

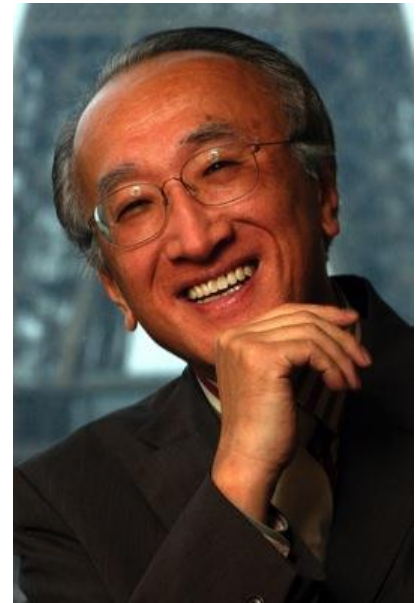
Role of Women in Global Energy and Climate Crises

「世界エネルギー・環境危機と女性の活躍」

2025-1-29 JCCP International Symposium

Nobuo TANAKA 田中伸男

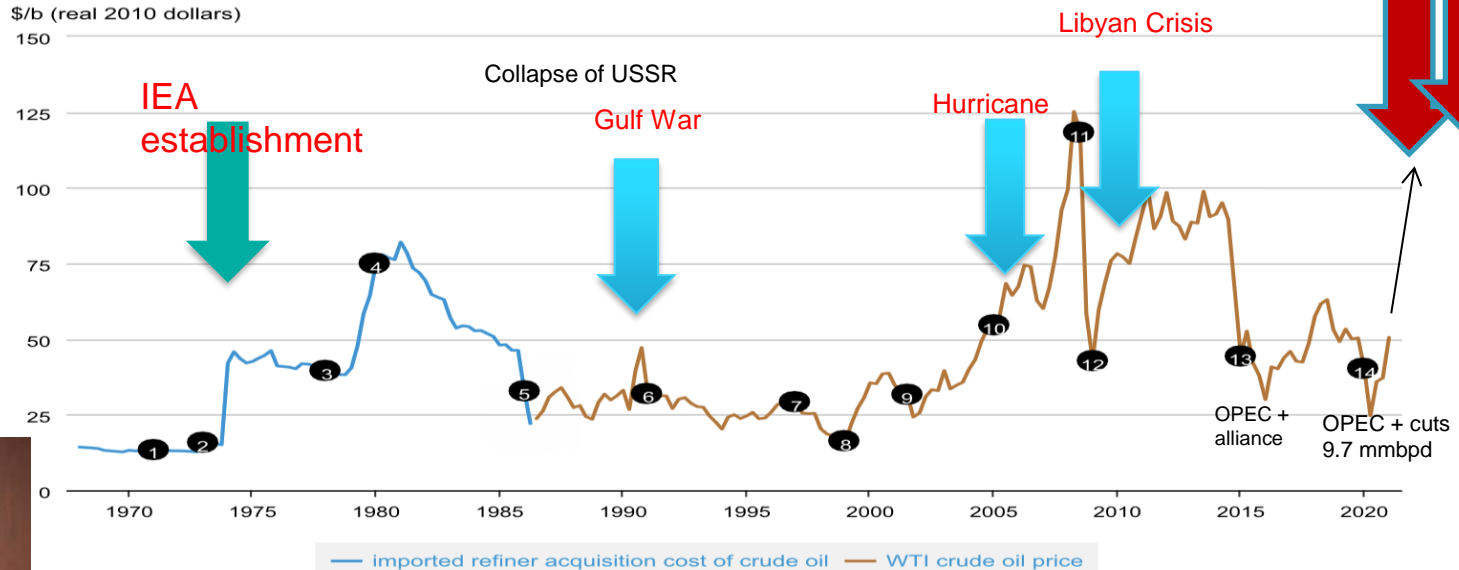
Executive Director Emeritus, International Energy Agency (IEA)
Chair, Steering committee of Innovation for Cool Earth Forum (ICEF)



IEA was established for the 1973 Oil Shock

Ukraine I & II

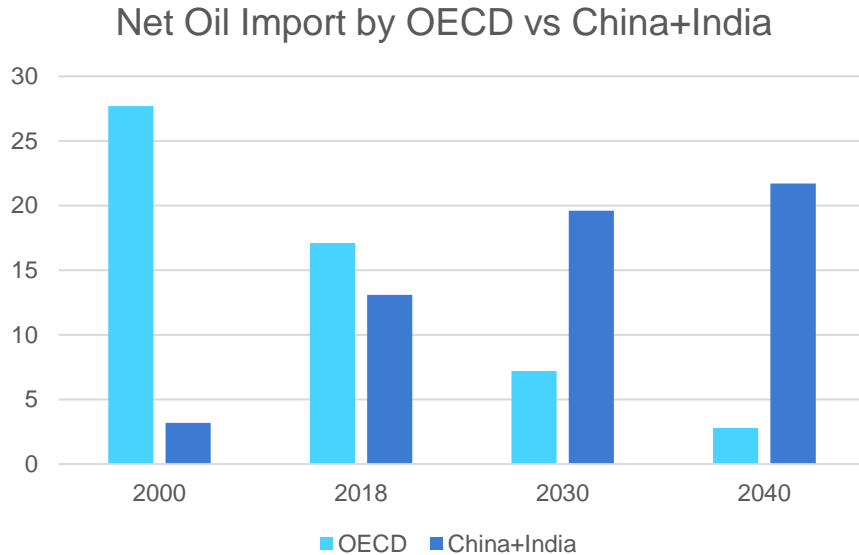
IEA's mission is energy security : it released the Strategic Petroleum Reserve Five times.



Source: U.S. Energy Information Administration, Refinitiv

Dr. Fatih Birol, Executive Director of IEA says that we are in the middle of the “first truly global energy crisis”.

Net oil imports of selected countries in the Stated Policy Scenario (mb/d) WEO2019



Asia becomes the unrivalled centre of the global oil trade as the region draws in a rising share of the available crude.

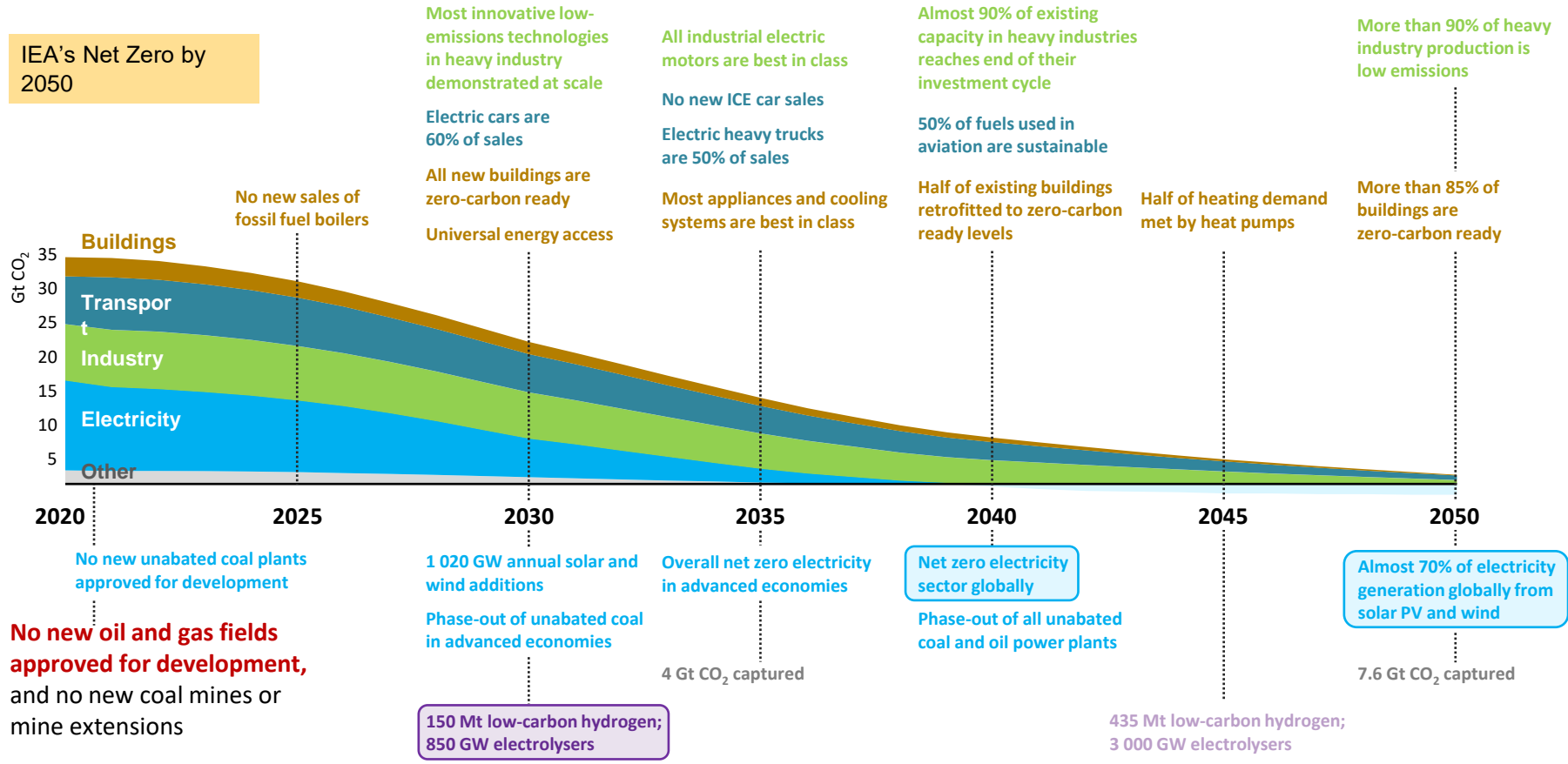
In 2023 India has officially requested to become a full member to the IEA.

Henry Kissinger's Advice: Get China and India in the IEA.



