

Building blocks of the future fissile material (cut-off) treaty

Pavel Podvig
UN Institute for Disarmament Research

UN First Committee Side Event
United Nations, New York
20 October 2016

Issues to consider

- Key elements of the treaty
- Verifiable declarations of existing stocks
- Disparities in a non-discriminatory treaty
- Materials are at unidir.org

KEY ELEMENTS OF THE TREATY

Recent developments

- Work of the Group of Governmental Experts
 - Views submitted by States
 - GGE deliberations and final report
- Draft treaty submitted by France
- Earlier drafts (International Panel on Fissile Materials and others), expert discussions

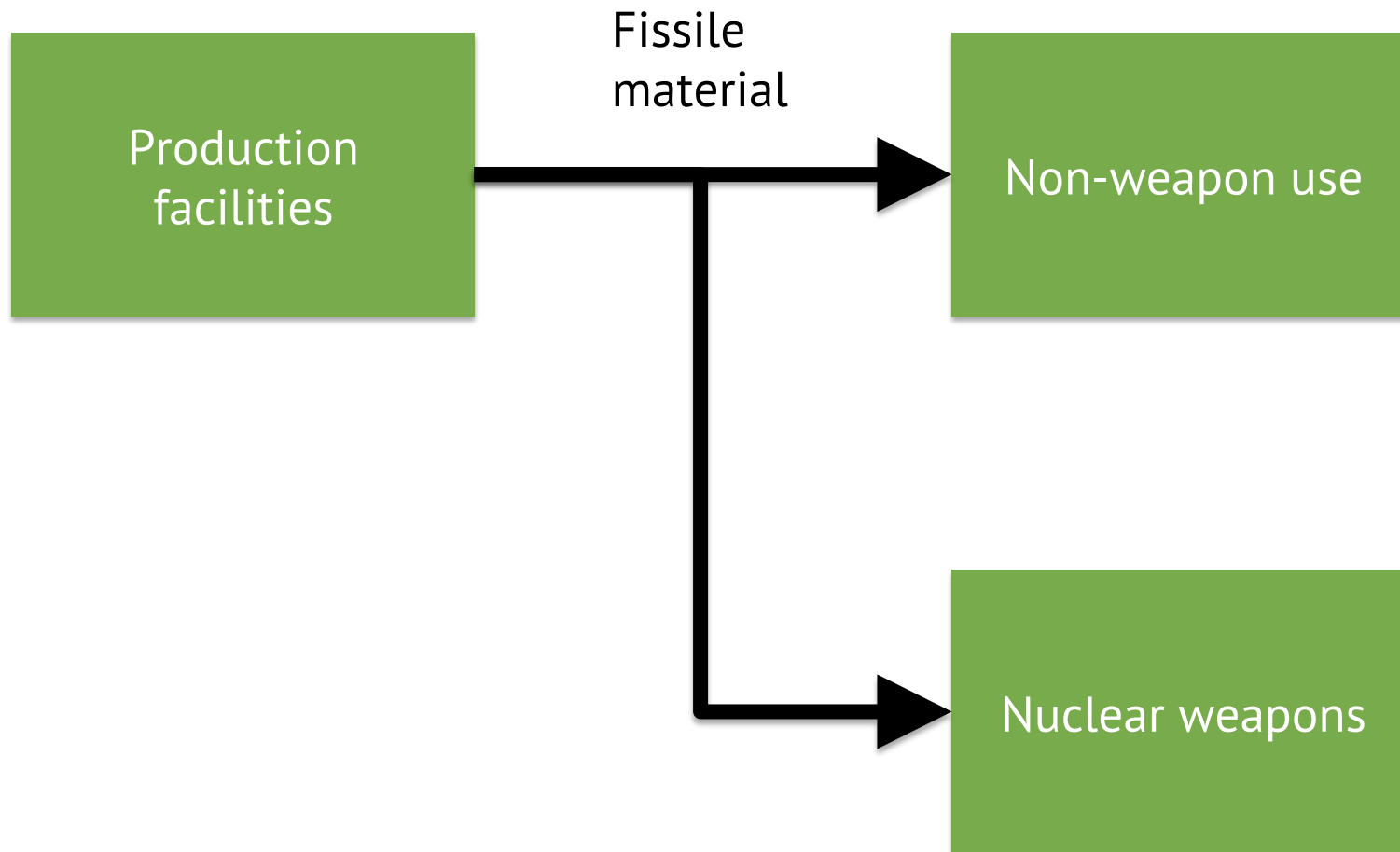
Some FM(C)T questions

- Definitions
 - Fissile material
 - Production, production facilities

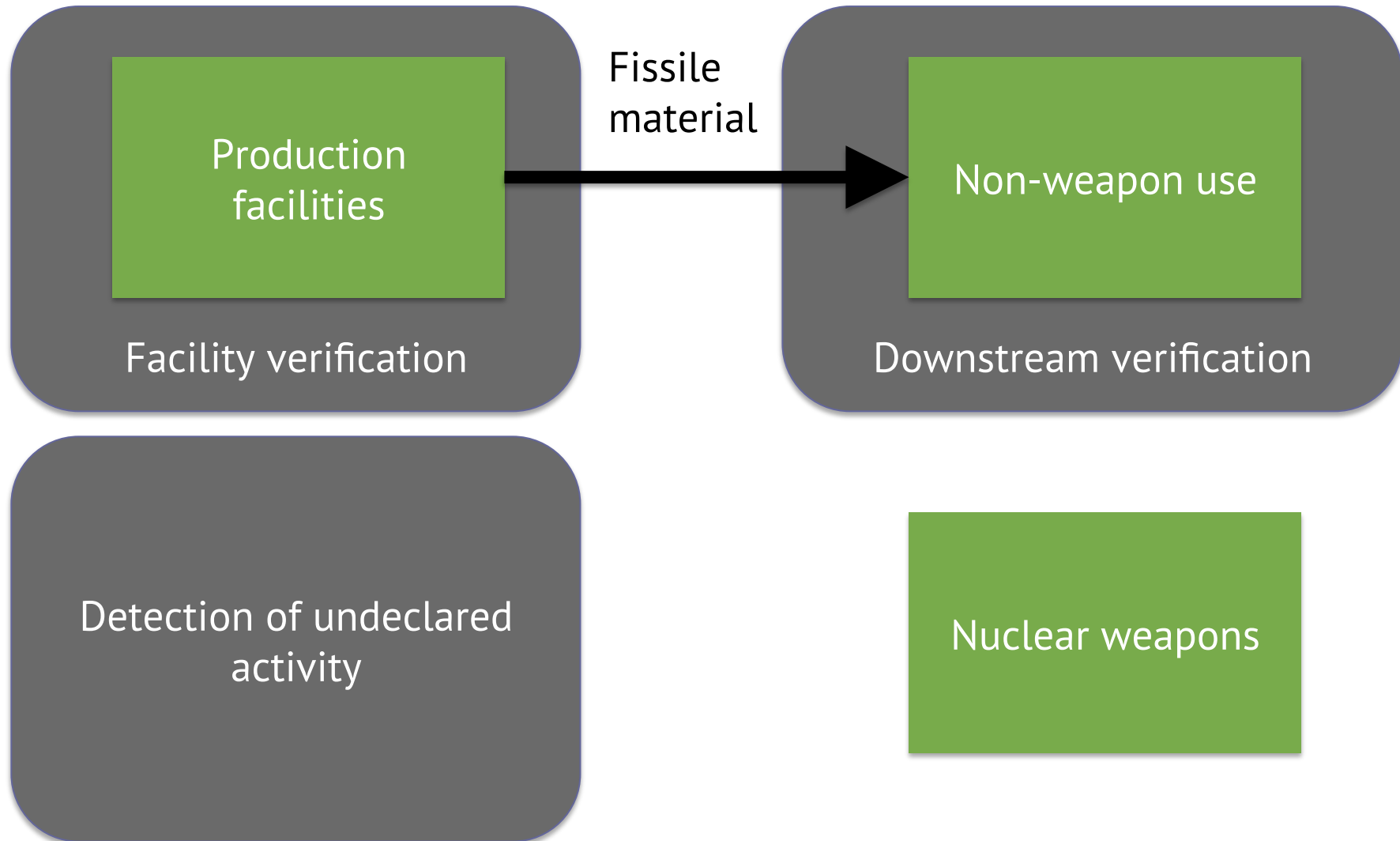
- Verification
 - Focused vs. comprehensive approach

