

# Prospects of nuclear proliferation, or of transition to a nuclear-weapon-free world

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## Abstract

We first provide a terse review of the status and prospects of nuclear-weapon proliferation, and we then discuss the present perspective of a future transition to a Nuclear-Weapon-Free World

## 1. The world-wide nuclear-weapon non-proliferation regime

### *The Non Proliferation Treaty*

The main pillar of the world-wide nuclear-weapon non-proliferation regime is the Non Proliferation Treaty (NPT). It entered into force in 1970. It distinguishes the States of the world in two categories: Nuclear-Weapon States (NWS) and Non-Nuclear-Weapon States (NNWS). The five NWS are those that demonstrated a nuclear-weapon capability (by testing nuclear weapons) before January 1, 1967: USA, Russia (as successor to the Soviet Union), UK, France, China. All the other States are categorized as NNWS. The NPT is based on three conceptual pillars: non proliferation of nuclear-weapon capabilities, nuclear disarmament (to eventually eliminate its discriminatory connotation), universal right to develop nuclear energy for peaceful purposes.

Now *all* States of the world are parties to the NPT, except three or perhaps four. The three States who never signed the NPT are India, Pakistan

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and Israel. The first two eventually acquired a nuclear weapon capability and demonstrated it by performing nuclear-weapon tests—underground, not to violate the Partial Test Ban Treaty which forbids all nuclear weapons tests except those underground, to which these States are parties. Israel is the third State that did not sign the NPT: it has an official policy of “ambiguity” concerning its nuclear-weapon capability, but it is universally believed to have acquired it over time. North Korea did sign the NPT, but at some point opted out of it and performed a few nuclear-weapon tests (underground); its status with respect to the NPT is unclear, and it is a matter of an ongoing negotiation with five other States (South Korea, USA, Russia, China, Japan), the outcome of which is hard to predict.

Certainly the almost universal support now prevailing for the NPT is a demonstration of its success, which was far from certain when it was initiated: at the time two of the five NWS were strongly opposed to it (the France of De Gaulle and the China of Mao), and several States had, at different stages of development, programs aimed at the development of a nuclear-weapon capability; so that at the time many “experts” predicted that the number of countries acquiring nuclear weapons would soon escalate, and for this reason opposed the signing and ratification of the NPT by their country and, more or less openly, advocated instead the initiation of a domestic nuclear-weapon program.

The NPT envisages every 5 years a Review Conference of the parties. The fifth Review Conference (in 1995) established (unanimously) that the NPT has no time limit. The next-to-last (May 2005) ended in disarray, with no agreed final statement. The last one (May 2010) ended with a unanimous agreement, including the principle of pursuing a Nuclear-Weapon-Free World (NWFWorld) (albeit without setting any definite time schedule). There also was an agreed decision to convene a Conference on the Middle East situation concerning nuclear weaponry, which might provide an opportunity to re-launch the prospect of a Nuclear-Weapon-Free Zone encompassing the extended Middle East (including Iran); this might conceivably constitute a context within which Israel might renounce its nuclear-weapon capability in exchange of a universal recognition, by all States in the zone, of its right to exist and of a credible guarantee (backed by adequate verification, involving also Israel) that no other State in the zone acquires a nuclear-weapon capability.

#### *Nuclear-weapon-free zones (NWFZs)*

The world-wide nuclear-weapon nonproliferation regime has another important component: Nuclear-Weapon-Free Zones (NWFZs). They now cover more than half of the globe, including the entire southern hemisphere. Many States belong both to the NPT and to a NWFZ.

*The risk of a collapse of the nuclear-weapon non-proliferation regime*

The collapse of the world-wide regime of nuclear-weapon non-proliferation might happen in two ways: proliferation by States; acquisition by sub-state (terrorist) groups of the capability to engineer a nuclear explosion.

In the long run, the alternative is clear: either widespread nuclear-weapon proliferation leading to the use of nuclear weapons and/or nuclear terrorism, with the prospect of major catastrophes, an end to our civilization, possibly the termination of *homo sapiens*; or the eventual establishment of a stable Nuclear-Weapon-Free World (NWFW).

Presumably the time scale of these developments is measured in decades rather than centuries.

## **2. The risk of nuclear-weapon proliferation by States, and eventually of their use “in anger”**

The critical areas are: The extended Middle East; South-Asia (the India-Pakistan conflict over the status of Kashmir); East Asia (the two Koreas; Japan, . . .); the rest of the world (Brazil, Argentina; Venezuela; Myanmar, Indonesia; . . .).

