The role of marine minerals in a sustainable future

GCE Ocean Technology Seminar 3 June 2021

Peter M Haugan, IMR Global Development
Cochair of the Ocean Panel Expert Group

High Level Panel for a Sustainable Ocean Economy

Peter Thomson
UN SG's Special Envoy for the Ocean

Justin Trudeau
Prime Minister of Canada

Erna Solberg
Prime Minister of Norway

António Costa
Prime Minister of Portugal

Uhuru Kenyatta
President of Kenya

Andrés Manuel López Obrador
President of Mexico

Andrew Holness
Prime Minister of Jamaica

Nana Akufo-Addo
President of Ghana

Joko Widodo
President of Indonesia

Yoshihide Suga
Prime Minister of Japan

Surangel Whipps Jr.
President of Palau

Sebastián Piñera
President of Chile

Hage Gottfried Geingob
President of Namibia

Scott Morrison
Prime Minister of Australia

Frank Bainimarama
Prime Minister of Fiji

Knowledge & Science: Informing Action

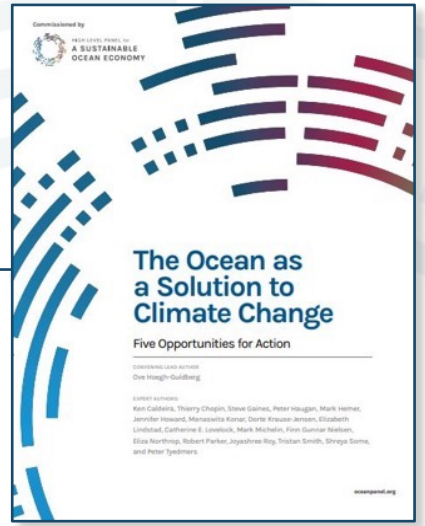
The Ocean Panel's recommendations are underpinned by a comprehensive knowledge base for action

