



## Nanosciences, Nanotechnologies, Materials and New Production Technologies Deployment in Latin American Countries

Addressing societal challenges:



Water | Energy | Health

[www.nmp-dela.eu](http://www.nmp-dela.eu)

Newsletter No.6 - August 2015

Welcome to the Sixth and Final NMP-DeLA Project Newsletter – including short summaries of the roadmaps and the second ethics and gender report. It also includes a short summary of the Policy Brief presenting the main overall findings and recommendations for policy makers, and researchers and industrialists, respectively. Six fact sheets highlighting specific issues are also introduced.

NMP-DeLA brings together an international and geographically diverse, ten-partner consortium from the European Union and Latin America to facilitate the deployment of advanced and enabling technologies in areas of major societal challenge in Latin America.

### Contents

- NMP-DeLA General Roadmap on Nanotechnology
- NMP-DeLA Roadmap on Nanotechnology for Health
- NMP-DeLA Roadmap on Nanotechnology for Water
- NMP-DeLA Roadmap on Nanotechnology for Energy
- NMP-DeLA Second Ethics and Gender Report
- NMP-DeLA Policy Brief and Fact Sheets
- Other events and news

**Download the final roadmap, the specific roadmaps for health, water and energy, the ethics and gender report, the policy brief and the fact sheets from the website: [www.nmp-dela.eu](http://www.nmp-dela.eu)**

### Do you have news for the community?

The NMP-DeLA LinkedIn group will remain active after the end of the project. You are welcome to post your event announcements, publications and other news or requests there.

<https://www.linkedin.com/grp/home?gid=7447999>



## NMP-DeLA general roadmap on nanotechnology

The “Final roadmap and recommendations for nano-health, nano-water & nano-energy deployment for societal challenges in Latin American Countries” will soon be published at the website [www.nmp-dela.eu](http://www.nmp-dela.eu).

This roadmap shows a way forward for initiatives that stimulate research, development and innovation of nanotechnologies and nanomaterials in Latin America.

A bibliometric study, literature review and stakeholder engagement during workshops, summer schools and interviews revealed wide disparities between countries and many weaknesses in the current higher education, research, development and innovation system in most countries in Latin America.

This roadmap focuses on the applications of nanotechnologies and nanomaterials for selected societal challenges that are relatively more important to Latin America: health, water and energy. The results of the roadmap exercise are discussed in the context of the wider status of Nanotechnologies, Nanosciences, Materials and New Production Technologies (NMP) in Latin America, and specifically for each of the application areas.

Most of the research in Latin America concerning NMP is still at the level of basic research. There is a lack of educated nanoscientists and nanoengineers and of research equipment, infrastructure and disposables. The roadmap therefore focuses on capacity building for research in nanoscience and nanotechnology in Latin America, to create the conditions for nanoinnovation in the long term. This can be achieved through:

- Consolidating and strengthening existing collaborations between Latin American and European partners within the wider NMP-DeLA Community of Interest.
- Bridging the gap between academia, industry and other stakeholders for capacity building.

As many stakeholders consider Nanosafety an important issue, this is addressed in a separate chapter.

The roadmap includes suggested indicators for monitoring progress in deployment of nanotechnology in Latin America. It concludes with timelines suggesting how the recommendations made by stakeholders may be implemented.

# NMP-DeLA roadmap on nanotechnology for health

The **“Roadmap and recommendations for deployment – Focus on nanotechnologies for health”** will soon be available from the website [www.nmp-dela.eu](http://www.nmp-dela.eu).

This roadmap argues that the specific case of Latin American countries provides an interesting and challenging object of study regarding nanotechnologies for health. On the one hand, diseases and medical conditions endemic to this area, such as tropical infectious diseases, demand well-targeted specialized measures. On the other hand, health problems that are common worldwide such as tuberculosis and cancer manifest themselves differently in Latin America.

Against this background and the opportunities described in this report, we present the main conclusions and recommendations to promote and advance the development and uptake of nanotechnologies for health in Latin America towards 2025.

