

COURIER



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The Nuclear Terrorism Waiting Game

Can the
Final Nuclear
Security Summit
End the Threat?

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Tackling Complexity with Simplicity...and a Plan

By Joseph McNamara, Editor

There is certainly no shortage of major issues facing the world today. Three months ago, news headlines focused on climate change as the Paris world conference reached a historic agreement. Later this month, the spotlight turns to Washington, DC, where leaders will gather for the fourth and final nuclear security summit, and we will watch for significant action to keep the world safe from the threats of nuclear terrorism.

For 60 years, the Stanley Foundation has been dedicated to bringing global leaders and experts together to develop solutions to these and other complex world issues blocking the peace of its people. As the foundation prepares for the upcoming summit, I am reminded of two lessons learned in my previous corporate life about dealing with and communicating complex situations. In a few words, they are simplicity of focus and communications.

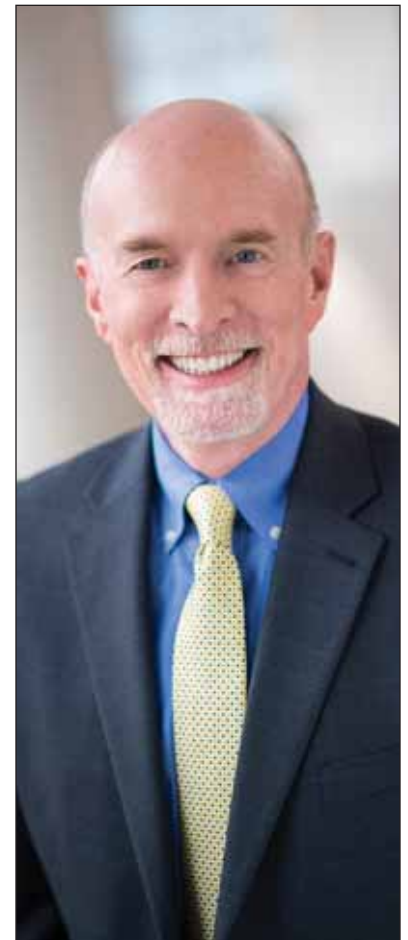
First, I recall how good or bad customer service could make or break a company, and how difficult it was to manage complex processes to achieve and maintain high quality levels. What's more, the higher levels we reached, the harder it was to reach even higher. We would reach 95 percent high-quality service, then with huge efforts maybe move the 95 to a 96. Each additional point seemed insurmountable...until we learned a secret. Instead of focusing on increasing good service from 95 to 96, we focused on reducing bad service from 5 percent down to 4, and then down to 3, and so on until we actually reached 98 to 99 percent quality levels.

With nuclear terrorism, efforts to eliminate the threat are focused on securing all the weapons-grade nuclear material in existence and preventing terrorists from acquiring any of it. Currently, some 99 percent of the world's nuclear materials have been secured, but the remaining 1 percent amounts to several thousand pounds. The challenge—no, the necessity—is to get it all secured, to increase the 99 percent to 100 percent. But to do that we must focus on the remaining 1 percent and secure it all. Similarly, communications should focus on eliminating the 1 percent, not continued rhetoric on progress of securing the 99 percent.

Second, I am repeatedly reminded of the simplest, most basic necessity for tackling complex issues: a plan. If you don't know where you are going, any road will take you there. A plan will guide action, even if the action is to determine the next steps.

In the long history of nuclear security negotiations, the upcoming summit is the last of four to assemble global leaders committed to addressing and crafting solutions to old and new threats. The summits were part of a plan, with structure, commitments, timelines, and actions. When the gavel ends the last one, much will have been done, but there is still much to do. The threats continue, and the need to arrest them is absolute.

The only way to ensure a positive legacy of the nuclear security summits is for their final action to launch a plan to complete the task. It is an act that rests with the world leaders assembled for the final summit. We hope and pray for their enlightenment and their unselfish, apolitical bravery.



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International Atomic Energy Agency Director General Yukiya Amano (foreground) at the 2014 Nuclear Security Summit at The Hague, Netherlands, 25 March 2014. While the summit made progress in further securing nuclear material with Japan's agreement to remove 330 kg of plutonium and 170 kg of highly enriched uranium, additional gains seemed remote as Russia's invasion of Crimea overshadowed the conference. (IAEA /Conleth Brady)

The Nuclear Security Summits

A Look Back, a Look Ahead

By Sam Ratner

Seven years ago on a windy spring morning in Prague, recently inaugurated US President Barack Obama announced “a new international effort to secure all vulnerable nuclear material around the world within four years.” Describing nuclear terrorism as “the most immediate and extreme threat to global security,” he pledged to prevent nuclear material from falling into dangerous hands by partnering with international stakeholders

to pursue removals of unsecured nuclear material and increased security standards. The effort, Obama offered, should begin by adding a wholly new event to the calendar of international diplomacy: a nuclear security summit.

It is unlikely that the president’s speech was met with great praise at Ukraine’s Kharkiv Institute for Physics and Technology, then home to one of the largest civilian stores of highly enriched uranium (HEU) outside of Russia and the United States. Since the mid-’90s, American nuclear security proponents had pressured Ukraine to give up its HEU, to no avail. Suggestions that the Kharkiv stockpile be removed provoked particular pushback, as some Ukrainian scientists saw Kharkiv as the key to a future civilian nuclear energy program. Indeed, a 2004 study by the Ukrainian government found that the Kharkiv HEU was an important national resource, not to be given up.

Yet only one year after the Prague speech, media cameras were flashing as Ukrainian President Viktor Yanukovich sat next to a smiling Obama at the first of what would become biennial nuclear security summits. Yanukovich, seeking to overcome the perception that he was a pro-Russian stooge by demonstrating good relations with the Obama administration, paid for his photo op in U-235, arriving at the summit with a commitment to remove all of Ukraine’s HEU, including the Kharkiv stockpile, within two years. Gary Samore, who was White House coordinator for arms control and weapons of mass destruction, and sherpa for the first two summits,

said, “There’s no question in my mind that Yanukovich’s decision to get rid of Ukraine’s HEU was connected to the public relations benefits of attending the summit.” The completion of the planned removal in 2012 remains one of the achievements of the Obama administration’s nuclear security efforts and a testament to the value of summit diplomacy. As the 2016 summit kicks off, however, questions are being asked about the legacy of the summit process and the way forward for global partnerships for nuclear security.

“A Forcing Event”

The original vision for the summits, as articulated in a July 2008 Obama campaign policy paper, called for “leaders of Permanent Members of the UN Security Council and other key countries” to meet and agree on efforts to secure all vulnerable nuclear weapons material within Obama’s first term. The meeting was to act as “a forcing event,” bringing global attention to nuclear security and pushing world leaders to produce measurable progress on security measures within their own countries.

