

# **Global Industry Development**

## **Africa Nuclear Business Platform**

**U.S. Nuclear Industry Council**

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# USNIC In Brief

- The United States Nuclear Industry Council (USNIC) is the leading U.S. business consortium advocate for nuclear energy and promotion of the American supply chain globally.
- Composed of over 80 companies USNIC represents the "Who's Who" of the nuclear supply chain community, including key utility movers, technology developers, construction engineers, manufacturers and service providers.
- USNIC encompasses eight working groups and select task forces including an Advanced Reactors Task Force; Advanced Manufacturing & Supply, Fuel Cycle, D&D, Transportation, Environmental Management and International Working Groups.
- Key proponent for an all-of-the-above approach to advanced reactors including Gen 3+, Gen 4 (SMRs, Non-LWRs)

# USNIC Global Market Initiatives

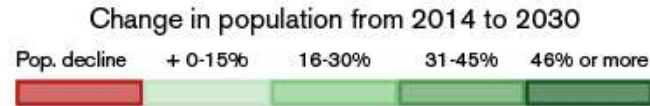
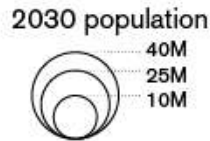
- Member, U.S. DOE Nuclear Energy Advisory Committee (2018-present)
- Member, U.S. Civil Nuclear Trade Advisory Committee (four terms including the current 2019-2020 appointment)
- Nuclear Innovation Clean Energy Future Initiative Partner
- Co-Chair, IAEA General Conference U.S. Industry Policy Forum
- Advisory Committee, Asia & Africa Nuclear Business Platforms
- Member, U.S. Department of Commerce Japan/Fukushima & Kingdom of Saudi Arabia Missions (2014 -- 2017)
- USNIC UK Nuclear Energy Industry Missions (2015, 2016, 2019)
- USNIC Canada Nuclear Energy Industry Mission (2017)
- Organizer, World Nuclear Exhibition USA Pavilion (2014, 2016, 2018 & 2020)
- Sponsor of Diplomatic Series on Nuclear Energy

# U.S. Nuclear Energy Delegation to Africa NBP

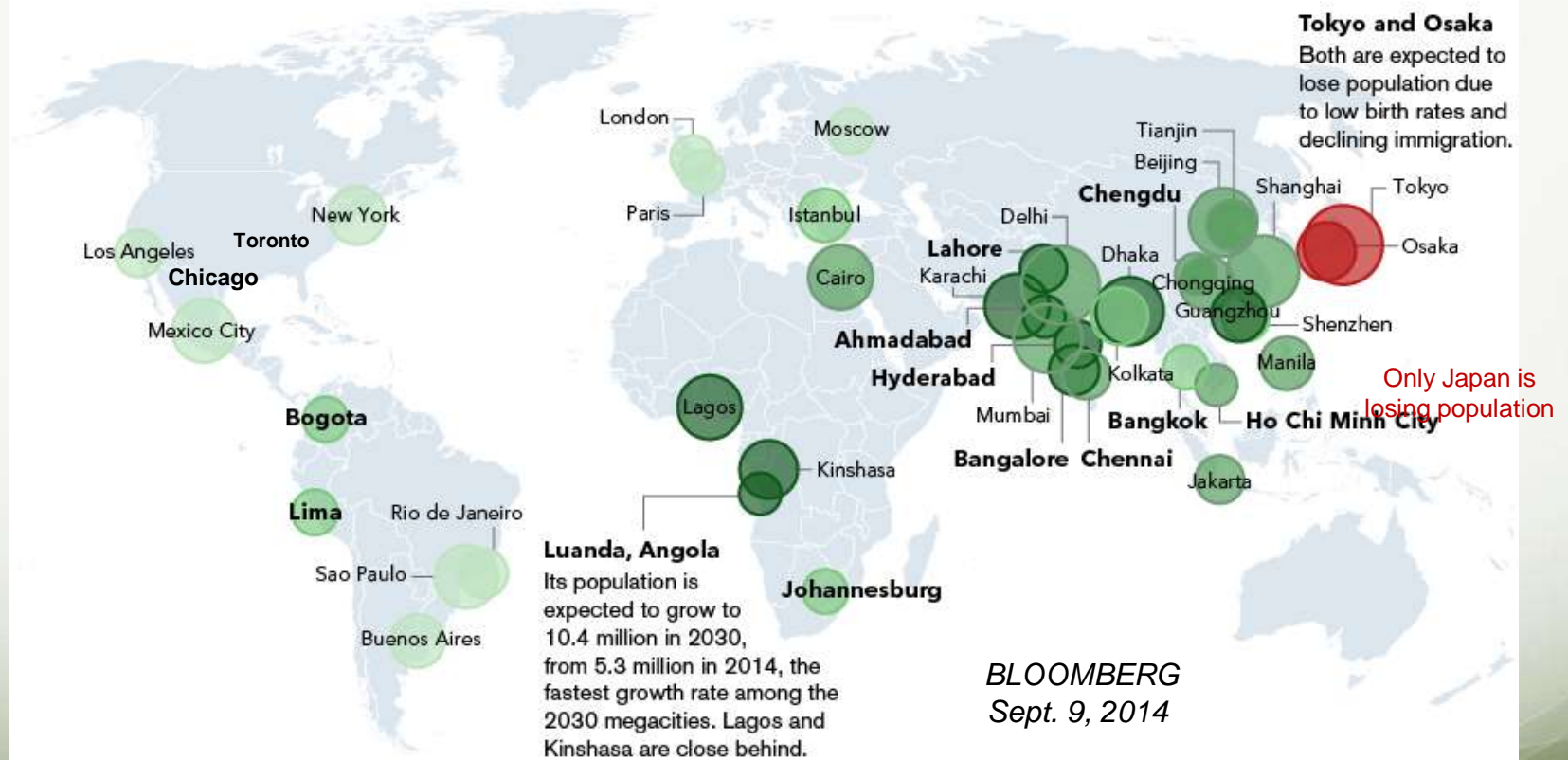
- Advanced Reactor Concepts
- Argonne National Laboratory
- GE Hitachi Nuclear Energy
- Idaho National Laboratory
- NAC International
- NuScale Power
- Pillsbury
- Terra Power
- Ultra-Safe Nuclear Corporation
- U.S. Nuclear Industry Council
- Westinghouse Electric Company
- X-Energy
- U.S. Department of Commerce
- U.S. Department of Energy
- U.S. Department of State