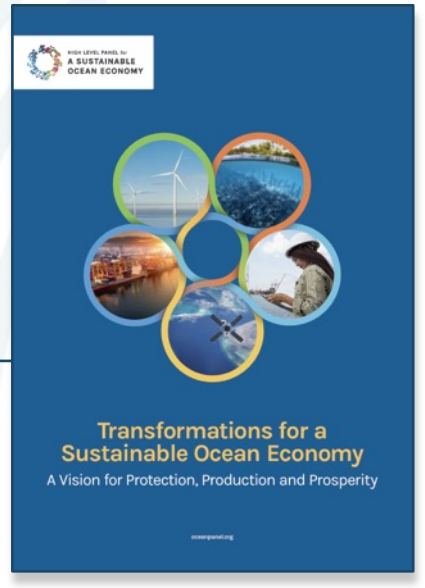
16 Blue Papers

3 Special Reports

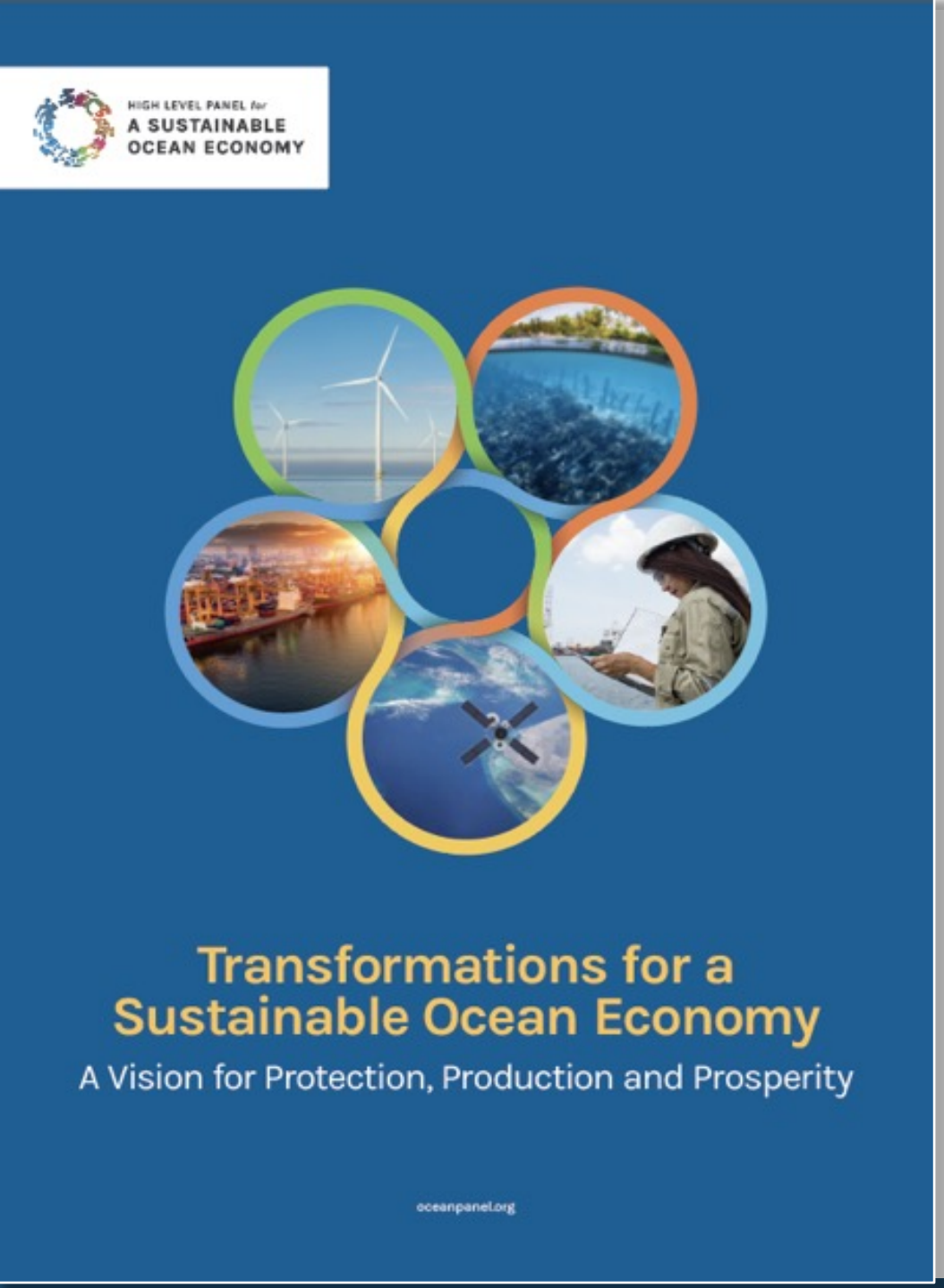
Ocean Solutions Report

Transformations

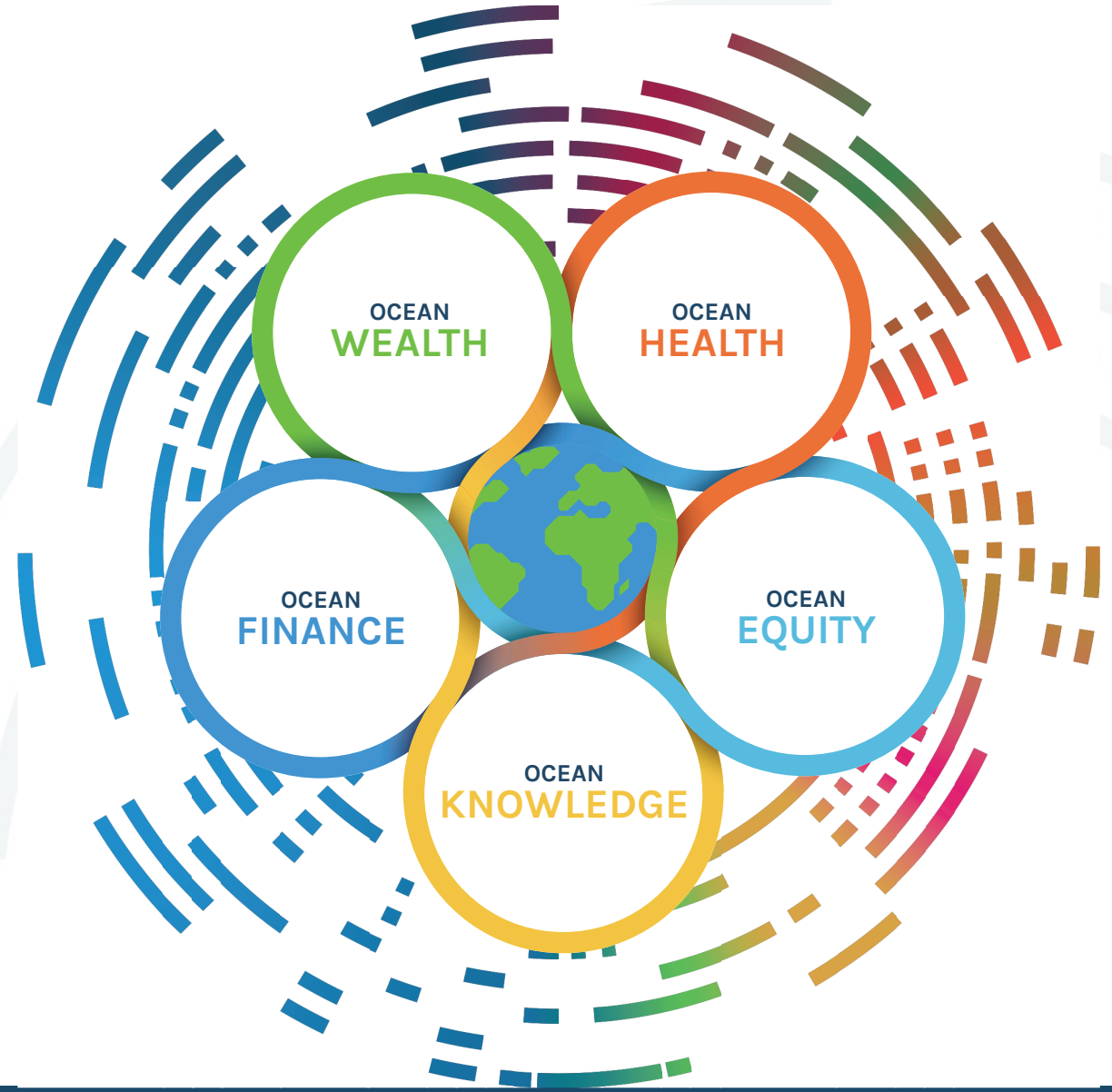




HIGH LEVEL PANEL *for*
A SUSTAINABLE OCEAN ECONOMY



The Ocean Panel Transformations



Ocean Wealth (From the Panel Transformations)

Unsustainable human activity—in the ocean and on land—is threatening the ocean's ability to regenerate and sustainably provide for people around the world.

We must transform our relationship with the ocean to ensure that it can continue to produce sustainably for future generations.

2030 OUTCOME for each of

- Sustainable Ocean Food
- Sustainable Ocean Energy
- Sustainable Ocean-Based Tourism
- Sustainable Ocean Transport
- Sustainable New Ocean Industries (including seaweed, cross-sectoral, genetic resources, CCS)

A Precautionary Approach to Seabed Mining

2030 OUTCOME: Sufficient knowledge and regulations are in place to ensure that any activity related to seabed mining is informed by science and ecologically sustainable.

A precautionary approach to seabed mining

Priority actions

- Build partnerships to increase research, innovation and deployment of urban mining, and of innovative technologies that will reduce the need for new sources of metals and rare earth minerals.
- Initiate an international research agenda to improve understanding of the environmental impacts and risks of seabed mineral activities.
- Ensure that regulations provide effective protection of marine environments, precautionary and ecosystem-based approach, science-based and transparent management, effective compliance with a robust inspection mechanism.
- Ensure that seabed mineral activities comply with robust environmental standards.
- Promote the participation of scientists from developing countries in research and make the results publicly available.

