PISM | POLSKI INSTYTUT SPRAW MIĘDZYNARODOWYCH
THE POLISH INSTITUTE OF INTERNATIONAL AFFAIRS

POLICY PAPER

No. 32 (80), December 2013 © PISM

New Nuclear Builds in Central and Eastern Europe: Safety Aspects

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With nearly all of the countries in Central and Eastern Europe considering construction of new nuclear plants, either to add to existing units or for the first time, it can be instructive to take stock of where they started following 1989, where they are now, and what lies ahead. Most of the countries benefited from nuclear safety-related assistance in the past. Through their membership in the EU and IAEA they also have access to the tools and institutional procedures that can be useful in assessing their nuclear programmes from a nuclear safety point of view. Poland, starting from scratch with a new nuclear build, may benefit from extensive external experience.

Introduction

In the more than 20 years since the U.S. and Western European governments began providing nuclear safety assistance to the countries of Central and Eastern Europe (CEE),[2] assistance relationships have matured into nuclear safety partnerships. Most recipient countries have firmly established themselves as reliable partners in the global civilian nuclear-safety community, with strong political and technical commitments to ensuring their plants remain safe and secure. They have since joined the European Union with accession agreements that commit them to the highest levels of safety and security, as well as fully participate in the International Convention on Nuclear Safety (INSC) as signatories. The assistance they received from the West and their ongoing participation in the global nuclear-safety community provide a good foundation on which to build as a number of them consider the construction of new nuclear units.

However, certain challenges lie ahead. The March 2011 accident at the Fukushima Daiichi plant in Japan prompted a worldwide evaluation of all operating nuclear power plants, including those in the CEE. The stress tests required by the European Commission (EC) revealed that all of the operating plants required moderate to extensive upgrades and that upgrades suggested following previous nuclear accidents, including

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[2] For the purposes of this paper, the countries with nuclear power plants or plans to build them include Poland, the Czech Republic, Slovakia, Lithuania, Bulgaria and Hungary.

the one at Chernobyl, had not been made by member countries. Moreover, each country is starting its own quest for new sources of nuclear energy at a different level in terms of nuclear safety infrastructure and technical capabilities. None of them have experience operating Western-style plants, although many have been upgraded through assistance programmes and have received extensive safety training from donor countries.

What They Have: Soviet-Designed Nuclear Reactors in Europe

After the demise of the Soviet Union in 1989, the Russians who operated Soviet-designed reactors across the CEE packed up and returned home, leaving host countries with reactors they had little to do with designing, much less operating, and almost no nuclear-safety infrastructure. Some nuclear expertise remained, but in many cases the reactor schematics, plans and other technical information were taken back to Moscow. Calls from the West to shut down the least-safe plants was untenable given their economic circumstances: closure of these plants would have increased the cost of electricity at a time when the economies of the states in which they were based were in transition. With little other cheap base-load capacity, these states depended on these nuclear plants to generate much of their electricity to fuel their energy-intensive infrastructures. Despite this, plant operators had minimal safety culture and little or no exposure to Western safety practices. When compared to global safety practices and standards, these plants fell short; the CEE countries therefore turned to the West for help in upgrading the safety of their operating plants and for creating the requisite safety infrastructure.

Most of the CEE countries operated an eastern variation of a Light Water Reactor (LWR)—one which uses water to moderate the nuclear reaction inside the core—but the oldest version of this plant design did not have a critical safety feature, i.e., a barrier to keep radioactivity from escaping into the atmosphere in the event of an accident or incident. This barrier, provided by a containment structure or confinement system—was completely absent in the VVER-440/230 units and first generation RBMK.[3] Six VVER-440/230[4] units were operating in the CEE after the states achieved independence: Kozloduy units 1–4 and Bohunice V1 units 1–2. Outside of Russia, only two other countries operated the early generation RBMK-style plants: Ukraine and Lithuania, at the Ignalina plant.[5] The two units at Ignalina, each rated at 1500 MW, were the largest of their class. These were the "Chernobyl"-style plants of greatest concern to the West, which sought to close them down in the near term.

Around 1970, Soviet reactor designers began developing the first uniform safety requirements to coincide with the newer generation reactors, this led to the VVER-440/213 and VVER-1000 designs. Units of the VVER-440/213 design are currently in operation in the Czech Republic (Dukovany 1–4), Hungary (Paks units 1–4) and Slovakia (Mochovce 1–2 and Bohunice 3–4). The VVER-1000 units are in operation at Kozloduy (units 5–6) and Temelin (units 1–2).

