

CNTA

Nuclear Power in America

SETTING THE STAGE

- **Std of Living = f(GNP) = f(available reliable electricity)**
- Demand for electricity will increase 20-30% over the next several decades
- Energy independence is a vital national goal and achievable if we set our mind to it
- **Oil & natural gas market fundamentals are volatile & uncertain; coal is challenged by emissions concerns**
- Wind and solar cannot provide **RELIABLE broad based electrical demand**
- Reducing the toxic gas emissions and other pollution from generating electricity is important

OUR NATIONAL ENERGY PORTFOLIO SHOULD CONSIDER THE ABOVE and CONSIST OF MIXED ASSETS, ESPECIALLY INCLUDING NUCLEAR

WHY NUCLEAR POWER

1. Nuclear plants in the U.S. are **fundamentally safe**
2. Nuclear plants are **environmentally benign**
3. Nuclear power plants are **extremely reliable**
4. Nuclear plants are **economically sound**
5. **Nuclear energy density requires much less land use**
6. The **next generation** of reactors are **passively safe** and **more economical**
7. Nuclear power is the foundation for other nuclear applications like **medical isotopes**
8. **There is enough nuclear fuel to last very, very long time**
9. **Nuclear waste is the good news** with respect to electrical generation
10. Being a world leader in nuclear technology is **strategically vital** to the U.S.

What about

- TMI, Chernobyl, Fukushima?
- Nuclear waste?
- Costs?
- Security?
- Wind and solar?

TMI, CHERNOBYL, FUKUSHIMA

- THREE MILE ISLAND
 - No one exposed
 - Resulted in INPO
 - Impacted public awareness in a negative way
- CHERNOBYL
 - Careless operation with a instable design
 - Would have been contained in U.S.
- FUKUSHIMA
 - Initially systems function as designed
 - Cultural issues may have impeded appropriate action

THESE ACCIDENTS WOULD NOT HAPPEN IN THE UNITED STATES TODAY

What About Nuclear Waste?

- In my opinion, that is the good news.
 - Coal, oil, and gas generate waste, much of which is dumped into the atmosphere
 - Only nuclear operation generates just energy and heat
 - If spent fuel were reprocessed, the volume of waste would be miniscule compared to that from fossil fuels
- Burning nuclear fuel does result in the generation of spent fuel rods
- Actual highly radioactive nuclear waste has been treated successfully since 1997.
- Generation IV plants will produce much less waste

What About the Cost?

- Present nuclear plants require high capital costs but are financially sound over the long haul
- The present glut of natural gas has prices for that fuel artificially low
- Nuclear fuel will be available a lot longer than fossil fuels
- Countries like France and South Korea already produce nuclear energy for prices less than fossil fuels
- Generation IV plants, especially the Small Modular Reactors, will be a lot less expensive
- Wind and solar currently depend on government subsidies to even give the appearance of affordability.

What About Security?

- Much easier and more impactful targets exist for terrorists
- Nuclear plant security forces are extremely robust and frequently tested
- Nuclear fuel cannot be made into a bomb
- Future nuclear plants will have even more enhanced safety by virtue of their design

What About Wind and Solar?

- Our Standard of living requires abundant, **RELIABLE**, relatively inexpensive, clean electrical energy.
- Wind and solar power just cannot provide **RELIABLE**, on demand, broad base, inexpensive electrical generation.
- Wind and solar are only available <30% of the time and must be backed up by fossil burning power plants.
- Wind and solar are ecological disasters
- Wind and solar require rare earth metals from China

Nuclear Energy is the only pollution-free, base-load power source.

The world is going nuclear!

