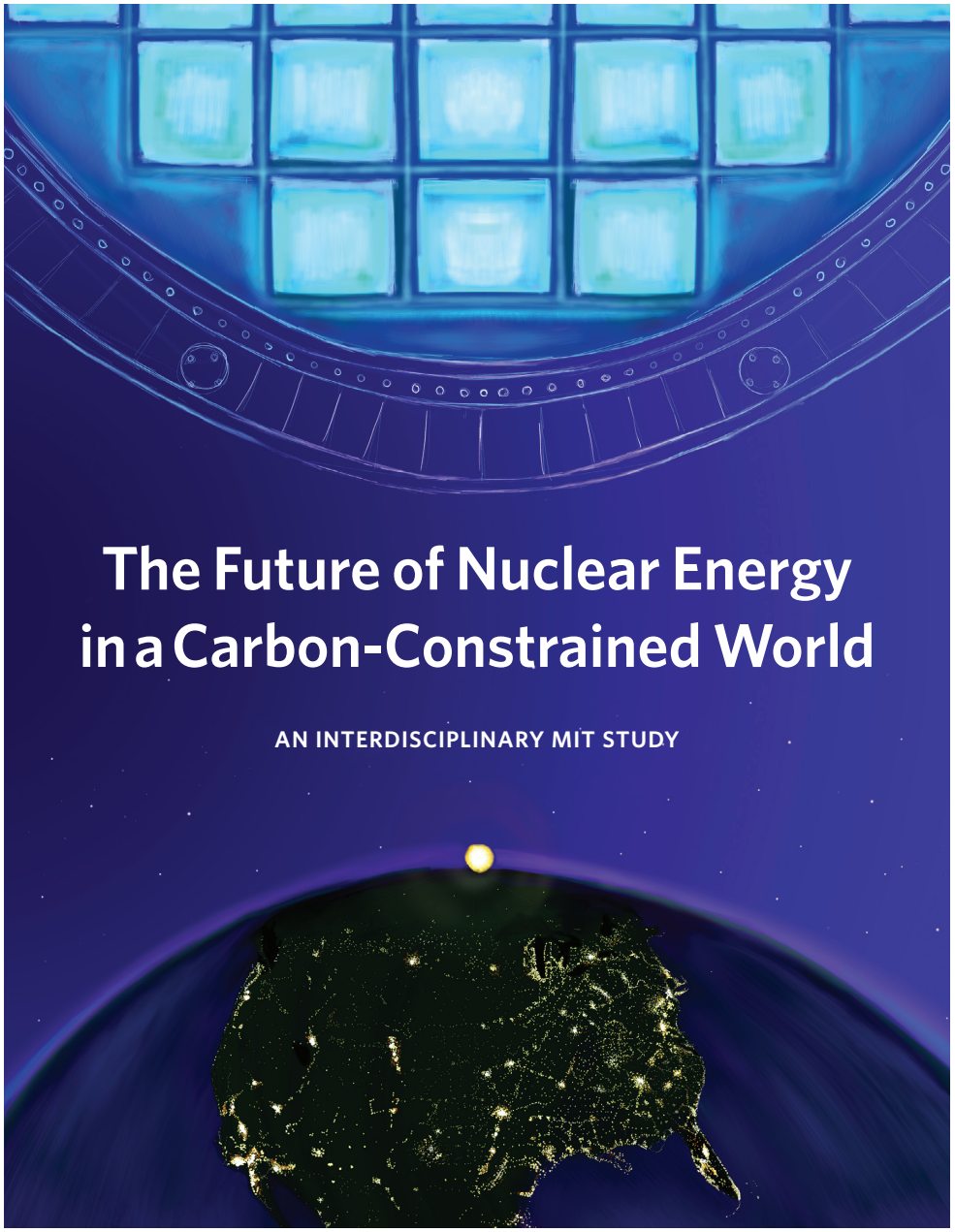


David Petti
Executive Director, INL

Jacopo Buongiorno
Co-Director, MIT

Michael Corradini
Co-Director, U-Wisconsin

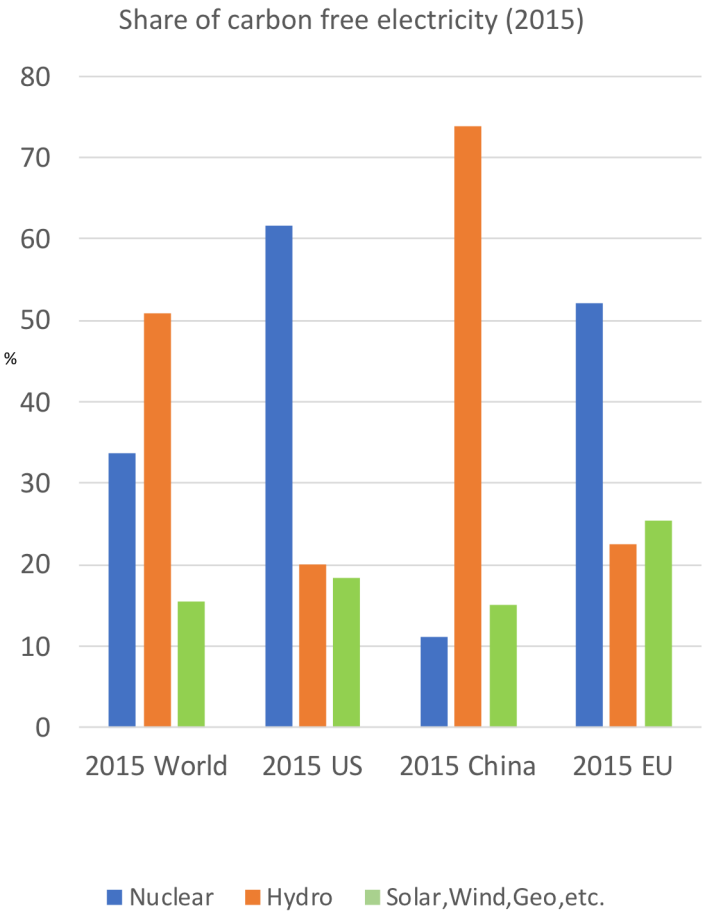
