HARVARD Kennedy School
BELFER CENTER
FOR SCIENCE AND INTERNATIONAL AFFAIRS
Managing the Atom Project

Managing the Atom – Goals, Topics, Approaches

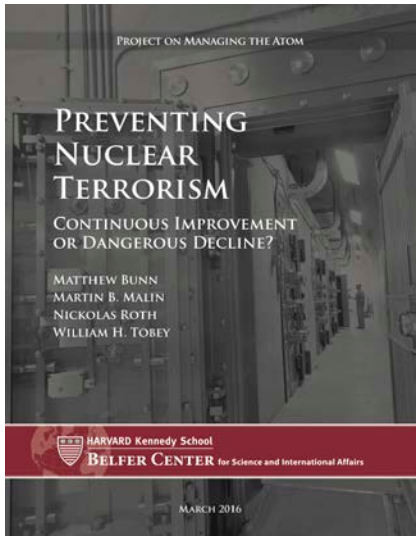
Matthew Bunn, Professor of Practice
Harvard Kennedy School

Managing the Atom Orientation
6 September 2018
belfercenter.org/mta

Managing the Atom project goals

- Developing ideas for more sensible nuclear policies and convincing policymakers to adopt them
- Preparing the next generation of leaders for work in the nuclear policy field
- Providing authoritative information to educate policymakers, other experts, journalists, students, and the interested public

Knowledge for a safer world



MTA is…

- Policy-focused
  - Research and analysis to *explain* and *influence* policy outcomes
  - No agreed political viewpoint
- Interdisciplinary
  - Physics + engineering
  - Social sciences
  - Policy analysis
- International
  - Participants from many countries
- A joint venture of major Belfer programs: STPP, ISP, ENRP
- A small core staff and faculty, supplemented by pre-doc, post-doc, and senior fellows
- Engaged in cooperation with others at BCSIA, others at Harvard, others in other centers and around the world

