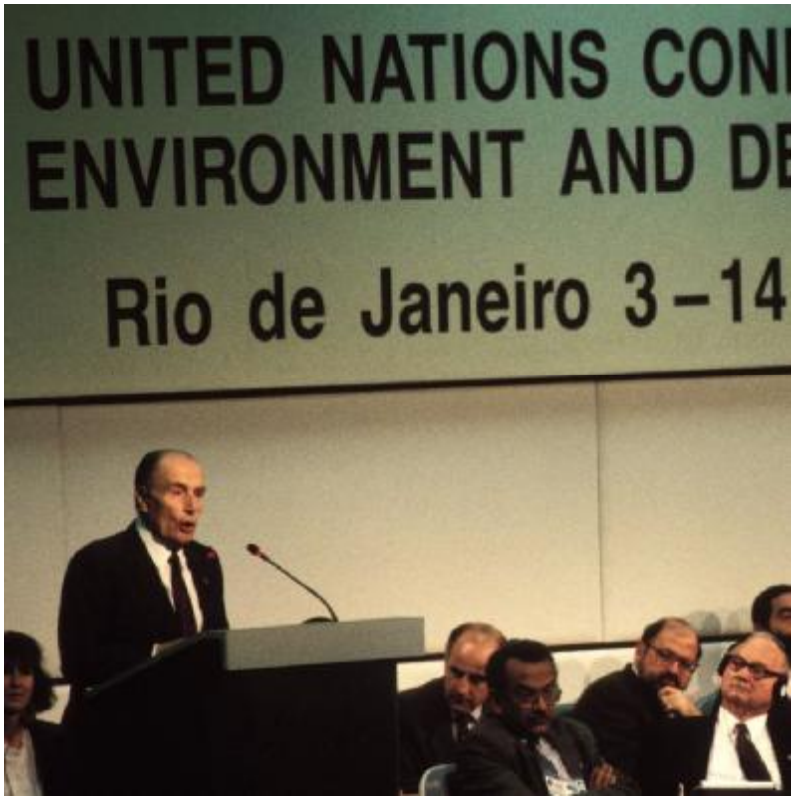
Two « new » ideas to precise what is sustainable (2/2)

Material intensity

Materials (t/TWh)	Coal	Gas CC	Nuclear PWR	Hydro	Wind	Solar PV
Concrete & cement	870	400	760	14 000	8 000	4 050
Iron/steel	310	170	165	67	1920	7 900
Copper	1	0	3	1	23	850
Aluminium	3	1	0	0	35	680
Glass	0	0	0	0	92	2 700
Silicon	0	0	0	0	0	57

Source DOE

Jean Eudes Moncomble
Chair, WFEO Committee on Energy



One day people will say to us, you knew all this, what did you do?

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Aldert Kamp (Netherlands)

Reimagining HE Through the Lens of the Digital and Sustainable Society and Workplace

Jűrgen Kretschmann (Germany)

Engineering For A Better World

Bohdan Zronek, Luděk Dušek, Petr Altschul, Vladimír Poklop, David Martinek (Česká republika)

ČEZ GROUP Panel Session - The future of Energy

Jűrgen Kretschmann (Germany)

Engineering For A Better World

Deutscher Verband
Technisch-Wissenschaftlicher
Vereine

Engineering for a Better World

Prof. Dr. Jürgen Kretschmann

Half-way to 2030:

- 15 % of some 140 specific targets to achieve the 17 SGDs are on track

- 30 % remain unchanged or below the baseline (among them „End extreme poverty and hunger“(SDG 1and 2) and „Gender Equality“(SDG 5))

„The world was already off track in achieving the majority of the SDGs before the COVID-19 pandemic“ (A/HLPF/2023/1 p. 4), and - because it started later - the Russian War with Ukraine!

