CHINA

Current status
Estimates suggest China currently has approximately 170 nuclear warheads including approximately 110 operationally deployed nuclear missiles, approximately 60 warheads stored for its submarine-launched ballistic missiles, and bombers. China has not declared publicly that it has ended the production of highly enriched uranium (HEU) and plutonium for nuclear weapons, though it is believed that China stopped production of HEU in 1987 and plutonium by 1990. China’s military inventory would be about 16±4 tons of weapon-grade HEU and 1.8±0.5 tons of weapon-grade plutonium.

Modernization
China is concerned with maintaining what it sees as a “limited” and “effective” nuclear arsenal and its modernization programme has focused on increasing the “survivability” of its land-based strategic missiles. It is expected that after this is accomplished, China will speed up the modernization of its sea-based strategic force. US missile “defence” plans will be a major driving force for China’s nuclear weapon modernization, as some Chinese officials are concerned that even a limited missile “defence” system could neutralize China’s nuclear force.

Economics
It is difficult to estimate the cost of China’s nuclear weapon force, however, assuming that China consistently maintains 5% of its overall military expenditure for its nuclear weapons programme, China would have spent between US$4.5 and $9 billion on its nuclear programme in 2011. A recent report by Global Zero estimates China’s nuclear cost to be $7.6 billion in 2011.

International law
China has signed but not ratified the Comprehensive Test Ban Treaty (CTBT). Most estimates assume China will ratify the CTBT only after the United States does. China officially supports the commencement of negotiations of a fissile materials cut-off treaty (FMCT) at the Conference on Disarmament, but US plans to develop its missile “defence” capabilities will likely affect China’s willingness to participate in FMCT negotiations. If China remains concerned about US missile “defence,” it would need more fissile materials to fuel additional ICBMs. In terms of disarmament, China is bound by article VI of the NPT to negotiate the elimination of its arsenal, though has consistently demanded the US and Russia reduce their arsenals first.

Public discourse and transparency
China is one of the least transparent of the nuclear weapon states though in theory it might increase transparency if it develops more confidence about the survivability of its nuclear force. There is scant public debate about nuclear weapons in China. After US President Obama outlined his “vision” of a nuclear weapon free world, an online survey conducted by the People’s Daily newspaper indicated that 51% of respondents wanted nuclear disarmament while 49% did not.

FRANCE

Current status
France possesses approximately 300 nuclear warheads, approximately 290 of which are deployed or operationally available for deployment on short notice. Its delivery vehicles consist of approximately 40 aircraft assigned to a total of 40 cruise missiles; four nuclear-powered ballistic missile submarines (at least two of which are always fully operational) equipped with nuclear-armed long-range ballistic missiles. France is no longer thought to be producing fissile materials for nuclear weapons. It is believed to have an estimated six tons of plutonium and 26 tons of HEU.

Modernization
France is the middle of a broad modernization of its nuclear forces involving submarines, aircraft, missiles, warheads, and production facilities that will continue for another decade.

Economics
The French government has indicated that it spends approximately US$4.6 billion on its nuclear forces each year, though a recent report from Global Zero estimates...
that the total cost for 2011 was approximately $6 billion. The government announced in November 2011 that the deficit would have to be cut by 20% in 2012 with half of the savings coming from spending cuts, but the nuclear weapons budget will reportedly only see a 1.3% decrease.

International law
Officials indicate that France will reject calls for nuclear reductions in the near term, which, especially when considered in context with its substantial nuclear modernization, is in conflict with France's obligations under the NPT to negotiate disarmament.

Public discourse
There is scant debate in France over the composition or cost of its nuclear forces.

