

ST. PETERSBURG INTERNATIONAL ECONOMIC FORUM
JUNE 20–22, 2013

New Catalysts for Change
THE ECONOMICS OF MANAGING MAJOR CATASTROPHES
Panel

JUNE 21, 2013
09:45–11:00, Pavilion 3, Amphitheatre

St. Petersburg, Russia
2013

Moderator:

Margareta Wahlström, Special Representative of the UN Secretary-General for Disaster Risk Reduction

Panellists:

Valery Akimov, Head of the All-Russian Research Institute for Civil Defense and Emergency Situations of the Russian Emergencies Ministry, Doctor of Technical Sciences, Professor

Gill Grady, Senior Vice President – Corporate Business Development, GSE Systems

Francesc Pla, Deputy Executive Secretary of the partial agreement of the Council of Europe on the prediction, prevention and assistance in the event of natural and man-made disasters

Vladimir Puchkov, Minister of the Russian Federation of Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters

Reto Schnarwiler, Managing Director, Swiss Re

Front row participant:

Valery Sorokin, Professor, Gubkin Russian State University of Oil and Gas

M. Wahlström:

Good morning, ladies and gentlemen. This session is about managing major catastrophes and the economic impact of catastrophes. We are, of course, also going to talk about the economic impact of catastrophes on private sector business. Specifically, we will look at how business manages and plans for future catastrophes and manages the risk. We will also, obviously, look at this from a public sector perspective.

My name is Margareta Wahlström. I am honoured to be the moderator of this session today. I am the Head of the UNISDR and the United Nations Secretary General's Special Representative on Disaster Risk Reduction. This is the main work we focus on – the prevention and mitigation of risk factors globally. For many decades, we have also had intense collaborations with Russia. Four decades ago, science and technology told us to be very careful of the potential of disasters to overwhelm a country's economy and weaken its resilience unless we start taking potential disasters seriously. So that is the background to today's session.

Our panellists today bring a wealth of expertise, knowledge, and practical experience to the area of managing catastrophes. Our first speaker today is the Honourable Minister of the Russian Federation of Civil Defence, Emergencies and Disaster Relief, Mr. Vladimir A. Puchkov. Our second speaker this morning will be Mr. Gill Grady, Senior Vice President of GSE Systems Incorporated. GSE Systems manages very large risk simulations and technical practices. Mr. Grady will explain to us the areas they are working in.

As the third speaker this morning, we are very pleased to welcome Professor Valery A. Akimov. He is the Head of the All-Russian Scientific and Research Institute for Civil Defence and Emergencies, and an expert on natural and man-made disasters, hazards and risks. We also have, very importantly, a representative of the insurance and reinsurance industry here this morning. I would like to welcome Mr. Reto Schnarwiler, Managing Director Global Partnerships Americas, Europe, Middle East and Africa at Swiss Re. Mr. Schnarwiler will shed some light on issues such as how

to use insurance more efficiently when compensating for losses, as well as a motivator for disaster prevention and risk reduction.

International institutions will be represented by a European institution, the Council of Europe (COE) and Mr. Francesc Pla Castelltort, Deputy to the Executive Secretary of the European and Mediterranean Major Hazards Agreement. Finally, we have a speaker who is a specialist on risk management in many areas relevant to this discussion, Professor Valery Sorokin, Professor at the Russian University of Oil and Gas, Consultant to the Expert Administration of the President of the Russian Federation, Director on the Board of Transneft. After we have heard from the speakers, we will open the floor to questions and answers.

What is the context of the Economics of Managing Major Catastrophes? The context is that in the past three or four years, major catastrophes hit countries, cities, urban areas in many parts of the world. They had an enormous negative financial impact, as well as social and political consequences. The context is the vulnerability of infrastructure, this interface between the hazards of nature and the society that we have created together, with aspirations for all people to seek continued economic growth. However, the resulting economic growth pattern has the potential to generate disaster risk at the same speed at which GDPs are growing in countries.

If you would like clear evidence on how economic and social development in itself generates new future risk, it is worth looking at the curves of economic development growth and disaster risk accumulation in East Asia, for example. Why is that? I am sure our panellists here today will explain further.

We are also interested in how decisions are taken, and who takes the decisions that mitigate risk. We are similarly interested in how we manage catastrophes. Who pays? How do we manage the increasing global impact of this, together with the other many stress factors that influence a country's ability to build resilience and sustain the economic development that is an aspiration of all countries? As you know, today we live in a world where we have fewer least-developed countries and

more and more middle-income countries. These emerging countries are also building risks for the future.

From the private business perspective – and we do have some publications that can tell you this – there is a clear trend that business is going into areas that are increasingly high risk. Business has higher risk exposure and higher exposure to disasters. What does business think about these disaster risks? Do they include them in their future and current return on investment (ROI) calculations? How do they see the long-term viabilities? How do they see the sustainability of their investments? What are the instruments?

A final perspective, and maybe the most important for the future, is the collaboration between the public and the private. How is it going? Where is the leadership coming from? Where are the areas where shared values can be built into risky environments?

These are the framing questions that we have this morning. Of course, the panellists will offer their own perspectives on this.

I would like to invite Minister for Russian Federation Civil Defence, Emergencies and Disaster Relief, Mr Vladimir Puchkov to commence our session. We would be pleased to hear your views, your experience, your recommendations and your call for action, if we may. Mr. Puchkov, please go ahead.

V. Puchkov:

Thank you, Margareta. Good afternoon, ladies and gentlemen.

Today, for the first time at SPIEF, we are discussing the economic problems of disaster prevention and risk management.

The world is developing rapidly. There are now more than seven billion people in the world. Cities are becoming larger, social infrastructure is developing, new sectors of the economy are appearing, and projects are being implemented to extend the penetration of IT throughout our society. All of this must be considered when assessing risk and drawing up economic models for social development.

External conditions and the environment are both changing. Earthquakes, tornadoes, hurricanes, and typhoons are all happening in places where they never occurred before. Vigorous action taken by society in the fields of natural, man-made, biological, and social disaster management can minimize the extent of natural and man-made threats. Timely detection of the early signs of danger and the creation of safe development models for the man-made environment both require extensive examination of the facts.

