



NUCLEAR ARMS CONTROL AND DISARMAMENT POLICY BEYOND THE OBAMA ADMINISTRATION

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Tokyo, 15 September 2016

OUTLINE / OVERVIEW

- Multilateral Arms Control
- The U.S. Nuclear Arsenal: Size and Posture
- Modernization of the U.S. Nuclear Arsenal
- Charting a Path Forward
- Verification Challenges of Nuclear Disarmament
- Conclusion

MULTILATERAL ARMS CONTROL

RELEVANT NUCLEAR ARMS CONTROL TREATIES



NUCLEAR NON-PROLIFERATION TREATY

Bans the acquisition of nuclear weapons by non-weapon states and commits the five weapon states to nuclear disarmament; verified by IAEA safeguards



COMPREHENSIVE TEST BAN TREATY

Bans all nuclear explosions in all environments and would be verified by extensive verification mechanisms (International Monitoring System, CTBT0)



FISSILE MATERIAL (CUTOFF) TREATY

At a minimum, treaty would ban fissile material production for weapons purposes; Issue about treaty scope: Would it also cover existing stocks?

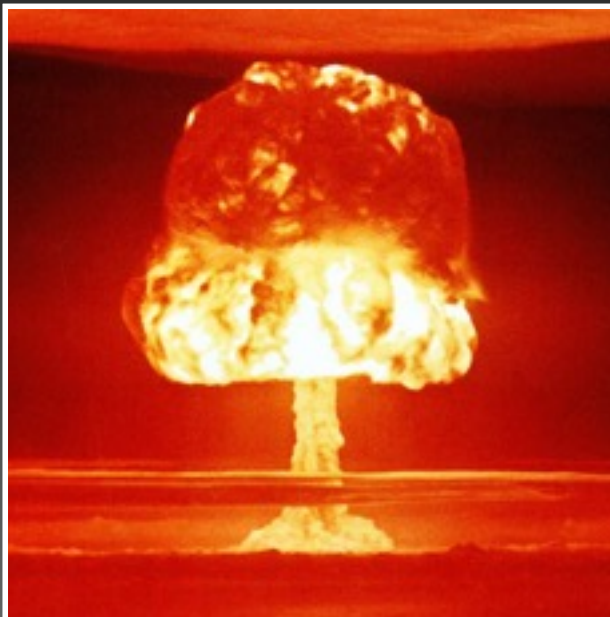


NEXT-GENERATION NUCLEAR DISARMAMENT TREATIES

Agreements that place limits on total number of nuclear warheads in arsenals would pose qualitatively new verification challenges

COMPREHENSIVE TEST BAN TREATY

[NEEDS SUBTITLE]



SCOPE OF THE CTBT

The CTBT bans all nuclear explosions in all environments

Signed by 183 states, ratified by 164 states (as of September 2016)

Enters into force when 44 “nuclear capable” countries have ratified



WHILE AWAITING ENTRY INTO FORCE OF THE CTBT

The Obama Administration is seeking a UN Security Council resolution reinforcing the global norm against nuclear testing; it reportedly also seeks a separate statement by P5 countries recognizing that any future nuclear test defeats the “object and purpose” of the CTBT

FISSILE MATERIAL (CUTOFF) TREATY

[NEEDS SUBTITLE]



SCOPE OF AN FMCT

FMCT would ban production of fissile materials for weapon purposes

De-facto FMCT for non-weapon states already exists (NPT)

Note: Fissile material production for weapon purposes has ended in NPT weapon states



UNBLOCKING THE CONFERENCE ON DISARMAMENT

In 2016, the United States introduced a proposal for a revised mandate, not referring the “Shannon Mandate” from 1995