Two large outcomes we'd like to influence

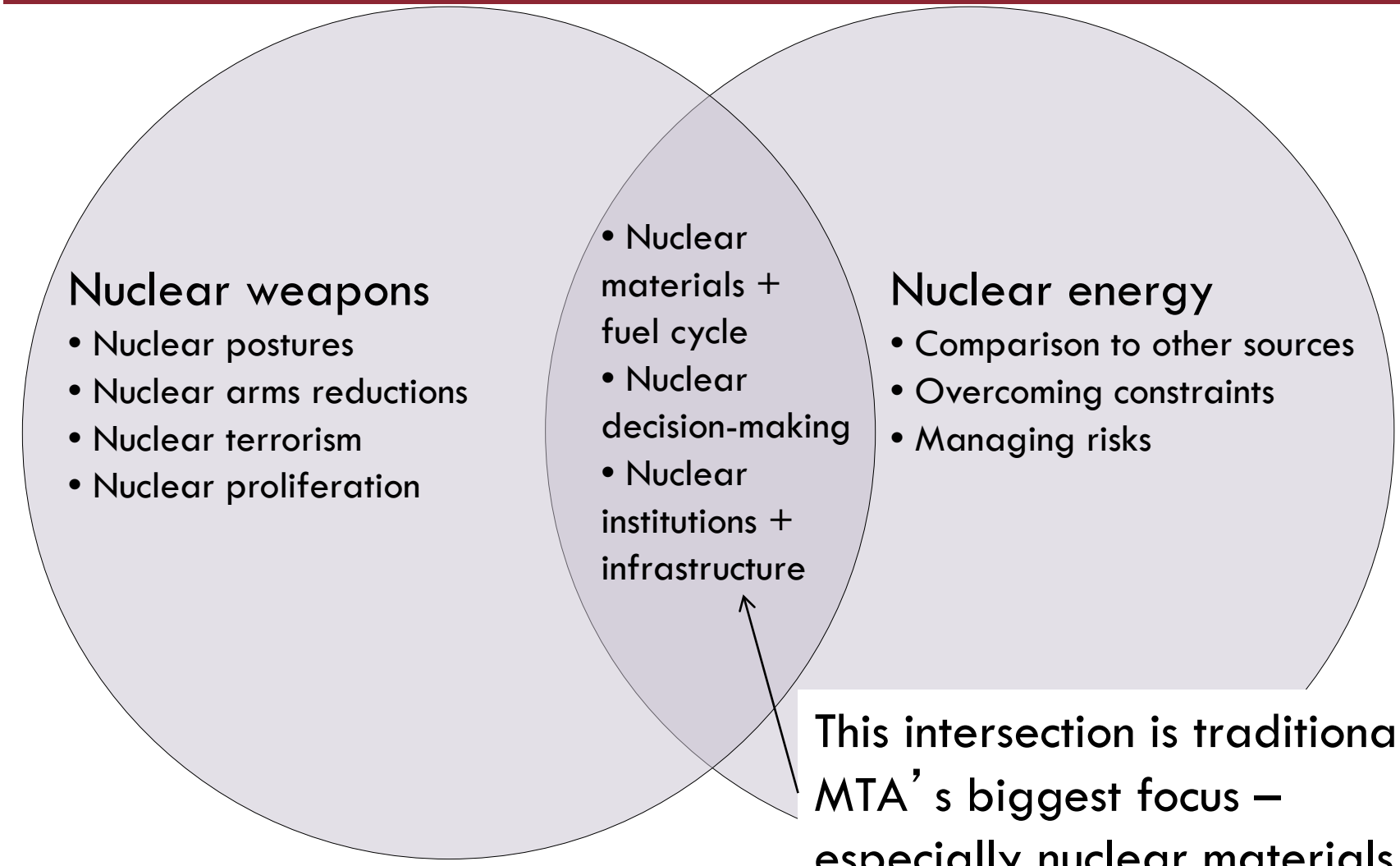
Reduce the probability of nuclear use

- Keep nuclear weapons out of terrorist hands
- Prevent proliferation to additional states
- Address dangerous nuclear postures in existing nuclear states
- Reduce roles, numbers of nuclear weapons in ways that reduce risks of use

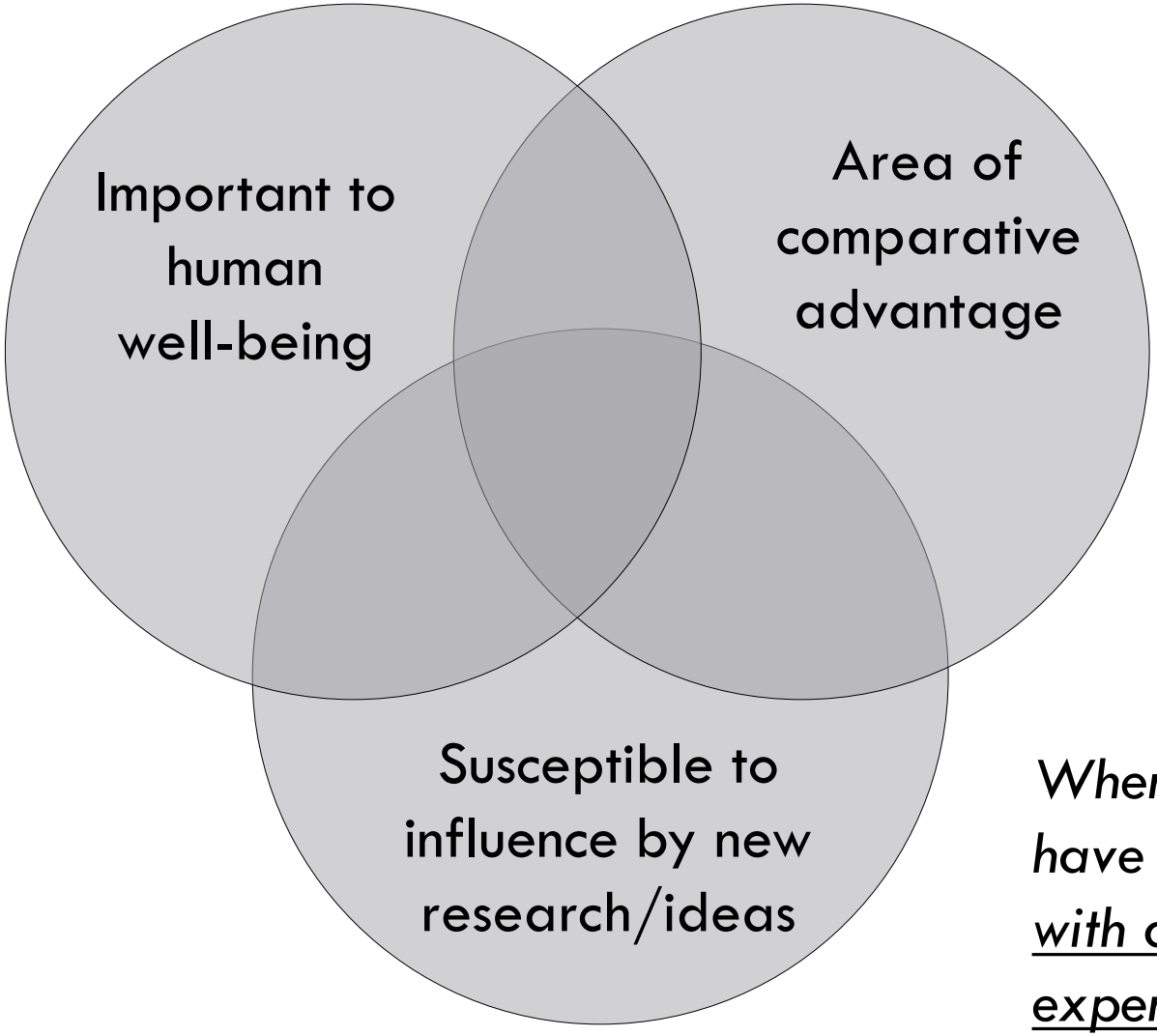
Provide needed energy while reducing the chance of catastrophic climate change