- Establishment of knowledge networks in nanomedicine including leading players in research and industry

- Strategic commitment of governments and international organisations, in particular the EU-CELAC policy dialogue on the Joint Initiative for Research and Innovation (JIRI)
- The formation of innovation ecosystems fostering translational nanomedicine
- Ensuring a fair operational environment by incorporating nanosafety and Ethical, Legal and Societal Aspects of nanomedicine

The roadmap concludes with timelines for recommended steps to be taken by policy makers and researchers and industrialists in the short (2020), medium (2025) and long term (2030). These steps are recommended for research, investment in infrastructure, technology transfer, policy making, capacity building, Responsible Research and Innovation, and cooperation.

The **“Roadmap and recommendations for deployment – Focus on nanotechnologies for water”** will soon be available from the website [www.nmp-dela.eu](http://www.nmp-dela.eu).

The roadmap argues that in general, socio-economic factors such as poverty, poor living conditions and lack of access to clean water, pose serious regional obstacles in Latin America. Increased scarcity of (clean) water, and extreme weather events, induced by climate change as well as industrial pollution, will call for improved and affordable technological solutions. The opportunities for nanotechnologies for water in these settings could have a major positive contribution.

Nanotechnologies applied to water potabilisation, (industrial) waste water treatment and monitoring, will need to be developed from lab-scale demonstrations to regionally relevant applications, and progress towards the market is expected by 2025.

The main advantages of nanotechnology-derived solutions include, more effective and cost-efficient solutions with less unwanted formation of hazardous byproducts and waste.

The report presents the main conclusions and recommendations for promoting and advancing the short- and long-term development and uptake of nanotechnologies for water in Latin America.

- Strategic commitment is needed of policy makers and stakeholders at national and international level, including the EU-CELAC policy dialogue on Joint Research and Innovation
- Knowledge networks focusing on nanotechnology for water challenges should also be established
- A fair operational environment is needed including nanosafety and fair patent regulations.

The **“Roadmap and recommendations for deployment – Focus on nanotechnologies for energy”** will soon be available from the website [www.nmp-dela.eu](http://www.nmp-dela.eu).

The roadmap argues that Latin American countries face the global challenges of energy security, environmental sustainability and energy equity. Regional challenges include lacking access to energy because of poverty or distant rural locations. Latin America is favorable for solar energy production, and rich in minerals and other raw materials used in energy applications. Nanotechnologies could improve performance of many energy applications in terms of energy conversion efficiency, material efficiency, cost savings, product life cycle, etc. Nanotechnologies may also enable the shift from centralized energy production towards decentralized and local energy. In this report we present the potential of nanotechnologies for advanced and alternative energy applications, including solar energy, hydrogen energy and electrochemical energy storage. The final chapter presents the main conclusions and recommendations for the development and uptake of nanotechnologies for energy in LA by 2025.

These recommendations include:

- Acceleration of research in international cooperation. This should include leading research groups in Latin America, Europe, Africa and other parts of the world.
- Strategic support for synergetic efforts involving coordinated funding strategies.
- Setting up innovation ecosystems from basic research to applications. This includes research groups and industrial companies along the value chain of nanotechnology for energy.
- Focusing on local and regional aspects to exploit market niches in Latin America.

The second NMP-DeLA Ethics and Gender Report can be downloaded from the site <http://www.nmp-dela.eu/index.php/reports>.

It explains how ethics and gender has been addressed in the NMP-DeLA project during the second year of its operation. Relatively more men than women have participated in the activities on water and energy. This is counterbalanced by the predominance of women in the consortium and in the health-related activities in the first year. Ethics has been addressed in all activities. NMP-DeLA Community of Interest members have discussed ethical, legal and societal (ELSA) aspects of nanotechnology for health, water and energy.

Subsequently, some opportunities for synergies with other initiatives are highlighted. This takes the form of a review of current developments in global, European and Latin American discussions related to ethics and gender. In particular this includes the global discussion about the contributions Science and Technology may make to the successor of the current Millennium Development Goals (MDG) that are targeted in the NMP-DeLA original work plan.