fissilematerials.org/blog/2016/03/united_states_proposes_ch.html

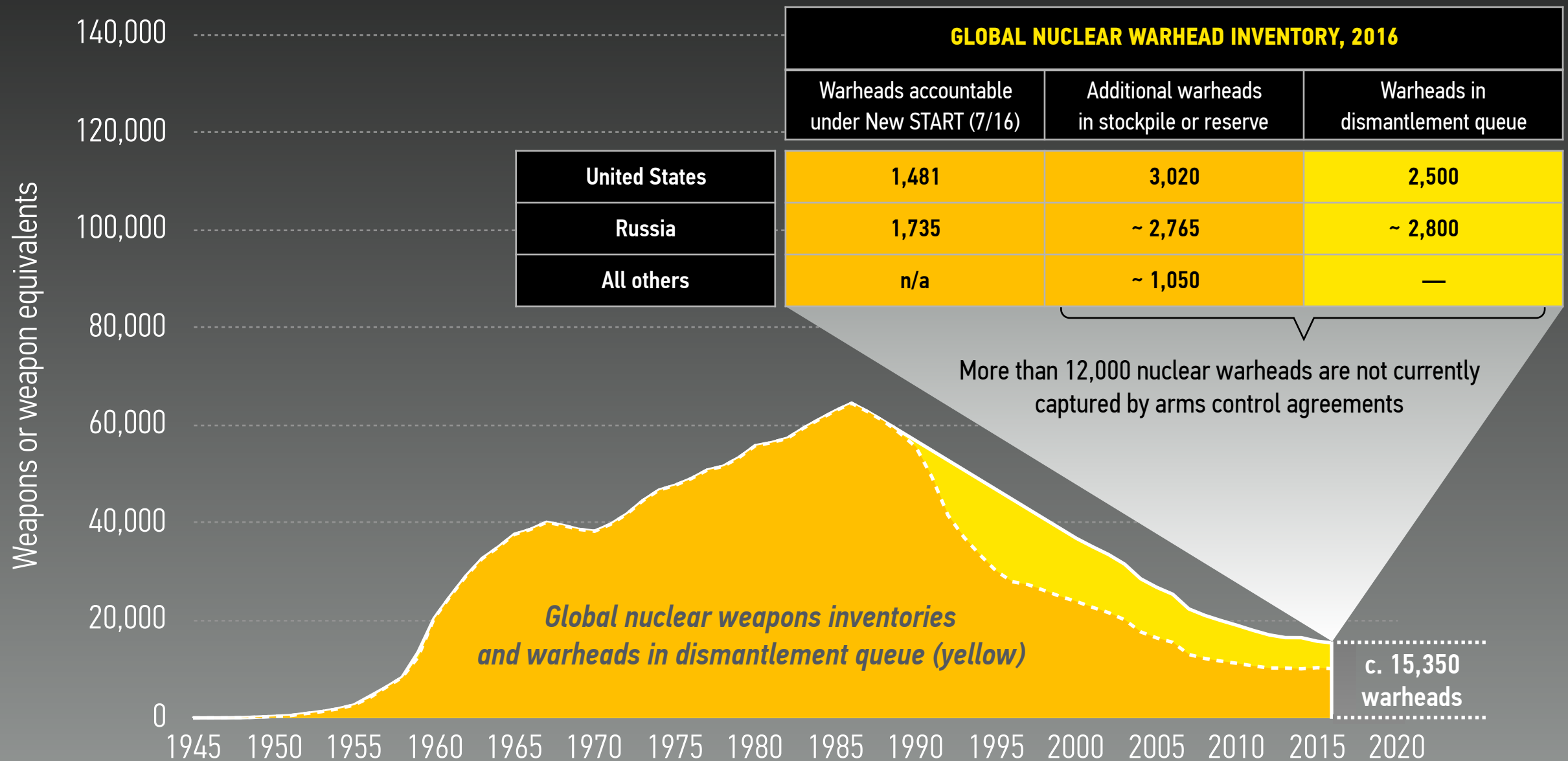
Sources: U.S. Department of Energy (top)

NUCLEAR ARSENAL

(SIZE AND POSTURE)

GLOBAL NUCLEAR WEAPON INVENTORY

1945–2016



“Status of World Nuclear Forces,” *Federation of American Scientists*, fas.org, May 2016

2010 NUCLEAR POSTURE REVIEW

APRIL 2010



Five key objectives of U.S. nuclear weapons policies and postures:

1. Preventing nuclear proliferation and nuclear terrorism;
2. Reducing the role of U.S. nuclear weapons in U.S. national security strategy;
3. Maintaining strategic deterrence and stability at reduced nuclear force levels;
4. Strengthening regional deterrence and reassuring U.S. allies and partners; and
5. Sustaining a safe, secure, and effective nuclear arsenal.

FUTURE REDUCTIONS IN THE ARSENAL



2010 NUCLEAR POSTURE REVIEW

Future efforts should “engage Russia [...] in negotiations aimed at achieving substantial further nuclear force reductions and transparency that would cover all nuclear weapons ...”



2013 BERLIN SPEECH

President Obama announces possibility of further reductions of “deployed strategic nuclear weapons by up to one-third,” i.e., down to 1000–1100 weapons; ideally, in negotiated cuts with Russia