- Scope
 - New material vs. existing stocks
 - Civilian and military material
 - Excess and disarmament material

Fissile materials and their uses

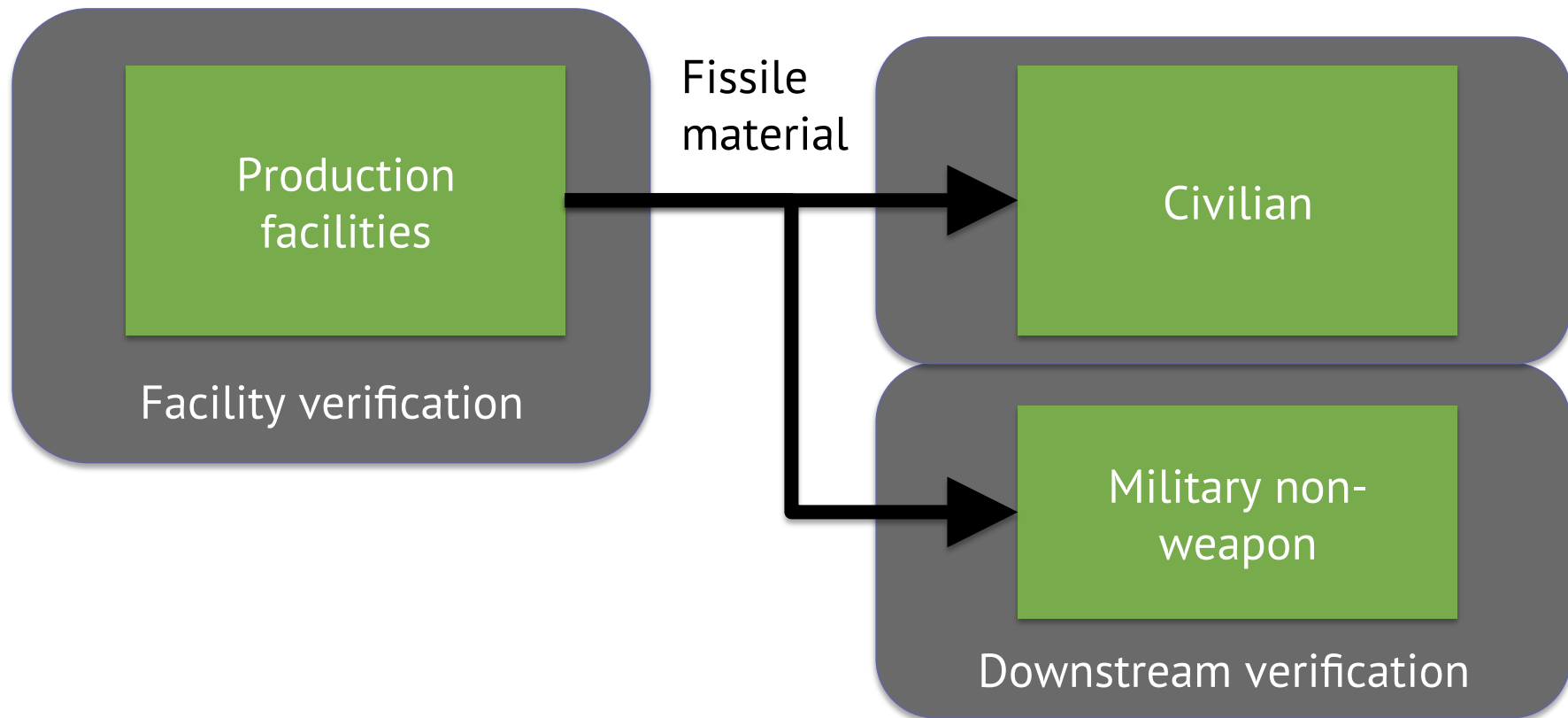


Key elements of the treaty



Non-proscribed military activity

- Naval reactors
- Military research reactors and critical assemblies



Verification at production facilities

- Production facility is a facility that produces fissile materials
- Possible exemptions
 - Facilities “not capable of producing” fissile materials?
 - Laboratory-scale facilities
 - Decommissioned and dismantled
- Facility-specific level of verification