Western Assistance Efforts

The 1986 Chernobyl nuclear disaster sparked global concern for the safety of Soviet-designed reactors, but it was not until 1989, with the dissolution of the Soviet regime, that nuclear safety assistance to the CEE began in earnest. The majority of work was determined using a framework outlined by the G7 group of nations during two key summit meetings held in London in 1991 and in Munich in 1992. Of the nearly $2 billion for safety assistance to plants in the CEE and Newly Independent States (NIS), more than 70% went to plants in Russia and Ukraine. Of that total, the CEE countries received roughly $500 million in assistance efforts.[6]

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[3] Reaktor Bolshoy Moshchnosti Kanalniy or "High Power Channel-type Reactor," a graphite-moderated nuclear power reactor.
[4] Vodo-Vodyanoi Energetichesky Reactor or "Water-Water Power Reactor;" pressurised water reactor designs originally developed in what was the Soviet Union, and is now Russia, by OKB Gidropress.
[5] There are three generations of the RBMK design.
[6] "Concerns with the continuing operation of Soviet-designed Nuclear Power Reactors," U.S. Government Accountability Office, GAO/RCED-00-97, April 2000.

A supplementary multilateral mechanism, a Nuclear Safety Account set up by the European Bank for Reconstruction and Development (EBRD), received €365 million from donors; EBRD also provides €325 million of its own resources to support Chernobyl projects, including the Interim Spent Fuel Storage Facility.[7] Of the $1.9 billion total provided for nuclear safety in the CEE and NIS, the U.S. provided roughly $545 million, with the EU providing the remainder.

Since the commencement of these efforts in 1992, U.S. experts have implemented more than 150 joint projects, with many of these reducing near-term risks by decreasing the possibilities for equipment malfunction and operator error. The primary objectives of the assistance included improving the plants' physical operating conditions, installing safety equipment, developing improved safety procedures, establishing regional centres for training reactor personnel, installing simulators for training control-room operators, and conducting in-depth safety assessments. On the regulatory side, assistance provided by the U.S. Nuclear Regulatory Commission (USNRC) included development of an institutional, regulatory, and legal framework for plant design, construction, regulation, and operation that was in keeping with international norms and practices.

The PHARE programme, one of the three pre-accession instruments financed by the EU to assist the CEE countries in their preparations for joining the EU, was devoted also to nuclear safety. In 2007, PHARE was replaced by the Instrument for Nuclear Safety Cooperation (INSC) and by the Instrument for Pre-Accession Assistance (IPA), for the period 2007–2013. In these programmes, the Joint Research Centre (JRC) of the European Commission (EC) provided technical and scientific expertise in the areas of design safety, on-site assistance, and assistance to the Nuclear Safety Authorities.

More importantly, the prospect of accession to the EU was a key reason a number of the older, Soviet-designed plants in the CEE were finally shut; the accession agreements specified that closure of the older plants was a condition of joining the EU. And, although a number of countries attempted to push back on those requirements, all VVER-44/230 and RBMK units in the CEE were closed just prior to the states' accession to the EU.

Are CEE Plants Safe?

Many efforts were made to measure the level of safety of the CEE plants throughout the duration of Western safety assistance programmes. In this regard, peer reviews were a useful tool in measuring these units against internationally accepted practices, standards and procedures.

IAEA Safety Services—OSARTs and IRRTs

Established in 1982, "operational safety review team" missions (OSARTs) are fielded by the IAEA Department of Nuclear Safety (DNS) upon request by a Member State to provide "advice and assistance to Member States in enhancing the operational safety of nuclear power plants (NPPs)."[8] The missions focus on the safety and reliability of plant operation and review the operation of the plant and the performance of the plant's management and staff. Such missions also review factors affecting the management of safety and the performance of personnel—such as organisational structure, roles and responsibilities, management goals, and the qualification of personnel. Safety culture in the plant is also reviewed as an integral part of each review area. Teams are comprised of peer experts taken from other Member States and review 10 areas, including training and qualification, radiation protection and emergency planning and preparedness; severe accident management was added following the accident at the Fukushima Daiichi NPP.

