

# The Development of Generation IV Systems for Commercial Deployment Utility-Informed Perspectives

**Andrew Sowder, Technical Executive**  
Advanced Nuclear Technology

**16 October 2018**

4th Symposium of the Generation IV International Forum



# Context for GEN IV Deployment: Uncertainty

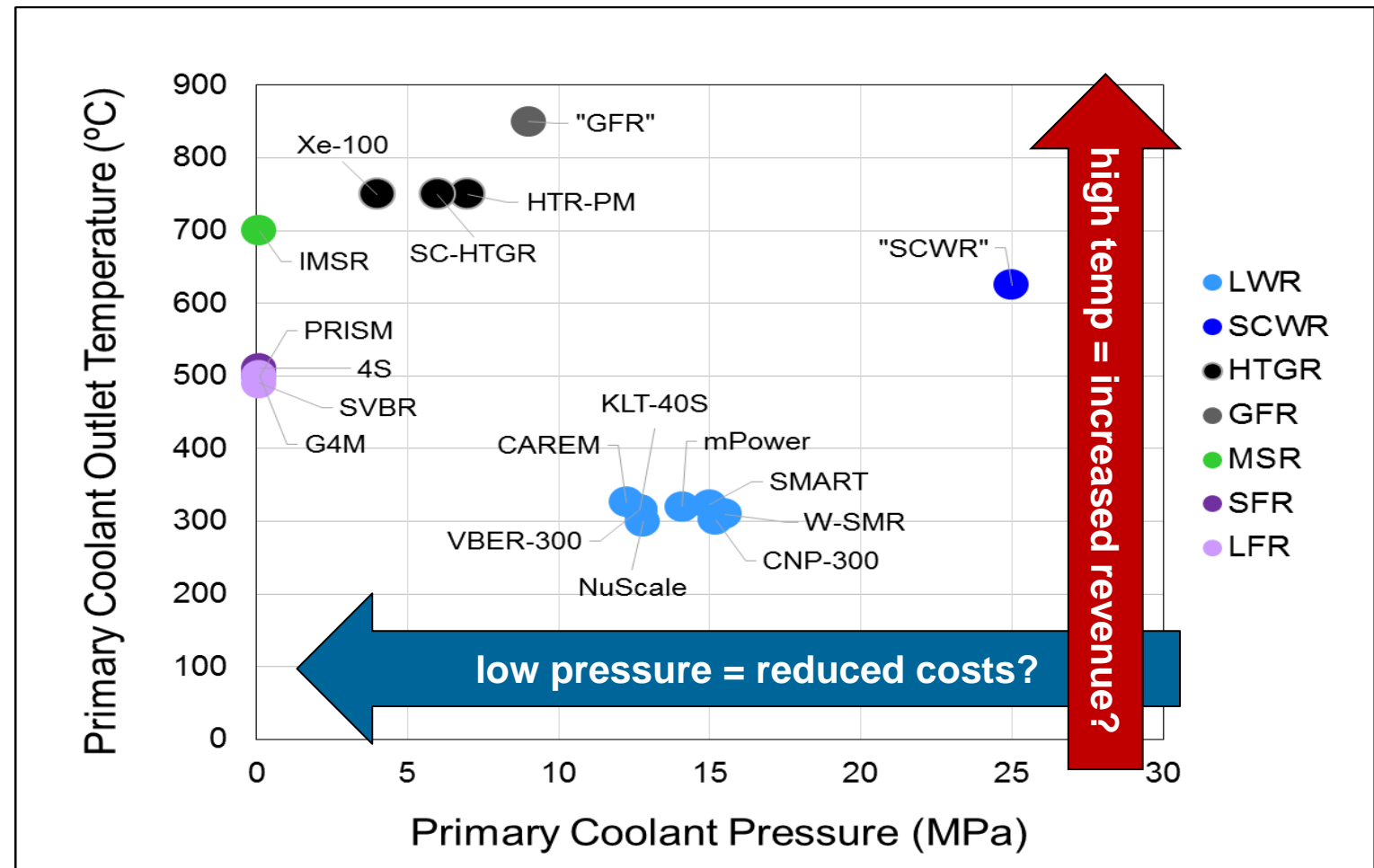
- What will the price of natural gas be?
- What will the price of carbon be?
- What will the technology competition be?
  - Natural gas with carbon capture and sequestration (CCS)?
  - Renewables with grid-scale energy storage?
- “Unknown unknowns” (*i.e.*, the next shale gas)

# What will it take to commercialize advanced reactors?

- Technologies that are:
  - mature (demonstration)
  - compelling (new attributes and capabilities)
  - competitive (cost and value)
  