- The United States has led the way with respect to nuclear safety, quality, and conduct of operations
 - We need to continue to have that influence
 - We need to compete in the supply chain
 - We need to assure non-proliferation

**IF WE ARE NOT INVOLVED, WE CANNOT
HAVE ANY INFLUENCE!**

WHY NUCLEAR IS STRATEGICALLY IMPORTANT

- “Being a world leader in nuclear technology is strategically vital to the U.S.” - ASME
- “Nuclear power remains a key element of U.S. energy strategy and more nuclear power is needed to meet environmental goals” - DOE
- “There are important national security risks associated with a nuclear world in which we are **NOT** engaged. The fundamentals are that energy demand will grow and fossil fuel will not be available forever. The gap cannot be filled by solar and wind.” – CSIS

Safe, available, reliable, ecologically sound electrical energy is as important as **preserving potable water supply for the future generations of Americans - DBA**

The Future of Nuclear

- Nuclear is not well understood by the public, which has been misinformed by opponents and the media
- Presently nuclear power plants (Gen III and III+) are not financially competitive in the short run
- **New reactor plant designs are passively safe**
- Modular construction and potential elimination of the need for robust containment structures will reduce cost and time to production
- SMR and advanced designs (MSR such as the LFTR) potentially offer greater market penetration

REQUIREMENTS FOR NUCLEAR

- **An aggressive effort to educate the public is required**
- A politically acceptable solution to the waste issue is needed
- Generation IV nuclear plants must be promoted including standardization and modularization in construction
- More manageable licensing is essential
- **Strong safety culture and SCWE**
- Security challenges must be understood and explained
- A robust supply chain must be revitalized
- **Government/private partnership to encourage new reactor design/builds should be explored**

Political leadership resolve and understanding is required to create a national will to support nuclear research, investment, and long term strategy; THIS IS ESSENTIAL!

ELECTRICAL GENERATION IN THE UNITED STATES

- A lot of coal capacity is going away
- A lot of nuclear capacity is going away
- Hydropower cannot be expanded
- Wind and Solar are not dispatchable (available on demand)
- Natural Gas prices will rise due to exports and increased usage.
- The expansion of wind and solar adds costs and difficulties to the grid management

Without nuclear expansion, estimates are electricity America could see a long-term 10% increase in energy costs.

RECENT GOOD NEWS

- President Trump established a **Nuclear Fuel Working Group** underlying his commitment to regaining our competitive global position as the world leader in nuclear energy; it authorized the establishing the **National Reactor Innovation Center**
- Trump Administration Department of Energy (DOE) has invested **more than \$170 million** over the last 2 years to accelerate the development of advanced nuclear reactor technologies
- DOE investigating **molten salt reactors & building a Versatile Test Reactor**
- There is an increased emphasis on **Small Modular Reactors (SMR)** and factory assembly and underground construction of same; the nation's first SMR is on track to be operating at Idaho National Laboratory (INL) by 2026
- The potential to tie nuclear and **hydrogen** production is being discussed
- The Nuclear Regulatory Commission (NRC) recently approved a new **“fast track” approach** to licensing non-light water reactor technologies.

DOE to select & help build two new prototype nuclear reactors within 7 yrs demonstrating that nuclear energy can be more efficient and affordable to build and operate.

GOING FORWARD

- Enabling legislation and regulatory action has been provided
- **The industry has achieved almost five decades of exceptional performance!!**
- Recognition exists that
 - additional base load generating capacity is required
 - the capabilities and operating characteristics of nuclear plants match well with this future demand
 - increasing environmental restraints on carbon emissions is an understood given
 - diversity required for true energy independence needs a significant nuclear power constituent
- **An appreciation exists of the strategic importance of the nuclear industry**
- **OPPOSITION STILL EXISTS AND MUST BE ADDRESSED THROUGH EDUCATION**

CONCLUSION

Federal Government Does Have Important Policy Objectives which align with nuclear energy:

- Economic Growth
- Export Expansion
- Advanced Manufacturing
- Energy Security
- National Security
- Environmental Quality

We need a national energy strategy that bridges political changes

Nuclear power infrastructure will not be easily recovered

The ASME Presidential Task Force on Response to Fukushima:

“Public understanding of any technology in bringing its benefits to society is essential. This is especially true of nuclear-related technologies.”