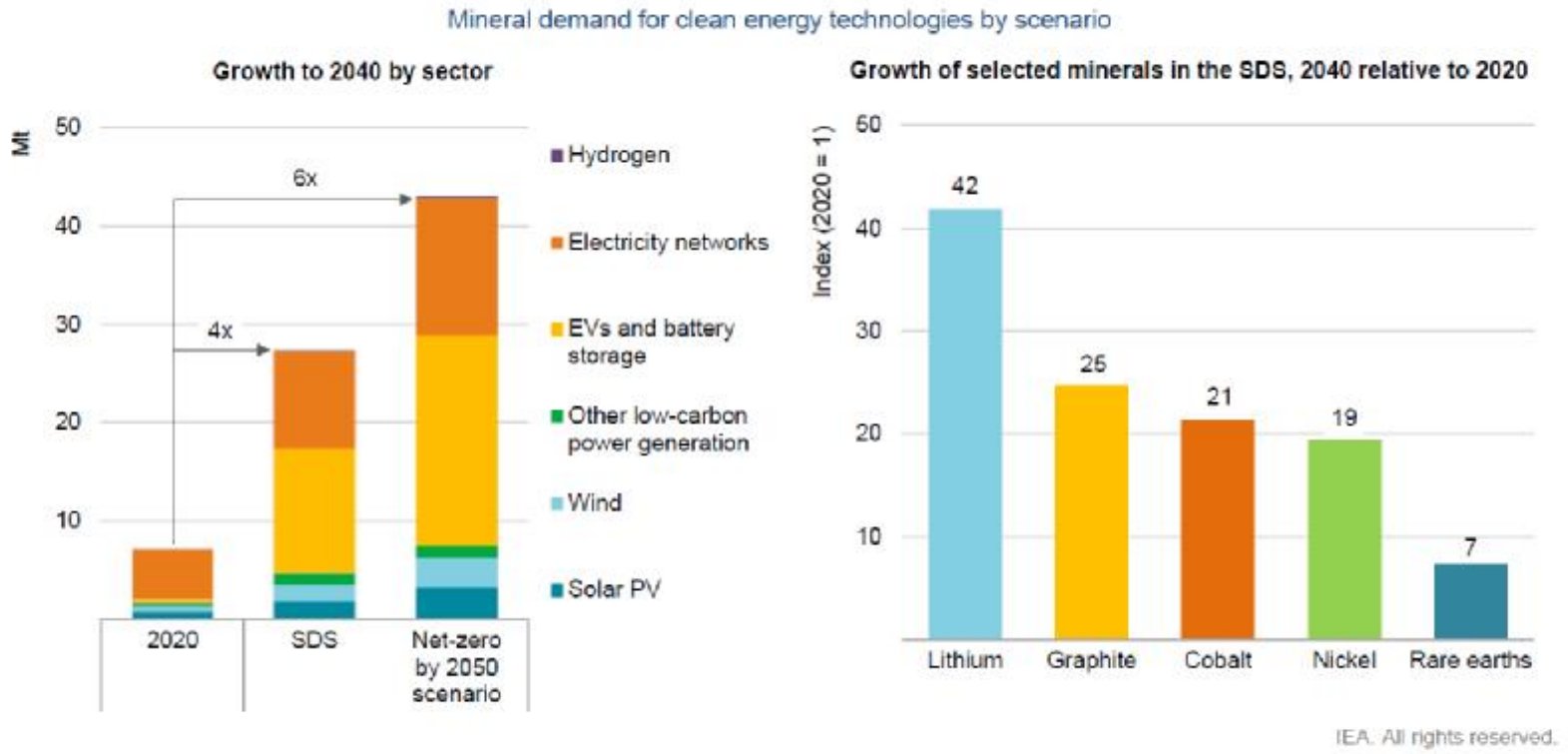
Results so far, SDG 13 Climate Action

Global CO 2 emissions 2015: 35,56 Gt
Global CO 2 emissions 2022: 37,5 Gt
Plus: 5,46 %

Global coal production 2015: 7.8 bio. t
Global coal production 2023: 8.4 bio. t
Plus: 7,7 %

Mineral demand for „clean“ energy technologies

…rises at least 4 times by 2040 to meet climate goals. We destroy nature to be clean!



