to be quickly reactivated. Nor have the two nations agreed to cut their tactical nuclear forces. In an analysis published in the April edition of the *Bulletin of the Atomic Scientists*, Norris and Kristensen estimated that the US stockpile includes about 2500 warheads maintained in reserve and roughly 500 operational tactical weapons. They estimate that another 4200 warheads have been declared surplus and are awaiting dismantlement, the result of a 2004 Bush directive that the stockpile be cut in half by 2012. Bush's order was fulfilled five years ahead of schedule, but dismantlements haven't kept pace; Norris and Kristensen figure that 300 warheads were disassembled in 2008 and that 350 will be taken apart this year. At that rate, they say, the backlog won't be cleared until 2022.

### Missile defense put off

Obama and Medvedev did not address Russian opposition to US plans to install antiballistic missile batteries and radar stations in Poland and the Czech Republic. Although the US has insisted that the system is meant to shield NATO members from a missile attack from Iran, Russia views the installations as a threat to the strategic balance in the region. A US policy review of the missile defense system is to be completed by the end of the summer.

The two presidents did agree to strengthen their cooperation in preventing nuclear terrorism and the proliferation of nuclear weapons. Specifically, they promised to increase security at nuclear facilities, minimize the use of highly enriched uranium (HEU) in civilian applications, support effective export controls, and consolidate their stockpiles of nuclear materials in fewer locations. The leaders also reaffirmed commitments to dispose of their massive stockpiles of weapons-grade materials that are deemed surplus, including 34 metric tons each of weapons-grade plutonium.

The leaders reiterated their nations' 2005 commitments to take back the HEU that they exported in decades past to allies around the globe, mainly to fuel research reactors. In May the NNSA announced that it had removed 14.5 kg of HEU from spent fuel in Australia, which completed the recovery of all 100 kg of US HEU in that country. Overall, the US has recovered more than 1215 kg of HEU fuel—enough to make about 48 nuclear weapons—from 27 countries, according to the NNSA. The US has also assisted Russia in its recovery of HEU from former Soviet republics. **David Kramer**

# Helping to rebuild Croatia

**In 1991** six republics of Yugoslavia fell into chaos. Croatia, Bosnia and Herzegovina, Serbia, Montenegro, and later the Serbian province of Kosovo saw massive population displacements and an estimated collective death toll of more than 300 000. Vast swaths of infrastructure were devastated. It was the worst crisis in Europe since World War II.

Central to the rebuilding of science and education in Croatia is Ivo Šlaus. "I was interested in physics at high school," he says, "particularly on the structure of matter." In 1958 at the University of Zagreb, Šlaus earned a PhD in nuclear physics based on research he did while on a UNESCO scholarship at the University of Rochester in New York. That trip, he says, "led to a 40-year association with a number of nuclear and particle physics centers such as UCLA; Duke, Georgetown, and Washington universities; TRIUMF in Vancouver, Canada; the Naval Research Laboratory; and the national labs at Argonne, Brookhaven, and Los Alamos."

Šlaus

Šlaus's other interest is politics. "While physics and science in general have a well-defined domain," he says, "politics permeates everything, particularly with R&D and education." Šlaus was a founder of the European Physical Society. In 1992, when Croatia was recognized as an independent country, Šlaus was appointed the foreign secretary of the Croatian Academy of Sciences and Arts, and promoted Croatia's membership in international scientific organizations such as the International Council for Science. He helped found the All European Academies and the global InterAcademy Panel.

### A call to serve

"In 1996, together with a colleague, Ivan Supek, I founded the Croatian Movement for Democracy and Social Justice," says Šlaus. That led in 1998 to his being asked to chair the social democratic parties council in Zagreb and to run in the 2000 parliamentary elections. Between 2000 and 2003, Šlaus was Zagreb's Member of Parliament; he worked on the foreign affairs committee and chaired the subcommittee on science, technology, and higher education. "Having a background in physics helped tremendously," he says. "Physicists think in terms of numbers, and in politics nearly everything comes down to numbers. Moreover, they have one additional advantage: Physicists think rationally based on axioms, but are always ready to challenge any axiom and do it constantly."

Šlaus says that his main push while in Parliament was to build education and research links with neighboring countries and the European Union. "I tried to introduce several reforms, such as increasing R&D investment [and] the number of university students and professors, and to get students to complete their degrees in a given time frame. Unfortunately, most of these attempts failed," he says. "Academic institutions can be extremely conservative in their operating structure—as US President Woodrow Wilson said, 'It is easier to move the cemetery than to change any curriculum.'" But, he adds, "I was successful in helping to establish new universities in Zadar and Dubrovnik."

The hardest part was trying to maintain his physics activities. "There were 15 PhD scientists in the Croatian parliament," he says, "but the number of practicing scientists was very low. . . . Politics is enormously time consuming and intensive." Nevertheless, adds Šlaus, while in Parliament he continued to teach in Croatia and the US two to three months every year, and published 10 scientific papers.

### A broader interest

In recent years, Šlaus's political interest has focused more on global issues, particularly on weapons of mass destruction and democratic stability: "I joined Pugwash [an organization of academics and ex-officials that works on reducing WMD] in 1963, but I became really active in 1993 when I became more interested in dealing with the [unstable] political situation in Croatia."

Šlaus is now on the Pugwash council, which has been a mediator in a series of back-channel talks between the US and Iranian governments. "WMDs are not a large concern of the public compared to other issues," he says, "despite the risk of annihilation."