# Mega Cities by 2030

## Cities with a projected 2030 population of more than 10 million



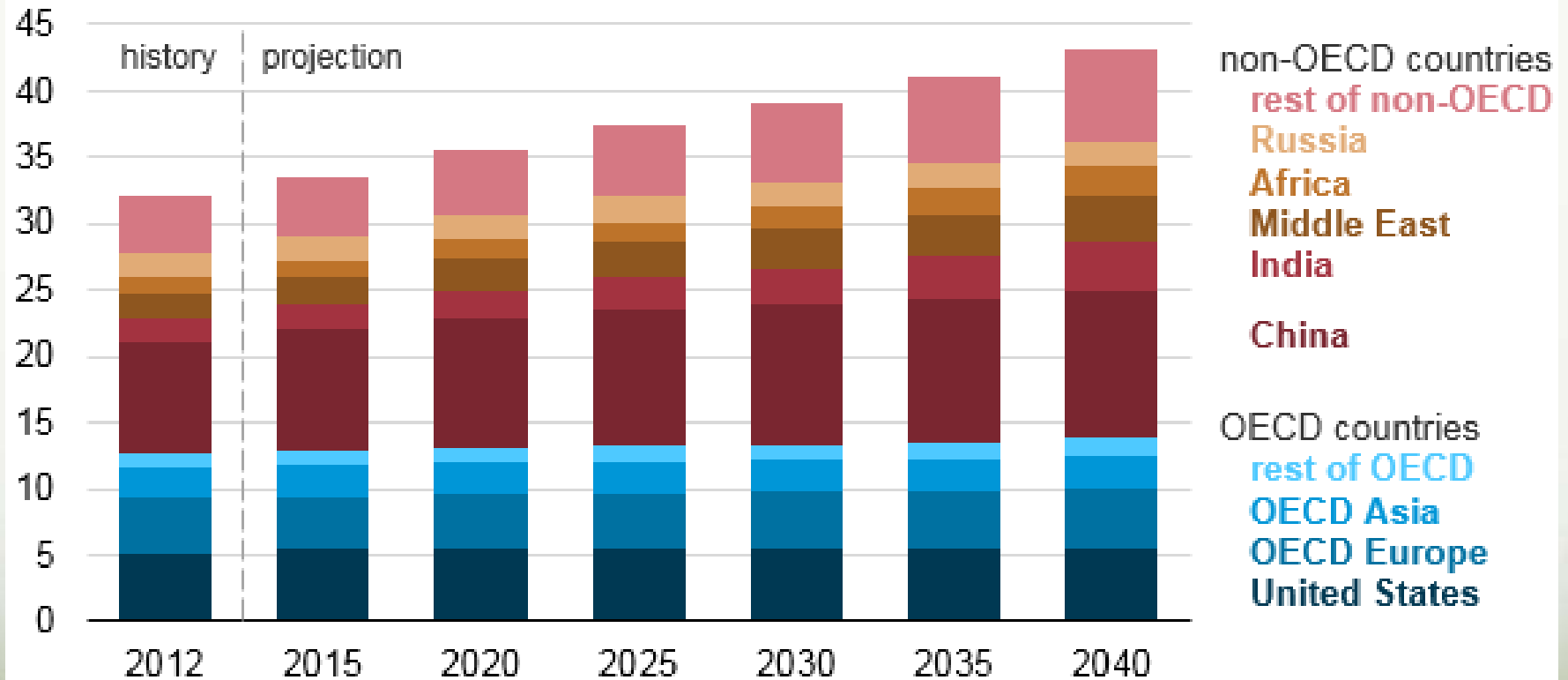
**Bolded cities:** projected to surpass 10 million people between 2014 and 2030



# Energy-related carbon dioxide (CO2) emissions by country or region (2012-40)



billion metric tons



Source: U.S. Energy Information Administration, International Energy Outlook 2016