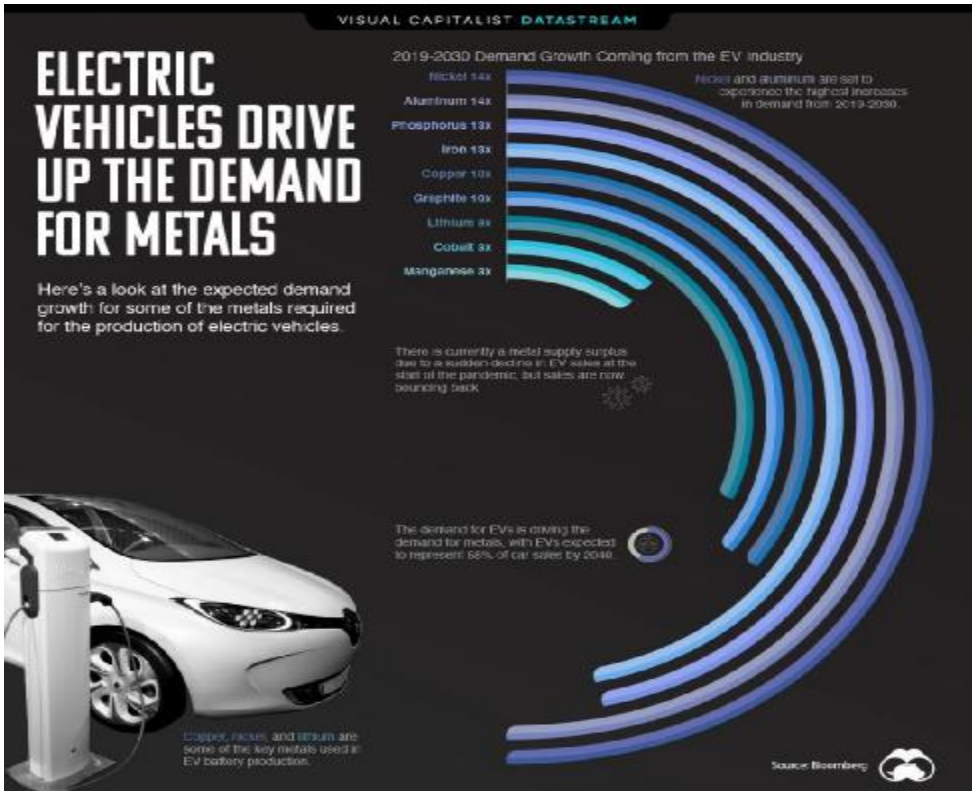
Notes: Mt = million tonnes. Includes all minerals in the scope of this report, but does not include steel and aluminium. See Annex for a full list of minerals.

Sources: IEA (2021): *The Role of Critical Minerals in Clean Energy Transitions*

Example: Electric Vehicles

Strong demand for certain raw materials to develop a more sustainable world, such as.

- **copper and rare-earth elements for renewable energy production,**
- **or nickel, manganese, lithium and cobalt for batteries.**