John Parsons
Co-Director, MIT

MIT

MITei
MIT Energy Initiative

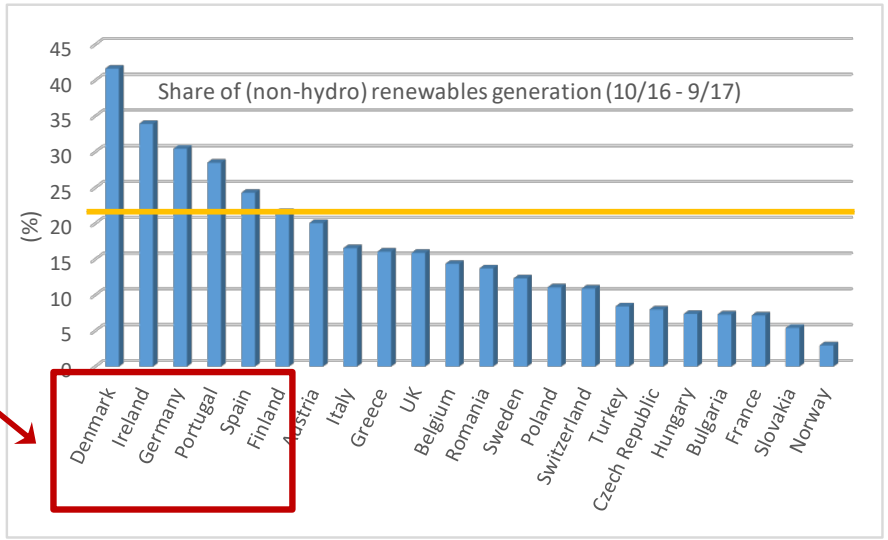
NSE
Nuclear Science and Engineering
science : systems : society