- Customers who:
  - understand (informed and engaged)
  - believe (evidence of performance)
  - need (business case)

# Compelling ... Worth Risk of Adopting New Technology

- Inherent safety
- Robust, competitive, sustainable economics
- Scalable, dispatchable, zero carbon energy
- Diversified products and market access
- Flexible operation
- Secure fuel supply

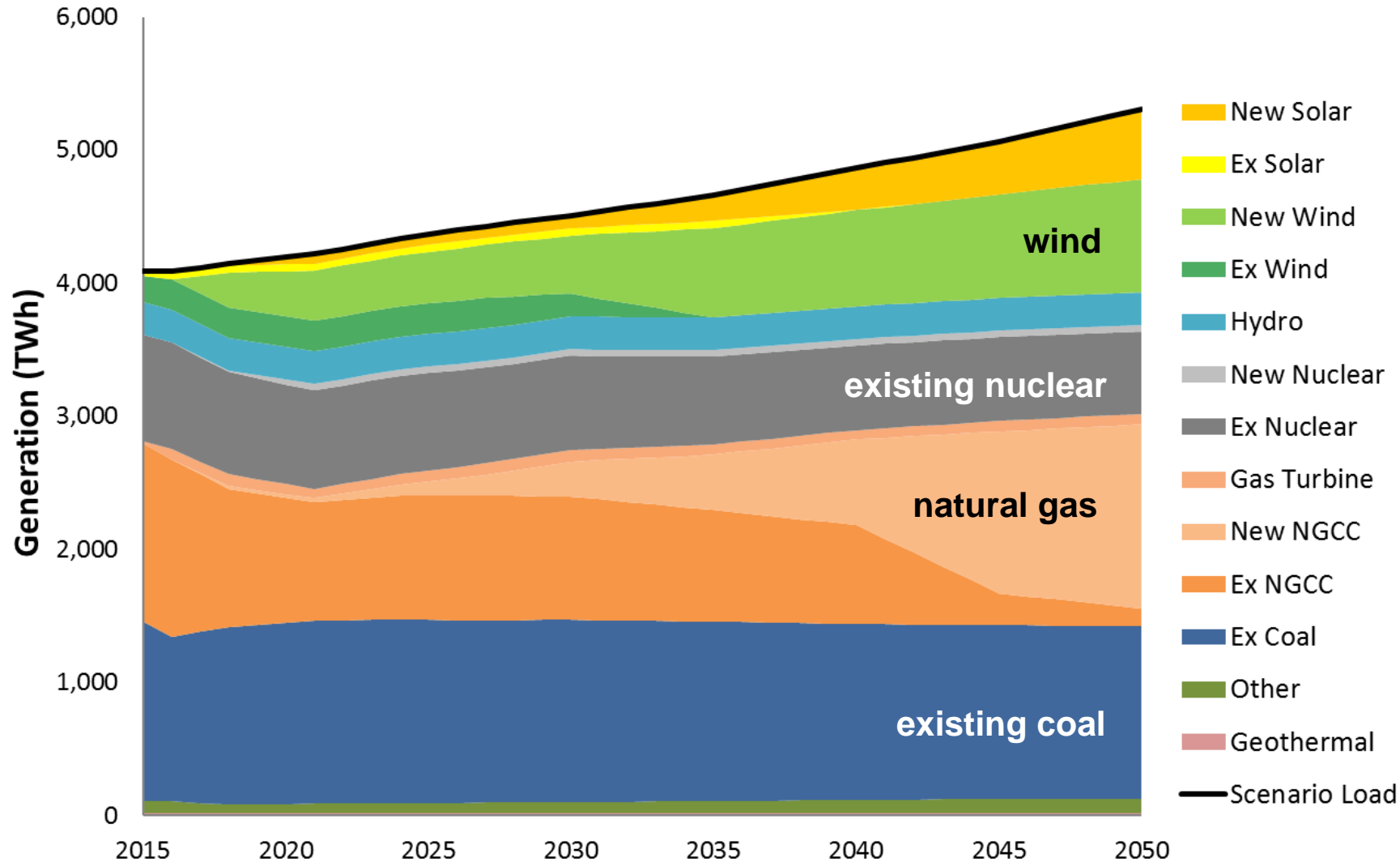


Options must offer dominant solutions for dispatchable, energy dense and non-emitting generation.

