



**World Resources Forum 2009**  
September 15 – 16, 2009 • Davos Switzerland

## FINAL REPORT

### R'09 TWIN WORLD CONGRESS & FIRST WORLD RESOURCES FORUM

#### THE EVENT

The R'09 Twin World Congress ([www.r2009.org](http://www.r2009.org)) was the 9<sup>th</sup> event in the biannual R' World Congress series, which started in 1993. It was organized by the Swiss Federal Laboratories for Materials Testing and Research Empa and the EcoTopia Science Institute, Nagoya University in cooperation with the Swiss Academy of Engineering Sciences SATW. The event itself constituted an example and an experiment in resource management: being held simultaneously in two parts of the world – Davos in Switzerland and Nagoya in Japan – this congress avoided many intercontinental flights, a factor known to account for most of the resource demand usually required for international congresses. The main halls at the two venues were interconnected by a teleconferencing technology system for several hours (from 8:30 to 12:30 in Switzerland and from 15:30 to 19:30 in Japan). All plenary lectures were shared on September 14 and 15.

In conjunction with the R'09 Twin World Congress, the first public event of the World Resources Forum WRF took place in Davos ([www.worldresourcesforum.org](http://www.worldresourcesforum.org)) from Sept. 15 - 16, 2009. The WRF provided first-hand information on natural resource use, revealing current trends and limitations to its development; it thus served as a platform to discuss the economic and political implications of the trends with the aim of creating a science-based, realistic vision of sustainable resource use. Parts of the WRF contributions were transmitted to Berlin/Germany and Nagoya/Japan.

The R'09/WRF addresses experts from science and engineering, from supply and recycling industries, from public authorities and international organizations in order to stimulate closer cooperation among the various disciplines and stakeholders across the materials life cycle. It aims to improve materials and energy efficiency in industry. Issues of environmental protection are treated where they are related to improving materials and energy efficiency and to minimizing disposal, including the integration of renewable energy and biomass into the production chain. Solutions to complex environmental problems can only result from co-operative behavior: R'09/WRF offers a balanced dialogue among players from industry and trade, science and academia as well as the public sector. To be sound, decisions on this level must always consider ecology, economy, psychology and politics, as well as human and social development.

#### TOPICS OF R'09

Economic growth under the condition of limited resources requires innovations for the materials life cycle. Both the global economy and the environment benefit from waste avoidance strategies, and technologies are required for the highly efficient conversion of matter and/or energy. Excellence in materials and energy efficiency is also a precondition for combating climate change. The R'09 Twin World Congress promoted innovative technologies and frameworks for resource management to improve materials and energy efficiency in the production, use and recycling of materials as well as absolute reductions in material flows.

The R'09 Twin World Congress aimed to contribute to improved materials and energy efficiency in industry, including energy supply, cement and building materials, Metallurgy, Chemicals, glass, pulp and paper, machinery, the automobile and electronic industries as well as activities of collection, sorting, further treatment and final disposal of post-consumer materials. The factor information, and therefore the use of information and com-

munication technologies, are of increasing importance in resource management and thus found special consideration during R'09.

Topics which were dealt with include *inter alia*:

- (1) Renewable energy and energy efficiency
- (2) Technologies for materials recycling and reintegration
- (3) Materials and energy efficiency in specific industries
- (4) Safe disposal and future waste generation
- (5) Green production, cleaner production
- (6) Economics and policies for the management of materials, natural resources and emissions
- (7) Life cycle thinking, material flows and environmental assessment
- (8) Information and communication technologies
- (9) Electrical and electronic waste
- (10) International trade, political and social factors

Contributions from emerging economies, which had been very inspiring in the past conferences, are becoming even more important in today's globalized world.

Sustainable development requires a substantial reduction in the life-cycle-wide resource demand per consumed service unit. Hence, optimal solutions for the trade-off between closing material loops and saving energy for processing and transport have to be found. This may involve integrated resource management and improved information processing, as well as innovation at the level of technological processes, products, product-service systems and institutional frameworks.

