

Climate of compromise

The chances of a strong treaty emerging from the United Nations climate talks in Copenhagen seem small, but recent progress offers hope.

With about six weeks left before nations gather in Copenhagen to finish negotiating a climate treaty, hopes are rapidly dwindling that countries will be ready to sign a strong, ratifiable agreement. The pessimism has spread so widely that it could be considered a global pandemic. News stories are already talking about the 'failure' of Copenhagen and squandered opportunities.

But viewed from the perspective of just a few years ago, the Copenhagen summit could already be considered a partial success. In a short span, many nations have pledged to cut their emissions of greenhouse gases by considerable amounts, well beyond any commitments they had made before, such as through the 1997 Kyoto Protocol. Norway, for example, offered this month to reduce its own emissions by 40% below 1990 levels by 2020. Indonesia said it would curb its emissions over that same time by 26% below the levels expected under a business-as-usual scenario, with even stronger cuts possible under an international agreement. The European Union has committed to a 20% reduction below 1990 levels and would increase that to 30% with a global pact. And, for the first time, the US Congress is moving towards establishing laws that mandate emissions cuts.

These words are not to be confused with achievements, but they at least show that countries have started to analyse their own emissions seriously and to develop domestic agendas that would set them on course to meet their commitments. Such unilateral decisions are an essential starting point for an international agreement, and they suggest that countries are now ready to back up their rhetoric in a way that was not true 12 years ago, when they signed the Kyoto Protocol. This is real progress, and it would not have happened without the pressure to produce a treaty.

Nevertheless, such vows fall short of what is needed to protect against the dangers of global warming. Nations need to reduce global emissions far more in

the longer term, and the endgame gets much tougher if leaders delay making those reductions.

In a package of articles this week (see below), *Nature* looks at some of the issues that will play crucial parts in the negotiations in Copenhagen. Several articles focus on factors concerning the developing world, which will endure some of the severest effects of climate change and which will also be responsible for much of the future growth in greenhouse-gas emissions. At the moment, major gaps

remain between the world's wealthiest nations and those still in the process of providing their citizens with basics such as clean water and electricity.

The negotiating impasse can be breached only by concessions on both sides. Developed nations, particularly the United States, must agree to substantial reductions in greenhouse-gas emissions, both in the next decade and in the long term. And developing nations must commit to controlling their greenhouse-gas pollution in some fashion. China has recently taken over as the leader in carbon dioxide emissions and there can be no hope of containing global temperatures without Chinese action.

At the same time, developing nations will need monetary and technical assistance in steering their economies towards a low-carbon future. The wealthy nations have so far committed too little on this front, and the effects of the global recession have tightened budgets around the world. But as economies improve, the wealthiest nations should fashion innovative ways to assist the developing world, whether through the proceeds of carbon trading or through new technical collaborations.

Another major financial obstacle is the issue of support for adaptation. Some estimates suggest that the developing world will require in excess of US\$100 billion in aid every year to cope with the effects of global warming. But the international funds created to help adaptation efforts in the world's poorest nations contain orders of magnitude

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less money, and even the available funds have not flowed smoothly to countries in need. The process of distributing funds should be streamlined. But there must be safeguards to ensure that adaptation money is used effectively.

With such major issues still unresolved, pessimistic observers see no chance of success in Copenhagen. But there is still time left for leaders to reach significant agreements if they make it a personal priority and recognize the urgency of the problem. Some leaders, such as British Prime Minister Gordon Brown, have indicated that they would be willing to attend the conference to seal a deal, but more should step forward and they should commit to going. This would lend stature to the negotiations and would raise the chances of achieving a substantial agreement.

It will not be possible to resolve many of the important issues in the remaining time this year. But leaders could make strong progress by building on the momentum at the national level. Many of the commitments made by nations this year are conditional — they depend on other parties taking specific actions as well. These could provide a model for approaching strong targets through a stepwise process.

