The Roadmap for Global Nuclear Commerce
And Actions Necessary to Enable US Participation

Donald R. Hoffman
President & CEO
EXCEL Services Corporation
Past President, American Nuclear Society
Chair, Virginia Nuclear Energy Consortium Authority
Chair, Next Generation Nuclear Plant (NGNP) Alliance
President Sensible Energy Matters to America Corp (SEMA)

Special Summit III on Global Nuclear Energy Markets
Washington DC, June 7, 2017
EXCEL Experience in the International Nuclear Markets

Supported Licensing, Training, Engineering Support, Setting Up Regulatory Authorities, Critical Infrastructure Protection, and Technical & Economical Evaluations of Gen-III / III+ reactor technologies and/or Long-term Strategic Studies for:

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<th>Asia</th>
<th>Europe</th>
<th>North America</th>
<th>South America</th>
<th>Middle East</th>
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<td>UK</td>
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Nuclear Energy Trends and Growth Around the World
Nuclear Electricity Production Trend by Geographical Area, 1970-2015

Source: IAEA PRIS
Nuclear Generation by Country in 2015
Nuclear Capacity by Decade, 2010

Global generation capacity for nuclear power has grown to over 346 gigawatts since 1955.
Nuclear Capacity by Decade, 2030
Nuclear Capacity by Decade, 2050

Global generation capacity for nuclear power has grown to over 370 gigawatts since 1955. Asia builds to 2050 to feed cities.

FEEDING CITIES
SMRs / Gen IV reactors can feed many more cities sooner, at a scale they can finance.

Projected
670 GW
TOTAL (IAEA mid-range)
400 to 900 GWs
Opportunities in the Global Nuclear Market by Geographical Area
Nuclear Power Plants in Asia

*As of 2016
Opportunities in the Global Nuclear Market: Asia

**China**
- Government plans to increase nuclear generating capacity to 58 GWe with 30 GWe more under construction by 2021
- Completed construction and commenced operation of over 30 new nuclear power reactors since 2002, and some 20 new reactors are under construction (same “construction speed” as the US in the 1970’s).
- Commencing export marketing of a largely indigenous reactor design (Hualong-1000, 3-Loop PWR). R&D on nuclear reactor technology in China is second to none
- Export of CAP1400 with 100% Chinese IP within 5 years
- First EPR and AP1000 will start up in China in late 2017. New orders delayed until 2-3 years experience.

**India**
- Targeting to have 14.5 GWe nuclear capacity online by 2020 as part of its national energy policy
- Reactors include light and heavy water reactors as well as fast reactors
- Has 22 plants online. Five power reactors are under construction, including a 500 MWe prototype fast breeder reactor fueled with Thorium. Currently, only 4xVVER1200 are realistic enough to go forward
- India is setting the scene for eventual utilization of the country's abundant Thorium to fuel reactors
- EPR and AP1000 future markets in India are uncertain
- GE-Hitachi ESBWR also very uncertain (too risky for GE)
Opportunities in the Global Nuclear Market: Asia (2)

**South Korea**
- South Korea has three new reactors under construction domestically as well as four in the UAE
- Planning for eight more reactors
- Involved in intense research on future reactor designs (e.g., KAERI SMR)
- Has won USA concession to build a REPROCESSING PLANT to allow offering future “fuel take back”

**SE Asia**
- Indonesia, Malaysia and Thailand are planning nuclear power programs (currently on hold)

**South Asia**
- Bangladesh has contracted with Russia to build its first nuclear power plant (2xVVER1200)
- With help from the Chinese, Pakistan has built three small reactors inland and is building two large ones near Karachi

**Central Asia**
- Kazakhstan, with its abundance of uranium, is working closely with Russia in planning development of small new reactors for its own use and export
Nuclear Power Plants in Russia

