60-year licenses expire for 100 GW of nuclear generation capacity by mid-2050

• More than 80 reactors have licenses to operate for 60 years.
• A big wave of retirements comes in around 2030, unless plant owners seek to extend operation for another 20 year (to 80 years).
  • To date only Exelon and Dominion had notified US NRC their intention to seek second license renewal for one plant each.
However plant owners are retiring reactors prematurely due to economics

• 6 reactors (4.8 GW) retired prematurely between 2013 and 2016; another 8 reactors (7.6 GW) are set to retire by 2025

• In addition to announced retirement, up to 43 GW in competitive wholesale markets might also be at risk of early shutdown

• Several states are trying to save their nuclear plants:
  • “Zero-Emission Credits” in New York
  • “Future Energy Jobs Bill” in Illinois
  • “Re-regulation” in Ohio

• These measures are likely to be challenged by other market participants and inconsistent with competitive markets.
Impacts of losing additional 43 GW of nuclear capacity in competitive markets by 2025: Two Henry Hub NG price scenarios
Gas-fired generation and imports fill the gap, wholesale prices rise

**PJM ComEd Zone; North IL (11 GW nuclear retire)**

- Ref HH Price
- EIA AEO 2016 HH Price
- Ref HH Price + 43GW Nuclear Retire
- EIA AEO 2016 HH Price + 43 GW Nuclear Retire

**Pennsylvania (10 GW nuclear retire)**

- Ref HH Price
- EIA AEO 2016 HH Price
- Ref HH Price + 43GW Nuclear Retire
- EIA AEO 2016 HH Price + 43 GW Nuclear Retire
Total system cost increases due to higher fuel expenditures (2016-2030)
CO2 emissions increase significantly in some states

- **Illinois** (50% of electricity generation from nuclear in 2015)
- **Pennsylvania** (37% of electricity generation from nuclear in 2015)
- **New York** (32% of electricity generation from nuclear in 2015)
Nationwide, CO2 emission increase but much less