Desired outcomes came in two categories: a unanimously endorsed communique underlining the international community’s determination to prevent nuclear terrorism and a set of commitments from each summit attendee to undertake specific, measurable steps toward securing nuclear material.

Presummit talks, however, only underscored to the American negotiating team the impossibility of international consensus

on a nuclear security regime. "Nuclear security," Samore said, "does not lend itself to big multilateral activities."

Consequently, negotiators adjusted the objectives and for the initial 2012 summit, held in Washington, DC, instead used the multilateral summit process as a basis for progress along bilateral lines. Attending countries were strongly encouraged to arrive at the summit with prearranged "house gifts": demonstrations of their commitment to promoting nuclear security. At the first summit, 29 attendees made gifts, ranging from major removals like Ukraine's HEU commitment to smaller offerings like Thailand's promise to join the Global Initiative to Combat Nuclear Terrorism. Taken together, the gifts represented progress toward Obama's goal of securing nuclear material and, along with the communique reaffirming participants' concern over nuclear terrorism, established expectations of what could be accomplished in the summit process.

The second summit, in 2012, took place in Seoul, South Korea. It showcased both the value and limitations of the summit format. Attendees went to Seoul with significant house gifts, particularly Kazakhstan's announcement that it had securely stored its extensive stockpile of spent nuclear fuel. The house gift program also expanded to include what became known as "gift baskets," groups of countries (as few as three and as many as 24) coming together to offer joint, voluntary contributions toward a particular aspect of nuclear security. Gift baskets allowed for larger coalitions, like the 23 countries that came together to support nuclear training centers, to act on particular topics without upsetting the fragile unanimity of the official summit communique.

Yet by 2012 it was clear that the summit process would not lead to the completion of the president's goal of securing all nuclear material within his first term. The progress that had been made came largely from what Kenneth Brill, former American ambassador to the International Atomic Energy Agency (IAEA), and others characterized as "low-hanging fruit," removals that likely would have happened without the summits but happened faster because of the summit process. The hardest cases, particularly the HEU in Belarus and South Africa, remained unresolved. As a result, the summits were producing diminishing returns. With so much low-hanging fruit picked, major steps forward became more difficult at each successive summit.

The 2014 summit, at The Hague, continued this trajectory. The summit scored a headline-winning success when Japan agreed to the removal of 330 kg of plutonium and 170 kg of HEU, the single largest removal the summit process has produced. Yet no movement appeared on the Belarussian or South African cases, and the goal of securing all nuclear

material seemed even more remote as Russia's invasion of Crimea overshadowed the summit.

NSS 2016: What to Expect

In 2015, the Stanley Foundation and the World Institute for Nuclear Security organized the panel discussion "Sustainable Nuclear Security Governance: Beyond the 2016 Nuclear Security Summit" in Vienna during the IAEA's annual conference there. When the organizers polled their audience of nuclear experts and stakeholders, 91 percent agreed with the statement, "The Nuclear Security Summits have made real progress in securing nuclear material." Yet 82 percent agreed that "continuing progress and maintaining momentum after the 'last' 2016 Nuclear Security Summit will be challenging," while 5 percent labeled it "impossible."

Bridging the gap between the accomplishments of the summit process and the uncertainty of the postsummit future will be one of the most important issues on the table at the 2016 summit, March 31–April 1 in Washington, DC.

The summit is likely to generate action plans for continued progress in nuclear security issues under the auspices of five international organizations: the IAEA, the United Nations, Interpol, the Global Initiative to Combat Nuclear Terrorism, and the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction. Yet there are concerns about the ability of these organizations to produce the kinds of results brought by the summit process. In addition to the low-hanging fruit problem, Interpol and the United Nations are underresourced when it comes to nuclear security, and the breakdown in relations between Russia and the West has put serious strain on the Global Partnership, the Global Initiative, and nuclear security efforts overall.

Most nuclear security experts agree that the 2016 summit will be the last. The process has run its course, and summit fatigue is a real concern. However the next American presidential administration chooses to attack the challenges of preventing nuclear terrorism, it is unlikely to duplicate the Obama administration's strategy. Yet even as the summit process fades, the bilateral relationships it fostered will remain, forming a basis for continued American leadership on nuclear security issues. The future of international efforts for nuclear security is cloudy, but the legacy of the summits can be found in the expansion of those relationships and the global awareness of the threat of unsecured nuclear materials.

Sam Ratner is a research assistant at the Belfer Center for Science and International Affairs at Harvard University as well as a freelance writer and editor.

The Stalking Threat of Nuclear Terrorism

Key Nuclear Security Summit Issue to Watch

The threat of nuclear terrorism remains the world's most unthinkable danger—despite years of agreements, cooperation, and safeguards enacted by almost all major nations on the planet. The threat is best contained, according to the world's leading nuclear security experts, by securing all the weapons-grade nuclear materials in existence and preventing would-be terrorists from acquiring them.

And, in fact, some 99 percent of the world's weapons-grade materials have been secured. But 1 percent or more is still out there, and it amounts to several thousand pounds that could be acquired by any one of several terrorist organizations.

What's more, some of the material that has been "secured" is still at risk of theft or purchase from smugglers because of security weaknesses.

The threat of nuclear terrorism is one of the most important issues to watch as the 2016 Nuclear Security Summit convenes and concludes. It is an issue that is not only persistent, even virulent, it is one with new recent challenges in the quest to contain and stamp out the threat. It is the issue of potential illegal access to nuclear material through smuggling and black market operations.

In November 2015, the Center for Public Integrity (CPI) published a comprehensive investigative news report on national security that exposed black market operations of stolen fissile materials in Russia and the serious implications of that threat to the world. It underscores the complexity and enormity of the task to secure all nuclear material. The article is reprinted in *Courier* with permission of CPI.



The following story was originally published on November 12, 2015 by the Center for Public Integrity, a nonprofit, nonpartisan investigative news organization in Washington, DC.

The Fuel for a Nuclear Bomb Is in the Hands of an Unknown Black Marketeer From Russia, US Officials Say

The presence of identical fissile materials in three smuggling incidents indicates someone has a larger cache and is hunting for a buyer.

By Douglas Birch and R. Jeffrey Smith



The arrest of Teodor Chetrus in Moldova in 2011. (Moldovan General Police Directorate)

CHISINAU, Moldova—The sample of highly-enriched uranium, of a type that could be used in a nuclear bomb, arrived here on a rainy summer day four years ago, in a blue shopping bag carried by a former policeman.