- Develop options to overcome obstacles to nuclear growth on the scale needed for climate contribution, while mitigating risks
- Explore pros and cons of nuclear energy *in comparison to* other carbon-reduction options

Nuclear weapons, energy, and linkages



Picking topics to work on



Where can I or my group have the biggest impact with available resources and expertise?

Two key ways MTA does its work

- Fellows' projects
  - Cover a broad range of topics – nonproliferation, nuclear energy, arms reductions…
  - Broad range of forms – dissertations, journal articles, op-eds, policy briefs…
  - In some cases, fellows and staff join together in joint projects
  - Key sponsors: Macarthur, Stanton
- Sponsored research projects on particular topics
  - Commitments to MTA funders
  - Largely carried out by staff and faculty – but fellows also involved
  - Key sponsors: Macarthur, Carnegie, others…

Some current MTA sponsored projects

- Nuclear security and nuclear terrorism, including:
  - Strategies for continuing momentum in the absence of summits
  - Insider threats, security culture
  - Rebuilding US-Russian cooperation
- Chinese nuclear policies
  - Fuel cycle, nuclear security, arms control and transparency, N. Korea
- Black-market nuclear technology trafficking (completed book with follow-on and related work)
- Managing the risks of Iran and North Korea's nuclear programs
- Stability in South Asia (including dialogue with Pakistani experts)
- Arms control, disarmament, and risk reduction in a new era (multipolar, and with defenses, cyber, counter-space, precision conventional…)

All of this is open to discussion, change, adaptation… We would love to hear your ideas on how to make MTA better!

Building the MTA community

- Everyone deserves respect for their ideas and contributions
  - Regardless of gender, nationality, race, religion, politics…
  - Regardless of what might be said to the contrary by some in the U.S. government (or other governments)
- Cooperation, listening are key
  - Much of what you learn at MTA is likely to come from other fellows
- Don't be shy
  - Others here may have crucial insights or information on your topic
  - Feel free to ask for time with faculty, staff – we're here to help
- Joint projects and working groups can seize synergies
  - Where your interests overlap, find common projects to work on together
  - Form working groups if several people are interested (already existing: Korea Working Group, Iran Project, Nuclear Terrorism Working Group…)
  - If you're interested in a topic the faculty and staff are working on, by all means find ways to get involved