India

Current status
India is estimated to have 80–100 nuclear warheads. It is also developing a range of delivery vehicles, including land- and sea-based missiles, bombers, and submarines. There are no official estimates of the size of India's stockpile of fissile materials, though it is known that India produces both HEU for its nuclear submarines and plutonium for weapons. India is estimated to have a stockpile of 0.52±0.17 tons of weapon-grade plutonium by the end of 2011. There has been speculation that India has used reactor-grade plutonium in its nuclear weapons, in which case, the nuclear arsenal could potentially be much larger, as India has approximate 3.8 to 4.6 tons of separated plutonium from its power reactors. Its fast breeder reactor programme also provides another potential source of producing weapon-grade plutonium.

Modernization
The primary focus of modernization has been on increasing the diversity, range, and sophistication of nuclear delivery vehicles. Its most recent missile tests were conducted in December 2011. Based on official reports and tests, it appears that India is aiming to have all legs of its nuclear triad operational by 2013. There are also plans to expand the nuclear weapons and missile production complex as well as the capacity to enrich uranium.

Economics
The expansion of India's nuclear and missile arsenals are part of a larger military build-up and consistently-increasing military spending. However, there is no reliable public estimate on nuclear weapon spending in India. Historically, the nuclear and defence research establishments have wielded considerable social, political, and economic power. They have been joined in recent decades by government laboratories, public sector and private companies, and universities, to form a burgeoning and powerful military-industrial complex.

International law
Since the 1974 nuclear test, the Indian government's focus in arms control diplomacy has been to resist signing onto any international treaties that impose any obligations on its nuclear arsenal. This allows the government to maintain that it is a responsible member of the international community because it has not breached any agreement. It also interprets this as meaning there are no legal constraints on any modernization activities that may affect the quantity or quality of its nuclear weapons. However, its activities may not be in complete concordance with international law; the 1996 advisory opinion of the International Court of Justice maintained that the obligation for disarmament is not restricted to signatories of the NPT.

Public discourse
Over the years, the idea that India has a right to possess nuclear weapons has become widely shared across much of the political spectrum. While nuclear weapons used to be seen as a “necessary evil,” there is no more enthusiasm for India to become a bonafide nuclear weapon power that can exercise its military might in the region. While the government continues to promote the 1988 Rajiv Gandhi plan for nuclear disarmament, this is somewhat hypocritical when viewed in the light of its ongoing modernization plans.

Israel

Current status
Estimates about the size of the arsenal are based on the power capacity of the nuclear reactor near Dimona. Experts estimate that Israel's current nuclear force ranges from 60–80 weapons at the low end to over 400 at the high end. The most frequently cited figure is 100–200 warheads. It is assumed that Israel has a triad of delivery systems: land, air, and sea. It is estimated that by the end of 2003, Israel could have produced approximately 510–650 kg of weapons-grade plutonium. Estimates of HEU production are even more difficult to make though public information suggests Israel has an uranium enrichment programme.

Modernization
In November 2005, Israel reportedly signed a contract worth US$1.7 billion with Germany for the construction of two more submarines, with the first one to be completed by 2012. In light of current and planned nuclear...
capabilities, it seems that the country is continuing to “enhance” its triad of delivery systems. Nuclear weapons modernization is related to modernization activities in the security sector generally, including in areas of information technology, advanced military technology, and outer space technology.

**Economics**
There is no reliable public estimate on nuclear weapon spending in Israel.

**International law**
Israel has signed but not ratified the CTBT. It is party to a number of non-proliferation-related agreements, on the basis of which it projects itself domestically and internationally as a responsible non-proliferant. Israel has not signed or ratified the NPT and interprets this as meaning it is not bound by the article VI disarmament obligation.

**Public discourse**
The policy of opacity entails a nuclear weapons capability about which “everyone knows” (domestically and internationally) and an umbrella of secrecy covering the physical and doctrinal elements of this capability. The secrecy surrounding Israel’s nuclear programme has taken on a life of its own at the domestic level with Israelis practicing self-censorship on a wide range of nuclear issues. At the same time, a discourse does exist at the academic level and increasingly in the media driving in large part by debate over Iran’s nuclear programme. This discourse relies primarily on foreign sources. Historically, public opinion polls have indicated support for the nuclear option though a new survey has indicated that 65% of Israelis would prefer a nuclear weapon free Middle East to the current situation.