Source: IAEA Country Nuclear Profiles

*As of 2016
Opportunities in the Global Nuclear Markets: Russia

• **Russia**
  - Russia plans to increase its nuclear capacity to 30.5 GWe by 2020, using its world-class light water reactor designs (VVER1000/1200, the most well-proven of Gen-III, and built mostly on time and on budget)
  - A large fast breeder unit, the country's second, is now producing power. Development is currently proceeding on other units
  - Russia’s initial floating power plant will be ready in 2018 (construction started in 2007)
  - Russia leads the world in nuclear reactor exports, as well as building and financing new nuclear power plants in several countries and offering 100% financing plus BOO or BOT and Fuel Take Back.
  - **Russia’s business model beats all other competition globally:**
    • Proven VVER1000/1200 design built/under construction in many export countries
    • Russian government financing (BOO Contracts available – but limited by Russia’s financial resources during Western sanction times)
    • Russian Operators of the plant (if needed)
    • Fuel supply and Fuel-take-back handled by Russia
    • Russia DECOMM and taking care of arising waste after 80 years (e.g., Turkey/Akkuyu)
Nuclear Power Plants in Europe

Source: World Nuclear Association
Opportunities in the Global Nuclear Market: Europe

• Europe

• Finland and France are both trying to expand their fleets with the 1650 MWe EPR from AREVA. The results to date have been disastrous cost overruns of 3x (from originally Eur 3.1 B /OL-3 and Eur3.3B for FL-3), plus schedule overruns of 10 years now. FL-3 RPV has serious manufacturing defects and the plant may not even start up. This has bankrupted AREVA, which had to be taken over by EDF on orders from the government. The new, emerging AREVA is back to its original shape: a FRAMATOME NSSS supplier and a reborn COGEMA.

• Finland is building a VVER1200 at Hanhikivi-1 in northern Finland (34% Russian ownership). This will be the first VVER1200 to start up outside Russia.

• Several countries in Eastern Europe are currently constructing or have firm plans to build new nuclear power plants:
  • Bulgaria (questionable),
  • Hungary (2xVVER1200 with 100% Russian financing),
  • Romania (2xCANDU-6 with Chinese (CGN) financing),
  • Slovakia (completing Mochovce-3/4 after over 20 years delay and new Czech owner), and
  • Turkey (4xVVER1200 at Akkuyu under Russian BOO Contract - but has already been delayed 6 years). Turkey’s political turmoil means that the projects at 2nd Site Sinop (4xATMEA1) and 3rd Site Igneada (4xHualong1000) will be delayed to the mid 2020’s or will NEVER be completed. The Russian Akkuyu (4xVVER1200) Project has now an expected construction start in 2018.

• Sweden is closing down 6 oldest reactors by 2021, and has invested heavily in life extensions to 60 years and upgrades (up to 20%).
Opportunities in the Global Nuclear Market: Europe (2)

• Europe

• A UK government energy paper in mid-2006 endorsed the replacement of the country’s ageing fleet of nuclear reactors with new nuclear build. Four 1600 MWe French units were also planned for operation by 2023. The government aims to have 16 GWe of new nuclear capacity operating by 2030. This is now all very unlikely:
  
  • EDF cannot afford nor finance the build 4xEPR at Hinkley Point C Site because the costs have become totally unrealistic. Not even Chinese financing of 33% will change that, nor UK government promises to guarantee paying 2xmarket price of electricity for Hinkel Point C output for 35 years
  
  • Chinese plans to build 2xHualong-1000 Plants at a UK Site are far from certain. The 3xAP1000 NPPs at NUGEN Site are “dead” after Westinghouse bankruptcy, and the Hitachi-GE 2xABWR plants at HORIZON are very uncertain, since the UK has no BRWs and basically nobody worldwide will build any anymore ABWRs

• Poland has been developing a nuclear program with 6000 MWe planned, but it has already delayed by 5 years because of cheap shale gas

• Estonia and Latvia are involved in a joint project with experienced nuclear power producer Lithuania (who has no money - a non-starter even if Hitachi-GE made a tentative offer)

• Belarus has started construction of its first two Russian VVER1200 reactors that were financed by Russia

• Hungary, Slovakia and Spain are all implementing or planning for life extensions on existing plants

