



Atoms for Peace or Atoms for War?

The Future of Nuclear Energy and Nuclear Weapons

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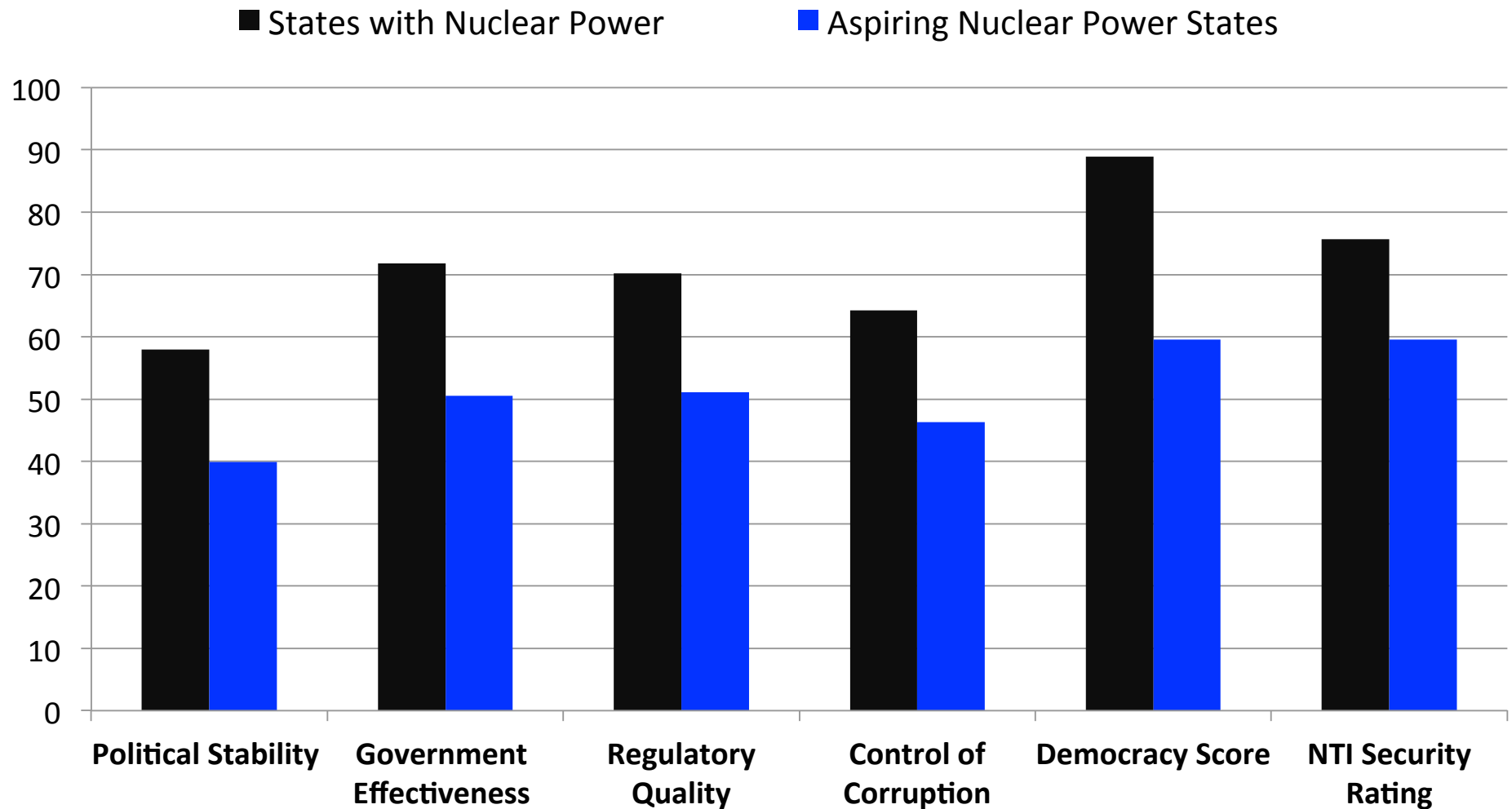
Stanford Graduate School of Business
March 27, 2014