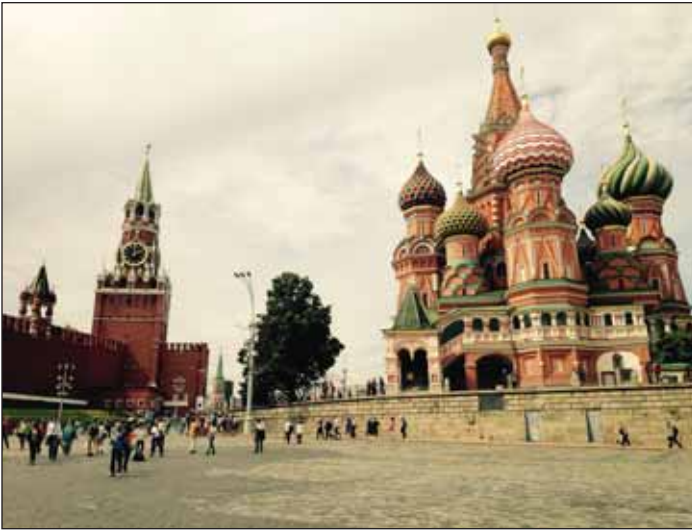
According to court documents, the bag quickly passed through the hands of three others on its way to a prospective buyer. It was not the first time such material had passed through this city, raising international alarms: It had happened twice before. And mysteriously, in all three cases, spanning more than a decade, the nuclear material appeared to have the same origin—a restricted military installation in Russia.

This news would quickly reach Washington. But that day, the first to pick up the blue bag was the wife of a former Russian military officer, who handed it off to a friend while she went shopping in this former Soviet city's ragged downtown.

Not long afterward, a 57-year-old lawyer named Teodor Chetrus, from a provincial town near the Ukrainian border, retrieved it and brought it to a meeting with a man named Ruslan Andropov. According to an account by Moldovan police, the two men had, earlier in the day, visited a local bank, where Chetrus confirmed that Andropov had deposited more than \$330,000 as an initial payment.

Andropov next examined the contents of the bag: a lead-lined cylinder, shaped like a thermos. It was meant to be the first of several shipments of highly-enriched uranium totaling 10 kilograms (22 lbs), a senior investigator here said. That's about a fifth of what might be needed to fuel a Hiroshima-sized nuclear explosion—but almost enough to power a more technically-advanced "implosion-style" nuclear bomb.

But then, abruptly, Chetrus's participation with this group of shadowy characters in the illicit sale of nuclear explosive materials—the stuff of nightmares at the CIA, the Pentagon, and the White House—went awry.



Red Square, Moscow, with the Kremlin on the left. (Center for Public Integrity/Douglas Birch)

Andropov turned out to be working with Moldovan police, who were monitoring communications between those involved, with advice from the US Embassy in Chisinau. On June 27, 2011, they swooped in. Photos of the arrests show a policeman in a ski mask holding a Kalashnikov while Chetrus knelt on a sidewalk in front of the bank. He would eventually be sentenced to five years in prison.

Chetrus's arrest ended one of four attempts in the past five years by Moldovan residents to smuggle dangerous nuclear materials into the hands of unscrupulous buyers. But his capture did not ease the concerns of Western intelligence services.

Instead, it stoked them, because the resulting international probe into the case has sparked fresh, and previously unreported, worries that thieves inside of Russia somehow made off years ago with a full bomb's worth of highly enriched uranium. Western spies fear the thieves have been doggedly looking for a buyer for the past sixteen years, by repeatedly dangling in front of them identical, genuine samples of that highly valuable material.

Five current or former US officials who have tracked nuclear smuggling, and who declined to be named because this assessment is classified, said it is now a consensus view within the intelligence community.

But no one in the West knows exactly who has this nuclear explosive material, and where they may be.

It's a mystery that so far has stumped America's best spying efforts, in no small measure because the government of Russian president Vladimir Putin has refused to provide needed information on the case—or even to acknowledge that some of the country's nuclear explosive materials are missing.

Three Identical Incidents

Western concerns are based on a simple trail of evidence that officials have until now kept secret: Three times since 1999, identically packaged containers of highly-enriched uranium have been seized by authorities outside of Russia—in Ruse, Bulgaria, in May 1999; in Paris in July 2001; and most recently here in Chisinau. In each case those holding the uranium said it was part of a larger cache, available to a buyer for the right price. That claim, while unproven, is considered credible by experts who have studied the three incidents.

Confidential forensic analysis by US and French nuclear scientists—worthy of a “CSI” episode—has shown that these materials came from the same stockpile. Officials say they believe all were produced in the early 1990s at a sprawling Russian nuclear facility known as the Mayak Production Association, located in Ozersk, in the Ural mountains, roughly 900 miles (1,400 km) east of Moscow. The facility, which produced the fuel for Russia's first nuclear warheads and for its naval nuclear reactors, is still one of the country's “closed cities,” where access is tightly regulated.

The similarities between these three seizures make them the most worrisome unresolved instances of illicit trafficking in authentic, bomb-grade materials anywhere in the world, according to more than a dozen government officials and independent experts interviewed for this article, many of whom spoke on condition of anonymity due to the sensitivity of the topic.

While seven of those involved in the smuggling have so far been prosecuted in Bulgaria, France and Moldova, officials say they are just low-level members of a shadowy international ring with Moldovan and Russian connections, all working for a person or persons whose identity remains cloaked.

Intelligence professionals—who say they put the issue of nuclear smuggling near the top of all their priorities—explain that this is a hard target to hit. Their principal ambition is to catch the thief and the buyer, but so far they have seen only middlemen.

But evidence collected from the probes of these three incidents indicates that a weapons-grade cache of nuclear material has been “in the wild since the mid-1990s,” a knowledgeable US intelligence official said. It's widely thought to be no longer in Russia, and to possibly have passed through multiple hands, the official added, explaining that the 2011 Moldovan case is what helped solidify this assessment.

The basis for international worry, several officials explained, is the potential for all or part of this nuclear-materials cache to wind up in the hands of a terrorist buyer who could transform it into a viable weapon, using technical information about nuclear bomb designs that has leaked long ago into the public domain.

The FBI has privately discounted Moldovan claims that radioactive materials seized in more recent smuggling incidents here were being sought by the Islamic State terrorist group. Still, American worries about the 2011 Chisinau case were heightened by the presence in the Moldovan capital at the time of the deal of a potential buyer from Sudan, where Al Qaeda tried to obtain some uranium in the early 1990s and remains active, officials here and in Washington said.

With so many nuclear explosives held by governments around the world, US officials have long worried about the possibility of a terrorist-engineered nuclear or radiological blast within the United States. Multiple federal agencies have held almost 1,400 drills in cities around the country over the last decade to train local police and emergency personnel in how to behave after such a nightmare unfolds, according to a spokeswoman for the National Nuclear Security Administration.