• Germany agreed to extend the operating lives of its nuclear plants, reversing an earlier intention to shut them down. However, it has reversed policy again following the Fukushima accident and is phasing out last NPP by 2023
Nuclear Power Plants in the United States

U.S. Operating Commercial Nuclear Power Reactors

Licensed to Operate (99)

As of May 2017
Nuclear Power Plants in Canada & Mexico

Source: IAEA Country Nuclear Power Profiles
*As of 2016. NOTE: All NPPs are right of the dividing line – the western locations are Uranium mines.
Nuclear Power Plants in South America
Opportunities in the Global Nuclear Market: United States

• United States

• In the USA, there are four new AP1000 design reactors under construction. Some of these new reactors could be online by 2020 if the Westinghouse bankruptcy issues could be resolved quickly
  • The more likely scenario is a suspension in 2017 of the 4xAP1000 under construction, with an undefined restart date based on who wants to take on the risk of another very large loss in completing these four projects.

• Extremely successful evolution in existing nuclear plant maintenance strategies

• Changes have increased utilization of US nuclear power plants, with the increased output corresponding to 19 new 1000 MW plants being built.

• Large near-term market is developing right now: The DECOMM Projects for about 10 US NPP to be decommissioned instead of put into SAFESTOR (but currently there is not enough capacity for that).

• The U.S. SMR market has stalled after the “experienced Vendors” (i.e., Westinghouse, B&W, GA) pulled out absent DOE support; sufficient near term SMR market size (min 10-30 orders) to justify construction of SMR Factories, NRC SMR Regulations by 2025, plus 5 years SMR licensing plus $500M for SMR licensing are “driving” new SMR Vendors to seek Licensing in Canada (~50% less cost and time).

• Without the Westinghouse crisis getting settled in U.S. market’s favor, there will be no near term progress in the U.S. market.
Opportunities in the Global Nuclear Market: Mexico & South America

• **Mexico**
  - Mexico has 2xGE BWRs in operation at Laguna Verde (quite successfully) and may be interested in GE ABWRs (with U.S. politics “permitting”)

• **South America**
  - Argentina is planning to add 1xCANDU EC6 at Atuch-3 Site (w/CNNC Financing), 1xHualong1000 from CNNC, and 1xVVER1200 from Rosatom at Embalse and/or Atucha Site. Since Argentina has little financing, the winners will be Russia and China
  - Argentina (INVAP) is currently building its first SMR (CAREMA-25 Integrated PWR Prototype for a CAREMA 200 or 300 MW Unit) at the Atucha Site. The startup date has now delayed 2 years, set to begin in 2019.
  - Brazil has restarted the construction of Angra Rais-3 (after over 20 years suspension). This is a German Konvoi NPP (forrunner to EPR) designed/partly built by Siemens but now to be completed by AREVA. However, due to the Brazilian national corruption scandal, the construction has been stopped in early 2017 and the half-completed NPP will be sold to either Rosatom or CNNC in 2018.
  - Chile has a research reactor in operation and has the infrastructure and intention to build commercial reactors. CODELCO (world’s largest mining company) was somewhat interested in SMRs

Source: The World Nuclear Association: Nuclear Power in the World Today
Nuclear Power Plants in the UAE

Status: Only about (1) year behind schedule – but 50% above original LOI price (means $30B for 4xAPR1450. Still by far the best deal ever for Gen-III NPPs).
Opportunities in the Global Nuclear Market: Middle East

**Middle East**

- The United Arab Emirates is building four 1450 MWe South Korean reactors at an original cost of over $20 billion (final cost is $30B or more), and they are collaborating closely with IAEA and experienced international firms. The schedule overrun is about 1 year. Clearly the best performing vendor for Gen-III NPPs. UAE is working with Swedish SKB to design a KBS-3 type Final Used Fuel Repository (deep underground). Finland will have a KBS-3 Facility by 2025.

- Iran’s first VVER1000 is in operation (Russians will provide the fuel and take it back), and more Units are planned (remember: originally the Site contained 2xSiemens PWRs partly constructed).

