

World Governance of Civilian and Military Nuclear Energy

François Géré

December 2009

Proposal Papers Series



www.world-governance.org



Forum for a new World Governance

December 2009

info@world-governance.org

Picture Researcher: Dominique Monteau

Graphic design: Elsa Lescure

Printer: Causses et Cévenne



Attribution-Noncommercial-Share Alike

<http://creativecommons.org/licenses/by-nc-sa/2.0/>

This paper is covered by a Creative Commons Licence which allows readers to use, reproduce and circulate it on the condition that they mention the title, author and the Forum for a new World Governance. The paper cannot be modified or sold.

Contents

Introduction

Part One

Overview

I: Origins

1. Examining the relationship between civilian and military atomic energy, both of which share the same roots
2. 1953: “Atoms for Peace”: two steps forward and three steps back — the absence of a better solution
3. Arms Control: crises and ideas

II: Nuclear War & Peace

1. State power and nuclear capabilities
2. Motives for acquiring nuclear weapons
3. Nuclear destabilization
4. The rise of non-proliferation and the new generation’s changing perceptions of what constitutes the national interest
5. Military nuclear programmes and warfare
6. Military nuclear programmes: promoting peace
7. Civilian nuclear programmes as drivers for peace through sustainable development and levelling out of inequalities
8. Nuclear power and terrorism
9. Traditional morality and the new earth-centric ethics

Part Two

Towards a renewed world, one that will not instantly transport us to the hereafter

I: A Triple Transformation for the Century Ahead

1. The end of the Cold War and bipolarity
2. The new energy needs: quantity and quality
3. Humanity, nature and planet earth

II: New-Era Nuclear Programmes and World Governance: what are the timeframes?

III: Is Abolition still Possible?

1. The new abolitionists
2. President Obama and the “logic of zero” nuclear weapons, or how to promote the growth of a peaceful nuclear power industry
3. “Logic of zero” and the return of arms control...to achieve what?

Part Three

Proposals

I: Consolidate the Foundation of a New Diplomacy

1. Promote the idea of a world social contract for nuclear programmes, based on a raft of shared interests and negotiated between stakeholders
2. Create Areas of Nuclear Trust and Cooperation (ANTC)
3. External encouragement of bilateralism: facilitate the creation of virtuous pairs (China-India, Iran-Israel)
4. Diplomatic and technical application and support measures
5. Security measures and guarantees
6. Sanctions, penalties, compromise: where is the just balance?
7. Moving beyond traditional imbalances

II: What Actions? What Tools for Action?

1. The institutional environment

1.1 Creation of a World Civil Nuclear Planning, Guidance and Development Control Agency

1.2. Proposed International Arms Control and Disarmament Agency (IACDA)

2. Proposed new complementary structures

3. Inspections

4. Financing: combining law and interests

III: Technologies and People

A new social contract for nuclear programmes in an information age

1. The sociological dimension: a closed world of military and industrial secrets

2. A social microcosm: clans, families and groups; close-knit yet divided

3. A fraught relationship with government and civil society

4. Technological research and development: always put people first!

5. A global nuclear communications effort to aid reconciliation

English Acronyms

IAEA	International Atomic Energy Agency
NPT	Non-Proliferation Treaty
CTBT	Comprehensive Test Ban Treaty
Cut-off	Halt production of fissile material usable in nuclear weapons
INFCIRC	Information Circular
LEU	Low Enriched Uranium
HEU	Highly Enriched Uranium
Pu	Plutonium
C-3	Command Control Communication
EURATOM	European Atomic Energy Community
EURODIF	French nuclear fuel plant
EDF	<i>Electricité de France</i>
AREVA	French nuclear power operator
COGEMA	former name of AREVA
BRGM	French state office for geological and mining research
CFE	Conventional Forces in Europe
INF	Intermediate range Nuclear Forces (500-5500km range)
ACDA	Arms Control and Disarmament Agency
ABM	Anti-Ballistic Missile treaty
SALT	Strategic Arms Limitation Talks/Treaty
START	Strategic Arms Reduction Talks/Treaty
SORT	Strategic Offensive Arms Reduction Treaty
CEA/DAM	<i>Commisariat à l'énergie atomique/Direction des applications militaires</i> (French Atomic Energy Commission/Military Applications Division)
MTCR	Missile Technology Control Regime
R&D/T	Research and Development, Research and Technology
URENCO	Enriched uranium manufacturer
SLBM	Submarine-Launched Ballistic Missile
ICBM	Intercontinental Ballistic Missile
CTR	Cooperative Threat Reduction
TACIS	Technical Assistance to the Commonwealth of Independent States-CEI
AIDA	French industrial risk regulations

Introduction

Hell for humanity, bringer of peace and prosperity: the two sides of the nuclear coin. Managing them requires wisdom and foresight within the framework of good governance.

Which begs the question: what does the notion of “good world governance of nuclear energy” represent?

It simply means developing the nuclear power industry in a way that ensures that the international community as a whole, and each individual member, live in peace and prosperity on our planet. This process implies taking into account the existence of nuclear weapons and the problems raised by the risk of proliferation. Proliferation is defined as attempts to acquire nuclear weapons by states, or possibly by non-state organizations more or less illegally, sometimes even by certain governments in violation of undertakings such as those within the Treaty on the Non-Proliferation of Nuclear Weapons (NPT¹). In a process known as “deproliferation²”, the five nuclear powers that signed and ratified the NPT agreed to various commitments between 1968 and 1991 relating to the reduction of nuclear arsenals. This process was set in motion at the end of the Cold War, hand in hand with numerous security and confidence-building measures aimed at limiting the risk of confrontation. In early 2009, the USA made a strong commitment to reducing the role of nuclear weapons, a development expected to give a fresh impetus to the deproliferation process.

From the outset, nuclear programmes have attracted and repelled, for an extraordinarily varied and inevitably contradictory range of reasons.

International opinion first perceived nuclear power as the force behind the spectacularly destructive explosion of the two bombs dropped on Hiroshima and Nagasaki at the end of the Second World War. In point of fact, aside from in Japan, the event was seen as just one more horror by populations suffering from five years of atrocities (more in China’s case), notably terror bombing. All these operations targeted civilian populations, on both sides. This should never be forgotten.

In the civilian sphere, two major accidents created negative feelings towards the nuclear industry: at the USA’s Three Mile Island in March 1979 and April 1986’s more serious accident at Chernobyl in Ukraine. It is also sometimes claimed that the chemical plant accidents in Seveso, Italy, Bhopal in India, causing 3,000 deaths, and, to a lesser extent, the AZF plant in France in September 2001, causing 30 deaths, are on the same catastrophic scale. This is not the issue. The 4,000 deaths in Ukraine (according to a United Nations estimate) and the number of people affected to varying degrees by radiation (around 70,000) is sufficient cause for legitimate alarm.

¹ Signed on 1 July 1968 and effective as of 5 March 1970.

² Term invented by the author in 1995 to designate the reduction in the number of weapons owned by countries with official access to them, renunciation of the right to own illegally manufactured weapons (South Africa) and cessation of programmes judged to be proliferating (Argentina and Brazil).

Part One

Overview

I: Origins

1. Examining the relationship between civilian and military atomic energy, both of which share the same roots

In 1934, the Hungarian physicist Leo Szilard contacted the British admiralty about the possible military uses of atomic fission. Then, in 1939, Neils Bohr, with Einstein's help, began to attract President Roosevelt's attention. The result was the Manhattan Project, which brought together the whole range of scientific and technical knowledge in the free world at Los Alamos in the New Mexico desert. It took the Manhattan Project's scientists three years and an unlimited budget to not only develop atomic weapons, but also build up detailed knowledge of the future of nuclear energy, its advantages and drawbacks.

They discovered that there were two source materials: highly enriched uranium and plutonium.

That it would be fairly easy to move from fission to fusion, which would allow the development of weapons of previously unimaginable force.

That the underlying principles for operating a nuclear reactor made it fairly easy to switch from civilian to military applications.

Right from the start, it was clearly important to take precautionary measures to prevent the dangers observed outweighing the benefits hoped for. This led to the creation of the Oppenheimer-Lilienthal Commission. The Commission's report was made public in March 1946, proposing the creation of an international body that would own uranium mines and their by-products. It would be in charge of managing nuclear power stations and plants producing electricity. It would have a group of inspectors in charge of accounting for materials and checking facilities to ensure that no materials were diverted.

Bernard Baruch presented the plan to the United Nations on 16 June 1946. Although the Soviets showed initial interest in the plan, they ended up rejecting it, whilst the American administration showed waning conviction in presenting the plan, drawing closer every week to confrontation with its former ally. Spying scandals, especially Klaus Fuchs's betrayal and Bruno Pontecorvo's defection³, created a climate of excessive suspicion, which would soon develop into the paranoia of McCarthyism. Many scientists were convinced that the nuclear weapons monopoly should not lie with any one state or government.

³ Klaus Fuchs, a German physicist, took part in the Manhattan Project. Recruited by the Soviets in 1941, he was discovered and sentenced to 14 years jail in 1950. He was released nine years later and emigrated to East Germany. Bruno Pontecorvo was an Italian-born physicist who worked in France in the mid-thirties then in the USA, Canada and England before defecting to the Eastern Bloc in 1950.

Professor Edward Teller, Oppenheimer's assistant on the Manhattan Project, made deliberate attempts to thwart all efforts at restricting military nuclear development and internationalizing the civilian industry. Why? Possibly owing to anti-communist convictions, or a desire to become the "father of the hydrogen bomb" and take his revenge on Oppenheimer, who ended up being suspected of leniency towards communism. The fact remains that the Soviets, led by Andrei Sakharov who had helped Youri Khariton develop the fission bomb, immediately went down the nuclear road and, in August 1953, performed the first thermonuclear fusion test. In March 1954, the USA carried out the spectacular Bikini test. The arms race had started, leading President Eisenhower to try and bring a degree of order and control to the nuclear chaos that threatened to develop.

2. 1953: "Atoms for Peace": two steps forward and three steps back — the absence of a better solution

This was the expression used by Ike Eisenhower, which led to the creation of the International Atomic Energy Agency (IAEA).

It is interesting to observe the return of the same concept over 60 years later. The atom was key to the development of countries lacking in energy resources. These countries needed access to the civilian nuclear industry via an international agency, reporting to the United Nations, which would control nuclear technology transfers for exclusively peaceful purposes. The International Atomic Energy Agency (IAEA) was thus founded in September 1956 in neutral Vienna, and held its first general conference on 1 October 1957. It is important to understand that the IAEA's role was to promote the benefits of the atom, including medical and agricultural applications. Its task has never been to act as a non-proliferation watchdog. As far as the political context is concerned, the major differences lie in the Cold War and the accelerated development of nuclear weapons.

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was proposed in 1958 by Ireland as a means of achieving nuclear disarmament, the initial phase in global disarmament, and was eventually established in 1968. It initially constituted a sort of cooperative agreement limited to the two major enemy states. It aimed for strategic stability based on the terrorizing effect of mutually assured destruction (MAD). The NPT was rooted in two axioms. Proliferation had to be avoided, since the multiplication of nuclear states risked triggering uncontrollable crises. The dialogue between the two protagonists, already very fraught, was not to be disturbed. Secondly, the two major powers of the time agreed to guard against West Germany and Japan ever having access to military nuclear weapons, given their potential and speed of economic recovery. The treaty was therefore concluded for a period of twenty-five years, after which they would assess the situation.

This Cold War treaty established a principle of discrimination between powers assuming the right to military nuclear technology — Nuclear Weapon States (NWS) — and other states which renounced the right to build or acquire weapons — Non-Nuclear Weapon States (NNWS). In return, the treaty offered NNWS states two key commitments: a pledge to reduce existing nuclear arsenals, which was not kept until the early 1990s, and support for NNWS' efforts to develop nuclear power for civil purposes; this pledge has been widely honoured. Various dedicated bodies (the Zangger Committee and the Nuclear Suppliers Group, known as the London Club) sought to oversee the transfer of the most sensitive dual-use technologies so as to maintain safety from the non-proliferation standpoint.

However, a number of states (India, Israel, China, Brazil, Argentina and France) refused to sign or ratify the treaty which, notwithstanding its universal aims, actually constituted a very specific form of what was at the time becoming known as arms control.

But these principles and measures fail to attain true universality. They are constantly compromised by states for their own reasons, to serve their alliances and their interests of the time, and to further the influence they seek to exert, not to mention the economic benefits they hope to obtain through the export of nuclear technologies.

In intergovernmental relations, intransigence can on occasion give way to laxity amongst governments with changing views about what comprises national interest and the strategy of non-proliferation. The protective indulgence shown by the USA towards the Israeli exception constitutes a perpetual cause of diplomatic exasperation to every other Middle Eastern state. This does not prevent other governments from authorizing transfers of proliferating technologies: France to Iraq, and China to Pakistan and Algeria. It is for this reason that Iran poses such a problem today. Teheran proclaims the universality of the treaty, which it ratified in 1970. Noting that Israel is, for no good reason, treated as a special case, Iran's leaders assert that their country has been discriminated against since 1980. This discrimination has led them to acquire, not without difficulty and under semi-illegal conditions, such technologies as they should by right have free access to by virtue of their status as signatories of the NPT. The good faith of the Iranian government is certainly debatable, in light of its cooperation with Pakistan and its acquisition of centrifuges that have enabled it to construct a previously undeclared enrichment plant at the Natanz facility. Nevertheless, the principles of a treaty remain legally binding and cannot be blithely reinterpreted over time by any party. The principles interfere with, and at times even contradict, the patchily applied law in a domain of great sensitivity in terms of national security. Efforts must therefore be undertaken to remedy this, working in a universalist direction and no longer only from a perspective that corresponds to the interests of any one state, be it the most powerful or the richest.

The IAEA is not the NPT

Understand by this phrase that refusal to sign up to the NPT did not prevent some states from signing safeguard agreements with the IAEA covering inspection regimes for their declared installations, even if the only reason is the pre-existence of the IAEA. This is a key point. The IAEA is not, and should never become, an aggressive tool for investigating a state's industrial activities. In the beginning, its role was simply to inspect installations declared by states that had signed specific agreements with the agency, each with its own degree of oversight.

BOX 1: Inspection Measures

93+2, or the Additional Protocol

"93" stands for the year that the strengthened measures were designed, and "+2" is the deadline for their adoption. However, not all NPT signatory states have ratified the protocol.

Adopted as late as 1993 in a bid to strengthen non-proliferation following the discovery of Iraqi breaches, this has not been ratified by all NPT signatories.

Installations concerned: all those that might relate, even indirectly, to nuclear activities.

Inspection tools: unannounced inspections at short notice (a few days).

The level of intrusiveness: visits to all building, authorization to take samples from inside and outside the sites concerned.

INFCIRC (Information Circulars) /153 and 66, more restrictive. These commitments cover partial or comprehensive guarantees.

INFCIRC/66/Rev 2 was discussed and adopted in 1965, predating the entry into force of the NPT. This directive may affect states that are not signatories of the NPT and thus, by extension, it remains applicable to states that were signatories but that exited the NPT in the agreed manner. Although not retroactive, this introduces the idea of permanent validity covering previous activities.

The subtlety resides in the fact that a state that has signed a convention of this type is unable to extricate itself from its obligations, as it can by leaving the NPT. The obligations remain in force, and it is required to continue to acquiesce to supervision of its reprocessing and conversion facilities (note that enrichment is not covered). But will these legal subtleties carry weight in the event of a serious crisis?

BOX 2: Material Qualities and Properties

LEU (low-enriched uranium)

(see table of acronyms)

HEU (highly enriched uranium)

3 enrichment levels: 3-5% for reactors; 10-20% for propulsion; 90% for weapons.

Plutonium (Pu.): 239 for reactors; 240 for weapons.

This aspect is key to understanding the issues involved in an international cut-off treaty (ceasing to manufacture nuclear materials for use as explosives).

Few fields are as time-sensitive: the duration of materials and civilian and military programmes is a delicate issue. Structuring nuclear forces and renewing reactor installations both require skilful synchronization of timings. Planning errors are as costly as technical faults. They can destabilizing the energy supply or the strategic stability of the military sector.

BOX 3: Component Lifespans

Lifespan of a reactor: 40 years, in theory. However, upgrades can extend reactor life by a decade or more; for example, Fessenheim in France.

Lifespan of a weapon: a distinction must be made between the explosive nuclear material, the triggers and the chemical compression explosives, including components such as deuterium and tritium, which generate the neutron burst.

Tritium: 12 years (indispensable for triggering a fusion weapon)

Caesium 137: 30 years

Americium 241: 430 years

Plutonium 239: 24,000 years

Neptunium 237: 140,000 years

The length of the research and development phase for a ballistic nuclear weapons programme varies from state to state as well as according to the complexity of the required weapons system. The most rudimentary is not necessarily the simplest, since it is necessary to start from unknowns, or to rely on outside help which is not always very reliable. It would take 15 to 20 years to achieve a fully developed system that could be deployed with almost total reliability if no testing had been performed.

Apart from weapon triggers, timeframes are all approximately 20 years.

Decisions thus have to be made about commitments for a distant future about which little is known, since accidents, crises and break-ups can be envisaged but not predicted.

START 1 (1990), START 2 (1991) and SORT (2006), known as the Moscow Treaty, expire respectively in 2009 and 2012. To ensure the safety of the weapons, these milestones must coincide exactly with component lifespan and replacement cycles. This constitutes a highly complex structural management that allows for no error. (see **BOX 3**)

3. Arms Control: crises and ideas

The historical theory of arms control posited by Morton Halperin and Thomas Schelling rested on a handful of pragmatic principles arising from a specific situation: political impasse, an arms race that was itself dangerous, and the exorbitant costs that this entailed. This was the period that saw the arrival in office of Robert McNamara, who was US Secretary of Defense for eight years. McNamara and Schelling formed a highly ambiguous duo who cooperated as much as they argued. Both were trained economists and were convinced that it should be possible to resolve even the most difficult military problems by applying lessons drawn from business and management. This can only be understood once the sequence of events is examined.