Nuclear is the largest source of emission-free electricity in the US and Europe

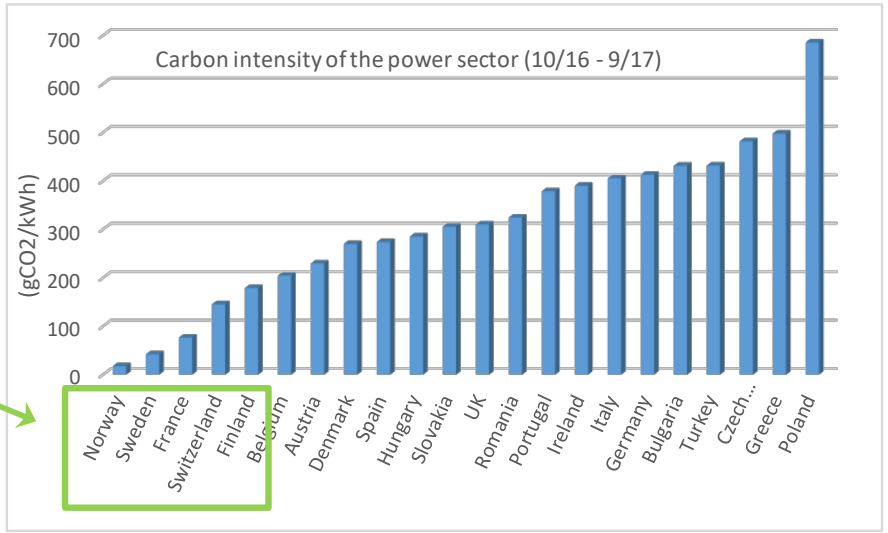


Low carbon intensity correlates with nuclear and hydro

EU countries with high capacity of solar and wind



EU countries with low carbon intensity

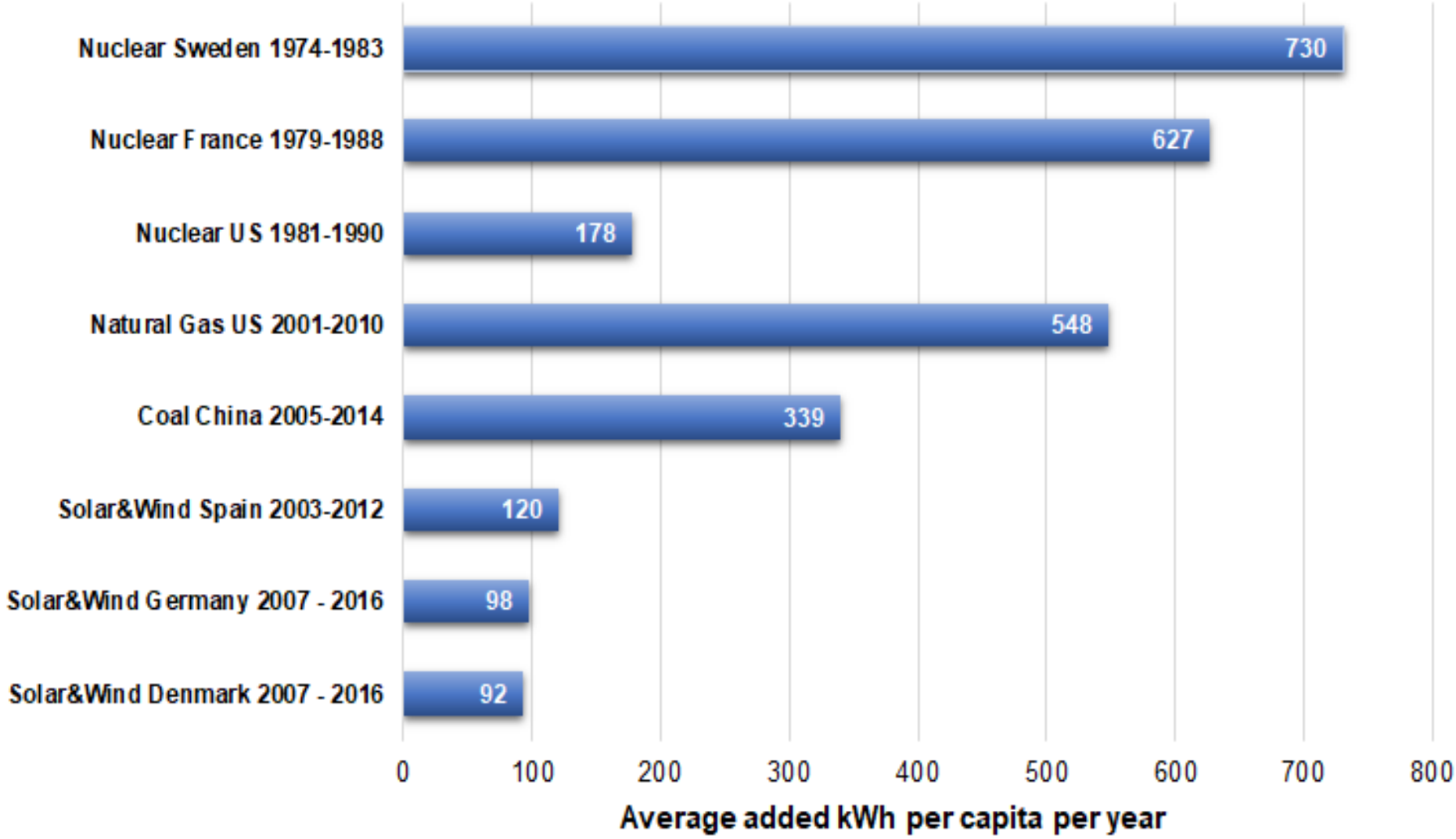


Data source: European Climate Leadership report 2017

(Energy for Humanity, Tomorrow, the Electricity Map Database)