- Saudi Arabia: Still studying potential NPP construction Sites (Finnish Poyry does the Site evaluations). They still have plans for 16 NPPs – but the time schedule has now “slipped” by a decade.

- Jordan and Egypt are also moving towards employing nuclear energy for power and desalination: Rosatom has signed contracts for 2xVVER1200 in Egypt and in Jordan with Russian financing. However, due to the political instability, it is questionable when these VVER Projects actually could be initiated (again, Russian financing is crucial, but also limited due to the sanctions).
NOTE: South Africa has announced this 9600 MW Program for the past 5 yrs without ever moving forward due to lack of money. This means only the Russians and Chinese can really compete if RFP is finally issued.
Opportunities in the Global Nuclear Market: Africa

**Africa**

- South Africa is committed to plans for 9600 MWe of further nuclear power capacity. The problem is that they have no credible organization (unless it is now back to ESKOM) and no money. This means only Russians and Chinese need to apply (potentially the Koreans). The time schedule has also slipped so that the first VVER1200 startup is now expected 2037 and the first CAP1400 startup is now planned for 2039.

- Kenya: EXCEL and Partners were asked to provide a 15-year Strategic Study for Kenya to introduce its first NPP by 2030. Front runners for this business are Indians, Chinese and Russians.

- Nigeria has sought the support of the International Atomic Energy Agency to develop plans for two 1000 MWe reactors.
Opportunities in the Global Nuclear Market: New Countries

- New countries
  - Bangladesh (has 2x VVER1200 under Russian contract)
  - Chile (interest in SMRs)
  - Philippines (may restart Bataan Unit 1 or may walk away from NPPs altogether)
  - Indonesia (still undecided)
  - Australia (South Australia tried, but failed in 2016 to restart nuclear interest for a Deep Geological Repository for used fuel from worldwide customers)
  - Thailand (no decision after postponement)
  - Malaysia (no decision after postponement)
  - Vietnam (no decision after 5 years postponement)
  - Kazakhstan ("Russian territory")
  - Saudi Arabia (still considering)
Challenges and Competition in the Global Nuclear Market
Challenges in the Global Nuclear Market

- The Fukushima Daiichi event eroded confidence of the global public in the capability for nuclear power to be operated safely
- Natural gas prices have been very low, which caused an artificial impact to the nuclear market
- The global electricity market overall does not value the unique aspects of nuclear energy
- There is currently more of a focus in producing and subsidizing wind and solar power
- Nuclear governance needs significant strengthening
- Most countries do not recognize the importance of supplying the international nuclear marketplace in countries’ geopolitical strategies to meet the economic and political ambitions of other nations that may not share their deep commitment to upholding effective nuclear norms (Global Nexus Initiative: Nuclear Power for the Next Generation)
# Competition in the Global Nuclear Market

<table>
<thead>
<tr>
<th></th>
<th>Russia</th>
<th>China</th>
<th>S. Korea</th>
<th>USA (GE)</th>
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<tr>
<td><strong>Company</strong></td>
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<td>KHNP</td>
<td>GE-H, H-GE</td>
<td>W</td>
<td>AREVA EDF</td>
<td>Toshiba Hitachi, Mitsubishi</td>
<td>SNC Candu, Energy</td>
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<td><strong>Intl Markets TODAY</strong></td>
<td>Belarus, Hungary, Finland, Turkey, Bangladesh, India, China, Vietnam, Jordan, Egypt, Armenia, Ukraine, Argentina</td>
<td>UK, Romania, Pakistan, Argentina</td>
<td>UAE</td>
<td>Japan, Taiwan, UK</td>
<td>China</td>
<td>China, Brazil, India, Turkey?</td>
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<td>India?</td>
<td>India? Depends on Future Owner</td>
<td>S. Africa</td>
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## Competition in the Global Nuclear Market (2)

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## Competition in the Global Nuclear Market (3)