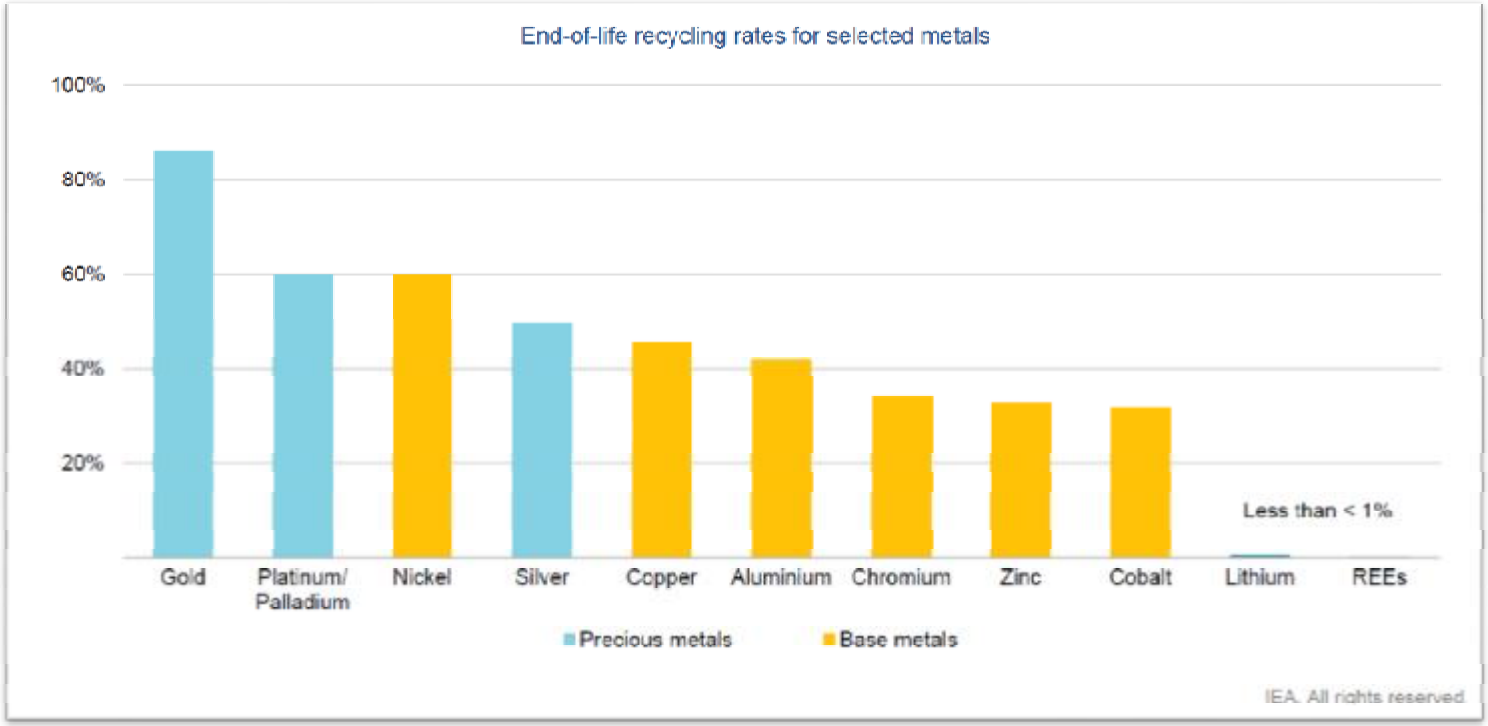



Waste
99%
Valuable Material
1%
Based on ore grades of e.g. copper, nickel or gold


Should we destroy nature to save the climate? Bigger holes cannot be the ultimate solution.