2030 OUTCOME

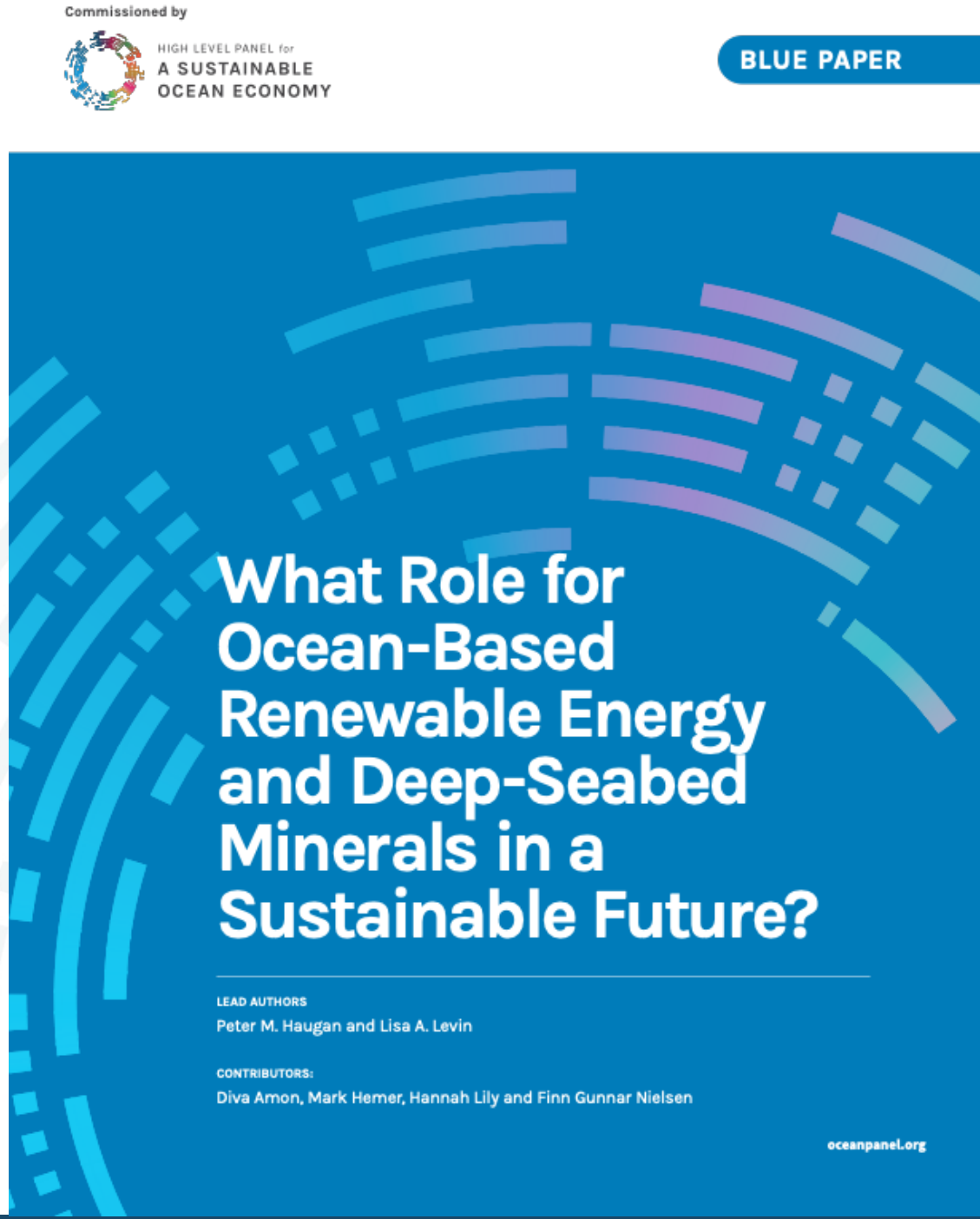
Sufficient knowledge and regulations are in place to ensure that any activity related to seabed mining is informed by science and ecologically sustainable .