# Limited Competitiveness of Nuclear: U.S. Example

EPRI REGEN-US Modeling

*Reference Policies, Reference Gas Prices, No Policy Change, \$5000/kW Nuclear*

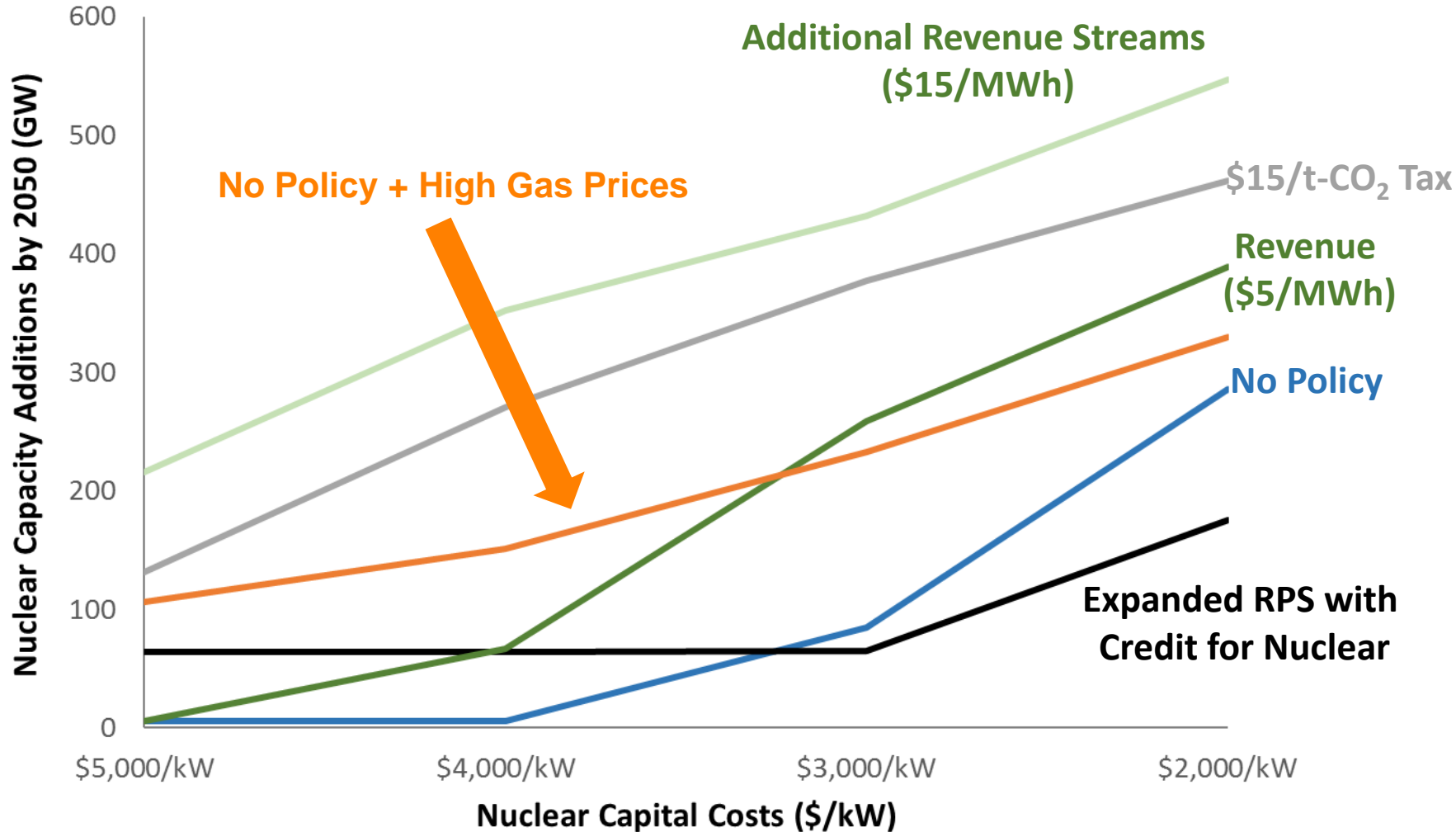


## *Future by default:*

- Low natural gas prices dominate picture
- Renewables fail to penetrate in many regions
- Gap from increasing demand and retirements is filled by NGCC

# Competitiveness from Cost, Revenue and Policy Improvements

EPRI (2018) Report No. 3002011803



- Competitiveness of nuclear impacted by nature of markets and competing technologies
- Without policy and with **reference gas prices**, levels below \$4,000/kW are required for nuclear deployment
- Additions driven by improvements in cost, revenue (value), and policy support

# Closing

- Technology developers need to understand customers and markets for their products
- Customers and other primary stakeholders:
  - have an interest in understanding technology landscape and horizon
  - have a role to play early in design process
- Advanced reactors must offer compelling options to compete
  - with other technology solutions
  - within uncertain and changing energy markets