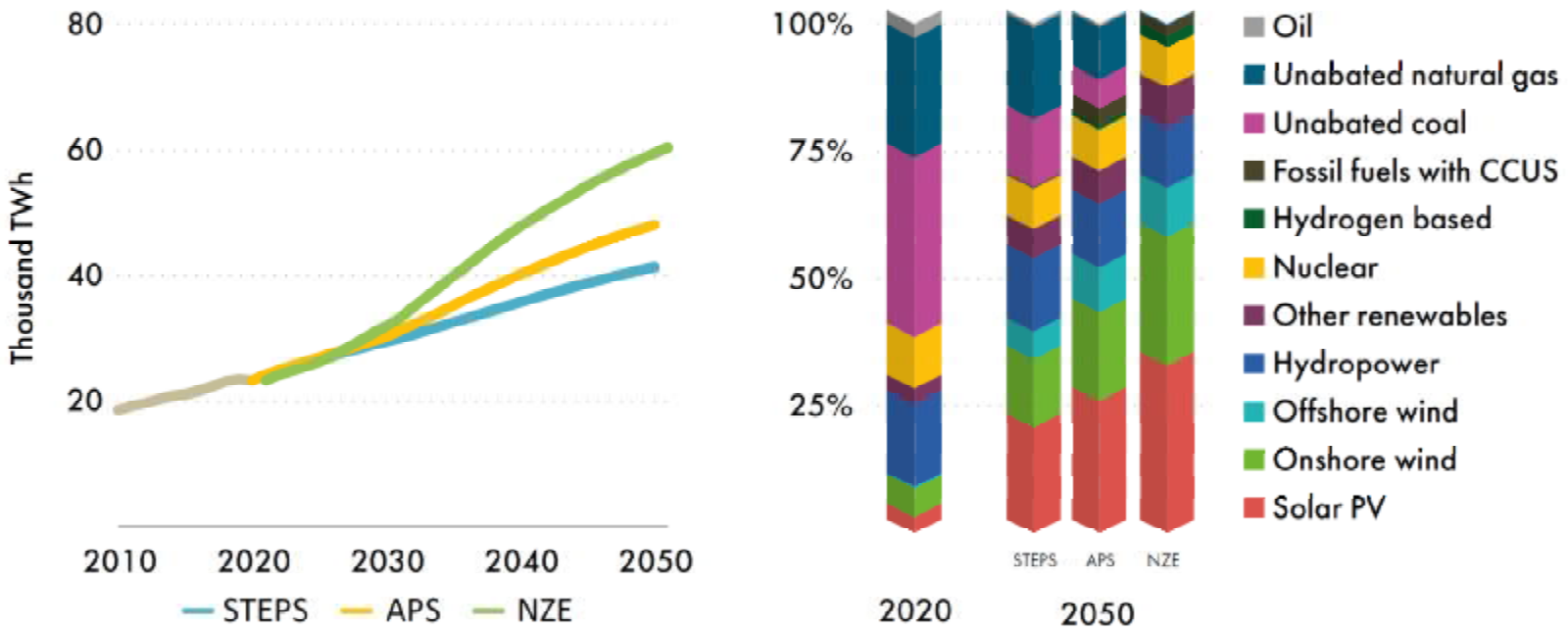
Status quo: Today‘s recycling rates

Development of recycling rates depends on collection conditions, price volatility and market maturity



Sources: IEA (2021): *The Role of Critical Minerals in Clean Energy Transitions*, based on Henckens (2021); UNEP (2011); Sverdrup & Ragnarsdottir (2016); OECD (2019).

