Countering the China-Russia Tandem with Nuclear Energy: An Allied Response

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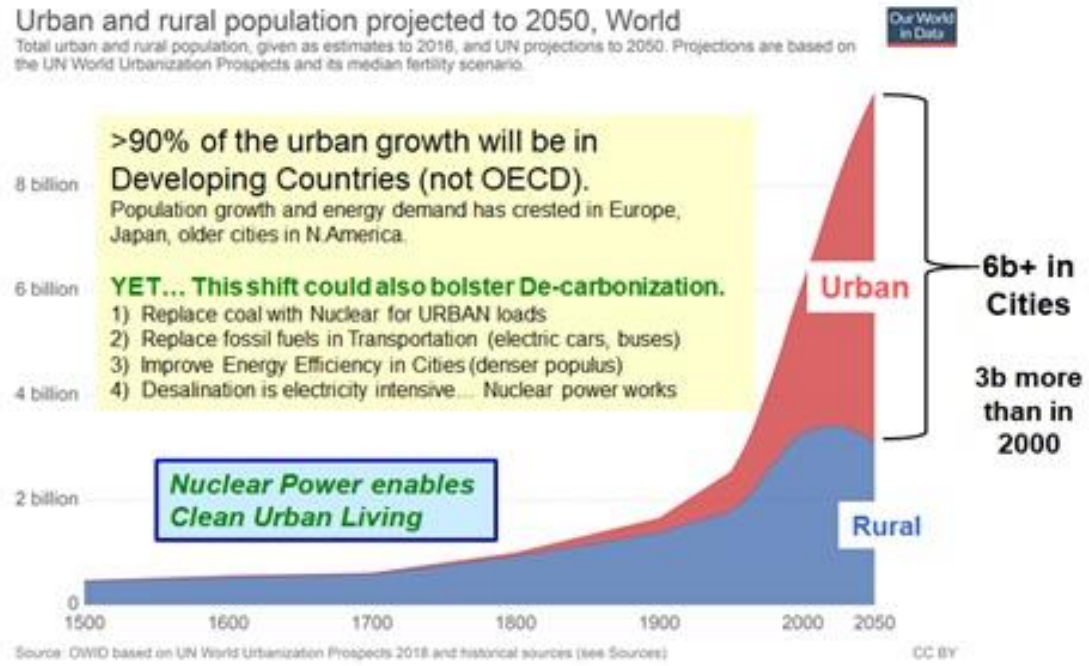
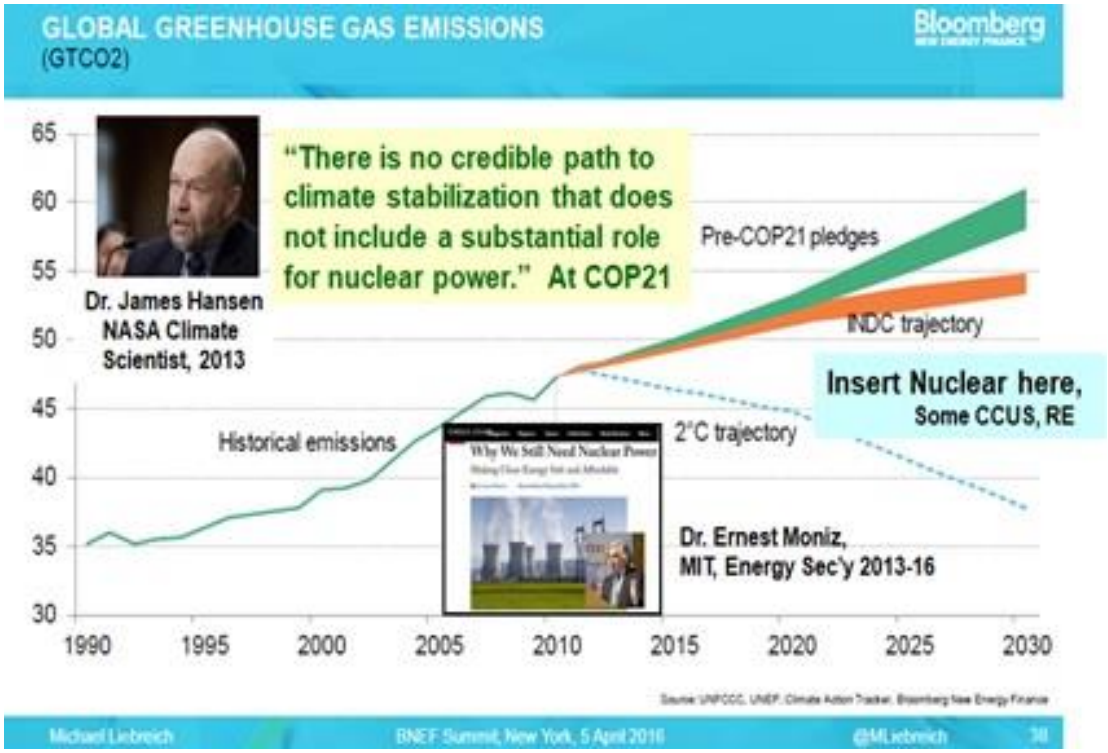
The twin pressures of carbon mitigation and long term rising global energy demand necessitate broad and significant deployments of nuclear energy worldwide. From 2000 to 2050, THREE billion more people will move to cities. In a world nearing 10 billion people, more than 6 billion will live in urban areas. (UN Population data). This massive scale of urbanization--with more and more electric cars and buses, demands for clean water, and high rise apartments and office towers--cannot be met without nuclear power, say prominent climate scientists.