Asked at a March 2014 nuclear security summit in the Netherlands whether he thought Russia's assertive foreign policy was the number one threat to the United States, President Obama replied that "I continue to be much more concerned, when it comes to our security, with the prospect of a nuclear weapon going off in Manhattan."

According to a 2004 Department of Homeland Security guidebook to disaster response, even a relatively small nuclear detonation—comparable to 10,000 tons of TNT, or about half the force of the blast that levelled Nagasaki—would kill hundreds of thousands of people, contaminate 3,000 square miles (7,800 sq km), and cause billions of dollars in damages, while leaving an urban area a mile (1.6 km) in diameter a smoking wasteland.

The Nuclear Smuggling Capital

Besides making the arrests in 2011, Moldovan police detained three people who they said were trying to smuggle depleted uranium in Aug. 2010, and last year the FBI helped investigate a group that tried to smuggle low-enriched uranium—neither of which can be used in a nuclear bomb. This year, further arrests were made in a case involving cesium, a radioactive, but not explosive, material.

Experts say Moldova's repeated role in nuclear smuggling is unsurprising, since cross-border crime is much more prevalent in poorly governed or fractured states. Roughly the size of Maryland with about two-thirds the population, it is one of

How Experts Traced the Explosive Materials to Russia

A "CSI"-style probe uncovered a distinctive radioactive signature.

A detailed 2013 report on the Bulgarian case from Lawrence Livermore National Laboratory explained how a nine-month study by a team of lab scientists discerned telltale particle shapes and sizes as well as distinctive radioactive decay rates and concentrations of 72 different elements in the sample provided to Washington, eventually leading "investigators to the source of the HEU [highly-enriched uranium]."

The lab analyzed the fiber content of the container's labels, with results showing they were "most plausibly produced in Eastern Europe," while the concentration of certain radioactive particles pointed toward production in "the former Soviet Union" and probably a light-water reactor, such as a facility associated with the production of fuel for "naval propulsion systems," according to the Livermore report.

Mark Kristo, a chemist at Livermore, said in an interview this conclusion was partly based on the type of lead in the surrounding canister, and the presence of a colorant known as barium chromate—a carcinogen banned in the West—in its wax lining. The Russians, he said, did not want to look at the paper, glass, and lead.

French researchers, separately writing in a 2007 International Atomic Energy Agency report, said the analysis of the Paris sample "gave a good correlation with the...enriched light water reactor fuel reprocessing"—of the type that current and former US officials say was done in the early 1990's at Mayak. "This sample really looks like the one in the Bulgarian case," the French researchers added.

—R. Jeffrey Smith and Douglas Birch

the poorest former Soviet republics. Filled with rolling fields and tiny villages, the country is squeezed between Romania and Ukraine and brushed by the Danube River. The capital of Chisinau, a brash and dusty place, shows signs of fast economic growth that has benefited only a sliver of its citizens. BMWs and Lexus sedans share the streets with hordes of tiny taxis and Soviet-era streetcars, and pensioners line the sidewalks peddling soaps, samovars and women's underwear.

Since 1992, its territory has been split into two ethnically separate regions, dominated one by Romanian and the other by Russian and Ukrainian speakers. Russian troops have been stationed for decades in the second of these regions, known as Transnistria, a sliver of land on the eastern bank of the Dniester River, over the opposition of the central government.

Like other fragments of the former Soviet empire occupied by Russian troops, Transnistria is a haven for smugglers, particularly of cigarettes, arms, and prostitutes. It has its own flag, displaying a hammer and sickle, but isn't recognized as a country by any member of the United Nations, including Russia.

The Transnistrian capital, Tiraspol, is where Galina Agheenco—who picked up the blue bag containing the uranium from the former policeman and passed it to a friend—lived with her husband Aleksandr, 58, a mustachioed Russian former military colonel, according to officials here. An English-language slide presentation about the incident prepared by the Moldovan Ministry of Internal Affairs calls Aleksandr the "leader of the criminal group" involved in the nuclear smuggling incident.

His ambition, a Moldovan Supreme Court ruling in May 2014 said, was to sell a total of one kilogram of highly-enriched uranium for roughly \$36 million, in a deal plotted on Skype, on mobile phones, and in emails—many of which turned out to be monitored by the government. The actual material offered prior to the police raid was one-hundredth of that amount.

But Col. Gheorghe Cavaliuc, a soft-spoken, young Moldovan police official who heads the special operations division, said in an interview here that efforts by the police to learn more about Aleksandr's activities and connections have been stymied. An arrest warrant for him is still unfulfilled, five years later, and officials here say they heard he fled from Transnistria to Russia. Attempts by the Center for Public Integrity to obtain his response to the allegations against him were unsuccessful.

"We sent several requests to the Russian Federation for information about him, but we didn't get any answers," Cavaliuc said.

Washington hasn't fared any better. The US Embassy here "does not maintain liaison relationships or active, ongoing contacts with Transnistrian law enforcement and/or security service personnel," a December 2009 State Department cable released by Wikileaks said.

Galina Agheenco, whose Lexus GS330 car had Transnistrian plates, was detained on the day of the incident and served three years in prison. But the former policeman who brought her the uranium, and was charged in the case, returned to Transnistria when he was released by a court pending trial, defying a judge's order, according to the Moldovan police report. Chetrus, meanwhile, was freed from prison last December and is appealing his sentence.

The two other cases involving identical samples of nuclear explosives—in France and Bulgaria—also had Moldovan connections, according to investigators here.

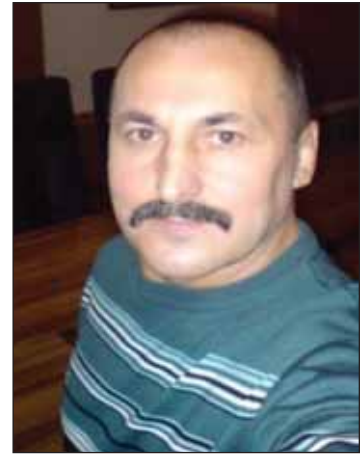
Nuclear Explosive Materials in a Van and a Trunk

The 2001 Paris case arose from a tip given to the police there that a 36-year-old Frenchman with a criminal record, Serge Salfati, was trying to find a buyer for 30 kilograms (66 pounds) of highly-enriched uranium – more than enough for a skilled bomb-maker to produce a nuclear explosion. He was using genuine samples weighing a total of 5 grams as a lure.

A special police squad checked for radiation in Salfati's apartment and garage, but found nothing. Their detectors then got a hit from a van he used, and so they arrested him and seized a lead container containing the samples.

The plane carrying the uranium to Paris flew to Charles de Gaulle Airport from Chisinau, said Ionel Balan, Deputy Director of Moldova's National Agency for Regulation of Nuclear and Radiological Activities, in an interview here.