## WORLD RESOURCES FORUM, WRF 2009

The WRF is a joint initiative of the Swiss Federal Laboratories for Materials Testing and Research Empa and Prof. Dr. Friedrich Schmidt-Bleek (President of the Factor 10 Institute), supported by the Swiss Academy for Engineering Sciences SATW. The Swiss Federal Office for the Environment, the UNEP Resource Panel, the Sustainable Europe Research Institute SERI, the German Federal Environment Agency UBA and many others are partners of the WRF.

The WRF is an independent, international platform for debate on global resource consumption issues, advocating innovation for resource productivity. The WRF is building a bridge from the natural sciences and engineering to economics; it aims to equip political decision makers to identify realistic policy options for sustainable growth. The WRF aims to transcend the current political focus on climate change and to bring the broader issues of global resource consumption and resource productivity back onto the agenda. It has assembled an interdisciplinary network of scientists, politicians and business leaders who recognize the necessity of establishing economic principles that respect the physical properties of resources and the laws of nature. The forum aims to reach consensus on the next practical steps to be taken towards a sustainable economy. The WRF encourages participants to debate and share research questions at the core of sustainable development which are equally relevant to economists and engineers. It is directed towards academics, politicians, research-oriented practitioners, entrepreneurs, consultants and other professionals working in the area of sustainable development, and especially for stakeholders working in the areas of resource management, resource efficiency and eco-innovation, climate change and economic framework conditions for global resource use.

The following questions were discussed during WRF 2009:

- Natural Resources: How can growth continue on a finite planet?
- Eco-efficient Technologies: What is the future role of technology in using resources productively?
- Economic Frameworks: How must the rules of the economic game be defined to avoid self-destruction?

During this first public event of the WRF in Davos (Sept. 15-16, 2009), over 350 participants shared their ideas and thoughts which resulted in a common [declaration](http://www.worldresourcesforum.org/wrf_declaration) ([www.worldresourcesforum.org/wrf\\_declaration](http://www.worldresourcesforum.org/wrf_declaration)).

### CO-ORGANIZERS AND PARTNERS

R'09 and WRF have been supported by a group of co-organizing institutions including the Swiss Federal Laboratories for Materials Testing and Research Empa and the EcoTopia Science Institute of the Nagoya University as the main organizers, the Swiss Academy of Engineering Sciences SATW, the Factor 10 Institute, France, the Engineering Academy of Japan, Inc. EAJ, the Japan Society of Material Cycles and Waste Management JSMCWM, the Society of Solid Waste Management Experts in Asia and Pacific Islands SWAPI, the Mercator Foundation, the Institute for Process Engineering IPE of the Chinese Academy of Sciences CAS, the Research Center for Eco-Environmental Sciences RCEES, the Board of the Swiss Federal Institutes of Technologies, the Paul Scherrer Institute PSI, the Swiss Federal Institute of Technology ETH Zurich, the Swiss Agency for Development and Cooperation SDC/DEZA, the State Secretariat for Economic Affairs Seco, the Federal Office for the Environment FOEN/BAFU, the Swiss Association for Quality and Management Systems SQS, the Canton of Graubünden (Grisons), the Municipality of Davos, the Japanese Ministry of Internal Affairs and Communications MIC, the Japanese Ministry of the Environment, the Japanese National Institute of Information and Communications Technology NICT, the Aichi Prefecture, the City of Nagoya, Cisco Systems, Inc., SWITCH Serving the Swiss Universities, the Commemorative Organization for the Japan World Exposition'70, the Tokai Television International Foundation, Net4you, the DAIKO Foundation, the Federal Environment Agency Germany UBA, the United Nations Environment Programme UNEP and many others.

### SCIENTIFIC COMMITTEE

A Scientific Committee composed of members from many countries helped to shape the program by providing sound and relevant information. The selection of abstracts was based on the following criteria: scientific content, practical relevance, economic feasibility and originality.

### PARTICIPANTS

The R'09 and the World Resources Forum was attended by delegates from more than 50 countries. Contributions from more than 40 countries gave an excellent overview of the conference topics.

## STUDENT PARTICIPATION

Students participated on four levels:

### College students:

50 college students from 30 schools from Austria, Germany and Switzerland participated in the R'09 and World Resources Forum. The subjects of the event had been prepared in the classes and led to the setup of follow-up projects in the schools.