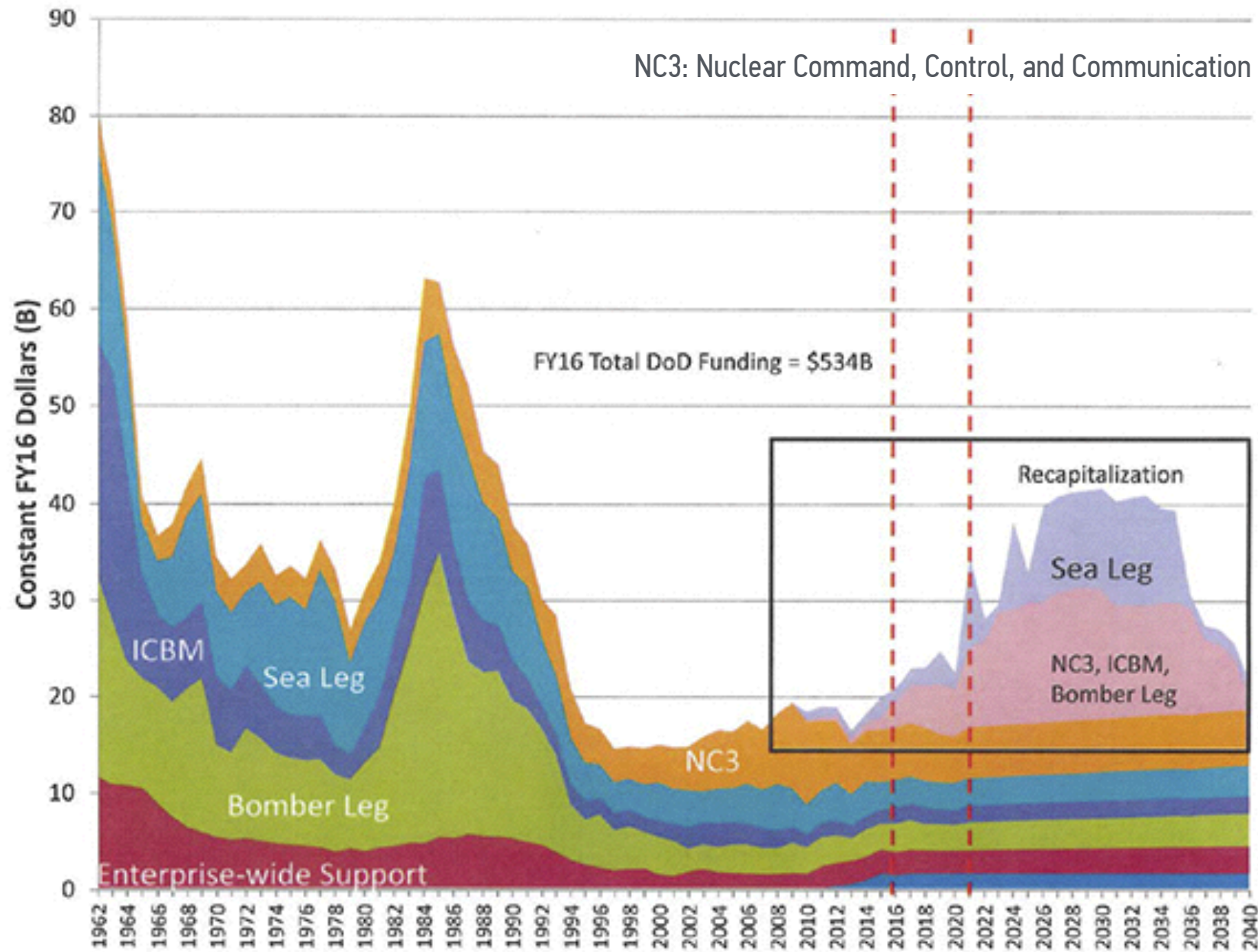
Source: www.whitehouse.gov/the-press-office/2013/06/19/remarks-president-obama-brandenburg-gate-berlin-germany

THE OTHER SIDE OF THE COIN

(MODERNIZATION OF THE U.S. NUCLEAR ARSENAL)

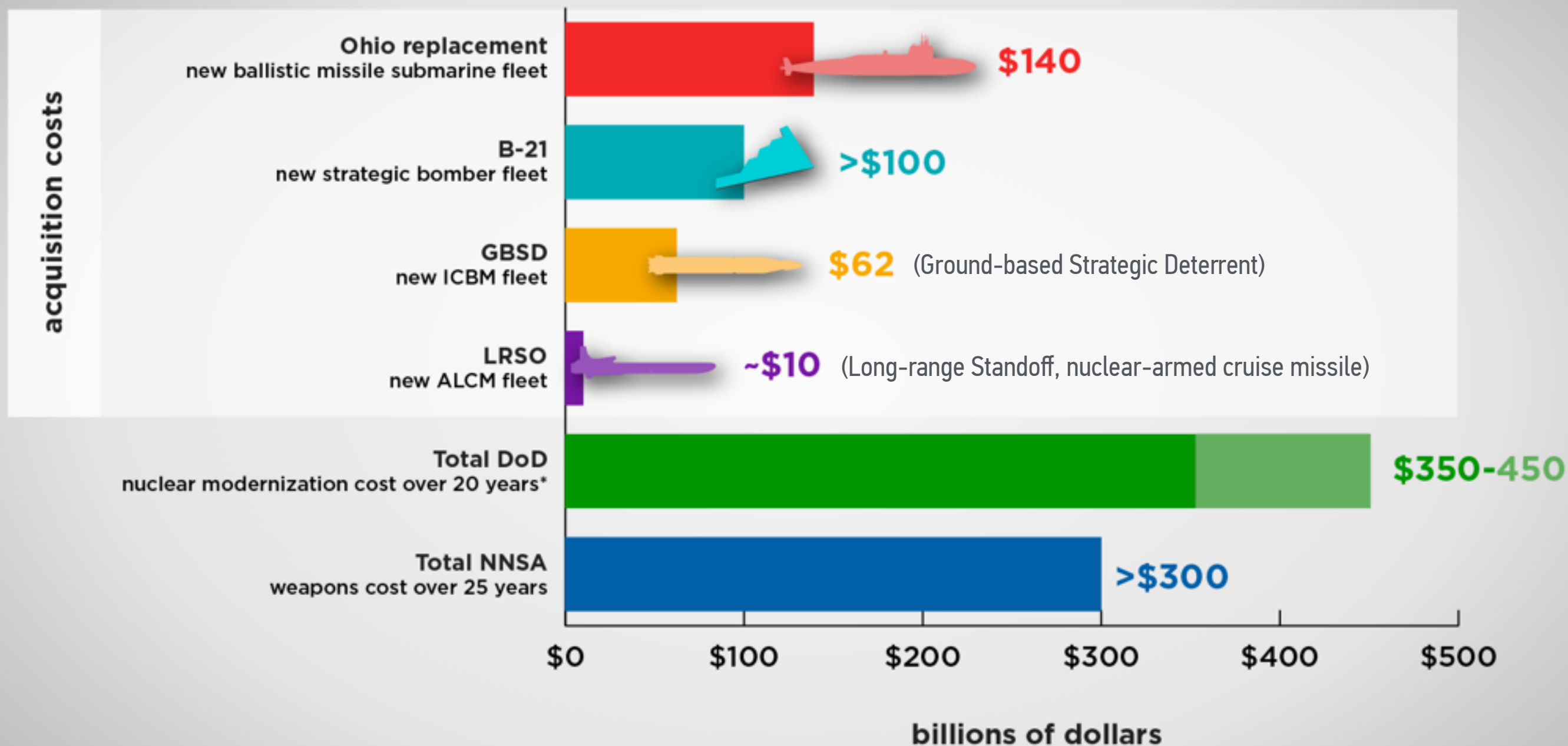


“MODERNIZATION MOUNTAIN”



