OPORTUNIDADES DE COOPERACIÓN I+D
Nanotecnología y Biotecnología

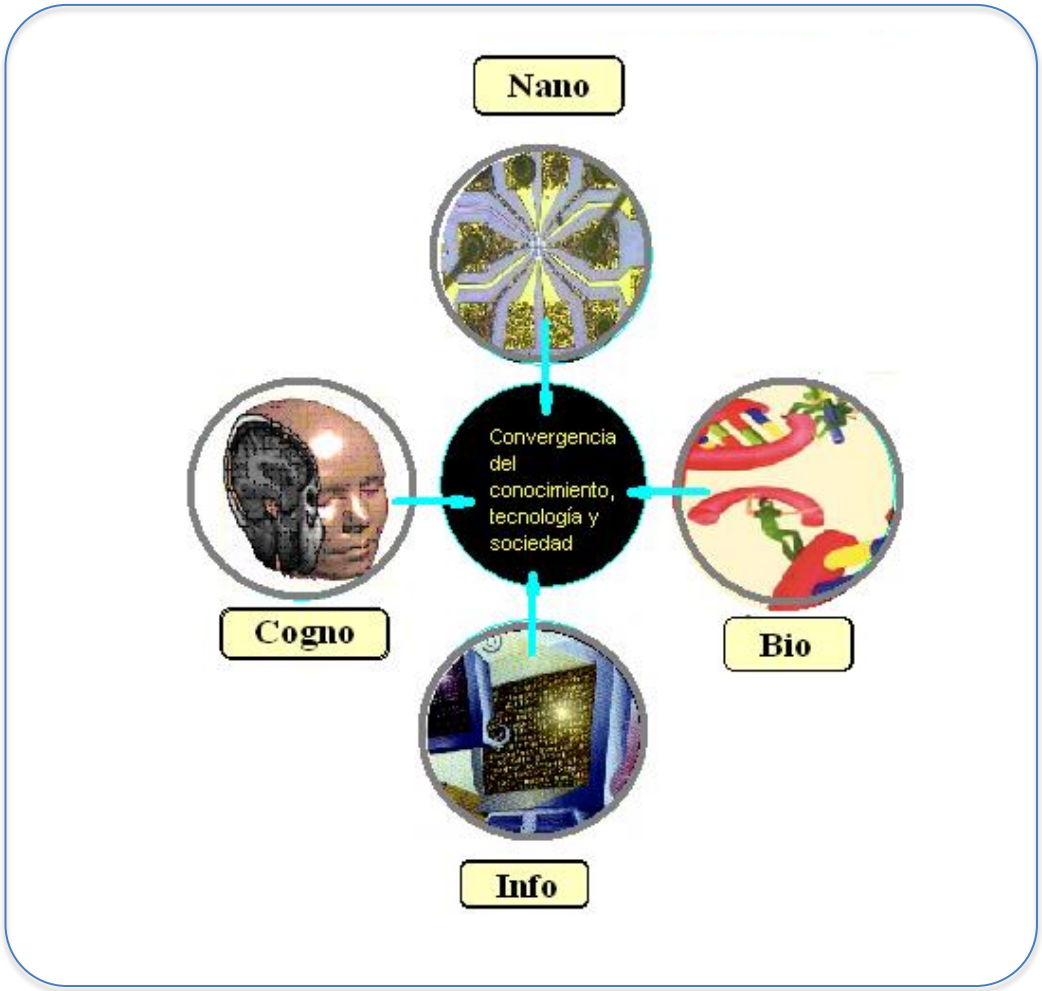
Edgar E González
Pontificia Universidad Javeriana
Academia Colombiana de Ciencias Exactas Físicas y Naturales
Asociación Colombiana para el Avance de la Ciencia
Cbionano-FOCALAE

Enrique Vera
Director de Investigaciones
Universidad Pedagógica y Tecnológica de Colombia
Instituto de Investigación de Materiales
Academia Colombiana de Ciencias Exactas Físicas y Naturales