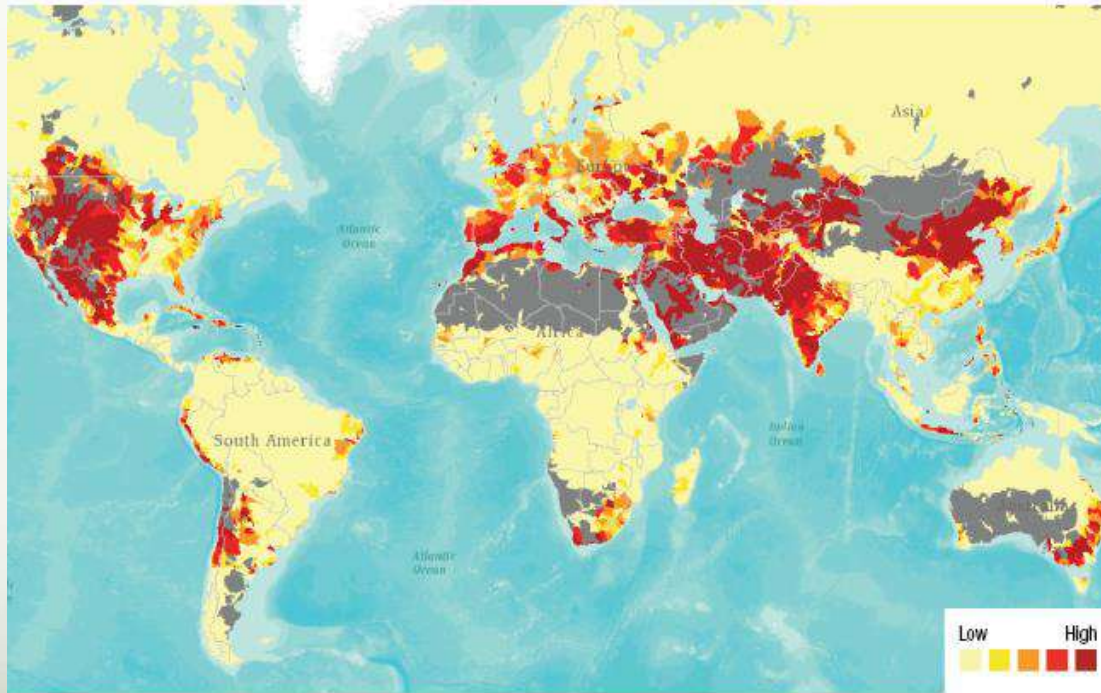


Could Advanced Reactors bolster Desalination in large volumes for cities?

## WRI: Global Water Stress – and National Security

**WRI: Water stress is not just a Developing World problem. Western USA.**  
**WHO: Impact of urbanization -- “By 2025, half of the world’s population will be living in water-stressed areas.”** **Could Nuclear boost fresh water supply?**

Projected Water Stress in 2030



Business as usual scenario  
aqueduct.wri.org

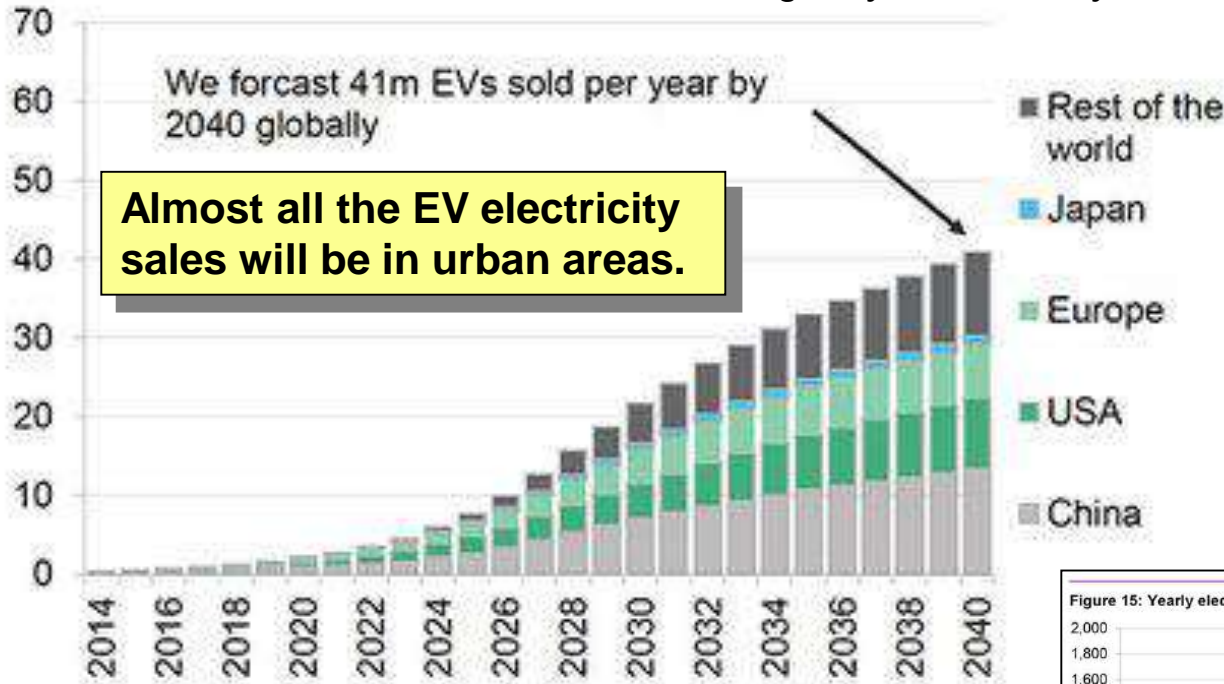
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WORLD RESOURCES INSTITUTE