The Bulgarian case, two years earlier, arose when a man driving over a bridge at a Danube River crossing to Romania aroused the suspicions of a border guard, who searched his vehicle. The guard found a receipt, written in Cyrillic, for the



Russian citizen Aleksandr Agheenco, seen here in this undated photo, is still at large after allegedly organizing a sale of highly enriched uranium. (Moldovan General Police Directorate)

purchase of “uranium 235,” and then, after pulling apart an air compressor in the trunk, found a lead container inside with that label on it. The man, Urskan Hanifi, told police he bought the material in Moldova and was headed back there after failing to find a buyer for it in Turkey, according to media accounts and a US government report.

Cavaliuc said he is convinced that a single group stands behind each of the three smuggling cases, and that a larger cache of material could be hidden in Transnistria. “In all three cases, there was the same container, the same chemical components [of the uranium] and traffickers from the same country, Moldova,” he said.



Ionel Balan examines a seized HEU sample in June, 2011. (National Agency for Regulation of Nuclear and Radiological Activity)

An Unmarked Plane Carrying FBI Agents

But no one knew any of this immediately. When the lead canister seized in 2011 was initially brought to the Moldovan government’s rudimentary police laboratory, Ionel Balan, a biochemist, expected it to be a hoax and so he handled it without gloves or a smock. He found the inside wall had been coated

with about an inch of paraffin wax, and inside it was a small glass ampoule shaped like a tiny harpoon, containing a blackish powder.

He used a snub-nosed radiation detector to take two readings, and then he consulted a dog-eared copy of a nuclear materials guide published by Los Alamos National Laboratory in the United States and used worldwide as a reference manual: “And immediately, I understood this was not simple or natural uranium, it was enriched uranium.”

His readings also indicated some of it had decayed, “a clear indication that this sample was old and not fresh.”

Word of this result quickly reached Washington and, shortly afterward, an unmarked private jet landed at the Chisinau airport, secretly carrying FBI agents. They scooped up the canister and its contents and flew them back to the United States.

The samples were taken to Lawrence Livermore National Laboratory, where US nuclear weapons have been designed since the 1950s and a group known as the Forensic Science Division specializes in analyzing foreign materials, using a classified library of radioactive particles collected by US officials and intelligence sources all over the globe.

According to Moldovan authorities, a preliminary report by the division, entitled “Results for Moldovan HEU Sample,” concluded that the uranium was produced in Russia and eerily similar to the materials seized a decade earlier in France and Bulgaria.

They did not provide details, but US officials said the isotopic signature, along with other evidence, pointed directly at Russia’s Mayak plant as the origin.

Patrick Grant, one of the lead Livermore investigators, declined to discuss the Moldovan case, but said in an interview that the findings in the Paris case “correlate very well” with those of the uranium seized in Bulgaria. In a 2014 textbook for nuclear forensic scientists, Grant and several colleagues wrote that the ampoules seized in Bulgaria resembled those used to preserve samples from specific production runs at Russian nuclear processing plants. Each of these plants, he said, might have dozens of such samples on its shelves.

Matthew Bunn, a nuclear security expert at Harvard who wrote a classified study about Russian fissile material stocks during the Clinton administration, said such samples would be relatively easy to steal. “You could easily imagine a room full of hundreds of samples... and someone sweeping them into a suitcase and walking out,” he said.

A Chaotic Moment at Russian Nuclear Plants

The apparent age of the purloined materials is not reassuring. The Livermore team fixed the time of the Bulgarian sample production as Oct. 30, 1993, plus or minus one month—a time when Russian political turmoil and economic problems had by many accounts seriously weakened security at the country’s nuclear installations.

At some facilities, security guards and scientists alike were not paid, and morale plummeted. Moreover, “they didn’t have seals, badge systems, or a computerized database” that showed how much explosive material they had and where it was, a US official said, speaking on condition of anonymity.

In 1994, a machinist at the Elektrostal Machine-Building Plant, a nuclear fuel production facility 36 miles (57 km) east of Moscow, told police he carried six and a half pounds (3 kg) of weapons-grade uranium out of the front gate, hidden in a pair of protective gloves. He gave the material to a relative, a butcher in St. Petersburg, who stored it in a jar in his refrigerator while he and two friends—a pipelayer and an unemployed man—hunted for buyers at open-air markets.

That same year, an Elektrostal metalworker named Vladimir Luzgachev smuggled out another 3.7 pounds (1.7 kg) of

enriched uranium in a bag of apples. He was not arrested until June 1995, when Russia's Federal Security Service learned of his efforts to find a buyer.

Both of those episodes occurred several years after the Federal Security Service arrested a group of nuclear workers for involvement in the theft of 41 pounds (18 kg) of nuclear explosive material from an unnamed facility in Chelyabinsk province, where the Mayak Production Association and three other major plants are located.

Viktor Yerastov, then chief of the Nuclear Materials Accounting and Control Department for the Ministry of Atomic Energy, said in the Winter 2000 edition of Russia's *Yaderny Kontrol* (Nuclear Control) magazine that if successful, that theft "could have inflicted a significant damage to the state." A 2002 CIA report to Congress separately quoted him as saying the amount stolen was "quite sufficient material to produce an atomic bomb."

No Accounting of What Was Stolen Years Ago

Washington's anxieties about a potential radioactive "dirty bomb" or nuclear blast on US soil have always been centered around the risk that explosive materials—more than a bomb's mechanical workings—could fall into the wrong hands. "In the nuclear business, it's all about the materials," said Anne Harrington, deputy administrator at the National Nuclear Security Administration, in an interview last year. "You can make widgets, pieces and parts, but without the material you don't have an improvised [nuclear] device."

Although roughly two dozen countries have enough nuclear explosives to make a bomb, Russia's materials have long been the chief Western concern. Of the roughly 20 documented seizures of nuclear explosive materials since 1992, all have "come out of the former Soviet Union," Harrington separately told the Senate Armed Services Committee's Subcommittee on Strategic Forces in April 2015. "We see a lot of former Russian military, former Russian intel involved in nuclear trafficking," a US intelligence official said in an interview.

Officials say that's why Washington has spent about \$4 billion over the past 25 years to help that country tighten control of the weapons-usable materials inside its vast nuclear complex. Russian nuclear facilities have made progress, they say, particularly in improving training for security personnel, installing new physical barriers and upgrading related sensor technology. New nuclear security regulations came into effect in 2012, and a civilian oversight group was created to ensure their implementation.

But a senior intelligence official from the Bush administration who retains security clearances said that he was still worried

about material stolen decades ago that may be "sloshing around" outside the walls of these facilities. "The real concern is that the material got out of these sites before we paid much attention" to securing them, he said in an interview, speaking on condition he not be named so he could discuss classified analyses.