These are the so-called “Sustainable Development Goals” (SDG), with a time horizon 2015-2030. At European level, the relevant discussion focuses on incorporating Responsible Research and Innovation in the Horizon 2020 programme for Research and Technological Development, as a more encompassing successor of the European Commission code of conduct for responsible nano-research as part of the European Action Plan for nanotechnology (2005-2009). Opportunities for synergies between the NMP-DeLA roadmaps with these discussions have been monitored in the second year of the NMP-DeLA project. This report takes stock of these developments.

A recurrent theme is the need for indicators to monitor progress in the implementation of the SDGs, RRI and societal and economic impacts of investments in (nano)science, technology and innovation. Targeting the SDGs helps to focus activities by policy makers, researchers, industry and other stakeholders on global priorities in sustainable development, including health, water and energy. Education and investment and cooperation in innovation and R&D are also among the priorities in the SDGs.

The main findings of the NMP-DeLA project are summarised in a six-page policy brief and six two-page fact sheets highlighting different aspects of the roadmap for deployment of nanotechnology, materials and production technologies for health, water and energy in Latin America. These documents are available on the NMP-DeLA website and will be disseminated by the partners to decision makers and stakeholders.

## **Policy Brief**

The policy brief is entitled: **“Frontier Science for Healthy & Sustainable Latin American Societies”**. Its main message is:

*This year offers a unique opportunity to connect at least two emerging international strategies: Nano- and emerging science and technology can be integrated into the Post-2015 Sustainable Development Goals (SDG) while contributing to the EU policy fostering Responsible Research and Innovation.*

It includes a short summary of the main scientific trends in nanotechnology for health, water and energy in Latin America and in EU-LAC cooperation. Developments in nanosafety are highlighted. Then it summarises options for policy makers and researchers and industrialists.

## **Fact sheets**

### **1) Stable investment in nanotechnology, materials and production technologies**

Fragmented and intermittent funding for science, technology and innovation in Latin America is a major bottleneck hampering economic growth and solutions to societal grand challenges. Participants in the NMP-DeLA community of interest recommended establishing a common long term investment strategy for nanotechnology, materials and production technologies. This should pool resources from the EU, national governments and private industry, banks and investors.

### **2) Standardising education in nanotechnology**

Educating researchers and workers in interdisciplinary nanosciences and nanotechnologies is a global issue. Nature Nanotechnology has featured debate about it since 2013, in the wake of discussions in the Journal for Nanoeducation and conferences all over the world. NanoAndes is developing a common curriculum for nanotechnology involving professors from universities in several Latin American countries, while NanoDYF coordinates public awareness raising initiatives. NMP-DeLA Community of Interest members call for building capacity for nanoeducation in a Euro-Latin American cooperation.

### 3) **Make nanosafety a national research priority in Latin America**

Latin American lags behind in research related to safety issues, risk assessment or environmental impacts of nanotechnologies. Researchers in Latin America strongly suggested that the development of new nanomaterials or nano-based technologies should be better accompanied by studies on potential and effective risks and impacts. First good practices and achievements in building nanosafety infrastructure and dialogues are becoming evident in some Latin American countries, above all Brazil.

### 4) **Nanotechnology innovates treatment of tropical diseases**

Most Latin American research in nanotechnology for medical applications is still in the basic research phase or targeting platform technologies rather than therapies or diagnostics for tropical diseases including tuberculosis. Worldwide, most translational nanomedicine research targets products for which a business case can be argued, e.g. cancer therapies or diagnostics. Deployment of nanotechnology targeting health of the Latin American population should build capacity for translational research targeting tropical diseases and cancer.

### 5) **Nanotechnology Helps Solve Conflicts over Mining**

Mining activities in several Latin American countries are surrounded by prolonged and at times violent conflicts between local populations and mining companies. Competition for scarce water resources and water contamination are key issues. We don't propose quick technological fixes. However, the introduction of innovative mining water and effluent purification solutions by a neutral third party in close consultation with all stakeholders may well change the dynamics in these conflicts. We sketch a potential scenario for such an intervention in the medium to long term.