Undated chart by the U.S. Department of Defense Cost and Program Evaluation (CAPE) office

Estimated Costs for Nuclear Triad Modernization



* In FY2016 constant dollars

Note: All figures in then-year dollars unless otherwise noted

Sources: U.S. Navy, U.S. Air Force, Center for Strategic and International Studies, NNSA, DoD Cost Assessment and Program Evaluation (CAPE) office

Arms Control
Association

U.S. NUCLEAR MODERNIZATION

POSSIBLE (COST-SAVING) SCENARIOS



BUDGETARY CONSTRAINTS MAY REQUIRE REASSESSMENT

Possible life-extension of the existing Minuteman-III missile?

Possible cancellation of the new nuclear cruise missile (LRSO) project?

Possible lower number of submarines?



FROM THE NUCLEAR TRIAD TO A NUCLEAR DYAD?

In the discussion, since the 1980s; 2010 NPR confirmed (only) that Triad “will be maintained under New START”

Sources: U.S. Air Force and U.S. Navy

THE “NO FIRST USE” DEBATE



2010 NUCLEAR POSTURE REVIEW

Use of nuclear weapons only under “extreme circumstances to defend the vital interests of the United States or its allies and partners;” the United States will work to establish conditions under which a sole-purpose policy (i.e., to deter nuclear attacks) could be safely adopted.



2013 NUCLEAR WEAPONS EMPLOYMENT STRATEGY

“The guidance narrows U.S. nuclear strategy to focus on only those objectives and missions that are necessary for deterrence in the 21st century. In so doing, the guidance takes further steps toward reducing the role of nuclear weapons in our security strategy.”

Sources: John Carleton/Flickr (image, top), Robert Burns/AP (bottom), and Factsheet, Whitehouse, June 19, 2013

CHARTING A PATH FORWARD

NON-PROLIFERATION AND DISARMAMENT INITIATIVE (NPDI)



BACKGROUND

Established in 2010, the NPDI has 11 members, recognizing “the need for a systematic and continued reduction in all types of nuclear weapons, including non-strategic and non-deployed nuclear weapons”



CURRENT PRIORITIES

Increased transparency of nuclear weapon states
Reduced role of nuclear weapons in security strategies
De-alerting of nuclear weapons

Sources: government.nl (top) and defenseimagery.mil (bottom)

WHAT WOULD IT TAKE FOR THE UNITED STATES TO GIVE UP NUCLEAR WEAPONS?

(FIVE CONDITIONS, ACCORDING TO THE 2010 NUCLEAR POSTURE REVIEW)

“The conditions that would ultimately permit the United States and others to give up their nuclear weapons without risking greater international instability and insecurity are very demanding. Among those conditions are success in halting the proliferation of nuclear weapons, much greater transparency into the programs and capabilities of key countries of concern, verification methods and technologies capable of detecting violations of disarmament obligations, enforcement measures strong and credible enough to deter such violations, and ultimately the resolution of regional disputes that can motivate rival states to acquire and maintain nuclear weapons. Clearly, such conditions do not exist today.”

Looking Ahead: Toward a World without Nuclear Weapons
Nuclear Posture Review Report, April 2010