# EV Growth matches timeline for Advanced Nuclear

Figure 11: BNEF global EV sales forecast by geography, 2015–2040 (m vehicles per year)

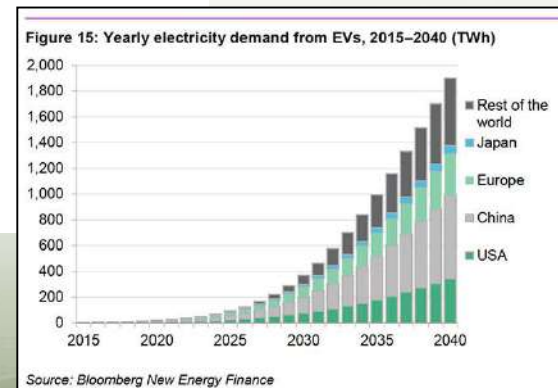
FEB. 2016:  
Plug-in hybrids + Battery EVs



Source: Bloomberg New Energy Finance, Marklines

Forecasts have shifted further out over time but battery costs are coming down; EVs might enter an S-curve as SMRs / GenIV are slated for commercial deployment.

Electricity sales volume for charging vehicles rises 4x from 2030 to 2040

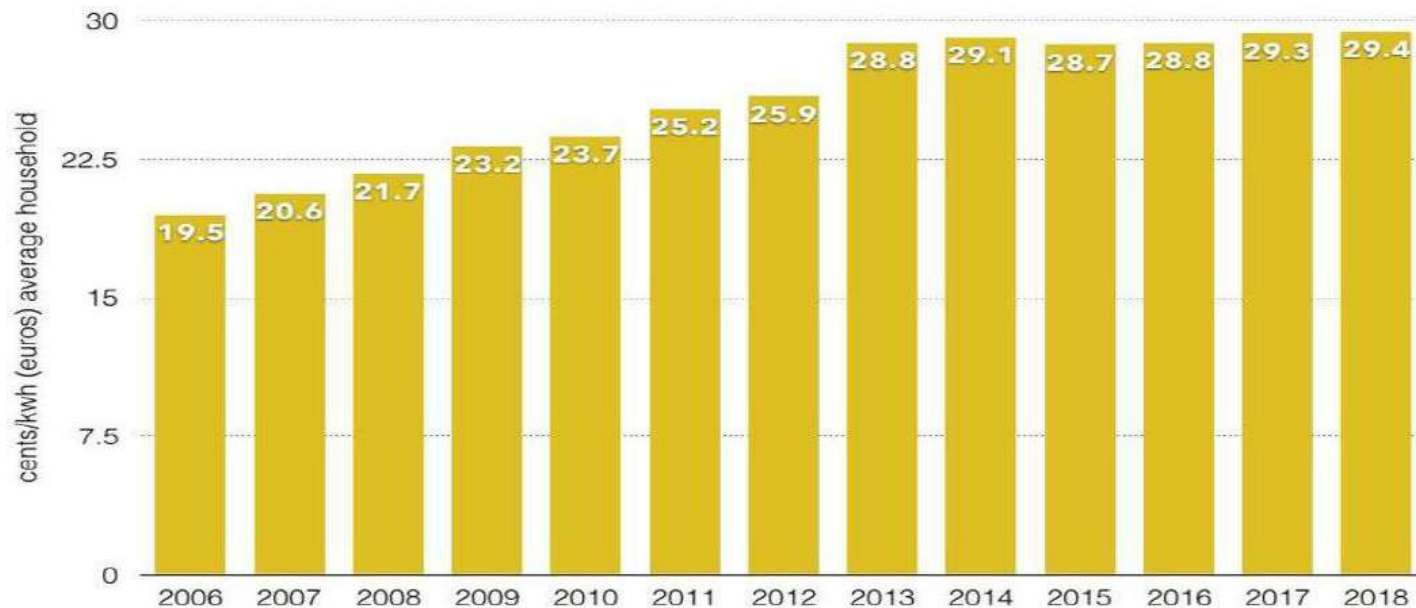


<https://about.bnef.com/blog/electric-vehicles-to-be-35-of-global-new-car-sales-by-2040/>