Blue paper commissioned by the panel

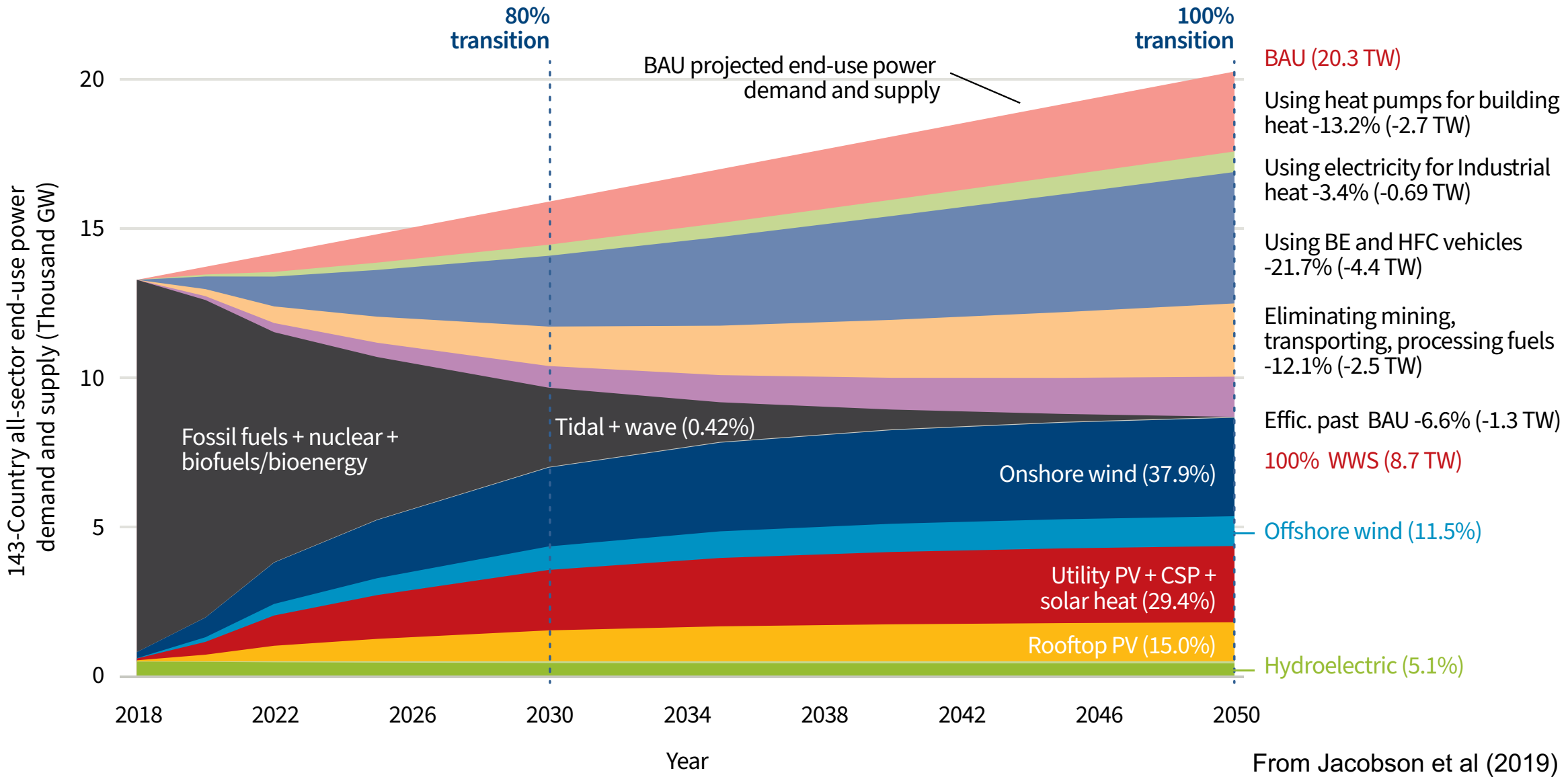
(Haugan et al 2020, also related Nature paper Levin et al., 2020)

A sustainable energy transition:

- Avoiding overshoot of 1.5 ^{0}C and damaging ocean acidification requires energy efficiency, Low Energy Demand and decarbonization of the energy sector
- Such transition has many co-benefits for human health and essentially all SDGs
- It requires electrification and renewables
- Connection between ocean-based renewable energy and deep-seabed minerals is mostly indirect through energy system change
- No single mineral or technology component in a transformed energy system is indispensable