### Master students:

In collaboration with the Mercator Foundation 10 master students were blogging live from the event ("WRF Student Reporters") at the WRF-website ([www.worldresourcesforum.org](http://www.worldresourcesforum.org)). They provided content summaries, background stories, interviews and impressions from the event. The blog generated 2615 views from 44 countries during the event and 132 comments (1.76 comments per entry).

### E-waste study tour:

The R'09/WRF conference was attended by 12 participants from Chile, Argentina, Colombia, Peru, Brazil and South-Africa which prior to the conference participated in an e-waste study tour held in Switzerland and Austria. The study tour was organized in the framework of the Swiss "Knowledge Partnerships in e-waste Recycling" Programme, which is funded by the Swiss Government (State Secretariat for Economic Affairs SECO) (see also [www.ewasteguide.info](http://www.ewasteguide.info)).

### PhD students:

With a view to promoting early career researchers, a PhD workshop was supported by the organizing committee in Switzerland for the first time in the R' series conference. The workshop offered the opportunity for young academics working in the field of scarce elements to come together and to discuss their projects. The workshop had fifteen participants (9 PhD students, 3 PhD students-to-be (MSc, about to start with a PhD), 1 industry representative, and 2 workshop chairmen) and addressed critical issues related to scarce element supply and demand, and their implications for scarce element governance; a research field which is recently experiencing growing public attention.

## TELECONFERENCING DAVOS / NAGOYA

To assess the environmental effects of this novel paradigm, we asked the participants both in Davos and Nagoya whether they would have flown to the other conference site, had the conference been organized in a traditional way, either in Davos, or in Nagoya. We also asked the attendees for an exact description of their travel routes and transport means to the respective conference site, thus enabling us to compute the greenhouse-gas emissions caused by their travel activities in fine granular detail.

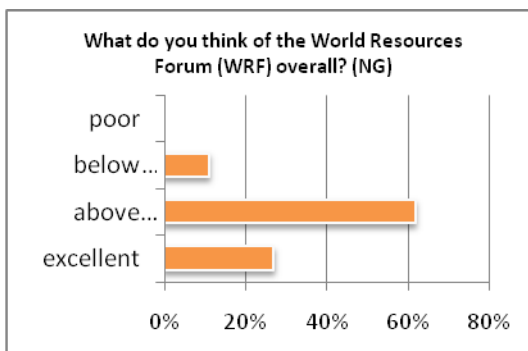
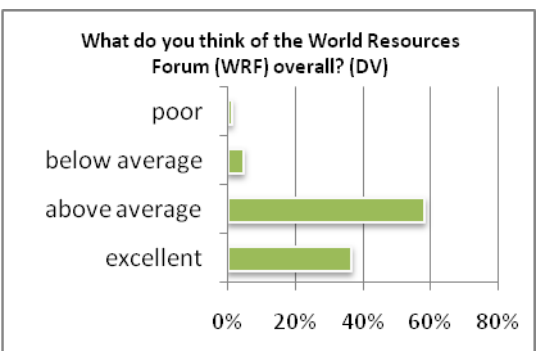
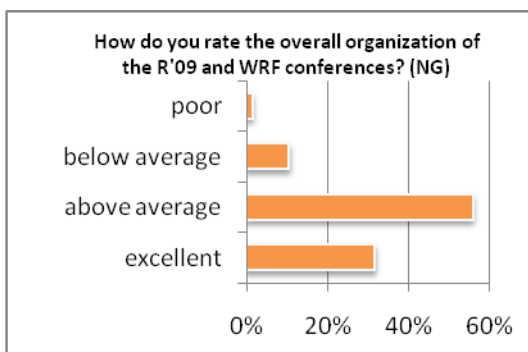
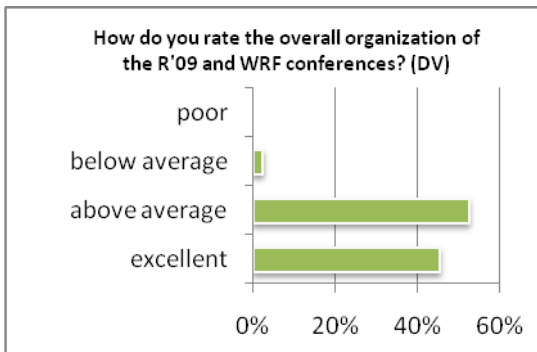
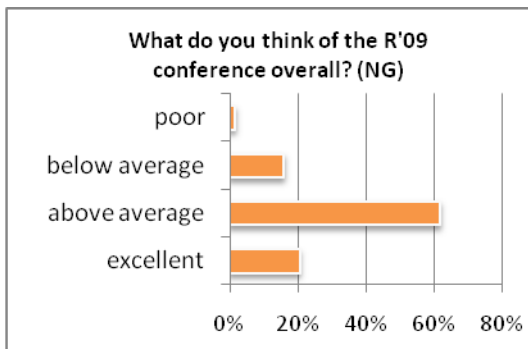
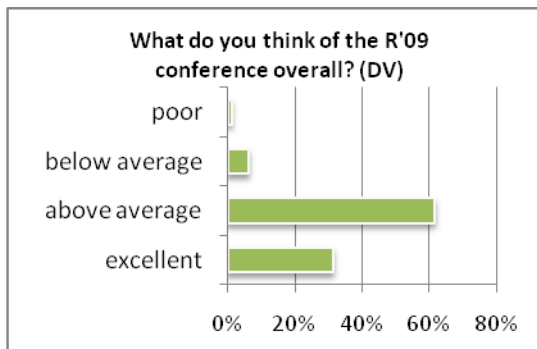
We thus were able to compare the two-site experiment with two possible alternative scenarios: a traditional conference held in Davos only, or in Nagoya only respectively. For the hypothetical alternatives, we considered the most conservative assumptions: for any attendee who would have traveled to the other site, we assumed travel by train to the closest international airport, from where he or she would have taken a direct flight to the remote conference site.