Extra slides if needed…

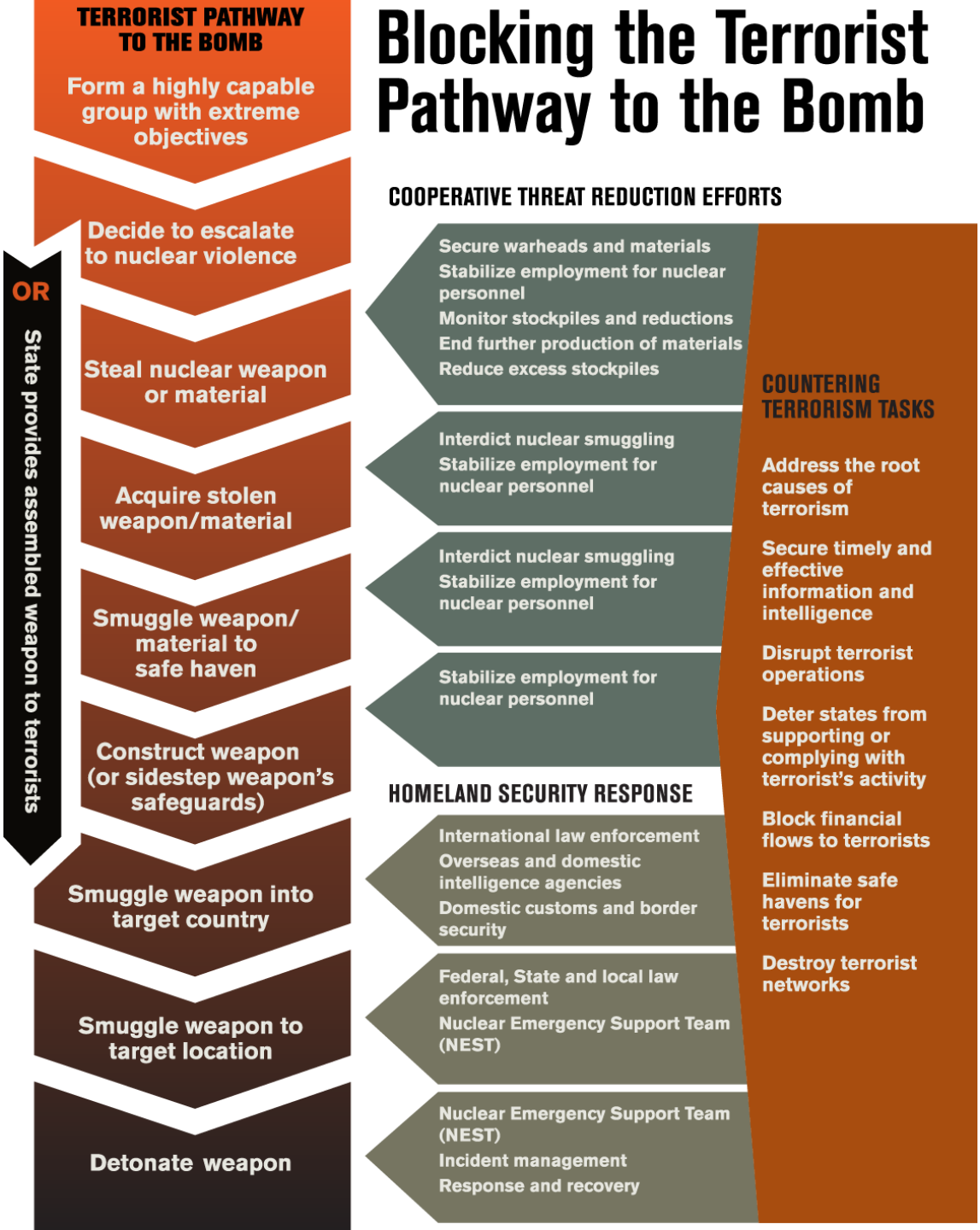
Resources to take advantage of…

- Some key experts at the Belfer Center, beyond strict limits of MTA:
  - Faculty, Senior Fellows, and Staff: Graham Allison, Gary Samore, Nicholas Burns, Will Tobey, Rolf Mowatt-Larssen, David Sanger, Joseph Nye… (Also many non-resident senior fellows)
- Bunn-Tobey proliferation course this fall
  - IGA-232, fellows encouraged to audit or take
- Frequent seminars beyond MTA seminar itself
  - Belfer Center talks, HKS "Forum" events…
  - MTA "Nuclear 101" series
- MIT, Fletcher, and elsewhere
  - Key experts, courses, lectures, seminars (e.g., Scott Kemp, Jim Walsh, Vipin Narang, John Deutch, Richard Lester, Marvin Miller, Ted Postol…)