We are carefully considering all Russian and global trends, and we are taking appropriate measures to minimize the risks. To this end, the President of the Russian Federation has approved the Principles of the State Public Safety Policy to be implemented by 2020. These principles regulate all interactions between government agencies and heads of municipalities, and promote the active participation of citizens in ensuring safety. In addition, public organizations and volunteer movements have begun to work vigorously in this area.

A Russian Unified Emergency Rescue Service, bringing together all federal agencies and all 83 regions of the Russian Federation, has been created in order to implement state policy. It will inform the decision-making of local governments and various organizations.

A modern legal framework has been created. Among other measures, a federal law was passed three years ago concerning insurance for potentially hazardous activity. Today, more than 300,000 companies are insured and meet all the requirements for risk prevention and reduction. A new paradigm for ensuring the safety of the man-made environment is being developed. The insurance community is coming to the aid of business by providing professional risk assessment. If, at your company, you have insufficient safety measures, a high risk of accidents and loss of technology, and if you do not take into account all the threats to the health and safety of your staff and the people living in the vicinity of your business, then your insurance premiums will be high. But if safety requirements are met, then your insurance premiums will be much lower.

The Ministry of Emergency Situations is working hard to introduce an independent risk assessment system for businesses, a declaration system, and, of course, a licensing system. Moreover, the number of licensed activities has been decreasing: while recently there were as many as eight, there are now only two left. We are transferring the main issues surrounding staff safety to businesses themselves. By drafting a declaration, the manager of a business assumes certain obligations to protect his business and the people living nearby. The manager is assisted by experts in this.

Security and risk assessment issues should be addressed through business planning with the assistance of expert organizations. When we were preparing to build the sports facilities for the Universiade in Kazan and the Olympic Games in Sochi, we started with an expert assessment. Right from the planning stage, we took the decisions that would ensure the safe operation of these facilities for decades into the future.

The next important point that I would like to emphasize is the system of financial reserves. We have a Reserve Fund of the Government of the Russian Federation for Disaster Prevention and Elimination, which enables state-level assistance for affected citizens and regions to be organized quickly. In particular, we have established standards for the amount of material assistance offered to citizens in disaster areas: each person is allocated RUB 10,000. The system allows for payments of RUB 50,000 per person for partial loss of property and RUB 100,000 per person for total loss of property. In addition, every citizen who has lost his or her home is entitled to a public housing certificate. Financial reserves have also been established in all of the federal constituent entities and regions of the Russian Federation. Literally on the very next day after a disaster, people will be able to begin to receive money to meet their basic needs. The key to rapid response and disaster management is the creation of material and technical reserves. All government agencies are working closely together: if a federal constituent entity lacks the financial and logistical resources, it can appeal to the federal centre, to the Russian Ministry of Emergency Situations to receive prompt assistance. This

situation is made even easier due to the fact that all of our material and technical resources are already deployed on the ground, so the transfer of financial resources is not a major problem.

Next, I would like to focus your attention on the training and education of business managers and staff, on the one hand, and of the public, on the other. A trained specialist will never let a risk threshold, as established by Russian regulations and those of all developed countries around the world, be exceeded. The public must also, in turn, be aware of the potential hazards of a particular place of residence, taking into account the various modes of transport available: personal and public, land-, air-, river-, and sea-based. We as professionals understand very well that we need the assistance and help of the public. Every individual must learn how to act in emergency situations. Each individual must be able not only to protect himself or herself, but also to help others and, of course, to call a professional.

Another aspect of this topic is forming public opinion. Ensuring the safety of social infrastructure is one of the most important aspects of protecting people's health and safety and ensuring the stable development of society. Non-governmental organizations and volunteers play an important role in creating economic mechanisms for the prevention of emergencies and in solving all the integrated security problems within a region. Public hearings, public expert reviews, and independent risk assessment must all form a part of the preparation and implementation of all major economic projects, and the identification of solutions for specific local issues.

It is impossible to underestimate the importance of the work of local government agencies. Protecting the health and safety of the population and ensuring housing security and the sustainable operation of vital systems are their primary obligations. Can you imagine a modern city that could be left for days without cold water during this time of year, in June? Or a city that does not have communications or electricity for days? This is a very serious problem for the heads of municipalities if they are poorly trained and do not know how to act in such circumstances.

This year we have adopted a programme to provide organizational and methodological assistance to municipalities. This includes training heads of municipalities and conducting a host of projects with businesses which are directly involved in public safety issues and supporting the stable operation of vital facilities. Today, my colleagues will come up with very different proposals in this area. I also encourage the audience to participate in the discussion.

Let us turn to international cooperation to create mechanisms to prevent emergency situations and to create new economic models according to which society can be structured. Yes, ensuring public safety costs a lot of money. Yes, comprehensive protection of a particular region requires significant financial investment. We must find a way to dynamically develop social infrastructure without compromising the efficient operation and profitability of business. By entering into multilateral agreements with other APEC countries, and with a united Europe participating in the Shanghai Cooperation Organization, we are developing a legal framework that takes into account international best practice in risk management, in the independent assessment and insurance of risks, as well as in declaration and licensing. By exchanging best practices, we can improve our response service, create a system of control centres in crisis situations, and coordinate international humanitarian aid.

Although the priority of our work is to prevent emergency situations, we have created powerful international tools to react to disasters. The Russian Federation has a highly effective rescue service. Other such services operate in Europe, Southeast Asia, and in North and South America. I am confident that our discussion today will give a new impetus to the development of early warning and response systems. Thank you.

M. Wahlström:

Thank you very much, Minister Puchkov. You have touched on all the key topics that need to be developed for risk management in an economic model that recognizes risks and plans for risks. You outlined the responsibilities and initiatives

of the public sector, the recognition that local governments need to have capacity to manage risk, public awareness, financial instruments, and whether governments can provide a safe environment for business, and whether business will see that a positive incentive for investment. Thank you.

I would like to turn to Mr. Gill Grady now, an expert on managing risk in a very important industry, but also a very emotionally touching industry. Mr. Grady, the floor is yours, please.