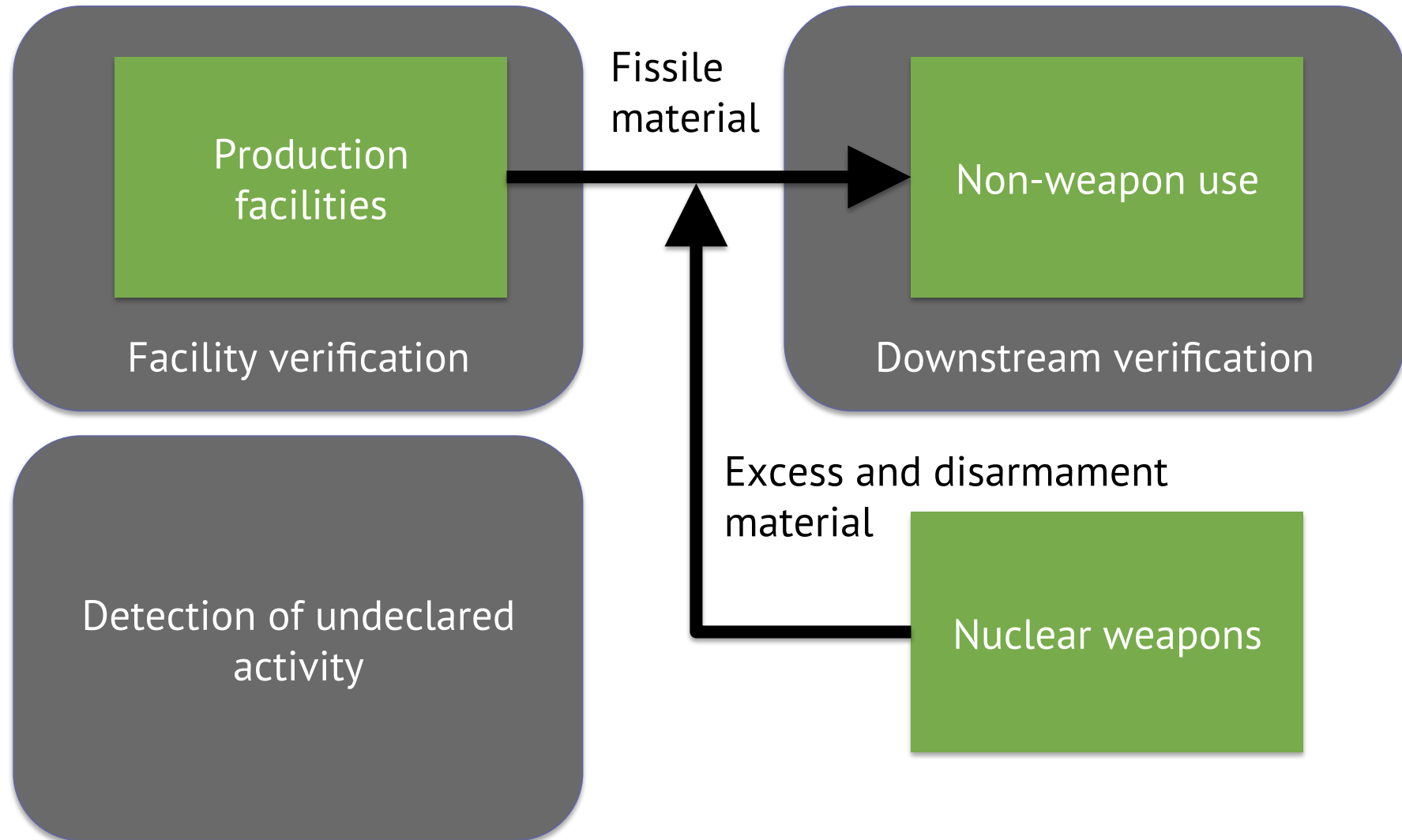
Detection of undeclared production

- Special inspections
- Environmental sampling
- Additional Protocol-type measures
 - High confidence in the absence of undeclared production may require rather intrusive “upstream” verification, up to uranium mining