The Global Environmental and Energy Imperatives for Nuclear Power

Near the end of the year, COP26 will entail a "five-year checkup" on progress since the historic COP21 Paris Accord. Importantly, at that Paris meeting, Dr. James Hansen, formerly the leading climate scientist at NASA, very clearly stated, "There is no credible path to climate stabilization that does not include a substantial role for nuclear power." And, he chastised many Environmental NGOs on their impractical "100% Renewable" campaigns in doing so.[1] For six billion urban residents in 2050, wind and solar and biomass or geothermal power are impractical for large urban power loads that must be available 24/7, even with batteries. Hansen and several of his colleagues have called for a stronger profile of Nuclear Power at the COP26 in Nov. 2020.



Nuclear power, with a very small footprint per MW, is ideally suited for cities in any climate. In Jan. 2019 during a Polar Vortex spell, the leading power utility in Michigan, CMS, suffered a gas compressor station explosion, and gas supply was not available for two weeks.[2] The icy conditions and overcast skies eliminated wind and solar. Fortunately, the Fermi 2 nuclear plant was running to sustain Detroit, MI and Toledo, OH under the severe weather. With droughts in western states, hydropower is dimmed. Running more transmission lines all over the landscape for wind and solar farms *increases* wildfire hazards, which California has seen four years in a row. The PG&E utility is bankrupt a second time. The "100% Renewable" Campaign--some use "*A Green New Deal*" as the rhetoric--poses a dangerous, ideological campaign with little grounding in physical reality. Faced with climate change, the worst strategy is to make