## **3. The risk of nuclear terrorism: the possibility that sub-state groups acquire the capability to engineer a nuclear explosion**

The explosion of a primitive (“Hiroshima type”) nuclear device in a city would be a sudden catastrophe, possibly worse than any tragic event in human history.

There exist terroristic groups who would cause such a disaster if they could.

A primitive nuclear explosive device could be easily manufactured clandestinely, and exploded, in a target city by a small terrorist commando if they could get hold of a sufficient quantity of weapon-grade Highly Enriched Uranium (HEU).

*One hundred kilograms would be quite enough.*

As a consequence of the enormous accumulation of weapon-grade HEU during the Cold War—and in spite of a significant elimination of this material during the last one-two decades, by downblending it to Low Enriched

Uranium (LEU) then used in nuclear reactors to produce electrical energy—there still are approximately *one million* kilograms of HEU; most of it in Russia, enormous quantities also in the USA, and smaller quantities (but still significantly larger than 100 kilograms) in several other countries. This material is *not* available for sale and is *in principle* well-protected; but not necessarily all of it *in real practice* (although the situation has improved over the last years, especially in Russia, both due to the improvement of the economic situation there, and thanks to outside collaborative interventions, mainly by the USA).

I consider still quite immanent the risk that a city be destroyed by a nuclear explosion engineered by a terroristic commando. Hence I believe that every effort should be made to protect all the existing HEU, to terminate all its civilian employments—by converting all research and naval reactors still employing HEU to using instead the much more compact LEU now available—and especially to eliminate (by downblending) *as much HEU as possible as quickly as possible*. The most important step in this direction shall hopefully be an extension—hopefully envisaging a fastest pace—of the HEU deal among the USA and Russia that will be soon completed (in 2013) after having eliminated 500 tons (*half a million* kilograms) HEU over 20 years (large part of the electricity now produced by nuclear reactors in the USA utilizes LEU downblended in Russia from HEU and then sold to American utilities; the overall income for Russia of this deal will reach approximately *ten billion USD*).

It is of course essential that, as long as HEU exist, all of it be well protected against theft or any other diversion; its accounting and physical security must be guaranteed, and it is presumably also quite important that all intelligence agencies (American, Russian, Israeli, . . .), both individually and cooperatively, organize “sting operations” in order to intercept any significant quantity of HEU that might be offered for sale by any “insider” who might have succeeded in getting hold of it.

It should be noted that the total elimination of HEU is quite compatible with the continued exploitation by humankind of nuclear energy for peaceful purposes.

The second material that can be used to produce a nuclear explosion is Plutonium: but it is considerably more difficult to manufacture a nuclear-explosive device using (weapon-grade) Plutonium than (weapon-grade) HEU. So the possibility for a small terrorist commando to achieve such a goal is somewhat less likely, even if they were to get hold of a sufficient quantity of Plutonium. It is nevertheless essential that, both now and in the future context of a NFWF, also Plutonium be carefully monitored

and protected. Indeed a component of the NFWF regime shall be a ban—sanctioned by a universal Treaty—to the production of *weapon-grade* Plutonium. The achievement of such a Treaty is one of the main items under current discussion at the Geneva Disarmament Conference, the institution where, in the United Nations framework, progress in multilateral nuclear disarmament, and related topics—such as the avoidance of a weaponization of space—are permanently under discussion.

#### **4. The prospect of transition to a Nuclear-Weapon- Free World (NFWF): from desirable utopia to political reality**

A date can be assigned to this development: January 2007, with the “coming out” in favor of the transition to a Nuclear-Weapon-Free World (NFWF) of a *bipartisan* group of four eminent American statesmen (former “cold-warriors”): George Shultz (Secretary of State under President Reagan), Henry Kissinger (Secretary of State under President Nixon), Bill Perry (Secretary of Defense under President Clinton), Sam Nunn (for decades Chairman of the US Senate Armed Forces Committee). Their main arguments was the unsustainability of the present world-wide non-proliferation regime unless a clear indication is given by the NWS of their willingness to proceed towards a NFWF and a collective world effort gets under way to establish it. The end of the Cold War has created conditions which make such a development feasible. A model—keeping of course in mind the relevant differences—might be provided by the, now existing, chemical-weapon-free world regime, based on the Chemical Weapons Convention (CWC), which bans the development, possession and use of chemical weapons and is supported by an effective verification regime backed by an international institution—the Organization for the Prohibition of Chemical Weapons (OPCW)—that *de facto* supervises the entire world chemical industry (a much more extended enterprise than the world nuclear industry).