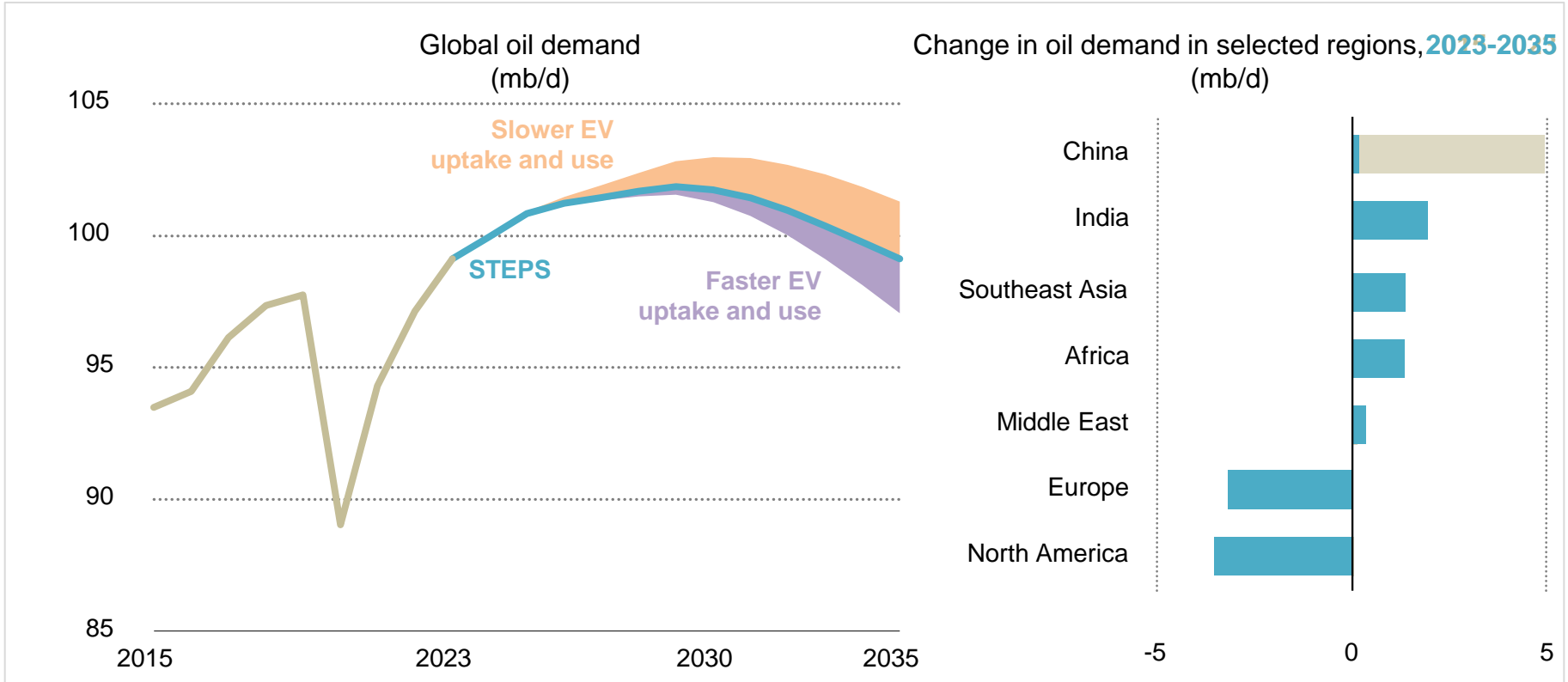
“Net Zero by 2050” surprised OPEC and Oil Majors: The IEA Shock!

IEA's Net Zero by 2050



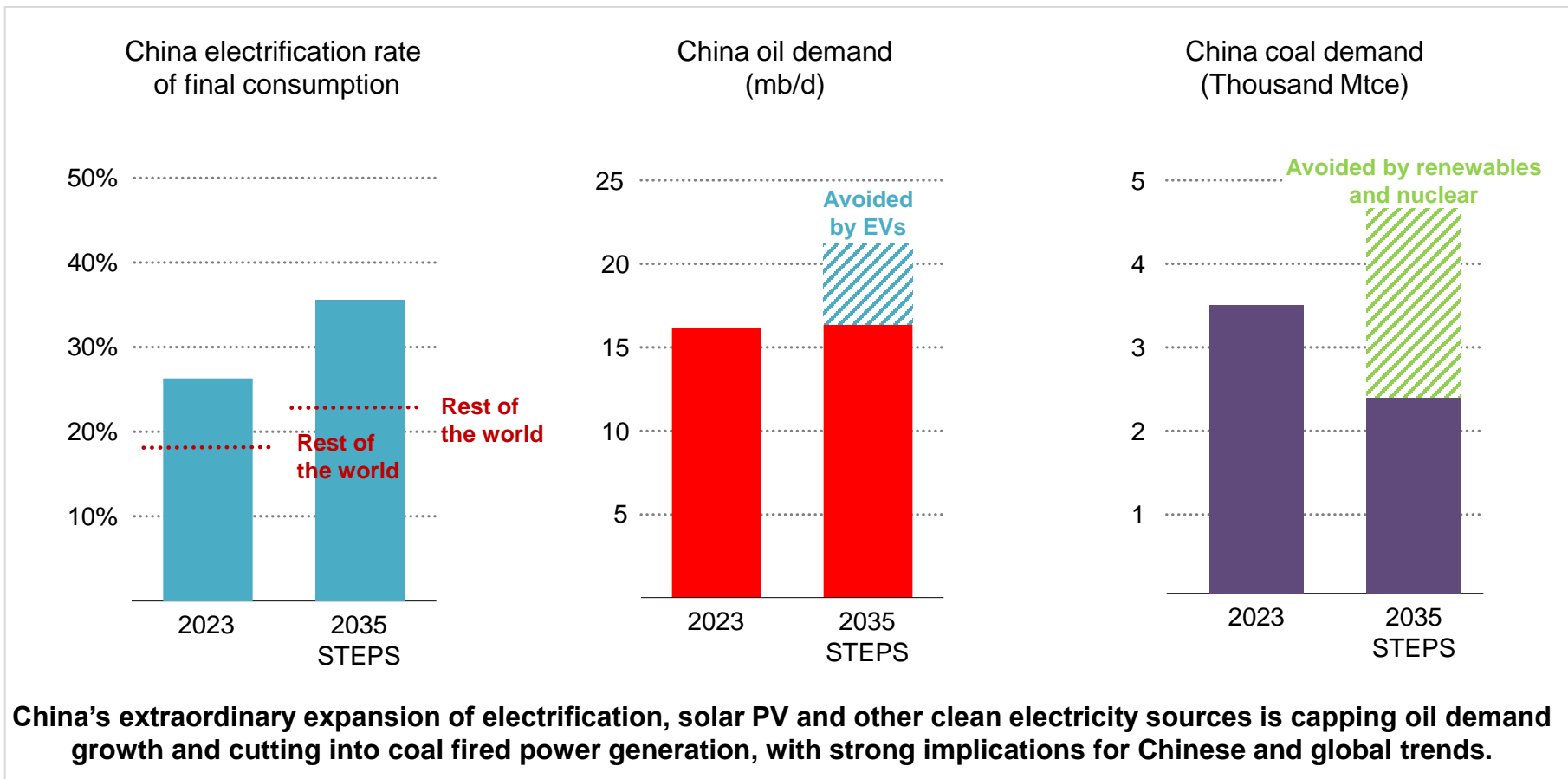
Net Zero by 2050 sets near-term milestones to get on track for long-term targets. (Back-casting)

Oil demand's engine is switching to electricity



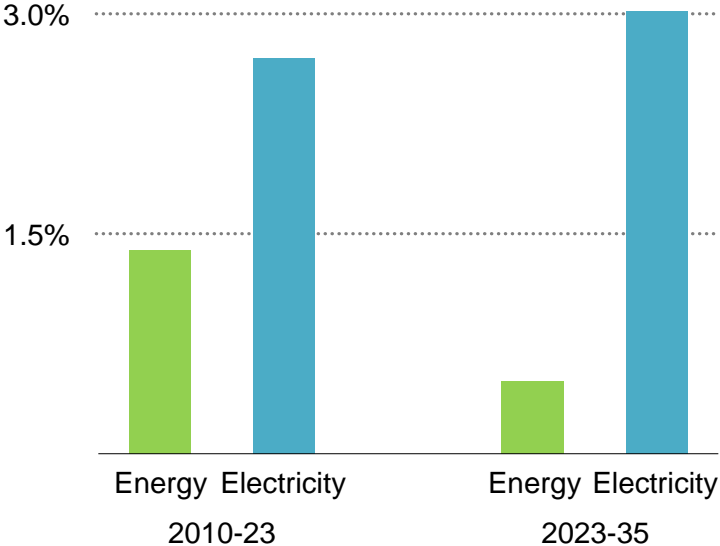
As China scales up electric mobility, India, Southeast Asia and Africa are the main sources of growth in oil use to 2035. Even if projected uptake of electric vehicles slows in key markets, a peak in oil demand remains on the horizon.

China's electrification jolts energy markets, again

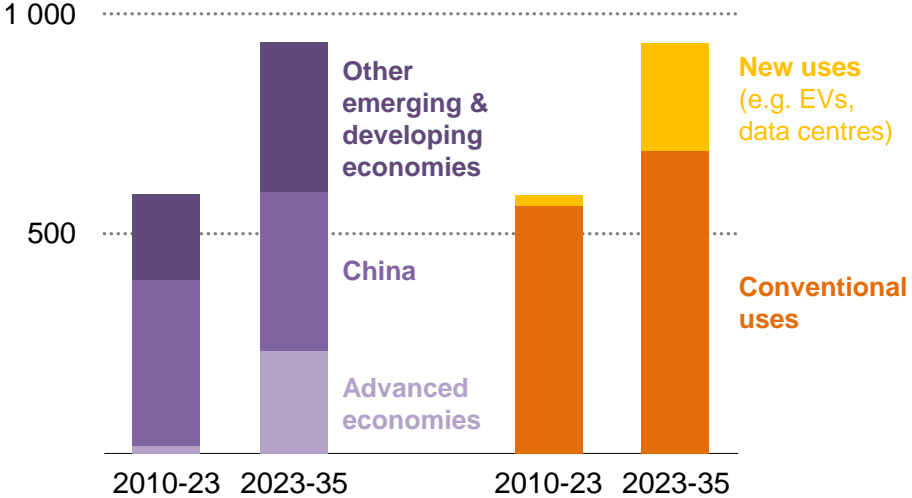


Moving at speed into the Age of Electricity

Annual demand growth in STEPS



Annual electricity demand growth (TWh)

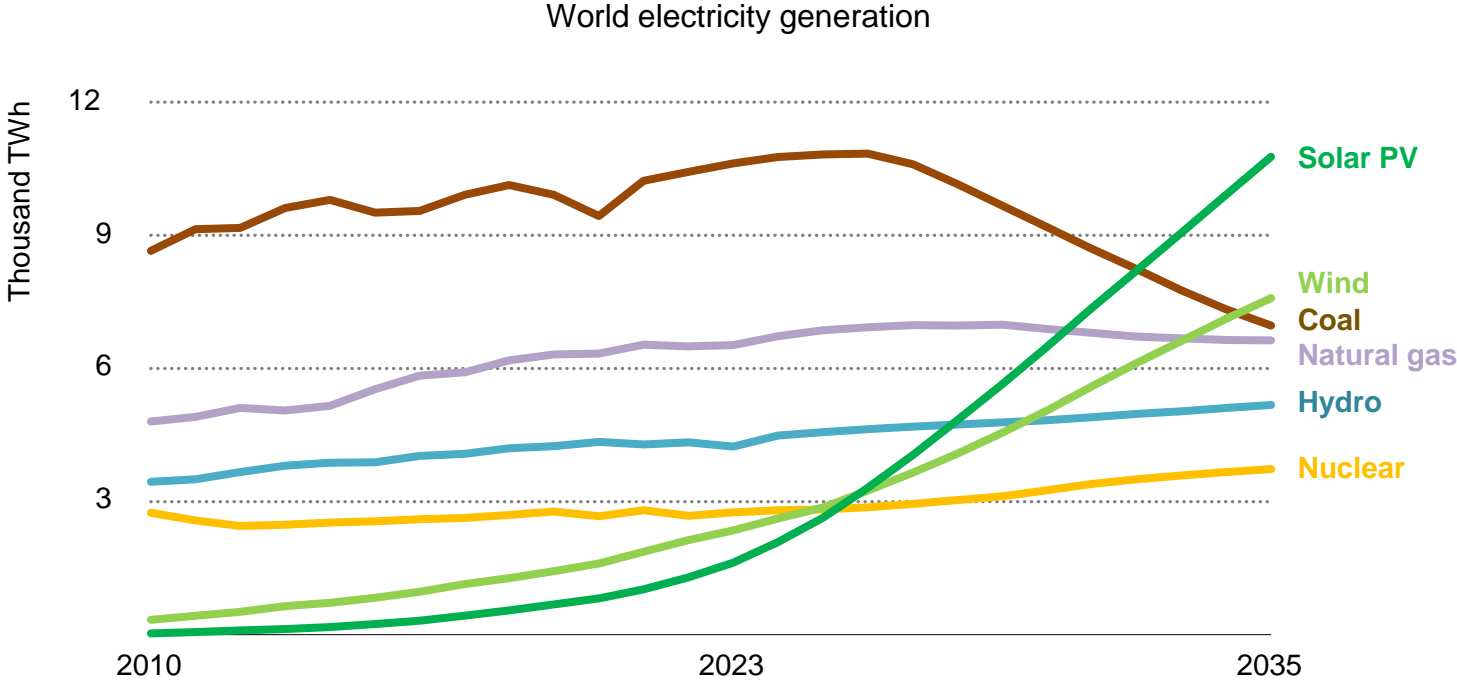


Electricity is growing faster than all other energy sources and it's growing across a wide range of economies, as conventional drivers of growth are supplemented by new ones like EVs, data centres and heat pumps.