Although the analysis is not entirely finished, the results seem promising. Even under these most conservative assumptions, for example, instead of the 531 attendees at both sites responsible for 119t CO<sub>2</sub> travel emissions, a conference in Davos only would have made 448 participants to take part, but due to the drastic increase in intercontinental travelling this smaller number of attendees would have almost doubled the travel emissions to 235t CO<sub>2</sub>.

**PARTICIPANTS FEEDBACK**

After the WRF/R09 an online survey was conducted, aiming at generating insights about the perception of the conference and gathering data for the environmental feedback. The response rate was high (43.4% Nagoya NG, 59.2% Davos DV).

Participants' feedback regarding content and organization was very positive:



## FINANCE

Due to the world economic situation participation both in Nagoya and in Switzerland was below expectations. Nevertheless, due to the contributions by several sponsors and a restrictive cost control it was possible to break even both in Japan and Switzerland.

## ADDITIONAL INFORMATION

Additional information (plenary and keynote speeches etc.) and documentation can be found at:

[www.r2009.org](http://www.r2009.org) and [www.worldresourcesforum.org](http://www.worldresourcesforum.org).

The UBA Film "Beyond Climate Change – FLOW" is available at [www.youtube.com/watch?v=nsJHTEvSE8s](http://www.youtube.com/watch?v=nsJHTEvSE8s)

## NEXT EVENT

After more than 15 years the R-Conference series ended with the event in 2009. In the future the topics of the R-Conference will be integrated in the World Resources Forum.

A preparatory workshop for the World Resources Forum will be organized in St.Gallen on June 14 and 15, 2010.

The next World Resources Forum is planned from Sept. 18 to Sep. 22, 2011 in Davos.

## THANKS

A special thanks goes to all the scientists and practitioners for their excellent contributions, to the members of the Steering and the Scientific Committees, to all the co-organizing, partners and supporting organizations and last but not least to Davos Congress and Nagoya University for providing the facilities and outstanding services and support. A final thanks to the crews of CISCO Systems Inc. and SWITCH for their excellent ICT services.

St.Gallen / Nagoya, January 2010

**Dr Xavier Edelmann**, Empa, Switzerland, Chairman of the R'09 Twin World Congress and of the World Resources Forum

**Dr Martin Birtel**, Empa, Switzerland, Technical Secretary World Resources Forum

**Martin Lehmann**, Empa Switzerland, Technical Secretary R'09 Twin World Congress

**Prof Dr Lorenz Hilty**, Empa, Switzerland, Chairman of the R'09 Scientific Committee

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