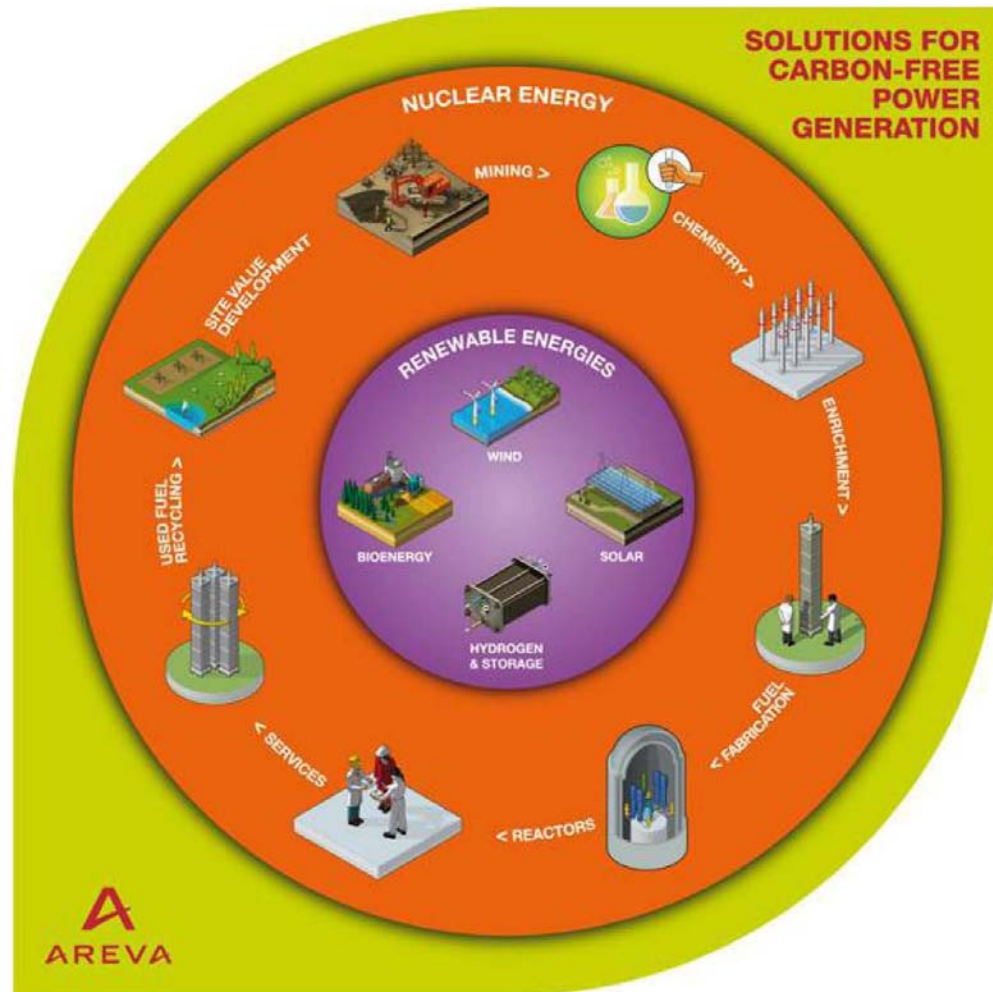


# Barriers to Implementing SMRs

Kim Stein



# AREVA Nuclear Fuel Cycle



# Lack of Nuclear Sales

- ▶ **Abundance of inexpensive natural gas**
- ▶ **Lack of Loan Guarantees**
- ▶ **Little, if any, carbon management costs**
- ▶ **Renewable Portfolio Standards rather than a Clean Energy Portfolio Standards**

# NRC Challenges

- ▶ Present fee structure not proportional to plant size
- ▶ How many modules can be handled by one control room?
- ▶ What is necessary to provide physical security?
- ▶ Present lack of ability to license advanced reactors
- ▶ High cost of licensing
- ▶ Time to license

# NGNP Lessons Learned

- ▶ **Lack of industrial participation leads to inefficient programs and loss of schedule**
- ▶ **Cost of a new reactor development through final design is ~\$1B. Sales of on the order of 4000 MWe needed to absorb costs.**
- ▶ **Customer interest 5-7 years out. You must have a licensed reactor to offer.**
- ▶ **Government funding variables make them an unreliable partner**
- ▶ **Vendor interest is inversely proportional to risk**

# Supply Chain

- ▶ **Supply chain depends upon orders**

# Technical Solutions

- ▶ **Solutions to technical problems must pass Technology Readiness Test. Risk is too high otherwise. (To pass a new material through ASME Code Review can take over 10 years.)**