Electricity use is growing fast, clean power is rising even faster



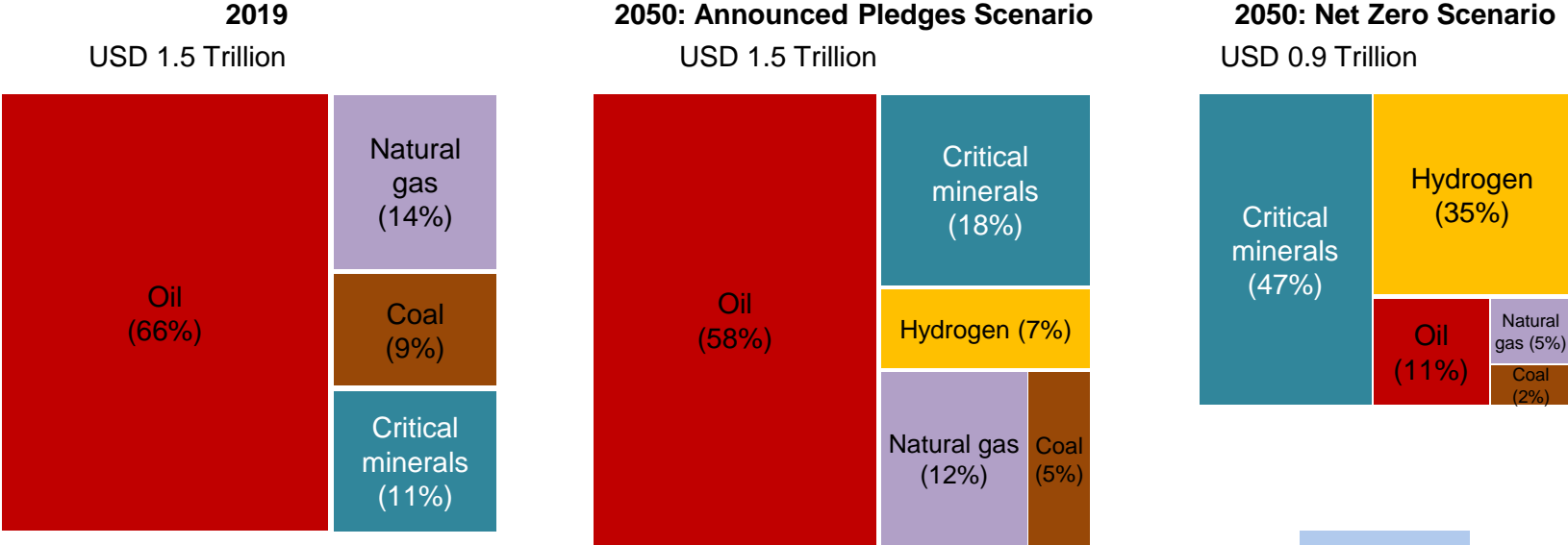
IEA WEO 2024



Solar PV and wind hit their stride and become the largest sources of electricity before 2035 in STEPS, complementing other clean sources like hydro and nuclear, and pushing coal into decline.

Energy Security in the net zero pathway: Critical minerals and hydrogen-based fuels are on the rise

Value of international energy-related resource trade



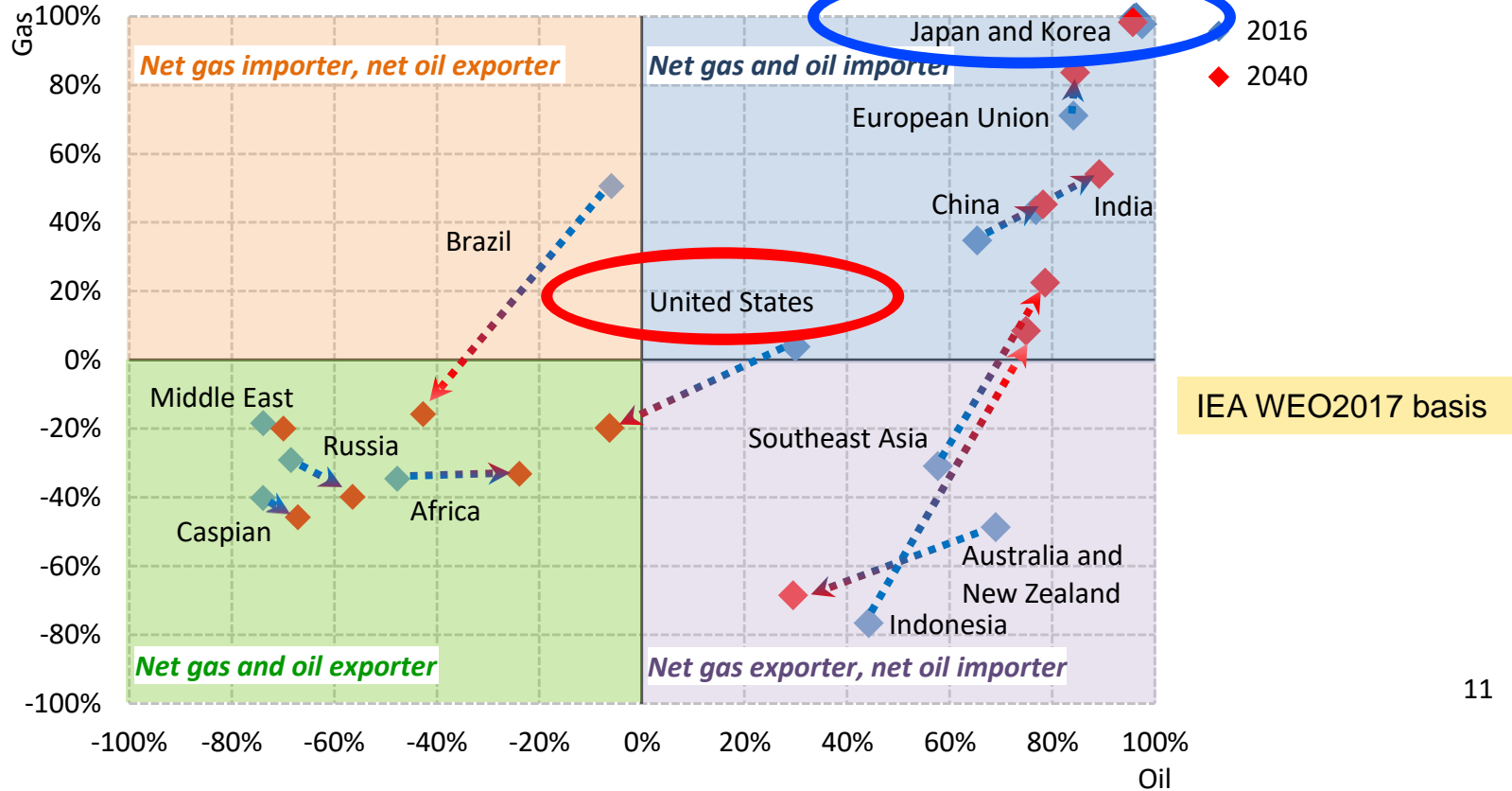
WEO2021

Hydrogen Stock Pile: MCH/LOHC may replace SPR in the Net Zero World

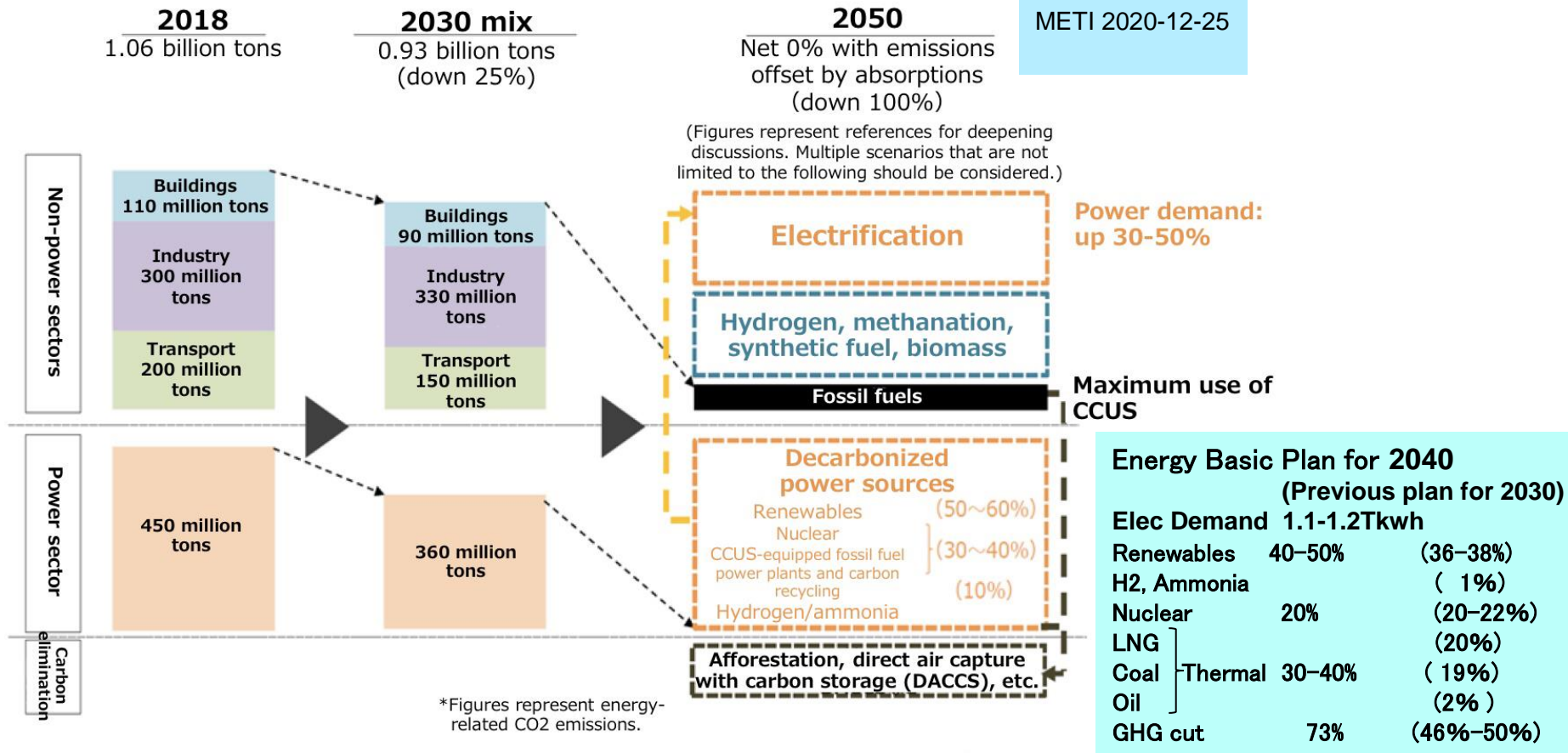
Winners and Losers of Energy & Climate Crises

Country	Short term	Long Term
Russia	- - Lost EU market, less revenue, more war expenses, Ukraine?	- - Loss of tech, investment, brain drain
EU	- Gas Shortage & high price. Ukraine?	++ RE Power EU and CBAM H2 pipeline
US (→Trump)	+ Energy Dominance by fossil fuel =MAGA	+MAGA = Out of ParisAccord. CCS, (EV?), H2? Megatech to lead RE100
China India	+ Cheap Russian gas & oil	++ RE super power, - risk of supply chain + H2 super power
Saudi Arabia	?Oil price	? Blue H2 CCS, Green H2 solar, Mid East Geopolitics
Japan/ Korea	- Oil and gas supply disruption	? Sustainable nuclear, Clean H2 supply chain
ASEAN	- high prices of LNG	? Renewables, Regional power grid connection

Energy Independence : Trump's US aims "Energy Dominance" by more oil and gas while China and Europe aim at Renewable Energy Independence. How can Japan and Korea survive?