- **Missile Gap and the Cuba effect**

The 1957 Soviet launch of Sputnik led to the belief that Moscow would soon have intercontinental ballistic missiles at its disposal, capable of striking major US cities. Goaded by the boasts of the Soviet leaders, the Americans decided that they had to catch up this dangerous inferiority at all costs. The Cuban Missile Crisis unfolded against this background of anxiety. It has been extensively studied and there are different views as to its true gravity. The fact remains that the USA drew two diametrically opposed strategic lessons from the affair, one leading towards an arms race, the other setting in place regulatory frameworks intended to finish with just such a race.

As a true historical turning point, although not a model, the Cuban crisis might help in formulating innovative proposals for nuclear governance motivated by a pragmatic desire for “realistic pacifism”.

At the same time as liberal academics were developing an innovative conceptual approach that led to a new diplomacy, in June 1962 Robert McNamara launched a strategic challenge in his speech at Ann Arbor, Michigan. Inspired by the crash programmes initiated by President Kennedy at the time of his inauguration and intended to bridge the missile gap, the Secretary of Defense outlined a nuclear strategy based on relentless attrition. The idea from the start was to drain the Soviet economy with the demands of military technological competition. This led to an exceedingly costly arms race that would prove the superiority of the USA. Reagan adopted the same principle in 1983.

1966 saw the publication of Thomas Schelling’s *Arms and Influence* which extended Schelling’s and Morton Halperin’s theories. Meanwhile, McNamara pursued his strategy until he quit the Pentagon in late 1967 during the shambles of the Vietnam War, a disaster that also affected Schelling.

The lesson the two men drew from the Cuban Missile Crisis was that, although there was no way out of the political impasse, neither the USA nor the Soviet Union had attempted to take irreversible action. The impossibility of reconciling irreconcilable political objectives and world visions did not rule out the possibility of coming to an arrangement over weapons, both in terms of quantity and quality. The challenge was coming to an agreement that would avoid everyone dying. The two sides had to find a way of cohabiting, even if it meant living in animosity, as a couple at odds. The destruction of the enemy naturally remained a goal, but not at the price of existence, a price which would demolish the very notion of victory.

This fertile intellectual questioning led to the decision to create the Arms Control and Disarmament Agency (ACDA) in autumn 1961, with John McCloy as its first director. This was an important step, since we will be using it as a springboard for a key proposal. Clinton dismantled the ACDA in 1999, less influenced by the end of the Cold War than by pressure from Republicans to reduce federal expenditure. In 2005 and 2006, the Republicans totally demolished the organization, wanting to purge it of the last “undisciplined and frequently disloyal” (sic) elements.

1957-1968 Chronology

1957: launch of the Soviet sputnik. Creation of the missile gap myth.

Late 1960: election of J.F. Kennedy who gave the green light to the crash programme, designed to bridge the missile gap.

1961: *Strategy and Arms Control* by T. Schelling and M. Halperin.

Creation of the ACDA.

June 1962: Robert McNamara's Ann Arbor speech.

October 1963: Cuban Missile Crisis.

1963: *Dr. Strangelove* by Stanley Kubrick.

1967: opening of negotiations between the Americans and Soviets to control strategic nuclear weapons.

The other concern was to curb the arms race for economic reasons. The process was costly not only in terms of GDP investment, but also in the use of expertise and a highly specialized workforce that could otherwise be working on civilian projects. The negotiators therefore sought to establish thresholds for launchers, the number of weapons and multiple warheads whilst trying to muzzle technological progress with the SALT agreements and 1970-72 ABM treaty which curbed space-based weapons research and testing. Their attempts were in vain, since the technology managed to overcome the obstacles and find support amongst Republicans in Congress and in the individual states. Ronald Reagan's arrival at the White House in 1981 unequivocally challenged the restriction efforts, and he instigated the Strategic Defense Initiative (SDI) in March 1983. The initiative, greatly influenced by Lawrence Livermore and Edward Teller (who remained an active figure), relaunched strategic competition based on economic and technological potential. Liberal capitalism and its support for high technology triumphed over the socialist Soviet economy, whose scientists were bogged down in a stratocracy. Reagan positioned himself as a nuclear weapons abolitionist. In 1985, in Geneva, he concurred with Mikhail Gorbachev's condemnation of nuclear war. Then, in Reykjavik in 1986, the proposal for total abolition of nuclear weapons arose out of the general confusion – and got nowhere. It was an idea that made a curious and more cautious comeback a quarter of a century later, in 2009. The Reagan approach sought to give a moral slant to the confrontation. Anti-missile defence was “Good”, whilst the nuclear weapons he wanted to render “powerless and obsolete” were “Evil”. In contrast to McNamara's cynical MAD, Reagan offered Mutual Assured Protection (MAP), an idea he imagined sharing with the Soviet Union. This was a remarkable strategic manoeuvre, constructed almost entirely by communications professionals: it presented an ethical face to the world whilst relaunching a major technology race in the same vein as McNamara in June 1962.

- **Comprehensive Test Ban Treaty (CTBT) and simulations**

The Comprehensive Test Ban Treaty has been through many incarnations since its signature in 1994. Two years later, the US senate with its Republican majority rejected the ratification requested by President Clinton. As a consequence, in 2009 President Obama continued to exercise extreme caution in order to obtain Congress' agreement. The end of testing went hand in hand with the development of simulations in the USA and France, with the Megajoule Laser, Airix and Cray supercomputers (for processing quantities of data estimated in teraflops) used to create reliable models. The objective is to establish a highly sophisticated knowledgebase so that these activities continue to appeal to young researchers, motivated by the technological challenges inherent in extreme environments. There is evidently a risk that very high technology introduces a new type of discrimination, with those who can control the reliability of weapons without resorting to testing on one side, and on the other those who remain more or less in a state of uncertainty. It would almost be tempting to envisage making a qualitative leap: engaging directly in simulation without first testing. Clearly an impossible solution, like trying to reproduce an object in the absence of the object. Unless, perhaps, the models were provided? But which government would accept transferring this type of data? We have to remain in the realms of the real! These sorts of hypotheses are nothing more than rash speculation.

- **The problem of cut-off and inspections**

In the wake of an initiative by President Clinton, in 1993 the UN assigned the Geneva Disarmament Conference with the responsibility for developing a treaty for halting production of nuclear materials with a military character, namely plutonium and HEU. France supported the objective and proceeded to halt production at its Marcoule and Pierrelate plants in 1995. China adhered to the treaty in October 1994. The idea was that the five nuclear states covered by the NPT, with sufficient materials for explosive purposes, could ensure that activities were halted in countries known as threshold states: India, Pakistan, North Korea, Iran and Israel. Other states, already signatories to the NPT, would merely have to reconfirm their commitment to abstaining from the military option. Only the details needed to be completed. And yet, seventeen years later, no progress has been made. Why?

Two problem areas arose at the time, with further difficulties developing over the years.

First came the question of the military character of uranium and plutonium.

New-generation nuclear-powered submarines use a fuel with a current enrichment level of around 10% for the most up-to-date propulsion systems instead of the 20% traditionally required. This level remains far higher than that introduced into ordinary civilian reactors, but is insufficient to be attributed a military character: 90%, enough to make a bomb. Nevertheless, a country that has the capacity to enrich at 20% would have no trouble enriching up to 90%. This is what poses the problem today in the case of Iran. In terms of plutonium, Carson Mark's 1962 test, made public in 1977 by the Carter administration, tends to show that it is not necessary to attain a very high level of purity in order to have a material that will react explosively to a chain reaction. But the American physicist worked with test conditions that would be difficult to apply for anyone wanting a reliable weapon from an operational point of view.

The second type of difficulty lies in the inspection process, which poses multiple problems: the international or strictly national nature of inspections and checks, the reliability of the process and thus the degree of intrusion, the quality of the information obtained, and the cost of inspections. We know

that the USA intends to focus on its satellite capabilities, whose results are jealously guarded, rather than international on-site inspections carried out by the IAEA. Unfortunately, experience has shown that satellites without quality human input do not know what to look for. Furthermore, small-scale storage units can always be used to dissimulate modest quantities of explosive materials, for example, 100kg of plutonium (enough to make approximately 15 weapons).

Combining different means and, in particular, avoiding placing trust in just one, should guarantee an extremely reliable checking process: satellite images and official forensic measures using different radioactivity sensors, backed up occasionally, when doubt prevails, with undeclared measures and the presence of on-site teams of inspectors.

If this type of agreement could be reached, what would be modified and how could it be improved? We examine the approaches, and limitations, of the anti-nuclear movement.

France has gradually set up a system for recycling its used military materials, thus obtaining a high substitution rate and guaranteeing the supply of existing weapons for several generations.

It is therefore useful to look at the evolution of accessible and saleable technologies that can be transferred legally or smuggled illegally. In the latter case, differences in technological quality play a major role: from China to Pakistan, from Pakistan to Iran.

II: Nuclear War & Peace

1. State power and nuclear capabilities

Over time, states of every kind (empire, monarchy, nation, etc.) experience variations in their power. These variations can be extreme, taking them from the highest summits to the abyss of disintegration and disappearance.

- There are two categories of power: status quo power, and destabilizing power.

Status quo powers seek to preserve acquired superiority and the prosperity that it brings. There are, however, two sub-categories: passive and active status quo powers.

The former preserve that which they have acquired through domination and leadership by adopting a powerful and static defensive attitude, and through fortifications such as the Roman Limes and the Great Wall of China that bar access to imperial territories.

The latter are those that strive to preserve superiority through adoption of an active defensive strategy that encompasses regional actions, the quest for technological superiority and the exclusion of potential rivals. Such strategy also includes preventative initiatives such as campaigns to reduce the threat posed by the enemy via incursions into its territory with the purpose of inflicting lasting damage on its capabilities. This principle of military strategy is evident throughout recorded history, and is generally accompanied by complex diplomatic manoeuvring to build alliances, as attempted by Bismarck during the period 1870 to 1900. The far more aggressive nature of this posture means that it comes with a strong degree of ambiguity. Does it not simply use the status quo as cover for a desire to wrest new advantages? The question is to know when there is a switch from one state of power to another, and what causes a state to opt for any one particular strategic posture; to understand when a power has reached full maturity, the peak of its superiority, its culmination (in a war context, this is the culminating point of an offensive). At what point does the great victorious beast feel sated? This applies to all the great conquerors: Alexander, Genghis Khan and Napoleon. Just how far do they want to go? When and why did the Roman Empire decide that it had attained its goals and that it had expanded sufficiently? The status of the USA has remained highly equivocal since the end of the Cold War. President Bush Snr. set out US objectives in 1990. A team led by Richard Cheney, Paul Wolfowitz and Ismay Khalilzad⁴ had drawn up strategic planning objectives intended to ensure the lasting dominance of the USA based on the idea of eliminating all new rivals of a size comparable to the Soviet Union. For the fact is that, in 2000, the neo-conservatives' goals went far beyond merely asserting power. They embraced the desire to make America a destabilizing power that sought to reconfigure regional systems, especially in the Middle East, according to US conceptions, values and interests. There were, however, no "barbarians" threatening to sweep into Washington! It took the 9-11 attacks to give the idea credibility with the public.

- There are three categories of destabilizing powers

- Ascending: in search of greater power, potential predators, against the status quo, against any order that would inhibit their appetites.

⁴ All three returned to power in late 2000. Mr Khalilzad went on to become the US ambassador to Iraq.

- Declining: they are losing their power and their disintegration sows disorder because of the contradictory appetites whetted by their weakness: Sick Men such as the Ottoman Empire. Just how far do they sink? Such cases must be examined by combining long- and short-term indicators (demography, health, internal security, size of informal economy, etc.). An interesting variant on this are powers only temporarily weakened which work to arrest their decline then to restore prestige (France when de Gaulle was first in office), or possibly the reality of a power nostalgically considered lost but that seeks to recover.

- Declining powers seeking to arrest their decline and to recover a portion of their power and their prestige. At what point does the turnaround occur? How is it achieved? Is civil and military nuclear power combined with energy resources sufficient in itself to relaunch a declining country? This seems to be the case for Russia, where the fact of being a nuclear weapons state is an asset in terms of both preserving and restoring power.

This leads to a key question: how does nuclear technology, whilst serving the different categories of stakeholders, affect their plans?

It is widely accepted, at least in the north-western parts of our planet, that all proliferators destabilize the established order or the balance of power existing at any particular moment. Equally, the destabilizer will tend to seek the acquisition of a nuclear arsenal. Here again it is important to question the nature of the political goal being sought. The status of destabilizer results from the nature of this goal. Take the example of North Korea. It is clear that this regime has no other goal than self-preservation, and that the destabilization provoked by its nuclear and ballistic posturing is intended to maintain its civilian and military leadership for as long as possible under the best conditions possible. Although it is undeniable that these ballistic-nuclear machinations are sufficient to irritate its neighbours and their allies, can they nonetheless really fear an aggressive move by the North Koreans based on use of these extreme mechanisms, a use that would lead to instant removal of the regime? This underlying principle is too readily accepted, and merits further examination. But to return to the fundamental question: why do some states, neither the most powerful nor the richest, seek to acquire nuclear weapons in the full knowledge of the inevitable drawbacks that such an enterprise entails?

2. Motives for acquiring nuclear weapons

Either to guarantee security and sovereignty. From this point of view, Iran is a destabilizing power by default, eager to overturn the status quo.

Or to assert newfound power (Iraq during the period 1975 to 1990) and then extort richer neighbours by virtue of a type of concealed blackmail. This might be termed aggressive sanctuarization.

Or to acquire (or recover) glory and prestige.

At the micro-strategic level, regional conflicts centring on local rivalries with limited wider implications. However, conflicts of this type can take on a disastrous character, as in the case of the seven-year war between Iran and Iraq (1981-1988) that saw a number of other powers acting in the background in support of one of the warring parties.

At the macro-strategic level, the fear of US conventional weapons superiority, or that of a major neighbouring continental power (such as Pakistan and India).

Civil nuclear programmes and, especially, the infinitely more spectacular military programmes are often linked to national prestige, glory and a certain historical revenge; witness declarations made by the Indian People's Party (the BJP, although in this regard the Congress Party is scarcely any less loquacious), and all parties in Pakistan and Iran. Perhaps too much emphasis is placed on this argument. The Pakistani and Indian nuclear tests of 1998 were widely exploited by both governments. However, in all countries that have had to submit to humiliation by the 'white man', the simple fact of attaining a level considered to be equal to that attained by the former masters is a matter of profound significance. This extreme sensitivity — something that the USA has no understanding of — will probably diminish with successive generations, but for the moment remains very much an issue, as attested to by schoolbooks worldwide.

Channels for proliferation and technology transfer are created and developed as a function of:

- the self-interest of economic forces seeking enrichment: the AQ Khan network; certain US companies who did deals with China, and European companies from France, Germany, the Netherlands and Switzerland which were selling sophisticated weapons to Iraq up to and including 1990;
- strategic alliances.

The battle to counter proliferation is not a priority for certain powers. Why? Recklessness? Narrow self-interest as soon as the threat is not on their doorstep? It might be to strengthen a rear alliance, as in the case of China and Pakistan. We consider it to be above all a product of global power imbalances.

The true problem today comes from the fact that the USA can call upon the world's most powerful conventional military force, a force whose budget never ceases to increase. This can but lead other states to seek a militarized nuclear capability to offset their conventional inferiority, a situation all too well described by Les Aspin as early as 1991⁵.

3. Nuclear destabilization

A nuclear weapon is a highly effective mechanism for disrupting the status quo of existing conventional forces. It sweeps away the unstable yet measurable underlying equilibrium between degrees of power. It is a troublemaker, something that prevents traditional forms of domination. The compensatory power of the atom does not level the playing field for the weak, but it does force an aggressor to renounce a major attack of whatever nature, be it conventional, chemical or nuclear. The atomic bomb therefore constitutes a restrictive factor in the development of military strategy, a hindrance to the full enjoyment of the coercive powers enjoyed by a superior power.

This is not because the USA does not know how exploit its initial success and gets bogged down once master on the ground. In 2003, the entire international community shared the experience. The UN does not protect states. The USA can crush the military might of a country the size of Iraq inside one month, although the Iraqi forces were admittedly a shadow of their 1990 counterparts. Thus, if the USA is serious about reducing levels of its own and others' nuclear weapons, it will have to undertake

⁵ Les Aspin (D) was then chairman of the Armed Services Committee in the United States House of Representatives. He went on to serve as Secretary of Defense (1993 -1994) under Bill Clinton.

a parallel process of reducing the defence budget: relinquishing half its aircraft carrier and submarine fleets. This would have the effect of rekindling the possibility of military defeat thanks to the relative levelling out of conventional capabilities. But was the Vietnam War not a defeat? Today, can not the US retreat from Iraq be seen in the same terms, at least whilst we wait to see what the outcome will be in Afghanistan?

But nuclear weapons are also troubling for the ideal of peace and those who embrace it, uncertain as they are of how to approach them. Some pacifists treat them as scapegoats, opportunistically exploiting their enormous symbolism as the absolute height of militarism. Commemorations of the bombing of Hiroshima are ritually marked by condemnations of the nuclear horror as the worst of threats facing humanity, a reminder of its dreadful effects on people.

4. The rise of non-proliferation and the new generation's changing perceptions of what constitutes the national interest

There can be no doubt that attitudes to the role of the nuclear industry in general, and to military nuclear programmes in particular, have changed enormously over the course of the past half century.

Civil nuclear power has undergone three phases: first came the optimism, bordering on arrogance, of the industry's backers (the 'nucleocrats').

The second phase was the relative climb-down during the period 1975-2005, an era notable for environmentalists' intensive criticisms of waste management and the risk of disasters.

Recent years have seen a resurgence, often presented as being civil nuclear power's second period.

As far as military uses are concerned, the initial anxiety provoked by the bombing of Hiroshima was simply wiped out by the effects of the Cold War, which triggered the arms race. It is also important to remember the historical experiences of European elites, forged in two world wars. They had experienced invasion, occupation and humiliation. They have a very different view of the risks posed by nuclear technologies.