Nuclear Power: Expansion vs. **Spread** Post-Fukushima 2013

Red = Canceling plans Green = Continuing with plans Black = No evidence
 Yellow = Ongoing debates that have produced a delay or uncertainty about plans

	Americas	Western Europe	Eastern Europe	Central and South Asia	East Asia/Oceania	Middle East	Africa
States with Nuclear Power Programs	Argentina Brazil Canada United States Mexico	Germany Switzerland Belgium Finland France Netherlands Spain Sweden United Kingdom	Armenia Bulgaria Czech Republic Hungary Slovakia Romania Russia Slovenia Ukraine	India Pakistan	Japan China South Korea Taiwan	Iran	South Africa
Aspiring Nuclear Power States	Peru Venezuela Uruguay Dominican Republic Haiti Bolivia Chile Jamaica El Salvador	Italy	Belarus Poland Lithuania Croatia Latvia Albania Estonia Greece	Bangladesh Kazakhstan Sri Lanka Mongolia Georgia	Thailand Singapore Myanmar Indonesia Malaysia Vietnam North Korea Philippines	Israel Egypt Jordan Turkey UAE Kuwait Qatar Saudi Arabia Bahrain Oman Syria Yemen	Senegal Nigeria Tanzania Tunisia Libya Kenya Algeria Namibia Niger Uganda Ghana Morocco Sudan

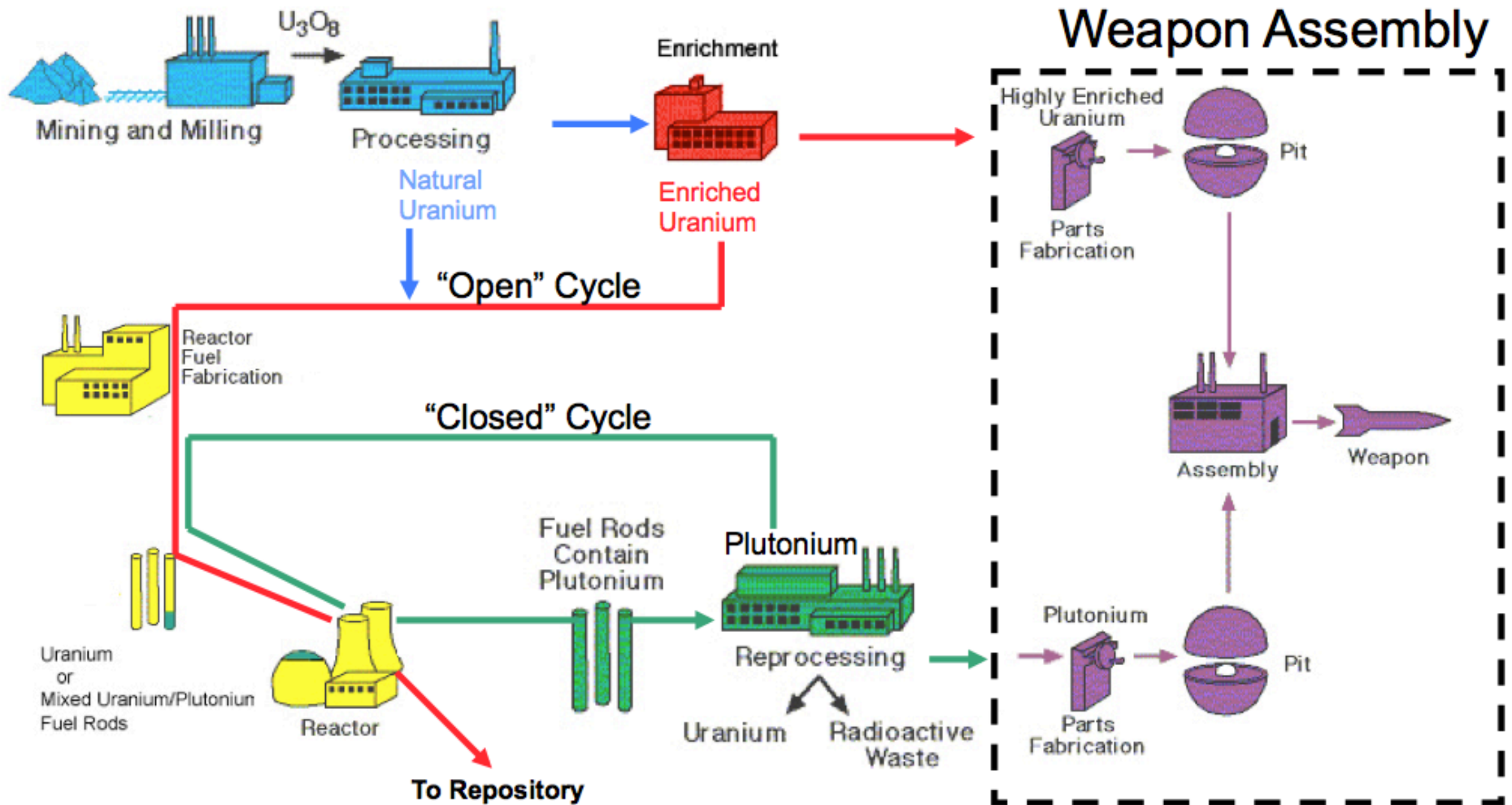
Governance, Corruption, and Regime Type 2013