Between 2010 and 2012, the IAEA led OSART missions to Bohunice 3 and 4 in Slovakia, Dukovany and Temelin in the Czech Republic and Kozloduy in Bulgaria. Representatives from a number of countries in the CEE operating NPPs also participate in OSARTs to other countries, including the U.S. Since the inception

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[7] "Nuclear Safety Account" fact sheet, www.ebrd.com/pages/sector/nuclearsafety/chernobyl-nuclear-safety-account.shtml (accessed 15 October 2013).

[8] Another safety service, the "Pre-OSART," evaluates a country's nuclear power plant prior to commissioning.

of the OSART missions, the Czech Republic and Slovakia have hosted the largest number of OSARTs, Pre-OSARTs and follow-up missions, with a total of nine each between 1989 and 2012. According to sources at the IAEA, the CEE countries are exemplary in their commitment to operational safety and have been diligent in implementing OSART team recommendations. The host governments have also shown a good level of transparency, posting final team reports on their operating authority websites for public review.

The IAEA Integrated Regulatory Review Service (IRRS) was established to strengthen and enhance the effectiveness of national regulatory infrastructure for nuclear safety, radiation safety, radioactive waste, and transport safety, and the security of radioactive sources. The IRRS process sets out to accomplish this expressed purpose through consideration of both technical and policy issues of a regulatory nature against IAEA safety standards and, where appropriate, good practices elsewhere.

Of the CEE countries, only Slovakia, Bulgaria[9] and Poland have hosted IRRS review teams thus far. During its mission to Bratislava in May, 2012, the IRRS team identified a number of good practices, including that the Nuclear Regulatory Authority of the Slovak Republic maintained a high degree of independence; that it developed and implemented a structured approach to training and developing its staff based on a systematic approach to training; that it had in place detailed legal requirements that provided a solid basis for on-site and off-site responses in nuclear emergencies and in coordination with local authorities; and, that it had established a comprehensive and exhaustive set of regulations and guidance in the area of waste management and decommissioning that encourages waste minimisation.[10]

An IRRS mission to Poland on 15–25 April 2013 reviewed the National Atomic Energy Agency (Państwowa Agencja Atomistyki, PAA).[11] The mission, requested by the Polish government, came at an important time as the PAA would take on far more responsibility should a nuclear power plant be built in Poland. According to the mission report, the team noted a number of strengths of the regulatory programme, including a clear and unambiguous focus on its safety mission; a competent, well-qualified technical staff and leadership team; and transparent processes that facilitate opportunities to participate in regulatory processes. The review team concluded that the PAA is implementing a framework that provides for effective protection of public health and safety and identified a number of good practices, including the introduction of changes to the Atomic Law Act and regulations, including those related to decommissioning, at an early stage in the NPP programme; leveraging the considerable experience of senior management of the PAA in regulatory issues, and personally mentoring new inspectors; broad public consultations concerning the development of regulations and laws (broader than is required by regulations) with the institutions engaged in the Polish Nuclear Power Programme and the public; and PAA's proactive coordination approach with Poland's Office of Technical Inspection. However, the team noted that there will be increasing demands on PAA's management as the agency's programmes expand. Further, it found that the senior managers who had experience with the Soviet-era nuclear programme were all facing retirement, which will leave a gap in knowledge.

International Convention on Nuclear Safety

It should be noted that, in addition to peer reviews of nuclear plants, important instruments in assessing the safety of the CEE plants are the national reports prepared by each country in compliance with the International Convention on Nuclear Safety (ICNS). All of the CEE countries are signatories of the ICNS. The Convention was proposed following the Chernobyl accident, but did not become a reality until negotiations concluded in 1994. The Convention entered into force on 24 October 1996, and, as of May 2013, there were 76 contracting parties, 10 of which have not yet ratified it. The Convention, an incentive instrument, "is not designed to ensure fulfilment of obligations by Parties through control and sanction but is based on their common interest to achieve higher levels of safety, which will be developed and promoted through regular meetings of the Parties. The Convention obliges Parties to submit reports on the

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[9] Nuclear Regulatory Authority of the Slovak Republic (UJD SR), 28 May to 7 June 2012.

[10] "Integrated Regulatory Review Service mission to Slovakia report," Bratislava, Slovakia, 27 May to 7 June 2012, p. 8, http://www.ujd.gov.sk/files/Final%20report_IRRS%20mission.pdf.