The intervention of the four wise men had an avalanche effect in the USA and worldwide, demonstrating its timeliness and validity. In the USA it was eventually endorsed by a bipartisan majority of those who had served in key positions in previous US governments: former Secretaries of State and of Defense and Assistants of the US Presidents for International Security. Worldwide it often mimicked the original intervention inasmuch as it took the form of a public pronouncement by a *bipartisan* quartet of eminent political personalities. Indeed one of the first countries where this happened

was Italy: an open letter was published in the main Italian newspaper (*Il Corriere della Sera*, July 24, 2008), entitled “For a world without nuclear weapons”, and signed by a quartet of active politicians, all serving MPs: a former Foreign and Prime Minister (Massimo D’Alema), a former Foreign Minister and current President of Parliament (Gianfranco Fini), a former Minister of the Budget and of Europe (Giorgio La Malfa), and a former Minister of Defense (Arturo Parisi). At the time two of these four politicians supported the center-right Berlusconi government and two opposed it; now all four oppose the Berlusconi government, as a consequence of the recent political developments in Italy. Nevertheless it remains true that this quartet of top politicians does represent the entire spectrum of significant foreign policy attitudes in Italy. I helped to draft that paper and was a fifth signatory, acting as a kind of representative of civil society and of the scientific community. For a compilation of the many analogous stands taken in other European countries and worldwide see, for instance, the website ([www.pugwash.org](http://www.pugwash.org)) of the Pugwash Conferences on Science and World Affairs, the institution that was awarded the 1995 Nobel Peace Prize “for their efforts to diminish the part played by nuclear arms in international politics and in the longer run to eliminate such arms”.

In addition to a myriad stands taken by eminent personalities there were also pronouncements by politicians serving in key governmental positions. The most important of these was the Prague speech by President Obama (5 April 2009), the final part of which deserves an extended quote:

*Today, the Cold War has disappeared but thousands of those [nuclear] weapons have not. In a strange turn of history, the threat of global nuclear war has gone down, but the risk of a nuclear attack has gone up. More nations have acquired these weapons. Testing has continued. Black market trade in nuclear secrets and nuclear materials abound. The technology to build a bomb has spread. Terrorists are determined to buy, build or steal one. Our efforts to contain these dangers are centered on a global non-proliferation regime, but as more people and nations break the rules, we could reach the point where the center cannot hold.*

*Now, understand, this matters to people everywhere. One nuclear weapon exploded in one city — be it New York or Moscow, Islamabad or Mumbai, Tokyo or Tel Aviv, Paris or Prague — could kill hundreds of thousands of people. And no matter where it happens, there is no end to what the consequences might be — for our global safety, our security, our society, our economy, to our ultimate survival.*

*Some argue that the spread of these weapons cannot be stopped, cannot be checked — that we are destined to live in a world where more nations*

*and more people possess the ultimate tools of destruction. Such fatalism is a deadly adversary, for if we believe that the spread of nuclear weapons is inevitable, then in some way we are admitting to ourselves that the use of nuclear weapons is inevitable.*

*Just as we stood for freedom in the 20th century, we must stand together for the right of people everywhere to live free from fear in the 21st century. [Applause] And as nuclear power — as a nuclear power, as the only nuclear power to have used a nuclear weapon, the United States has a moral responsibility to act. We cannot succeed in this endeavor alone, but we can lead it, we can start it.*

*So today, I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons. [Applause] I'm not naive. This goal will not be reached quickly — perhaps not in my lifetime. It will take patience and persistence. But now we, too, must ignore the voices who tell us that the world cannot change. We have to insist, "Yes, we can". [Applause]*

The significance of this ending of President Obama's speech should perhaps be underlined by recalling that the slogan "Yes, we can" was the clarion call of his successful election campaign.

## 5. Recent positive developments: some examples

The New START Agreement among USA and Russia, entailing a resumption of verified USA-Russia nuclear arms control sanctioned by Treaty and some reductions of the strategic nuclear arsenals of the two nuclear Superpowers; signed in April 2010, it entered into force in January 2011.

In May 2010, just before the last NPT Review Conference, significant progress in nuclear transparency was offered by the USA: a complete disclosure of the USA operational nuclear arsenal, and of the new Nuclear Posture Review, restricting the circumstances of possible employment of nuclear weapons, and stating that the *fundamental* role of nuclear weapons is to *deter* an attack performed *with nuclear weapons* (hopefully the next step will be to establish that the *exclusive* role of nuclear weapons is to *deter* an attack performed *with nuclear weapons*, thereby opening logically the way to a *no first use* doctrine and to the eventual universal elimination of nuclear weaponry).