Japan's Energy Path to 2050 Carbon Neutrality



(Source) Secretariat of the Committee on the Growth Strategy, Cabinet Secretariat "Green Growth Strategy through Achieving Carbon Neutrality" (Document 1) p.6, for the sixth meeting of the Committee on the Growth Strategy, December 25, 2020

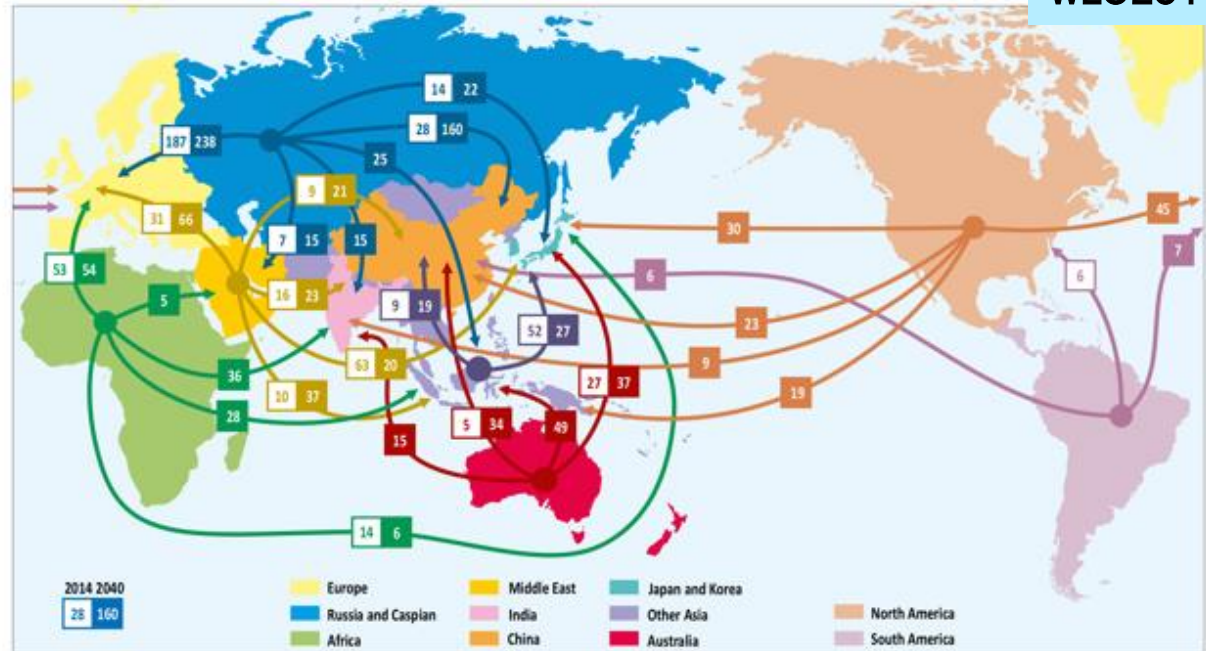
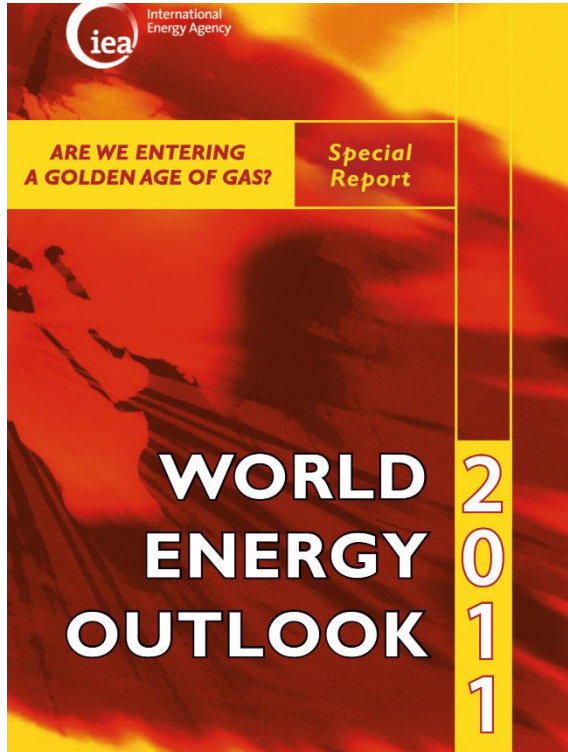
A Golden Age of Liquefied Natural Gas (LNG)

North America's Shale Gas revolution + Japan & Korea contribute by LNG trade.
Golden Age of Gas is closing, but continues for LNG.

Japanese Government decided LNG is one of the critical material.

Figure 4.17 > Selected global gas trade flows in the New Policies Scenario (bcm)

WEO2011

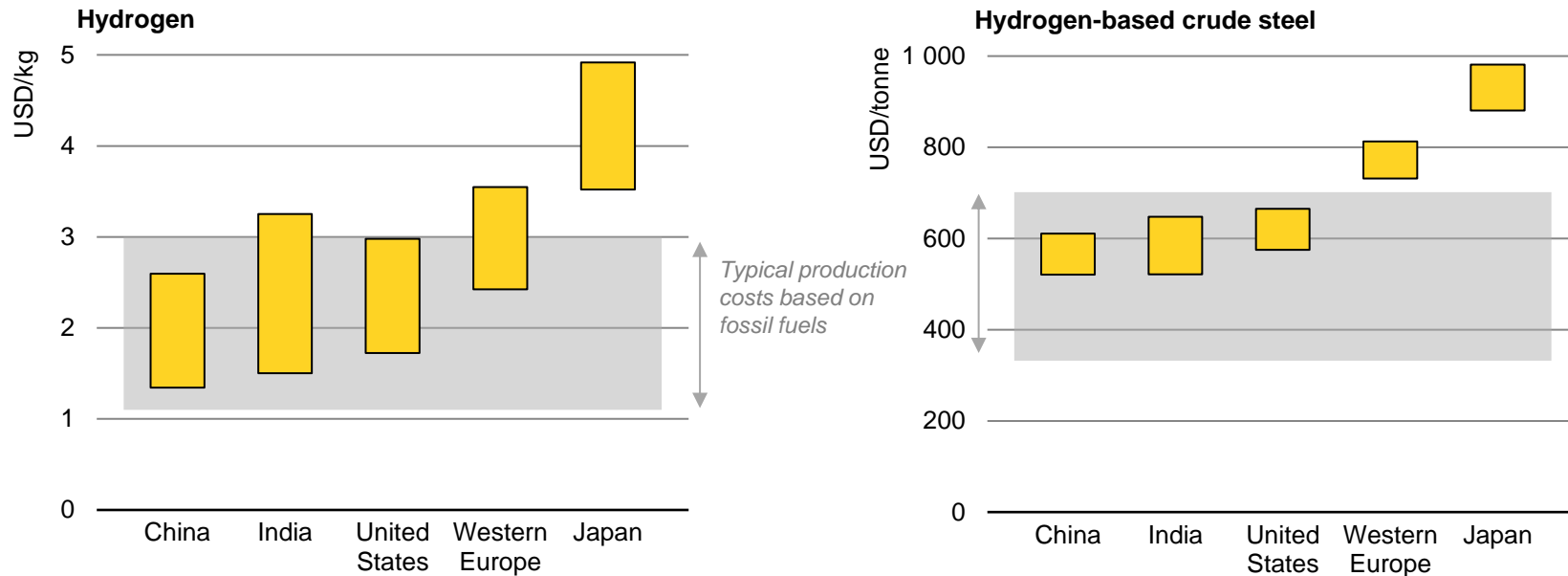


This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The strong import growth in Asia underpins a fundamental shift in trade flows away from the Atlantic basin to the Asia-Pacific region

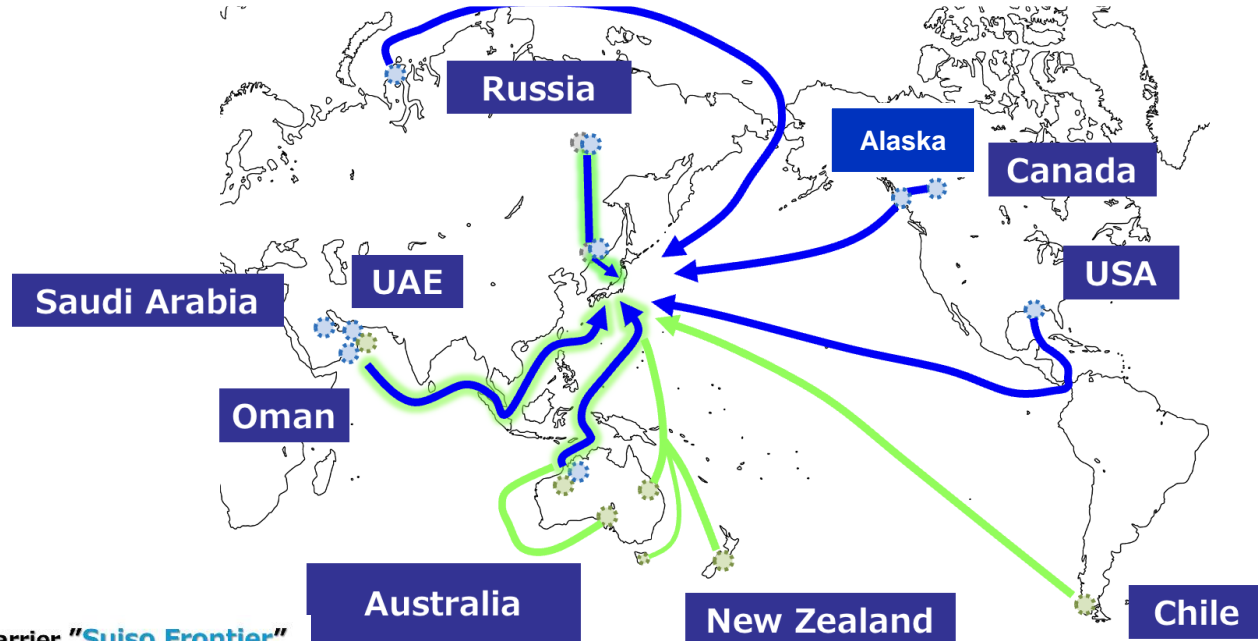
Competitiveness is a key consideration for industrial strategies

Production costs using electrolysis and variable renewables under announced climate pledges, 2030



Climate goals and innovation policy are driving new project announcements for energy intensive commodities, but persistent cost competitiveness gaps indicate the need for strategic partnerships and international collaboration.

A Golden Age of Hydrogen is coming?