# Large-Scale Wind and Solar Deployment Increased German Electricity Bills

**German electricity prices rose 51 percent, 2006 - 2018**

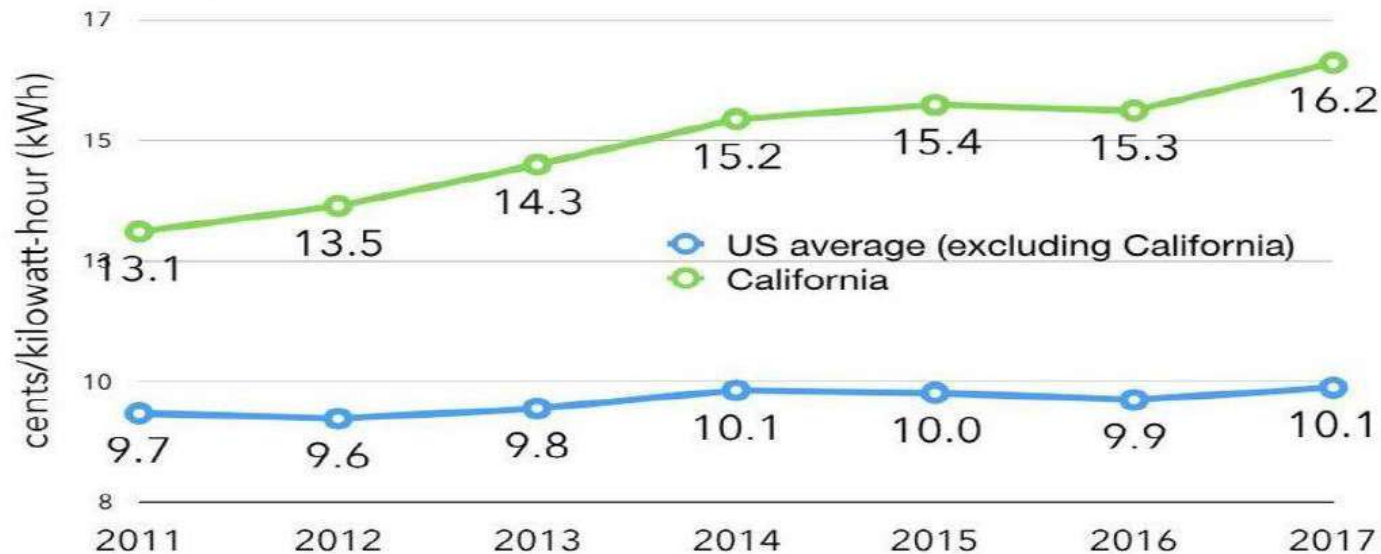


Source: Federal Association of German Energy and Water Industries (BDEW), 2017, via Clean Energy Wire, 2018

***This Occurred With No Significant Decreases in Carbon Dioxide Emissions and Recent Decreases in Natural Gas Prices !***

# Large-Scale Solar Deployment Increased California Electricity Bills

**Electricity prices in California rose 5x more than in rest of U.S.**

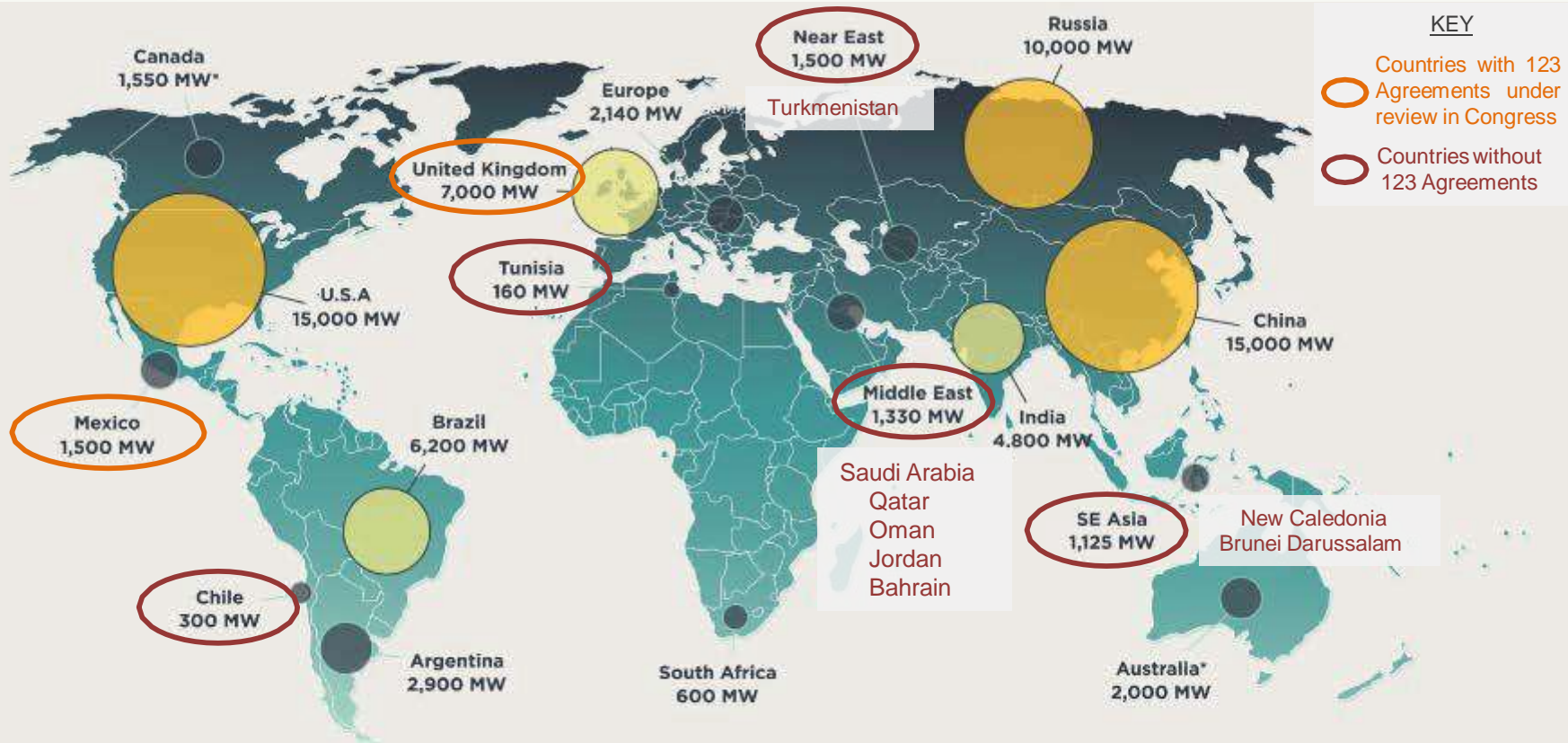


Source: US Energy Information Administration, 2017.