**Pakistan**

**Current status**
Pakistan is currently estimated to have 90–110 nuclear weapons. It has a number of short-range, medium, and longer-range road-mobile ballistic surface-to-surface missiles in various stages of development. It has developed a second generation of ballistic missile systems over the past five years. It is estimated that Pakistan could have a stockpile of 2750 kg of weapon-grade HEU and may be producing about 150 kg of HEU per year. Estimates suggest Pakistan has produced a total of about 140 kg of plutonium.

**Modernization**
Pakistan has been rapidly developing and expanding its nuclear arsenal, increasing its capacity to produce plutonium, and testing and deploying a diverse array of nuclear-capable ballistic and cruise missiles. Pakistan is moving from an arsenal based wholly on HEU to greater reliance on lighter and more compact plutonium-based weapons, which is made possible by a rapid expansion in plutonium production capacity. Pakistan is also moving from aircraft-delivered nuclear bombs to nuclear-armed ballistic and cruise missiles and from liquid-fueled to solid-fueled medium-range missile. Pakistan also has a growing nuclear weapons research, development, and production infrastructure.

**International law**
Pakistan is not a signatory to the NPT nor has it signed the CTBT and it appears to recognize no legal obligation to restrain or end its nuclear weapons and missile programme. The government has, however, said it supports negotiation of a nuclear weapons convention. Pakistan has blocked negotiations of an FMCT at the Conference on Disarmament arguing that it would only further entrench asymmetries between the nuclear weapon possessors. It has indicated it would support talks if were granted an exemption on nuclear trade from the Nuclear Suppliers Group as India has been.

**Public discourse**
The government has sought to create a positive image of the nuclear weapons programme, often by linking it to national pride and identity. Pakistan’s major political parties publicly support the nuclear weapons programme. The central thrust of most public debate about Pakistan’s nuclear weapons is the struggle with India. Pakistan’s nuclear weapons are widely seen as a response to India’s.
Russian Federation

Current status
Russia is estimated to have about 11,000 nuclear weapons: 2,430 strategic and about 2,000 non-strategic warheads that are considered operationally deployed; and about 3,000 strategic and up to 3,300 non-strategic warheads awaiting dismantlement. Russia’s delivery vehicles include about 330 operationally deployed ballistic missiles of five different types that carry about 1,100 warheads; nine submarines carrying 16 SLBMs; and 72 heavy bombers capable of carrying more than 800 air-launched cruise missiles. Russia is estimated to have about 737±120 tons of HEU and 145±8 tons of weapon-grade plutonium.

Modernization
Russia’s modernization plans indicate that it is determined to maintain parity with the United States in terms of number of warheads and delivery systems. Most of the currently operational ICBMs are being retired but new multiple-warheads missiles are being deployed to replace them. In 2011 the government decided to begin development of a new multiple-warhead liquid-fuel ICBM, which is supposed to be ready for deployment in 2016 although development will likely take longer. There are no plans to extend modernization of the strategic fleet beyond the planned construction of eight Project 955 submarines. In the next few years, Russia will continue an overhaul of its current strategic bomber fleet and start work on a new-generation strategic bomber.

Economics
Modernization of the nuclear arsenal is part of a broader rearmament programme that is expected to spend about US$600 billion on various military systems in 2011–2020. About 10% of these funds will be spent on strategic force modernization. Financial constraints could affect the scale of these plans, though the rearmament effort appears to have strong support of the political leadership and public, so significant cuts to the modernization programme are unlikely. This situation may change if political environment in Russia would allow an open discussion of government spending priorities and the role of nuclear weapons in national security policy, but so far this discussion has been very limited.