G. Grady:

Thank you, Ms. Wahlström. Minister Puchkov has set up my discussion quite well. However, instead of some of the national frameworks that will be discussed on how to mitigate and respond to disasters, I would like to take an industrial perspective on what industry should be doing, and what technology can do to ensure that we mitigate risk and respond to risk effectively.

If we think about disasters, there are obviously things we can control and things we cannot control. We wish we could control the weather, but we have not figured that out yet. However, we can control human performance. And when we talk about human performance, I am talking about it in a very broad perspective.

We tend to think of human performance in the area of a disaster as human error – somebody did something wrong, somebody made a mistake. Actually, human performance takes on other aspects as well. It takes on the design of industrial plants: it takes on whether they are laid out efficiently and safely, whether we are maintaining the equipment effectively, and whether regulation that we have developed is meeting its intended purpose.

As we look at some examples of how we can introduce regulation, we also need to take a step back and look at the assumptions that we are making as we introduce regulation and try to improve safety. If something bad happens, we do an analysis; we create a regulation; we feel good because we assume that that bad thing will not happen again. Yet what assumptions are we making?

We assume, for example, that if we develop good operating procedures and people follow those procedures, nothing bad will happen. In reality, however, can we develop procedures that take into consideration all of the different factors? The answer is obviously no. That now means that humans have to interact and use their experience to adapt to those procedures.

But where do humans get experience in events that typically never happen, or we hope never happen? Are the lessons that we learned from past disasters the correct lessons? Did we view the root cause effectively? And, as we look at worst-case scenarios, are they really the worst-case scenarios?

We have some very good methodologies. Certain industries do a very good job of this. I particularly deal a lot with the nuclear power industry worldwide. The methodologies of using a probabilistic approach to determining risk has been a very effective methodology. The probabilistic approach tries to answer the questions: what can go wrong? What are the consequences if it does go wrong? Also, what is the likelihood that it will happen? We then design our industrial plants around the answers to those questions.

If we take a recent example, the Fukushima disaster in Japan, let us look at what the assumptions were regarding that nuclear power plant. The assumption was that if we built a 10 metre high sea wall, it would block any tsunami that would likely hit the plant. We ended up with a 14 metre tsunami that spilled over that sea wall. We assumed that the backup generators and equipment would operate effectively. To prevent earthquake damage, we put those storage tanks above ground. That did protect us from the earthquake, but it did not protect us from the tsunami. We also had assumptions regarding how long power would be down, and how much time we would have to respond to the incident.

So Fukushima has given us, again, another opportunity to step back and look at what assumptions we are making within our design basis, what the correct assumptions are that we should be making, and what we can do about it all.

We will obviously come up with new regulations regarding that. But part of that is the question of where technology can help us. Minister Puchkov spoke about not

only the use of technology but also the importance of training operators. There is technology that exists, and has been used for many years, that is a simulation-based technology which can help us achieve a better understanding of what the real risks are, whether it is a man-made disaster, a natural disaster, or an intentional disaster.

When we think of simulation we often visualize a cockpit simulator, which is how we train our pilots. The technology has advanced now to where simulators really become an engineering tool. We can use them along with probabilistic safety assessment methodologies, and along with accident assessment methodologies, to really get a better understanding.

Industrial plants are becoming so much more complex now, not only in the technology that we are using, the controls, and the human interaction, but also in some of the external assumptions that we have made over the years about the hundred-year storm that we design around. That hundred-year storm seems to be happening about every other year nowadays. So, again, we are rethinking and using technology to test out whether the assumptions we have made and the designs we are making are really providing the safety that we anticipate needing.

Different industries handle this in different ways. I think there are lessons to be learned. Some of it has been a little bit more voluntary and industry-led: the chemical industry worldwide, through responsible care programmes in both the United States Chemistry Council and the European Chemical Industry Council, has adopted process safety methodologies which are very good. But we can go a step further.

I am not necessarily a big proponent of simply adding new regulation. Often we need to step back and reanalyse the regulations and standards that have been put in place because they tend to evolve over time; they tend to become incrementally changed without paying enough attention to the total effect of the various changes.

One of the interesting aspects of the Russian markets is their understanding of the need to evolve regulations in a structured way and the ongoing look at industrial safety and how we really prove whether our industrial facilities are safe or not. I

think that there is an opportunity for Russian companies now to look at a different risk-based approach when analysing the safety of their facilities; using mathematical modelling and simulation and probabilistic analysis, to really prove scientifically that these facilities are safe. Not just to rely on assumptions of past regulations.

That is one of the reasons why my company is investing in the Russian market. We have developed a joint venture with a local company, Electrobalt Holding, to bring these technologies to the table, and to leverage the lessons that we have learned in a highly regulated industry, like nuclear power, and how that might apply to the chemical industry, the oil refining industry, and other hazardous industries.

I do not necessarily always say that we should look to regulation; there are other methods. However, I also understand that we are human, and that corporations are made up of humans, and that humans do not always do things that are in our own best interests. Otherwise we would not smoke tobacco, drink alcohol, and eat potato chips!

There is probably some level of encouragement that is needed, from a regulatory point of view, to develop a minimum standard of use of technology which would help prove to ourselves that our facilities are designed safely; that they are operated safely, that our people are competent, and that they have been fully trained and certified in operating specific facilities. Sometimes it seems as though we have stricter regulations on confirming that a person has the knowledge, skills, and abilities to drive a car than we do on how to run a billion-dollar chemical plant.

We would like to ensure that we not only have safe systems, but also that we are using technology to prove that the designs are going to be safe, again, whether that becomes a natural disaster, an accident, or intentional disaster, regarding our industrial plants. Thank you.

M. Wahlström:

Thank you very much, Mr. Grady. Those were some very important points about the standards, as well as the readiness to set industrial and professional standards, and the inspiration across different industries. It is particularly important not to forget that

the assumptions we make are very often just based on the past. The future is not always like the past. Often, too, the limits of the human imagination put some serious limits on what we can make assumptions about. So the importance of continuous learning cannot be underestimated; we need to take potential risks seriously.