He has been involved in bringing together scientists from NATO and non-NATO countries to work on scientific research and on counterterrorism; Croatia officially became a member of

NATO on 1 April of this year. "NATO's third role—science for peace—is the greatest achievement of any political military alliance I know of," he says. "However, it is still not adequately stressed [by NATO], and financial allocations are smaller than what they should be."

But Šlaus thinks education is still the key to progress and that in spite of the frustrations, he'll remain active in politics for a while yet. "Most of the threats and dangers facing the contemporary world can be neither prevented nor reduced by military power and deterrence. The 21st century demands a knowledge-based society," says Šlaus. And physicists could help provide the solution. "They have a unique broader aspect based on their education, to think outside the box," he says. "And most of the solutions facing the world at the moment cannot be fixed by traditional methods." **Paul Guinnessy**

# Divisions heat up as Senate mulls carbon caps

**Republicans warn that curbs on greenhouse gas will worsen recession.**

**By a thin margin,** the US House of Representatives passed a bill in late June that would mandate the first-ever reductions in US emissions of carbon dioxide. Climate-change politics then moved to the Senate, where Democratic leaders decided against earlier plans to put a bill to a full vote before the August recess. President Obama has promised to sign a bill once it reaches his desk.

Even as their majority grew to 60 members, Senate Democratic leaders faced an uphill battle to muster the three-fifths vote needed to pass climate legislation. Frank Maisano, who tracks energy issues for the law and lobbying firm Bracewell and Giuliani, last month estimated that more than half of Senate Democrats were undecided about how they will vote on capping $CO_2$ emissions. The reasons vary: Some are worried about their reelection bids; others are concerned about the cap's impact on their states' manufacturing or farming sectors. Only a handful of Republicans, including Maine moderates Susan Collins and Olympia Snowe, John McCain of Arizona, and perhaps Judd Gregg of New Hampshire, are likely to vote for carbon controls, he adds.

For his part, Obama praised the American Clean Energy and Security Act—better known as Waxman–Markey after its principal sponsors, Representatives Henry Waxman (D-CA) and Edward Markey (D-MA). Obama called the more than 1400-page bill "a bold and necessary step that holds the promise of creating new industries and millions of new jobs." In his remarks on 26 June, shortly after the House voted 219–212 to approve the bill, he said that the measure would "make significant new investments in the research and development of home-grown, renewable sources of energy." He also stressed the bill's creation of a system of clean-energy incentives to complement his administration's earlier action to raise automobile efficiency standards and his pledges to double the nation's wind and solar power generation capacities.

## Cap and trade

The centerpiece of the House-passed bill is a cap-and-trade system, in which the government sets a cap on the total amount of $CO_2$ that industry can emit in a year and then issues permits to businesses entitling them to emit $CO_2$. Businesses that want to increase their emissions will need to purchase additional permits from those who reduce their $CO_2$ output. Initially, all but 15% of the permits would be given away, with the remainder to be auctioned off. The cap would be tightened over time to achieve the reductions mandated in the House bill—17% below the 2005 level by 2020 and 83% by 2050.

The partisan division over $CO_2$ limits was apparent when the Senate Committee on Environment and Public Works kicked off its 7 July hearing. Chairman Barbara Boxer (D-CA) emphasized the new businesses and jobs that will be created as the US moves toward clean energy sources. She cited a recent report by the Pew Charitable Trusts stating that more than 10 000 new clean-energy businesses had been established in California from 1998 to 2007. During that period, investments in clean energy created more than 125 000 jobs and generated jobs 15% faster than the California economy as a whole, she said.

But James Inhofe (R-OK), the committee's ranking Republican member, pointed to a Rasmussen survey released 1 July in which 56% of the respondents said they were unwilling to pay more taxes or higher utility bills to slow global warming. Inhofe, who once declared global warming "the greatest hoax ever perpetrated on the American people," asked Environmental Protection Agency administrator Lisa Jackson about a 2008 EPA analysis of a Senate bill that would have regulated carbon emissions. Jackson acknowledged that the analysis showed that US curbs alone would scarcely impact global $CO_2$ levels. But Secretary of Energy Steven Chu, seated alongside Jackson at the witness table, told Inhofe he disagreed with the EPA's conclusion. While he did not elaborate, Chu pointed out that the US and China together account for half of all emissions.

## EPA is accused

Sen. John Barrasso (R-WY) grilled Jackson about a report that the agency is accused of suppressing. An EPA economist alleged that he was ordered by his supervisor not to discuss his analysis questioning the scientific data the agency used to determine that $CO_2$ emissions must be regulated. Jackson replied that when she heard about the accusations, she personally told the economist to circulate his analysis widely and asked him to locate peer-reviewed research in support of his findings.

Sen. Lamar Alexander (R-TN), who recently called for the US to build 100 new nuclear reactors, complained about tepid White House support for nuclear power as a carbon-free energy source, in contrast to the administration's enthusiastic embrace of renewable energy sources. Chu responded by pointing to $18.5 billion in loan guarantees that the Department of Energy has available for financing new nuclear power stations.

The reaction to passage of the House bill was largely predictable. Environmental organizations applauded it. "We're thrilled that Congress has finally caught up with science and the American people in recognizing the need to switch on clean energy. Our future is now looking more like the Jetsons and less like the Flintstones," said Kevin Knobloch, president of the Union of Concerned Scientists, in a statement. But some industry groups warned that the measure would saddle US businesses and consumers with higher energy costs and cause more US jobs to be shipped overseas to countries without emissions limits. Thomas Donohue, president of the US Chamber of Commerce, wrote in a statement, "Does anyone think this would be a good idea in the midst of the worst recession since the Great Depression?"

In his Senate testimony, Chu pointed to an analysis by the nonpartisan Con-