Resources to take advantage of…

- Number one: your MTA colleagues
  - Many opportunities for cross-fertilization of ideas
  - Potential opportunities to work together on joint projects
  - Can form working groups on topics where several people are interested
- PIs and senior staff happy to help – come see us
  - I will try to meet with each of you to discuss your work – others available too
  - Opportunity to be matched to a senior mentor if you'd like
  - Don't let yourself get "stuck" on a particular problem without asking others for help, ideas

Blocking the Terrorist Pathway to the Bomb



Source: Matthew Bunn, *Securing the Bomb 2010: Securing all Nuclear Materials in Four Years* (2010)

Reducing dangers of existing arsenals

- Seek to understand, suggest options to address, drivers of "hair trigger" postures based on early nuclear use
  - Especially in likely nuclear flash points, such as South Asia
  - Explore options for de-alerting, other measures to extend warning time, reduce risk of mistaken launch
- Reduce impact of existing arsenals on proliferation, nuclear terrorism
  - High security for all nuclear warheads, weapons-usable materials
  - Negotiate reductions (making sure not to increase instabilities…)
  - Ratify CTB, negotiate fissile cutoff – find ways for weapon states to address ban treaty
  - Do not pursue new warheads unless *net* impact on security – combining effect on deterrence and on proliferation – is positive
  - Reduce roles of nuclear weapons

Reducing proliferation risks – lessons of proliferation crises

- Engage the hard cases
- Beef up nuclear security
- Strengthen nuclear safeguards
- Take new steps to stop black-market networks
- Stem the spread of enrichment and reprocessing
- Toughen enforcement
- Reduce demand
- Keep the weapon-states' end of the bargain

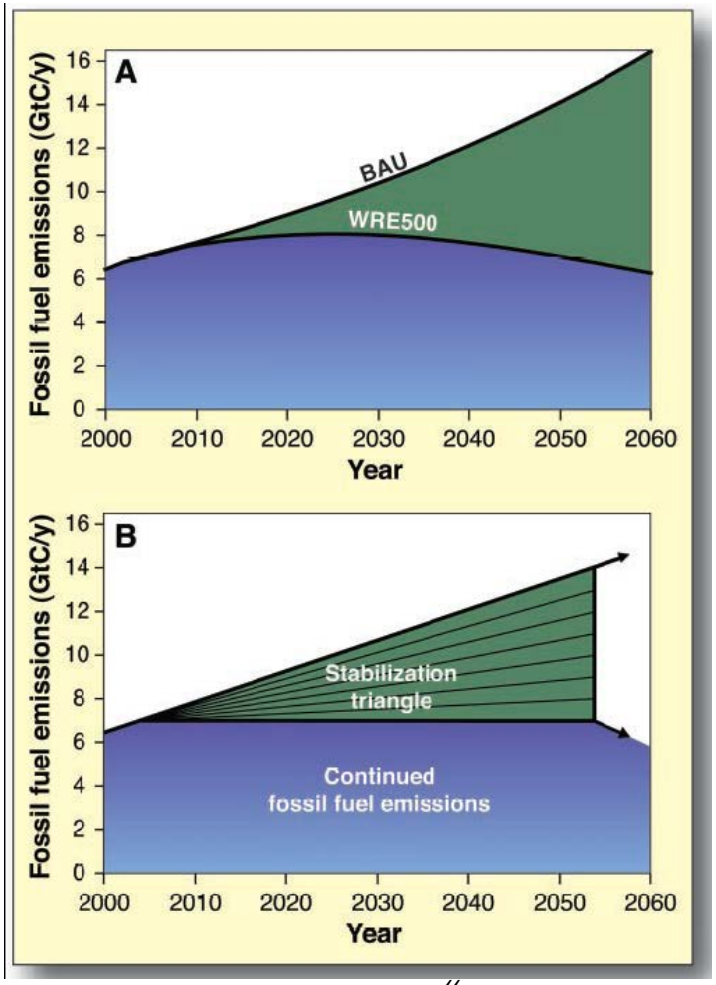
With the right policies, we can hope that 20 years from now there will still be only 9 nuclear weapon states – or fewer.