Professor Valery Akimov is a Russian expert in the area of the limits of the human imagination. Professor Akimov, please tell us how you see this area of risk management from your perspective.

V. Akimov:

Thank you, Ms. Margareta Wahlström, for allowing me the opportunity to speak at SPIEF. Our Minister, Vladimir Puchkov, mentioned that we are taking part in the Forum for the first time today. Finally, economists from around the world have realized that the damage caused by emergency situations is growing faster than gross national product, and it may surpass it by the 2050s–2070s if we do not take steps to halt this trend. We address the situation in two ways: by increasing economic efficiency and reducing the damage caused by natural disasters. Since we are specialists in the field of emergency situations, we study the second problem.

I am responsible for science within the Ministry, and I would like to bring several scientific problems to light. According to independent international experts, the Russian Ministry of Emergency Situations is one of the most effective services of its kind in the world, not least because of the fact that its leaders have always paid great attention to the development of science and new technology. Even during the awful 1990s, when science in Russia was underfunded, the Ministry's leaders found opportunities to invest in science within the agency. What is more, they were able to put the results of research into practice. Science will always move forward when needed, even when funding is limited.

Our departmental research activities focus on several areas. The first research area focuses on developing a general theory of safety, including applied risk

management analysis methods. The classical approach states that empirical laws are formulated on the basis of empirical data, and it is from these laws that we can formulate a certain theory or scientific discipline. Fortunately or unfortunately, we cannot experiment in the field of safety, thus we use a different interdisciplinary method. There is a system of disciplines, including the natural sciences, technical sciences, social sciences, and humanities, and the application of these fields of inquiry to safety forms the basis of a general theory of safety.

I will provide a simple example from high school physics. We are well aware of the law of increasing entropy (chaos). For forecasters, it states that any process can be predicted over a specific, evidence-based period of time. Perhaps science is not yet able to offer short-term predictions of when an earthquake will occur, or long-term predictions of natural hazards. Nonetheless, a certain forecast horizon exists, and within those limits we can predict disasters with a high degree of certainty.

Let us move from theory to applied methods of risk management analysis. We study events that occur rarely, but whose resulting damage would be enormous. Classical probability theory and mathematical statistics do not always work here. In 1999, there was a catastrophic flood in the area of Lensk. The Ministry leadership asked the Russian Academy of Sciences to forecast the likelihood that such a natural disaster could occur again in the coming decades. Academy staff, with experience and advanced academic degrees, said that we should not expect such catastrophic flooding again within the next 100 years. But in 2001, the waters of the Lena River rose to 24 metres. Lensk had to be evacuated to higher ground, and the losses were enormous. Thus, we are also working on risk analysis methods.

The second research area is providing a scientific and methodological basis for state management in the field of safety. A legal and regulatory framework is necessary. This is provided by the Federal Law 'On Safety' and by laws developed directly by the Ministry of Emergency Situations: 'On Protecting the Population and Regions from Emergency Situations', 'On Civil Defence', 'On Fire Safety', and 'On Rescue Services and the Status of Rescuer Workers'. Naturally, the Ministry's scientists are actively involved in developing laws and regulations, including the

Federal Law 'On Civil Liability Insurance for the Owners of Hazardous Facilities' and its by-laws. The Ministry pays great attention to volunteering. We have played an active role in the development of the Federal Law 'On Voluntary Fire Brigades'. Currently, we are discussing a draft law on volunteering in general.

Within this same research area I would like to mention our scientific work related to technical regulations. Together with our colleagues from Kazakhstan and Belarus, we are preparing technical regulations within the framework of the Customs Union that will define the requirements for emergency protective products intended for regional populations. Here we are carefully studying the relevant laws which exist within the European Union. The technical regulations include more than 50 national standards and codes that impose mandatory and voluntary requirements for products intended to protect the population. Of course, we should not overinflate the requirements for business, and in particular for small and medium-sized businesses. However, at the same time, businesses should not deceive the population by offering uncertified and counterfeit products.

The Ministry's third research area focuses on automation as well as information and telecommunications technologies that increase the efficiency of rescue work. The faster we can react to a situation, the more people's lives we can save. Each human life, as we know, is priceless.

You already know that crisis management centres have been established in the federal constituent entities and that unified on-duty dispatcher services have been established in municipalities. A comprehensive system to provide emergency notification to the population concerning threats and the occurrence of emergency situations is being developed in accordance with the Presidential Executive Order. More recently, the Russian government has adopted a federal target programme to create the Unified 112 Emergency Call System. Our role as a leading research institute is to make sure that all of these sub-systems and the 112 Emergency Call System are compatible and developed using a common technical and software platform so that a Russian citizen moving from one constituent entity to another can feel like they are in their home region.

Our fourth research area (which Vladimir Puchkov has already addressed) is the creation of a culture of safety. A smart person can react correctly to an emergency situation, but a really wise person will avoid such situations entirely. This is a long-term project, and we will not see any immediate effects from it. But we have to support it. We are constantly working with our preschoolers, school-age children, and university students. Unlike in many other countries, in Russia the subject 'Fundamentals of Safety' is a mandatory part of the curriculum in schools, while the 'Safety' discipline is a required element in universities.

I will provide an example that shows the importance of such instruction. Margareta Wahlström mentioned the 2004 tsunami in Southeast Asia, which claimed the lives of around 200,000 people. On Sumatra there was a hotel in which around 300 British tourists were staying. Before a tsunami, the water starts to retreat from the shore back into the ocean. There was a 12-year-old girl who came up to her parents and said: "Hey, Mum and Dad, the water is being sucked back into the sea. A tsunami is on its way. We need to save ourselves!" This 12-year-old girl was responsible for saving all 300 British citizens, who were then able to get away from the coast and head for higher ground.

On April 30 of this year (Fire Safety Day), we held an all-Russian open 'Safety School' for the first time and at the initiative of the Ministry of Emergency Situations. We received the support of the Ministry of Education and Science and the Government of the Russian Federation. Twelve million school children participated at the same time. The lesson was held not in classrooms, but at rescue centres, fire stations, state inspectorate facilities for small vessels, etc. Children will not forget this experience, and it will change their attitude towards their health and their own lives. They will remember how they should react to specific kinds of disasters, which, generally speaking, do occur regularly.