In the end, successful international negotiations share some important characteristics with scientific research. Both are iterative processes, in which results from one step help to determine the path forward. They require time and perseverance. And they rarely travel in a straight line. Countries should endeavour to build on the positive actions of the past year, both before and after the Copenhagen summit. ■

Russia's grand plan

The creation of a second pillar of excellence will give the country a chance to regain its scientific stature.

When former Russian President Vladimir Putin identified nanotechnology as the spearhead for Russia's economic and technological renewal, critics scoffed, saying that the move was ill-prepared and bound to fail. The multi-billion-dollar initiative would drown in corruption and nepotism, they said. Jokes made the rounds about 'banano' business.

The nanotechnology initiative includes nanoscale techniques with applications in a broad variety of fields, from materials research to mechanical engineering, and from electronics to medicine and biotechnology. Two years on, criticisms of the grandiose project persist. But there is no doubting the political commitment to gingering up Russia's capacities in science, in an attempt to lessen the former superpower's precarious dependence on natural resources.

The creation of the Russian Corporation of Nanotechnologies (Rusnano), a state-owned venture-capital organization that is to shoulder the task of turning Russia into a powerhouse for nanotechnology, is arguably the best thing that has happened to Russian science since the collapse of the Soviet Union. Its procedures for selecting ideas and projects worth investing in are, in terms of thoroughness and transparency, streets ahead of anything else in Russia's dated science-funding system. And in Anatoly Chubais, the 'super-manager' who was responsible for the privatization of Russia's oil and gas industry during the Boris Yeltsin era, Rusnano has a formidable figurehead with the backbone required to negotiate between Russian politics and big business.

No one could complain of a lack of funds: by 2015, Russia will have allocated 318 billion roubles (US\$11 billion) to the initiative (see page 1036). Yet Russia's aspirations could prove over-ambitious because of other critical weaknesses.

In particular, the nation's business and legal environment needs to be more receptive to foreign capital, personnel and know-how. Just as important will be the creation of a research community that can generate ideas and skills: Russia's move into nanotechnology creates a demand for at least 100,000 scientists, requiring in turn a boost in the delivery of Russian undergraduates in relevant disciplines.

The Kurchatov Institute in Moscow, founded during the Second World War to develop nuclear weapons, has been chosen to lead this effort. Diversifying in recent years, it has basic-research competence in most 'nano'-related disciplines. Its director, Mikhail Kovalchuk, has been instrumental in getting the nanotechnology initiative off the ground. But although recently refitted with 6 billion roubles' worth of state-of-the-art equipment for nano-engineering, the Kurchatov Institute cannot master the task alone.

To put basic research in nanotechnologies on a more solid footing, the Russian government is now set to create a national research centre for nuclear physics and nanotechnology. Coordinated by the Kurchatov Institute, the centre will comprise a number of other existing research institutes, such as the Russian Academy of Sciences' Petersburg Institute of Nuclear Physics near St Petersburg.

In addition, the government plans to set up a small number of national research universities. The move, announced earlier this month, is an attempt to overcome the counter-productive separation — a relic of the Soviet science system — of teaching at universities and basic research done mostly at academy institutes.

This move deserves every support. It has the potential to breathe new life into a research system that has in the past 20 years been plagued by brain drains and frustration, and delivered few internationally recognized achievements. Such a second pillar of basic science, financially and structurally independent from the Russian Academy of Sciences, would be a strong signal of hope, not least to Russia's large scientific diaspora.

But in establishing the centre, the modus operandi of which is still under discussion, the science ministry must avoid the autocracy and subordinating merit to celebrity that hamper many Russian institutions. An international advisory committee should oversee all aspects of the centre's science, recruitment and procurement. Leading positions must be filled with top scientists and administrators, and recruitment decisions should be transparent. Collaboration with leading research institutes abroad, and with Russian university research departments, should be a high priority from the start. Only through such integrity and openness will Russia's drive to science-based prosperity have a hope of succeeding. ■

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