[11] "End of Mission Report," IAEA Expert Mission for Supporting the Self-Assessment of Nuclear Power Option in Poland, 2013, Warsaw, Poland.

implementation of their obligations for 'peer review' at meetings of the Parties to be held at the IAEA."[12] Since the Convention's entry into force, its signatories have held five review meetings—one every three years; a sixth is scheduled for March/April 2014. Article 5 of the Convention established a requirement for signatories to submit a national report and to review those reports; this is done so that contracting parties can learn from each other's solutions to nuclear safety problems and to contribute to "improving nuclear safety worldwide through a constructive exchange of views." National reports are publically available for all of the CEE countries and show a gradual evolution in the status of nuclear safety in each of those countries.

New Builds in the CEE—Challenges and Choices

In evaluating the status of nuclear safety in the applicant countries, the European Commission compared the level of safety at the CEE units against that of Western plants and international standards and practices. As a result, the accession agreements of these countries all included requirements that each had to take in order to satisfy those agreements and successfully accede to the EU. Notwithstanding the billions of euros and dollars spent to upgrade the safety of CEE plants and efforts to convince these countries to close early generation models, the prospect of EU accession proved to be the most powerful tool in getting Bulgaria and Lithuania, in particular, to close their least-safe plants.

With the closure of the older, Soviet-designed units in the CEE and the transition and growth of their economies under the EU, a number of CEE countries are now considering new nuclear builds. Since the dissolution of the Soviet Union, two countries have completed units at existing plants started during the Soviet era; units 1–2 at Mochovce in Slovakia and units 1–2 at Temelin in the Czech Republic. Construction of additional units are under way at those plants while other countries, including Poland, Bulgaria, Lithuania and Hungary, continue to evaluate the possibility of new nuclear builds at existing sites. Given that all but Poland have experience operating Russian-designed plants, the newer generation plants being offered by Rosatom—along with generous financing arrangements—have proven attractive. However, with little to no operating experience for these designs and because the level of independence of the domestic regulatory authority in Russia is questionable, it will be incumbent upon CEE countries considering construction of these units to be thorough in evaluating their safety. While the same could be said of newer Western designs, the countries selling them—France and the U.S. in particular—have domestic regulatory authorities that are far stronger and more independent. They have licensed these designs for operation in the U.S. and for export. When faced with these decisions, each country must have the skill set and infrastructure to evaluate the technologies in front of them and to make an informed choice.

Another consideration is technological maturity of reactor designs. While some countries view development of a new nuclear power programme as a means to develop unique capabilities surrounding a new nuclear technology, it is important that they also assess the risk involved in using a reactor design that may not have an extensive operating history or proven track record. The national regulatory organisation must also assess whether this new or innovative design is licensable domestically. According to the IAEA, "each country needs to strategically evaluate the technological maturity risk they are willing to assume and weigh it against the potential gains in national capabilities associated with innovation and technology transfer."[13] In contrast, selecting a more mature reactor design, one that has been reviewed, licensed and operated in other countries, "can minimize project uncertainties."

In order to make an informed decision, an independent national regulatory authority should have in place requirements for evaluating an application for siting, construction, operation and design review. The IAEA provides advice regarding the regulatory infrastructure required to adequately evaluate these and other key issues. In "Milestones in the Development of a National Infrastructure for Nuclear Power,"[14] the IAEA's Department of Nuclear Energy (NE) lays out a series of benchmarks a country should have accomplished in order to create an effective infrastructure for the safe and secure operation of nuclear power:

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[12] Convention on Nuclear Safety, IAEA, www-ns.iaea.org/conventions/nuclear-safety.asp (accessed 27 November 2013).
[13] "Technology Options for a Country's First Nuclear Power Plant," IAEA, www.iaea.org/About/Policy/GC/GC56/GC56Inf Documents/English/gc56inf-3-att4_en.pdf (accessed 28 November 2013).
[14] "Milestones in the Development of a National Infrastructure for Nuclear Power," IAEA Nuclear Energy Series no. NG-G-3.1.

- Milestone 1—ready to make a knowledgeable commitment to a nuclear program;
- Milestone 2—ready to invite bids for the first nuclear power plant; and,
- Milestone 3—ready to commission and operate the first nuclear power plant.

These milestones are applied to each infrastructure issue, such as nuclear safety, the legislative framework, and management and regulatory framework. With such an infrastructure in place, a country should have the skill set to evaluate the technological choices offered to it through competitive tenders in order to identify which reactor technology works best for their domestic requirements.