Definitions of fissile material

- Nuclear material (Article XX of the IAEA Statute)
 - All enriched uranium
 - All plutonium, separated or not
- Unirradiated direct-use material
 - Highly-enriched uranium (more than 20% U-235)
 - Separated plutonium
- Weapon-grade material
 - 90% HEU
 - Plutonium with 90-95% Pu-239
- Intermediate-grade
 - ~40-50% HEU
 - Plutonium with ~60% Pu-239

FM(C)T and disarmament



DECLARATIONS OF EXISTING STOCKS

FM(C)T and existing stocks

- Shannon report:
 - The mandate “does not preclude any delegation from raising ... any of the above noted issues” – i.e. past production or management of materials

- States’ view on FM(C)T (2013):
 - Mexico: “The treaty negotiations should be part of a broad and comprehensive nuclear disarmament and non-proliferation process”

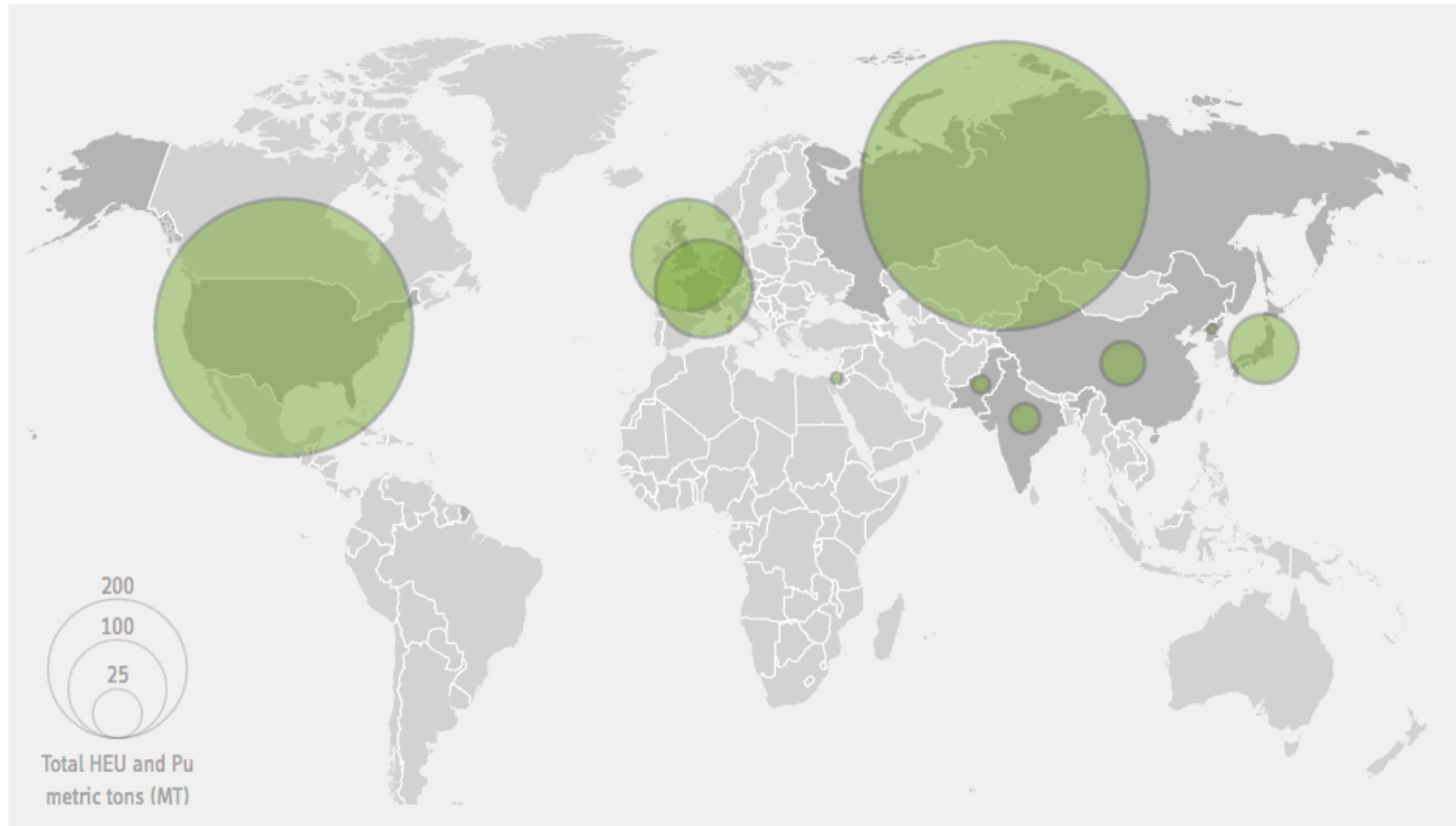
 - Switzerland: “A treaty should ... address past production of fissile material”