TRANSPARENCY SCORECARD, 2016

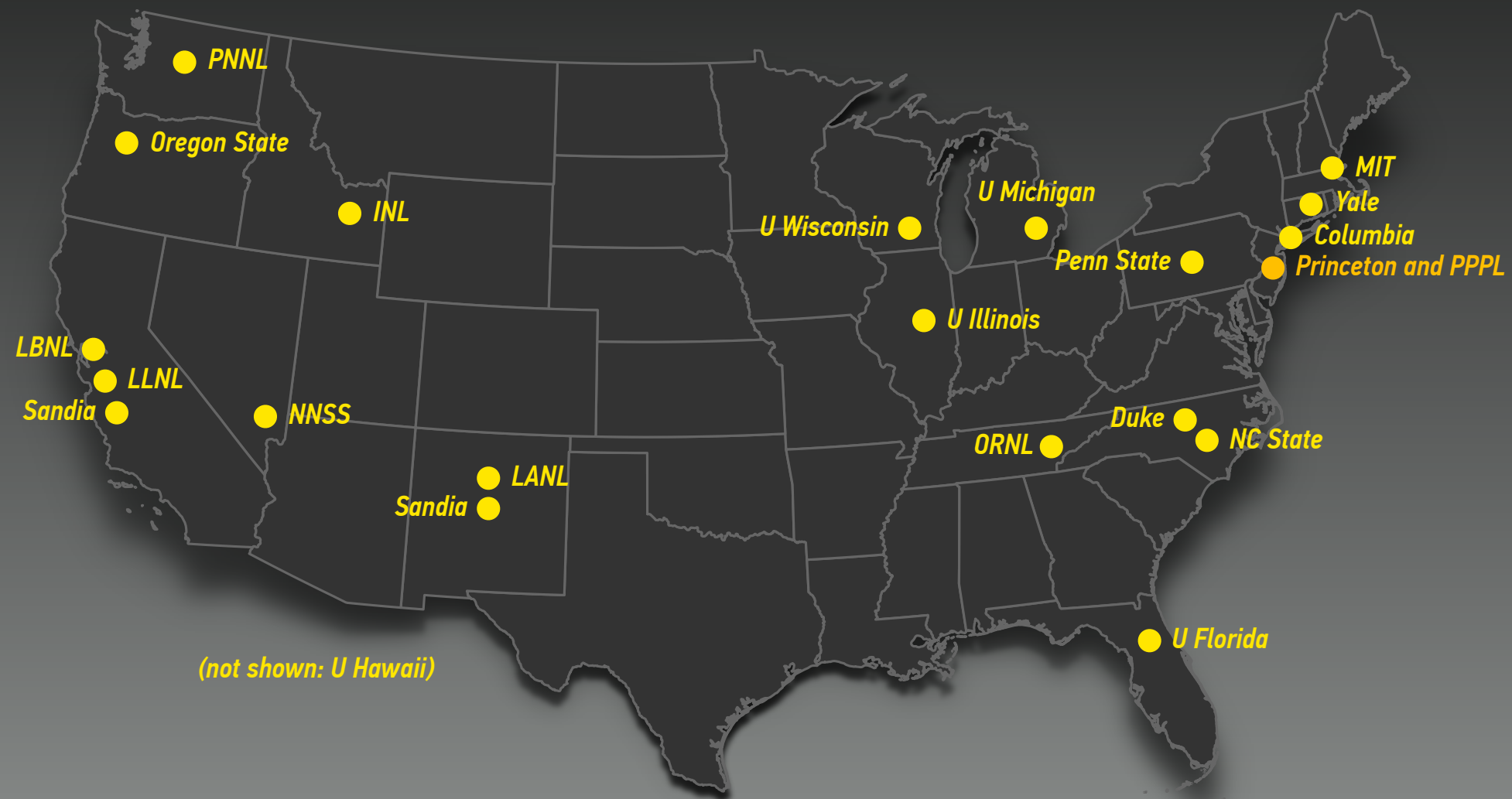
INFORMATION ON NUCLEAR WARHEAD AND FISSILE MATERIAL INVENTORIES AND STATUS

	United States	Russia	Britain	France	China
Number of total warheads	Approximate	No	Yes (upper limit)	Yes (upper limit)	Relative (out of date)
Number of deployed warheads	Yes (strategic only)	Yes (strategic only)	Yes (planned)	Yes	No
Dismantlements	Yes	No	Yes (no details)	Yes (no details)	No
Verification	Partial	Partial	No	No	No
Fissile material stockpiles	Yes	No	Yes (no details)	No	No
Production histories	Yes	No	No	No	No
Excess/Disposal	Yes (nothing new)	Yes (nothing new)	Yes (nothing new)	No	No
Verification	Partial	Partial (but no longer)	Partial (some plutonium)	No	No

VERIFICATION CHALLENGES OF NUCLEAR DISARMAMENT

(AND THE POTENTIAL ROLE OF NUCLEAR NON-WEAPON STATES)

CONSORTIUM FOR VERIFICATION TECHNOLOGY



Five-year project, funded by U.S. DOE, 13 U.S. universities and 9 national labs, led by U-MICH

Princeton participates in the research thrust on disarmament research
(and leads the research thrust of the consortium on policy)

INTERNATIONAL PARTNERSHIP FOR NUCLEAR DISARMAMENT VERIFICATION

Established in 2015; currently 26 participating countries (including Japan)



Working Group One: “Monitoring and Verification Objectives” (chaired by Italy and the Netherlands)

