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Balancing the Energy Trilemma: Environmental Sustainability

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Centering Environmental Sustainability in policy is the key to balancing the energy trilemma, because...

01
Leaders in the Energy Trilemma Index rank high in other indexes such as **Sustainable Development Goals** and **World Economic Forum...**

02
Robust policy including decarbonisation, **diversification** of energy systems with **renewables**, and energy **efficiency**, lay the groundwork for **transition readiness**...

03
And sustainability commitments generate national **energy independence, regional & global cooperation** and **energy security**.

World Energy Trilemma

"The World Energy Trilemma Framework provides a legitimacy to climate policymaking that rises above labels of any particular leaning, providing a new equilibrium where climate policies are not only acknowledged as legitimate, but recognized as **essential."**

— **Maria van der Hoeven** *Executive Director of the International Energy Agency 2015*

(World Energy Council 2024)

Environmental Sustainability

Represents the transition of a country’s energy system towards mitigating and avoiding potential environmental harm and climate change impacts.

Focuses on environmental benefits, renewable energy resources, and reduction of emissions and GHG.

Positive environmental performance is integral to effectively managed energy transitions.

Energy transitions entail profound whole-system changes that transcend the confines of traditional energy frameworks.

Core Features

In the Council's tracking of countries' environmental sustainability...

the **top 10** ranked demonstrate **robust policy efforts** to **decarbonize** and **diversify** energy systems away from fossil fuels.

Emissions reductions

Transitioning to renewable energy sources is essential to reducing GHG emissions.

Diversified low-carbon energy systems

Ensuring Energy Security and Sustainability alignment.

Energy efficiency

Implementing energy-efficient technologies can significantly lower energy consumption and reduce the environmental footprint.

Respect of 9 critical planetary boundaries

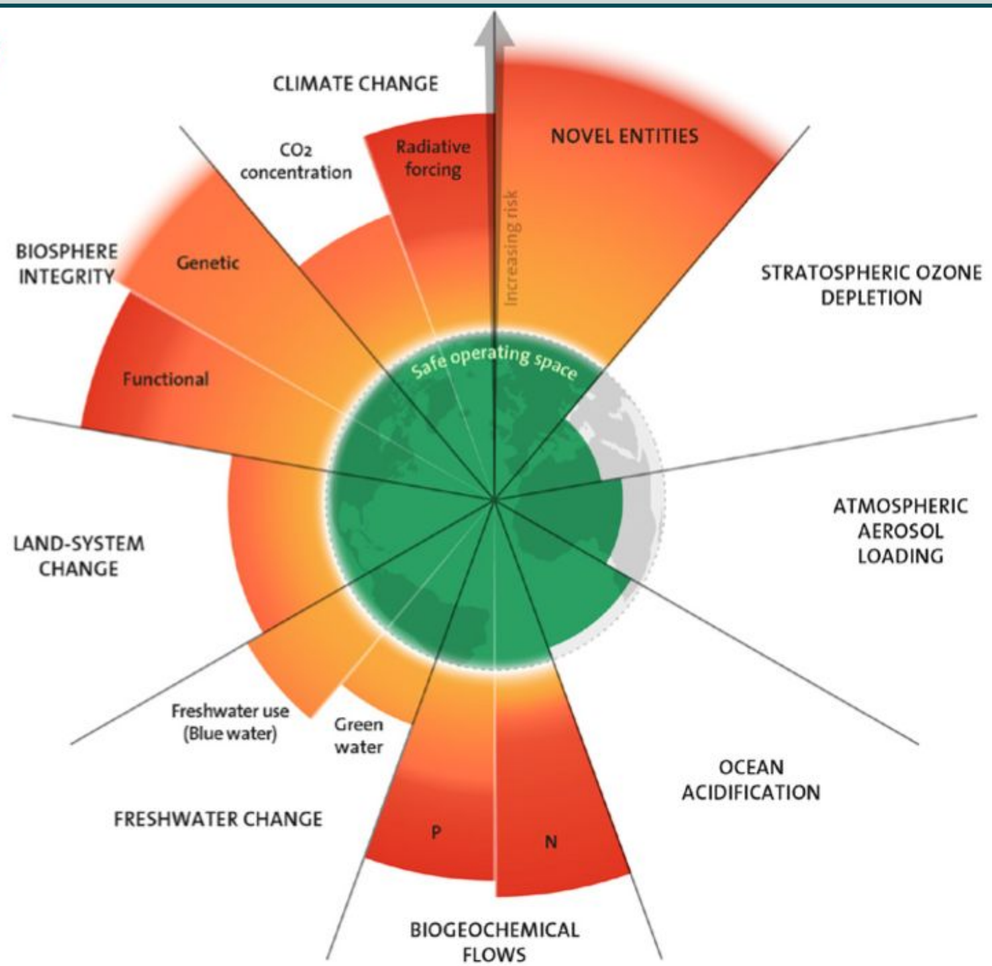
Minimizing the negative effects of energy exploration on ecosystems and climate change.