In France, which suffered greatly from the disaster of 1940 and its consequences, the deterrence strategy offered by a military nuclear programme was the guarantee of survival. The British, who watched the disaster from close quarters, were also very interested in such a guarantee. National pride was an additional factor (General de Gaulle exclaimed "*Hourrah pour la France!*" after his country's first nuclear test in February 1960), although its influence was less enduring.

Contrary to the arguments put forward by pacifists and abolitionists, the partisans of nuclear deterrence considered that the weapon was not a means for projecting power, but was instead a counter, a balancing force, a precaution. For by virtue of their extraordinary power, nuclear weapons cannot offer domination either through their use, or the threat of their use.

A return to a more usual state of balance of power at the global level and the relaxing of major sources of tension led to a reinforcement of the non-proliferation strategy, to the detriment of more hawkish dissuasive postures. There is no doubt that in this regard the end of the Cold War constituted a major advance. However, the highly virtuous progress that occurred in relation to international law and the raft of ratifications of the NPT between 1990 and 1995 have their roots primarily in the profound

changes in the way states assess their national interest. This can be illustrated using three examples: South Africa, Ukraine and France.

In 1993, under conditions of the greatest discretion, South Africa handed over the nuclear weapons it had secretly produced as part of its long-standing collaboration with Israel to the IAEA. It was unthinkable that the new South Africa, with the end of apartheid and the arrival in power of the ANC, would hang on to its nuclear weapons. The matter was dealt with efficiently and with that remarkable degree of mutually desired discretion that only nuclear affairs can induce.

Ukraine, like Belarus and Kazakhstan, found itself in possession of nuclear weapons following the disappearance of the Soviet Union. Although matters were quickly resolved in Belarus and Kazakhstan, this was not the case in Ukraine. The country had paid a heavy price during the Chernobyl disaster and had need of a civil nuclear industry so that it could scale back its dependency on Russia. Glimpsing a possibility for national emancipation, Kiev decided to negotiate based on the strategic weapons located on its soil. This was a key step, one that stands as a turning point in the evolution of the diplomacy of non-proliferation. Ukraine was required to return the weapons to Russia and entered the NPT as an NNWS on the occasion of the 1995 Review Conference. That was the view taken by the Americans, backed by every European state. There was, of course, to be compensation, but the choice was to accept, or to face economic strangulation from both East and West. Ukraine reluctantly acceded under the watchful gaze of US Secretary for Defense William Perry.

The gradual shifts in France's position are highly revealing. They confirm the decisive nature of the 1990 break. President Mitterrand decided to give greater weight to the role of international bodies (the UN) and to strengthen Europe, as no counterbalance existed to offset the power of the victorious Americans. Strangely enough, the same period brought to light a number of hitherto unknown issues. The British secret services informed their French counterparts of the existence of a Chinese-supplied large-capacity research reactor at Ain Oussera in Algeria. France and China both then ratified the NPT. This was a turning point that opened the way for others to follow. Until the period 1990-1995 (NPT Extension Conference), the French nuclear industry claimed to be non-proliferating on the basis that it took all necessary precautions. Over the previous fifteen years, the civil nuclear industry, which remained closely tied to the state, had come to realize that the success of its development was in part contingent on its support of and cooperation with non-proliferation diplomacy. Liaisons between industry operators (AREVA-EDF-CEA) and the French foreign ministry were stepped up, largely replacing the role of the *Direction des Applications Militaires* (DAM) and military weapons administrators. This change in the national stance begged the (somewhat delicate) question of the degree of national independence or alignment with the US position.

Is non-proliferation an end in itself, as would seem to be the view held by members of the vast and influential community of 'believers'? Certainly not. It needs to be viewed in the proper context. Non-proliferation is a strategic instrument that serves the interests of all. At the international level, it is a tool that can be manipulated in order to attain hidden objectives centring on the preservation of existing dominance by maintaining acquired superiority. Frank Miller rightly seeks to reinforce the parallels (established by the NPT) between efforts made by proliferating states and conventional arms reductions made by nuclear weapons states⁶. The political motives of proliferators are wholly unrelated to reductions in US and Russian arms stocks, a process which will do nothing to modify the

⁶ Frank Miller, *Disarmament and Deterrence: A Practitioner's View*; p. 149 in *Abolishing Nuclear Weapons, A Debate*; Carnegie Endowment for International Peace; George Perkovitch and James M. Acton, editors, 2009

proliferators' position. Which means that the argument for the exemplary nature of non-proliferation is unfounded. Why? Because of the powerful strategic and political motives cited above. But can we find a way to break free from this overly traditional and bipolar vision?

National interests remain dominant, and it is not impossible to improve relations that are currently very strained and highly complex, such as those tying the three nuclear states, China, India and Pakistan. It is for this reason that a new type of diplomacy may be able to overcome these stumbling blocks, which it would be wrong to underestimate.

5. Military nuclear programmes and warfare

Let us start by acknowledging that the civil nuclear power industry cannot in itself represent a cause for war. However, nuclear installations are vulnerable to becoming high value targets in the event of war between two states, or the target of a terrorist attack.

Counter-proliferation action can be envisaged if it is suspected that civil activities are being diverted for clandestine military purposes. Israel has provided two examples, against Iraq in 1981 and Syria in 2007. Today, Iran runs the same risk, but on an even greater scale.

A difference must be made between:

war by nuclear means — the recourse to arms — that is particularly inexcusable because of its apocalyptic effects, but that might be justified as part of a strategy of deterrence,

and *war for nuclear means*, caused by attempts to acquire nuclear weapons and the opposing desire to prevent such an event from occurring.

The latter issue leads us to introduce a new distinction between the causes and motives for acquiring such weapons.

War by nuclear means

Nuclear weapons in themselves do not constitute grounds for war, far from it. But the decision to use them would provoke massive devastation that would imperil the human race and the future of our planet, triggering profound upsets such as the nuclear winter hypothesis. Once set in motion, a war of this type could be uncontrollable, leading to all-out war. To which must of course be added the scenario of an all-out nuclear war, imagined by US physicist Herman Kahn during the 1960s as he sought to “think the unthinkable”⁷: high intensity warfare encompassing the paroxysm of an uncontrolled escalation of nuclear strikes. Not only would all the adversaries be destroyed, but the state of the planet would be such that the survivors might envy the dead.

There are, however, other scenarios that also offer the prospect of obliteration. These are far more concrete as they are more limited and closer to reality. Invasion, occupation, exploitation,

⁷ Herman Kahn, an emblematic figure amongst scientists working for the Rand Corporation during the late 1950s and early 60s. He published several notable works on nuclear strategy: *On Thermonuclear War* (1960), *On Escalation* (1965) and *Thinking the Unthinkable* (1962).

collaboration, cultural debasement, the death of national identity. Such were the aims of Nazi Germany and the Soviet Union in Poland; such too was the destiny Hitler intended for France. It is not necessary to have nuclear weapons in order to eliminate a people and its cultural identity. The strategists responsible for France's nuclear deterrence capabilities always kept this in mind whilst they created a doctrine that would banish the prospect of so tragic a destiny.

Proliferation: a cause of war

Nuclear war is one thing, but a war whose origins lie in the desire to prevent nuclear proliferation is another. It is salutary to remember that, at one time, certain elements of the US military establishment sought to prevent Soviet accession to nuclear status by an extensive bombing campaign of their existing installations, an idea categorically rejected by President Truman. McNamara re-examined the idea in 1962 when considering an attack on Chinese installations — a plan similarly abandoned.

However exceptional their character, the acquisition of nuclear weapons is not an end in itself. It can be said that the majority of experts and diplomats engaged in non-proliferation seek to set aside issues of political motives and strategies, considering only capabilities. Why do states seek to establish nuclear industries? The answers to these questions will serve as the basis for our proposals.

A distinction must be drawn between law and facts, between the realities of relative degrees of strength, and between strategic considerations and perceptions of the national interest, all of which are unique factors that are not affected by the norms of international law. The fact is that proliferation, by which is meant the quest to acquire a military nuclear capability, is not of necessity an illegal enterprise.

There are three possible scenarios:

- the state is not an NPT signatory. It is therefore free to conduct its nuclear policy in complete legality. At least in theory, for it will find itself shunned by nuclear technology suppliers;
- the state is an NPT signatory but, like Iraq, Iran and, in its own atypical way, North Korea, it clandestinely develops programmes that constitute various degrees of violation of its commitments. Again, it is important to distinguish between Iraq's wholly clandestine programmes, North Korea's attempts to secretly divert plutonium from its reactors for reprocessing, and Iran's development at Natanz then at Fardoo, near to Qom, of centrifuge-based uranium enrichment facilities without having made the requisite timely declaration to the IAEA;
- a state with an operational nuclear power industry may decide to exercise its right to withdraw from the NPT by claiming a threat to its vital interests. Until now, states that have contravened, or are suspected of having contravened, the treaty have been treated as the 'bad guys'. But what would be the reaction were a 'good guy' such as Japan or Turkey to decide to travel such a path in the name of its national security and supreme interests?

Attempts to acquire a nuclear weapon can be a cause for war, or acts of war, so-called counter-proliferation, that take one of three forms:

- a) it is proven that the commitments and obligations have not been met. Punitive actions are subject to, and mandated by, a UN Security Council resolution. They take the form of sanctions;

- b) unilateral intervention by a neighbouring power keen to thwart the emergence of an exceptional threat (Israel in Iraq in 1981, and in Syria in 2007); pre-emptive force with no international legal backing, claiming the right to take military action in defence of national security;
- c) intervention by a distant power acting either on its own behalf, or to protect a threatened ally. As a rule, the USA has attempted to blur this distinction, claiming that proliferation of nuclear weapons and ballistic missiles might endanger its territory. Such an argument is very simple to propound since it has no technical basis, unless considering the very long term. Perhaps the day will come when the USA finds itself threatened by Iranian capabilities. If this does happen, doubtless the USA will take pains not to confuse its own security with that of its allies.

6. Military nuclear programmes: promoting peace

“Deterrence is peace!”

This was the slogan pushed by French politicians Alain Juppé, Philippe Séguin and others in 1995 in the teeth of the slight panic that gripped that country’s government when it became aware of the depth of hostility to France’s resumption of nuclear tests. The government was looking for a way to ease its isolation, and therefore also revived François Mitterrand’s 1992 proposal for a “concerted” European deterrent. The idea — which should have been revived earlier — did not meet with any more success. The response was generally polite, and categorically negative.

Working under less fraught circumstances, French strategists and certain foreign colleagues constructed a conception of the strategy of nuclear deterrence. There are endless publications that focus on this topic, which is by its very nature endless, and we outline below certain major themes.

Deterrence certainly offers no peace, neither universal nor micro-regional. It does make it extremely hard to set in motion a major attack of whatever nature, conventional, chemical, biological or, of course, nuclear, against the vital interests of a state that has the capability to reply with nuclear weapons. It is a fact that France has chosen not to define its vital interests. Such uncertainty must carry weight in the plans of any potential aggressor.

Regarding conflicts that take place beyond national frontiers, there is no *raison d’être* for nuclear deterrence, and no legitimacy in its exercise. The conflicts in the Balkans during the 1990s were self-evidently not an arena for deterrence. In 1994-96, it was strange, on an intellectual level, to hear certain perfectly intelligent German figures complain during the time of the French nuclear tests that nuclear power was no use at Srebrenica!

Does military nuclear capability serve the interests of those that seek to advance their interests and use pressure to increase their power? Can it be a positive force? The end of the Cold War saw the rise of another proliferation, of unpredictable theorizing about possible uses of nuclear weapons: ‘aggressive sanctuarization’, combined with nuclear blackmail, *deterrence against ‘mad’ elements*, *deterrence by the strong against the weak*. Speculative musings such as these have all proved to be devoid of logical basis but, from time to time, they resurface to be used to mask hidden interests and objectives, particularly the development of specific nuclear weapons capable of being deployed against limited targets.

Nuclear weapons constitute a factor in favour of relative regional stability, but one that is necessarily unsatisfactory in that it rests on the neutralization of direct massive military action by the agency of a morally unacceptable mutual terror, even if this is but temporary. Moreover, the strategic posture includes fear of a technical malfunction or a breakdown in rational perception of the gain to be had. The problem is that we have failed to find a better arrangement up until now. By which we mean nothing as radically effective.

7. Civilian nuclear programmes as drivers for peace through sustainable development and levelling out of inequalities

The development of the nuclear power industry, in its second phase, seeks to calm and resolve the root causes of confrontations of all types. Alongside other factors, it can help to ease tensions that may become the causes for major wars of the future.

Recourse to nuclear energy reduces tensions surrounding energy demands and related pollution. It leads to a reduction, at times small, at others larger, in new motives for waging war (eco-confrontations). The nuclear power industry can therefore exert a positive strategic influence in both micro and macro terms. A more just redistribution of available energy would soothe frustrations and cut the most flagrant inequalities in matters of development. From this point of view it would be wise to re-evaluate more justly the markets for certain raw materials, especially natural uranium from Africa. Former IAEA director Mohammed El Baradei is prepared to go so far as to link this situation with the risk of nuclear terrorism⁸.

8. Nuclear and terrorism

This is an issue used to attack the nuclear industry, especially since September 2001, by proponents of non-proliferation and by the anti-nuclear movement (which jumped on the bandwagon), relying in part on arguments put forward by the Bush administration, despite its diametrically opposed objectives. This is another instance of collusion by two 'extremes': ambiguous, unnatural, yet highly effective.

It is worth looking at what Graham Allison has to say. Allison is an academic and author of a remarkable essay on the Cuban missile crisis. He spent a brief spell at the Pentagon as under-secretary for Russian affairs and nuclear disarmament, and has doggedly propounded a theory that has become viewed as ungainsayable truth. With perseverance, and mixed results, Mr Allison has published numerous papers and made endless media appearances with the aim of promoting the idea that there exists an overriding danger of clandestine nuclear weapons transfers. He proposes new mechanisms for reinforcing the methods used to detect nuclear frauds, but that stop short of the use of massive military force in the cause of counter-proliferation. The idea centres on the creation of a database describing all nuclear material held by each state; it would then be possible to trace the origin in the event of a terrorist attack or clandestine transfer, and to hold to account the state that had made such a transfer.

It is an appealing idea, but there are innumerable difficulties with it. For a start, identification following a nuclear attack would require months of sample gathering and analysis in the midst of an

⁸ Mohammed El Baradei, *A Recipe for Survival*, 16 February 2009

environment devastated by an aggressive act. There is no guarantee that samples would enable a 100% accurate identification to be made. Also, a government could then claim that any transfers were made without its knowledge, and must therefore be the work of criminal elements. The Pakistani government could not be held entirely responsible for the action of the holding company controlled by AQ Khan. How, therefore, can the threat of nuclear reprisals against an identified state be believable? A more convincing suggestion is the creation of a World Anti-Nuclear-Terrorism Alliance. Member states would make a series of undertakings covering the exchange of information about the nature and grade of their nuclear materials, and the measures in place to prevent transfers to terrorist organizations or the theft of such materials.

The theft scenario

From 1990 onwards, the states of the former Soviet Union were considered to be fertile ground for illicit trading of all sorts. Numerous rumours were current about the sale of miniaturized weapons that could be carried in a suitcase or backpack, rumours that were lent credence by certain figures who had been unsettled by the convulsions witnessed in Russia, such as the Russian General Lebed. No such trades ever occurred; the KGB-FSB remained in effective control.

Another possibility is the transfer of nuclear weapons to a terrorist organization by a so-called rogue state. Such an action could be triggered by pure venality, in the case of North Korea, or possibly by ideological solidarity, such as that propounded by radical Islamism. The concept of the Islamic bomb has been current since 1994, although it has been overshadowed by the development of Pakistani military nuclear capabilities. We have subsequently been treated to rumours originating in the USA, Israel and India, but nothing has ever been proven.

Did Al-Qaeda approach AQ Khan? It is by no means impossible, to be expected even. What happened then? Why? Seeking to buy what? Khan had become a businessman, ready to sell components of sometimes less than top quality for high prices, as Iran's troubled experience attests. But none of this is to say that this man was in favour of trading weapons and the one-sided transfer of knowledge so deeply identified with its unique status of being owned by Pakistan alone. Did he consider cheaply offloading so many years of experience in order to satisfy the hazy aims, perhaps dangerous to himself, of a "flea-ridden" (*sic*)⁹ band armed with nothing more than their ideological fanaticism?

In Pakistan, the ideas of the role of nuclear weapons correspond to the principles of deterrence that exist everywhere worldwide. The path of that country's relations with India is a fine example of this truth.

The plain fact is that, once set against the reality of all the constraints that handling an atomic weapon entails, this idea becomes frankly implausible. What infrastructures do the terrorists possess for handling their weapon once they get their hands on it? How can such an enterprise be conducted in total secrecy? How can the operation be effectively put into action? How can the weapon be transported and activated once at the target? Even the most imaginative of experts are at a loss when faced with the innumerable technical difficulties that would have to be overcome. Such an operation has absolutely nothing in common with the ingeniously makeshift nature of the 9-11 action, which relied on astonishingly sparse resources (a few craft knives and one-way airline tickets).

⁹ Author interviews with heads of Pakistan's strategic forces, autumn 2000.

Radiological terrorism is, however, a wholly different prospect. Radiological products (radium, caesium, strontium, tritium) found in countless apparatus (medical, lighting, smoke alarms, etc.) can be used to build 'dirty bombs'. Although fairly harmless, such an attack would be a disaster in political and psychological terms. The thought of a city centre radiological attack is every government's nightmare, and the world over governments are preparing to manage an event about which we know absolutely nothing. Ever since the 2002 Prague summit, certain NATO force manoeuvres have been adjusted in order to prove their ability to adapt to new situations such as this.

9. Traditional morality and the new earth-centric ethics

- **Reflections on the anti-nuclear movement: seeing into the future by looking to the past**

It is important to take pains not to confuse movements seeking to abolish nuclear weapons with anti-nuclear movements pursuing resolutely pacifist aims. The ambiguities of the positions taken by the former group are self-evident. Not only are they absolutely not pacifists, many are even in favour of a new generation of civil nuclear power. This is why they accord particular importance to strengthening active diplomatic initiatives to promote non-proliferation.