The next important area of research activity will be the development of emergency rescue equipment. Beginning yesterday, we started preparing for the twenty-fifth anniversary of our Ministry, but the main thing to recognize is that this event is not a typical anniversary. I would like to present new results and new technologies at this

event. Today, a large number of innovations have entered into practical use: emergency rescue equipment, vehicles, and monitoring technologies in both the natural and man-made environments.

But I will repeat that the most advanced and cost-effective research area is disaster prevention, forecasting, and monitoring.

Finally, I will talk about how technology commissioned by the Russian Ministry of Emergency Situations is being used abroad.

First of all, we have commissioned a mobile diagnostic system for inspecting buildings and structures, which estimates their residual seismic threshold. This system has been used repeatedly in Germany, Italy, Turkey, Portugal, and other countries. Today, we have created and are already using an upgraded version of the system. It is operating near Samara and in the Kuznetsk Basin, where an induced seismic event did recently occur.

A second example is the Extremum geographic information system, which allows the impact of an earthquake to be quickly assessed, wherever in the world it may have occurred. This system is being used in the European Union and under an Open Partial Agreement of the Council of Europe, which my colleague will describe in the next presentation.

International cooperation in the scientific field is constantly being improved. One of the main objectives of science in our field is interdisciplinary research. We need to develop earth and atmospheric science in order to study natural disasters. We need to have a thorough understanding of the technical sciences in order to study man-made disasters. We need to know physics and mathematics in order to master risk analysis and management methods. We must refocus our research on problem solving, which requires an interdisciplinary approach, since short-term earthquake forecasting requires the use of mathematics, physics, chemistry, geography, and other disciplines.

Thank you for listening. I wish you all success at SPIEF.

M. Wahlström:

Thank you very much, Professor Akimov. I particularly take the comment from you when you say that science is in demand when someone has an interest or money. This would suggest that science that is not paid for is not always considered useful to others; I think that scientists around the world will really agree with that statement. We have to create more demand. This is very much the area of decision-taking, but also of understanding that science needs to develop in the way Professor Akimov was talking about. And managing risk is a truly interdisciplinary science. It really requires a whole-of-society approach.

The insurance industry also bases itself, to a great extent, on science and modelling. Mr. Schnarwiler, will you give us your perspective on the role of innovation in insurance, and if you please, also how, in your experience, the public and private sectors manage risk?

R. Schnarwiler:

Thank you, Ms. Wahlström. It is a pleasure to be here; thank you for the invitation. Swiss Re was established in 1863 with the primary goal of dealing with the financial consequences of natural disasters. We have 150 years' worth of experience, dealing with events which many people consider to be 'once-in-a-100-years' events. When we look at the effects of the tsunami that hit Fukushima in Japan, as previously mentioned, or the recent flood events in Central Europe this year, or even the uncontrolled forest fires a few years ago in Russia, we observe that insurance was used, to different degrees, as a kind of shock absorber. In many countries, insurance is widely understood and well-used, whereas in other markets, insurance penetration is still very low, or even marginal.

A study from the Bank for International Settlements recently showed that natural catastrophes actually have a measurable impact on economies. It is mainly the uninsured portion of catastrophes that drive the macroeconomic impact. It also showed – which is particularly interesting for our industry – that well-insured catastrophes can be inconsequential, or even positive, for economic activity.

This is not often shown in GDP studies. However, when you look at economic activity in detail, there is an added value by the insurance industry. It really can play an important role in mitigating macroeconomic costs from disasters.

When we look at the Russian situation, the non-life-insurance penetration as premium per GDP is at 2.3%. This is still below the world average of 2.8%, and also somewhat below 3%, which we see as the European average. So there is definitely room for higher insurance penetration, despite all the measurements that the Minister outlined earlier.

On the positive side, we see that more and more governments see risk management and risk insurance as a proactive tool, and not just as an expense. It is recognized that prevention and risk transfer actually have a meaningful role to play. They are probably more efficient and less expensive than just dealing with a catastrophe after the fact.

We see that governments are spending more resources on identifying risks, and trying to assess risks and their frequency and impact, not only for natural disasters but also for other big events, such as pandemics or an ageing population, for example. We can see that there is a shift, in terms of the financing strategy, from post-event response strategies to pre-event strategies; thinking in advance about what the impact of a major catastrophe would be on my balance sheet or on the budget of a public authority, and thinking about new, innovative instruments to deal with those risks in advance.

It is important therefore to educate your people – employees, homeowners – about how to manage these risks. They need to know what their responsibility is and what they can expect from the government. For example, in Turkey, the government made it very clear to the homeowners that they need to buy insurance; that they cannot expect any support from the government after an earthquake. That is a clear assignment of responsibility. The Turkish government established a very efficient earthquake insurance pool, which was set up by local insurance companies and supported by international reinsurance and the capital markets.

We are also seeing more and more governments becoming aware of the risks that they absorb in their budgets and in their daily activities. Typically, governments deal with the risk factors after something has happened: they reallocate budgets, they cut expenses in other areas to finance reconstruction, or they raise public debts in the capital markets. With the current fiscal situation facing many governments, this is decreasingly viable. We are seeing governments transfer some of the risks to the insurance market and to capital markets, as an efficient tool. Those instruments can diversify risk across the globe and thus make it more efficient than absorbing the risk into a government budget alone.

We are seeing innovative countries like Mexico, the Caribbean, or even states like Alabama in the US, which use insurance instruments to transfer some of these financial consequences to the insurance and capital markets. We have developed new tools that enable a payout as soon as two weeks after the event, so governments actually have the financial means to help their people when they need it most. Thank you.

M. Wahlström:

Thank you very much, Mr. Schnarwiler. Regarding some of the major catastrophes over the past two to three years – the floods in Australia, the earthquake/tsunami in Japan, the New Zealand earthquake – in two of these countries, the government increased taxes in order to pay for the cost of the disasters. In the third, there was an insufficient insurance instrument. However, the 20% impact on the GDP of New Zealand from the Christchurch earthquake should really be a motivating force to push for the further development of insurance instruments. Are you already seeing that happening?