This anxiety has been sporadically acknowledged by intelligence officials in the past decade. "We find it highly unlikely that Russian authorities would have been able to recover all the material reportedly stolen," a National Intelligence Council report concluded in 2005, according to an excerpt read by then-Sen. Jay Rockefeller of West Virginia at a hearing of the Senate Select Committee on Intelligence in February 2005.

Rockefeller asked then-CIA Director Porter Goss whether enough had vanished from Russia's stockpile to build a nuclear weapon. "There is sufficient material unaccounted for so that it would be possible for those with know-how to construct a nuclear weapon," Goss responded. Rockefeller also asked if Goss could assure the American people the missing material was not in terrorist hands. "No, I can't make that assurance," Goss said. "I can't account for some of the material so I can't make the assurance about its whereabouts."

In November 2002, a senior Russian nuclear and radiation safety official, Yuri Vishnevskiy, affirmed that small quantities of nuclear materials, including highly-enriched uranium, had indeed disappeared from nuclear facilities. But Russian officials have been increasingly tight-lipped since then.

Former CIA director George Tenet, in his 2007 memoir, said that after hearing Al Qaeda was trying to buy Russian nuclear devices in 2003, an Energy Department intelligence official went to Moscow to seek information about "reports we had received of missing material." But the Russians refused to provide details, Tenet wrote, and "in the final analysis, it was still a game of spy versus spy."

To overcome some of this distrust, US officials tried the following year to draw Russia into joint analysis of fissile materials seized in the Bulgarian incident, but had only limited success. Scientists at Livermore shared a half-gram of that highly-enriched uranium with Russia's Bochvar All-Russia Scientific Research Institute in Moscow, and paid them \$50,000 to do an independent analysis.

According to a report by Michael Kristo, a chemist at Livermore, Bochvar scientists "confirmed the analytical results" reached at his laboratory, including the fact that the sample originated at a nuclear fuel reprocessing facility. But Bochvar did not agree with Livermore that this meant it

came from the former Soviet Union, and instead claimed “it could have been produced by any nuclear state possessing the appropriate facilities,” Kristo wrote.

“They’re very guarded and sensitive about the possibility that anything is missing,” a former senior Obama administration official said in a recent interview, echoing comments from many others in Washington. “They never told us” whether they investigated the 2011 Moldovan case or what they found.

The 2011 version of an annual CIA report on Russian nuclear security practices—the most recent one completed—reaffirmed that “we judge it highly unlikely that Russian authorities have been able to recover all of the stolen material,” and added that large uncertainties exist about more recent thefts and the current state of Russia’s safeguards.

Under Putin, Russia has steadily cut back its overall nuclear security cooperation with the United States, arguing that

it no longer needs Washington’s financial or technical assistance to safeguard its own fissile material stockpile. “It just faded to a tertiary issue under Putin,” Michael McFaul, the US ambassador to Russia from 2012 to 2014, said in an interview. This year, for the first time in its budget proposal to Congress, administrators at the National Nuclear Security Administration shifted all Russia-related nuclear security expenditures to other purposes.

Officials with Rosatom, the state-owned corporation that runs Russia’s nuclear energy and weapons plants, declined to be interviewed for this article. But Kirill Komarov, first deputy director of Rosatom, spoke briefly to a reporter for the Center for Public Integrity at Moscow’s AtomExpo nuclear exposition in June.

Asked whether a cache of stolen Russian nuclear materials might be held by someone with ill motives, Komarov was dismissive, calling it “a question out of spy plots.”



The headquarters of Rosatom, the state-owned corporation that runs Russia’s nuclear weapons and energy programs. (Center for Public Integrity/Douglas Birch)

“You know very well that a very operational system of controlling nuclear materials has been established worldwide—none of them are out of control,” Komarov said, adding that these materials are not passed around like a box of matches among smokers. “Their movements are always strictly controlled,” he said.

Vladimir Rybachenkov, a former counselor on nuclear issues at the Russian Embassy in Washington and now an advisor to the Russian Foreign Ministry, similarly dismissed fears that there were caches of Russian-made nuclear explosive

materials that smugglers were dipping into to peddle on the black market.

“Many things are being invented, you know, kind of illusions,” Rybachenkov said. “People like journalists like to write about things that they don’t know for sure. So it’s rumors—rumors and nothing more.”

Birch reported from Russia and Moldova; Smith reported from Washington, DC, and California. This story was co-published with VICE News.

Previous Seizures of Nuclear Material

Date	Location	Material	Amount, g	IAEA confirmed
6 Oct. 1992	Podolsk, Russia	HEU (90%)	1500	No
29 Jul. 1993	Andreeva Guba, Russia	HEU (36%)	1800	No
28 Nov. 1993	Polyarny, Russia	HEU (20%)	4500	No
March 1994	St. Petersburg, Russia	HEU (90%)	2972	Yes
10 May 1994	Tengen-Wiechs, Germany	PU	6.2	Yes
13 Jun. 1994	Landshut, Germany	HEU (87.7%)	.795	Yes
25 Jul 1994	Munich, Germany	PU	.24	Yes
8 Aug. 1994	Munich Airport, Germany	PU	363.4	Yes
14 Dec. 1994	Prague, Czech Republic	HEU (87.7%)	2730	Yes
June 1995	Moscow, Russia	HEU (21%)	1700	Yes
6 June 1995	Prague, Czech Republic	HEU (87.7%)	.415	Yes
8 June 1995	Ceske Budejovice, Czech Rep.	HEU (87.7%)	16.9	Yes
29 May 1999	Rousse, Bulgaria	HEU (72.65%)	10	Yes
2000	Elektrostal, Russia	HEU (21%)	3700	No
16 Jul 2001	Paris, France	HEU (72.57%)	.5	Yes
26 Jun 2003	Sadahlo, Georgia	HEU (89%)	~170	Yes
1 Feb. 2006	Tbilisi, Georgia	HEU (89%)	79.5	Yes
11 Mar. 2010	Tbilisi, Georgia	HEU (89%)	18	Yes
27 June 2011	Chisinau, Moldova		4	Yes

Source: “Illicit Trafficking in Nuclear Materials: Assessing the Past Two Decades,” Lyudmila Zaitseva, University of Salzburg, 2015. List provided by author.

