

NANOQUÉBEC ACTION PLAN

**MAKE NANOTECHNOLOGIES
A SOURCE of INNOVATION and COMPETITIVENESS
IN 4 KEY SECTORS:**

**INDUSTRIAL
MATERIALS**

FORESTRY

HEALTH

**MICRO
SYSTEMS**



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NANO 2012**

STRUCTURE OF THE ACTION PLAN

**INDUSTRIAL
MATERIALS**

FORESTRY

HEALTH

**MICRO
SYSTEMS**

STATE-OF-THE-ART INFRASTRUCTURE

FINANCING OF RESEARCH AND INNOVATION

TRANSFER OF KNOWLEDGE AND TECHNOLOGIES

NATIONAL AND INTERNATIONAL OUTREACH



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STATE-OF-THE-ART INFRASTRUCTURE

CONTEXT COMMON TO ALL 4 SECTORS

- QNI: a single point of contact bringing together Quebec expertise financed by NQ
- \$300 M in cutting-edge equipment and 300 experts in key scientific and technological sectors (current QNI grouping)
- Current competencies within the QNI: micro-nanofabrication, characterisation, synthesis, modelling
- Other infrastructures available to the community and not financed by NQ.

IQN
INFRASTRUCTURE QUÉBÉCOISE EN
NANOTECHNOLOGIE



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Common actions:

- Supporting and guiding the QNI, organizing it according to priority sectors
- Completing the QNI's offering by financing new infrastructures in response to the needs of priority sectors
- Structure Quebec infrastructures as a whole for a "enlarged QNI".



FINANCING OF RESEARCH AND INNOVATION

CONTEXT COMMUN TO ALL 4 SECTORS

- High-level scientific and technological competencies
- Industry renowned for the development of new products and currently competitive worldwide
- Potential to increase the number of collaborations between the academic and industrial sectors
- Financing tools to be improved (ongoing financing, projects lead by industry, etc.)



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FINANCING OF RESEARCH AND INNOVATION

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- High-level scientific and technological competencies
- Industrialists renowned for the development of new products and currently competitive worldwide
- The potential to increase the number of collaborations between the academic and industrial sectors
- Financing tools to be improved (ongoing financing, projects drawn from the industry, etc.)

Common actions:

- Financing technological feasibility projects (maximum 6 months)
- Financing collaborative industry/university research projects (1 to 2 years)
- Financing international research projects with strategic NanoQuébec partners.



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TRANSFER OF KNOWLEDGE AND TECHNOLOGIES

CONTEXT COMMON TO ALL 4 SECTORS

- Still limited knowledge of the true potential of the industrial applications of nanotechnologies
(except in the microsystems sector)
- Major potential for innovating and improving competitiveness thanks to nanotechnologies
- Need to collect and disseminate information on health-safety and regulatory aspects.



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Common actions:

- Training economic stakeholders to stimulate the development of nanotechnologies
- Establishing groups of scientific, technological, and financial consultants to handle solicitations from industrialists
- Organizing interactive visits (agreement with the NRC-IRAP): visits by experts to evaluate the possibility of nano solutions.



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Common actions (cont'd):

- Gathering and disseminating information and the latest results of research in the field of health-safety and standards
- Gathering and disseminating technological and economic trends in each of Quebec's priority sectors (NQ team and relations with well-known firms)
- Encouraging societal studies conducted by independent firms (ex : Ne³LS, CEST).



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Common actions (cont'd and conclusion):

- Implementing a competency base (online CVs on the NQ website)
- Providing ongoing training (by sector) to industry personnel
- Fostering total immersion internships with the QNI for technologists in training or on the job market (1 wk.)
- Making the young aware of nanotechnologies and the development of science.



NATIONAL AND INTERNATIONAL OUTREACH

CONTEXT COMMON TO ALL 4 SECTORS

- World-class nanotechnology infrastructures and expertise in Quebec
- Potential for attracting new projects and investments to Quebec.

Common actions:

- Extending Quebec's outreach to attract new projects and investments and fostering the Quebec community's participation in major international projects
- Developing and disseminating promotional tools for nanos by industrial sector (case studies, sectoral fact sheets)
- Sensitizing, training and tracking QNI ambassadors (international visibility)
- Organizing sectoral days (sensitization and industrial and academic networking)
- Organizing an annual conference (+poster sessions)



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NANOQUEBEC PLAN OF ACTION

SECTORAL SPECIFICS

**INDUSTRIAL
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STATE-OF-THE-ART INFRASTRUCTURE

Specifics

Actions

INDUSTRIAL MATERIALS

- Different types of nanoparticles and integration technologies
- Different types of matrices and properties sought
- Health, safety and regulatory constraints

- Reinforcing the QNI to allow **open collaborations among producers, integrators and end-users** while complying with best practices in the areas of **health and safety**, and involving standard-setting bodies and regulatory organizations.