As already mentioned, in May 2010 the Quinquennial NPT Review Conference ended with a unanimous statement, while the previous one—May 2005—had ended in disarray, in my opinion largely because of the arrogant

attitude of the George W. Bush Administration (while the Non-Nuclear-Weapon States were severely requested not to proliferate, no progress in nuclear disarmament by the Nuclear-Weapon-States was then envisaged).

## 6. Recent hopeful developments: some examples (possibly indicating my wishful thinking)

The recent, significant improvement of the relations among the USA and Russia.

The postponement of the decision by the new (conservative-liberal) UK government to develop a new generation of Trident submarines (the only remaining component of the British nuclear arsenal), and the recent creation by that government of a Commission to assess the future of the British nuclear-weapon capability; the composition of this Commission suggests that it might conceivably even propose to terminate it altogether. Indeed, several former top military leaders in Great Britain already advocated such a development, on the basis of the financial strictures which make it difficult for the British military establishment to meet its tasks (such as the war in Afghanistan), while a sizable part of the military budget goes for nuclear weapons, which are militarily totally useless.

The (not yet finally accomplished) elaboration of a New Strategic Concept by NATO, with a commitment to being more open to collaborating with Russia, an alignment with the USA attitude to restrict the role of nuclear weaponry and support for President Obama's commitment to the vision of a NFWF as desirable, indeed essential, goal. Hopefully NATO shall soon, consistently with this attitude, also decide to withdraw the relatively few American nuclear weapons still stationed in Europe (down from over 7000 at the peak of the Cold War to one-two hundred), whose military relevance is universally recognized to be nil (the only type left are bombs for aircraft, which require months to become operational!), and whose symbolic significance in terms of burden sharing within the Alliance has now become laughable (during the Cold War they were stationed in almost all the European States members of NATO, now they are present in 5 or less out of 27 member States!).

The strong commitment manifested by several governments world-wide (including key States such as Germany and Japan), and of course by the United Nations, to progress towards a Nuclear-Weapon-Free World.

The creation of a *European Leadership Network for Multilateral Nuclear Disarmament and Non-Proliferation (ELN)*, mainly composed of eminent



politicians committed to work towards a Nuclear-Weapon-Free World (see the Statement signed by 36 European personalities, posted on September 29, 2010: [www/toplevelgroup.org/2010/09/29/europeangroupstatement](http://www/toplevelgroup.org/2010/09/29/europeangroupstatement)).

## 7. A final personal note

It is known that public opinions worldwide favour—by significant majorities—the transition to a NFWF. But there are some sceptics, especially among the so-called nuclear-weapons experts (especially among those with a civilian background, who make a living by pontificating on these matters). From these quarters it is often stated that “it is impossible to disinvent nuclear weapons”. But many social institutions have been disinvented over time: anthropophagi of enemy prisoners, slavery, chemical weaponry (after these weapons had been repeatedly used, during the twentieth century). Even war itself has now become unthinkable in certain contexts: the primary example is Western Europe, where the two World Wars took place. It is moreover remarkable that nuclear weapons have been employed in war only twice, 6 and 9 August 1945, Hiroshima and Nagasaki. They have never been used afterwards, even when States possessing enormous nuclear arsenal were defeated in war by States without nuclear weapons, for instance the USA in Vietnam and the Soviet Union in Afghanistan. This is the first time in human history that something of the kind has happened. It is an indication that, in some quite significant sense, we already live in a NFWF: a world were nuclear weapons are—*de facto* if not yet *de iure*—unusable. Were it not so, how to explain the fact that—by becoming parties to the NPT and possibly in addition to a NWFZ—almost all world States have voluntarily given up the option to acquire nuclear weapons; including several States for whom acquiring such a capability would have been technologically quite easy?

The recent, significant surge of pronouncements—by political leaders worldwide—in favor of a transition to a NFWF brings to mind the famous dictum attributed to Victor Hugo: “nothing can stop an idea whose time has come”. This is why I am confident that such a transition is *in fieri*. Obama said in Prague (see above) that this goal, *perhaps*, will not be reached in his lifetime. I am much older than he is, yet I entertain the hope—based on the evidence outlined above—that it might, *perhaps*, be achieved in my lifetime.

In any case I think all of us should do whatever we can to promote this goal; quoting again President Obama, *to seek the peace and security of a world without nuclear weapons*.