Resolutely anti-nuclear bodies, such as Greenpeace, seek nothing less than the complete cessation of all nuclear activities, citing concern for the well-being of humanity and our planet. Their strategy has been to progressively turn the spotlight on various branches of nuclear activities. They began by opposing weapons and tests because this is the most obvious point of attack, and the most useful from a total denuclearization standpoint. In the same way, plutonium has also been a special target for abolitionists because of its special properties, as we shall see below. Because of the fundamental differences in their ultimate aims, anti-nuclear movements and abolitionists have only limited common ground and are thus confined to forging temporary tactical alliances and other forms of short-term arrangements.

Let us leave aside commercial interests and questionable connections, examining instead the sincerity of the heartfelt anxiety that has gripped an anti-nuclear generation and motivated its actions; for instance, French presidential candidate Mitterrand's 1980 commitment to cancelling the planned facility at Perros-Guirec in Brittany. These anxieties touch on the very survival of humanity and, progressively, our environment, the place where we live, and, by successive shifts, the earth as a place becomes the focus of the same concern. This commitment also flows from the rejection of all that is considered to be a factor for destruction, as opposed to conservation, preservation and protection, even restoration, by halting pollution and rediscovering the ecosystem's previous natural state. The earth is not a dustbin for industrial waste, nor for the most redoubtable types of nuclear waste, because of the very great length of time that some of them endure. Rejection of destruction thus goes hand in hand with a rejection of war and opposition to the development of the arms industry. The reasoning process comes to a logical close, and gives rise to a wholly coherent way of thinking. Green pacifism has emerged progressively to battle against every assault on nature's purity, seeking to defend the ecosystem: environmentally- and ecologically-driven ethics. An agonised moral doctrine of the world

in danger¹⁰. Nuclear energy has come to embody nameless fears and deep-seated anxieties. And it is not over; servicemen and women retroactively come forward seeking damages.

A sociological examination of militant anti-nuclearism leads to the proposed social contract set out in Part 3.

Nuclear power is evil! And not just because of the weapons, but also in the light of a certain vision of economic development, the evolution of humanity and our relationship with nature. This is dogma, sectarian even, bordering on the irrational, as has been shown by countless well-intentioned sociological studies.

The sociological study of militant anti-nuclearism¹¹ well illustrates the fear and incomprehension produced by the impact of a lack of communication. Such anxieties occur in addition to libertarian principles that demand that the state be opposed, and nuclear programmes are viewed as the summit of state oppression. Regional attachments are crushed by centralizing states, which destroy regional autonomy and arbitrarily impose the installation of dangerous activities without consulting local people.

In Germany, environmental activists have taken a very serious, and radical, approach to the problem. The Greens have based their arguments on constructive alternative proposals, thereby becoming well-regarded actors on the German political scene. For its part, Greenpeace has managed to construct a scientifically-based counter position thanks to the concerns of civil nuclear power professionals who are genuinely scandalised by the manner in which the nuclear industry abuses its power. But the real weakness lies in the absence of alternative industrial models that are grounded in reality. Enemies of plutonium, and the nuclear industry more generally, are able to turn to the oil and enriched uranium industries for support. Anti-nuclear activists are seen as opposing progress, economic growth and general prosperity. This will lead them into isolation.

Alternative energies such as solar and wind, notwithstanding their strong progress over the past few years, cannot yet offer results likely to meet the growing demands for energy quickly enough.

- **The strange case of the anti-plutonium activists**

These various categories of opponents include a very particular type, one that fights plutonium above all other considerations. It is an artificial (not natural) element that appears to have little to recommend it. It is a by-product that has to be reprocessed by a specialist industrial process. Plutonium reactors also generate other highly radioactive wastes such as americium, strontium and neptunium.

Insofar as plutonium is used in the manufacture of weapons, and to operate new generation reactors, it represents a choice target for anti-nuclear movements and pacifists. The strategy is to criticize arms in the first instance, particularly civil plutonium programmes, and then to attack the nuclear industry as a whole. It is a strategy of progressive strangulation: if there is no longer any weapons grade Pu available then it becomes impossible to make any more weapons using highly enriched uranium, so its production can be halted too. It is a question of cut-off. Reducing the material used means drying up

¹⁰ Spencer R. Weart, *Nuclear Fear*, Harvard University Press, 1988

¹¹ A. Touraine with M. Wieviorka, *La prophétie antinucléaire (The Anti-Nuclear Prophet)*, Le Seuil, 1980

the source; reducing the material available means using only that which remains available, without any renewal! In the USA, the civilian nuclear sector abandoned the plutonium-contaminated waste reprocessing industry in favour of enriched uranium. This move was subject to extensive criticism, often inspired by competitive considerations. The objective convergence of disparate interests in opposition to plutonium and the reprocessing industry has led to the appearance, then disappearance into the limbo of the media world, of a range of unlikely figures united in common cause, but without us ever gaining an understanding of their motivations, aside from their declared convictions. Can it be pacifist beliefs? Is it a desire to promote the interests of industrial competition? This is a domain that plays host to a wide range of contrasting figures, including Albert Wohlstetter, a vehement opponent of proliferation, somebody close to supporting outright abolition, who criticised France's proliferation activities as early as 1960¹². This is hard to fathom. Again, it is worth identifying each stakeholder's interests, their reasons for taking a stance and their actual convergence.

Mykle Schneider is a tireless opponent of nuclear technologies who has dedicated much time to fighting reprocessing in France, first by COGEMA then AREVA¹³. He is unstinting in his denunciation of "the waste nightmare"¹⁴. Doctor Abraham Béhar, a Jewish former pro-Palestinian activist and president of the Franco-Albanian Friendship Society, found himself a new cause to fight for by demonizing plutonium during the 1990s¹⁵. It is also highly revealing to examine the career of Jonathan Schell. As a journalist, he began his career by denouncing war crimes committed by US forces during the Vietnam War. He went on to become a leading figure in the fight against nuclear weapons, publishing *The Fate of the Earth* in 1982, *Abolition* in 1984 and his latest book, *The Seventh Decade* in 2007. His recent public pronouncements, set against the new abolitionist context, have shown some cautious change, but he remains resolute¹⁶.

These were the arguments about plutonium that raged during the Cold War years and in its immediate aftermath. There are two reasons why they no longer apply today. First, because the nuclear power industry has modernized and restructured; then, because our perceptions concerning the environment have changed profoundly, as we shall be examining later on. Problems are considered on an entirely new, and infinitely greater, scale. From this standpoint, Greenpeace's activities henceforth appear insufficient and tardy as its narrow focus is now outdated, thanks to the very efforts of the organization to get its message heard.

An entire generation, from 1970 to 2000, has witnessed an argument between two sectarian and intransigent positions. It has become very important to move beyond these ancient divisions in the hope of establishing a system of nuclear governance that, if not unanimously approved — which will never happen — at least aims to garner a very wide degree of long-lasting consensus. This is even more pressing as today's ethical debate has changed fundamentally in nature, and is drawn irresistibly

¹² Albert Wohlstetter, *Nuclear Sharing: NATO and the N+1 Country*. *Foreign Affairs*, Vol. 39, No. 3 (April 1961), pp. 355-387

¹³ International Network of Engineers and Scientists Against Proliferation, Information Bulletin 28, April 2008

¹⁴ *Le cauchemar des déchets (The Waste Nightmare)*, documentary aired on Arte, October 2009.

¹⁵ *Plutonium, Or mortel de l'âge nucléaire (Plutonium: the Deadly Gold of the Nuclear Age)*, *Médecine et Guerre nucléaire*, vol.VIII, no. 3, July-August 1993.

¹⁶ *Abolishing Nuclear Weapons, A Debate*, George Perkovich and James Acton, editors, Carnegie Endowment for International Peace, 2009.

towards new ecological concerns. The problem of the relationship between humanity and its environment offers an outline for a new ecological code of ethics that must take account of the civil nuclear power industry as well as worries surrounding non-proliferation.

But are today's anti-nuclear activists the same as those of thirty years ago? Are they driven by the same motivations, do they follow the same ideology? Even if there exists an old guard that clings on, the new militants are clearly influenced by increasing governmental acceptance of the demands that were put forward by their elders. Pursuing the same overall objectives, they are inevitably forced to modify their vision as they embark upon the process of becoming stakeholders: not protestors, but partners with access to the decision-making process. We can observe a structural crisis in the anti-nuclear movement as civil nuclear power is henceforth considered an environmentally-friendly solution to the challenges presented by global warming. Many countries are turning to the civilian nuclear power industry either because of the inexorable exhaustion of their fossil fuel reserves, or as a way of ensuring sustainable and environmentally-friendly development in under-developed countries. The gravity of the crisis is such that it even impacts the foundations of historical anti-nuclear positions. It is untenable to deny steadfastly developing countries in what we once termed the third world the right to develop in accordance with ecological good sense. This is where lies the good fortune and historical significance of the alternative globalization movement: a synthesis of old and new worlds. Alternative globalization, when understood to embody a guiding spirit of global co-operation, and based on fair and sustainable development, has taken up the reins, realizing that although it might not become the dominant power model, it will eventually, at the very least, be in a position to negotiate a share of the power.

We then need to examine the ethical debate which occurs in spiritual realms: the Churches, non-violent sects such as the Jehovah's witnesses, conscientious objectors and all whose influence derives from the spiritual sphere, regardless of any specific doctrinal content. Such groups reflect on the morality of nuclear technologies. But what is being discussed? Is it all things nuclear? Which would be like asking, absurdly, if electricity is moral. Is it just weapons? But everything hangs on the use that is made of them. The strategy of deterrence relies on the principle that major wars are impossible thanks to the threat of possible overwhelming reprisals. Churches worldwide have pondered this dilemma for fifty years. An imperfect peace, meaning the absence of war as the result of immoral deterrence would not, in principle, be acceptable. But is virtual terror that inhibits war acceptable, if it prevents a greater evil? Stimulated by the thoughts of leading religious thinkers and academics, questions such as these, inviting to the theologically minded, were debated against the background of the Cold War. The Churches were by no means insensitive to the fact that the enemy was atheistic communism, a persecutor of believers. Once communism disappeared, it was time to reconsider the issue of the legitimacy of nuclear deterrence vis-à-vis all those states, formerly members of the Soviet Union, within which religion resumed its place with all the fervour of the newly liberated.

The Churches never accepted nuclear weapons; during the Cold War¹⁷ they tolerated, at best, the strategy of nuclear deterrence on a strictly provisional basis. But whatever the nuances of the moment — which it is tempting to describe as tactical opportunism — the Churches remain profoundly abolitionist.

¹⁷ Father Christian Mellon, *Ethique de la dissuasion nucléaire: l'Église catholique a changé (Ethics of Nuclear Deterrence: the Catholic Church has Changed)*, *Défense nationale*, 8/9 2000.

Up until the end of the Cold War, the ethical debate was concerned with weapons and the legitimacy of the strategy of deterrence. But with the disintegration of the USSR, it became clear that the justifications of the past had lost much of their validity. How was deterrence to be justified now that the Soviet (anti-religious) menace had gone, and that no other substitute enemy existed? This is where ideology comes into play. The upper echelons of the Roman Catholic Church take a wholly different attitude to Orthodox Russia than they previously took to the USSR, the persecutor of the faithful.

The secular world, it must be admitted, was far from displaying the same degree of sternness and consistency.

After Hiroshima, philosophers such as Karl Jaspers and Jean-Paul Sartre recognized that something exceptional had taken place. But instead of seeking to determine what exactly it was, instead of talking to scientists like Oppenheimer who were seeking a moral code, they continued to turn obstinately towards the thinking of the ancients and to ordinary, if radically critical, moral authorities. "Everything is possible... everything is permissible." By some strange and singularly unphilosophical short-sightedness, the so-called Moderns limited themselves to citing the prophecies of the Ancients: Dostoyevsky and Nietzsche. Camus, who was so forthcoming about the guillotine, had nothing to say about nuclear weapons; neither did Malraux at the time. Could his logic lead him to celebrate the [French] test in February 1960? And so it goes on. Then came the media-friendly intellectuals who, ignorant of the science, sought to personify the mood of the times in a way that reflected their own agendas, indiscriminately mingling nuclear weapons with concentration camps, the Holocaust, genocides in Africa and universal barbarism. Such overwrought emotionalism found regular echo in the media, creating biased perceptions and generating misunderstandings, leaving the path open for sterile and ill-conceived quarrels. This is a strange reversal of the role of the philosopher or the cleric. Instead of illuminating the path to knowledge, such a profusion of polemics leads instead to the promotion of obscurity. This in turn has unexpected consequences: the technostucture, initially unsettled, can today take comfort in such mental confusion, which permits it to continue with its activities since the questioning fails to impact its true, concrete operations.

The German philosopher Peter Sloterdijk comes closer to the problem when he writes: "With it [the bomb] we leave the realm of *practical* reason where *ends* are pursued through appropriate means...for it is the boundless means that exceeds every *possible end*."¹⁸

Fundamentally, Western philosophy has never witnessed a conceptual breakthrough in its relationship to nuclear technology. This inability has contributed to its current degeneracy.

A re-establishment of the fundamentals of a nuclear code of ethics thus becomes vital, including for the Churches. But how, and on what basis? Why get involved in the way that an industry is managed? How does this affect the future of all humanity? Mohamed El Baradei, who headed the IAEA for fourteen years, is neither a believer nor a philosopher. He sought to embark upon this task by drawing links between the risks of arms proliferation and unequal development, and to the poverty that lies at the root of this unhappiness, and that can be exploited and manipulated by fanatical organizations.

¹⁸ Peter Sloterdijk, *Critique of Cynical Reason*, University of Minnesota Press (January 1988).

Part Two

Towards a renewed world, one that will not instantly transport us to the hereafter

I. A Triple Transformation for the Century Ahead

Rising demand for energy, limited natural resources, dangerous weapons. The result: humanity lives on a planet facing a two-pronged threat!

The years 1990 to 2000, lying at the symbolically important start of a new millennium, witnessed a remarkable coincidence, a rare event in history, between three key phenomena that will radically alter the role of nuclear technology in the 21st century: the end of the Cold War, which lasted for two generations, the rising demand for energy by emerging nations and a profound change in the relationship between humanity, nature and the planet. These three events have occurred at the same time as our civilisation has entered the information age, where the volume of information and speed of communication have radically transformed humanity's perception of the passage of time. As we will show, a critical component in our studies and proposals will rely on changes to biological human timeframes, info-communication timeframes and, last but not least, nuclear material timeframes, whose physical properties vary over time. One of the challenges facing a governance system is thus to draw together these three timeframes.

1. The end of the Cold War and bipolarity

This heralded the end of the threat of a nuclear war that would devastate the planet. The concern was then for non-proliferation both via former Soviet Union states and the considerable turbulence that suddenly came to light in terms of proliferation. Iraq in the years 1990 to 2003 constitutes a sort of paradigm.

In 1990, Iraq invaded Kuwait. The UN forced it to withdraw. Iraq was required to submit without conditions to a regime of severe inspections of its military activities. Inspectors, guided by intelligence provided by Iraqi refugees, unearthed that country's clandestine military nuclear programme. Also revealed were the (well-documented) chemical and (more surprising) biological programmes. All were dismantled, but to no real purpose. It was the regime that had to be destroyed, and yet more on the spot inspections were performed in the knowledge that nothing would be found; all in all, a worrying sleight of hand.

North Korea also played an important role in rising concerns about non-proliferation. In 1993, Pyongyang was caught red-handed in the act of secretly diverting plutonium-contaminated waste intended for reprocessing towards a programme to manufacture military grade material. The country withdrew from the NPT in 1994, paving the way for a crisis that continues to this day.

We have already discussed how the revelation of a number of semi-clandestine activities in Algeria, during a time when it was riven by vicious internal strife, did much to change France's attitude to non-proliferation.

Strangely enough, the years 1990-1995 saw the intelligence services begin to exchange far more information than had previously been the case. They made public information that had remained secret during the Cold War since governments had no intention of disclosing it. Non-proliferation was thus able to act with greater weight. Freed from the overarching mutual threat, the major powers started to take a closer interest in the cases of small regional troublemakers. We moved from a global macro-strategy to a regionalized micro-system. The beginnings of a new world nuclear order began to become apparent. Proof of this change can be seen in the fact that at the time, and despite strong lobbying and revelations by the People's Mujahedin of Iran concerning cooperation between Iran, Pakistan and North Korea, nobody took any real interest in the Iranian case. George Bush Snr. then Bill Clinton limited themselves to trying to dissuade Russia from completing construction of the Bushehr power station and China from supplying a reactor to Iran. These obstacles drew Teheran towards Pakistan, itself a recipient of Chinese technologies.

2. The new energy needs: quantity and quality

It has not taken long for the arrival of increased demand for energy driven by the accelerated rate of growth amongst the major energy-hungry emerging states to alter the way that nuclear energy is perceived, in the light of the gradual exhaustion of fossil fuel supplies. This global phenomenon is accompanied by a sudden outpouring of ecological worries, to the exclusion of almost all other concerns. Former vice-president Al Gore received a Nobel Prize for his work on climate change. This symbolic reward is intended to attract global public attention to the issue. These events certainly present a remarkable coincidence, but to what can this be attributed? It is now two generations since the famous 1968 Club of Rome report announcing zero growth. But there is no point in declaring "we've been telling you this for the past forty years!" On an equally fundamental level, the civil and military nuclear industries are partially linked to a relatively rapid (a half century) transformation in the way humans perceive nature and their place in the world.

3. Humanity, nature and planet earth

At a more profound level for the century ahead, the development of nuclear technologies is closely tied to a new relationship between people, nature and the planet: the three tiers of the second Copernican revolution.