United Kingdom

Current status
In September 2010, the UK government announced that it had “not more than 225” Trident nuclear warheads and that this would be reduced to “not more than 180” by the mid 2020s. The UK’s only delivery system is the Trident D5 missile. Until 2010 each of the two or three armed Vanguard class submarines carried between 12 and 14 operational D5 missiles. This will be reduced to eight missiles per submarine over the next few years. It is estimated that the UK has produced over 3.5 tons of weapon-grade plutonium and that it has acquired from the United States 21–22 tons of HEU and has produced 4–5 tons itself.

Modernization
The UK has plans to upgrade and extend the lives of its warheads in conjunction with the United States. It will be making a decision on whether or not to design and build a successor to Trident in 2015–2020. US modernization of the D5 missile system will apply equally to the missiles deployed on British submarines. The UK is also planning to replace the Vanguard class submarine. There are also plans to upgrade and expand facilities at the Atomic Weapons Establishment (AWE), including by constructing a new enriched uranium facility and a new warhead assembly/disassembly facility, refurbishing the plutonium fabrication facility, and more.
**Economics**

Annual expenditure on the UK nuclear weapons program, including AWE, is currently estimated as £2.1 billion in 2010/11. Meanwhile, public expenditure is due to be cut by 5.3% between 2011/12 and 2016/17. The government’s aim is to reduce public spending from 46.6% of the GDP to 39%.

**International law**

In 2006 the UK government claimed that its plan to replace Trident was consistent with the NPT because the Treaty does not set a timetable for nuclear disarmament and does not specifically prohibit the updating of nuclear capabilities. This implies that the UK government thinks it can continue indefinitely to retain and modernize its nuclear forces. Its current plan is not to keep nuclear weapons for a short period of a few years, pending multilateral progress on disarmament, but to introduce a new system that can remain in service until the 2060s.

**Public discourse and transparency**

The UK government has disclosed some of its plans for modernization, but there have been important limits to its transparency. It has tried to keep the Mk4A warhead modification program out of the limelight. The upgrading of AWE is presented as if it were disconnected from the development of a successor warhead. The government uses safety and surety as arguments to support the modernization of British nuclear forces. The Trident force operates from Faslane, Scotland. The Scottish National Party, which is strongly opposed to Trident, has formed the Scottish government since May 2007. In May 2011 it won a majority in the Scottish Parliament and will hold a referendum on Scottish independence in August 2014. If successful, this would result in an end to the UK hosting its nuclear weapons in Scotland.

**UNITED STATES**

**Current status**

The US government indicates it has an active stockpile of 5113 nuclear weapons. Independent estimates indicate it also has approximately 3500 “retired” warheads, an unknown number of which are being maintained for possible reactivation. The US currently reports 1970 strategic nuclear weapons as deployed on ICBMs, SLBMs, and heavy bombers. This does not include warheads that are in the stockpile that could be carried by delivery systems not defined as deployed. Independent estimates indicate the US stockpile has 760 non-strategic weapons with about 200 deployed, most of them at air bases in NATO countries in Europe. The US currently deploys 448 ICBMS; D5 SLBMs on 12 Trident submarines, currently carrying 249 SLBMs; and two long-range heavy bombers. The US has produced approximately 850 tons of HEU and 85 tons of weapon-grade.

**Modernization**

The US government is officially committed to modernizing its nuclear bombs and warheads; the submarines, missiles, and aircraft that carry them; and the laboratories and plants that design, maintain, and manufacture nuclear weapons. US policy and budget documents all manifest an intent to keep some thousands of nuclear weapons in active service for the foreseeable future, together with the capability to bring stored weapons back into service and to design and manufacture new weapons should they be desired. The US also has been engaged for more than a decade in efforts aimed at taking advantage of improvements in the accuracy of long range missiles and re-entry vehicles to develop the means to deliver non-nuclear weapons anywhere on earth in short order. Furthermore, the US is refurbishing and upgrading many of the facilities where nuclear weapons are designed, tested, and manufactured.