The challenge of disarmament

- Non-nuclear weapon states will not support more measures that constrain *them* – new fuel cycle controls, tougher enforcement, stronger safeguards, more stringent export controls – unless the nuclear weapon states also accept constraints on their nuclear postures
- Need to renew the fundamental NPT bargain: nuclear weapon states committed to pursue nuclear disarmament in good faith
- Need for both immediate steps and fundamental analysis of feasibility, desirability of particular near-term actions and longer-term visions…
  - Ban treaty likely to have major impact on future international politics of nonproliferation and disarmament

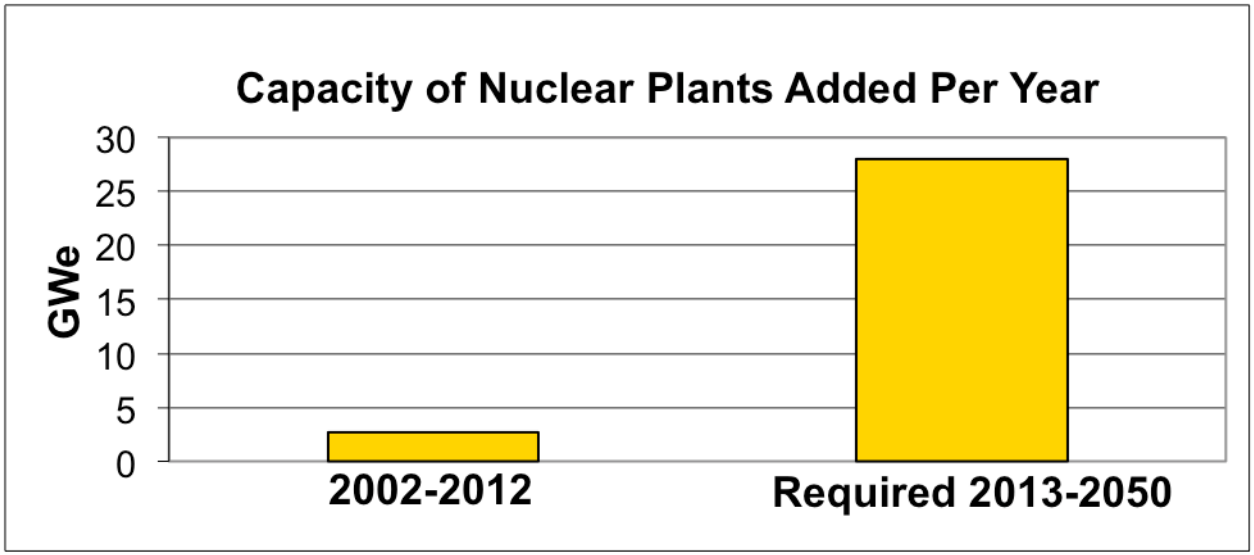
Nuclear in the energy-climate context

- *Dramatic* nuclear growth required for climate contribution large enough to be significant
- To provide *one* of seven "wedges" needed to stabilize CO2 at 500 ppm, nuclear would have to add 700 GWe of capacity by 2050 – in addition to replacing existing 369 GWe of existing capacity
- 2 wedges may be unobtainable
- 10-14 wedges may be needed