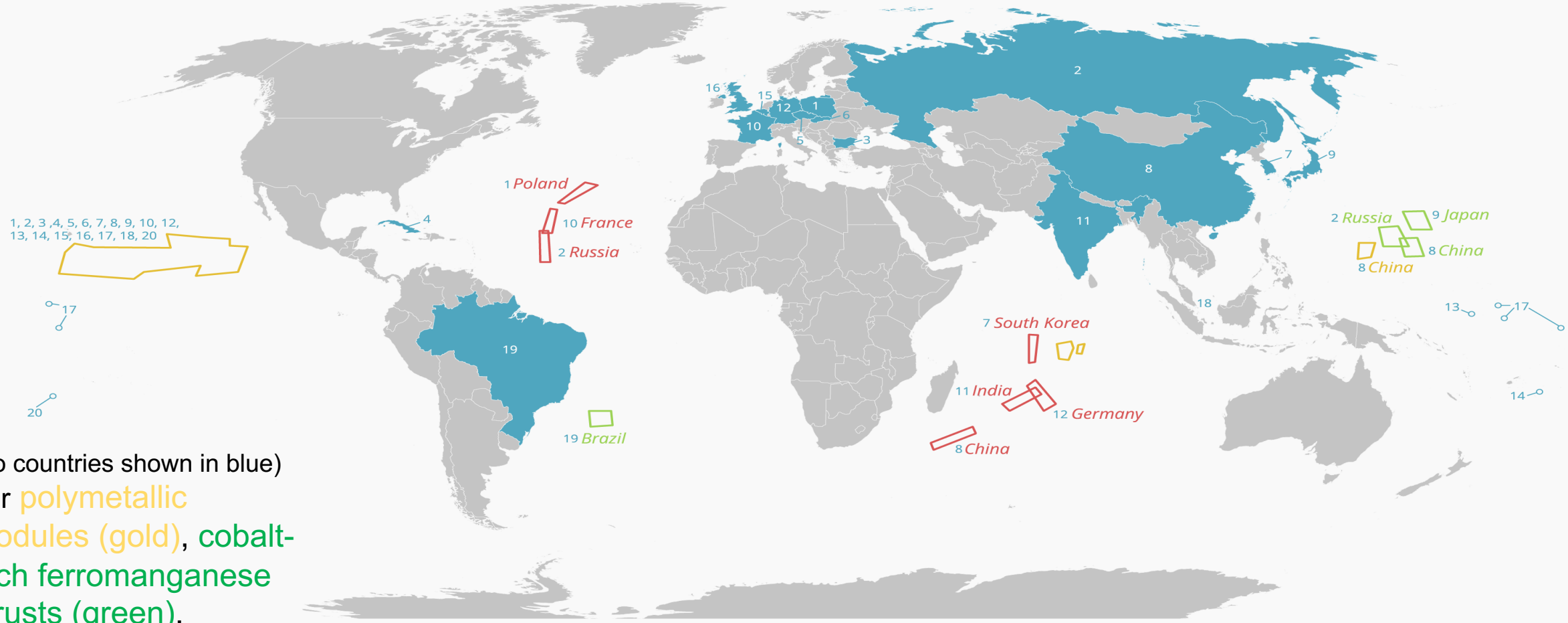


Low Energy Demand (LED) scenario



From Jacobson et al (2019)

30 exploration contracts granted by the **I**nternational **S**eabed **A**uthority



(to countries shown in blue) for polymetallic nodules (gold), cobalt-rich ferromanganese crusts (green), polymetallic sulfides (red)

(Haugan et al. 2020)

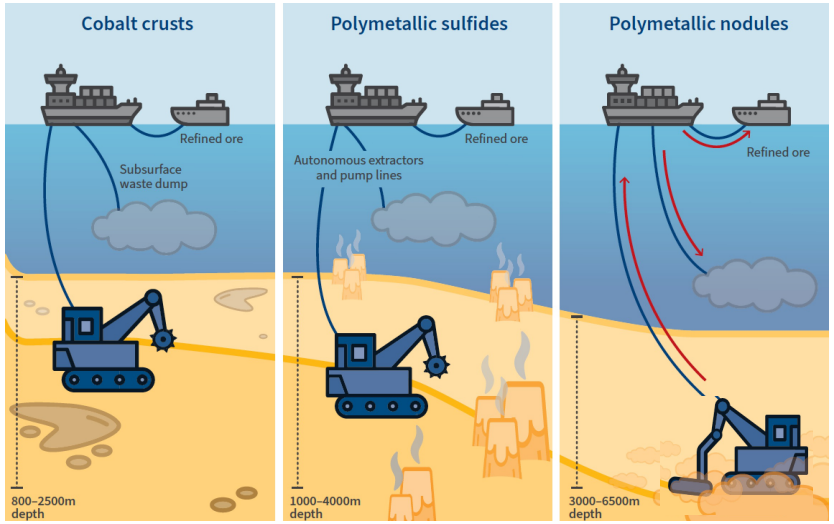
	Country			Country	
1	Poland	(2)	11	India	(2)
2	Russia	(4)	12	Germany	(2)
3	Bulgaria	(1)	13	Nauru	(1)
4	Cuba	(1)	14	Tonga	(1)
5	Czech Republic	(1)	15	Belgium	(1)
6	Slovakia	(1)	16	UK	(2)
7	Korea	(3)	17	Kiribati	(1)
8	China	(5)	18	Singapore	(1)
9	Japan	(2)	19	Brazil	(1)
10	France	(2)	20	Cook Islands	(1)