Sources: World Bank, *World Governance Indicators, 2011*, info.worldbank.org/governance/wgi/index/asp; Polity IV Project, *Political Regime Characteristics and Transitions, 1800-2007*, www.systemicpeace.org/inscr.htm; NTI Nuclear Materials Security Index, <http://www.ntiindex.org/>. * Measurement for Democracy/Autocracy Score is mean Polity IV 20-point score on a 100-point scale. Scores above 50 represent democracy; below 50 implies non-democracy.

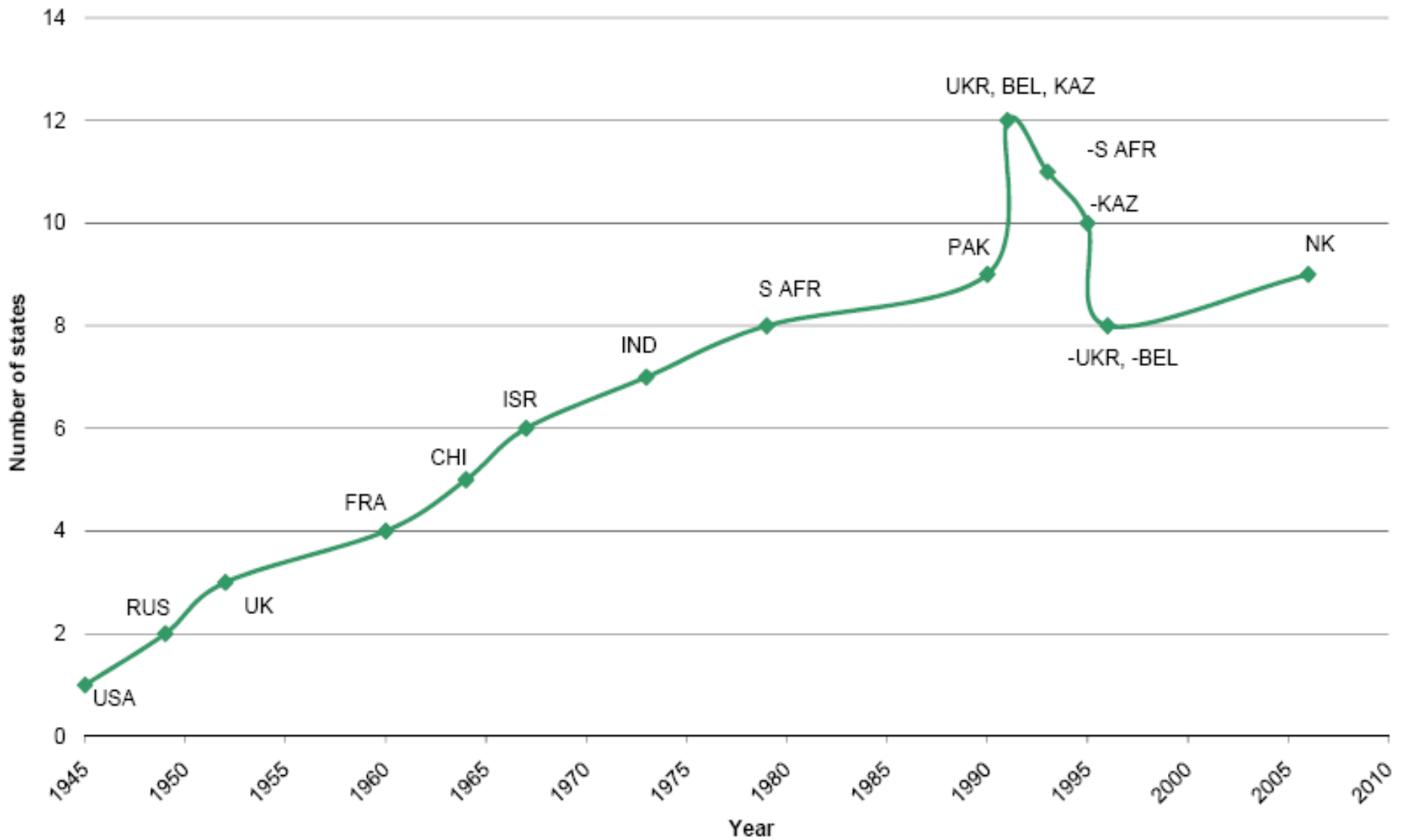
Figure © Scott D. Sagan 2013

The Nuclear Fuel Cycle

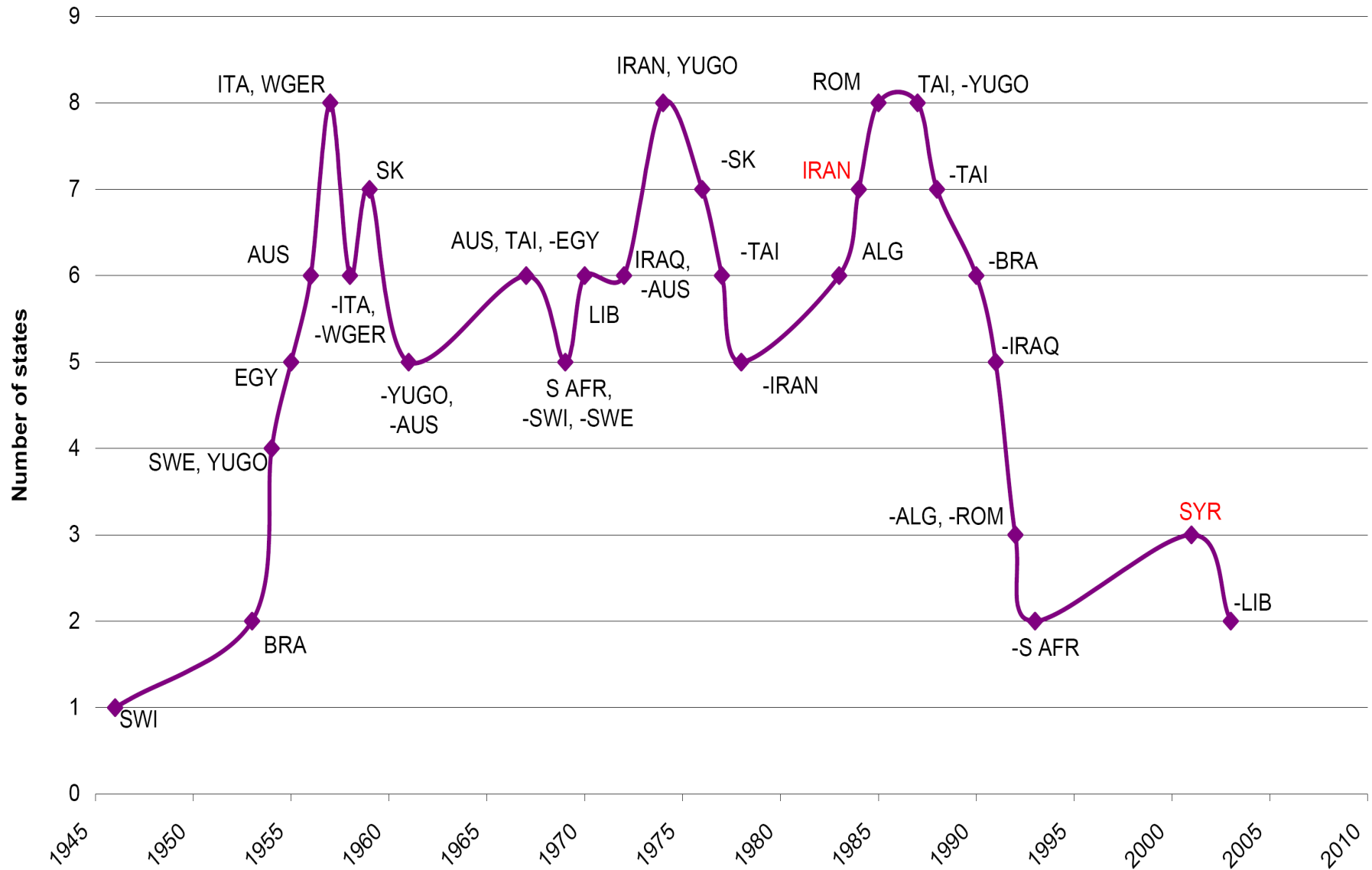


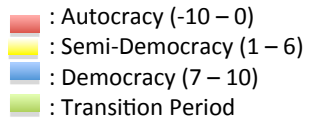