Growth of global electricity demand to 2050 in three scenarios



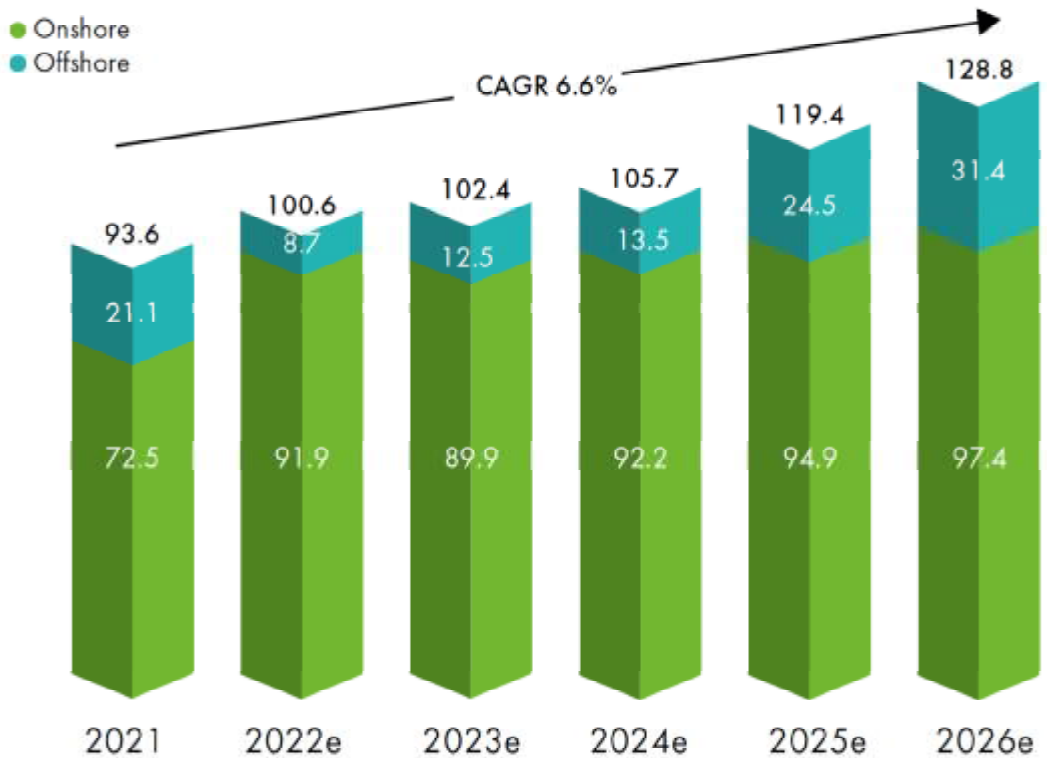
Source: IEA, World Energy Outlook 2021. Note: STEPS = Stated Policies Scenario based on prevailing policy settings; APS = Announced Pledges Scenario where all announced net zero pledges and NDCs as of mid-2021 are met in full and on time; NZE = Net Zero Emissions by 2050 Scenario where the global energy sector achieves net zero CO2 emissions by 2050.