➡ Natural Gas (Blue)

➡ Renewables (Green)

CLEAN FUEL AMMONIA ASSOCIATION

Liquefied Hydrogen Carrier "Suiso Frontier"

Launch ceremony (11 December 2019)
at KHI Kobe Shipyard



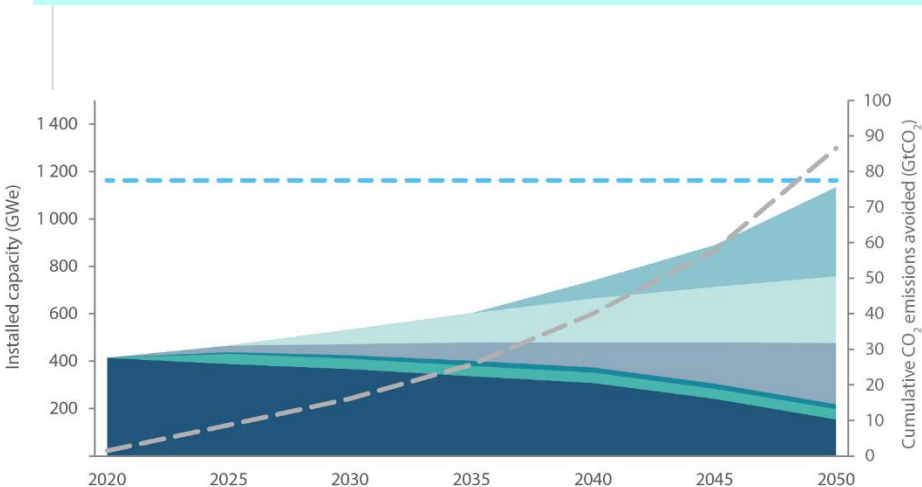
Cargo Tank Installation (7 March 2020)
at KHI Harima Works



AHEAD ADVANCED HYDROGEN ENERGY CHAIN ASSOCIATION FOR TECHNOLOGY DEVELOPMENT



At COP28, Countries Launch Declaration to Triple Nuclear Energy Capacity by 2050, Recognizing the Key Role of Nuclear Energy in Reaching Net Zero



— Cumulative emissions avoided
 - - - IPCC 1.5°C scenarios (2050 average) = 1 160 GW nuclear capacity (based on the average of IPCC 1.5°C scenarios)

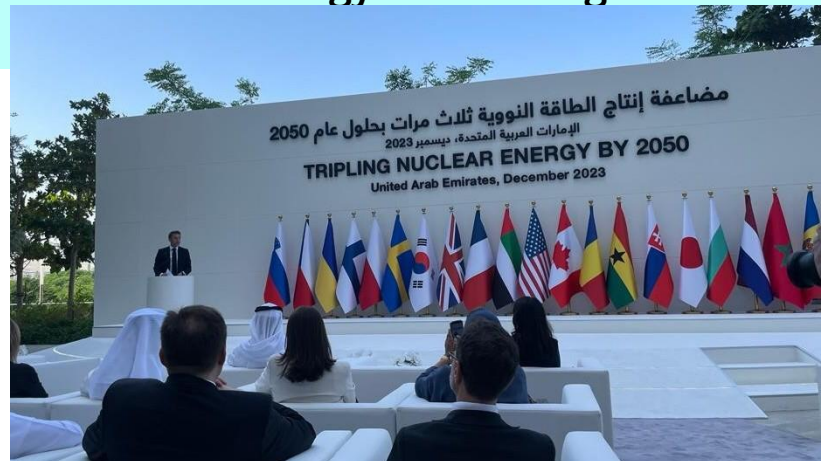
Conservative projections

- Small modular reactors (2035 market outlook)
- Large-scale new builds (under construction)
- Long-term operation (planned)

Ambitious projections

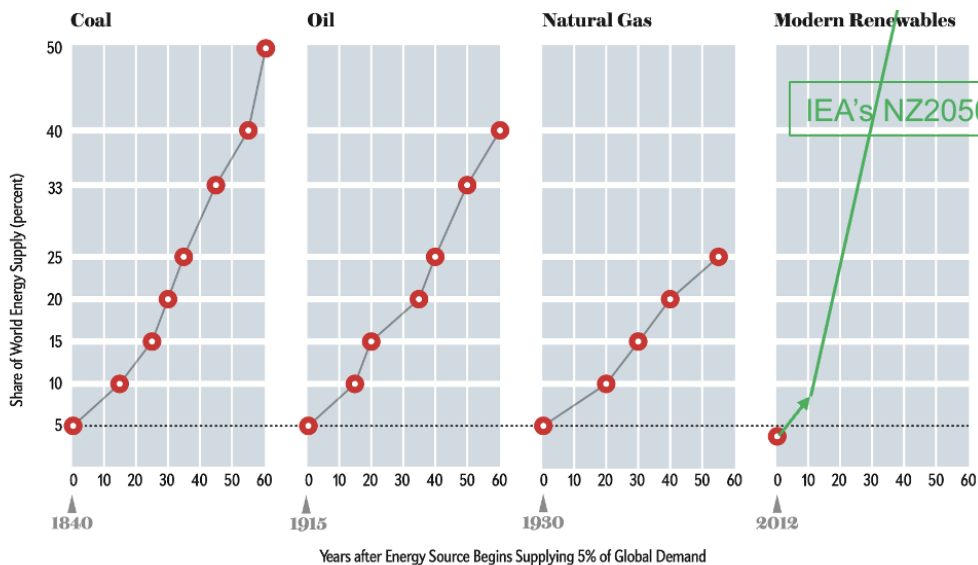
- Small modular reactors (post-2035 market extrapolation)
- Large-scale new builds (planned)
- Long-term operation (to 80 years)

Nuclear Energy Agency (NEA)



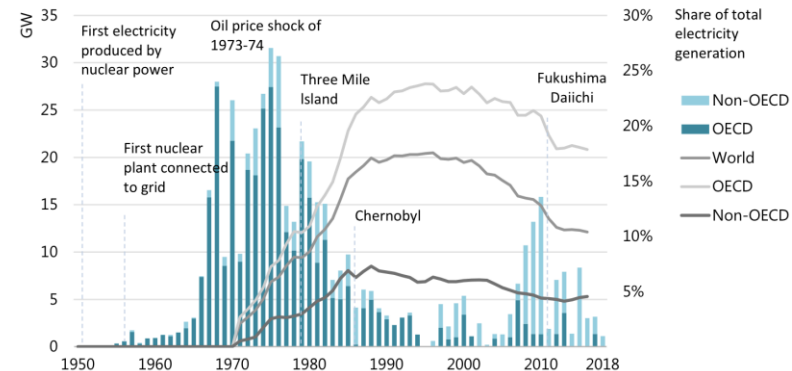
- President of the French Republic Emmanuel Macron and United States Special Presidential Envoy for Climate John Kerry announced that 20 countries have launched the 'Declaration to Triple Nuclear Energy by 2050' at the 28th United Nations Climate Change Conference or Conference of the Parties of the UNFCCC (COP28).
- Endorsing countries include the United States, Bulgaria, Canada, Czech Republic, Finland, France, Ghana, Hungary, Japan, Republic of Korea, Moldova, Mongolia, Morocco, Netherlands, Poland, Romania, Slovakia, Slovenia, Sweden, Ukraine, United Arab Emirates, and United Kingdom.
- Those countries that choose this option will need to work in concert to address issues such as affordable financing, enhanced supply chains and the need for a skilled workforce if success is to be in reach.

Nuclear is a “Successful Failure” (Vaclav Smil)



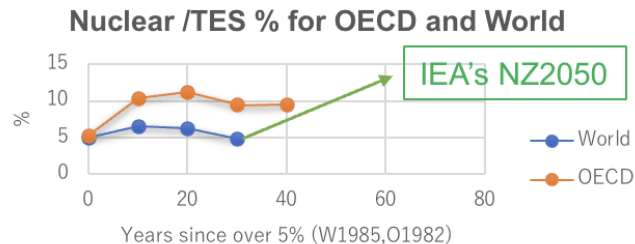
Vaclav Smil vs IEA's Net Zero by 2050

Figure 5. Reactor construction starts and share of nuclear power in total electricity generation

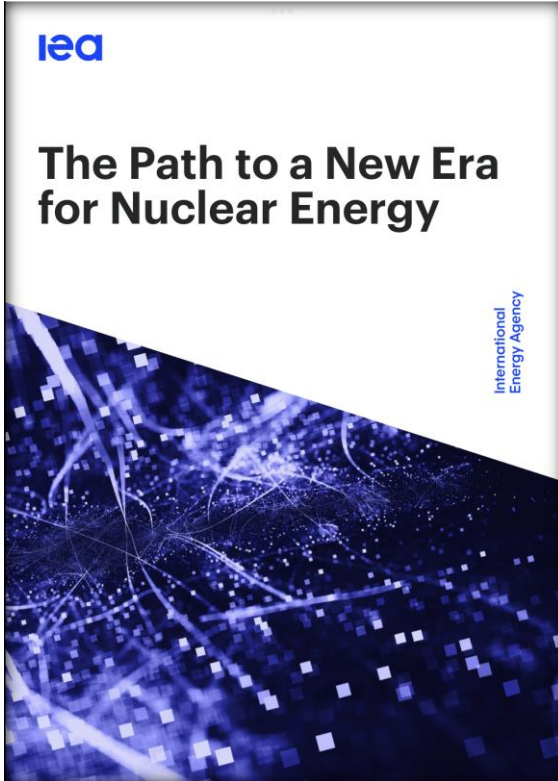


Note: OECD = Organisation for Economic Co-operation and Development.
Sources: IAEA (2019), Power Reactor Information System (PRIS) (database); IEA (2018a), Electricity Information 2018 (database).

Most of the nuclear reactors in operation today in advanced economies were built before 1990.



The market, technology and policy foundations are in place for a new era of growth in nuclear energy over the coming decades.

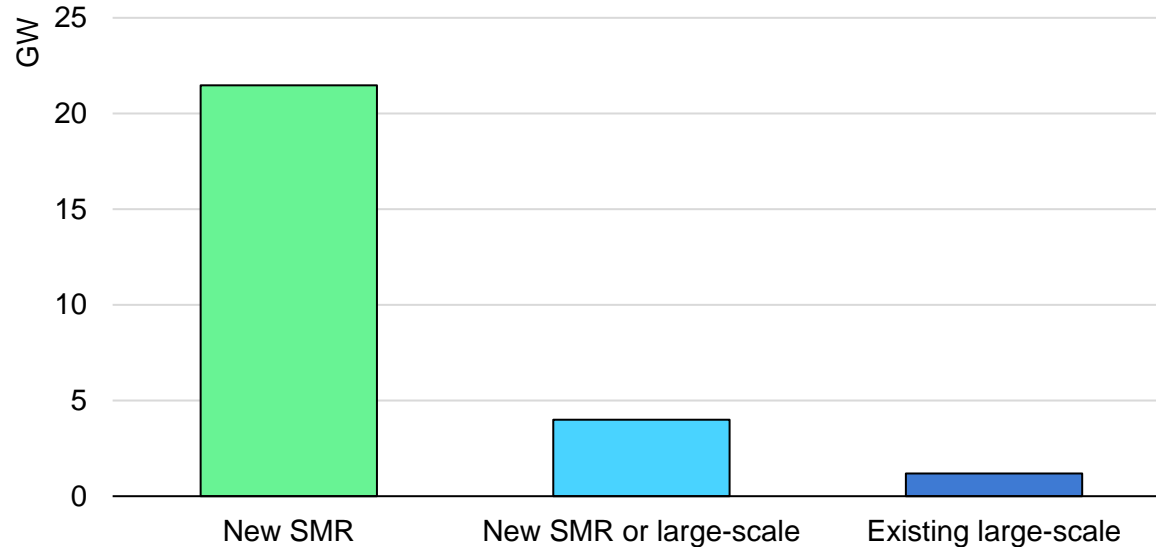


- Generation from the world's fleet of nearly 420 reactors is on track to reach new heights in 2025.
- A shift in market leadership is underway: half of the projects that are under construction today are in China, which is on course to overtake both the United States and European Union in installed nuclear power capacity by 2030.
- Cost-competitive SMRs, boosted by government support and new business models, can help clear the path to a new era for nuclear energy.
- The rise of SMRs, alongside a new wave of large-scale reactors built on time and on budget, can open the possibility for Europe, the United States and Japan to reclaim technology leadership.
- Governments have a unique capacity to provide the strategic vision, and the policies, incentives and public finance that can move the nuclear sector forward.