The United Nations has made progress building atrocity prevention considerations into policy planning and program design across its system. In Mali (below), peacekeepers help transition from conflict to peace and protect civilians from remaining threats. (MINUSMA/Marco Dormino) In the Democratic Republic of the Congo (left), several UN agencies and nongovernmental organizations search for solutions to help displaced persons. (MONUSCO/Abel Kavanagh)



Acting on the Responsibility to Protect

Five-Year Progress Report on
How the World's Nations Are Doing

By Alex J. Bellamy

The United Nations member states adopted the Responsibility to Protect (R2P) in 2005 to recognize and guide local and global responsibility for protecting individuals from atrocity crimes—namely genocide, crimes against humanity, war crimes, and ethnic cleansing. Five years later, in 2010, the Stanley Foundation convened a meeting of UN officials, permanent representatives

to the United Nations, and human protection experts at Tarrytown, New York, to assess progress to date and discuss the future implementation of R2P.

The meeting identified seven concrete actions that needed to be taken:

1. Develop an early warning and assessment capability in the United Nations of potential atrocity threats.
2. Improve the United Nations' capacity for timely and decisive responses to atrocities.
3. Establish a UN office to jointly address genocide prevention and R2P.
4. Work across the entire UN system to strengthen R2P.
5. Improve interaction between the United Nations and regional and subregional institutions.
6. Encourage states to accept and commit to their responsibility to protect, and build capacity for them to do so.
7. Ensure the ongoing consideration of R2P in the General Assembly.

Now, five-plus years later, it is worth taking a step back and considering how the international community is faring. Unsurprisingly, the picture is mixed, but overall a considerable amount of progress has been made, though major challenges remain. The continuing critical task now is the practical one of making R2P a reality everywhere.

Progress on R2P

Significant progress has been made on the institutional and political fronts:

- The United Nations has developed a variety of early warning and risk-assessment capabilities, including the Framework Analysis for Atrocity Crimes, which helps detect the risk of genocide and atrocity crimes; a program of regional quarterly review meetings of UN senior leaders to review assessments of risks and set policy priorities accordingly; and a more coherent system for activating comprehensive responses to imminent crises that may involve the commission of atrocities.
- A well-established joint office for genocide prevention and R2P is increasingly integrating its work into the UN system.
- A regular cycle of secretary-general's reports and General Assembly dialogues have helped cement the principle and deepen consensus and shared understanding within the UN system.

So successful has this latter process been that several experts and many member states now argue that these cycles have exhausted their utility and should give way to a more formal set of processes.

In addition, one crucial institutional development was not anticipated: the embrace of R2P by the UN Security Council. In 2010, the council was cautious and hesitant to embrace

the R2P principle. However, since then, R2P has become an almost regular feature of the council's deliberations and, more importantly, its resolutions. As of January 2016, the council had issued 43 resolutions referring to R2P. Such political progress was not anticipated in 2010.

A Positive Trajectory, Room for Improvement

Progress has been more mixed in generating more national ownership of the responsibility to protect, but the world is, nonetheless, on a positive trajectory. Perhaps the most obvious indicator of countries' demonstrating their commitment to and ownership of R2P is their willingness to appoint a senior governmental official as national R2P focal point who helps the government strengthen policies to prevent mass atrocities. From modest beginnings in 2011, today more than a quarter of UN member states (51) have appointed R2P officials and committed themselves to a global network of focal points. Other states have preferred to focus on regional initiatives, such as the Latin American Network for Genocide Prevention and the Global Action Against Mass Atrocity Crimes network that includes several more UN member states.

Likewise, progress toward working across the UN system to strengthen R2P has continued, albeit unevenly. On the one hand, thanks to a combination of outreach by the joint office for genocide prevention and R2P, the Framework Analysis for Atrocity Crimes and early warning assessments, and the secretary-general's Human Rights Up Front action plan, UN bodies are increasingly building atrocity prevention considerations into their policy planning and program designs. On the other hand, this progress remains inconsistent across the system. The secretary-general has also stopped short of articulating a clear and actionable strategy for overcoming these inconsistencies throughout the UN system.

Limited Success

That leaves two areas where progress has been more limited: (1) improved interaction between the UN and regional/subregional institutions, and (2) strengthened capacity to act in a timely and decisive manner in response to atrocities.

Perhaps the least amount of action has been toward improving partnerships with regional arrangements with respect to implementing R2P, but the signs are that this is becoming a key priority. Experience over the past decade teaches that international action is most effective when the United Nations and regional organizations act collaboratively. Yet, although the United Nations has developed strategic partnerships with a number of regional organizations, atrocity prevention and the protection of vulnerable populations have not been key areas of focus. As a result, responses to new crises remain ad hoc and selective. In his 2015 report,

the secretary-general promised to ensure that the United Nations and its regional partners will incorporate R2P considerations into their strategies, thus sending a clear signal of intent to address this issue.

Finally, the international community's failure to respond in a timely and decisive manner to the crises in Syria, Sri Lanka, and Yemen, in particular, and also the global crisis of displacement and the rise of atrocities by violent extremists, show that much more needs to be done in this area.

To be fair, the overall picture of responsiveness is moving in the right direction. Since 2005, the Security Council has become both more likely to respond to atrocity crimes and much more likely to emphasize protection in its response than it once was. However, there is a clear need for fresh thinking about how to respond more effectively in the most challenging of situations and, of course, a need for improved practice.

Challenges and Recommendations

The international community and UN leaders need to think about how to improve the Security Council's decision-making processes so that the council acts in a way that is more aligned with its R2P responsibilities. There are a number of initiatives in that regard, including a push for the council to refrain from using its veto in atrocity response circumstances and Brazil's "responsibility while protecting" initiative, which suggests R2P could be strengthened by adding additional principles, specifically related to military intervention, in order to counter the perception that R2P could be used for any purpose other than protecting civilians.

But the international community also needs to effectively implement R2P mandates that already exist. In the Central African Republic, South Sudan, the Democratic Republic of the Congo, and elsewhere, UN missions face major challenges and have not always proven themselves capable of protecting civilians from atrocity crimes—though civilians fare much better in regions where peacekeepers are deployed than in comparable regions where they are not. The challenges here involve generating action earlier, building and maintaining consensus, and ensuring that the Security Council's demands are supported with the political will, strategy, and resources needed to implement them.

It is here that the challenge for the next decade lies. Having made progress on the political, conceptual, and institutional fronts, the world faces the challenge of making R2P a lived reality for all the world's vulnerable populations.

Alex J. Bellamy is professor of peace and conflict studies and director of the Asia Pacific Centre for the Responsibility to Protect at the University of Queensland, Australia.

Save the Climate for Us All

Student Leaders
Speak Out About
the Challenge
They Will Inherit

During the summer build-up to the Paris climate change conference, the Stanley Foundation hosted a seminar on major climate issues for high school students attending the Global Scholar Program in Washington, DC, conducted by AMP Global Youth. Afterward, these outstanding students and future leaders provided their perspectives on critical climate change issues—viewpoints that mix simple basic realism with broad vision and are worth noting for all of us, now and going forward.