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<td>AREVA</td>
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<td>✓ MHI</td>
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<td>2.</td>
<td>3.</td>
<td>5.</td>
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<td>4.</td>
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<td>7.</td>
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Challenges and Competition in the Global Nuclear Market: Conclusion

• There are not many potential new build countries that have not either signed with Russia, China, or Korea, or who are not in serious talks with Russia, China, or Korea

• The market share remaining for US technology is already very small. The possibilities include:
  • Mexico
  • India
  • Poland
  • UK
Setting the Stage
Three Issues-Three Paths

- Paris Agreement: What it means for global nuclear commence
- Finding a place for US technology in the global market place
- The next big thing: Spent fuel storage and Decommissioning
Paris Agreement: A Toothless Accord but With a Heavy Nuclear Component

- The math behind the 2 Degree Celsius scenario of Paris Agreement requires a massive global investment in nuclear.
- Over 400 additional 1000 MW reactors are required by 2050 to achieve minimum Paris Agreement goals.
- Global supply chain in US is weak, but partnership with Korea and Japan allow for US technology competitiveness.
- Olkiluoto, Flamanville, Vogtle, Summer all show what happens when you stop building and lose your supply chain and experienced construction leadership.
- Nations that keep building will dominate the global market and take advantage of Paris Agreement.
US Reactor Technology—Stranded?

- Japan withdrawing from nuclear construction strands US technology from competing globally. Acquisition and possible 3rd party constructor may change this
- Uncertainty chills market opportunity – US can not compete in UK, India, or Middle East without AP-1000 constructor/supply chain
- Align with Korea to keep in the game? Korean APR-1400 (modified System 80+) may become the only US based technology meeting US safety standards that is competitive internationally
- SMR and Advanced Reactors have global potential. Getting market must be a priority. But the markets will be outside US, requiring a political reality check about domestic jobs
Spent Fuel Storage

• If the nuclear energy goals of Paris Agreement were really implemented, then globally, a new Yucca Mountain disposal capacity will be needed every 4 to 5 years – this is unrealistic and unnecessary.

• Yucca Mountain is only a small part of the solution. Changing the approach to managing spent fuel and re-thinking/innovating recycle and disposal are required

• China is making strategic long-term decisions on spent fuel as part of their plans for energy security and will have the ability to extend that solution to other nations

• Spent fuel storage, transport, and/or recycle will be a global business for those willing to make the effort to develop disposal
Decommissioning

• Globally, there are about 100 commercial power reactors in some stage of decommissioning. That number will more than double by 2050

• Decommissioning will become the largest global employer of nuclear professionals and crafts if reactor building stagnates

• Nuclear suppliers and vendors need to start shifting now to focus on decommissioning

• US has leadership potential, but it is already losing UK and France with their state sponsored companies

• US needs a new approach to negotiating liability and risk for US companies to compete in international markets
Key Vendor Success Factors

- **Key Vendor success factors in international new build competition:**
  1. Provide up to 100% Contract Financing (Build, BOT, BOO)
  2. Fuel Cycle – provide fresh Fuel and “Take-back” Used Fuel (life time)
  3. Proven Gen-III/III+ Reactor Design – built on schedule and to budget
  4. Training of Utilities, Regulators and a National NPP Educational Program
  5. Building a local supply chain (including Technology Transfer if needed)
  6. Long-term outlook for Vendor (need to provide 80-100 years support of NPP)
  7. Geopolitics (NPT, Reprocessing, Enrichment, Nuclear Liability, Trade)
  8. Reactor Type – PWR standard, BWR and CANDU both marginalized today
Recently Announced Retirements of US Nuclear Reactors