 - Brazil: GGE should “explore ... a phased process of destruction of all pre-existing weapons-grade fissile material”

Potential roles of initial declarations

- Trust and confidence-building measure
- Measure of progress toward nuclear disarmament
- Baseline for the treaty verification system
- Baseline for complete elimination

Fissile material stocks



Source: International Panel on Fissile Materials, fissilematerials.org

Status of declarations

	Military material	Civilian material
United States	Detailed account of plutonium and HEU production and inventories	Excess military plutonium reported as civilian
United Kingdom	Military HEU and plutonium inventory	Plutonium and HEU under Euratom safeguards
France	—	Plutonium and HEU under Euratom safeguards
Russia	—	Reactor-grade plutonium
China	—	Reactor-grade plutonium
India	—	Plutonium under IAEA safeguards

Voluntary unverified declarations

- Lack of common standard
- Errors and inaccuracies
- Potential for misunderstanding

Verification strategies

- What is “effectively verifiable”?
- Gradual approach
 - From simple declarations to gradual opening of records
- National technical means and independent analysis
- Fully verified declarations
 - Similar to the IAEA model

Verified declarations

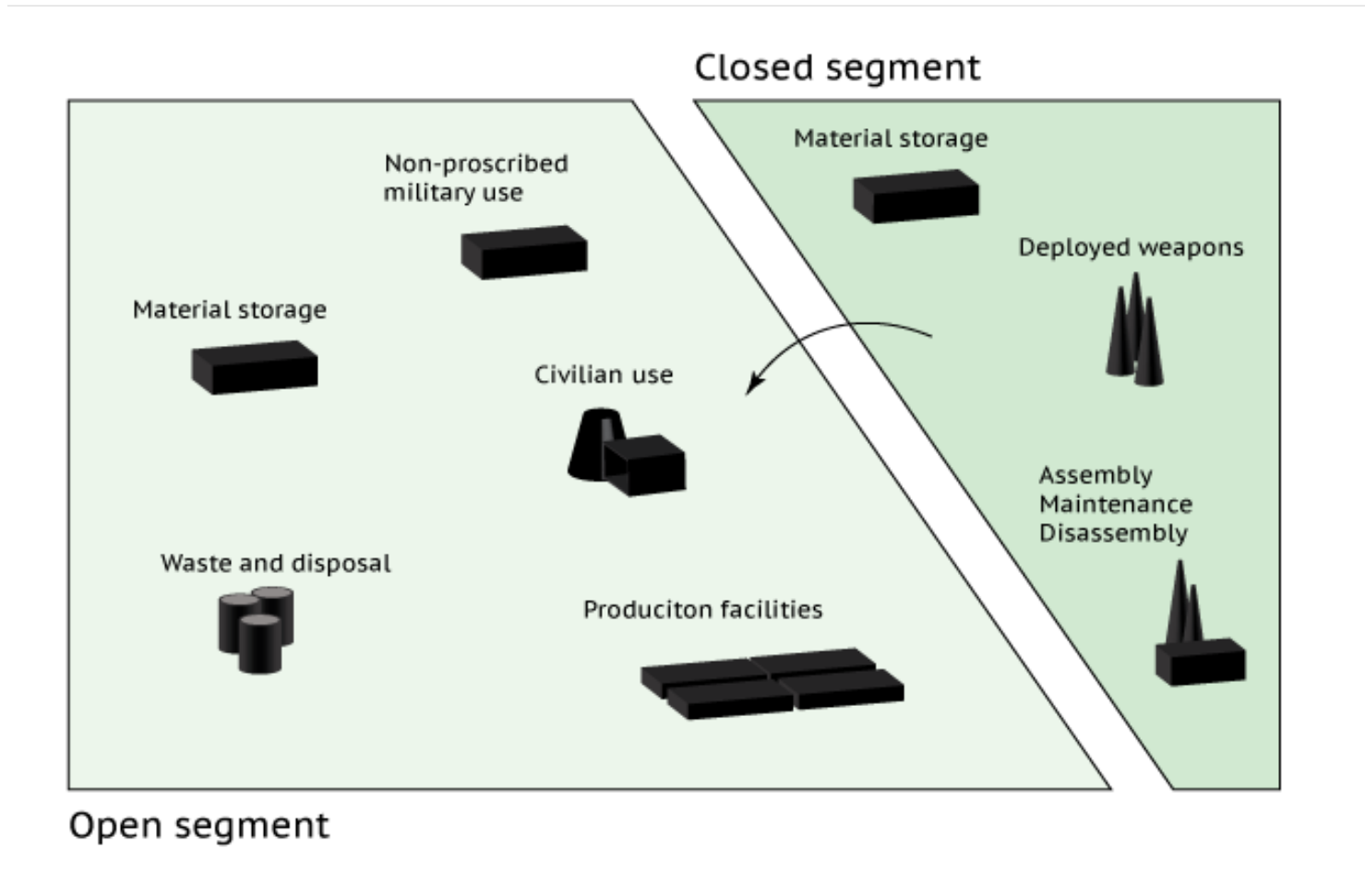
- Physical inventory
- Production and material balance history

Verified declarations

- Physical inventory
 - Lack of access to materials in active use
 - Limited accuracy of measuring material content
 - Waste, bulk material

- Production and material balance history
 - Limited accuracy and availability of production records
 - Potential proliferation sensitivity
 - Some removals are unverifiable

