

OECD Conference on Fostering Safe, Innovation-Led Growth in Nanotechnology

by Lynn L. Bergeson

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There is little doubt that nanotechnology is delivering on its promise to revolutionize many sectors of the global economy. As nano-enabled products populate the commercial landscape at an accelerated pace, there is growing interest in developing tools that can be used to assess more precisely the benefits to the environment of nanotechnology and/or nano-enabled products. Largely in response to this growing interest, the Organization for Economic Cooperation and Development (OECD) convened on July 15-17, 2009, a fascinating three-day conference in Paris, France, titled *OECD Conference on Potential Environmental Benefits of Nanotechnology: Fostering Safe Innovation-Led Growth*. The conference was intended to jump start a more structured dialogue aimed at identifying and quantifying the environmental benefits of nanotechnology while fostering the safe, innovation-led growth of nanotechnology. The conference attracted over 200 attendees from all over the world. The Conference Steering Committee elected to use the term “life-cycle perspectives” to characterize the need to consider both the benefits and impacts throughout the life cycle of the nanomaterial or nanotechnology application.

Key among the conference’s objectives were identifying the range of environmental challenges that could benefit from nanotechnology, the possible environmental benefits from applying these technologies, and challenges for developing, commercializing, and

applying nanotechnology for environmental benefit. The conference also sought to review key, state-of-the-art technologies that have the potential to provide environmental benefits, to consider the environmental, health, and safety implications related to the use of nanotechnology for beneficial environmental purposes, and to discuss policy measures for addressing challenges in the application of nanotechnology for environmental benefit and their relevance in the context of future OECD work programs.

Structurally, the conference consisted of a keynote presentation; two plenary sessions that introduced the conference, framed the desired outputs from the conference, and offered various perspectives on nanotechnologies; eight parallel sessions that focused on specific technological case studies through workshops; and a plenary wrap-up session.

Each of the eight parallel sessions, or “workshops” as they were called, lasted three-and-one-half hours and included five or six presentations by different speakers. Each workshop focused on specific case studies involving various applications of nanotechnology. The workshops included sessions on: water treatment and purification; environmental sensing; clean car technology; cellulose nanofibers; site remediation; better batteries enabled by nanoscale innovation; agricultural nanotechnology; and greener nanoproducts.

Each presenter was “charged” with addressing three sets of questions:

1. What is the environmental benefit and who are the beneficiaries? Is it measurable? What opportunities exist to enhance further environmental benefits, e.g., finding ways to more clearly or efficiently produce the nanomaterials?
2. Given the life-cycle considerations for the nanomaterial application, what are the most important, compelling, or relevant exposure scenarios that must be addressed? What data are needed to conduct a comprehensive exposure assessment for this scenario? What data are currently available, what are the data gaps, and what are the obstacles to collecting additional data?
3. What are the barriers and suggestions for enhancing benefits and minimizing risks?

At the conference’s end, participants reviewed the findings and policy-related considerations collected by the rapporteurs during the plenary and parallel sessions. The review is being summarized and will be prepared in a report that will include: each of the background papers from the plenary sessions and the workshops; a short review of the benefits and risks from state-of-the-art technologies discussed at the conference and, in particular, the potential role of nanotechnology in realizing environmental benefits; a

summary of the challenges and opportunities in the application of nanotechnology for environmental benefit in the areas discussed; and a number of policy areas for further examination by the OECD to be undertaken through its committees and working parties, as appropriate. Throughout the conference, rapporteurs recorded “findings” to the extent consensus was achieved and policy-related considerations discussed during the plenary and parallel sessions, which all participants were able to consider at the conference’s end.

The conference did not yield specific answers to the “charge” questions noted above, nor was answering each charge necessarily a conference goal. Rather, the conference discussion provided a much needed opportunity for a diverse community of nanotechnology experts to focus on the urgent need to develop a “life-cycle perspective” construct applicable to nano-enabled products and technologies. Until a more refined construct is available, quantifying net benefits throughout the life cycle of a nanoproduct will remain challenging.

The summary report of the conference should help greatly in moving the discussion along. The conference report will be widely distributed to OECD

stakeholders, policymakers, and others, and made available through the OECD website at <http://www.oecd.org/nanobenefits>.

As a conference organizer and participant, several observations are worth noting. First, participants reflected a high degree of support for and optimism about the fate of nanotechnologies generally. Given the diversity among meeting attendees and the range of topics considered, this is good news.

Second, the conference confirmed what many believe obvious, namely, the diversity and sophistication of nanotechnologies that are available for use or on the verge of commercialization are impressive. There is no wonder why the enthusiasm for nanotechnologies is seemingly limitless and the pressure to commercialize relentless.

Third, at least among meeting participants, there appeared to be alignment on several key issues. Participants appeared to agree that true environmental benefit can best be confirmed through application of a life-cycle assessment process that fairly describes the benefits and impacts of a nanotechnology or nano-enabled product. Participants readily agreed that such an assessment requires much more data and

information. There also appeared to be general agreement that global collaboration is essential in areas of data development and that every effort should be made to avoid unnecessary and/or duplicative testing. Also, it was generally agreed that broader public engagement is needed in the nano debate, as consumer awareness and understanding of nanotechnologies is relatively low.

Finally, in reflecting upon the discussion at the conference, it is clear that much work remains to be done. The good news is the OECD conference enabled many talented people to join together briefly and focus on the enormous potential for positive change that nanotechnologies offer society. The bad news is that focusing so intently on big concepts such as life-cycle perspectives and engaging the public more systematically in the debate highlights the enormity of the tasks that remain to be done to ensure the safe, innovation-led growth of nanotechnologies. The OECD conference was an exceedingly valuable first step in building a life-cycle approach to demonstrating the net societal benefits of nanotechnologies that are truly safe and innovation-led.