Data centres are emerging as a new dedicated market for SMRs

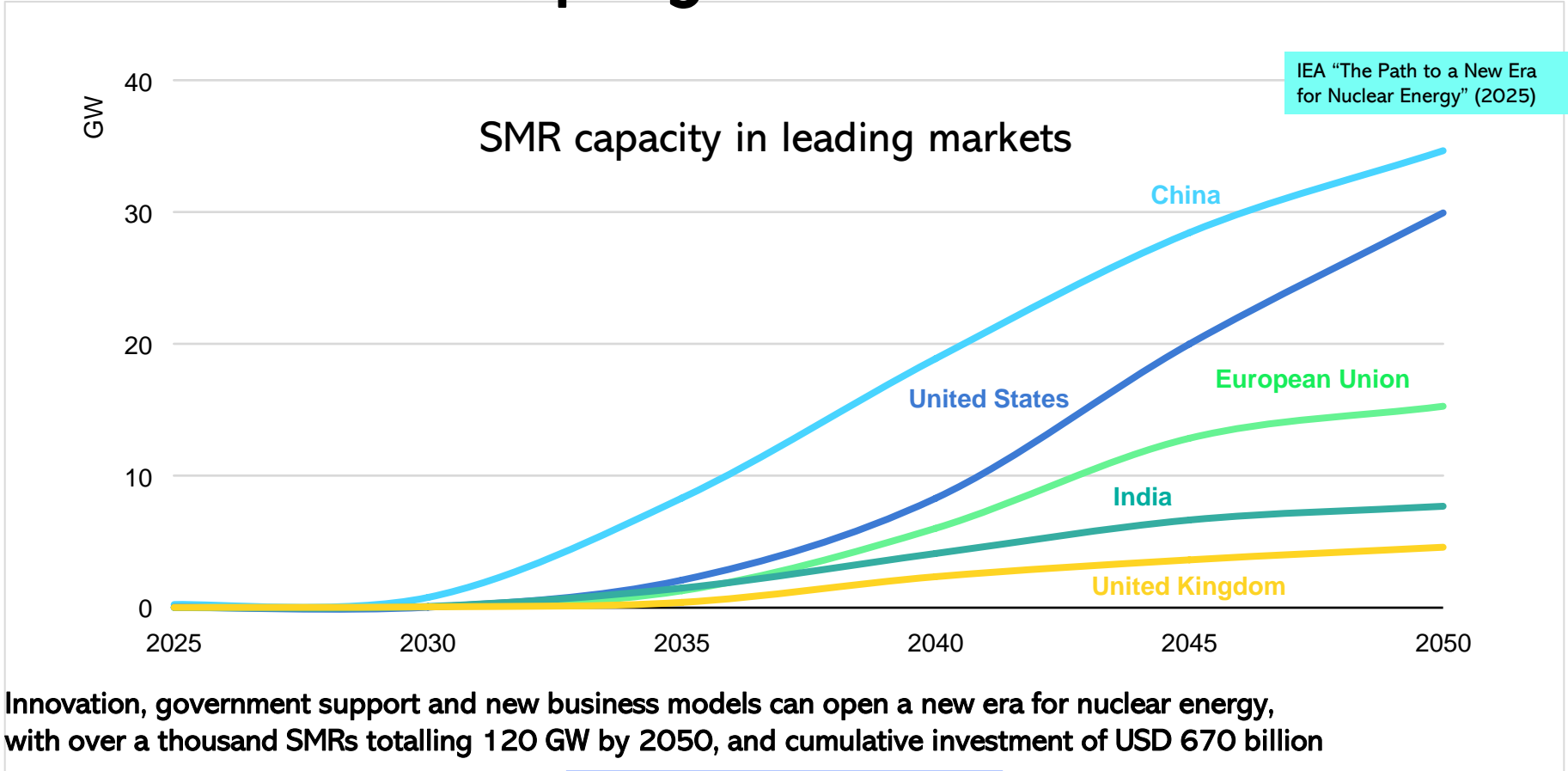
Announced global nuclear capacity related to supplying the data centre sector

IEA "The Path to a New Era for Nuclear Energy" (2025)



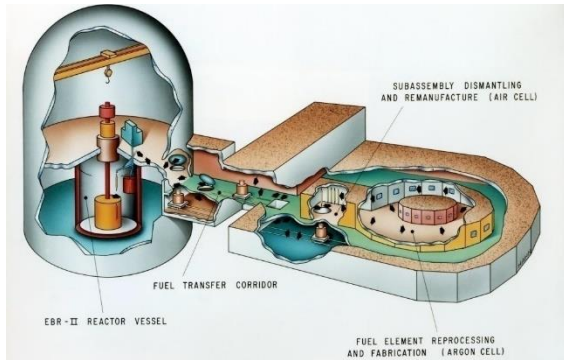
The appetite for SMRs is strong in the rapidly expanding data centre sector to meet their clean power needs. Up to 25 GW of SMR capacity for powering data centres have been announced – almost all in the United States.

SMRs are set for rapid growth

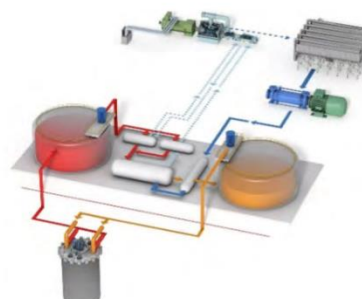


Innovation, government support and new business models can open a new era for nuclear energy, with over a thousand SMRs totalling 120 GW by 2050, and cumulative investment of USD 670 billion

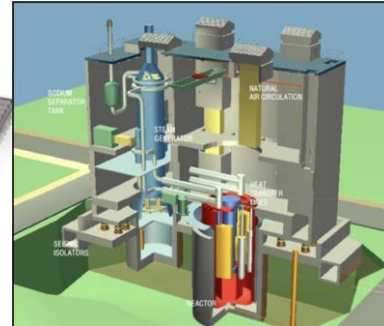
Sustainable Nuclear Models?



Integral Fast Reactor



Terra Power's Sodium



GE-Hitachi's
PRISM

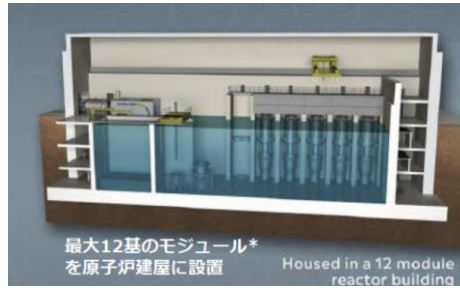


rendering of Oklo's Aurora powerhouse
by GenStar

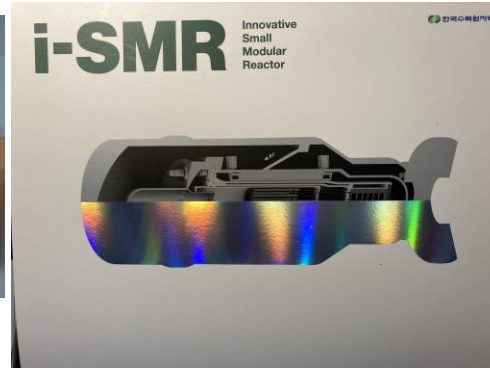
OKLO's Aurora reactor



Dow Chemical
and X-energy



Nuscale



Korean i-SMR



Akademik Lomonosov

Tenth Anniversary of the Fukushima Accident.

Women did play honorable role for Fukushima recovery and can do more.

“If the President of the Tokyo Electric Company had been a woman, she could have avoided the tragedy of the Fukushima Daiichi Nuclear Power Plant disaster in 2011”

Nikkan Kogyo shinbun 2021-4-5



元国際エネルギー機関（IEA）事務局長／前笹川平和財団会長

田中 伸男

たなか・のぶ 専大経卒、通商産業省（現経産省）入省。通商政策局総務課長、経済協力開発機構（OECD）科学技術産業局長などを経て07年に欧州出身者以外で国際エネルギー機関（IEA）事務局長に就任。16年笹川平和財団会長、20年顧問、70歳。

原発事故から10年「福島と女性」

誇り見つける 祈りと決意

講演

福島原発事故から10年を迎えた2021年、テレビで「Fukushima 50」という番組が放送された。この番組は、事故から10年たった今も、福島第一原発の廃炉作業に従事している女性職員、福島出身の所員を家庭から支える奥さんや娘さんら。福島女性についての映画といえは、私の大好きな「ラガール」がある。常務取締役という花形エネルギー産業が静岡となり男たちが失業する中で、この場を息づかすに転換させた常務ハワイアセンター1（現パブリックサービス）の女性リーダーたちの奮闘と苦闘の物語である。福島の復興にも「ラガール」が活躍したと聞いて、女性の安全や安心に対する感覚は男性の比ではない。そもそも人間の発展の過程で未知なる男性はリスクをとり、留守を守り子どもを育てる女性ばかりに感じになり、危害を避けるように脳が発達したことがNHKの特別番組で紹介



震災から10年を迎えた福島県大熊町・双葉町

女性が生後のある投資顧問会社は福島事故が起る半年前に東京電力の推奨をよめて投資家を守った。なぜそうしたのかと聞いたところ、同じような事故と間違いない繰り返す原発は投資リスクが許さず考えなかった。企業も安全に関する業務の責任者も女性を雇う社は多い。原発の車庫に消防隊員での役割の過失をみると東電に原子力発電所を運営する資格はない。20年の5月1日付のこのコラムで書いたが、もし東京電力の社長が女性だったら福島第一原発事故は防げたのではないかと考えます。

10年前に福島県出身の女性から私の講演を聞いた感想のメールが送られてきた。5年間は悲憤な感情論を山ほど聞いて、どちらに向けて顔を上げていきたいのだから、福島の人間はもっと機嫌よくたのむのだと思います。昨夜、統合型高炉（IHFR）によるテラリ処理の提案を聞いて、私は原発が街に初めてやってきた子ども達の顔を思い出しました。お前は、私をその時と同じ気持ちで思い出させてくれた。そのような話を聞いたのは初めてです。私は科学者にはなれません。私は科学者に尽くすという意味で、「つくす」ま、福島」になれないのだと、そう気がつきました。それは決して後ろ向きな話ではなく、その上に私たちが福島の誇りが戻つけられたいのではないかと感じました。友人たちが原発連帯やラガールになったという彼女はたかまじい。

（今回はMedicine Japan AXCeilingの近藤浩氏です）

というのが、私が議長をしている「イノベーション・イニシアチブ」の結論である。

原子力もろくではないか。あの研究所の厚皮で今般、女性だけの次世代原子炉をめぐる研究会を立ち上げ、いわゆる「原子力ムウ」は男性中心の世界であるが、彼らには現状を変えようという突破力を感じられないうちだ。

5年前に福島県出身の女性から私の講演を聞いた感想のメールが送られてきた。5年間は悲憤な感情論を山ほど聞いて、どちらに向けて顔を上げていきたいのだから、福島の人間はもっと機嫌よくたのむのだと思います。昨夜、統合型高炉（IHFR）によるテラリ処理の提案を聞いて、私は原発が街に初めてやってきた子ども達の顔を思い出しました。お前は、私をその時と同じ気持ちで思い出させてくれた。そのような話を聞いたのは初めてです。私は科学者にはなれません。私は科学者に尽くすという意味で、「つくす」ま、福島」になれないのだと、そう気がつきました。それは決して後ろ向きな話ではなく、その上に私たちが福島の誇りが戻つけられたいのではないかと感じました。友人たちが原発連帯やラガールになったという彼女はたかまじい。

Interim Recommendations of CIGS Study Group on Next Generation Nuclear Energy Utilization “Facilitating Revitalization of Nuclear Energy in Japan”

Nuclear Power Generation in the Future. We believe that nuclear power is indispensable to form an energy mix in Japan. Past experiences tell us that, in the future, Japan must take a completely different approach from the conventional path to meet the following three conditions.