- *Uncertain humanity on a fragile planet*

In a paradoxical manner, nuclear weapons have helped to change humanity's relationship to nature: from hostile, it has become something that people are able to alter, destroy even. We must now protect that which we once fought against. Humanity has become a dangerous master. I referred above to the second Copernican revolution. Copernicus and Kepler introduced us to the idea of humanity no longer at the centre of its world. Humans become inhabitants of a fraction of a system, a system within which the earth is but a simple satellite. With Hiroshima and the advent of thermonuclear weapons, the permanence of humanity has ceased to be a given on a planet that also offers less certainties than

previously owing to the damage done to its major systems. This perception is tied to the development of new knowledge and measuring instruments, understanding of ecosystems, some of them far-off (to know Mars is to perceive the Earth differently). The greater the knowledge, the more today's humans are cast into attitudes of relativism and contingency rather, as during the 19th century, into greater faith and a sense of control.

- *The uncertain planet*

Traditionally, humanity positioned itself against nature, facing down all the dangers that its environment presented. Wild beasts and the whims and caprices of an angry nature were all factors that weighed on humanity's fragile existence, and people often gathered into groups precisely in order to protect themselves against such attacks. Such is the vision that prevailed during the Enlightenment, with intense debates between Rousseau and Voltaire about the noble savage and the state of nature. This was the meaning of civilisation: to place untamed nature in the service of human intelligence, to become its master. The military atom, in the wake of two hugely destructive World Wars, overturned this representation by triggering an enduring crisis of confidence. Humans no longer knew where their destiny lay.

- *A relationship destabilized* by the tragic feeling that the grand ideals for peace have failed

The notion of the march of civilisation was dealt a serious blow by fifty years worth of military and civil slaughter. The optimism of the 18th and 19th centuries was built on an idea of peace, the benefits of science and technology¹⁹. It was founded on faith in a humanity at once imperfect yet essentially positive. Not much of this remained by 1945, even if the United Nations Organization was established in this vein. This was the starting point for a gradual change in the way that the balance between humanity and its environment was perceived. This change led to a new status for humanity: from prey to predator. Ideas of the role of humanity changed from the innocence of legitimate self-defence to the guilt of the aggressor. From predatory, ego-centric, humano-centric exploitation of nature, born of the survival instinct and sheer greed, in a competition whose outcome was uncertain, we changed to demanders of preservation, protection, even a Malthusian approach to management of activities that rely on the exploitation of available resources.

Now begins a sequence, probably irreversible unless an apocalyptic catastrophe occurs, that views our planet as being bounded and fragile. Although political frontiers remain between states that may trigger serious conflicts, the overriding image that dominates now is of all-encompassing global environment. But far from spreading peace and harmony, this concept itself is the potential harbinger of acute crises that may lead to acts of war.

The fact is that inter-state borders may be called into doubt in the name of an overarching global environmental situation²⁰. One can easily imagine that a state, respecting norms for the production of energy in an environmentally-friendly fashion, would not long tolerate the CO₂ output from a

¹⁹ André Malraux, Art and Culture Conference, UNESCO, 4 November 1946

²⁰ FnGM/IBASE, *What Amazonia Does the World Need?*, Proposal Papers Series, Rio de Janeiro, 2008

neighbour that, through short-term self-interest, failed to adopt even the most basic of countermeasures. Such situations have already arisen in regards to water resources, their destruction (Aral Sea), their sharing (Israel, Palestine, Jordan, Turkey and Iraq) and their pollution by waste dumped upstream. The coherence of a natural homogenous ecosystem pays no heed to artificial borders. We shall see that these developments could trigger serious conflicts. In just twenty years, states have ended up taking on board this collection of perceptions and restrictions and the resulting obligations, with considerable differences in their recognition of the notion of urgency.

But let us not be too hasty. These perceptions and conceptions remain far from universal. This point of view is heard far and wide yet is far from being adopted by states and the major multinationals. In Asia, a region hit hard by the 2008-11 economic crisis, the solutions put forward are all based on relaunching production and a highly predatory acceleration of growth, as witnessed by the debates within ASEAN. The Bush Jnr. administration spent eight years resisting ratification of Kyoto. The battle is far from won. The USA will gradually be forced to admit where its true long-term interests lie. For if (almost) all the major stakeholders, public and private, are well aware of the problem, each seeks to limit the damage or even gain new advantage as a function of the traditional self-interest motivated by national security considerations or the demands of shareholders.

However, the affirmation of the notion of human security and states' obligations towards those for whom they are responsible, its citizens, alters the relationship. There can be no question of states being irresponsible, incompetent, failing through negligence or indifference towards those for whom they are responsible. Rights and responsibilities are shared. The notion of a contract between state and citizen is gradually expanding, even to China. This duty of protection no longer concerns only the citizen, but it also extends to everything that lives and to the planetary ecosystem.

In the wake of the disasters that were hurricane Katrina, the tsunamis and 2008 Chinese earthquakes, safety — and the demand for greater preparedness — in the face of natural disasters have increased. By a remarkable turnaround of a very deep-seated trend in the history of humanity, people no longer regard nature as hostile. Its violence is assuredly dangerous, but is perceived as being innocent. If nature, by some mysterious reversal, has regained its right to its natural status, governments no longer have the right to negligence, no more so than any individual, citizen of this fragile planet, has the right to be insouciant. It would seem that the era of worldwide responsibility is at hand. The safety of people and the safety of the planet have at last come together, each a precondition for the other, without yet totally coinciding; that would be too wonderful, but it is already a major step forwards! A page has been turned. *Without being overly Utopian, this means that world nuclear governance is conceivable.*

II: New-Era Nuclear Programmes and World Governance: what are the timeframes?

A relaunching of civil nuclear power is the inevitable alternative to the progressive exhaustion of fossil fuel reserves. This will doubtless not occur for another thirty years. The nuclear industry must be allowed to expand without being hampered, or even halted, by the risks of proliferation for military uses. This would require the establishment of a range of good governance mechanisms and regimes. This is precisely what the nuclear industry craves in order to be able to develop its activities against a background of verifiable security. However, the fact is that the two main regions for potential expansion of civil nuclear power are also two geosystems riven by conflicts and rivalries, some of which span the two regions.

[Insert the two MAPS]

East Asia

North Korea

The need is as great as the scarcity of fossil fuel resources, coal excepted. Even if India and China are examining ways of cutting their coal-related CO₂ emissions, the need for electricity is too great for nuclear energy not to be an inevitable part of the solution.

Furthermore, for political national security reasons, there are considerable risks of proliferation. These may emanate from Taiwan, Japan, South Korea or, in the longer term, Indonesia.

The Middle East

It may appear that there is a lesser need for a civil nuclear power industry in this ill-defined geographical region, which has fossil fuel reserves for at least the next twenty-five years. Nevertheless, well-managed development plans and rational use of existing fossil fuel reserves mean that alternative energies sources must be considered. Iran is the leader in this regard. Its nuclear programme was launched under the Shah in cooperation with the USA (Stanford), then France (Eurodif).

Saudi Arabia and all the member of the Gulf Cooperation Council (GCC) are therefore forty years behind the Iranians. Massive outside help would be needed to make up lost ground, and assistance on this scale cannot be hidden. However, if these states commit to accepting a reinforced inspection regime, they should then be able to receive transfers of cutting edge civil nuclear technologies. It is thus, however you look at it, vital to find a satisfactory solution to the Iranian crisis, and equally vital to put an end to the Israeli exception.

Egypt and Turkey must also be added to this list. Both these states, amongst the region's most populated, have no fossil fuel reserves and have considerable electricity needs that the nuclear industry would be able to meet.

But in a region prey to numerous conflicts and riven by endemic political instability and social tensions, there are very real risks of proliferation, as the case of Iran over the past twenty years demonstrates.

We must in all cases avoid baseless generalizations. A general rule always finds an exception in the particular. Every case is particular, and demands in-depth examination. Regional demographic growth, for example. The Saudi population is certainly not going to increase tenfold in a generation, and even if its electricity needs are significant in terms of its strong growth, its scale is in no way comparable to China or India. The United Arab Emirates are, at present, interested only in desalination and access to greater quantities of drinking water. There is nothing particularly alarming about objectives such as these. However, what about tomorrow? The utmost caution must be shown in a region of such political instability and swept by destabilizing ideologies. A global safety and security plan must be a priority before any significant increase in nuclear activities. This is another valid argument for powerful world governance, built upon regional sub-systems (see the section below on creating ANTC).

As we have shown at the start of this Proposal Paper, time is with us. It will take twenty years, if all goes well, for civil nuclear technology to be widespread in these regions. This leaves enough time for world governance to be put in place. And as with the Japanese case, special attention must be paid to

seismic instability. Finally, although thousands of kilometres separate these two regions, we must be mindful of the routes that link them. Iran is the hub and source of continuity between the two geo-systems: Japan-China-India-Pakistan, Afghanistan-Iran-GCC-Iraq.

III. Is Abolition still Possible?

1. The new abolitionists

Since April 2009, the international community has been faced with a serious and, on balance, fairly popular initiative launched by the new US president. It is universally acclaimed. Certain parties are hastening to sign up. Other are proving more sceptical. We can safely say that it needs to stand the test of time. And that this type of initiative appears cyclically, part of US diplomacy and the constant efforts made by states which position themselves as champions of peace and have therefore made nuclear weapons a disarmament priority. The Canberra Commission's 1995 work coincided with an attempt at bringing a total halt to nuclear tests and mobilized many famous figures, supported by a handful of states. A noteworthy fact is that this was the first time an abolitionist initiative arose in an environment totally free of the Cold War's consequences.

Abolitionism appeared in the columns of the *Wall Street Journal*, not known for its liberalist politics, in 2007 and again in 2008 thanks to a surprising "gang of four", consisting of former top level officials, both Republicans and Democrats, from various American administrations: Henry Kissinger, George Shultz, Sam Nunn and William Perry. Abolitionist ranks were gradually swelled by European politicians, both retired and still at their posts, like M. Frattini, the Italian Foreign affairs minister.

The argument is based on the idea that nuclear weapons are too dangerous and should be abandoned in order to prevent proliferation in other states and, by cutting off the source, stop them falling into the hands of a terrorist organization fanatical enough to use them.

These prominent opinions can be contrasted with the inexhaustible list of all those who have refused to take the same path: Brent Scowcroft, James Schlesinger and Harold Brown. But they have been careful not to mount a real counter initiative, resulting in the abolitionists dominating the media scene. Not that this has any great importance. The interesting aspect is the discovery of a conscience after so many years in power. Beyond the rifts between different groups and people, we very rarely hear of people mentioning the USA's overwhelming superiority in terms of conventional weapons. This represents a sort of taboo, generally acknowledged by all American analysts, that needs to be transgressed if we want to be serious in achieving the reduction of nuclear weapons within the perspective of possible world governance.

The former ministers' initiative has been taken up with enthusiasm by the opposing side, the liberal-learning non-proliferation community linked to the Democrat party. The major foundations like Brookings and the Carnegie Endowment have brought their experts into play: Ivo Daalder, currently US ambassador to NATO, and George Perkovitch, linked to Vice President Biden. A remarkable intellectual steamroller has been set in motion. It is currently dominating the European Union, incapable of formulating an original strategy in such crucial areas. This manoeuvre is successful in exerting influence over people's thinking, with the exception of states, both emerging and powerful, that are closed off, and troublemakers who are not concerned with foreign views, originating in other cultures and linked to other interests. The very essence of world nuclear governance lies here, at this

possible but hard to discern and unrealized intersection between fundamentally heterogeneous geosystems.

By identifying areas where interests converge and offering mechanisms for mutually beneficial cooperation, world governance can work to overcome an incompatibility of interests that has until now been seen as too deep-seated to allow a solution based on peaceful compromise.

2. President Obama and the “logic of zero” nuclear weapons, or how to promote the growth of a peaceful nuclear power industry

Weapons abolitionists are not against nuclear technology itself. Quite the opposite. To avoid unfortunate illusions, it is useful to distinguish carefully between the motivations of the different sides in a context that is particularly fluid. This context fosters the establishment of new tactical alliances with totally different aims. We need to look beyond the sweeping declarations of principles, whose values we shall not however neglect, and examine the various stakeholders’ complex motives.

Barack Obama’s initiative does indeed correspond to a non-proliferation vision. But the nature of non-proliferation during the Cold War and after the Cold War has undergone profound change. It is now neither universal nor absolute. It remains linked to specific interests: state and industry interests.

We therefore need to create a link between this new geostrategic situation and the second phase of the nuclear industry’s development, wherein the USA intends to play a major role. This constitutes a major turning point in terms of the stagnation which has prevailed over the last thirty years. The American nuclear industry has undergone profound change. The key businesses have developed and formed links with other states. In short, the nuclear market has become transnational. Toshiba has taken over Westinghouse. Japan is clearly favouring an approach based on industrial profit. Development strategies have consequently been modified. The Japanese perception of the nuclear industry does not coincide with that of the USA, in terms of both the civil and military sectors, despite the stated agreements. Within the perspective of its new development phases, the nuclear industry is demanding more measures for controlling non-proliferation which primarily affect the military sector — and that do not stifle its own activities. There is therefore a delicate balance between countless highly technical measures and agreements and an increasingly restrictive legal framework concerning equipment and personnel safety.

3. “Logic of zero” and the return of arms control...to achieve what?

In a greatly altered strategic environment, infinitely less ideological, we can see the fundamental ambiguity of Reagan’s 1983 project. The strategic defence initiatives opposed nuclear weapons within an abolitionist vision that aimed to give the USA supremacy in space. The approach remains fundamentally ambiguous, as in 1983 or 1992 when Les Aspin took a stand on the role of nuclear weapons in the new balance of power. “We were the equalizer...we do not want to become the equalizee”. During the Cold War, NATO’s nuclear weapons thus served to equalize, or more accurately offset, as General Lucien Poirier termed it, the (supposed) superiority of the Soviet Union’s conventional forces. This is why the General launched a counter-proliferation initiative in late 1993, meant to complement non-proliferation diplomacy in the event that it failed in the case of certain countries, those the USA was starting to call rogue states. His brutal honesty earned him strong

criticism from the Republicans and a number of military figures who felt that his declarations constituted a dangerously sincere strategic act. He was indeed effectively saying that the USA intended prioritizing the superiority of conventional forces, an area it already led in terms of firepower, precision, range and stealth: Paul Nitze and the evergreen Andrew Marshall²¹. It is interesting to note that despite profound differences in strategy, Democrats and Republicans agree on the aim: the, on balance, perfectly legitimate goal of maintaining the USA's superiority. Then comes the important question of whether this superiority should be overwhelming, or if margins of tolerance in the balance of power can be allowed, so as to create a minimum of trust.

The 2002 *Nuclear Posture Review*, drawn up by George W. Bush's administration, does in some sense confess the truth of the choices made. When read carefully, the document clearly shows the components of the USA's intended overwhelming strategic superiority. They comprise not only nuclear weapons but also systems used to implement them in optimal conditions. Two recent developments have profoundly changed the systems' capacity: electronic and computer technologies and the various space-based components used for transmissions and navigation. These are not directly nuclear technologies, but have considerably improved areas like weapon reaction times and precision. In addition, work on stealth in the 1980s provided major gains in efficiency which pose a further challenge to anti-missile defences.

Technological progress in managing and implementing C2-C3 (Command-Control and Communication) systems thus plays a key role, linked to nuclear weapons and conventional weapons such as cruise missiles that cannot be ignored if we want to establish a serious, credible, effective and long-lasting governance. Another objective lies in promoting the development of Anti-Ballistic Missile Defence (ABMD), a costly project that could trigger an arms race between missiles and anti-missiles or the strengthening of offensive nuclear capacities in order to cross the hypothetical defensive shield. This raises the devilish problem of "strategic stability" in terms of first and second strikes, which developed from the 1960s to the 1980s and gave the arms race its conceptual impetus.

It would be naïve to think that Barack Obama's administration will make a clean sweep of these strategies. There is indeed a wish to change direction, but without affecting the ultimate objectives: maintaining and even strengthening the USA's supremacy. A new *Nuclear Posture Review* is being drawn up, to be released in spring 2010. It goes hand in hand with new diplomatic manoeuvres that reveal a desire to break with the ABMD so as to transform the USA's relationship with Russia within the perspective of a renewed arms control rooted in abolitionism.

This relatively new situation, promising in the short term, provides a particularly favourable opportunity for formulating highly innovative proposals in a domain that has been in turmoil for the last few years.

But to succeed in doing so effectively, it is important to move beyond traditional thinking and transform the non-proliferation community, overly dominated by the USA and still too deeply affected by the Cold War in terms of analysis mechanisms and methods for tackling problems.

²¹ Paul Nitze was one of the architects of the USA's *Containment* strategy in the early 1950s. He later contributed to the various agreements on nuclear weapons, notably the SALT agreements. Andrew Marshall has been director of the Pentagon's *Office of Net Assessment* since 1973 (appointed by Nixon and re-appointed by all his successors). In the 1950s and 60s he was part of the RAND Corporation.

For example, security guarantees are linked to the NPT, but are also dependent on states' real power and the importance of their forces. It is vital to rethink the current reality of nuclear relations in order to overcome the obstructions and obstacles of the past. This current reality signifies states' interests, their status, disparities in development and power, the relationship between the civil and military sectors, their security needs and requirements in terms of prosperity so as to assess the exact role that nuclear technology plays for them. This is an age-old problem, but becomes less commonplace once we actually propose solving it. What we are proposing is a set of measures for creating a comprehensive range of institutions, cooperation agreements and joint regulation and control instruments in the nuclear field, to be used to move beyond self-seeking national interests that are a potential source of conflict. Nuclear technology as a source of world peace? With good world governance, rooted in efficient mechanisms and suitable institutions, why not?

Part Three

Proposals

I: Consolidate the Foundation of a New Diplomacy

We are currently experiencing a pause in major wars of a strategic macro or even global dimension. Violent conflict remains geographically limited, but has certainly not dropped in intensity, as demonstrated by the appalling death tolls in African countries and Iraq since 2003²². This carnage is often contained within borders that are not directly threatened, even though neighbouring states play major behind-the-scenes roles. But this picture of the immediate present corresponds entirely with a radical change in the issues and motives involved in war.