CONTEXTO

**Problemas
que afronta la sociedad
siglo XXI**

CONTEXTO


Nano
Cogno
Convergencia del conocimiento, tecnología y sociedad
Bio
Info

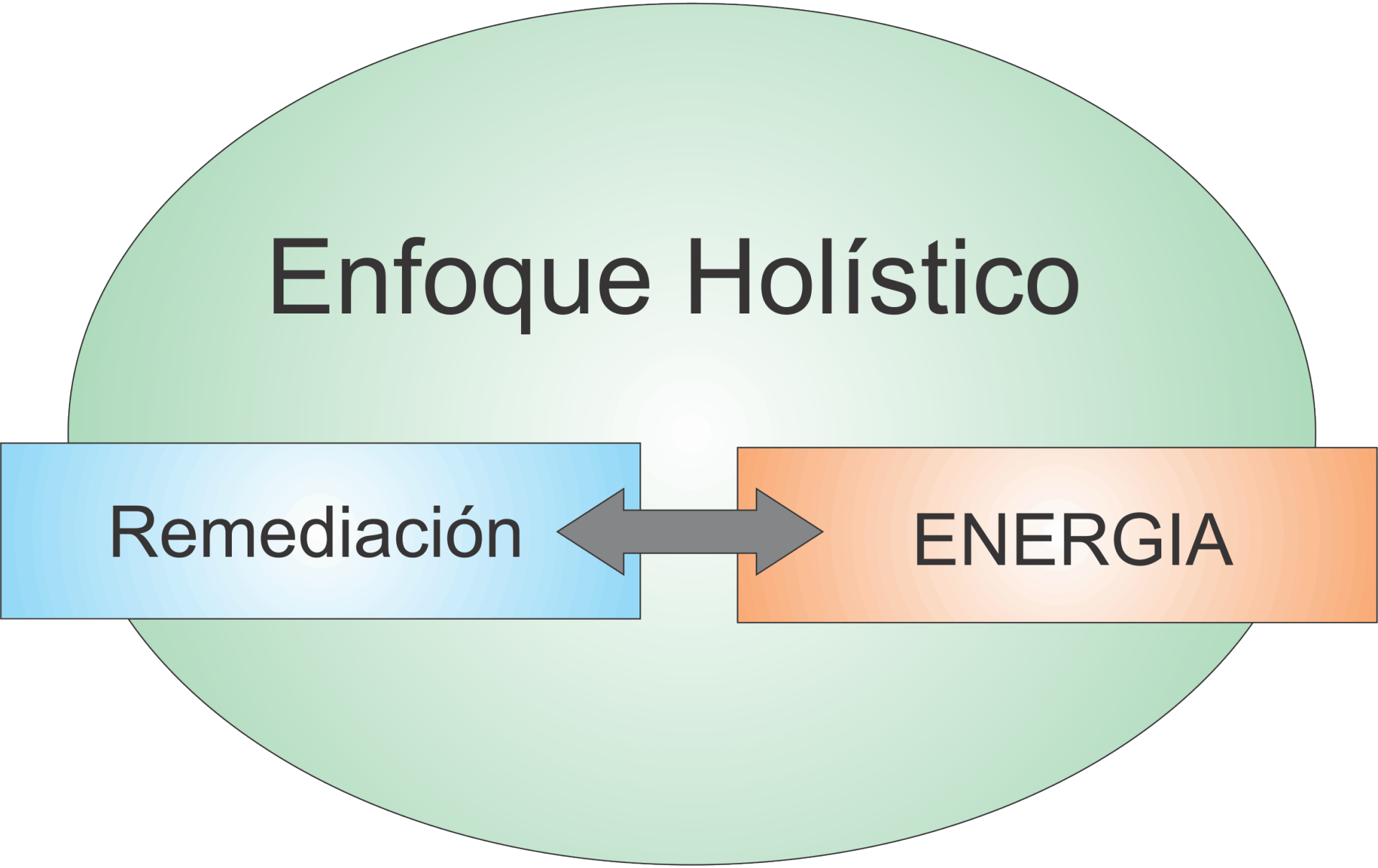
CONTEXTO

CONTEXTO

CONTEXTO

I+D
Nano
Problemas
que afronta la sociedad
siglo XXI
Bio
COOPERACIÓN

CONTEXTO


Enfoque Holístico
Remediación
ENERGIA

CONTEXTO

ENERGÍA

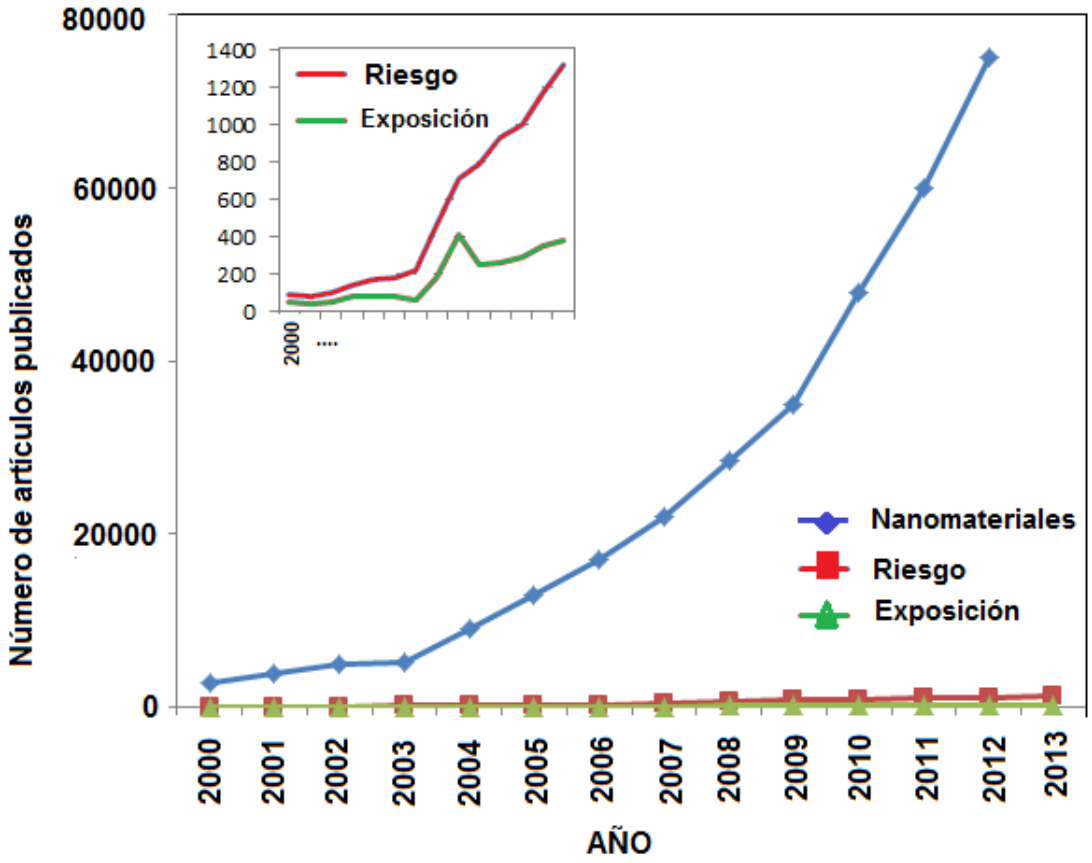
Medio contaminado

Catalizador

Bio/Nanomaterial

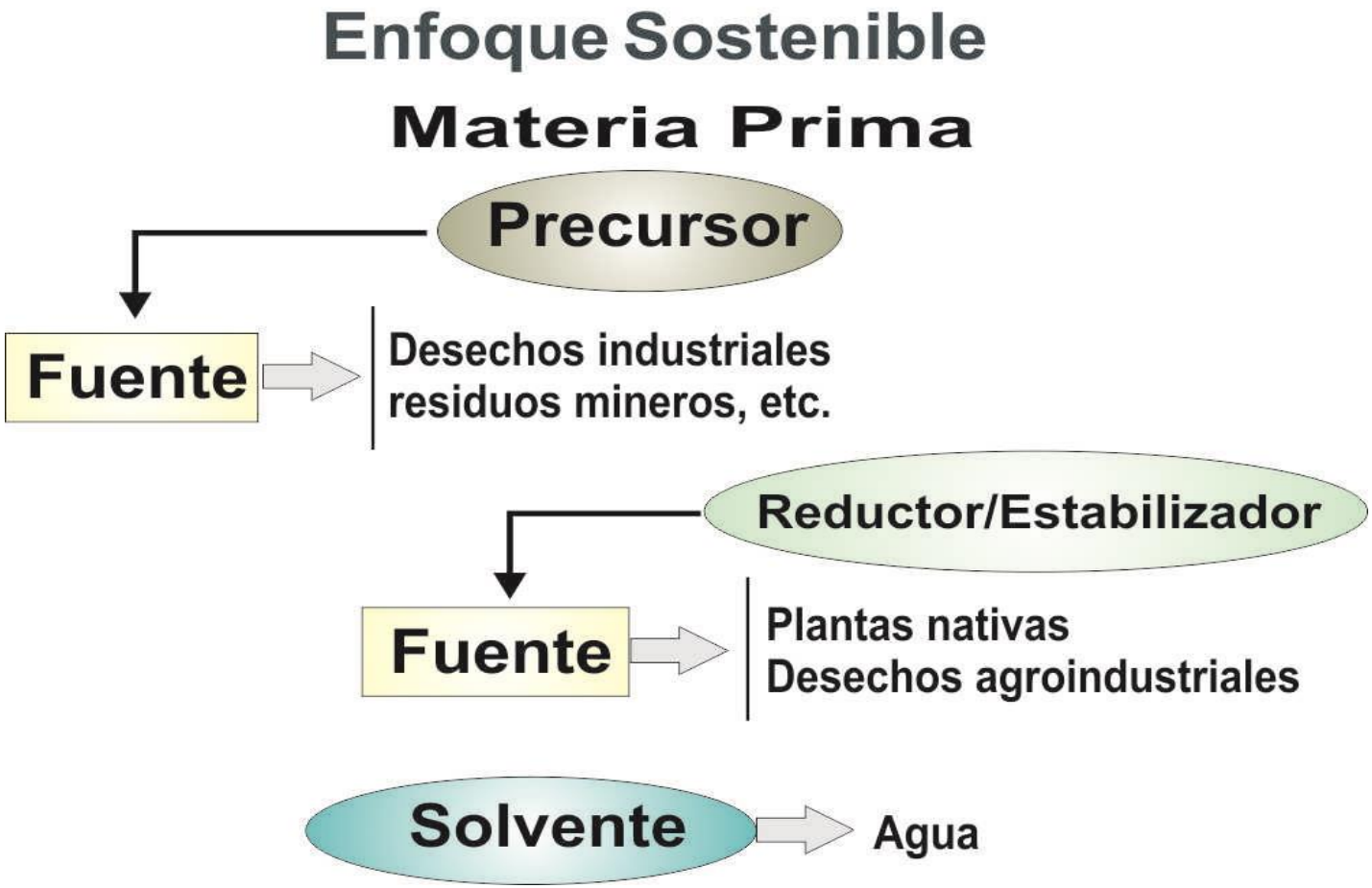
Medio descontaminado

CONTEXTO



Líneas de tendencia en el número de publicaciones sobre nanomateriales, riesgos y exposición. Para consolidar el número de publicaciones se consultaron las bases de Scopus.