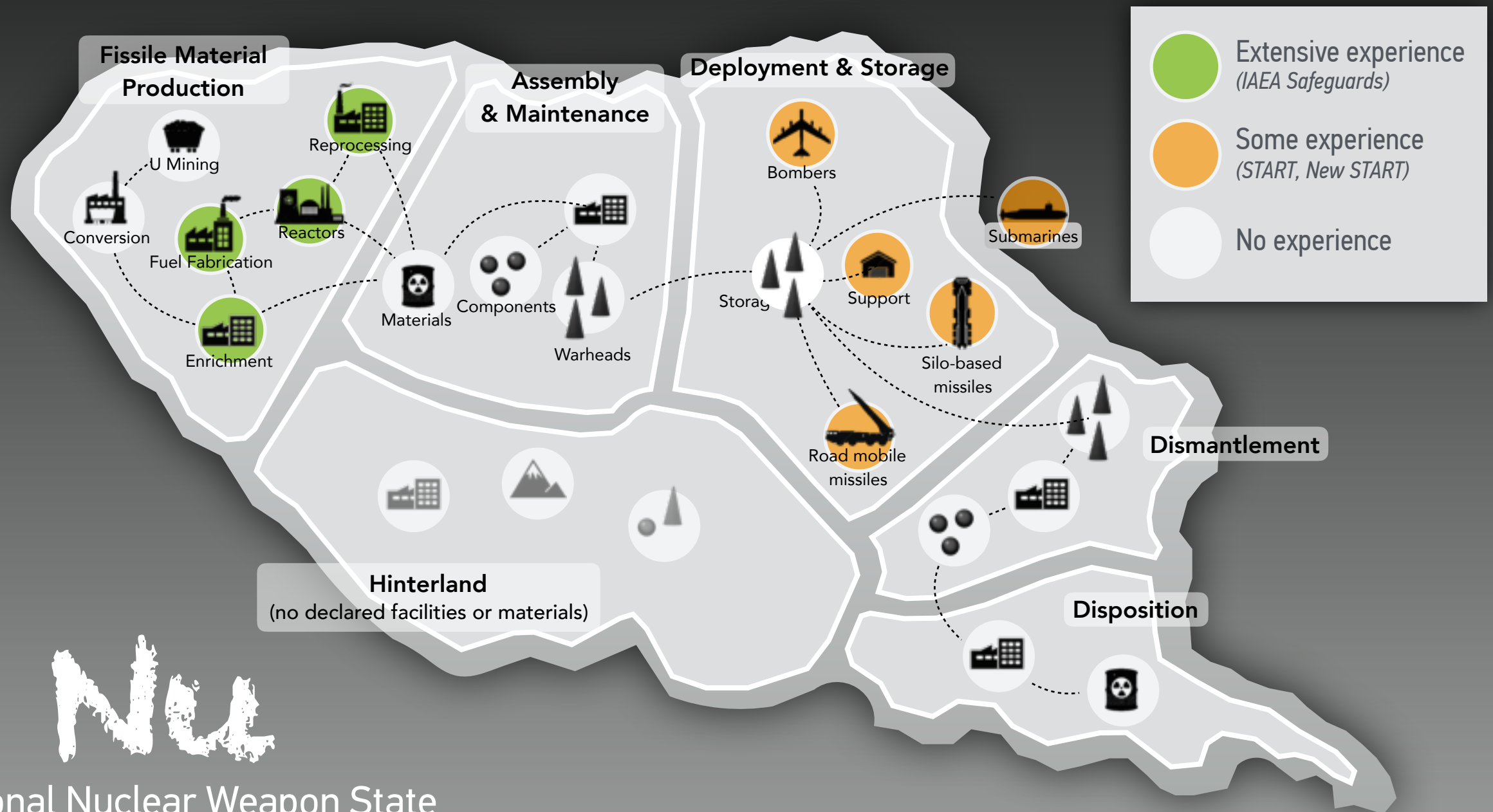
Working Group Two: “On-Site Inspections” (chaired by Australia and Poland)

Working Group Three: “Technical Challenges and Solutions” (chaired by Sweden and the United States)

www.state.gov/t/avc/ipndv

WHAT IS TO BE VERIFIED?