Global wind energy market expected to grow by 6.6% per year on average

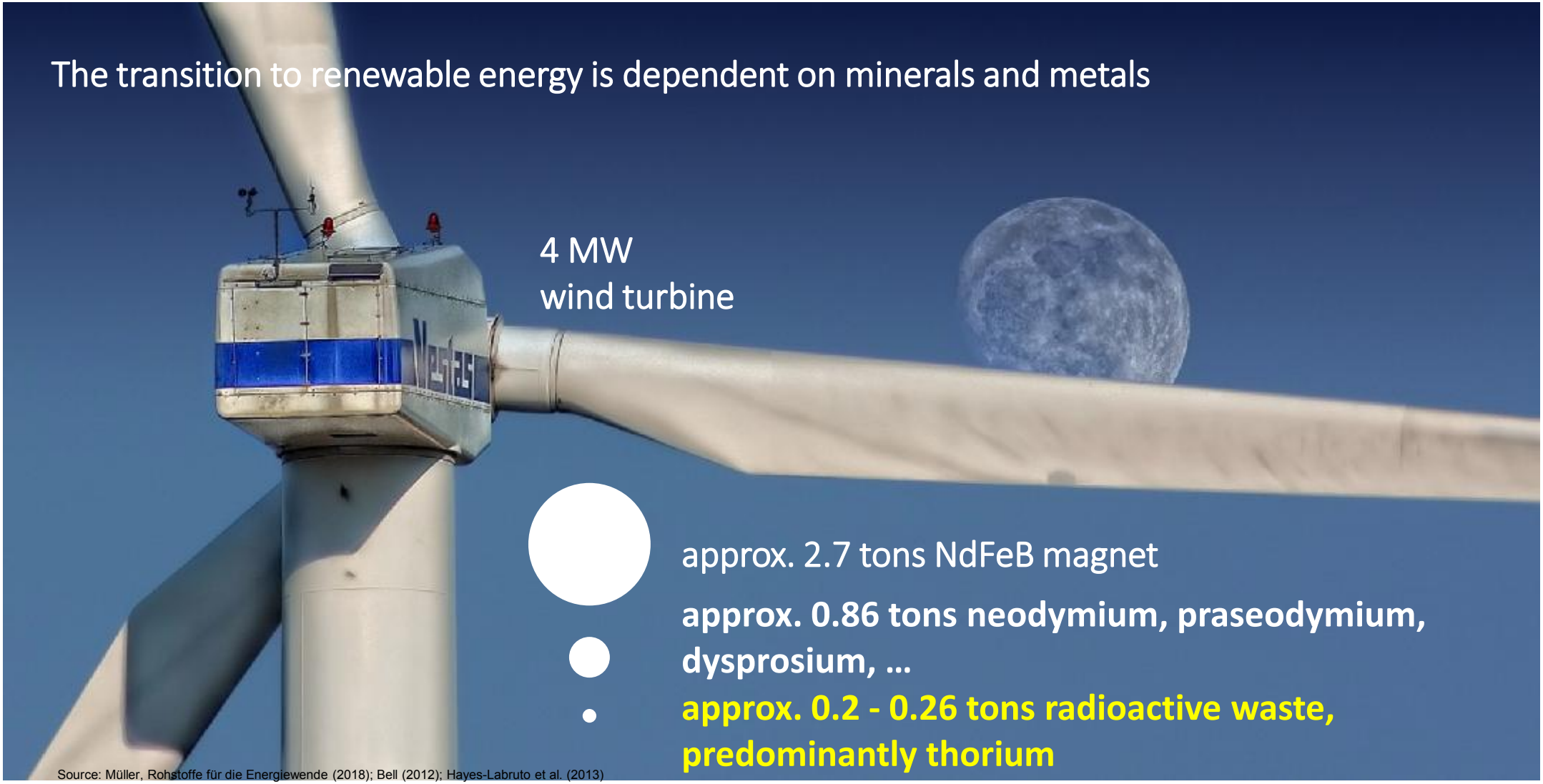
New wind power installations outlook 2022-2026 (GW)

GWEC Market Intelligence expects that 557 GW of new capacity will be added in the next five years under current policies.

That is more than 110 GW of new installations each year until 2026.



Source: Drusche (2022) based on Constantinides, 2018


The transition to renewable energy is dependent on minerals and metals
4 MW
wind turbine
approx. 2.7 tons NdFeB magnet
approx. 0.86 tons neodymium, praseodymium, dysprosium, …
approx. 0.2 - 0.26 tons radioactive waste, predominantly thorium
Source: Müller, Rohstoffe für die Energiewende (2018); Bell (2012); Hayes-Labruto et al. (2013)

Ján Košturiak, Gabriela Končitíková, Stanislav Martinec, Zdenka Hofbruckerová, Václav Sušeň

(Slovak Republic, Czech Republic)

Tomas and Jan Bata and Competitive Business Strategies for Present Business World