Manufactura de nano/biomateriales



"…se priorizarán las áreas biotecnología, la nanotecnología y las tecnologías de información y las comunicaciones (TIC) como tecnologías convergentes, que por sus características pueden proveer soluciones y estimular el avance en diversos campos”.

CONPES Política Nacional de Ciencia, Tecnología e innovación 2016-2015
Versión para discusión1- 22/06/2016

Transferencia de conocimiento y Tecnología

El problema específico son las insuficientes condiciones para la cooperación entre el sector productivo, tanto público como privado…

Los vínculos entre las instituciones generadoras de Conocimiento y el sector productivo son débiles…

3% de las empresas tienen alguna relación de apoyo para adelantar ACTI con universidades. (EDIT) VII.

Estrategia de internalización de la investigación a partir 2017:

Acuerdos de cooperación científica con países e instituciones líderes en las áreas y tecnologías focalizadas, diseñados a partir de objetivos comunes de investigación…

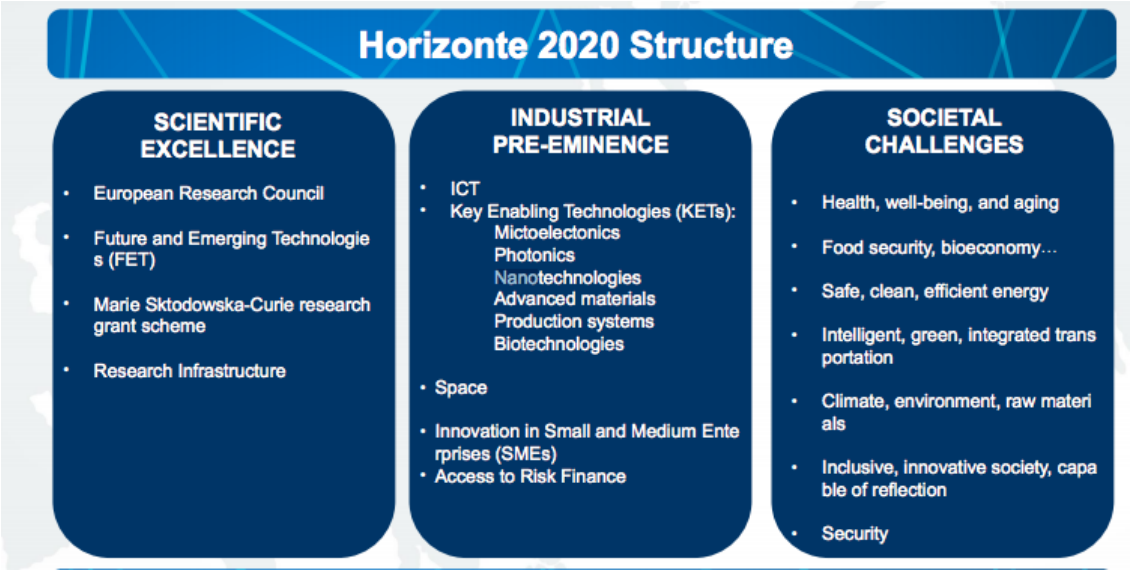
Financiación de proyectos conjuntos de investigación con instituciones académicas líderes a nivel mundial y regional en las áreas y tecnologías focalizadas.