R. Schnarwiler:

Yes, we are definitely seeing a movement in that direction, especially after an event. However, it is necessary for governments and public authorities to really use the tools available to identify the risks that are out there, even before they happen. As

Professor Akimov outlined, there is a lot of knowledge available on not only historical events, but also on scenarios that could happen in the future. We need to have that knowledge; we need to get hold of that knowledge and come up with a risk landscape. We need to ask ourselves what the probabilities, and the impact of the major risks, are that we see in a country, in a region, or even for a city. And then, based on that transparency of the various risks, we can come up with strategies as to how we want to deal with those risks, in terms of emergency management, and also with the financial consequences.

M. Wahlström:

Thank you very much for that. There may be more aspects to that.

Our final speaker from this part of the room is Mr. Fransesc Pla, representing the Council of Europe. The COE has worked for many decades on cooperations to manage major hazards. From your perspective, what are some of the positive things that have actually happened, that make it more likely that we will manage future risks?

F. Pla:

Thank you, Ms. Wahlström. One of the most important things is that we are really in a domain where the multiple stakeholders and the multidisciplinary aspect is essential. I think all of the previous interventions have highlighted this point. And it has been growing. For example, linking scientific work with the operational is clearly one of the things that has appeared, but we have also seen that other aspects and other stakeholders have increasingly come on board, and are really having an impact.

When we are discussing risk, we are discussing a whole network reacting. When we are talking about resilience, it is societies which have to be resilient, not a company, a region, or a country. We have to think globally. This is not easy, but we have to do it. At the same time, we have to take decisions at the individual level. This gives us different partners. We have scientists who can provide the technical evaluation, and

technical tools, to help to face these situations. We also have the development of different authorities. Not only national authorities, which were originally the ones that handled this kind of problem, but local and regional economies, which, due to the spread of decentralization around the world, are gaining more and more importance. We have also seen the need to involve civil society through awareness of aspects that have already been raised here. Because if you do not react appropriately all of your planning will be misleading. However, I think I need to emphasize something very important, because we are here essentially facing people from private companies. The question, that I am sure they have in mind is, what they, as an individual, can do to contribute to this point. And why it is important for them to contribute. This is essential for companies.

As we have pointed out, for your business, you need some continuity. This continuity can be handled simply by setting up a continuity plan on how to proceed with matters afterwards, for recovery. However, I also think that we have to move more toward the prevention aspect. The cost of these recovery tools is increasing. In contrast, having more proactive work towards prevention is cost-efficient.

Along these lines, private companies can also have a very important advocacy role, with respect to governments. We are now in a situation where governments need to be doing a lot more than in the past, and they have to do it with far less money. This is because we are all facing a slowdown in the GDP. At the same time, however, the risks are increasing because they are related to natural and technological hazards. So from this point of view, private companies also have an important role, as leverage for governments, to assign quite a high level of importance in their agendas to developing prevention and recovery actions.

I am especially thinking of all of the networks. Nowadays all companies rely on a lot of networks, some of which are privately owned, but most of which are still public. So it is very important for business sectors that these networks are effective and working well, even in the case of disasters, because disruption is not equally spread. This is a very important point, and sometimes it does occur. One month ago, we were attending a global platform at Geneva, gathering a lot of people, and it

was interesting to listen to a private sector advisory group which had done a very interesting study and presented many interesting examples of how companies can contribute in this way. So it is a very real thing, it is not just policies.

This point has to be emphasized. Perhaps one possible way to emphasize this is to use what is growing at national level. To use national platforms that are in charge of defining, what Minister Puchkov, for example, insisted on: the need for planning. Even if we are facing many uncertainties, as Mr. Grady pointed out, in any case, we need planning.

To execute this planning, we also have to take the private sector on board. We have seen in the past that national platforms were essentially some kind of inter-ministerial tool to coordinate the ministries. The more recent form of national platforms, however, have shown that they are taking on board the fact that the private sector is important. In the private sector, I am including the insurers, of course, because they are a natural partner, but also industries. I am thinking, for example, of the case of the building industry. We know that most of the vulnerability of our societies is related to our living space. The involvement of the building sector in contributing to this resilience is essential.

In the case of Turkey, for example, which was presented earlier, this increasingly shows that the national platform has involved the private sector directly in its work because it can contribute and also raise important issues for the private sector. It also translates this general planning into specific actions at the individual level. This may be the message I insist on.

I will not insist on this particular form of international cooperation, because that is also a point that appears to be very important in the other discussions in which I participated yesterday here at this Forum. It is important for international companies to have some kind of convergence of the different regulations and the way that things are done in different countries, so as not to have to handle a jungle of different and contradicting regulations. It is also very important for countries to insist on their capacity to resist disasters, because it affects that country's ability to compete for investment, because it is very important for companies to consider you a safe country.

One of the things that they do not like – apart from regulations, even if they understand their importance – is disruption to their activities.

These are the kinds of things that we have to work on. I encourage the private sector participants to think and have a look at what can be their own contribution to this global effort to achieve more resilience. Thank you.

M. Wahlström:

Thank you very much, Mr. Pla, for that contribution and for creating a demand for resilience and safety. It is implied that safety, obviously, needs to be a core business interest for businesses. And not only as a contribution to the public. We are all in the same space and sharing the same resources.

Thank you also, Mr. Pla, for calling on the individual's role in all of society's engagement for resilience. You highlighted very well the question of where the space is where public and private interests genuinely meet, and together develop the models for managing risks in the future.

Professor Sorokin, the spotlight turns to you. You have been involved in major energy safety initiatives. Right now, you are involved in the Global Marine Protection Initiative, and have gained a lot of experience in the international domain on this topic. Could you share with us your perspectives on that experience, and perhaps also your thoughts on what you have heard from us this morning? Thank you.

Prof. V. Sorokin:

Good morning. What I would like to do is highlight one small, but important area of the much wider challenge of managing major catastrophes. This is the issue of preventing, preparing for, and dealing with accidents in offshore oil production and exploration, as well as dealing with maritime transportation accidents, and dealing with the consequences of either.