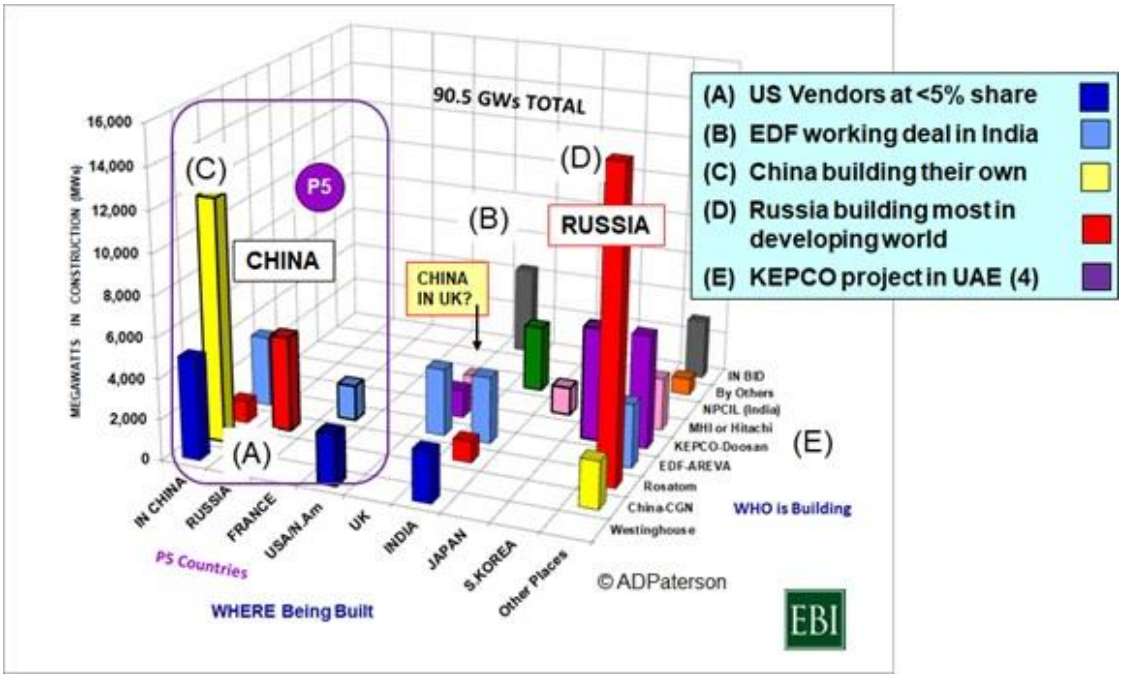
your entire power system MORE vulnerable to severe weather... for millions of people dependent on reliable power in major cities.

The Global Nuclear Arena: A Sino-Russian Tandem in Energy

The World Nuclear Association states that 400 GWs of nuclear capacity operates today. And they list about 50 reactors under construction worldwide (50-70 GWs in capacity), Currently, Russian (Rosatom) and Chinese (CGN) state-owned companies are leading *half of the world's new nuclear new build*. Russia and China, individually, are formidable competitors in the global arena and other energy industries. However, in January 2019, within its Global Threat Assessment presented to Congress, the Director of National Intelligence (DNI) noted that China and Russia are collaborating more, and using projects in the energy sector to expand their spheres of influence.[3] The "Overland Belt and Marine Route Initiative" (BRI) proposed by China in 2013 directly implements this strategy across Eurasia and into Europe. China now owns several ports in Europe. Russia has expanded a stranglehold on the Suez Canal and the Eastern Mediterranean with nuclear projects in Turkey and in Egypt, and a proposal in Sudan for a floating reactor. Both China and Russia are expanding into Africa and South America by buying up substantial stakes in mineral resources and forging alliances in energy. China's takeover of Chile in the last decade is shocking--primarily to dominate 40% of the world's lithium supply (Chile has 8 million tons in reserves)... for batteries. China already dominates more than 60% of global solar panel production; USA makes under 5%.

THE "GLOBAL ARENA": Landscape for Current Nuclear Power Projects - Who is building and Where

The diagram below is built up from the WNA listing of projects (2018-2025), augmented with trade press reports on projects that are sited and very close to financing agreement, but not yet under construction. 30 GWs of 90 GWs are being built captively (no outside vendors). Russia, China, South Korea, and Japan all build reactors natively in their domestic regions without outside vendors. Until 2017, China bought reactors from Russia, France (EDF / AREVA), and the U.S. (Westinghouse). With the emergence of the Hualong One (1100 MW), China is now building that reactor domestically going forward. In addition, CGN is building two of those reactors at Karachi, Pakistan. Moreover, they have proposed building it in the UK at the Bradwell and Sizewell sites as part of an equity investment deal in the Hinkley Point C plant--but construction has begun neither at Bradwell nor Sizewell. China and Russia account for HALF of the new projects globally in the nuclear sector (in construction or negotiation), while USA alone comprises less than 5%--US leadership is in decline.[4]