### 6) **Nano-niches for sustainable energy**

Latin American academic research in nanotechnology for sustainable energy is comparable to the European state of the art, but public-private and international cooperation require improvement. Around 800 publications on nanotechnology for energy have been produced by Latin American authors in 2000-2012. Solar energy was the most frequent topic. National and international investment strategies for sustainable energy should incorporate innovative solutions including nanotechnology.



## **NMP-DeLA results have been presented at:**

- The CELAC-EU Academic Summit 2015 on Monday 8 June 2015 in Brussels
- The EURONANOFORUM 2015 conference on 10-12 June in Riga, Latvia
- The EU-SPRI conference also on 10-12 June in Helsinki, Finland

All in all, around 150 participants including policy makers, academics and industrialists attended one or more of the presentations on NMP-DeLA findings.

## **NanoDYF calls for new partners**

The international network José Roberto Leite for dissemination and education in nanotechnology is opening itself to new members, from Latin America, Spain, Portugal and other countries. It is a continuation of the IberoAmerican network NANODYF and continues as a subsidiary of the Official College of Spanish Physicists COFIS. Contact person: Joaquín Darío Tutor Sánchez [jdtutor@icai.comillas.edu](mailto:jdtutor@icai.comillas.edu)

More information can be found here: <http://nanodyf.org/objetivos.php>

## **Other Events Fostering Euro-Latin American Cooperation on Nanotechnology**

The **Week of Nanoscience and Nanotechnology** takes place 5-9 October 2015 in Barranquilla Colombia, <http://snyn2015.wix.com/snync-2015>

The **NanoTradeShow** will be organised in **São Paulo** on 13-15 October 2015. See: [www.nanotradeshow.com.br](http://www.nanotradeshow.com.br)

The **V NanoAndes** School 2015 will be organized in San José, Costa Rica, on 16-27 November 2015. Topics include nanobiotechnology and nanomicroelectronics. See for more information: <http://www.nanoandes2015.com/>

On 18-20 November 2015, the **MINAPIM** workshop on Smart Monitoring for Agriculture, Industrial, Environmental and Health Applications takes place in Manaus, Brazil. Info: <http://www.suframa.gov.br/minapim/index.cfm>

11-13 December 2016, the **BALEWARE** conference hosted by NM-AIST in Arusha, Tanzania, will bring together Latin American, African and European researchers and stakeholders interested in developing water and energy solutions. See [www.baleware.org](http://www.baleware.org)

## **Funding, grants and research jobs**

The EU-CELAC summit of 10-11 June 2015 announced new investments in SMEs, road infrastructure, water sanitation and sustainable energy totalling €118 million. Nanotechnologies are explicitly mentioned as part of the ELAN programme (European and Latin American Business services and Innovation Network) worth €11 million benefiting companies from the EU, Argentina, Brazil, Chile, Peru, Colombia, Mexico and Costa Rica. Info: [http://europa.eu/rapid/press-release\\_MEMO-15-5152\\_en.htm](http://europa.eu/rapid/press-release_MEMO-15-5152_en.htm)

Check out the latest information on EU **Horizon 2020** calls here:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/index.html>

UNESCO's regional training centres including the South American Institute for Fundamental Research in Sao Paulo, Brazil and the Meso-American Centre for Theoretical Physics in Chiapas, Mexico offer opportunities for exchange and mobility, schools and conferences, visiting senior researchers and postdocs, etc. Info: <http://mctp.mx/index.html> / <http://www.ictp-saifr.org/> / [www.ictp.it](http://www.ictp.it)

Continuously updated research jobs and fellowships in Europe are published at the **EURAXESS** website:

<http://ec.europa.eu/euraxess/>

The French-Brazilian Innovation Working Group calls for proposals from cooperating SMEs in both countries. Deadline 30 October 2015. Info: <http://www.brasilfranca.mdic.gov.br/>

The 2<sup>nd</sup> ERANET-LAC call will be launched in December 2015: <http://www.eranet-lac.eu/>