On the one hand, there is a real decline in traditional wars motivated by nationalist fervour, the desire for domination and hatred of the other and fuelled by a desire for territorial expansion. On the other hand, global changes in factors affecting power and prosperity are seeing the rapid emergence of other causes for conflict. If war is now rooted in different motives, peacekeeping needs to adapt its strategy for dealing with conflict. All conflict is venal, in the sense that the various participants are motivated either by the desire for gain, or, conversely, the need to minimize loss, which does not necessarily mean acquiring material goods. This is the stumbling block facing Marxist-Leninist analysis.

In a Europe that has brought together each member's interests in a common market, resorting to war to conquer a few patches of land — a practice that was all the more shameful since the atrocities appeared totally lacking in rational foundation — has fallen into abeyance. Greed itself has ceased being a motive for war, since the paths to prosperity are to be found elsewhere. Serbia learnt this lesson to its cost, as a country that led a war left over from a previous age, at least as perceived by the dominant conceptions of the role of war in the European geosystem. Elsewhere, in Africa and Asia, the situation is totally different. Nationalism remains a powerful motive and the use of armed force is still considered to be one of the means for attaining a political end. But although conflict caused by traditional nationalist motives is declining globally, another type of conflict is in the ascendant.

Although the Cold War bipolarization led to a world divided into two sides, it also united them in the same dread of total planetary destruction caused by a fatal exchange of thermonuclear strikes.

This period represented a stasis between the era of the two world wars and the new age which, as we must acknowledge, is seeing a return to war and conflict of all kinds, and holding out the very worrying prospect of an escalation to levels that may include the nuclear dimension.

Major global conflicts were to all intents and purposes frozen and, by tacit agreement, crises were limited by the dampening effect of nuclear weapons looming in the background.

²² From the official declaration of the end of the war in May 2003 until summer 2008, around a hundred deaths and injuries were recorded every day, representing around 110,000 deaths.

The Cold War has ended and a new phase of conflicts has taken its place, conflicts that have the potential to generate war. We do not know how serious these wars may prove to be, in terms of size and length. Alliances will be formed in response to new issues, with new combinations and even new forms. These forms will differ hugely from those we have seen before, and we need to be considering them right now. These wars will be about the distribution or redistribution of limited resources, about water, strategic raw materials and the ecological management of the planet. They could also be wars of nuclear counter-proliferation.

The nuclear power industry is not a universal panacea in the quest to avoid conflicts of this kind, but it is now recognized as one of the solutions which could meet the critical long-term need for environmental protection (see the European Union's 2002 Green Paper). That is, as long as it works on bringing satisfactory solutions to the problem of reprocessing and storage nuclear waste.

But it is important to remember that the new causes of war are developing in an environment where some states have access to nuclear weapons and others do not. This is a fact no one should forget.

1. Promote the idea of a world social contract for nuclear programmes, based on a raft of shared interests and negotiated between stakeholders

World governance of nuclear activities is only likely to be established and to function if it benefits all stakeholders — states, NGOs and the people (who are more than just manipulated public opinion). Everyone's interests are at stake, both in terms of their security and prosperity but also their ideals²³. This is why we suggest promoting the principle of a global social contract on nuclear energy based on a platform of common interests, negotiated between the different stakeholders.

We propose developing a pragmatic approach combining the general and the specific, the global, regional and, whenever necessary, bilateral. This approach should be characterized by freedom of thought and absence of cliquishness, and make no attempt to give one option the monopoly over all others. Belief in a single solution has created an unbending non-proliferation community by cutting it off from the reality of alternative visions, not necessarily antagonistic, in countries where cultural factors have produced different perceptions. We propose the development of a far broader approach, on a global scale, inspired by what we call "realistic pacifism"²⁴. This type of global approach would broaden the overly technical vision developed by closed communities of non-proliferation 'believers', such as the anti-nuclear movement. It would also help to overcome the reticence shown by large and small states alike, attached as they are to a narrow vision of their national security interests.

It is important to move beyond these traditional divisions and bring together the different specialists so they can agree on a common goal. We therefore wish to examine the relevance of the various levels.

- **The global level**

We could envisage a strategic contract for global stability with a top down approach. It would consist of freezing the situation at the global level, with each participant committing to indefinitely maintaining their nuclear assets without changing, modernizing or renewing them. This scenario is

²³ This is what underpins Jean Monnet's reasoning.

²⁴ See François Géré, *La société contre la guerre (Society against War)*, Desclée de Brouwer, 1995.

far from realistic given the nature of the globalization process and the diffusion of civil nuclear technologies.

We could also imagine a nuclear Kellog-Briand pact²⁵, which would renounce the use of nuclear weapons. But the success of such a pact would be far from guaranteed. What inspection and control measures would it require? What sanctions, with what degree of automaticity? These questions arise because of the wish, above all, to avoid ending up with a sort of nuclear governance League of Nations. So, unless we succeed in establishing a coherent, reliable and effective system, it would be best to do nothing. We need to protect ourselves from the dangers of an imperfect order. What alternatives does this leave us?

- **An old-style entente between the powers**

This solution would hardly be more satisfactory. Why? Due to the absence of any discriminating universality, as it would be dominated by a new club of powerful states, no doubt enlarged for the 21st century, but what then? The NPT is criticized for its discriminating character. It would be difficult to replace it with a new form of segregation. Many states likely to develop a nuclear industry would feel excluded. Furthermore, there would be no guarantee that the prospect of this nuclear G20 would prove satisfactory to the states involved, due to their mutual mistrust. Conditions that apply to economic, trade and financial domains would not prove acceptable where military nuclear applications are concerned, even indirectly.

2. Create Areas of Nuclear Trust and Cooperation (ANTC)

What is an Area of Trust? A geographically defined area where several states agree to total transparency or, at least, open communication concerning their nuclear and associated activities.

The aim would be to create an environment within which states would have to commit to starting talks, according to a strict timetable, aiming to establish thresholds for conventional weapons. All weapons over the threshold would be withdrawn from border areas or, preferably, eliminated. It would be perfectly feasible to base it on the model of the 1990 Treaty on Conventional Armed Forces in Europe (CFE) and apply it, for example, to the Middle East.

In the ANTC, a body of inspectors approved by member states would carry out inspections, controls, readings and counts. It would not replace the IAEA, but decentralize its systems and ease its burden by helping to delocalize some of its activities. Each ANTC would have a High Representative with the rank of deputy director working alongside the Director General. Each deputy would be responsible for transferring information to the DG, who would centralize and align the data. In short, it would be a more generalized version of the EURATOM model, which was created in 1955 in a context of very limited trust between European states.

²⁵ The Kellog-Briand pact, named after Aristide Briand and Frank B. Kellog, the foreign affairs ministers of France and the USA at the time, was signed on 27 August 1928 in Paris by fifteen countries, soon joined by around fifty other nations. The pact condemned “recourse to war for the solution of international controversies” and stood for a vision of an international system governed by rules of collective security.

3. External encouragement of bilateralism: facilitate the creation of virtuous pairs

Bearing in mind that every strategic situation is singular, we can take the case of the relationship between Brazil and Argentina not as a model, but as an example. These two huge states, endowed with considerable potential and occasionally displaying lofty ambitions backed by turbulent, populist and, therefore, demagogic political parties, have established a sort of nuclear understanding. This understanding has been translated into multiple bilateral control and inspection agreements under the aegis of the IAEA, although without any direct intervention by the agency. This process has finally given a concrete basis to the Treaty of Tlatelolco via ratifications that had previously been delayed.

However, we cannot be satisfied with small, well-intentioned states establishing relationships of trust amongst themselves. The challenge is to tackle the most substantial cases concerning the key pairs: China and India, India and Pakistan, Iran and Israel.

World governance would aim to promote the adoption of a diplomatic approach dealing with the main areas of animosity, those likely to impact the entire geosystem of conflict in Asia. Stabilizing these relationships would create the conditions for long-lasting peace.

Conversely, the stagnation of confrontations risks endangering the entire Asian continent and, as an indirect consequent, the whole world. A guiding principle has to be applied to the nuclear issue: there is no continent that is now safe from the effects of a major conflict involving nuclear weapons. We should therefore examine the most difficult situations in the different key geosystems concerned. How can we bring about change in situations of conflict where vital interests are at stake? Below are two examples.

First case: China-India-Pakistan

This is the most difficult situation due to the rear alliance between China and Pakistan against India.

Nuclear deterrence does seem to work. But tripartite relations create a factor of increased uncertainty that should be lessened by encouraging China and India to agree to reducing and limiting their nuclear programmes and committing, in their own way, to a type of arms control similar to that established between the USSR and the United States. A process of this kind would have major consequences on Pakistan, which would then spread to Iran. Furthermore, India and China are two vast and overpopulated countries that sooner or later will have to come to some agreement on cooperation over their respective CO₂ emissions, linked to their massive use of fossil fuels.

Second case: Iran-Israel

Iran is seeking to adopt a position similar, on a purely technical level, to the Japanese situation. This goal remains some way off, given Japan's considerable lead in nuclear technologies, especially plutonium and enrichment. By pursuing its civil activities, Iran can hope to approach this level, which still remains a research generation away.

The military nuclear situation shows a remarkable parallel with Israel's strategic position. It is easier in the short term. "We are not declaring a weapon to be in our possession, but we allow it to be understood that we have one, and that we will not be the first to make use of it in the region."

We hereby suggest that the Iranian exception becomes the general rule.

For several reasons, including national pride, it is highly unlikely that Iran will accept being singled out by being subjected to stricter regulations, more restrictive than those enacted by the additional protocol. The 2010 NPT conference provides an excellent opportunity for solving the problem. President Obama has made it clear that his administration intends to reinforce control regulations. The necessary demands for greater transparency within the Iranian programme could thus be used as a standard for a sort of 2010+n. This type of model would be useful in the quest to develop and spread the use of atomic energy in Gulf states. It could also create other virtuous pairs, with states such as Saudi Arabia and Egypt.

Nevertheless, Israel's status as an exception — which is actually a lack of status — is likely to remain a major obstacle. It needs to be changed. We propose resorting to the virtuous pairs approach inspired by the example of South Africa, Latin America, India and Pakistan in the 1990s, as described above: a bilateral Israeli-Iranian nuclear relationship with procedures for mutual bilateral inspection. Israeli inspections at Natanz and Iranian inspections at Dimona, a site which is only talked about publicly, including to the IAEA, in generally agreed terms. This may well appear to be a Utopian vision, one that the way of the world shows to be a vain hope. But who in 1988 would have imagined American military inspectors enjoying access to Soviet sites and accepting Soviet inspections at the heart of US plants? In 2009, France's President Sarkozy put forward a daring proposal for an Israeli-Jordanian nuclear plant, a remarkable sign of the desire to promote the civil nuclear industry in this unstable geosystem. In spite of evident difficulties, peaceful world governance of nuclear energy could be made possible using a bottom-up approach to accumulate virtuous pairs.

This approach would also allow participants to join an International Arms Control and Disarmament Agency (IACDA) without reservation.

4. Diplomatic and technical application and support measures

We need to address a problem that arises at this point: would it be preferable to reinforce restrictions and control measures or broaden the scope for voluntary commitment? To opt for encouragement or deterrence? Or should the two be carefully combined?

Let us start by examining legal application and control instruments and other tools for improving cooperation.

UN Security Council resolution 1540, adopted in 2004 following revelations of the AQ Khan secret holding company's activities, provides a departure point for developing new proposals. Its full adoption by all states would itself be a major step forward.

Our proposals address the following areas.

- Create a **public register of nuclear technology transfers** similar to UN weapons' sales register. This would put an end to the confidentiality that not only conceals transactions, but has the damaging effect of authorizing data manipulation and opening the door to unfounded rumours and fears. Accounting for materials would be placed under international control, in association with the London Club.

In 1995, Russian academicians Goldanski and Rodionov formulated a remarkable proposal for a register of fissionable materials based on voluntary answers to a questionnaire drawn up by an international group of scientists. As proof of their good intentions towards nuclear

disarmament, and taking into account the difficulties of an intrusive checking process, they proposed a default system for a global check on the quality of the data provided.

- **Codes of (good) conduct** were drawn up during the Cold War.

In 1994, COCOM (Coordinating Committee for Multilateral Export Control) extended the far from perfect Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies.

The Missile Technology Control Regime (MTCR) was established in 1987 to prevent exports of missiles with a range of over 500km. It provides an example of voluntary restrictions. Could an approach so strongly marked by the Cold War be worth extending to the nuclear field? Or would it better to start afresh and create new models adapted to the current situation and recent problems stemming from the newly freed arms markets? By breaking free of strategies from the past, we stop wanting to incorporate new participants who may later prove recalcitrant. Instead, we are proposing dialogue on new bases (we are particularly thinking of China).

- **Measures for building trust and stability**

There are numerous highly interesting and promising examples in this domain:

- measures for building trust at sea, in space and for certain conventional weapons;.
- sharing information and prior notification of tests in order to avoid errors of interpretation on the nature of the test intentions, and for ballistic missile tests between India and Pakistan.

Such measures are similar to traditional systems for providing notifications of large-scale military manoeuvres, especially when they take place in sensitive border areas.

It is important to get across the need to calm fears by gradually building up confidence in trustworthy behaviour that will only come with time.

5. Security measures and guarantees

This section brings together several approaches, some traditional, others more innovative.

- **Guaranteeing supplies and securing flows**

Any state can legitimately demand guarantees for its nuclear fuel supplies. Once it relies on others for its supplies, it needs to be assured that this dependence is compensated by formal commitments to avoid any risk of shortage for whatever cause.

It is not acceptable to depend on a supplier that can suspend deliveries and thus directly affect its customer's vital interests and enjoy the unendurable power to exercise blackmail, as exemplified by gas supplies from Russia to Ukraine and the Baltic states. We can understand why Iran mistrusts the prospect of depending on an external supply of fuel for its reactors, be it from Russia or other sources. We can look to the example of fossil energies to give us a clear picture. We should also consider the

concern, not to say the major strategic fear, about the possible breakdown in supply circuits²⁶. The states concerned know how to deal with the other elements. Convoys of spent fuel are carefully escorted from Japan to The Hague, protected by ships and submarines.

- **Strengthening security guarantees: positive or negative**

We recommend a return to the sort of pragmatism that looks beyond declarations that commit no one and are not linked to any restrictive measures. There is certainly some value in states making commitments and giving undertakings, but they cannot hide the source of the problem. It is rooted in the different proportions of power, in terms of weapons, territory, population and technological know-how. Yes to guarantees — but who to? Everyone? Or between really dangerous pairs within their geosystem? The negative security guarantees provided by China do not have the same value as those given by the USA. The same applies to medium-size powers like France or the United Kingdom. The lack of reliability precludes universality and vice-versa. The non-use of nuclear weapons as a first resort is subject to interminable Byzantine discussions with no definitive conclusion. The Chinese position on the non-use of nuclear weapons as a first resort is a good example. Considering the vast size of its territory and growth of its conventional military power, the PRC has issued unilateral proclamations of principle that are endowed with no more than the value they feel like attributing to them at any given moment. This is logical in the context of preventing Taiwan from equipping itself with nuclear weapons. And the Chinese political and military authorities do not hesitate in declaring publicly that depending on the situation, they would need to reconsider the response to serious threat. Realism requires always taking into account what would become of these unilateral commitments and agreements in principle in the event of a major crisis arising.

It would therefore seem advisable to leave these Cold War paradigms behind and reinvent the assurance of nuclear security in a more global context which gradually adjusts to arms levels (we will refrain from saying disarmament) in order to lessen disparities between force and research capabilities.

6. Sanctions, repression, compromise: where is the just balance?

This paper calls for an assessment of the respective values of the different approaches that have been adopted until now.

Do we need to develop new proposals in terms of sanctions or create new mechanisms for legal coercion by obtaining acceptance of a principle of automaticity, as proposed by non-proliferation jurists? Drawing on the INFCIRC 66 directive, Bernard Goldschmidt suggests a principle of irreversibility. Once a state has withdrawn from the NPT, it cannot have access to materials it previously placed under guarantee²⁷.

Non-proliferation seeks to take a particularly hard line since it wishes to avoid counter-proliferation. We can acknowledge that this is a sincere position — but what is the reality? Is it not an elegant intellectual construct designed to put states like North Korea, or even Iran, in an untenable legal position?

²⁶ President Chirac counted this as a possible element in what could be seen as a major threat to France's vital interests in his speech at L'Île Longue, Brest, in 2006

²⁷ Bernard Goldschmidt, Carnegie Endowment for International Peace, report 100, April 2009.

The principle holds out no real interest for the future, at least until it no longer appears simply a clever stratagem for a specific situation, and thus lacking in universal scope for an unlimited period.

When it comes to counter-proliferation, should *casus belli* clauses be formulated beforehand? Or would it be better to discard the principle itself?

The two approaches seem in practice to have failed, or even to have created confusion and triggered bellicose actions with no effect, if not a counterproductive effect. We should have no hesitation in changing a strategy that has proved to be ineffective.

Let us suppose that regulations are reinforced. Let us suppose that the rules for sanctions and repression are accepted universally. We then need to establish a principle of reciprocity. If proliferating parties can be subject automatically to new and more draconian sanctions, we need to ensure that international law cannot be contravened by unilateral warlike initiatives. It is no longer enough for the most powerful state to confer guarantees of security from its position of conventional and nuclear military superiority. It is also important that all states, regardless of their nature, be assured of a guarantee against the arbitrary actions of Force when Law no longer suits.

All states that overstep Security Council resolutions would be liable to sanction. Yes, but who votes for the sanctions? And the veto? It would not work. Can we be satisfied with a declaration by simple majority that only proclaims that the offender is breaking the law?

Would Iran and North Korea, with their respective concerns for survival, feel protected by such a declaration?

The Proliferation Security Initiative, created in 2003, has a fragile legal status. It is a tool against counter-proliferation created unilaterally by the USA, joined by allied states on a voluntary basis. One could imagine giving it a potentially universal dimension, with states undertaking to participate via intelligence and military contributions. Only proliferators would remain on the outside. Which is a difficult position to achieve. The initiative would then turn into a counter-proliferation tool supplementing and supporting the action of the new bodies proposed below; IACDA, NUCLEO INTEL/POL, etc.