Programa de pasantias posdoctorales bajo estándares internacionales que permita atraer investigadores de alto nivel para su trabajo en centros y grupos de investigación de alta calidad en el país.

Diseño y ejecución de un plan para identificar y canalizar recursos internacionales para la realización de I+D en Colombia, particularmente de empresas multinacionales organismos multilaterales y centros de pensamiento e investigación.

PROGRAMA
HORIZONTE2020
El programa de la UE para la Investigación e Innovación

Programa de financiación para investigación e innovación de 80 mil millones de Euros (2014-2020).



COLCIENCIAS es el punto nacional de contacto (NCP) coordinador en Colombia para H2020

PROGRAMA IBEROAMERICANO
CYTED
CIENCIA Y TECNOLOGIA PARA EL DESARROLLO

Promover cooperación en temas de ciencia, tecnología e innovación para el desarrollo armónico de Iberoamérica.
La red BIOFAB fue pionera de trabajo cooperativo en el campo de los Biomateriales.
En energía, la red Nanoenergía canalizó importantes tareas de cooperación.

Opportunities for Joint Cooperation in R&D for FEALAC Countries
On Nanotechnology and Biotechnology
Ivan Montenegro, Mónica Botero & Edgar González

Medición de las oportunidades de cooperación en investigación y desarrollo entre instituciones de los países de Asia y América Latina en el marco del Foro de Cooperación FOCALAE.
Submitted: Sci. Tech. Innov. Pol. Rev. STI

International Workshop

Bio-Nano Convergence Network, phase 2 (CBN-W1)

ENVIRONMENT AND ENERGY

Challenges and Opportunities from Bio and Nanotechnology

BOGOTÁ - COLOMBIA

9 – 10, March 2016

Millones de asiáticos beben agua con arsénico

Un vietnamita muestra la piel de las manos, dañada por el arsénico.|PNAS

FOTO MANUEL SALDARRIAGA

PLOMO en los alimentos.

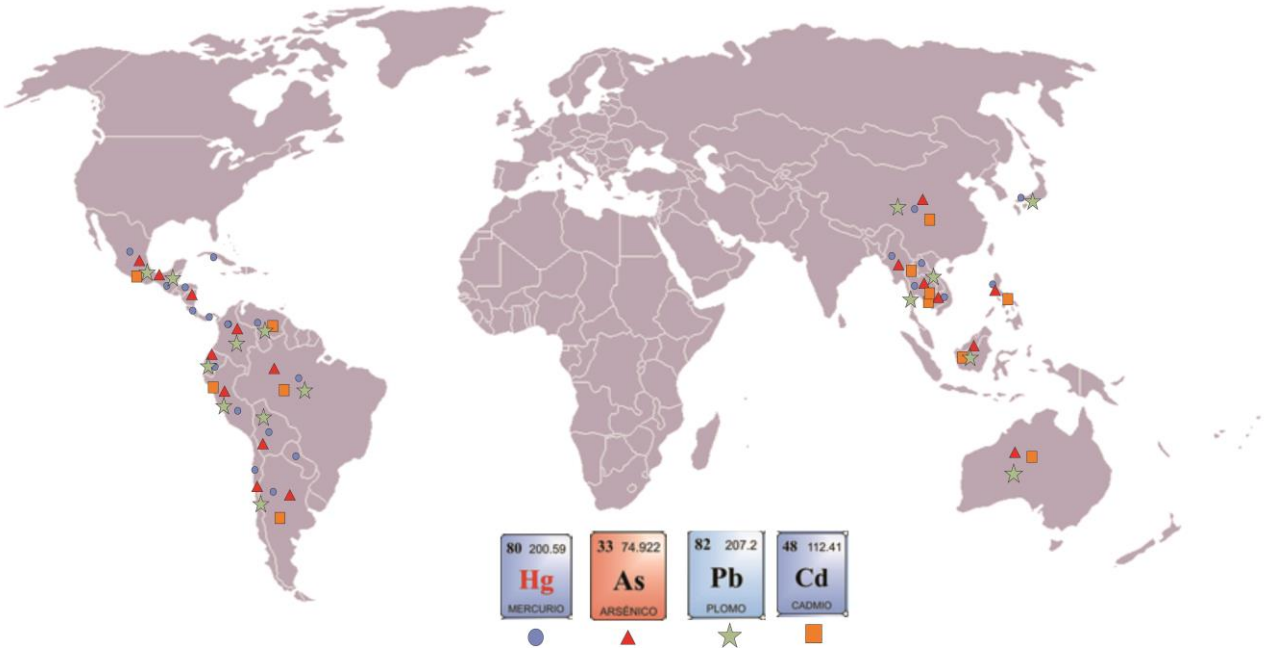
Cereales, verduras y agua del grifo son las principales fuentes alimentarias de exposición al plomo