WNA: www.world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx

Taking nuclear energy as a prime example, the USA alone cannot counter a China-Russia tandem. An adequate response to these challenges will require coordination and the formation of deep partnerships among the U.S. and its allies. After the two Vogtle units are completed for Southern Company, the NuScale plant, sited at the Idaho National Lab (INL), remains the only U.S. plant (720 MWs) slated for construction at DOE's INL--by 2027--to power Salt Lake City, UT. Even at Vogtle (2200 MWs for expansion), Doosan (South Korea) provided reactor vessels and steam generators--those central large elements cannot be fabricated in USA. Elsewhere in the OECD, the outlook is riddled with uncertainty. Within the G7, Germany is phasing out its reactors (8 GWs now); Italy already closed its four reactors; and the EU lacks a harmonized approach to nuclear power with 14 its 27 members favoring it, half not. France is somewhat in retreat on new nuclear plants after suffering major cost overruns in Finland and at Flamanville in France with its large EPR (1600 MW).

Countering Russia and China via International Alliances

Considering these dual realities--emerging Russian-Chinese collaboration and mounting issues in the U.S. and allied countries--the need for multinational coordination and partnerships is as critical as ever. 2020 is a year of significant meetings for international conclaves--viral contagion allowing--within which alliances could be strengthened or renewed: G7 (June), Three Seas Summit (June) for Eastern Europe, G20 (Nov), and the COP26 in the UK (Nov). These are each opportunities for the USA to deepen alliances in energy broadly, on emissions reductions, and in nuclear energy.

Canada could be a useful ally in the mix with its recent thrust into small modular reactors (SMRs; sub-300MW), given its current base (13.5 GWs from 19 reactors). Similarly, outside the G7, South Korea (with 23 GWs operating) has proven its capability to successfully build the APR-1400 in the UAE, and is bidding elsewhere. And, as noted, the two reactors at Vogtle in Georgia could not be built without Doosan SK. Furthermore, in 2009, Doosan acquired Skoda Power, the premier electrical equipment manufacturer in the Czech Republic with 1,100 employees. By not adopting the Euro currency, manufacturers in the Czech Republic maintain a very competitive profile in the heart of Europe.

Doosan's recent investment in NuScale (Dec. 2019), and acquisition of Skoda in 2009 and its presence in the Eastern European market merits further attention. The Eastern European region is a promising market for nuclear power, and one in which western vendors directly face strong Russian (and Chinese) competition. Leveraging the inroads that allied countries have established in critical areas for nuclear energy will be essential for the USA foreign policy of upholding the highest technical safety standards globally. If China and Russia are leading new construction, then USA will have no say.

Partnerships will be important not only for conventional large reactors, but also small (sub-300 MWs) and advanced reactors with new fuel forms and coolants. Canada has made significant investments into advanced reactor deployment, and also boasts favorable initial markets--such as remote communities primarily powered by diesel generators--for these technologies. The Canadian government has also been proactive in supporting the development of these new reactor concepts through the establishment of sites for demonstration projects.