THERE REMAIN MAJOR GAPS AND CHALLENGES
FOR VERIFIED NUCLEAR DISARMAMENT



Nu

A Fictional Nuclear Weapon State
www.verification.nu

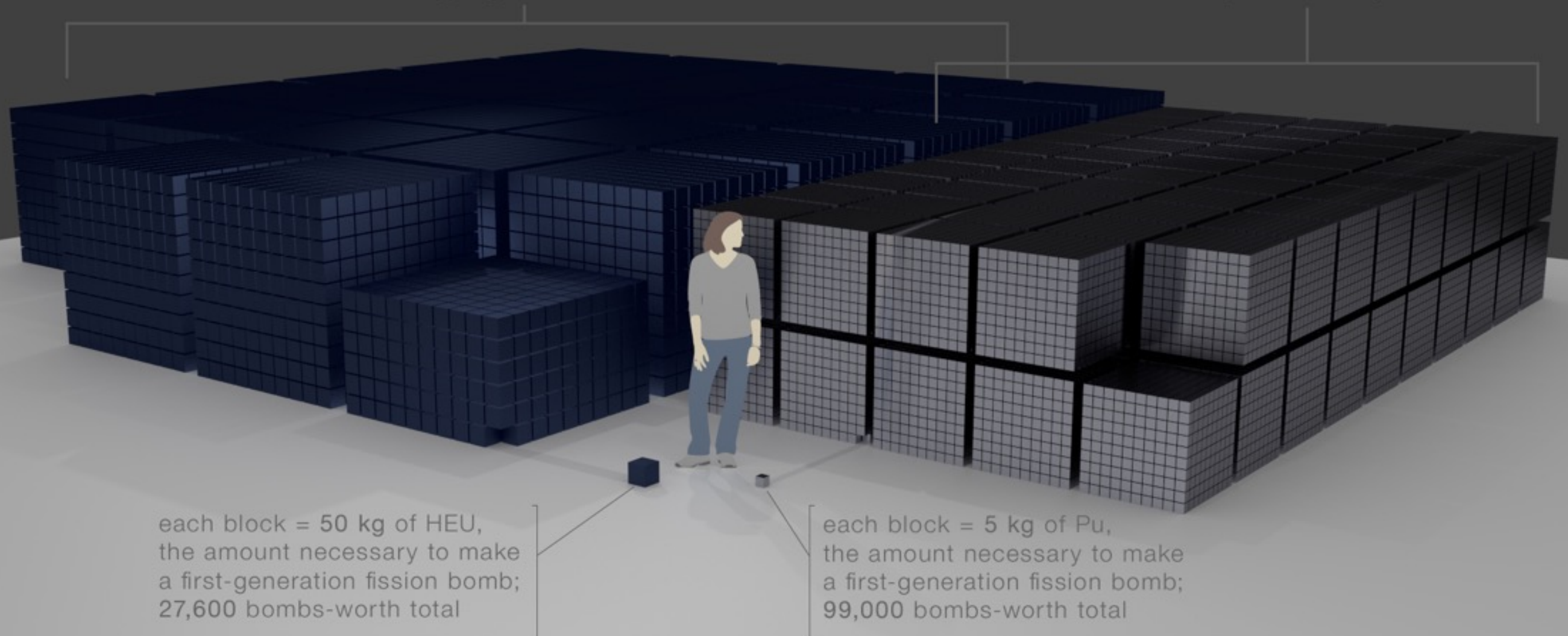
World Stockpiles of Fissile Materials

~~1380~~ 1345

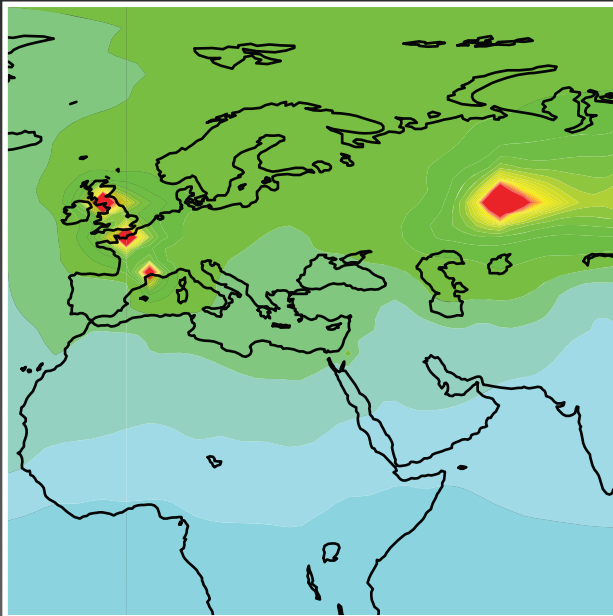
tons of highly-enriched uranium

~~495~~ 503

tons of separated plutonium



WILL WE EVER KNOW HOW MUCH FISSILE MATERIAL EXISTS WORLDWIDE?



RECONSTRUCTING HISTORIC FISSILE MATERIAL PRODUCTION

Many aspects of declared production histories can be reviewed for consistency even without verification

(for example, by comparison with historic krypton emissions)



DATA EXCHANGE AND NUCLEAR ARCHAEOLOGY

Verification could begin with data exchanges (e.g. sharing of available operating records) and, eventually, envision onsite inspections

Nuclear archaeology is based on nuclear forensic analysis of samples taken at former production facilities

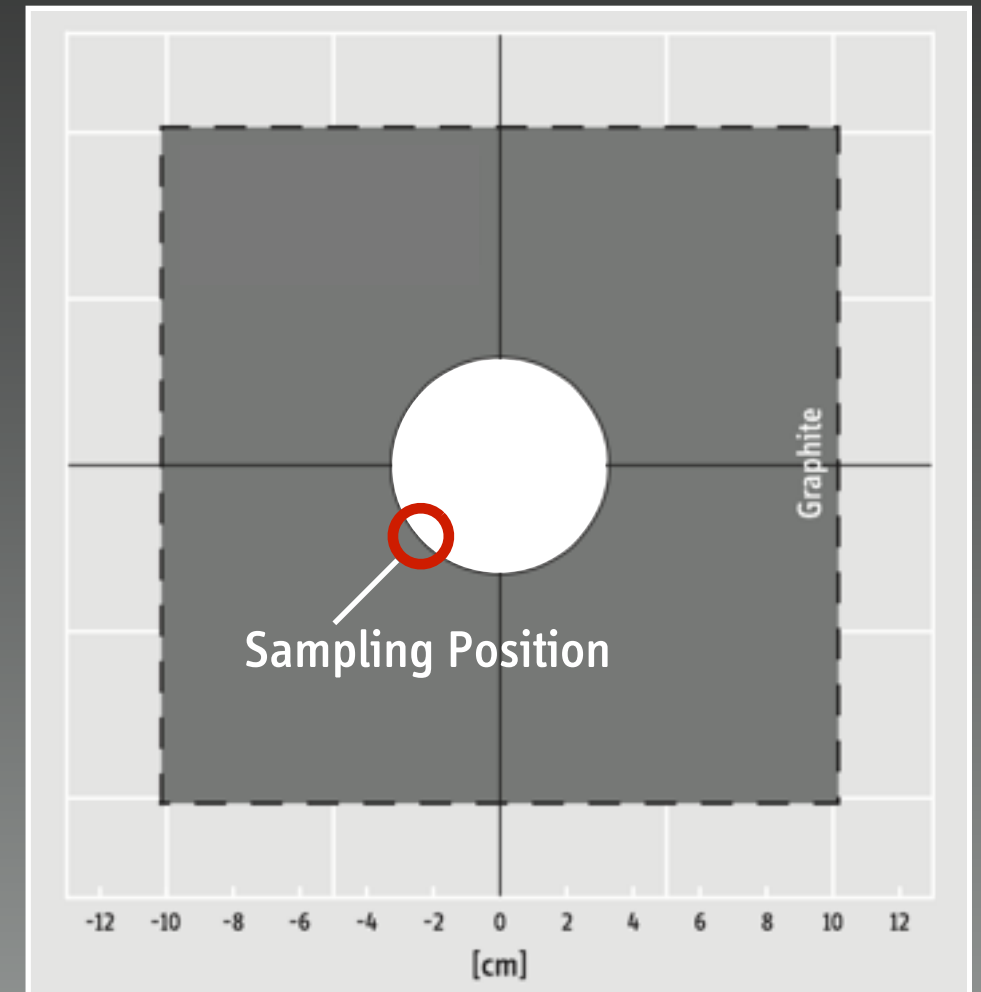
Source: Ole Ross and www.francetnp2010.fr