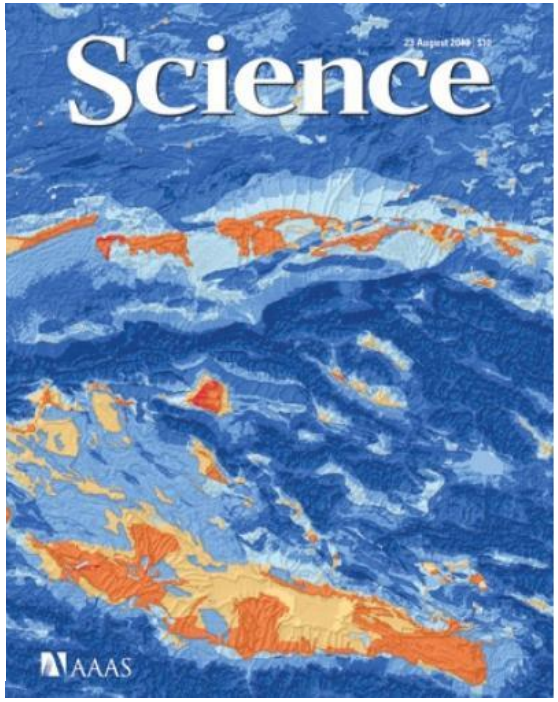
La cantidad de plomo presente en los alimentos es mínima, pero no nula. Las principales fuentes de exposición a este metal son los cereales, las verduras y el agua del grifo, ya que es resistente a la acción de este elemento. Su acumulación en el organismo durante años y sus efectos nocivos para la salud, como la esterilidad, alteraciones en el riñón o gástricas, son los principales problemas que derivan de su consumo.

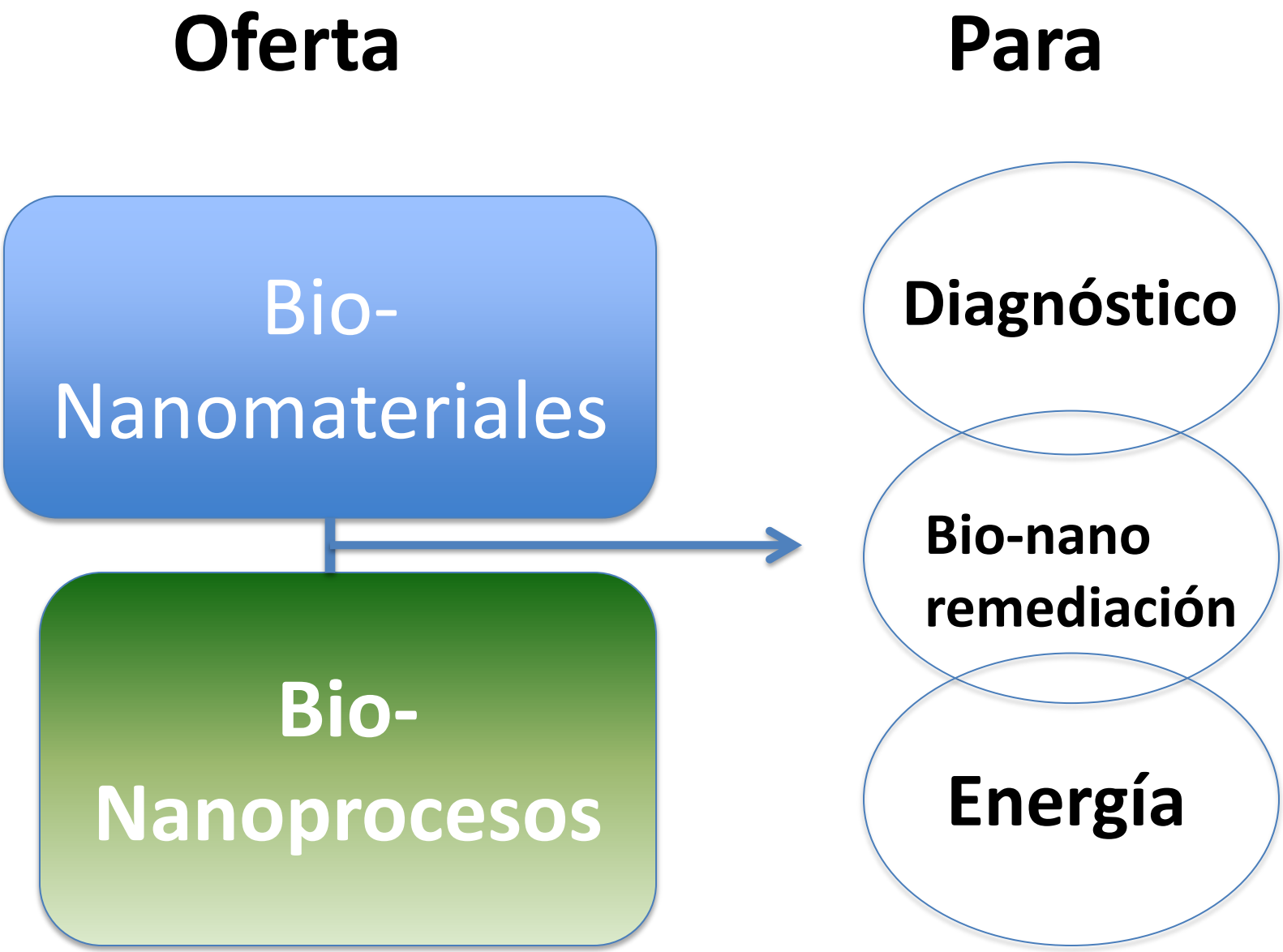
Fuente: consumer (3 de mayo de 2010)