Deferred verification

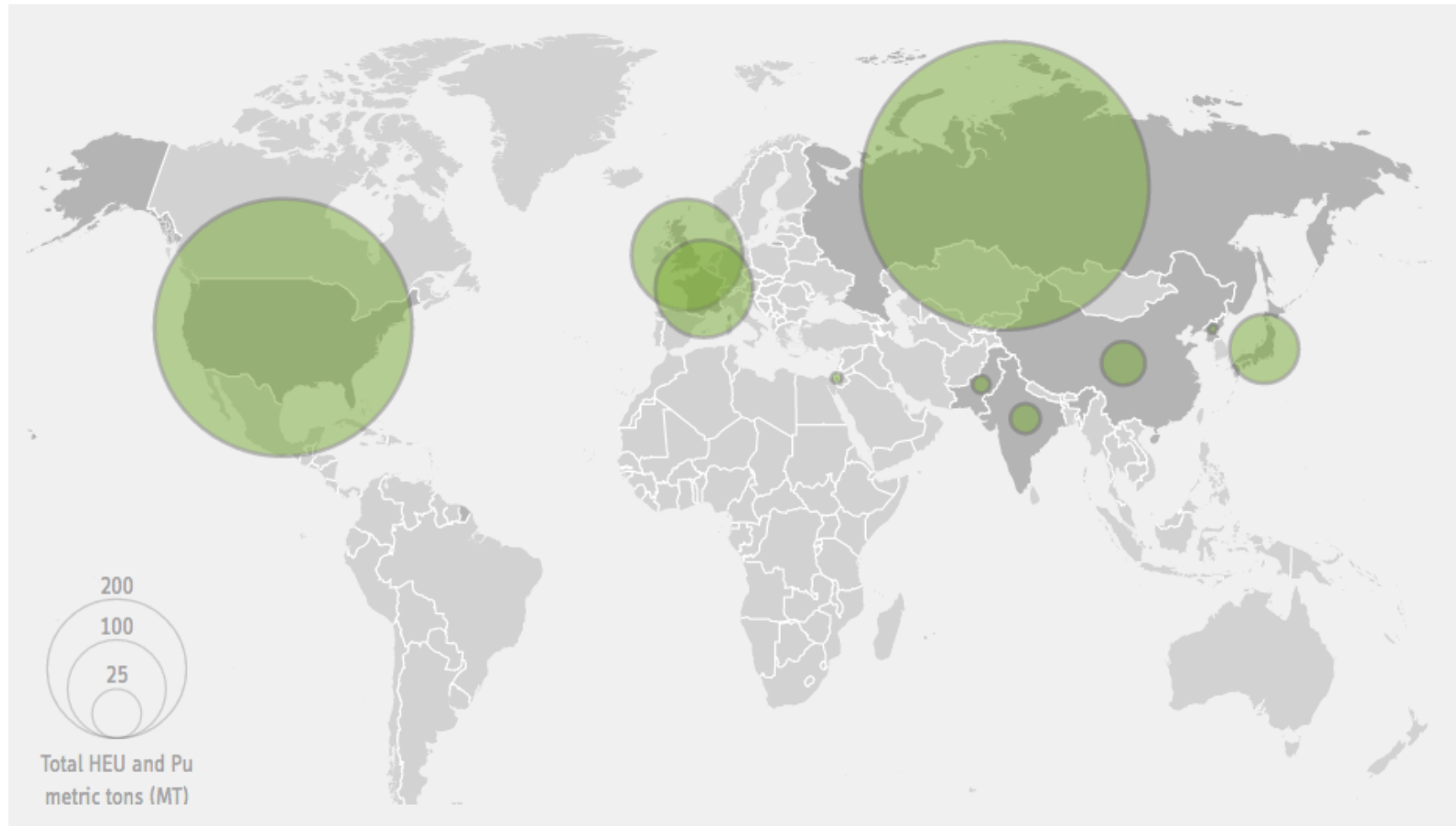


Open and closed segments

Closed segment	Open segment
Quantity of material known and declared with high accuracy	Quantity of material declared, but may not be accurately known
Active and reserve warheads, material for maintenance	Civilian material, material in mixtures, waste, disposed material
No verification access	Open to verification
No production facilities	All production facilities
No material added, all removals are verified	Ban on production of materials for weapons is in force. All new material is subject to verification
All weapon-related activities	Civilian and non-proscribed military activities
Initial declaration verified when all material is removed	Gradually growing confidence in the absence of undeclared material

DEALING WITH DISPARITIES

Existing stocks



Verification objectives: IAEA approach

- Objective:
 - Timely detection of diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or of other nuclear explosive devices or for purposes unknown
- Timeliness:
 - Time that would be required to manufacture a single nuclear explosive device from diverted material
- Quantity:
 - Plutonium: 8 kg
 - HEU: 25 kg

Verification objectives: Arms control

- Objective
 - Detect significant violation in time that allows to respond and offset any threat that the violation may create
- Timeliness
 - Time required to offset the violation
- Quantity
 - Violation “significance” may depend on the size of existing stock

SOME CONCLUSIONS

FM(C)T today

- There is a consensus on the basic structure of the treaty
- Even a treaty that covers only future production would create a valuable disarmament mechanism
- Verifiable declarations of existing stocks are possible
- The role of existing stocks needs further discussion