NE also offers a service to help a host country evaluate its nuclear infrastructure before it moves ahead with development of a nuclear plant. The Polish government hosted an IAEA team in April 2010 that assisted in the evaluation of the "current status of nuclear infrastructure in Poland and "the intentions of the different local organisations for involvement/participation in future nuclear power programs for Poland, based on their existing capabilities." Based upon that evaluation, the IAEA team determined that the government would benefit from additional legal assistance in the development of nuclear laws and support in developing a strong nuclear workforce with effective training.[15]

The Department of Nuclear Safety and Security (NS) offers similar guidelines and resources for countries seeking to build new nuclear units, emphasising capacity-building in education and training, human resource development, and knowledge management. Capacity-building in this context means "a systematic and integrated approach that includes education and training, human resource development, knowledge management and knowledge networks to develop and continuously improve the governmental, organizational and individual competencies and capabilities necessary for achieving a safe, secure and sustainable nuclear power program."

The department also maintains a series of safety standards that provide guidance to countries operating nuclear units or considering the construction and operation of nuclear units. In particular, Specific Safety Guide No. SSG-16, "Establishing the Safety Infrastructure for a Nuclear Power Programme" provides "guidance on the establishment of a framework for safety in accordance with the IAEA safety standards for States deciding on and preparing to embark on a nuclear power programme … it proposes 200 safety related actions to be taken in the first three phases of the development of the nuclear power programme, to achieve the foundation for a high level of safety throughout the entire lifetime of the nuclear power plant, including safety in the associated management of radioactive waste and spent fuel, and safety in decommissioning."[16] According to the guide, these include national policy and strategy, the regulatory framework, safety assessment, design safety, and radiation protection.

Impact of Fukushima and EU Stress Tests

In the aftermath of the accident at the Fukushima Daiichi NPP, the European Council requested that the EC and the European Nuclear Safety Regulators Group (ENSREG) develop stress tests for all EU NPPs. They agreed on voluntary tests for the EU's 143 nuclear power reactors based on a common methodology to assess both natural and man-made hazards (i.e., the effects of airplane crashes and terrorist attacks). The assessments were conducted by operators under the supervision of regulatory authorities and focused on three areas: natural hazards, loss of safety systems and severe accident management. The U.S. and the IAEA participated in the reviews as observers. ENSREG also requested that each national regulator develop and make public an action plan associated with post-Fukushima lessons learned and stress-test peer-reviewed recommendations and suggestions.

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[15] "IAEA Mission to Support the Self-Assessment of Poland National Nuclear Infrastructure: End Of Mission Report," Warsaw, Poland, 27–29 April 2010.

[16] "Establishing the Safety Infrastructure for a Nuclear Power Programme: Specific Safety Guide," IAEA Safety Standards Series SSG-16, Vienna, 2011.

All of the CEE countries performed the requisite stress tests on their nuclear plants, issued a national progress report, a final report, and a national plan, all of which were subject to peer review. While the peer reviews overall showed "satisfactory" safety, the final commission report, issued last October and leaked to the press before public release, said that the tests "exposed 'hundreds' of problems at the EU's 132 reactors, which could need up to 25 billion euros ($32 billion) of investment" to meet international safety standards.[17] For example, the stress tests performed at four unnamed reactors in two unnamed countries "would have less than an hour to restore safety functions if electric power was lost." The lack of adequate backup power was a key deficiency during the Fukushima accident. The report also identified a problem involving basic safety and monitoring measures, including the lack of seismic monitors at reactor sites in several countries, including the Czech Republic. Finally, the report identified a number of improvements recommended following previous nuclear accidents, including at Chernobyl, which had not been implemented in EU countries.

Despite public comments by EU Commissioner for Energy Guenther Oettinger that he is "satisfied" with EU nuclear safety despite the critical nature of the October 2012 report, the findings led the EC to review the existing European legal framework for nuclear safety; on 13 June 2013, it announced revisions to the EU nuclear safety directive that aim to strengthen the independence and role of national regulators, key in ensuring the implementation of safety enhancements and new requirements. The proposal also introduces new provisions regarding on-site emergency preparedness and response, and calls for national reviews at least every 10 years. The EC hopes the rules will be approved in 2014, with Member States given 18 months to write them into domestic legislation. Their subsequent failure to comply with the revised directive would subject them to judicial action and fines by Brussels. The EC will report on the implementation of the stress test recommendations by Member States in June 2014, in partnership with national regulators. The EC also plans to propose stronger measures for nuclear insurance and liability sometime in 2014. It is clear that the revised nuclear safety directive will have a strong influence on the construction and operation of any new nuclear units built after its adoption, including any built in the CEE.