Planetary Boundary

Figure 13: The 2023 Update to the Planetary Boundary

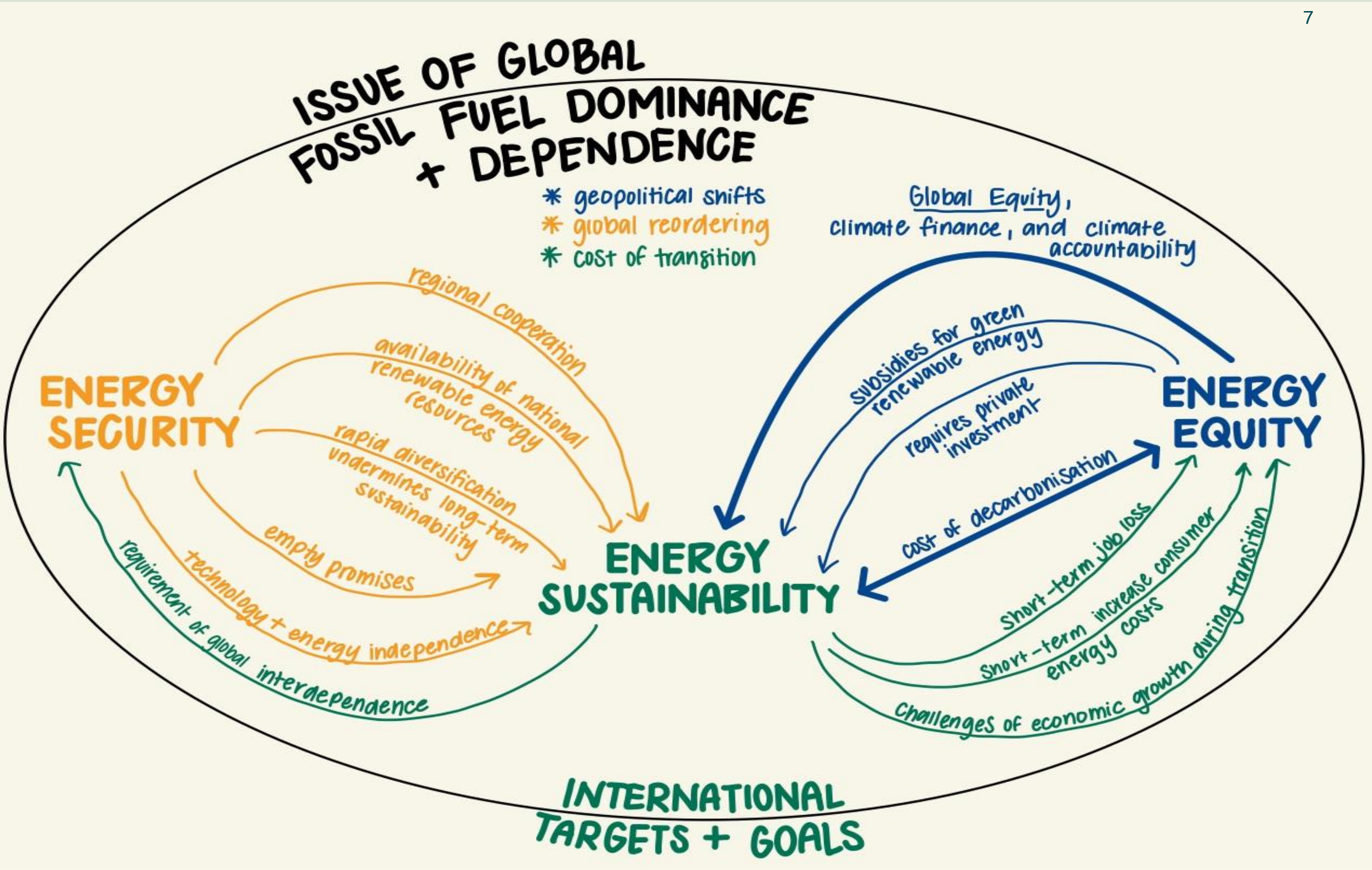
! 1. Climate change—crossed
! 2. Ocean acidification—crossed
3. Chemical pollution—unknown
! 4. Nitrogen and phosphorus loading—crossed
5. Freshwater withdrawals—approaching
! 6. Land conversion—crossed
! 7. Biodiversity loss–crossed
! 8. Air pollution—crossed
9. Ozone layer depletion—improving

Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al., 2023



(World Energy Council 2024)

Other Dimensions



Benefits & Disadvantages

1. Enhancing energy efficiency reduces overall consumption
2. Decarbonisation helps in minimizing GHG emissions, improving air quality and public health while combating climate change
3. Sustainable practices foster innovation and technology development, new job creation, opportunities, and economic growth in green industries.
4. Lower operational costs and less environmental impact
5. Implementing sustainability practices encourages resource conservation, ensuring long-term availability

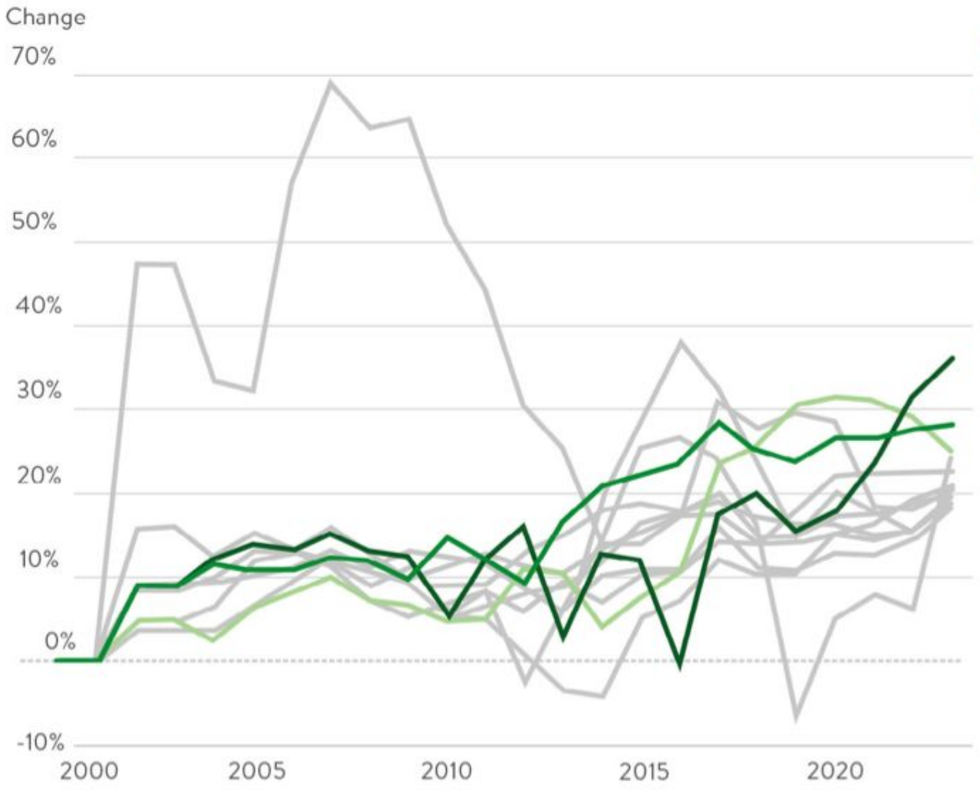
1. Transition to sustainable practices often requires significant initial investments
2. Societal transformations are needed beyond decarbonization
3. Some sustainability measures may lead to short-term job losses in traditional industries, creating economic discomfort
4. Sustainable technologies can potentially create negative environmental impacts

Highlighted Success

Figure 1: Comparing country ranks on the World Energy Trilemma Index, Sustainable Development Goals, WEF Energy Transition Index

COUNTRY		SUSTAINABLE DEVELOPMENT GOALS	WORLD ECONOMIC FORUM
Denmark	1	3	2
Sweden	1	2	1
Finland	2	1	4
Switzerland	3	15	5
Canada	4	26	19
Austria	5	5	8
France	6	6	7
Germany	7	4	11
Estonia	7	10	10
United Kingdom	8	11	13
Norway	8	7	3

Figure 11: Top improvers in 2023 against their 2000 score



Rank	Country	Score Improvement
17	Estonia	+36%
4	Denmark	+28%
124	Qatar	+25%
116	Benin	+25%
27	Ecuador	+23%
120	Iraq	+21%
42	Nicaragua	+21%
91	Cambodia	+20%
31	Greece	+19%
22	Ireland	+19%
32	Peru	+19%
36	Netherlands	+19%

(World Energy Council 2024)

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Thank you

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