***This Occurred While Decreasing Natural Gas Prices !***

# Global SMR Market Potential

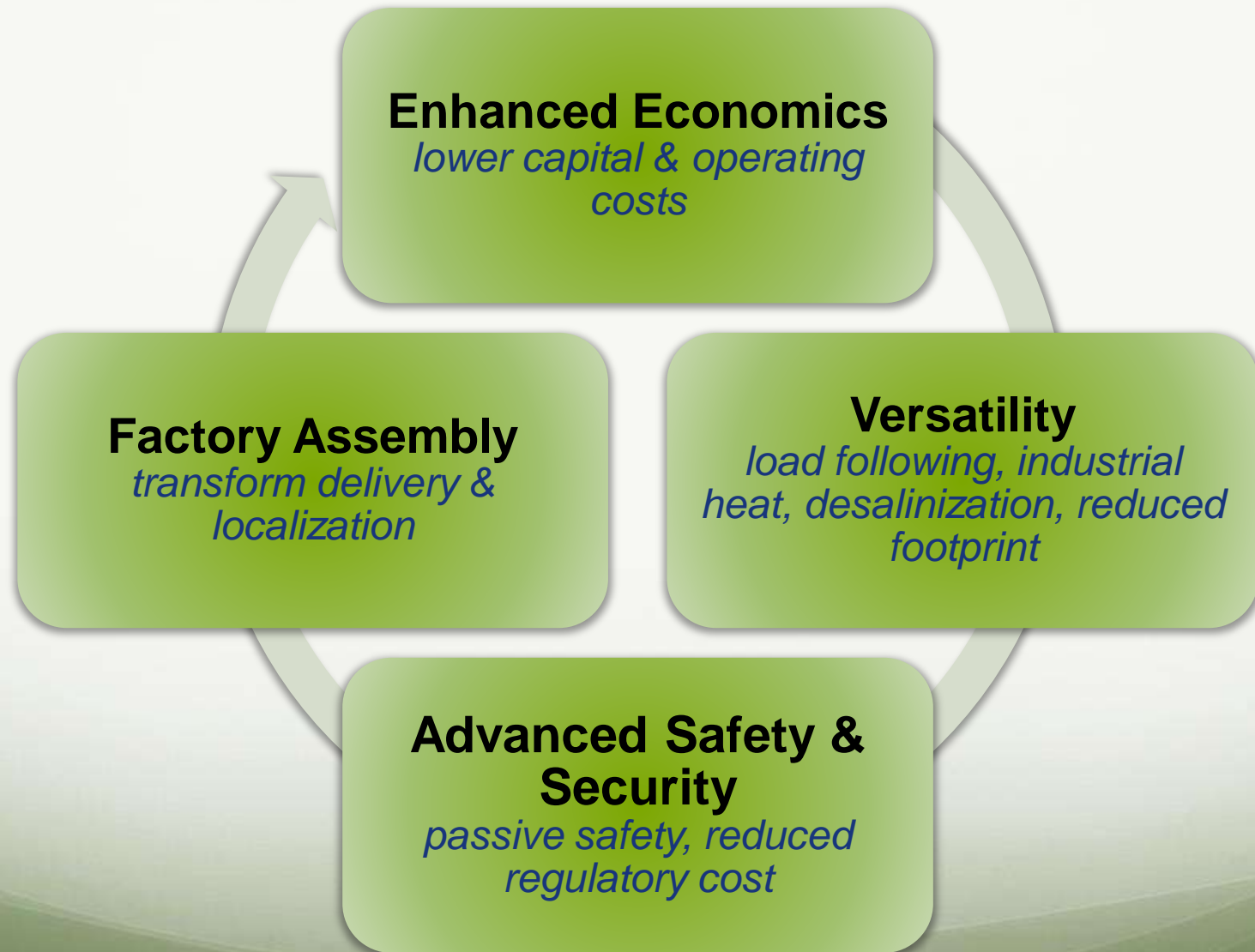
- UK NNL estimates the potential SMR market to be approximately 65 – 85 GW by 2035; this is **1300 – 1700 NuScale Power Modules** or a **\$350B – \$550B market value**
- Many of these potential countries for SMR exports do not have 123 Agreements with the United States