1. **Risk Minimization.** Since the risk in nuclear power generation cannot be made zero, the idea of risk minimization is quite important. Even in case of a nuclear accident, smaller scale nuclear reactors with smaller fuel inventories could reduce the area affected, such as emergency evacuation zones. It is also necessary to develop technology for enhancing passive safety, so that the operation of a reactor can be stopped as safely and quickly as possible. As part of this process, if the design of the reactor can be made as locally acceptable as possible, it will help to gain the understanding of the local community where the reactor is located and encourage the participation of local residents.

2. **More Realistic Method of High-level Radioactive Waste Treatment.** It is a difficult issue to determine site for high level radioactive waste disposal in all countries. Because such waste must be stored in geological disposal facilities and kept isolated from the human living environment for several hundred thousand years. On the other hand, pyroprocessing technology for metal fuel cycle succeeded in shortening the isolation period of radioactive waste to 300 years by extracting plutonium and minor actinides (MA). This technology was tested using simulated fuel debris which had the same elements as TMI-2 fuel debris. Although this debris could not be reprocessed by the conventional reprocessing method, it was successfully reprocessed when this technology was applied. This means that both spent fuel that has been exposed to sea water and fuel debris that should be retrieved in the future from damaged reactors of Fukushima Daiichi Nuclear Power Plant could be reduced to radioactive substances, which merely requires isolation for 300 years. It should be noticed that the problems associated with the use of the light-water reactor system may be able to be skirted around when this technology is introduced in the future.

3. **Contribution to Nuclear Non-proliferation.** Besides the problem of high-level radioactive waste disposal, the light-water reactor system also poses difficulties when viewed from the angle of nuclear non-proliferation. The uranium enrichment technology that is essential for fabricating fuel of light-water reactors, together with spent fuel reprocessing technology, can be easily applied to development of nuclear weapons. Therefore, future nuclear power generation systems must be as unlikely as possible to produce materials that could lead to nuclear proliferation. Also, it will be necessary to review the management system of nuclear substances in line with the development of novel technologies and the associated nuclear proliferation risks.

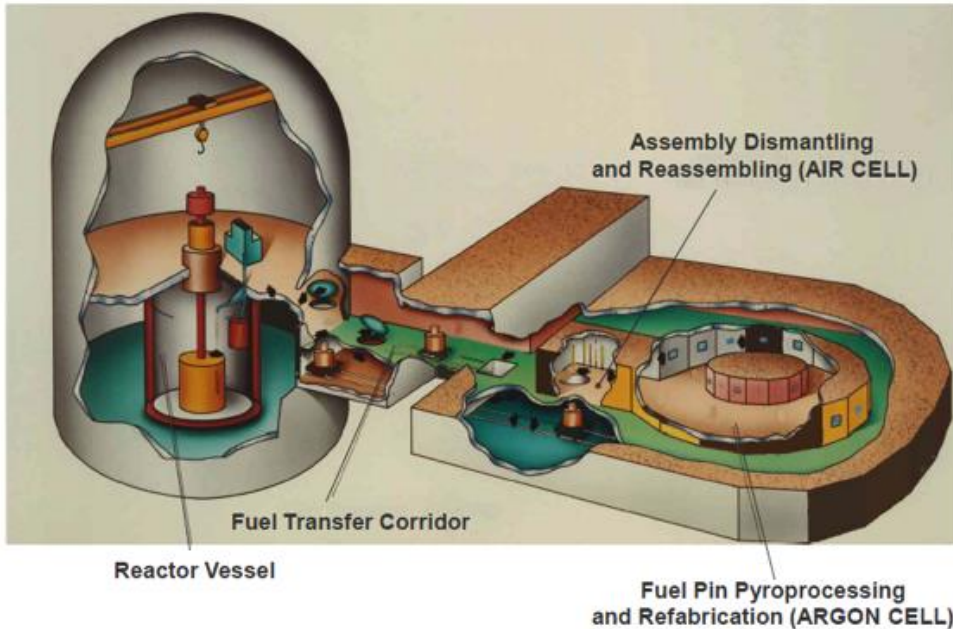
For the purpose, the improvements of environment such as (1) **political leadership**, (2) **Obligation of the government**, (3) **Residents’ Participation and Interactive Communication**, and (4) **Reconstruction of Fukushima and Peaceful Uses of Nuclear Energy**, are necessary.

Members
Nobuo Tanaka (Chair)
Tomoko Murakami
Momoko Nagasaki
Reiko Fujita
Maiko Takeuchi
Atsuko Kanehara
Junko Sugaya
Mao Kurahashi
Mina Sekiguchi
Minako Fujiie
Akiko Iwata (Observer)
Chieko Nagayama (Observer)
Eri Nakatani (Observer)
Yuki Hasegawa (Observer)

https://cigs.canon/en/article/20221107_7096.html

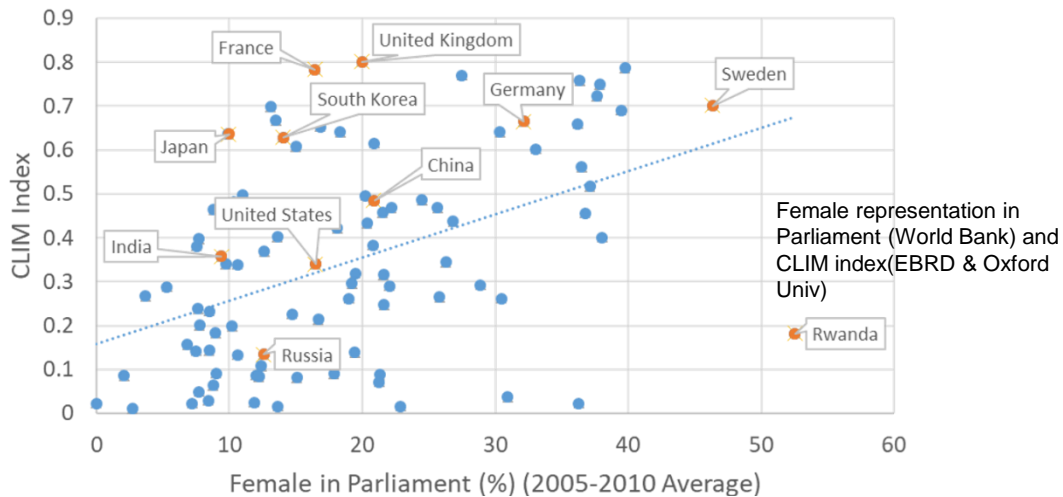
Time for Safer, Proliferation resistant and Easier Waste Management Paradigm: **Integral Fast Reactor (Metallic fuel, Close cycle Fast Reactor) and Pyroprocessing**

Pyroprocessing was used to demonstrate the EBR-II fuel cycle closure during 1964-69



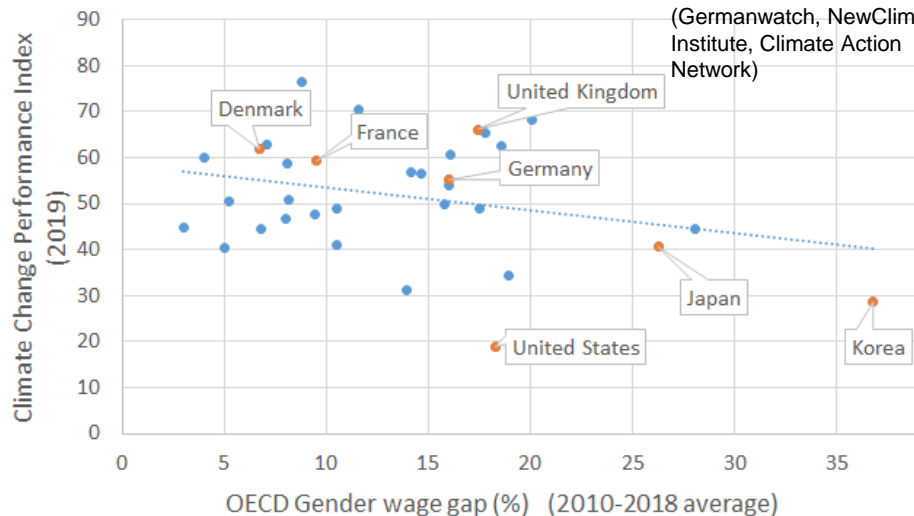
IFR has features as Inexhaustible Energy Supply ,Inherent Passive Safety ,Long-term Waste Management Solution , Proliferation-Resistance , Economic Fuel Cycle Closure. High level waste reduces radioactivity in 300 years while LWR spent fuel takes 100,000 years.

Dr. YOON IL CHANG
Argonne National Laboratory



Climate Change is NOT Gender Neutral

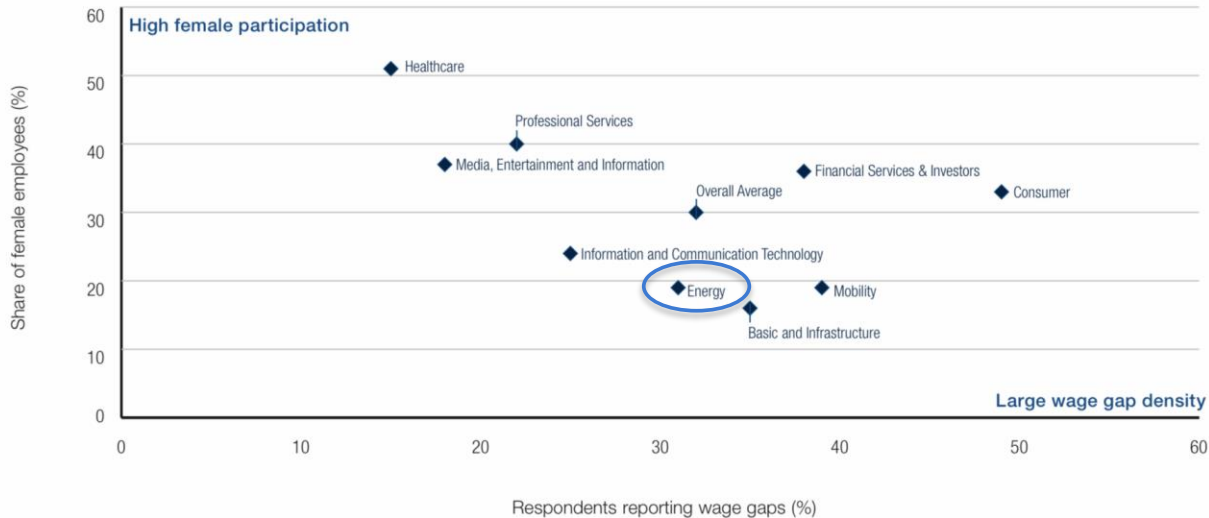
Gender Wage Gap (OECD) and Climate Change Performance index (Germanwatch, NewClimate Institute, Climate Action Network)



The IFC study's "results offer a convincing argument that having a more gender-balanced board and leadership team contributes to stronger **Environmental**, **Social**, and **Governance** performance, which in turn, leads to better business performance."