**Economics**

US nuclear weapons, the associated systems for fighting nuclear wars, and the factories and laboratories to design, produce, and maintain it all are owned, managed, and operated by an interlocking network of public agencies and private corporations. These in turn are part of a military-industrial-political complex of unprecedented size and power, a social phenomenon still so new and large that it remains incompletely understood. The fiscal year 2012 US military budget, including nuclear weapons spending, totaled about US$650 billion, which is about 43% of global military spending. At the time of the Fiscal Year 2012 President’s Budget Request submitted to Congress in early February 2011, the administration anticipated spending approximately $88 billion for bombs and warheads and supporting infrastructure and about $125 billion for delivery systems over a ten year period. Despite austerity measures, an announcement was made in January 2012 that the 2013 military budget will make no significant cuts that would affect current US nuclear weapons systems.

**International law**

More than four decades after the United States signed and ratified the NPT, it retains a nuclear arsenal large enough to end civilization in short order. None of its bilateral reduction agreements with Russia fundamentally change the character of nuclear weapon deployments. The US has signed but not ratified the CTBT; ratification was rejected by the US Senate in 1999 even after a bargain was made to modernize its arsenal in exchange for ratification. Meanwhile, the US announced its withdrawal from the Anti-Ballistic Missile Treaty in
2011; continuing US development and deployment of ballistic missile “defence” systems remains an impediment to disarmament progress. Endless modernization of the research laboratories and factories necessary to design and produce nuclear weapons is inherently incompatible with any “principle of irreversibility” in regard to disarmament. Doing so with the express intention of being able to re-arm, to permanently hold open the potential to reconstitute large nuclear arsenals throughout the course of disarmament, also is inconsistent with an “unequivocal undertaking” to eliminate nuclear arsenals.

Public discourse
In the broader populace, there is little debate about US nuclear weapons policies or spending. Thirty years on from the outpouring of disarmament sentiment that brought a million people out to protest in Central Park, little is left in the way of a disarmament movement in the United States. What remains is a scattering of organizations, some more towards the “arms control” end of the spectrum that always were part of the political mainstream and some that are institutionalized remnants of movements past. The former always have pursued a remedial and incrementalist politics. Most who work in the latter have come to believe that they have no choice. Either way, what public discussion there is about US nuclear weapons policy is dominated by specialists.

INTERNATIONAL LAW
The application of international law to modernization, especially qualitative modernization, faces multiple challenges. In the NPT context, while nuclear weapon states have endorsed in principle the CTBT, FMCT, and capping and reducing nuclear arsenals, they have resisted specific commitments with respect to qualitative modernization. Thus the 2010 NPT Review Conference could only record the “legitimate interest” of non-nuclear weapon states in “constraining” development and improvement of nuclear arsenals.

There is no international institutional mechanism for assessment of nuclear weapons programmes and the state of their compliance with international law with respect to cessation of the nuclear arms race and nuclear disarmament. Nor is there any international mechanism for enforcement of compliance. In the NPT review process and in the UN General Assembly First Committee, a few states devote at most several sentences to general statements on the subject of modernization. No ad hoc official international expert groups have examined the subject. NPT states parties not only do not have any institutional capability for assessment and enforcement of compliance with article VI, they have not developed such a capability with respect to non-proliferation. That is handled by the International Atomic Energy Agency, a wholly distinct body whose Board of Governors has a restricted membership, and the UN Security Council.

The establishment of adequate institutional capability to monitor nuclear weapons matters would help develop reliable information and a shared understanding of applicable standards, and thus the trust needed for a workable process of global disarmament. It would counteract the tendency of states, especially powerful ones, to treat international law and institutions as manipulable for their own ends, rather than as global public goods whose integrity should be preserved.

Notwithstanding those challenges, international law bearing on modernization is reasonably well developed. It is a normative code that the ‘invisible college’ of non-governmental analysts exemplified by the authors in this collection, as well as disarmament experts and advocates within and without governments around the world, can and should draw upon in working for an end to modernization and a beginning of global disarmament.