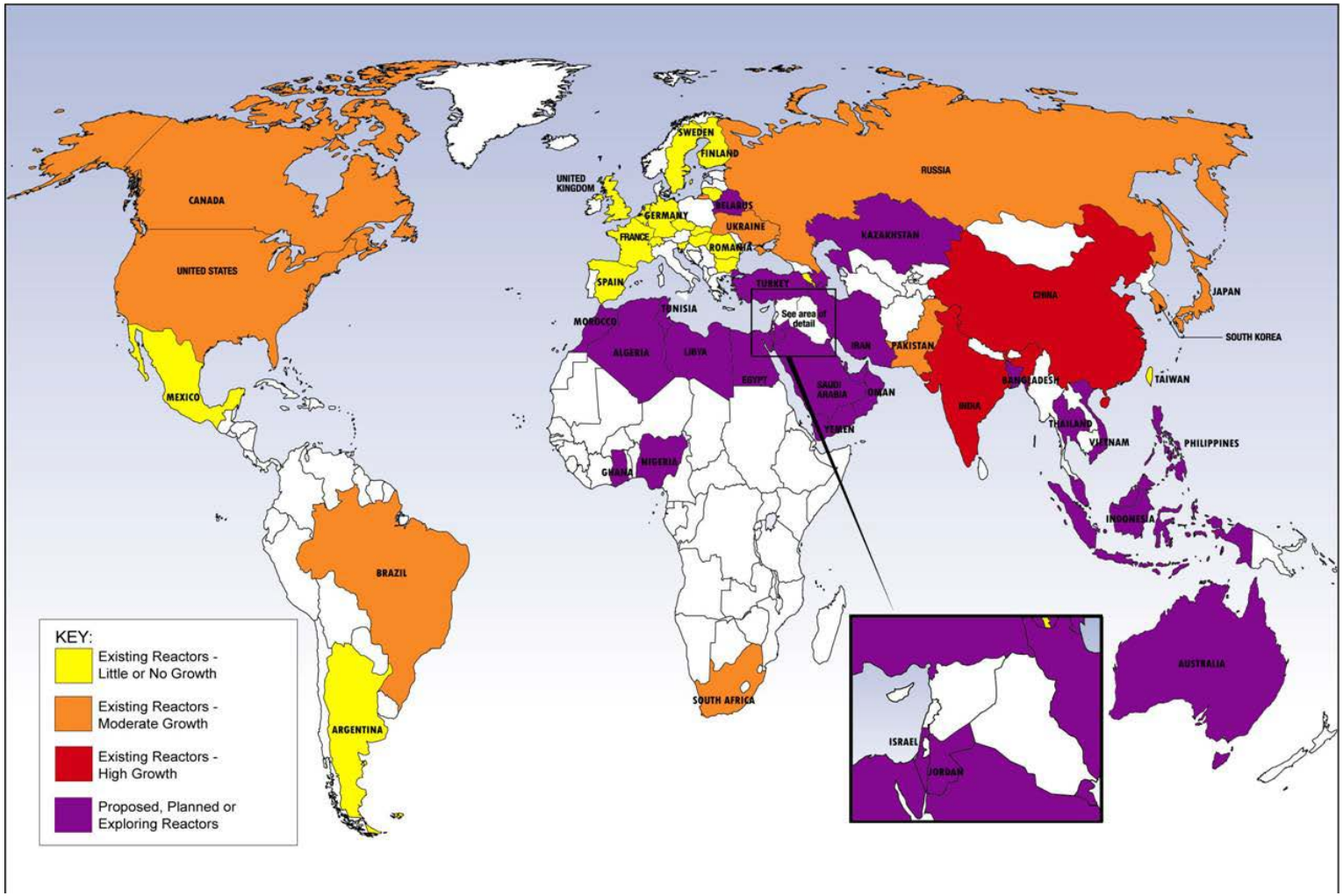
Source: Pacala+Socolow, "Stabilization Wedges," *Science* **305** 968-972 (2004)

For a nuclear "wedge," huge increase in construction needed



- Need to shift from 3 to 28 GWe/yr
- Nuclear must become dramatically *more* attractive to governments and utilities than it was before Fukushima – a difficult challenge
- Any further disaster, from accident or terrorism, would doom any realistic prospect for growth on this scale

Large-scale nuclear growth implies nuclear spread – the picture so far



Source: Sharon Squassoni, Carnegie Endowment for International Peace

f

- Factors affecting whether governments and utilities *want* to build nuclear power plants:
  - Economics
  - Safety
  - Security & terrorism
  - Proliferation
  - Waste
  - Assurance of supply
  - National pride & prestige
  - Weapons options, regional balancing
  - Applicability/appropriateness to broad range of needs
  - Public perceptions of above
- Also constraints on *ability* to build at desired pace:
  - Production capacity (e.g., steel containment vessels), personnel, infrastructure (e.g., regulations, grids), capital availability…