FORESTRY

- Troubled industry seeking new applications
- World-class pilot production units

- Supporting initiatives for the industrial production of nanomaterials based on wood products and **strengthening Quebec's leadership.**

HEALTH

- Major opportunities in the areas of drug delivery (nanovectors), diagnostic/personalized therapy (theranostics) and biosensor technologies

- Reinforcing the NQI to allow developments in these sectors while making researchers aware of product certification aspects in order to **facilitate the transfer of technologies.**

MICROSYSTEMS

- Current NQI offering meeting the sector's research needs
- Recent investments in industrialization (C²MI)
- Industrial leaders in production and marketing

- Implementing and promoting a complete value chain, from research to marketing:
QNI → C²MI → INDUSTRY



STATE-OF-THE-ART INFRASTRUCTURE

Specifics

Actions

INDUSTRIAL MATERIALS

AND

FORESTRY

- Extensive field of applications
- Large number of potential receivers (SMEs)
- Need for information on aspects relating to health, safety and standards.

- Financing **projects in conjunction with the industry** and seeking to develop new products and applications
- Financing research projects in the fields of **health and safety.**

HEALTH

- Growing interest of start-ups and pharmaceutical firms in nanovectors, theranostics and biosensors.
- Commercial models based on IP

- Financing **major targeted research projects** combining academic and industrial expertise. The duration of these projects could extend as long as 3 years.

MICROSYSTEMS

- Development potential from research through to marketing using existing infrastructures (ex: QNI, C²MI, Industries)

- Financing projects with **high commercial potential using existing infrastructures** (ex.: QNI and C²MI)



TRANSFER OF KNOWLEDGE AND TECHNOLOGIES

Specifics

Actions

INDUSTRIAL MATERIALS

AND

FORESTRY

- Large number of receivers
- Extensive range of applications
- Some sectors less attractive to students
- Importance of standards and regulations

- **Prioritizing sectors based on the Quebec fabric** (ex : plastics, composites, textiles, rubber, aluminum, etc.)
- Making the young aware of the potential of the forestry sector through **corporate internships**
- **Raising awareness among sectoral organizations** such as CRIAQ, ARBORANANO, CRPCQ, CRDA, labour committees, PARI, CCTT, MITACS, etc.
- Ensuring a **presence and influence** within standard-setting bodies and regulatory organizations

HEALTH

- Potential collaboration with the clinical sector
- Potential creation of SMEs (spin-offs)

- **Facilitating collaboration and exchanges** among key academic, industrial and clinical players
- **Raising awareness among sectoral organizations** such as CQDM, MEDEC, BIOQUÉBEC, PARI, CCTT, MITACS, etc.
- Ensuring a connection with development firms

MICROSYSTEMS

- Problem retaining HQP
- Potential for creating companies using existing infrastructures

- Making young researchers aware of the sector's potential by disseminating market trends
- Gathering testimonials of fables entrepreneurs to **generate entrepreneurial projects**
- Organizing workshops on financing in order to **support the creation of companies**



NATIONAL AND INTERNATIONAL OUTREACH

Specifics

Actions

INDUSTRIAL MATERIALS

AND

FORESTRY

- Need to build bridges between nanoparticle producers and end-users
- Need to consolidate leadership worldwide through the development of standards

- International forum for **completing the producer-integrator-end-user value chain**
- Participation on CSA, ISO and other committees
- **Fostering the creation of producer and integrator “spin-offs”** and attracting others from abroad

HEALTH

- World-class competencies in the areas of nanovectors, theranostics and biosensors

- International promotion of Quebec expertise to **attract new projects and investments**
- Fostering the creation of “spin-offs” and the transfer of technology

MICROSYSTEMS

- A single value chain from research to marketing (NQI, C²MI, industrialists)
- Potential to attract companies thanks to state-of-the-art infrastructures

- International promotion of Quebec’s single value chain
- International forum to attract new projects and investments
- Fostering the **creation of “fabless spin-offs”** or attracting others on the international scene