7. Moving beyond traditional imbalances

We need to ensure that the decreased importance of nuclear weapons does not lead to a new conventional arms race. The nuclear guarantee has enabled medium-size powers to reduce, even relatively, investments in the conventional military sector.

Furthermore, nothing will have been achieved if we fail to tackle the most difficult challenge: there will be no renouncement of nuclear proliferation and acceptance of the zero approach without accompanying measures in terms of conventional weapons potential (the twelve American aircraft carriers). The USA's vast military budget, over US\$ 500 billion a year, is a source of concern for all states, and creates a feeling of insecurity in some of them.

We have not achieved satisfactory results in nuclear governance, haunted by the risks of proliferation, because we have ignored nuclear technology's relationship to security and conventional defence, as Les Aspin has recognized implicitly. With some rare exceptions, American abolitionists of every hue are blind to this fundamental aspect.

It is important to stress the importance of this issue so that any form of nuclear governance could draw on a strategy for reducing existing conventional potential and military-industrial complexes. Without turning into a precondition that would block any progress, negotiations on new generation conventional arms control have become vital. They need to be addressed by an appropriate organization, able to achieve concrete results. This would be the IACDA.

This implies dismantling, at least partially, the system that has been built up since 1950, as feared by Eisenhower. It is not a simple conversion issue, as was naively believed at the end of the Cold War. It requires reorienting industrial sectors, by region and by federal state, in the USA and Russia. And, since a short restructuring phase between 1990 and 1995, neither of the two states has taken any serious steps to reform. Neither of them has shown any real wish to draw conclusions from the Cold War's end. Instead, they have headed in the opposite direction, each in their own manner. China, Brazil and India are still exempt from this structural situation. Many countries within the European Union have undertaken major disengagement in terms of both the civil nuclear sector and conventional military industries. A worldwide transformation is now possible. It should rely in part on the current crisis, including Iran and North Korea, as well as emerging states' increasing civil nuclear needs. The significance of the challenge can be expressed in these terms: can we create world governance that is sufficiently fair to be acceptable on a long-lasting basis, based on a situation shown to be discriminatory? Are we not witnessing the desperate efforts of a handful of powers to hold onto an order that serves their interests, but is falling apart on all sides? This is why the choice of a world nuclear governance is the most appealing alternative scenario.

II. What Actions? What Tools for Action?

Which mechanisms, methods, institutions and regulations should be used to construct the new nuclear world governance and principles of diplomacy? Our proposals are divided into four closely-linked areas.

The institutional environment: who leads?

Intelligence: who knows and who informs?

Inspections and concrete measures: material implementation in a climate of trust.

Funding: who pays?

1. The institutional environment

The first question to ask is simply: do we need new institutions and organizations? Are they not already too numerous? This is why we are formulating several options, aiming to find the right balance between creating indispensable new bodies and reforming existing proven organizations. These proposals are made in the context of an international environment undergoing profound change. We must consider two angles.

Firstly, the incorporation of nuclear governance into the changes currently affecting international bodies whose origins go back to the Second World War.

Once the obsolescence of the old international order became an established fact, institutional change become inevitable: the UN, G8 — now the G20 — and regional cooperation and security bodies, like the Organization for Security and Co-operation in Europe (OSCE). The central question of the veto remains unanswered.

All these bodies are inexorably adjusting to the world's reality. We need to take advantage of this phenomenon to provide the nuclear industry with the long-lasting foundations for improved governance. We do not need to wait until reform is complete. Quite the opposite, it would be better to seize the opportunity offered by this favourable context and stimulate the process so that it incorporates the principle of good nuclear governance from the very start. In the case of the Iranian nuclear crisis, we can clearly see that the traditional structures have collapsed. Three European countries have left the European Union (EU-3). Then Germany joined the five permanent Security Council members (P5+1) — but why not Japan, which has plenty to say on the subject of the nuclear industry? The North Korea crisis only involves its neighbouring states. We are therefore justified in demanding that these bodies for dialogue become genuinely coherent.

Secondly, the creation of new mechanisms or alterations to existing bodies to adapt to changes in the international order and supranational institutions.

What benefits can existing alliances and regional security organizations offer?

- NATO, which is undergoing considerable change, no longer believes nuclear weapons to be the main guarantor of stability in Europe. Increasingly concerned by terrorist risks and environmental disasters, it is considering adapting some of its resources to use for nuclear safety and the protection of populations in the event of an accident.
- The Shanghai Cooperation Organisation (SCO).

All states have nuclear concerns. The Central Asian states have established the Treaty of Semipalatinsk, which creates a new nuclear-weapon-free zone.

- The European Union

The European perspective on nuclear energy ranges from countries that reject it, such as Italy, Germany and Sweden, and others that demand it, such as Finland.

We could formalize links by establishing a nuclear unit within each security organization (OSCE, SCO, NATO, OAU, etc.) associated with a reformed IAEA — or a new agency — which would receive the information in the form of regular reports and provide general coordination so as to promote overall coherence. All these bodies, in line with the geographical area they cover, would have to cooperate with the ANTC.

Institutional scenarios

In this initial domain, necessarily the most important since it is the departure point for everything else, our proposals are divided into three main options.

The first consists of maintaining the IAEA, broadening the scope of its missions and strengthening its surveillance and control powers. The role of Director General would be modified to achieve these

changes. In addition, several organizations, either regional (the ANTC mentioned above) or specializing in a specific area (intelligence, communication, etc.) would be attached to the agency.

The second option would be to create an entirely new institution which would replace the IAEA and concentrate extensive powers by bringing together new organizations. There would be a risk of creating a bureaucratic monster.

The third option, a variation of the two others, takes a two-tier approach: on the one hand, a reformed IAEA dedicated entirely to the development of the civil nuclear industry. On the other hand, a new organization oriented towards controlling legal military activities, observing and repressing illegal activities and suspect transfers. This would involve creating an International Arms Control and Disarmament Agency (IACDA), complementing the IAEA. With a parallel or a subordinate role? The question needs discussing, but in any event the links and cooperation between a reformed IAEA and an IACDA need to be strong and organic in order to ward off the risk of competition, duplication and information losses.

The option chosen, whichever it may be, will only be meaningful and effective if accompanied by the creation of new support instruments:

- NUCLEO INTEL/POL (intelligence and repression of non-state criminal activities);
- NUCLEO RTI (research and technical innovation);
- NUCLEO COM/EDU (external communication and public education).

1. 1. Creation of a World Civil Nuclear Planning, Guidance and Development Control Agency

The agency would cover two forward-looking activities:

- developments in the civil industrial market (supply and demand);
- predicting risks and prevention of proliferation activities as well as all deviations and contraventions of the legal commitments previously agreed to.

This would amount to a total reform of the IAEA, probably the best solution, even if it means rethinking its link with the UN. Half a century has passed. A deep-reaching reform is not necessarily an iconoclastic step, but part of the process of rebalancing the major international bodies.

We will confine ourselves to detailing some of the elements of this major transformation.

• IAEA Director General powers

It seems inevitable that the DG should see his/her authority reinforced and powers extended to meet the new task falling to the agency. This hypothesis has already been examined by various experts. Henry Kissinger suggests international control over enrichment and reprocessing. He wonders if the IAEA is capable of taking on this role. Practitioners of international nuclear diplomacy like Pierre Goldschmidt also ask the question of revising the DG's authority by reinforcing it. Nonetheless, these proposals, valid as they are, lack inspiration and a real vision of the future. They remain excessively

attached to the existing system in a spirit of non-proliferation inspired by national interests or international legalism.

An Agency of Uranium Producing States, as suggested by the new relationship between France and Brazil and aligned with the OPEC model, is appealing. In practice, however, it could well be the worst of solutions, since it would not be a tool for world governance but, rather, an aggressive and internally divided lobby like OPEC. But it does merit consideration.

- **A world bank (stock) for fuels**

Proposed by President Obama during his April 2009 Prague speech, this idea is also under consideration in Russia and has been submitted to the IAEA. It would involve creating a world reserve of low enriched uranium that the Agency's members could use. Sixty years later, the issues that arose in 1946-48 during debate over the Baruch, relaunched in 1977 by Jimmy Carter, are reappearing. We should not be put off by the return of old ideas which had a bad start, were badly managed and went unheeded. We need to recognize that ideas that went nowhere during the Cold War could find more fertile soil in today's climate, unless we assume that bipolarity was never anything more than a pretext for refusing to consent to relinquishing superiority and thus holding onto power. This makes it clear the care that needs to be taken when considering this type of initiative. If the Cold War is no longer a reason for rejecting the internationalization of materials, there could be other pretexts, good or bad, which would delay it for another half century. The methodological problem here is the need to *anticipate* opposition in order to overcome it successfully.

The initiative would involve producing materials that are handed over to the bank and that can be used by everyone who needs them. But many points remain unclear. Would this be an ordinary and regular supply, or an occasional option in the event of an unusual supply shortage? Here again arise the dangers of immediate interests and short-term manoeuvres: how could Iran be convinced to supply itself from an organization of this kind rather than have free access to its own materials? This initiative could only be really effective if rooted in harmonization, with a cut-off treaty whose signatories renounce producing materials for explosive purposes.

1. 2. Proposed International Arms Control and Disarmament Agency (IACDA)

It is neither possible nor desirable for the IAEA to have to intervene directly in problems linked to existing weapons and negotiate reduction and balances. The advantage of an IACDA would be in relieving the reformed IAEA from tasks linked to military nuclear issues. The reformed Agency would have plenty to do in pursuing its traditional missions of developing the civil nuclear industry and its applications. It could retain its materials control activities within the perspective of non-proliferation, but not go any further.

An IACDA would enable problems linked to the reduction of nuclear weapons to be tackled using the same approach as the NPT. It would also be a tool for providing an overview of the different negotiations and opening the door to necessarily related areas, but which are no longer covered by the IAEA: strategic conventional weapons, control over militarization of space and new factors linked to cyberspace that represent an increasingly crucial field in the balance between strategic forces.

To avoid any superfluous duplication, the IACDA would contribute actively to the Conference on Disarmament's activities and provide it with information, thus improving its efficiency and, when needed, broadening its scope of activities.

The agency would be closely supported by the new NUCLEO INTEL/POL organization, equipped with surveillance and intelligence resources, and financed by states and by a tax on nuclear industries as a function of their development.

2. Proposed new complementary structures

Intelligence: NUCLEO INTEL/POL

An element that should never be forgotten is intelligence: data collection and exchange, cooperation and the establishment of trust based on shared interests which needs to be elevated to a general level. It is similar to the battle against terrorism. Since 1992, cooperation between the Russian FSB and its German and other European counterparts generally has been very effective in repressing a great many attempts, rarely very serious, at trafficking dangerous nuclear materials.

This is one of the most important sectors. The history of the nuclear industry, both civil and military, has been plagued with spying, disinformation, rumour spreading, fear and lies. For every lie, we can add another half-lie. The secrecy that surrounds nuclear weapons as well as industrial expertise has created a particularly dangerous environment, uncontrolled and unstable. This is why nuclear world governance relies on the creation of an international agency for policing illegal underground activities linked to nuclear energy. This is not the same as IAEA controls, but rather consists of surveillance of all activities relating to nuclear materials and weapons: traffic, contraband and disinformation. By 'policing' we mean activity based on information, communication, transparency and repression. It represents a challenge since a number of services already practice some of these activities at the national level, sometimes for good reasons (provoking traffickers), but also for very bad reasons, such as the false American and British report on Iraq in 2002-2003, and the red mercury hoax which has been the subject of endless articles written by pseudo-investigative journalists.

We are stepping onto particularly shifting ground, where intelligence plays a vital but alarming role since once information is manipulated, it can distort judgment. This is why the establishment of a reliable base requires a special organization entrusted with the specific missions within negotiated and agreed limits.

It is also vital to fight against disinformation, the fog of rumours and spontaneous and manipulated fears, and seek to deter attempts to mask a serious problem by toning it down. This would be one of the agency's missions. INTEL/POL could work for the IAEA or constitute a branch of the IACDA.

What methods and tools should we use to create this new organization? Traditionally, the IAEA can benefit from intelligence obtained by the states who have the necessary national technical resources, i.e. satellite imaging. In 1994, the USA supplied the Agency with images of secret work happening at North Korea's nuclear sites, catching the country in the act of carrying out illegal activities. Intelligence supplied on Iran was sometimes reliable, sometimes to be handled with caution; and let's not even discuss Iraq between 2002 and 2003. It is clear that using a single source of information creates a situation of dependency that is not very favourable to creating trust. The future of intelligence on nuclear activities must be based on a process of international cooperation used to cross-check

information. Furthermore, the problem with intelligence services is not so much what they know, but the moment and circumstances chosen by their respective governments to tell international authorities what they have known for a while. This is the general problem with inspections.

3. Inspections

The inspection process is too often presented as an exercise in spying. The IAEA's inspectors are supposedly secret agents working for foreign powers. This is the fantasy beloved of proliferators. There must of course be no violations and no mass infiltration of the inspection teams by CIA experts. There is no avoiding transfers of skills from one body to another, but once people are engaged in working for an institution, strict barriers need to be erected. All these rules have been transgressed in the absence of a dedicated organization capable of tackling unfair accusations.

Not every state has access to these resources, thus creating an intelligence inequality. It would therefore be useful to create an international pool of proliferation intelligence. But how would this work when a member state is caught red-handed illegally transferring sensitive technologies?

Inspections could be improved by strengthening forensic technologies used to detect and track/monitor materials and thus know who is transferring what to whom. This is already a well-known area, and could be developed extensively, a development which would be highly satisfactory for suppliers of appropriate technologies. It would be supported or performed by NUCLEO RTI (research and technical innovation).

A reformed executive body

Whichever options are chosen, they all require total reform of the management and decision-making structure. The current council of IAEA governors, which is rooted in a state-centric approach, would be replaced by a functional and geographical approach based on the principle of a management college under the authority of the Director General. The possible members are outlined below.

We could envisage a collegial administration based on creating a four-way structure with several directors:

- IAEA DG;
- IACDA director;
- NUCLEO INTEL/POL, NUCLEO RTI and NUCLEO COM/EDU directors;
- joined by the ANTC directors, which would add a country element.

This format would create a body endowed with sufficient substance and with the networks needed to liberate it from state control as well as the pressure of industrial corporations.

4. Financing: combining law and interests

Who could contest the value of more numerous and diversified organizations with better coordination? In any event, and whichever option is chosen, funding needs to be found. The vital question arises directly: who will pay, what for, and how much? How many nuclear cooperation projects (Gore-Tchernomyrdin, KEDO for Korea in 1994, Gallucci²⁸), have failed because no funding materialized when the time came to finance the reality of the diplomatic agreement?

Nuclear energy is an industry, which means that, from a positive point of view, it is possible to finance its peaceful progress.

The multi-nationalization of businesses does not cancel out the role of the board of directors, with its necessary concern about the distribution of profits. There is no such thing as worldwide shareholders in either the nuclear or the oil industry. All businesses obey their board of directors, motivated by prosperity. This is another area which has to be advantageous to all participants, within the bounds of respecting certain rules. Breaking these rules would damage shareholders' interests, in a relatively short space of time. Nevertheless, it is perfectly plausible and realistic, to imagine a consultative council, a sort of regulatory High Authority linked to the IAEA, which would advise businesses and guide the directions they take in terms of investments and the development of the world nuclear market by guarding them from the damaging effects of unbridled competition. This is similar to the guidance provided by control and safety organizations. Each contract would involve a clause requiring 0.5% for each party, the state and the service provider, representing 1% of the amount. This would be equivalent to a Tobin tax on nuclear development, with 1% of investment paid over to organizations and agencies contributing to non-proliferation.

III. Technologies and People

A new social contract for nuclear programmes in an information age

"There is no wealth but men"

Jean Bodin (1530-1596)

In order to set up world nuclear governance that the main stakeholders can accept and support over the long term, there are two aspects that need to be envisaged and linked together: people and technology on the one hand, and all areas linked to information and communication, including education, on the other. We need to set out the principles of a *social contract* for the nuclear world designed to promote its improved incorporation into civil society and the international community. However crucial a role played by technology, people have an even more important part to play. The capacity to transmit and share information between the various stakeholders will thus create the link used to build a new contract. *World nuclear governance can only be achieved if it succeeds in becoming deeply embedded in the social fabric of civil and military nuclear activities and, simultaneously, making its objectives comprehensible and appealing.* This would help to find support and overcome reservations. It is almost as though we were imaging converting a feudal system to another form of organization where

²⁸ KEDO: Korean Peninsula Energy Development Organization. The American Robert Gallucci was one of the architects of the Agreed Framework signed in 1994 by North Korea and the USA.

power was to be more widely distributed and shared on a better basis, capable of adopting a democratic approach. Two objectives emerge:

- create a new relationship between policies and nuclear power;
- bring the entire system into compliance with the demands and practices of the information-communication age.

The nuclear community is a world that has long remained apart. It has been arrogant, criticized, and suspicious, and then realized that it had to be part of civil society and, especially, improve the way it communicates and develop a system for educating the public. However, it needs to play the game in all sincerity. Communication should not be just a gadget.

1. The sociological dimension: a closed world of military and industrial secrets

The nuclear industry has created closed communities in each state, driven by the quest for success and united by secrecy.

In Russia, the Academy of Sciences has taken on an unusually important role in the nuclear field thanks to unlimited funding offered to top level scientists, whose skills have been systematically directed towards military applications. The secrecy of military activities under a totalitarian regime — Beria was responsible for nuclear programmes until his assassination — produced nameless closed communities (Tcheliabinsk and Arzamas 21), with a spartan lifestyle bordering on poverty, their own culture, a pure vision of another world, a better world. This is a fascinating world, presenting as it does a certain idea of Russia, very far from the triviality of political affairs, indifferent to communism, closer to the generosity of Tolstoy and his dreams of a different world. This community is very much open to a world vision which coincides with the reality of their work.