Recent Examples of New Construction in the CEE: Temelin and Mochovce

When the government of the Czech Republic decided to complete the units at the Temelin plant begun during the Soviet era, it sought the assistance of the IAEA, World Association of Nuclear Operators, and other independent experts.[18] A site safety review and a "Pre-OSART" were conducted in 1990; they concluded that the Temelin site met all safety criteria in accordance with the IAEA recommendations and that the instrumentation and control system at Temelin Unit 1 should be replaced with an advanced Western design. An IAEA Design Review Mission concluded that the Unit 1 design—a VVER-1000—was found to be very similar to modern PWR plants that have been put into operation in other countries.[19] The Czech government is currently evaluating bids for the construction of Units 3 and 4 at Temelin, each of which are likely to undergo similar reviews by the IAEA and others. Along with Slovakia, the Czech Republic is ahead of the other CEE countries in having overseen construction and commissioning of new nuclear units since independence.

Construction of the four-unit Mochovce NPP began in 1981, each of which are VVER 440/213 units. The first two units were completed in 1998 and 2000, respectively, and have since been significantly upgraded; the instrumentation and control system have, for example, been replaced with Western technology. Work on units 3 and 4 was started in 1986 and halted in 1992. Construction restarted in 2008. They were planned initially to be completed in 2012 and 2013, but the completion date was pushed to 2014 and 2015.

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[17] T. Patterson, "Europe's 'Dangerous' Nuclear Plants Need 25bn Euro Safety Refit," *The Independent,* 4 October 2012.

[18] The basic design of Temelin units 1 and 2 was completed by the Czech architect-designer company Energoprojekt (EGP) in 1985. The site license was issued in 1985 and the construction license in November 1986. Construction of the buildings was begun in February 1987.

[19] F. Hezoucky, "Temelin NPP Status: The Challenge of Safety Improvements," Uranium Institute 25th Annual International Symposium, 2000.

In contrast to the experience in the Czech Republic and Slovakia, in which the governments were faced with finishing reactors that were already at some degree of completion after having been started during the Soviet-era, Lithuania, Hungary and Poland are now considering the construction of completely new units. The former have extensive experience in operating NPPs, but not post-independence licensing and construction of a new plant. Poland has never operated a nuclear plant. In the 1980s, the Polish government began construction of four VVER-440 reactors at Żarnowiec, but the project was cancelled in 1990 because of public opposition. Those who did work on that project are preparing to retire, so that means Poland, in considering new nuclear construction, is effectively starting from scratch. Therefore, these countries should develop the regulatory and legal infrastructure required to assess new nuclear construction as well as the development of expertise to build and operate a new plant. Services provided by the IAEA as well as assistance from countries that have already gone through this process can help ensure that these projects are carried out safely.

Conclusion

Between 1989 and the present, the U.S. and EU have spent billions of dollars (and euros) to bolster nuclear safety in countries that operate or used to operate Soviet-designed reactors and to ensure that nuclear plants on their soil are operated with a strong nuclear safety infrastructure. Those efforts are about to be tested, as a number of those same countries evaluate new nuclear construction. The level of operational nuclear power experience in the CEE varies; on the one side are countries such as Hungary, which, as early as 1999, was determined to have a safety infrastructure nearly comparable to that of the West. On the other side of the spectrum are countries such as Lithuania and Poland. Lithuania has only had experience operating what the West considered a very unsafe reactor design and has never licensed a new nuclear unit. Poland have never operated a NPP nor has it, after independence, overseen the licensing and construction of one. The lack of trained staff, regulatory and legal infrastructure, and operational experience will require Poland to start from scratch but because it is part of the EU it can benefit from the extensive experience of other countries operating nuclear plants. In Lithuania, many things will have to be unlearned and new experience gained should it decide to build a new NPP. The new standards being put into place following the Fukushima Daiichi accident will bind all of the CEE countries to strengthened safety standards; this new era of nuclear construction should be seen as an opportunity to capitalise on the years of safety assistance provided by the West as well as serve as a crucial test for each country. Though they will have many resources available, ultimately the safety of a nuclear plant is the responsibility of each country—as operator and regulator.