Source: Adam Bernstein (2009). *The Production of Fissile Materials for Nuclear Weapons and Nuclear Power* [PowerPoint slides]. Retrieved from http://www.lanl.gov/orgs/ndo/n4/documents/02.prod_fissile_mat_nuc_weap_nuc_power.pdf

States with Nuclear Weapons

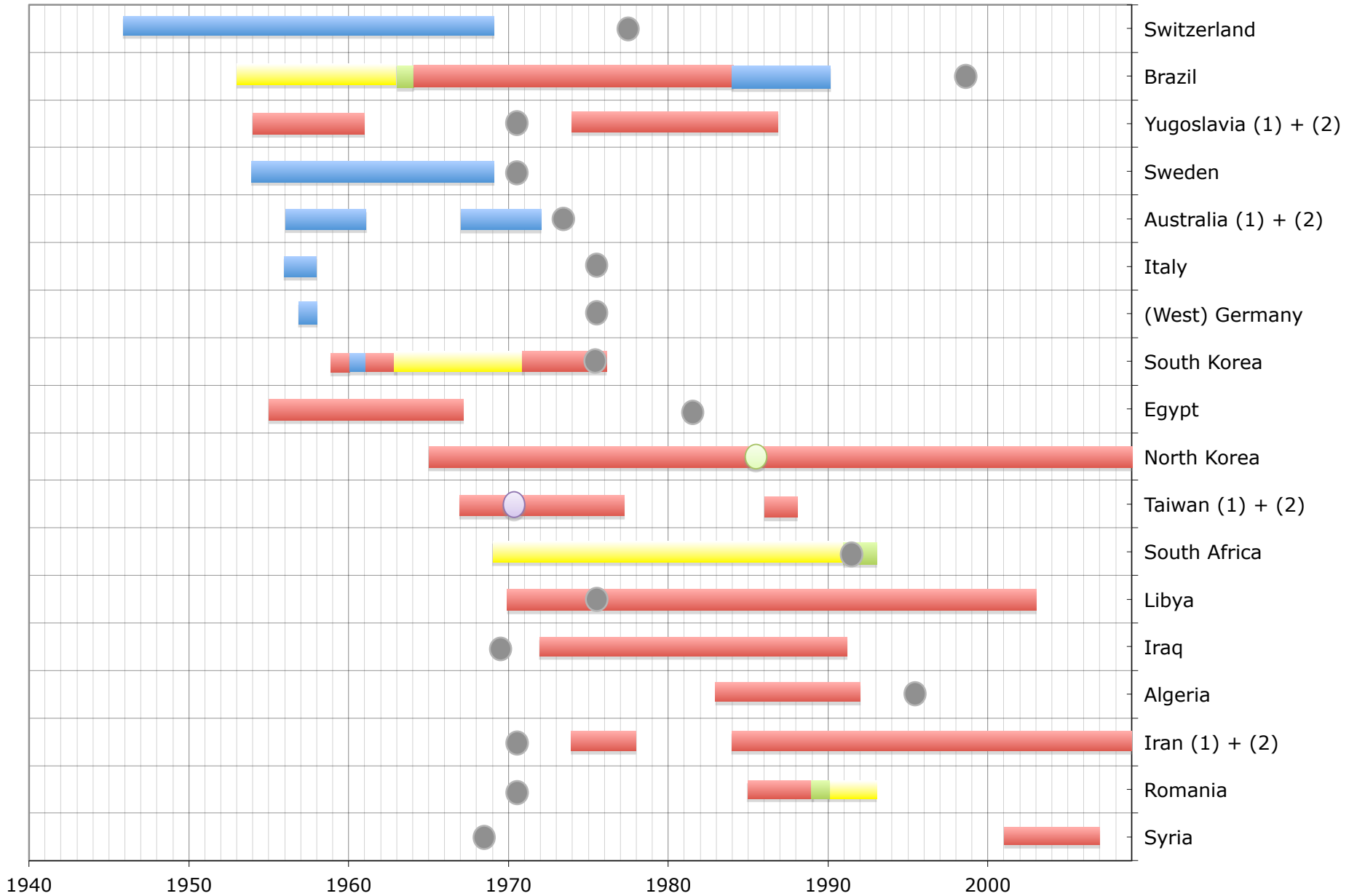
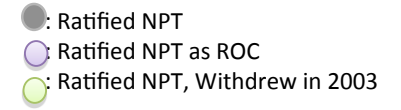