I will touch on the issues, but I am somewhat limited in doing so because I am Co-Chair of an initiative being developed and implemented within the framework of the G20.

Group 20, the Global Marine Environment Protection Initiative. We are talking about 23 countries and the European Union. I have limitations because we have a common position, and I cannot give way to some of my ideas which are personal. But in any case, here is the background.

Offshore oil production started, more or less, in a sizeable and commercial manner 70 years ago. Today, the annual global output of oil is 4.1 billion tonnes, and a third of this total is offshore oil. With this magnitude, you understand that anything that happens to this offshore oil production and exploration affects the energy supply worldwide.

In spite of more than 70 years' experience, accidents happen. They happen on offshore rigs, they happen at the underwater, seafloor pipelines; there is no guarantee that they will stop happening. Their numbers run into the thousands. Not all of them catch the attention of the press, but they still need to receive the attention of experts.

Offshore gas and oil production remain frontier energy enterprises. They will stay that way, no matter what we do. Of course, industry, in particular, faces this problem almost daily. They manage to successfully avoid risk most of the time. Sometimes, however, incidents happen which immediately attract the attention of the world. For example, you remember the accident in the Gulf of Mexico in 2010. That accident claimed 11 lives at the Deepwater Horizon platform, and flushed 655,000 tonnes of oil into the Gulf. That was a disaster, a catastrophe, and a tragedy, all in one.

In the aftermath of that accident, Prime Minister Medvedev, who was President of the Russian Federation at the time, proposed that the leaders of the G20 think about a global marine environment protection initiative which would target precisely this type of scenario, in order to prevent this type of accident and, when that is not possible, to deal more successfully with the consequences. That was 2010. Since then, subsequent G20 Summits have maintained the mandate for the countries to do this job – in Seoul, Cannes, Los Cabos, and now St. Petersburg.

The mandate given to the group of countries was to, first, establish a mechanism for sharing best practices in preventing and dealing with accidents and their

consequences. The second element was that this mechanism of sharing best practices should, and will. Consist of, among other components, a dedicated website where all relevant information on these issues that I have indicated, would be made available; it would be a kind of focused portal.

The third element of the mandate is that the G20 must cooperate with a number of stakeholders, amongst which are the OECD, our base, and OPEC and the International Regulators' Forum. Then it goes down to individual regulators, businesses, individual companies, and industrial associations, as well as scientific and civil society.

It is very interesting to note that the first draft, which we received in the G20 on this topic, was prepared by environmentalist groups, which certainly created some problems with discussions among business and the governments.

So this is our framework. What we are trying to do is to establish a mechanism for sharing best practices. It will be launched in three weeks, here, in St. Petersburg, as part of the G20 Summit.

This is not as top-down initiative as it may seem. Dozens of stakeholders are participating in our activities, making this exercise more difficult, but we have a common denominator in our efforts.

So this is what we are doing. We are certainly looking for input from countries because that is the absolute key element in our mechanism – the portal. I am very grateful that the Russian ministries and agencies have contributed heavily. My thanks go especially to the Ministry for EMERCOM. They contributed wonderful, excellent material to the Russian input to this portal.

There are other issues which I would like to talk to you about but I am running out of time. I will be happy to answer questions or to continue discussions with my colleagues. Thank you, Ms. Wahlström.

M. Wahlström:

Thank you very much, Professor Sorokin. It has been a very interesting series of perspectives, offering us some clear insights into what the issues are and what some of the answers are.

In order to respect my promise to open the floor, I will invite two questions. We are a little short on time, but I would like to hear from those of you who have joined us this morning. What are the issues that these presentations have raised with you? We have two speakers sitting next to each other on the first floor. Could you please introduce yourself and your question?

A. Alexandrov:

Hello. I am Alexander Alexandrov, General Director of GSE Russia. Virtually all of the presentations touched on the need to prevent emergencies, but Mr. Grady proposed a specific new technology to analyse and prevent emergencies. Could you explain to me what this is? Thank you.

M. Wahlström:

Thank you; we will take the second question also.

E. Sandalova:

Thank you very much. My name is Evelina Sandalova, High Representative for Foreign Affairs and Security Policy at G8 and G20 Youth Summit. I am here as a representative from the European Union; I have a Bulgarian background. Youth 20 took place just before SPIEF. We have just adopted our official declaration and recommendations for the G20 Leaders, and it was presented to President Putin yesterday. If you are interested, I will be happy to show you a copy of our declaration and recommendations.

My question concerns Mr. Gill Grady's statement about regulations. We would like to ask you about regulation in sustainable development, and crisis prevention and management. In the Youth 20 sessions, we could not reach an agreement on regulations. You mentioned that no more regulations should be introduced.

However, how are we going to tackle sustainable development and crisis prevention if there are no regulations?

The second part of my question is more a message Ms. Wahlström. Do you think that there will actually be a united position? Will countries unite in their different approaches on how to tackle this issue? We heard about best practices from the Russian side. In the Youth 20, however, we also heard that many other countries would not agree to the same measures. How can we reach a consensus in the G20 when we can hardly reach any consensus in the Y20? Thank you.

M. Wahlström:

That is an excellent question. Can we take a third question before we go back to the panel? Yes.

From the floor:

Thank you very much for a great panel. Again, this might be a follow-up to Mr. Gill Grady when you address the first question. I was going to ask you about this threshold that you think about. You had a very nice comment about intentional versus natural or man-made disasters, suggesting that you can actually think about disasters as being types, equivalent to each other.

I was wondering how one would go about registering an intentional disaster versus an industrial disaster? Because in some way, we could speak facetiously and say that running down our natural capital is an intentional disaster. Or even the idea of frontier risk, which Dr. Sorokin spoke about, is on some level looking at disasters with intention. Also, perhaps at some level, shutting down Boston and running around looking for a 19-year-old terrorist would be what could be termed an intentional disaster. Could speak to us a little bit about those assumptions?

M. Wahlström:

Thank you very much for that. Mr. Grady, two interesting issues have been laid on your table.