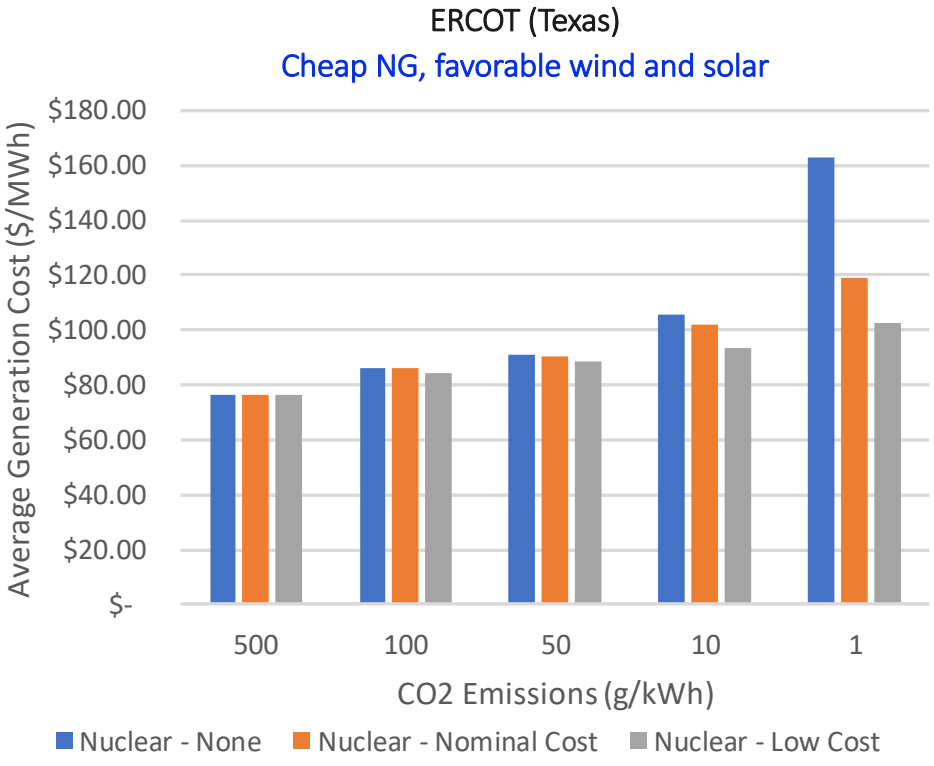
The scalability argument

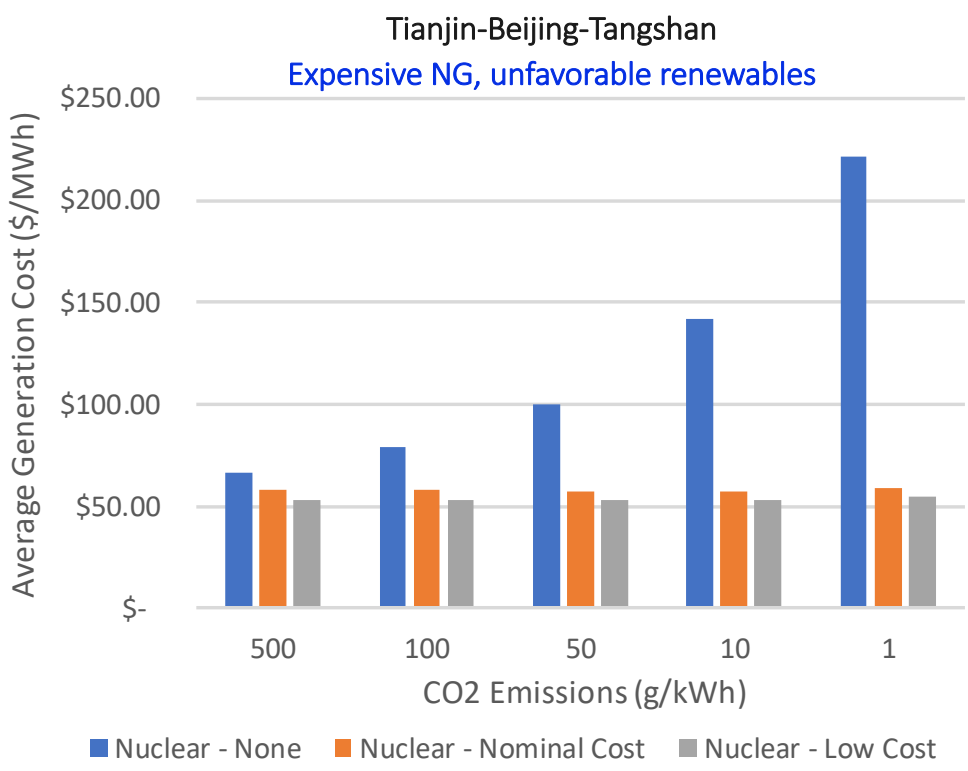
Nuclear electricity can be deployed as quickly as coal and gas at a time of need



The economic argument: a look forward to 2050

Excluding nuclear energy drives up the average cost of electricity in low-carbon scenarios

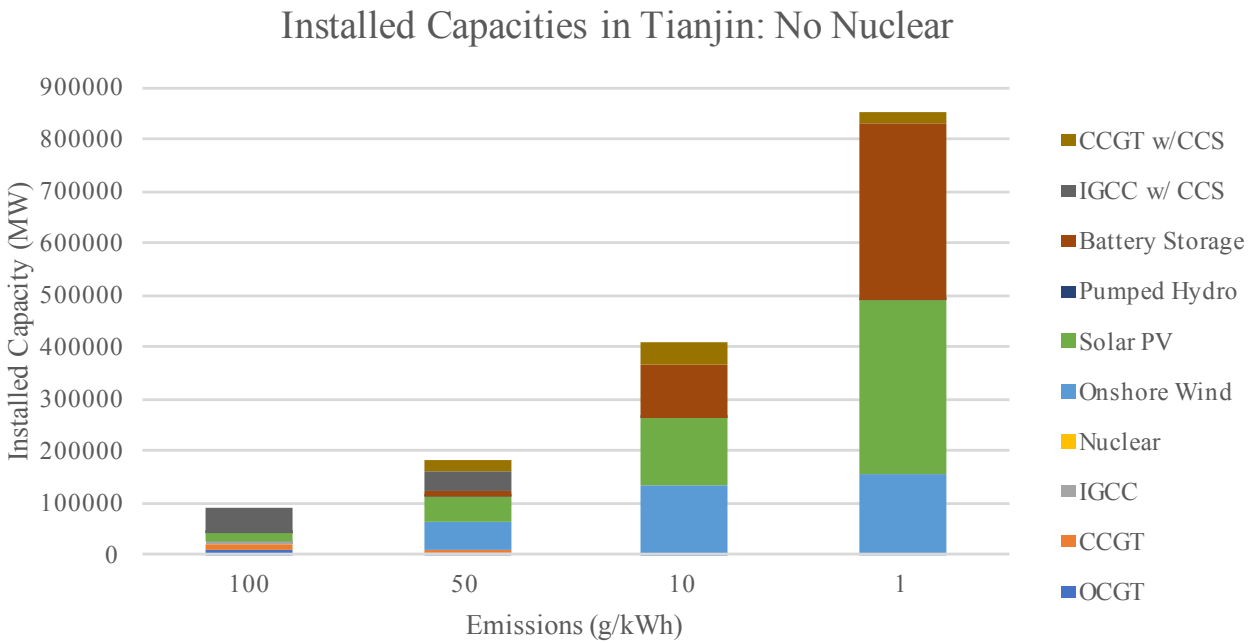




Simulation of optimal generation mix in power markets

MIT tool: hourly electricity demand + hourly weather patterns + capital, O&M and fuel costs of power plants, backup and storage + ramp up rates

Tianjin-Beijing-Tangshan Results



To meet constraint without nuclear requires significant overbuild of renewables and storage

By contrast, installed capacity is relatively constant with nuclear allowed