<table>
<thead>
<tr>
<th>Reactor</th>
<th>Size (MW)</th>
<th>Region</th>
<th>State</th>
<th>Owner</th>
<th>Age (yrs)*</th>
<th>Retirement Date</th>
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</thead>
<tbody>
<tr>
<td>Crystal River 3</td>
<td>860</td>
<td>Southeast</td>
<td>FL</td>
<td>Duke Energy</td>
<td>36</td>
<td>February 2013</td>
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<tr>
<td>Kewaunee</td>
<td>556</td>
<td>MISO</td>
<td>WI</td>
<td>Dominion</td>
<td>39</td>
<td>May 2013</td>
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<tr>
<td>San Onofre 2</td>
<td>1,070</td>
<td>California</td>
<td>CA</td>
<td>SCE &amp; SDG&amp;E</td>
<td>30</td>
<td>June 2013</td>
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<td>San Onofre 3</td>
<td>1,080</td>
<td>California</td>
<td>CA</td>
<td>SCE &amp; SDG&amp;E</td>
<td>29</td>
<td>June 2013</td>
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<tr>
<td>Vermont Yankee</td>
<td>620</td>
<td>New England</td>
<td>VT</td>
<td>Entergy²</td>
<td>42</td>
<td>December 2014</td>
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<td>Fort Calhoun</td>
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<td>SPP</td>
<td>NE</td>
<td>Omaha PPD</td>
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<tr>
<td>Fitzpatrick**</td>
<td>847</td>
<td>New York</td>
<td>NY</td>
<td>Entergy²</td>
<td>42</td>
<td>2017 (p)</td>
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<td>Ginna**</td>
<td>582</td>
<td>New York</td>
<td>NY</td>
<td>Exelon</td>
<td>46</td>
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<td>Nine Mile Point 1**</td>
<td>637</td>
<td>New York</td>
<td>NY</td>
<td>Exelon</td>
<td>47</td>
<td>2017 (p)</td>
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<tr>
<td>Clinton†</td>
<td>1,065</td>
<td>MISO</td>
<td>IL</td>
<td>Exelon</td>
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<td>June 2017 (p)</td>
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<tr>
<td>Quad Cities 1†</td>
<td>934</td>
<td>PJM</td>
<td>IL</td>
<td>Exelon</td>
<td>44</td>
<td>June 2018 (p)</td>
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<tr>
<td>Quad Cities 2†</td>
<td>937</td>
<td>PJM</td>
<td>IL</td>
<td>Exelon</td>
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<td>June 2018 (p)</td>
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<tr>
<td>Oyster Creek</td>
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<td>NJ</td>
<td>Exelon</td>
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<td>2019 (p)</td>
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<tr>
<td>Pilgrim</td>
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<td>New England</td>
<td>MA</td>
<td>Entergy²</td>
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<td>June 2019 (p)</td>
</tr>
<tr>
<td>Diablo Canyon 1</td>
<td>1,118</td>
<td>California</td>
<td>CA</td>
<td>PG&amp;E</td>
<td>31</td>
<td>2024 (p)</td>
</tr>
<tr>
<td>Diablo Canyon 2</td>
<td>1,122</td>
<td>California</td>
<td>CA</td>
<td>PG&amp;E</td>
<td>30</td>
<td>2025 (p)</td>
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</tbody>
</table>

**SUMMARY**

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<td>4,665 MW closed</td>
<td>8,527 MW planned</td>
<td>13,192 MW total</td>
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What Can the United States Do to Become More of a Key Player in Global Nuclear Commerce?
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market

1. Convince Federal government to establish nuclear energy as a strategic imperative and commit to becoming the global nuclear leader again

2. Develop strategic energy plan with the future in mind in 5-year segments and develop and implement a plan to get there

3. Convince the cities, counties, state, regional and Federal government of the unique value of nuclear energy through an industry collaborative effort, for Energy, Economy, and Environment

4. Change the flawed policies at all levels that undervalue nuclear energy
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market Again (2)

5. Change the electricity market to be more fair to all energy assets

6. Establish a general energy policy based on the strengths and weaknesses of all energy assets
   a. Coal 21%
   b. Oil 1%
   c. Gas 39%
   d. Nuclear 24%
   e. Wind/Solar (Combined) 8%
   f. Hydro 6%
   g. Biodegradables 1%
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market Again (3)