NUCLEAR ARCHAEOLOGY WOULD HAVE BEEN USED TO VERIFY NORTH KOREA'S PLUTONIUM DECLARATION

FORENSIC ANALYSIS OF GRAPHITE SAMPLES COULD CONFIRM TOTAL PLUTONIUM PRODUCTION IN NORTH KOREA WITHIN AN UNCERTAINTY OF ± 2 KG



The banner reads: "Let's protect Dear General Kim Jong Il desperately!"
Credit: CNN/Brian Rokus, 2008



Unit cell of the DPRK Yongbyon reactor

FISSILE MATERIAL PRODUCTION FOR WEAPONS HAS LARGELY ENDED BUT FACILITIES ARE BEING DECOMMISSIONED OR DEMOLISHED



Shutdown of the last Russian plutonium production reactor ADE-2 in Zheleznogorsk, 2010

Source: U.S. Department of Energy



Demolition of the K-25 uranium enrichment plant began in December 2008 and has been completed in 2012

Source: Bechtel Jacobs

MANY NON-NUCLEAR WEAPON STATES HAVE CANDIDATE FACILITIES THAT COULD BE USED TO DEMONSTRATE METHODS REQUIRED FOR NUCLEAR ARCHAEOLOGY



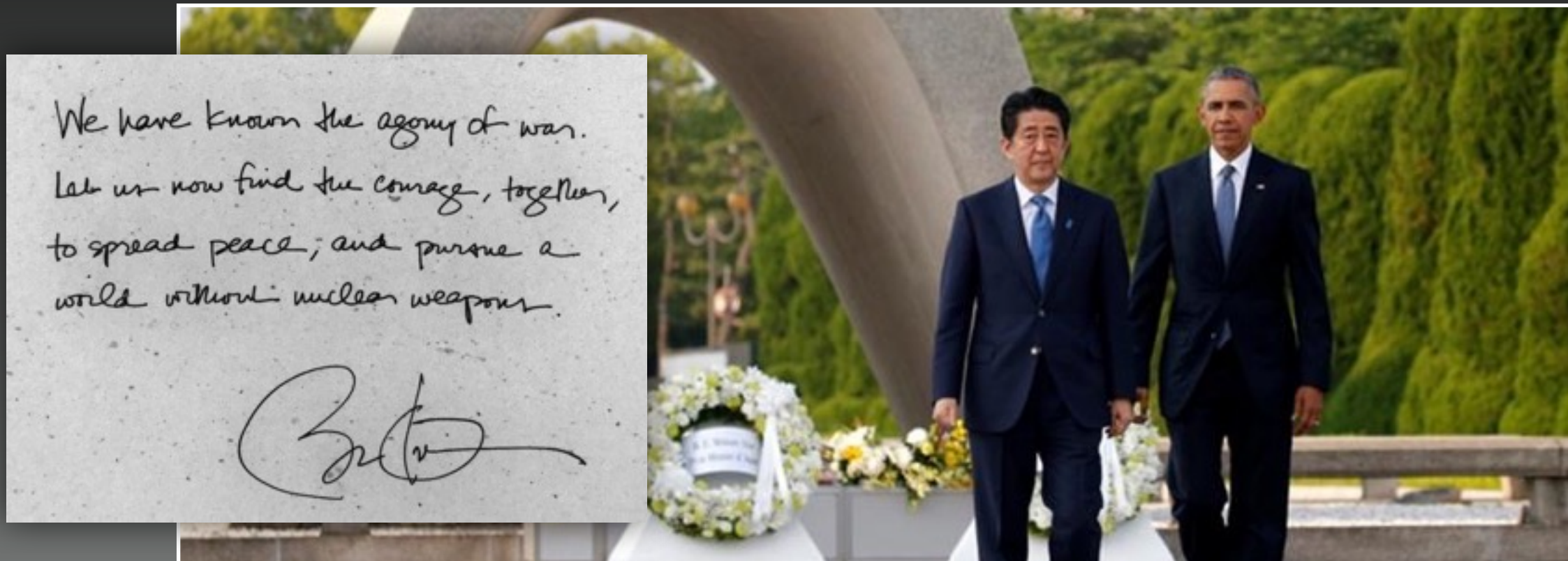
*MZFR (200 MW), Karlsruhe, Germany
Now decommissioned*



*Tokai Magnox (587 MW), Tokai, Japan
Now decommissioned*

THE IMPERATIVE OF HIROSHIMA AND NAGASAKI

REMARKS BY U.S. PRESIDENT OBAMA AND PRIME MINISTER ABE
HIROSHIMA PEACE MEMORIAL, MAY 27, 2016



*We are determined to realize a world free of nuclear weapons.
No matter how long and how difficult the road will be,
it is the responsibility of us who live in the present to continue to make efforts.*

(Prime Minister Shinzō Abe)

Source: Carlos Barria/Reuters