Negative Correlation between female participation and Gender pay gap. Energy sector performs poorly.

Gender wage gap and women's participation, by industry

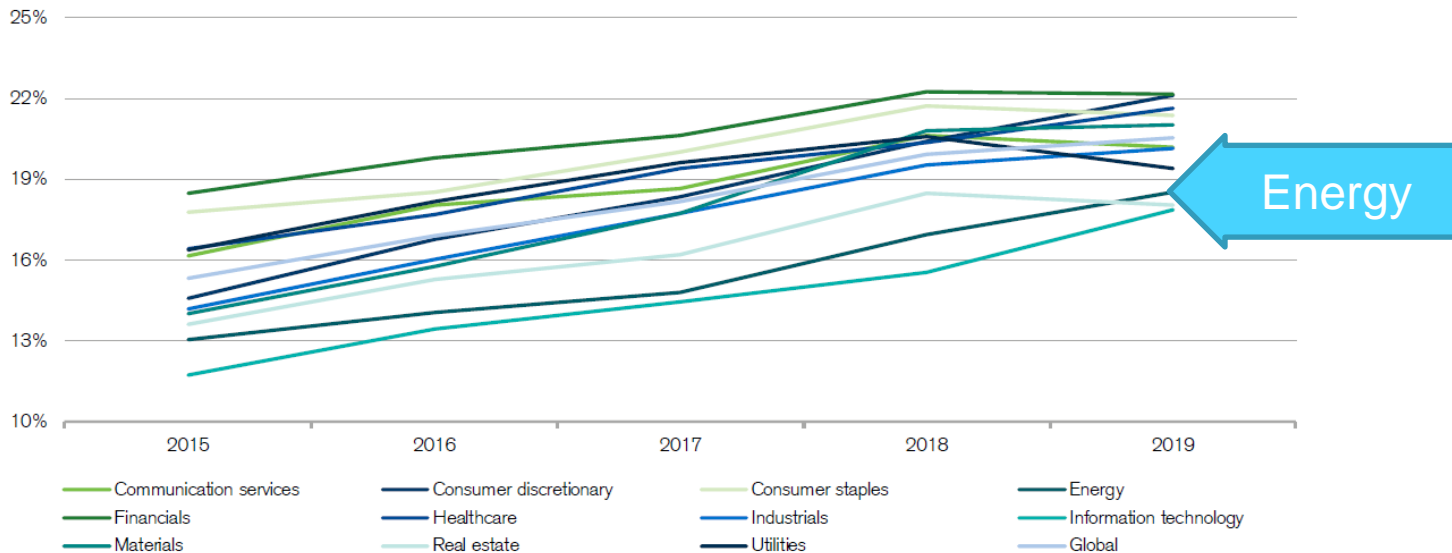


Source: Future of Jobs Survey, World Economic Forum.

WEF. The Industry Gender Gap Women and Work in the Fourth Industrial Revolution (January 2016)

Energy boards lacking gender equality trigger climate worry

Figure 2: Diversity in the boardroom by sector

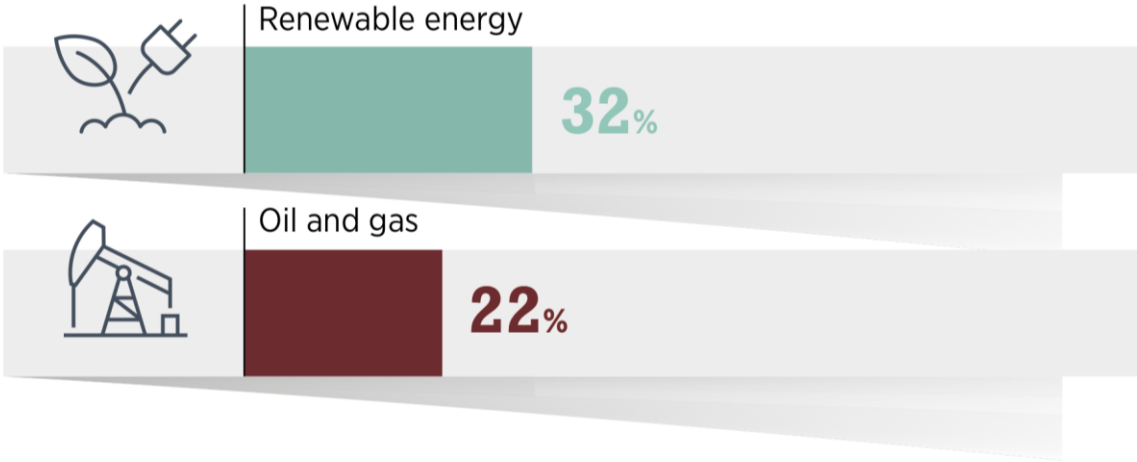


Source: Credit Suisse Research, CS Gender 3000, The BLOOMBERG PROFESSIONAL™ service

“There is a clear parallel between the progress we’ve seen on gender equality and climate change over the last six years,” by Christiana Figueres (2016)

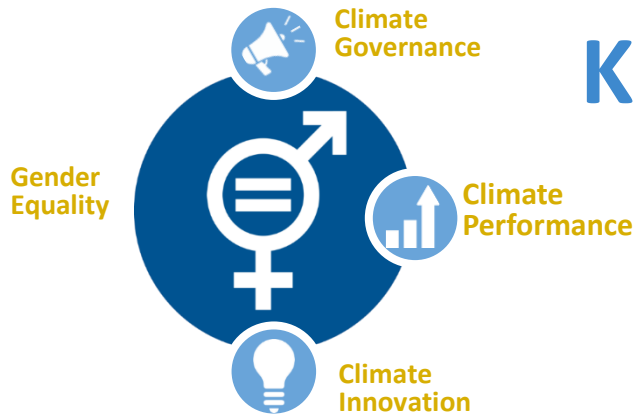
Renewable Energy hires more women than traditional energy sector.

Figure 2.2 Share of female full-time workforce in renewable energy and oil and gas



Sources: IRENA online gender survey, 2018; Rick *et al.* (2017).

Climate Change is NOT Gender Neutral!



Key Findings

>30%

✓ Gender diversity positively correlates to better **climate governance** and **innovation**.

✓ Critical mass of >30% women on

Board (WOB) makes difference.

Global Trends

>30% WOB threshold is growing 2% => 16% in 10 years.

More women in management reasonably correlates to % women in workforce

✓ International initiatives such as TCFD is key driver for better climate governance, and early adopters show better gender diversity.

✓ Legislation and reporting requirements accelerate disclosure

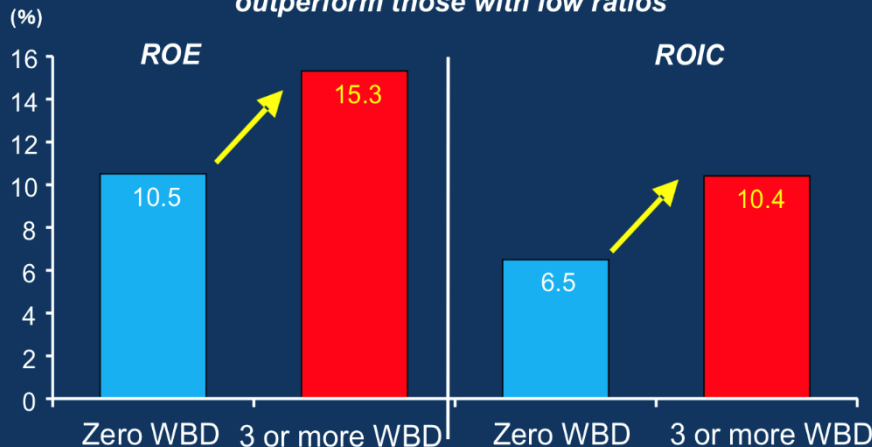
Corporations with more than 3 female board members show higher ROE/ ROIC

ICEF2020 Plenary1
 Presentation by Kathy Matsui
 of Goldman Sachs

Goldman Sachs

Myth: Diversity has no impact on corporate, stock price performance

Fortune 500 firms with high female director ratios outperform those with low ratios



Note: Companies with sustained high representation of Women on Board of Directors (WBD; 3 or more WBD in at least 4 of 5 years vs. those with sustained low representation (zero WBD in at least 4 of 5 years).
 Source: Catalyst

Global Investment Research



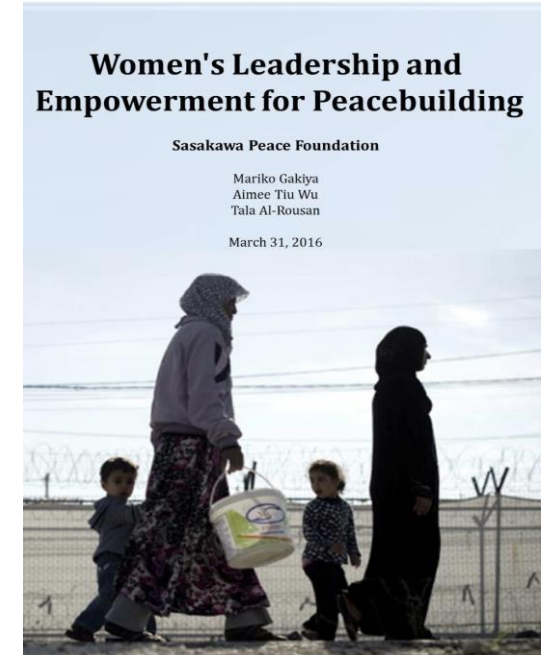
Innovation for Cool Earth Forum
 7th Annual Meeting -Virtual Forum-

OCTOBER 7-8, 2020

*Concurrent sessions will be held in advance from late September

Women's Leadership and Empowerment for Peacebuilding

- Research has consistently shown that sustainable peace is only possible if there is inclusive peacemaking where women are strong participants, both in their numbers and in their authority.
- Another study showed that a peace agreement is 35 percent more likely to last at least 15 years if women participate in its creation (O'Reilly, Suilleabhain, & Paffenholz, 2015).
- In fact, in cases of women's participation and strong influence, an agreement was almost always reached. Furthermore, strong influence of women in negotiation processes also positively correlated with a greater likelihood of agreements being implemented.



Sasakawa Peace Foundation 2016

What Do Countries With The Best Coronavirus Responses Have In Common? Women Leaders



Avivah Wittenberg-Cox Contributor



Political Leaders Showing the Way 20-FIRST



The Forbes

A huge amount of evidence is emerging that the Coronavirus will have an outsized economic impact on women.

Geopolitical Mistake of not using Nuclear

Chancellor Merkel's Mistake

She said, " I am a scientist and know what is nuclear. But to do nuclear here give me votes." After the Fukushima accident, she decided to phase out nuclear power by 2022. To reduce coal, she needed to rely too much on Russian gas, which invited the worst geopolitical crisis after the WW2.



Abendessen mit der Bundeskanzlerin am 29. September 2008 im Bundeskanzleramt

Angela Merkel