14 paralelních sekcí pro klíčová témata

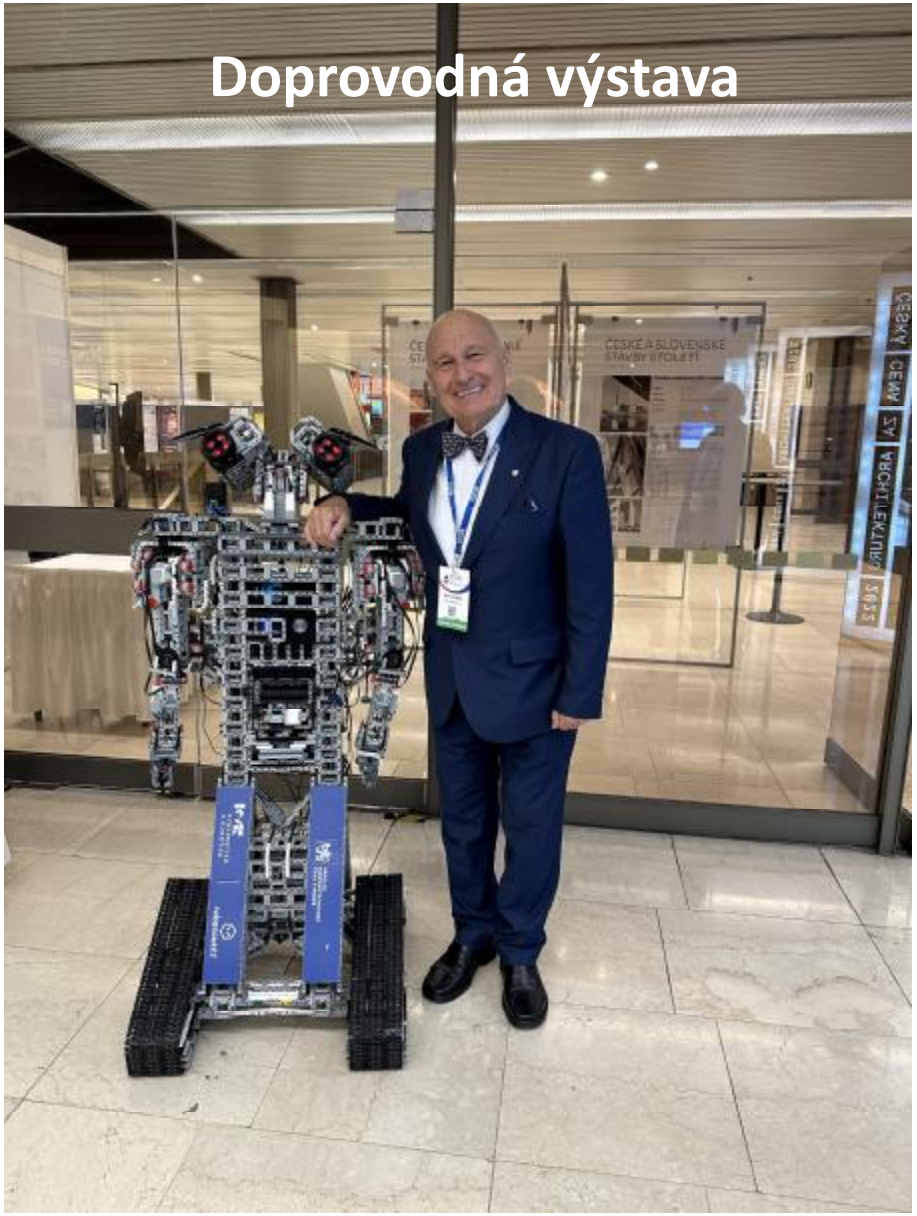
1. Engineering in Health Care
2. Food and Fresh Water Supply
3. Climate Change Mitigation and Adaptation
4. From the Earth to the Universe
5. Engineering Education and Continuing Professional Development
6. Young Engineers Forum
7. Women in Engineering

8. New Solutions for Energy
9. Smart Cities, Concept of Urbanization
10. Green Transport
11. Safe Digital World
12. Innovative Technologies in Industry
13. Engineering Approach to Environment Protection
14. Natural and Industrial Disasters Prevention

Doprovodná výstava

Doprovodná výstava


AFI-X
CEAC
Artificial
Intelligence


Doprovodná výstava

Doprovodná výstava

Účast delegátů a návštěvníků kongresu

1765 delegátů ze 76 zemí ze všech kontinentů

- **Afrika**
- **Asie**
- **Austrálie**
- **Jižní Amerika**
- **Střední Amerika**
- **Severní Amerika**
- **Evropa**


7th WEC 2023
PRAGUE, CZECH REPUBLIC
REGISTRATION STATISTICS
TOP 5 COUNTRIES
Czech Republic
Nigeria
Kenya
China (People's Republic of)
Ghana
TOTAL:
76 countries
GENDER BALANCE
Male
Female