G. Grady:

I guess I was a little more controversial than I wanted to be. Allow me to address a couple of things. Regarding the technologies, it is actually a combination of technologies that exist; it is a matter of the ability nowadays of computing power calculating holistically, taking into account all of the different elements of risk facing an organization. So it is a combination of modelling the physical attributes of a chemical plant or a nuclear reactor and understanding the interactions of all of those systems, in combination with accident simulation technology that looks at radiation exposure, or explosion potential, and the effect it could have on the plant, as well as probabilistic risk and some of the new methodologies regarding that.

It is really about the ability now, with computing power, to take advantage of that technology, in order to have a more holistic look at what all the risks are; running an almost infinite number of scenarios to really understand where the risks lie. It is the combination of both proven techniques and technologies, and the adaptation and standardization of use of that for risk analysis and mitigation.

Regarding the comment on regulation, I am not proposing that we do not need any regulation. I am saying that we need to take, again, a holistic look at legislation and regulation. There are examples of industries that do a relatively good job of self-policing. For example, the nuclear industry in the United States after the Three Mile Island accident. The industry decided to get ahead of regulation and formed their own industry group that actually has stricter rules on how nuclear plants should behave – the standards, the safety culture – than is required by US regulations from the Nuclear Regulatory Commission. This is an example of where the industry regulated itself even more stringently than was officially required.

The utility industry in the United States is more concerned about the Institute of Nuclear Power Operations giving them a bad finding than they are about the NRC because that industry group is probably a little more strict in its regulation and how it polices its own members. The chemical industry does some of that as well.

However, the issue is coming up with what the baseline of technology is, that we are going to use, in order to establish how we leverage the technology that is available to us today and was not available before. How we ensure that regulations, that were written 20 years ago, are really suited to the technological environment and the physical environment we face today. We keep talking about climate change and more dramatic weather events than were probably ever considered when some plants were designed 20 and 30 years ago.

Regarding the comment on intentional disasters, my realm was not what we are doing from a political or economic point of view that could bear intentional damage, but that we ought to look at the different causes of a disaster – weather-related, human error in operating a facility, or terrorism and intentional harm. It still comes down to being able to analyse the effects of crippling an industrial plant – the cause does not really matter. It is about trying to understand what the effects are and how to protect against those effects.

A typical case of a nuclear reactor would be that if you remove the ability to take away the heat of the reactor, it will eventually melt down. So you have to build in security and safety around defending against someone's ability to damage the equipment that helps to remove heat. It is really looking at all the different causes of a disaster – whether natural, man-made, or intentional – and what we can do, from a safety perspective, to design either redundancy or resilience within the facility.

M. Wahlström:

Thank you, Mr. Grady. We are absolutely running to our deadline now. I know that Mr. Schnarwiler wanted to say a few words. I do not know whether Minister Puchkov also would like to say a few words before we close. Minister? I will ask Mr. Schnarwiler first and give you the final word.

R. Schnarwiler:

Very briefly, since Gill talked about probabilistic modelling used by risk managers of chemical industry plants. A side benefit of insurance is the signalling it gives to a

risk manager. Insurance transfers the risks, but it also signals to you, with the level of the insurance premium, how risky your venture is. If you have a risky business, the premium is higher; if you invest in prevention and mitigation efforts, the premium goes down. So that is a clear signal to you, as to how risky your business, your venture is. I think that that is also a clear signal for investing in prevention. Thank you.

M. Wahlström:

Thank you for that. A good pricing signal.

Minister, before I answer the question whether G20 can unify itself around this, I will offer you the chance to give some reflections on what we have just said.

V. Puchkov:

I am very pleased that the Y20 is discussing such important and serious problems. It would be fantastic if young people could study how to reach consensus on even the most complex, broad-based issues.

Colleagues, today we have had a really constructive conversation. We have discussed the latest approaches to creating an economic model for the safe development of society. The point of departure in the creation of this model is the individual, and the protection of his or her life, health, and material wellbeing. The evolution of society has necessitated the development of safety and sustainability requirements for the economy and other areas. For its part, the state should create conditions for the implementation of safety models, and it should provide assistance to local governments, which are not always able to cope on their own. This is especially true of large-scale man-made and natural disasters that impact social infrastructure.

The safety services sector has become an important part of the economy. Research teams are active in this sector. They develop fire rescue and other technologies, as well as technologies to prevent accidents and disasters. I believe that safety

services can serve as a catalyst for development in countries that are in search of new economic sectors.

Today we actively discussed the topic of training the managers of large and small businesses on safety issues. Training is also a driver of economic development in various countries.

I would like to thank all the guests who came to St. Petersburg from different corners of the world to take part in SPIEF and to discuss the issue of creating a new economic model for risk prevention and management. I would like to offer special thanks to the Forum's Organizing Committee for arranging the event so well. As the host I would like to remind everyone that St. Petersburg is a wonderful city: here we have the Gulf of Finland, the Neva, and excellent museums. Even the weather makes us happy. Take advantage of this pleasant opportunity to learn about our culture and traditions in this beautiful corner of Russia while you are learning about safety. Thank you.

M. Wahlström:

Thank you very much, Minister Puchkov. Do I think that the G20 will reach a consensus? Let me tell you that catastrophes are already on the G20's Agenda, since Mexico's chairship. We would like to see the G20 place a very high political priority on safety and security in all its aspects, and not consider natural hazards as unpredictable and distinct from security and marine environment safety. It is all part of the same package. I believe in that, and I will work very hard to make my belief come true. And I would like your support to do that.

To the business participants here, we hope that this will inspire you to see this as something that is very core to your interests, and share among yourselves what you do to mitigate risks, to learn from each other, to talk about what it costs you, and to offer solutions to your own industries and across industries. Then the public sector will become a very efficient partner and you will become an extraordinarily important partner. Without business and private sector involvement, risks will not be managed

and reduced. We are not here just to give you some stories about your importance – we are here to tell you that without you it cannot be done.

Thank you very much for joining us this morning. We look forward to the continued cooperation with Russia, of course, and with all of you who represent different sectors and industries. Thank you very much.