- Countries with ISA exploration contract areas
- Polymetallic sulphide ISA exploration contract areas
- Cobalt-rich crust ISA exploration contract areas
- Polymetallic nodule ISA exploration contract areas

ENVIRONMENTAL CHALLENGES:

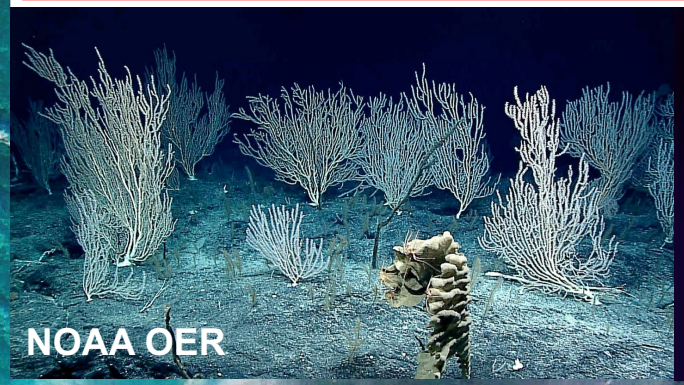
There are many unknowns around the nature, severity, implications and mitigation of environmental impacts.

- *Impacts to and loss of biodiversity and ecosystem services, Substrate and chemical disruption, Sediment plumes, Noise, Light, Contaminant Release;*
  - **Unknown recovery times**
  - **Unknown restoration potential**
  - **Cumulative effects**



(Haugan et al. 2020)

THERE HAVE BEEN NO PILOT STUDIES ON SCALES RELEVANT TO COMMERCIAL EXPLOITATION MINING


NOAA OER


Chong Chen


D. Amon and Craig Smith

SOCIAL CHALLENGES

Concerns have been expressed about:

- Potential for transboundary impacts on ecosystems and people
- Land-based activities that will affect local communities
- Potential loss of spiritual or cultural value
- Benefits may not flow to developing countries as intended by UNCLOS
- Uncertainty that deep-seabed mining will replace terrestrial mining & its associated problems
- Costs to states engaging in seabed mining, responsibility for harm or damages
- Intergenerational equity

GOVERNANCE CHALLENGES

for a new extractive industry through a multilateral process, in trying to achieve equitable and global benefit from exploitation of commonly owned resources.

- ISA has potentially conflicting mandates from UNCLOS
  - Minerals licensing
  - Monitoring and enforcement of regulations
  - Collection of revenues
  - Protection of the marine environment from the harmful effects of mining
  - Operation of 'The Enterprise'
- Minerals resources are the common heritage of (hu)mankind. The ISA must operate on behalf of humankind, with equitable benefit sharing.
- Overlapping regulatory sectors for the deep ocean (ISA, FAO/RFMOs, BBNJ)
- Exceptionally broad range of stakeholders (States, Civil society, IGOs, NGOs)
- Transparency and capacity

Opportunities for action on deep-seabed mining (1)

GROWING DEMAND:

- Engage in independent research and long-term planning to facilitate a circular economy for targeted minerals.
- Focus attention on Life Cycle Sustainability Analysis and develop alternative methods to address the metal demand.
- Strengthen research and development and economic incentives to favour a less mineral-intensive renewable energy system.

KNOWLEDGE GAPS:

- Slow the process of transitioning from exploration to exploitation to allow time for more research and regulation development.
- Create an international research agenda through the UN Decade for Science for Sustainable Development to expand research and synthesise high-quality scientific data.

Opportunities for action on deep-seabed mining (2)

CONFLICTING MANDATES:

- Enable an expert and independent environmental and scientific committee to handle the environmental regulations and decision-making within the International Seabed Authority (ISA).
- Declare and enforce a network of large, biologically representative, fully protected no-mining zones.

STAKEHOLDER PARTICIPATION:

- Cooperate to enhance societal awareness of the choices associated with deep-seabed mining.
- Maximise opportunities for public and expert consultation.
- Facilitate the attendance of all stakeholders to the ISA and State meetings.

Summary

The High Level Panel takes a precautionary approach.

A diverse set of stakeholders and concerns are relevant for DSM.

Can we do without DSM?

Science can find out more about impacts.

Alternatives should be sought.

2021 2030 United Nations Decade of Ocean Science for Sustainable Development