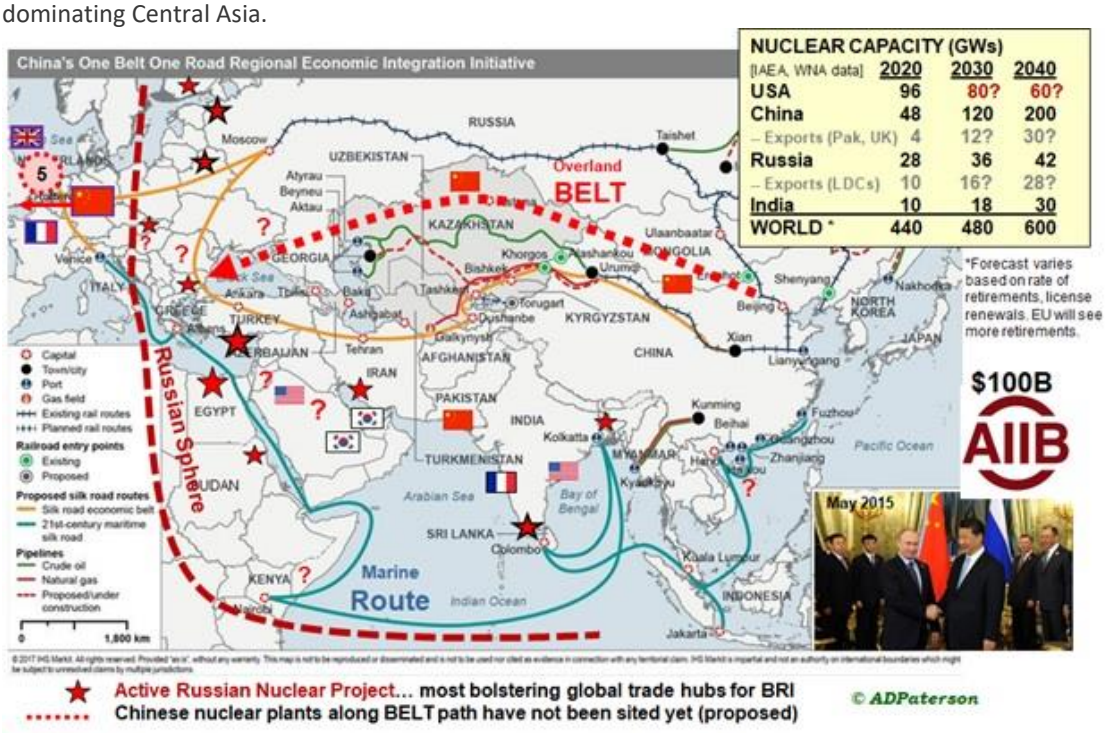
From DOE's IFNEC, at least 20 countries are currently evaluating financing approaches for 40-50 reactors, and therein lies the near-term opportunity for USA and allies to step up to the China-Russia challenge. Indeed, with 400 GWs operating now worldwide, much of that capacity must be rebuilt by 2050 to meet demand for reliable power in cities primarily, and to lead the global effort to curb emissions. Exponential growth in electric vehicles will drive demand further, and reduce emissions also, especially in the Developing World--a major theme for COP26 in November 2020 at Glasgow. Japan and South Korea, as allies, each excel in the automobile industry and are promoting wider adoption of electric vehicles in urban areas, much more so than USA. Taiwan runs on millions of scooters, and by 2035, they must all be electric!

Conclusion: A Strategic Path Forward through Alliances in Technology, Policy and Finance in Nuclear ARENA

The path forward for USA lies in alliances. "USA Alone" is not a strategy; it too is an ideological crusade that is impractical in the face of global challenges which are exponential in nature, such as billions more in cities and the severe pollution associated with that. Nuclear energy--with allies--is the only exponential energy source [E=mc2]. Going forward, US vendors and allies must strengthen the overall structured financing approach to win such projects. In some sense, the large nuclear project landscape is not a "market" with ready entry and exit of suppliers and customers. Instead, the nuclear energy landscape can be seen as a "Global

Arena" more like the defense system contracting business with HEAVY state agency engagement on both the demand-side and supply-side. While there are common attributes for all nuclear projects (fuel, electricity management, regulatory issues) as a "market segment," the projects carry substantial unique local and regional factors, such that "Customization for Sovereigns" is a major aspect of each project.[5]

ADDENDUM: The Dominance Strategy by the China-Russia Tandem within the Belt-Road initiative (since 2013) The map shows active nuclear projects within the BRI and the Chinese vision of dominating Central Asia.



DATA SOURCES

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ENDNOTES

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