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Wake Up

Here Today, Gone Tomorrow

By Veronica, High School Student in California

A

Almost everyone can agree that at one time or another, they heard the age-old mantra, “You never know what you have until it’s gone.” The same can be said today for Californians such as myself. And yet, many of those within and outside of my community fail to come to terms with the severity of our recent drought.

The fault that these people have is that they don’t realize it is simply not enough to reduce the number of times they water their grass or how much they reduce the duration of their showers. In order to get rid of a weed, one does not mindlessly clip off its leaves but must attack the plant at its roots.

What is this weed’s roots? Climate change. Global warming and climate change due to an accumulation of greenhouse gas emissions and other pollutants does not just mean hotter summers, rising sea levels, or pictures of sad polar bears. On the contrary, society has only hit the tip of the (rapidly melting) iceberg. One of the very real, very dangerous side effects of climate change is extreme weather conditions. While for some that means raging winds, record-breaking hurricanes and tsunamis, or frozen winters, for Californians it means enduring some of the hottest and driest years on record. The alarming mindset of too many individuals seems to be that as long as there is water running out of their hoses, sinks, and showers, there is no problem. However, they could not be more wrong.

We cannot afford to wait until my town and so many like it become the next Porterville, California, with historically low rainfall and high pollution, before the decision is made to take action and make a difference. And just the same, there is no simple solution to such a complex issue. It will take a collectivized effort from all parts of California’s population: from the everyday consumer to the agricultural sector to large corporations and privatized businesses, as well as government and the officials at its core. This means taking measures such as



Historic California drought is producing record low water levels and dry lakes. (Flickr/ Don Barrett)

cutting back on excess food, water, and resource consumption, as well as switching to cleaner, more-renewable energy sources. In addition, reducing the amount of crops that require exorbitant amounts of water (such as avocados and almonds), as well as transforming lawns by replacing them with ground cover and drought-resistant plants, would mean more water for necessities. Opting to ride a bike or carpool to work, as well as reducing red meat consumption, would lead to a decrease in detrimental greenhouse gas emissions. However, as important as any environmental conservation effort is, we must also remember to spread the word to those around us, keeping in mind people like me. As a senior in high school, I should be worrying about college applications and prom, not if water will come out of the tap or shower head. No one should need to worry about a future in which they will have to choose between living where they call home or having access to water.

Climate and Treasures on the Sea

By Katie, High School Student in Florida

For most of my life I've lived in the city of Port Orange, Florida. I grew up going to the beach, playing in the sand, and trying to catch tadpoles with my bare hands. I loved it when my family and I were able to go out on our boat and into the water. We would go out and anchor ourselves to a small island, and the first thing I would do is jump off of the front of the boat into the salt water.

However, the water may no longer be a source of recreational fun, but a source of disaster.

Just imagine: you and your family go out on your boat to a small island that previously appeared only at low tide, and when you arrive, the island is no longer there. It is low tide, but the water level is so high that it doesn't matter; the island is gone forever. Within the next fifty or so years, it is predicted that the water levels will rise high enough

that entire islands (some of which are countries) will be completely submerged. If rising sea levels can do this to a country, then why couldn't it happen to Florida?

The rising sea level is already affecting Florida, as it did during the flooding of Miami in 2014. Every year Miami faces the King Tide, the highest annual tide. In 2014, the predicted crest of the tide was over one meter. In order to prepare for this, the city of Miami created pumps that would divert the flood water. Even with the pumps, however, the roads of Miami were partially flooded, causing many citizens to question what may happen in the future if the tide level continues to rise.

One simple thing you can do to reduce greenhouse gases is use solar panels. Getting and using renewable energy is quickly becoming as cheap as, and may become cheaper than, using fossil fuels. The average person in Florida can actually save over \$700 per year by using solar energy. In Orlando, the Orlando Utilities Commission will credit you five cents per kilowatt hour for your use of solar energy. This means you could build up enough credit to cut your bill in half or eliminate it. It's incredible to think that doing something as simple as changing your energy source can keep you and your family from swimming with the fish.



Miami heads the list of beautiful Florida cities on the water by the sea. (Flickr/ NOAA National Ocean Service Image Gallery)





Small Steps Add Up to Big Change

Nami, High School Student in Texas

I am writing to express my concern about my state's lack of attention to global warming, which is affecting our lives. Living in one of the hottest states, Texas, Texans hardly notice the effects of global warming because every day feels like summer. However, we would not appreciate this if we knew the temperature was rising because of climate change. We know how fast ice melts in the heat; similarly, the glaciers in the north will melt faster from the effects of global warming.

You can't enjoy an ice cream because it melts too fast. The burning sun makes me not want to go outside. As Texans, who experience weather over 100° F, we should not allow this rise in temperature to harm other states or countries. We should try to stop this climate change before we get all get burned—literally.

First, people need to become aware of what global warming really is. Withering droughts, rising sea levels, and soaring temperatures are all identified consequences of climate change that force people to find ways to cope. More heat leads to evaporation, removing water supplies and making irrigation less effective—therefore, water prices will go up. The usage of air conditioning is also a cause of global warming. People need to turn off their air conditioners when they are not in the room. There are several other ways to cool yourself down while producing and emitting fewer greenhouse gases. We could encourage people to have a cold food or drinks. In ancient times, when people didn't have air conditioning, they were drinking plenty of water, staying in the shade, and avoiding extraneous time outside during the day. Taking a shower is also an effective way to cool down your body. In Texas, we could organize an event, provide cold food such as watermelon or cold drinks, and invite climate-change experts to raise public awareness.

Climate change is not a dismissible future issue. I don't want Texas to become a desert area, and neither should you. As the nation's biggest emitter of carbon dioxide, we need to work together to cut back.

(USDA photo/Cynthia Mendoza)



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CONSIDER THIS...

Getting to Know World Leaders of Tomorrow

In early February, 149 exchange students from 53 countries currently attending Iowa high schools gathered in Des Moines to participate in the Stanley Foundation's 21st annual Iowa Student Global Leadership Conference (ISGLC). Like the conferences before it, this magic two-day event enabled the world leaders of tomorrow to meet each other and learn from sharing world cultures and together facing key global issues through interactive workshops and discussions.

Jill Goldesberry, the foundation's program officer for community partnerships, shares two of the many comments from the students about their experience: "One was from a Palestinian girl who talked about all the many problems in the world and how impossible it might seem to be to solve them—but her plea was that we all keep trying 'because that is the only hope for peace.' Another was from a boy from Kosovo who talked about the relationship with his friend, a girl from Serbia. He talked about how they see each other as good people and they trust each other as friends, even though there was a terrible war that took place between their countries. He talked about remembering the humanity of our enemies, and it was really very moving." (Photos by Kelly Chamberlain)