States that Explored or Pursued Nuclear Weapons





Start and End of Nuclear Weapons Activity and NPT Ratification



Five Cracked “Pillars” of the NPT

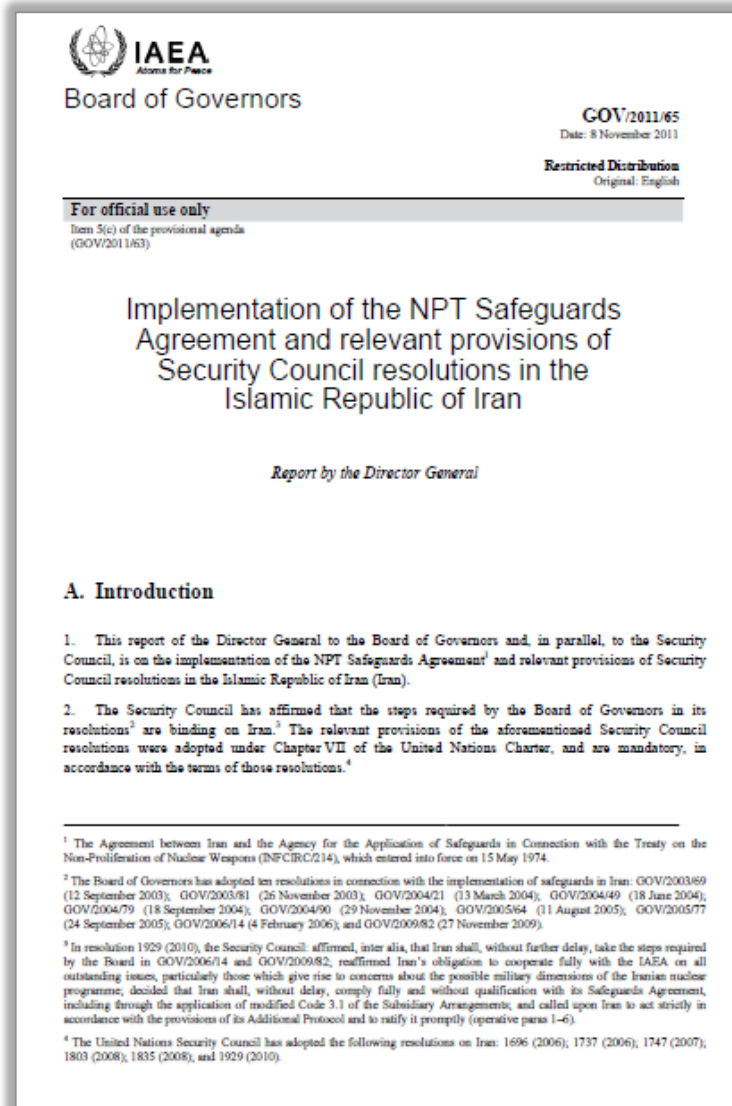
Article X:

“Each Party shall in exercising its national Sovereignty have the right to withdraw from the Treaty... It shall give notice of such withdrawal... three months in advance.”

Iran's Nuclear Program

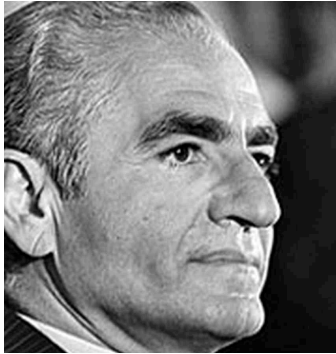


Evidence on Iran's Bomb Program



- Instructions for making uranium metal hemispheres
- Tests of implosion-type detonation systems
- Missile RV engineering work
- Communication and links between nuclear and missile programs
- Failure to cooperate fully with IAEA

Iran: A Security-Driven Program?

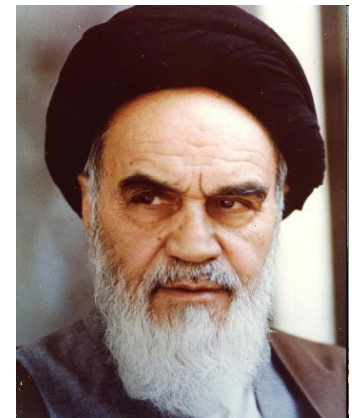


“If anyone in the neighborhood has [the bomb], we must be ready to have it.”

-Shah Mohammed Reza Pahlavi, 1973

“The commander has said we can have no victory for another five years, and even by then we need to have 350 infantry brigades, 2500 tanks, 300 fighter planes... [Iran would need] a considerable number of laser and nuclear weapons to confront the attacks.”

-Ayatollah Khomeini, 1988



“The moral teachings of the world are not very effective when war reaches a serious stage...We should fully equip ourselves in the defensive and offensive use of chemical, bacteriological, and radiological weapons.”

-Hashemi Akbar Rafsanjani, 1988

Iran's Security Concerns

- 2001 U.S. Nuclear Posture Review
- January 22, 2002: “Axis of Evil” Speech
- 2003: Tehran should “take a number”
- 2006: “How can a side that wants to topple the regime also attempt to negotiate?”



*Ali Larijani, Iran's top nuclear negotiator
August 2005 - October 2007*

Iran: Domestic Politics

- Broad support for nuclear power
- Split on nuclear weapons?
- Reformers and industry want international trade
- IRGC and weapons interest



Iran: The Norms Model



- Fatwa Against Chemical and Nuclear Weapons
- Islam and the Nuclear Taboo
- Membership in the “Nuclear Power Club”

November 2013 Iran Nuclear Deal



- Interim deal between P5+1 and Iran reached on November 24th in Geneva
- Adds time to an Iranian nuclear “breakout” in exchange for limited sanctions relief
 - Suspension of work on Arak
 - No enrichment above 5%
 - Dilute or convert 20%
 - Improved IAEA safeguards



Recent Developments on Iran Nuclear Deal



Negotiators Wait for Start of Closed-Door Negotiations in March 2014

Ensuring a Safer Nuclear Future



International Fuel Bank



Regional Repositories



NSG Export Guidelines



IAEA Additional Protocol

2014 Hague Nuclear Security Summit



- Pledge by 35 countries to turn nuclear security guidelines into national law and undergo external reviews of nuclear security procedures
 - Russia, China, India, and Pakistan not part of group endorsing these measures
- New nuclear materials reduction commitments by Japan, Italy, and Belgium