Source: UK National Nuclear Laboratory "SMR Feasibility Study", December 2014

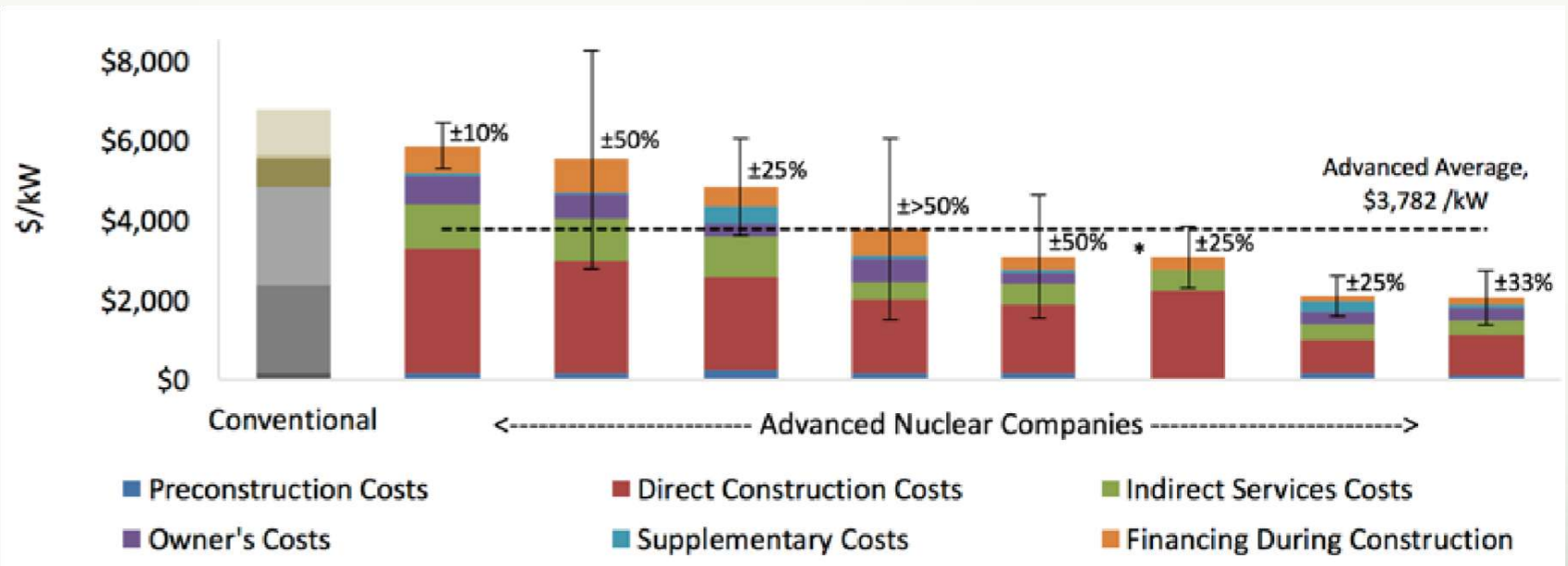
\* Potentially inaccessible - e.g. moratorium on new nuclear build or nationalized energy sector.

