Scientists, Clerics, and Nuclear Decision Making in Iran

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Introduction

Iranian Nuclear Decision Making

History: Iranian Nuclear Program

Conclusion
Introduction
Motivation

- why do states build nuclear weapons?
- various models of proliferation
- Scott Sagan
- scientists as drivers: e.g., US, India, Pakistan
Relevance

“nuclear tipping point”

understanding proliferation can help prevent further spread

not enough attention payed to understanding proliferation
Iran develops nuclear weapons
as a deterrent (US, Israel)
for international prestige
for domestic politics (unity, popular cause, nationalism)
scientists: “blackboxed”
Core Question

To what extent have scientists driven Iran’s nuclear effort?

to what extent have Iranian scientists made decisions independent of clerics on nuclear matters?

to what extent have scientists pushed for nuclear program in bureaucratic self-interest? (jobs, employment, pride)
scientists: significant role: pushed for nuclear program at critical points

motivation: prestige, jobs, curiosity

not simply enablers, but drivers
No doubt that:

- strategic decisions: Supreme Leader and leading clerics

- but: what about

- decisions about technical paths

- technical momentum
Sources

- newspapers, primarily Iranian (BBC Monitoring), FBIS
- industry newsletters (Nucleonics Week, Nuclear Fuel)
- open sources: IAEA, IISS, NTI, Carnegie, FAS, GlobalSecurity.org
- some interviews with Iran experts
Sources: Limitations

- nuclear decision making: extremely secretive
- little information about scientists
- inferences, but no causal links
Nuclear Decision Making
Decision Making in Iran

“chaotic, but not anarchic”

weak bureaucracies

informal networks (family, religious instructors, military experience): key to decision making in Iran

[Abbas William Samii, Naval War College Review, Winter 2006]
Western analysts agree:
only small number of people (10-15) involved: decision by consensus
Decision Makers

- Supreme Leader
- President (?)
- Senior clerics, formal institutions
- Supreme Nat. Security Council (2003-)
- Revolutionary Guards, intelligence
- Scientists associated with AEOI
Context of Nuclear Decisions

- new factor since 2000: public
- nationalism, anti-colonialist, “inalienable right”
- public opinion now strongly pro nuclear: complete fuel cycle
- official line: for peaceful nuclear technology, against weapons
History of the Program

Four phases

1. 1957-1979: Shah
2. 1979-1989: Khomeini and Amrollahi
3. 1989-1997: Khamenei and Amrollahi
4. 1997- today: Khamenei and Aqazadeh
Phase 1:
1957-1979, Shah

- 1957: US-Iran nuclear cooperation (Atoms for Peace)
- 1967: 5 MW reactor at TNRC
- 1974: Shah, ambitious program:
  - 23,000 MW in 20 y, fuel cycle
  - Founding of AEOI
- 1978: program crashes
Phase 2:
1979-1989, Khomeini

- 1979: revolution
- 1980-1983: Cultural Revolution
- massive brain drain: AEOI only 800
- 1979-1982: major AEOI projects shut down: Bushehr (75% complete)
- proposal: Bushehr into grain silos
Phase 2 (cont.)

- anti-nuclear sentiment: against foreign interference, dependency
- AEOI: tries to survive
- 1982 new AEOI head: Amrollahi
- supported by speaker of parliament, Ali Akbar Rafsanjani
Amrollahi

- had studied at U Texas
- AEOI director 1982–1997: driver
  - for resumption of Bushehr
  - for U exploration, buying U
  - for enrichment, reprocessing R&D
  - for nuclear cooperation with Argentina, Pakistan (Khan!), South Africa, China
Amrollahi

- convinced Rafsanjani and Khomeini
- some: Amrollahi behind nuclear weapon efforts, revitalization
- others: neither outstanding scientist nor competent manager
- but: relative of Rafsanjani
Rafsanjani

well known
in the West
Rafsanjani

very influential cleric and politician

close connection with Khomeini

speaker of parliament 1980–1989

commander in chief in Iraq war

President 1989–1997

Chairman of the Expediency Council

conservative, but pragmatist
Rafsanjani

- strong interest in S&T for development, energy, nuclear matters
- key role in cooperative agreements with India, China, Russia
- since 1985 appealed to Iranian scientists in exile to return to Iran
Sum Phase 2: Revitalization

- revolution, brain drain, Iraq war
- But: AEOI scientists active: work on fuel production: UF6, centrifuges
- Rafsanjani, AEOI keep project alive
- 1990: AEOI back to 200 scientists and 2,000 personnel

1989: death of Khomeini

- new Supreme Leader: Ayatollah Sayyid Ali Khamenei
- new president: Ali Akbar Hashemi Rafsanjani
Khamenei personal interest in S&T, nuclear
pushes for nuclear energy program:
self-sufficiency: fossil fuels will run out
nuclear: key to development
S&T central to developing power
“inalienable right”
“irreversible path”
publicly opposed to WMD; secret fatwa against nuclear weapons

however: supports enrichment and reprocessing efforts

representatives in policy bodies: unlikely that he does not know
Phase 3 (cont.)