DIVESTMENT FOR DISARMAMENT: CHALLENGING THE FINANCING OF NUCLEAR WEAPON COMPANIES
In order to ban the use and possession of nuclear weapons by all states, the modernization of nuclear arsenals must be effectively challenged. Divestment is one such strategy for mounting this challenge.

In four of the nine nations that possess nuclear arms—the United States, Britain, France and India—private companies are heavily involved in the design, manufacture, modernization, and maintenance of nuclear warheads, their delivery vehicles (missiles, submarines and bombers), and related infrastructure. Vested interests in nuclear arms production are a major impedance to disarmament. The nuclear weapons industry is booming, with more than US$100 billion spent on nuclear weapons programmes globally in 2011, much of which went to private military contractors. These companies employ lobbyists to patrol the corridors of power in search of the next big deal.

Divestment focuses on financial institutions—banks, asset managers, insurance companies and pension funds—that invest in nuclear weapons companies, either by providing capital loans or through the ownership of bonds or shares. Divestment helps to establish, or reinforce, the illegitimacy of the nuclear weapons industry by building understanding and acceptance of the illegality of these weapons and drawing attention to the catastrophic humanitarian and environmental harm they cause. The ultimate aim of divestment is to force nuclear weapons companies to withdraw from the industry, fearing financial losses or damage to their
reputation. If companies choose to withdraw from the industry because of the commercial harm caused to them by divestment, decision makers will feel less pressure to continue investing in nuclear weapons modernization programmes.

The nuclear weapons industry is the most illegitimate of all industries. It threatens every one of us. Yet mainstream financial institutions across the world continue to invest in companies that participate in this grossly immoral, earth-endangering industry. It is up to civil society to act to stop this complicity. It is time for a global divestment campaign to challenge the build-up and modernization of the world’s most destructive weapons. Such a campaign will be vital to the success of a genuine, total ban on these ultimate instruments of terror.

POLITICAL WILL: CIVIL SOCIETY, SOCIAL MOVEMENTS, AND DISARMAMENT IN THE 21ST CENTURY

As the articles in this volume show, all of the nuclear weapons states are modernizing their nuclear arsenals, and some are continuing to expand them. It appears likely that smaller but still potentially world-destroying nuclear arsenals have been normalized, and are an integral part of the political and economic architecture of the global system as it now exists. Despite social and political changes of a magnitude that from the perspective of the Cold War times might have been expected to make nuclear disarmament possible, the nuclear dinosaurs appear to have adapted successfully to their new environment. The task now is to imagine conditions in which humanity can outlive them, and the means to bring those conditions about.

When seeking to explain the perennial absence of disarmament progress in international negotiating fora, diplomats and NGO staffers alike often will cite the absence of “political will”. How such political will might be created, however, is seldom seriously analyzed or discussed.

Much of the work done by civil society at the international level has focused on developing mechanisms and tools to implement disarmament institutionally and technically once the requisite “political will” exists. While useful, it has not actually generated “political will”. Creating the political will for disarmament requires the construction of movements within states, particularly in states that deploy nuclear weapons or in which there are powerful elements that might wish to acquire them. Constructing movements capable of supporting the conditions for disarmament will vary depending on the role that nuclear weapons and nuclear technology plays in national economies, development discourses, and in the military and geopolitical strategies of particular national elites. As during the Cold War, the internationalist character of disarmament work will consist of finding common ground between the relevant movements in parallel on both sides of confrontations between states that involve nuclear weapons, including efforts by nuclear weapons states to prevent additional states from acquiring them.

Movements sufficient to create the political will to eliminate the danger of nuclear weapons use, and finally the weapons themselves, will not arise from within the professional and institutional worlds of arms control and disarmament. Even the kind of debate and analysis needed to understand what must be done to create the political conditions for disarmament have largely failed to take hold within disarmament discourses and institutions. It is a time for all of us who work not just for disarmament but for peace and justice to be looking outward: for allies, for hope, and for understanding of what must be done. Only by building a place where we can have the conversation about how to make another world possible, will we be able to start moving towards a world where nuclear weapons have no place.