# 1. Advanced Nuclear SMRs: A Game Changer

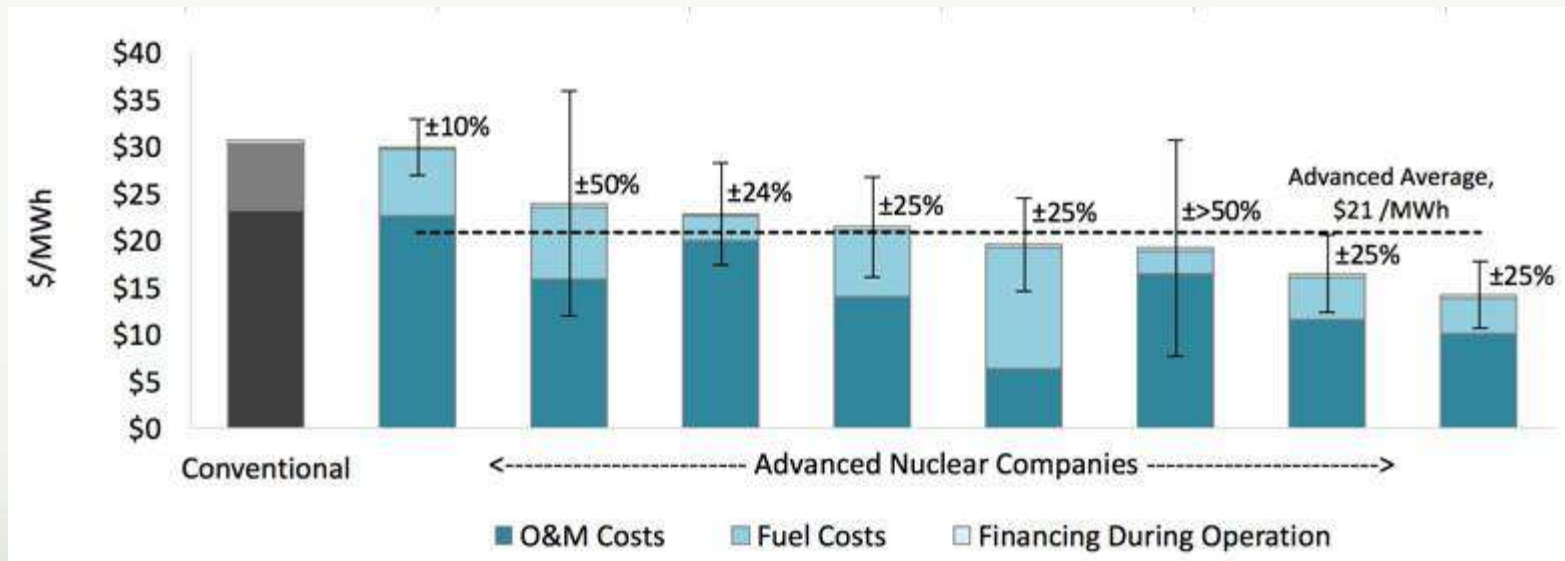




# Advanced Nuclear Projected Capital Costs

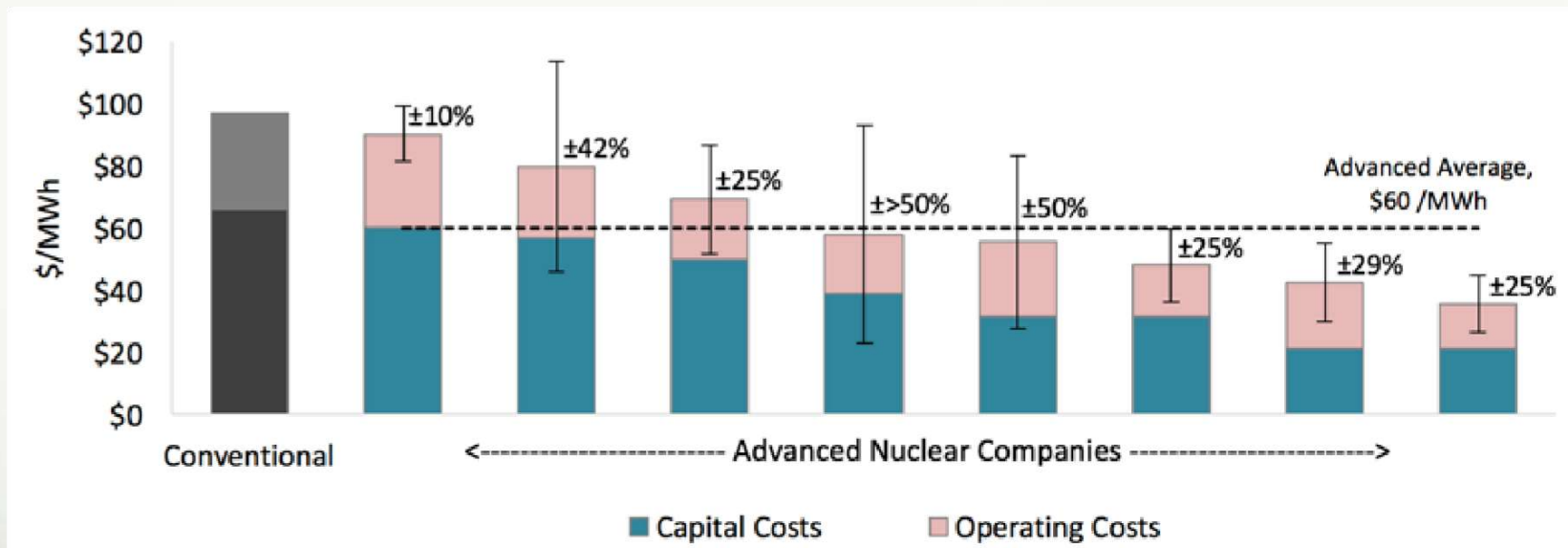


# Advanced Nuclear Projected Operating Costs





# Advanced Nuclear Projected Levelized Cost of Electricity



# U.S. Focus on Advanced Nuclear Deployment

- **Plant Vogtle 3-4 Expansion** (2021-22)
- **NuScale Power SMR** at Idaho National Laboratory (2026)
- **TVA Clinch River Site SMR** (2020s)
- U.S. Department of Energy, U.S. Department of Defense **SMRs/Micro-Reactors Deployment** (early 2020s)
- **Versatile Test (Fast) Reactor** at Idaho National Laboratory (2026)
- **High Assay – LEU Reprocessing** of U.S. Navy, EBR fuel (ongoing)
- **High Assay – LEU Fuel Demo** and Commercialization (2020s)
- **Transformational Challenge Reactor** Initiative at Oak Ridge National Laboratory (2022)
- Advanced Research Projects Agency – **Energy automation focus**

# U.S. Government Actions

- **Nuclear Energy Innovation & Capabilities Act (NEICA)**
- **Nuclear Energy Innovation & Modernization Act (NEIMA)**
- **Nuclear Energy Leadership Act (NELA)** – pending
- **NRC Modernization & Transformation**
- **New U.S. International Development Financing Corporation**
- **U.S. EXIM Bank Reauthorization**
- **Reinvigorated Whole of Government Approach to Global Nuclear Markets**
- **White House Reviving & Expanding Nuclear Energy Initiative**

# Summary

U.S. Advanced Nuclear is on the move

Advanced Nuclear will be a Game Changer:

- “Better, faster, cheaper”;
- Maintains technology edge;
- Catalyst for retooling the supply chain;
- Pivotal to jobs, exports, clean energy leadership – and repowering the nuclear industrial base;
- Market maker internationally.

2020s deployment is critical to the next wave of nuclear energy and to continued leadership globally



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