- secret research: conversion, enrichment, Pu separation
- foreign assistance (Russia, China): fuel cycle facilities
- Khan network, centrifuge design
- construction of enrichment facilities at Natanz around 2000
Gas Centrifuges
Natanz 2002, 2004
1990s: no evidence for dedicated nuclear weapons program
systematic effort to develop options: procurement effort, front companies
Phase 4:
1997 to present

- 1997: new president: Khatami
- new head of AEOI: Aqazadeh
Phase 4 (cont.)

- August 2002: Iranian opposition group reveals Natanz and Arak
- Oct. 2003 and Nov. 2004: agreement with EU-3, includes suspension of enrichment and reprocessing activities
- but: Iran resumes these activities repeatedly: crisis
Aghazadeh

1997-present: Pres. AEOI, Vice President, no nuclear background

1985-1997: Minister of Oil

technocrat, well connected, in firm control of AEOI

not closely associated with political networks
Aghazadeh

- reluctant to accept EU-3 nuclear deal: “long delay will inflict huge econ. damage” (ISNA 12 Dec 03)
- represents scientists, fights to protect nuclear program, jobs
- concerned that experts leave Iran, asks Majlis for job guarantees
AEOI’s bureaucratic interests: “finding new projects and tasks to ensure their preservation and expansion... They are very concerned that Iran, in dealing with the IAEA, would accept a concession that prevents these organizations from achieving their goals of survival and “logical” expansion.”

Nasser Hadian, professor at Tehran U
many AEOI scientists angry that Iran agreed to stop enrichment

Aug. 2003: 500 students (Sharif Technical U), 240 faculty members wrote two open letters, warning gov. not to make promises to IAEA
“Any lack of steadfastness with regard to finding alternate sources of energy would be considered by Iranians of future generations as treason... We are concerned that due to foreign pressure that many years of hard work which has led to a lot of advancement in the field of nuclear technology and science may be wasted. We the signors of this letter, urge the government of the Islamic Republic of Iran to, under no circumstances, sign any letter which would create an impediment to our legitimate right to acquire knowledge and technology.” [Hadian, pp. 58-59]
human chains in support of AEOI, November 2004
Conclusion
to what extent have scientists pushed for nuclear program in bureaucratic self-interest? (jobs, employment, pride)

- to a very significant extent: major driver
- vocal advocates for fuel cycle
to what extent have Iranian scientists made decisions independent of clerics on nuclear matters?

AEOI scientists pushed for experiments that violated IAEA safeguards, apparently without consent of clerics

they have monopoly on technical expertise
Conclusion

To what extent have scientists driven Iran’s nuclear effort?

- Scientists have actively shaped Iran’s program: more than just enablers: drivers
- Bureaucratic self-interests
- Professional pride leads to momentum
Finally

coalition between bureaucratic actors:
- AEOI (nuclear establishment)
- pro-nuclear populists (president)
- public

momentum, difficult to stop

nonproliferation policy: break coalition
Questions?
Backup Slides
Foreign Ministry vs. AEOI

- Foreign Ministry: avoid more isolation
- AEOI: move forward with nuclear fuel cycle
source: BBC

http://news.bbc.co.uk/2/shared/spl/hi/middle_east/03/iran_power/html/default.stm
**Tehran Nuclear Research Center**
U.S.-supplied 5MWt light-water, HEU, research reactor, subject to safeguards; site of pilot-scale uranium conversion experiments, hot cells and plutonium separation between 1988 and 1993.

**Kalaye Electric Company Site**
Site of centrifuge tests using UF6 between 1998 and 2003, subject to safeguards.

**Pilot Laser Enrichment Plant**

**Planned heavy-water production plant**
Planned heavy-water reactor.

**Pilot Fuel Enrichment Plant**
164-centrifuge cascade installed, 1000 P-1 centrifuges planned; Commercial Fuel Enrichment Plant, under construction, 50,000 centrifuges planned, both subject to safeguards.

**Nuclear Research Center**
Uranium conversion facility; Chinese-supplied zirconium production plant; planned fuel manufacturing plant; four research reactors; all subject to safeguards.

**Bushehr**
Russian-supplied 1,000 MWe, light-water power reactor, LEU, subject to safeguards, expected to be operational in 2006, fuel to be supplied by and returned to Russia.
Scientists in Iran (cont.)

- Institute for Studies in Theoretical Physics and Mathematics in Tehran (IPM)
- string theory and particle physics
- director: Mohammad Javad Larijani (brother of Ali Larijani)
- other centers on biotech, astronomy