7. DOE should establish a Governors Energy Council
   a. Do a study of each State to determine how all of energy assets apply now and will in the future
   b. Work with the Governors and the States to make the decisions about energy in each State
   c. Establish a country-wide program that works for each State with State-specific exceptions/allowances
   d. Develop a program and energy policy that is based on the strengths and weaknesses of each of the 8 energy assets for the American people
   e. Update that energy policy every 6 months based on
      • improved methods and technology
      • market conditions
   f. Continue to work with the States to maintain a Federal program that works for all States

8. Create a “reasonable” approach to 123 Agreements, 810 Requirements, and improve EAR and Part 110, enabling suppliers to engage on the global marketplace
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market Again (4)

9. Save the current fleet from premature shutdown by utilizing a “zero emissions credit” concept like that used in New York and Illinois for all States where nuclear operates

10. Establish a vigorous program of advanced reactor development and deployment

11. Ensure Westinghouse emerges from bankruptcy as an American-owned company that is stronger, better, and more focused on core competencies

12. Establish a Public/Private Partnership that funds the technology through design certification and/or licensing, and into operation with a payback
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market Again (5)

13. Establish a program to rebuild and rebrand U.S. nuclear capabilities in the US and internationally

14. Overhaul and streamline the regulatory/licensing review process of the NRC to reduce schedule and costs of licensing review with predictable and stable processes where the NRC is held accountable to levels of effort, costs, and review schedule and review program adherence, while still ensuring public health and safety

15. DOE, DOC, industry to develop a robust communications program for all to share with the American people

16. Have our leaders support nuclear openly and act as ambassadors of our industry
Example of Leader Supporting Nuclear Openly and Being an Ambassador for the Industry

Russia, India plan for Kudankulam 5 and 6
world-nuclear-news.org

Russia to help build Egypt's first nuclear power plant
aljazerra.com

Vietnam-Russia: new nuclear cooperation goals
iunc.net

Erdogan hosts Putin to tighten Turkey-Russia alliance
Nation.com

47
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market Again (6)

17. Ensure there is efficient and timely accountability and capital to support nuclear by making the EX/IM bank and other appropriate entities fully functional and accountable

18. Provide for a rational approach to a nuclear expended fuel storage strategy, communicate it, and implement it

19. Establish adequate budget levels to accomplish all these programs and initiatives and keep the budget levels

20. Establish a comprehensive nuclear liability regime for US nuclear suppliers
What the US Can Do to Become “THE” Major Player in the Global Nuclear Market Again (7)

21. Hold the government and the industry accountable to delivering on their commitments

22. Be creative and think like our international competitors – China, Russia, and Korea:
   a. What are they doing now?
   b. What will they do and what will we do now?
   c. Collaborate with US suppliers and technologies – we are not in competition with each other

23. Consider how US technologies and suppliers can collaborate and partner with the China and Russia technology exporters – we can assure a part of a very large market share instead of all of no market share
What’s At Stake if We Fail to Preserve the Nuclear Fleet and Our Leadership?
Imperativeness of the Nuclear Fleet

• America developed the nuclear technology
• Global leader for six decades
• Losing that global leadership position rapidly
  • Political and policy driven, not technology driven
• What does it mean to the US?
  1. Loss of seat at the table or meaningful voice in global nuclear activities
  2. Loss of overview of regulatory and safety issues for immature or emerging nuclear nations
  3. Loss of oversight and control of nuclear proliferation issues
  4. Loss of economic benefits of US nuclear suppliers
  5. Loss of basis for research and development for new and advanced reactors
Imperativeness of the Nuclear Fleet
(2)

• What does it mean to the globe?
  1. Loss of US leadership and regulation and technology transfer
  2. Loss of US experienced and competent supply chain
Immediate Actions
Immediate Actions

• Establish industry/government organization funded and committed to affecting these required changes to reestablish US as “The Global Nuclear Leader”
Questions?

Donald Hoffman
President/CEO
EXCEL Services Corporation
Email: Donald.Hoffman@excelservices.com
Phone: (301) 984-4400