In the USA, the national nuclear laboratories, Los Alamos, Lawrence Livermore and Sandia, are under the authority of the Department of Energy. They enjoy extensive federal autonomy and compete ferociously for programmes and credits.

All other things being equal, the giant American installations lost in the vast deserts of New Mexico and California have much in common with their Russian and Chinese counterparts: closed, inward-looking communities, focused on technical challenges, obliged to respect strict rules of secrecy and harbouring an out-of-touch vision of the rest of the world. In addition, competition between such powerful bodies is occasionally of a magnitude to impact the state's political decisions.

These similarities have led to the creation of truly extraordinary organizations, such as Pugwash²⁹, attracting scientists from all states concerned with reducing and then eradicating the threat of nuclear war. Skilled scientists in several countries have joined up to form think-tanks (Federation of American Scientists, Union of Concerned Scientists) and have also developed a pedagogical approach designed to break the wall of silence.

²⁹ Joseph Rotblat and Bertrand Russell launched the Pugwash Movement (*Pugwash Conferences on Science and World Affairs*) in 1957 in the Nova Scotia town of Pugwash.

2. A social microcosm: clans, families and groups; close-knit yet divided

It is vital that we leave behind the feudal system of the past, created in a Cold War context that distorted the entire process. We need to gradually establish ordinary inter-relations between scientists and connect the nuclear world with the norms of international relations, which do remain difficult, but are not determined by a fear of mutual destruction. Furthermore, we must not let fear of terrorism distort the establishment of a delicate but fundamentally appeased relationship. The world governance solution really comes into its own on this central issue.

We need to take into account three professional categories which form a strange trinity, all involved in civil and military nuclear projects: businesses, in principle lacking any direct relationship with nuclear military nuclear activities, military authorities in charge of weapons, and scientists and engineers who comprise the essential link between the other two categories.

The relationship between these two spheres is not straightforward. The history of nuclear technology is rooted in their mutual disagreements, both ideological and professional. In France, Yves Rocard, father of former prime minister Michel Rocard, stood out from his colleagues, who nearly all rallied to the Stockholm Appeal and rejected military nuclear activities, unlike the case in the Soviet Union. However, aside from the difficult decade between 1945 and 1955, which saw a great many defections, the US and UK scientific-technical communities have rebuilt themselves.

[Insert portraits: a photo of SAKHAROV! or photos of couples with von Hippel]

Abdus Salam, Pakistani, Director of the Trieste International Centre for Theoretical Physics, trained in British laboratories like his Indian colleagues well before the 1947 partition.

Abdul Qadeer Khan. This Pakistani metallurgical engineer was employed by the Dutch company URENCO, specializing in uranium enrichment, and disappeared with a number of documents in 1975. A number of young Pakistani PhD students quit Canada and the UK at the same time. AQ Khan may not have been a very high level scientist, but he proved to be a good engineer and crafty businessman, skilled in setting up subsidiaries and selling his wares, even if not necessarily top of the range. He has become a symbol of national pride for a country with close to 200 million inhabitants, a fact that we tend to forget in the West.

As in many other disciplines, a nuclear research laboratory constitutes a big family. And like every family, it has its divisions and rifts. Human nature being what it is, friction between people³⁰ is inevitable. The more closed the environment, the closer its inhabitants. But the same applies to the tensions between them, which are exacerbated by their isolation. The community's practice of recruiting young specialists and absorbing them makes it even more inward-looking. Sociology tells us what type of women and men work in the nuclear industry. But it has not made much progress in the highly specialized sector of military nuclear activities. States are sparing with information on their human resources. It is possibly the most closely guarded secret. Installations can be bombed, a few specialists can even be assassinated, but once a certain threshold of specialization has been reached,

³⁰ As was the situation, for military biological research, in the Soviet Union's formidable Biopreparat conglomerate.

the expertise cannot be completely destroyed. It can only be diluted via cooperation programmes (Cooperative Threat Reduction), TACIS or via reconversion by association, taking in scientists one by one. We could add AIDA for good measure. These programmes were launched by the USA, EU and France respectively after the Cold War, in order to incorporate unoccupied and penniless Russian scientists into joint research and reconversion programmes.

In France, where the relationship between scientists and engineers has historically been very poor, the nuclear industry has developed thanks to engineers from the *Corps des Mines* (the foremost of the great technical corps of the French state), mostly graduates of the *École Polytechnique*, France's most select scientific school. They enjoy military status and a growing power that has created a state within the state. They have been running France's major nationalized companies since 1945 in all legality. This development has seen a section of the French economy end up in the hands of this group of devoted servants who identify themselves with France itself. Despite personal rivalries, fierce as they often are, a strong sense of solidarity unites them: Pierre Guillaumat, General Charles Ailleret, de Gaulle's Chief of the Defence Staff, responsible for the Sahara tests and the first success of the *Gerboise bleue* strike in 1960, whilst his brother heads EDF — *École Polytechnique* graduates all. André Giraud, Jean-Laurence Delpech, Jean Syrota via BRGM (which supplies ELF-ERAP-TOTAL with uranium by means of strategic metals and fossil energies) and other organizations. The *Mines* engineers accumulate responsibilities, members of the board of directors of every company in which the state is the majority shareholder. *Corps des Mines* engineers have also worked their way into the governmental sphere, contesting ministerial posts with the political parties and, of course, their main rival, the newly created *École nationale d'administration* (ENA).

Rivalry is merciless inside these elite circles. The rivalry between Teller and Oppenheimer is an example at the very highest level. These conflicts are omnipresent but rarely public. How many laboratory and major programme directors have taken credit for the fruit of work undertaken by their researchers, whose bitterness is not hard to imagine (Robert Dautray and Michel Carayol)? But does not the person who has to take responsibility for failure have the right to take credit for success? This is an endless debate that affects every discipline. One person's research is appropriated by the shrewdness of someone else, more politically astute, closer to the decision-maker, with whom s/he enjoys a beneficial and highly ambiguous relationship based on mutual manipulation. Who really holds the reins of power when it comes to knowledge? It is true that power, and sometimes knowledge, are transmitted from father to son or by family ties and alliances. The French *Direction des applications militaires* (DAM), part of the *Commissariat à l'énergie atomique* (CEA), formed a very small closed community characterized by endogamy.

The same phenomenon arises everywhere. The stakes are so high, the secrecy so intense, the skills so rare that a ruling group quickly forms, tending to confuse service to the state with its own corporatist interests. This currently seems to be the case in Iran, where nuclear expertise is becoming autonomous within the complexity of the manoeuvring for influence amongst the various power centres.

Ultimately, what drives this cohort of experts in such specialized fields? What goes on in the brain of a nuclear engineer?

They have passion for research, for the technical challenge to meet, the difficulties to overcome. They are motivated by the technological challenge and the nationalism that gives meaning to a mission where success will mean an increase in the country's prestige internationally. They are driven by personal ambition, ego and rivalries between laboratories. Joliot-Curie published the results of his work in German reviews until 1938 without any concern for Nazism.

This same phenomenon occurs at different times and different places. There really is a nuclear culture stretching from Los Alamos to Natanz and encompassing Valduc and Sinkiang. This passion for problem-solving does not pay much heed to proliferation. When it does, an astonishing disparity appears in how proliferation is viewed. Roger Baléras, high-level engineer and Director of the CEA DAM, did not see the world with the eyes of an ordinary citizen or even in the same way as his regulatory political authority, closer to the average citizen. This disparity may result in serious misunderstandings with the presidential political power (in this example, François Mitterrand in 1994) or fallacious points of agreement. Did Ronald Reagan and Edward Teller really understand each other? In France, a new president receives intensive but brief training, and no one can judge what his subsequent convictions may be. Valéry Giscard d'Estaing's declarations after his presidency suggested that his point of view had not been affected. De Gaulle himself was only informed at late stage, almost by accident, about the strong Israeli-French nuclear cooperation, which he hastened to bring to an end. This does not pose much of a problem to experts in detonics and limited energy release. Which explains their interest in small-scale weapons, the neutron bomb and other fascinating technological challenges, perfect for satisfying the urge to indulge in research for the sake of research.

3. A fraught relationship with government and civil society

This operational trinity comes up against the political authorities, with their decision-making powers, and, through them, civil society. Politicians can only decide on the basis of a summarized assessment of the opinions expressed by these three categories. As arbiter, the government enjoys considerable powers, as long as the balance between each authority is rigorously maintained. And on the condition that the trinity transmits information to the political authority with no omissions. Which is far from always having been the case: information on an activity or external cooperation is at times deliberately omitted. The corporatist vision that organizations have of themselves ends up spontaneously liberating them from their regulatory authorities. This has noticeably been the case in France. The CEA-DAM was founded on the principle of rigorous confidentiality, thus freeing it from all control; firstly during the process of acquiring nuclear weapons, and then during development programme³¹. To the extent that it has become a state within the state, rivalling the political authority. Over the last ten years or so this tension has calmed down, due to operational needs being met and to France's non-proliferation commitments to the international community. This is not necessarily the case in other countries, with or without nuclear weapons.

But the political authorities represent the interface with the different opinion trends and interests and conflicting pressures. They constantly calculate the probability of a positive result. In the service of national interest, no doubt, but also for the success of their political careers.

This relationship between state authorities needs to be fitted to civil society, which has the right to express an opinion, without going as far as the form of manipulation that is a demagogic referendum.

³¹ See *Moyens de la puissance, Activités militaires du CEA 1945-2000 (The Means of Power: The Military Activities of the CEA)* Jean-Damien Pô. Study (paperback). Published in July 2001.

These tensions that arise in all states armed with nuclear weapons, or even those who plan to acquire them, need to be tackled at the global level within the framework of world governance. The challenge is considerable. It calls for a particular focus on people.

There is also the syndrome of retired soldiers and, sometimes, politicians. Prey to belated guilt, they denounce their former activities. General Wheeler, American Admiral Rickover, employed in preventing France from getting access to thermonuclear expertise, and a number of British chiefs of staff are some examples. On leaving office, they all denounced the danger, risks and inadequacies. These military men are frequently also religious men. They must have been torn by the profound dilemma between their sense of national obligation and their religious ethic throughout their careers.

We do not wish to propose creating a new big family which would freely share the most specialized and complex knowledge. But it is possible to build a more open relationship to civil society, including for military nuclear activities. This would also foster better understanding of certain issues and better acceptance of certain precautions. Secrecy constitutes a form of rejection of other people which needs to be gradually lifted.

Nuclear governance must take into account all these balances of power and influence in order to define exactly the right strategy, a strategy that comes as close as possible to achieving balance.

It is possible to put to good use the paradoxical points of agreement that have developed over the last half century, despite national antagonisms and fundamental opposition to the value of nuclear technology, crossing borders and ideological differences. The same area of knowledge and language unite the adversaries in a community of stakeholders that understand each other. The Pugwash scientific initiative has succeeded in exploiting this intellectual complicity, including with anti-nuclear movements. The nuclear issue is so singular in nature, requires such specialized skills, that it ends up bringing together the adversaries and transcending their differences by obliging them to speak the same language. It is remarkable that at the height of the Cold War, American and Soviet scientists were able to meet and share information even without speaking the same language, to the great displeasure of the state security organizations.

When nuclear managers and professional anti-nuclear activists meet on such slippery ground, the same characteristics arise. They start from radically opposed standpoints, but are obliged to speak about the same objects. Such meetings might not create sympathy, but they do create empathy. The only serious rift springs from a lack of understanding, sometimes sincere and sometimes deliberate, on either side.

We need to find the processes and mechanisms for reforming and reconciling the two communities: nuclear practitioners and the mirror community of professional anti-nuclear activists. World governance would constitute a disconcerting change for both sides' traditional position.

It would provide them with solutions for overcoming their internal contradictions. It would also open the door to a meeting of compatible objectives. This vision is far from Utopian when we consider the remarkable number of meetings and dialogues that have taken place over the last thirty years.

4. Technological research and development: always put people first!

Leaving aside questions of personal prestige, the small and sometimes somewhat closed community of experts is therefore motivated by the challenge of meeting new technological demands. This applies to every country. It is for this reason that we suggest creating a link between sociological transformation and technological cooperation, via the intermediary of an international research agency: **NUCLEO RTI**.

The existence of a gap is traditionally thought to be a means of superiority. We have already examined the historical importance of the “missile gap”. Some felt it had to be bridged, others that it should be maintained, extended even. Some people manipulate the risk in order to obtain greater funding, to launch new programmes, and so on. Technological research is always obsessed by keeping ahead, or falling behind. The fear of being overtaken by the progress of others is one of the core drivers of the arms race, as well as in the civil sector where the competitor always seems to make a better offer (but not always less expensive!). It is thus time to move beyond hostile and aggressive competition, embracing cooperation instead which, as an added bonus, must also include the acceptance that disparities in relative levels must be addressed. No easy task! This is why a special multi-national body must be set up to research ways in which to drive down inequalities in knowledge and skills. In response to the hostility of defenders of any particular sector or nation, the response must come in the form of multi-nationalisation and the creation of an international research community. Pooling skills will help to reduce anxiety about any knowledge “gaps”, and so this will cease to be an excuse for conflict. The negative and dangerous effects of competition can be reduced by offering greater incentives for cooperation, and it is for this reason that we propose the creation of an international nuclear research agency. This, in theory, is close to the idea behind CERN (the European Organisation for Nuclear Research). Why not develop along these lines?

If technological challenges are what stimulate research, they are also the cause of permanent anxieties amongst states and researchers themselves. These anxieties must be quelled through international cooperation in advanced research, for which history offers us a remarkable model: CERN in Geneva, straddling the border between France and Switzerland. Would it not be enough to transform it by vesting it with a far wider remit in order to make it a truly global organization? Although CERN is essentially European, it does undertake cooperative international ventures, notably with Japan, but it operates around a very restricted core of flagship programmes. A radical transformation might enlarge the scope of its activities so that it could operate at a truly global level. In practical terms, this would be a new entity. This being the case, it would seem more sensible to create a new research body from scratch, one whose missions, being very different, would not impinge upon the continued existence of CERN, which would be able to provide enormous assistance in certain specific areas.

This international research and technology agency, NUCLEO RTI, would have two arms:

- pure research at the cutting edge of our understanding of the atom;

This would enable ambitious research projects to be launched, leading to valuable technological advances whose spin-offs would benefit all participants. Funding would come from each state’s research and technology departments as well as from industry via a levy (see our funding proposal, below). The purpose is to reduce disparities and ease competitive pressures, in the knowledge that these will never fully disappear, in matters of technology skills and knowledge.

- applied research to further the aims of non-proliferation, placing this new agency in direct contact with NUCLEO INTEL/POL and IACDA (or the strengthened IAEA). Work would centre around two missions: high-sensitivity detection and forensic identification of materials for inspection purposes.

5. A global nuclear communications effort to aid reconciliation

Sad as it is to say, the past fifty years have been characterised by a combination of *arrogance* and *ignorance*.

We've pretty much heard it all from the nucleocrats! "Too complicated for the layperson... it's a matter for the specialists. Trust us... There's nothing to worry about. We've got everything under control." This posture came unstuck in the face of the, admittedly very rare, accidents, but especially when faced with the lies about costs and incidents, at Chernobyl and other sites. In democratic states, critical elements within civil society have developed their own counter-propaganda in order to shine a light on matters deliberately left unexamined. They have denounced the lies told when accidents occur³². Lamentable public relations and communication was a recurrent feature of the civil nuclear power industry right up until the end of the 1990s. So much so that it was a simple matter for its enemies to present the nuclear industry as being a permanent threat, as evidenced by its need to tell endless lies about its activities. What is the reason for such serious failures? Engineers' aphasia? Cliquish self-interest? Disdain? This is not even the case. This is a group apart that knows nothing of others, and pays them no heed. Self-assuredness, arrogance vis-à-vis those who do not understand. One of the key problems has been military and industrial secrets, overlaid with state secrecy. At its root this is a cultural problem whose origins lie in a mindset utterly out of step with the information age. But nuclear technology is itself more or less of the modern age. It should have understood and exploited the era of mass information; but it failed to. This handicap must be surmounted before the nuclear world can move in step with the wider world. Great efforts must be made to clarify positions in the post-Cold War era, establishing a common communications strategy to support the role played by nuclear technologies. Such a strategy would aim to explain, especially to every state thinking about developing a nuclear power industry, what nuclear technology can be used for in general, and military nuclear technology and the types of strategy it can solely be used to support in particular.

Hence the proposal to create information-communication mechanisms designed to heal/bridge a social and intellectual divide: NUCLEO COM/EDU.

An **annual international forum** about information and communication on nuclear issues should be held: where are we now? What's not working? What could be improved? The goal being to come up with new ideas, ideas capable of providing clear information, accessible to laypeople everywhere.

This effort to clarify communication must initially be applied to the IAEA, both in its present and future guises and whatever reforms it undergoes, for its legal-technocratic statements are comprehensible only to a small group of experts who communicate in jargon amongst themselves, relying on acronyms that end up becoming a secret language that is closed to outsiders.

³² For example, in 1986 after Chernobyl, when the radioactive cloud moved towards western Europe. Declarations made by Marcel Boiteux, EDF.

A new educational effort about civilian and military nuclear technologies must be set in motion, using new terms suited to the transformation of information as described above.

The anti-nuclear movement too is not immune from the passing of generations, and it should join with this undertaking as a stakeholder in its own right, so as to create a true community of interests amongst stakeholders. The aim here is not to achieve a broad consensus where no such thing exists, simply to soften attitudes on both sides, emphasizing the way that a new world governance will provide the tools for positive outcomes that make it possible to move beyond the quarrels of the past.

Education, endlessly renewed, is always vital in the face of eccentric fantasists, agitators, warmongers, always ready to join forces when it comes to breaking the limits of the rational. The self-interest of various bodies and the actions of their apologists contribute to the creation of a certain environment. That is why the utmost vigilance is required in matters of non-proliferation and, even more so, counter-proliferation which, by definition, supposes the deployment of armed forces!

Back cover: (to be filled in)



www.world-governance.org

This Proposal Paper is published with the support of the Fondation Charles Léopold Mayer