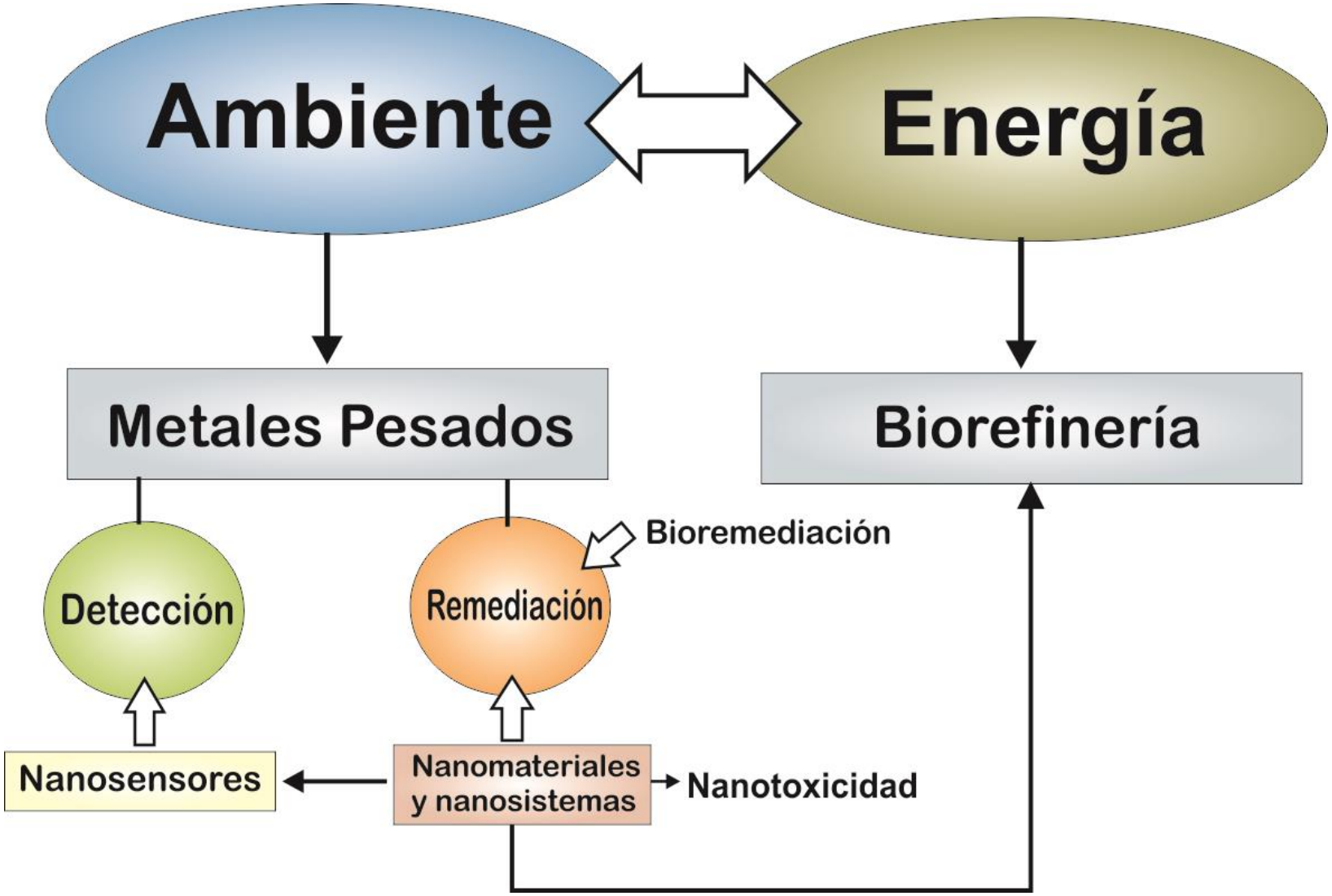
Por NATÀLIA GIMFERRER MORATÓ

Contaminación por metales pesados en países de FOCALAE
Un problema común



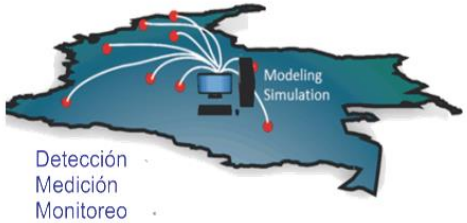



Oferta
Para
Bio-
Nanomateriales
Bio-
Nanoprocesos
Diagnóstico
Bio-nano
remediación
Energía

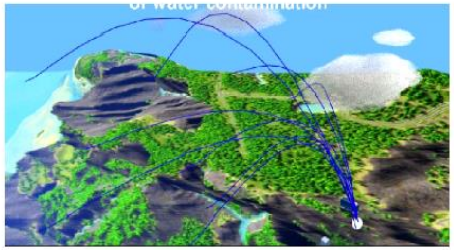

Ambiente
Energía
Metales Pesados
Biorefinería
Bioremediación
Detección
Remediación
Nanosensores
Nanomateriales y nanosistemas
Nanotoxicidad

DIAGNÓSTICO

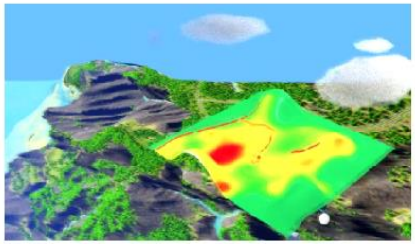
Red Interconectada de Sensores



Sensores



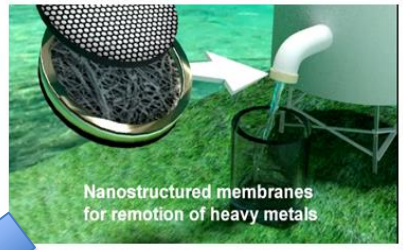
Redes de Nanosesores

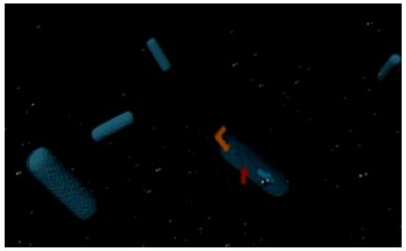


Modelos Simulación

Estandarización

NANOREMEDIACIÓN
BIOREMEDIACIÓN





Microorganismos/bio-arcillas

Ciclo de vida
Ecotoxicidad

Pre-tratamiento
Retención de contaminantes
Inactivación de microorganismos
Manejo y disposición adecuada de residuos

Investigaión y
Desarrollo

Salud

Educación
Trabajo Comunitario

FOCALAE

BIO-NANO Network

Bio-Nano Convergence Network

www.cbionano.org

NADP News
- NADP Newsletter
- Hg Monitoring in Asia
- Litterfall Hg Initiative
- Fukushima Fallout
- MercNet

Mercury Wet Deposition Monitoring in Asia

NADP continues to work with many agencies in the Asia-Pacific region to develop a network of mercury wet deposition and atmospheric mercury collectors, to develop standardized measurements, support monitoring, and encourage data sharing. The Asia-Pacific Mercury Monitoring Network should begin limited pilot monitoring in Thailand, Vietnam, and Indonesia during the next several months. This work also supported by groups in the Taiwan, Korea, Japan, and the U.S. and Canada.

A meeting of the Science Advisory Group will occur in Hanoi, Vietnam during September 2014. This meeting will focus on finalization of the Standard Operating Protocols, training of new monitoring groups, along with introducing more countries to the AMNet effort.

NADP is providing advice on monitoring methods and network operations.All interested parties are welcome to join in the effort to formulate a mercury network in Asia

Asia Pacific Mercury Monitoring Network Initial Wet Deposition Sites (click to enlarge).

Invited Groups and Agencies from

Canada
China
India
Indonesia
Japan
Korea
Malaysia
Philippines
Singapore
Taiwan
Thailand
United States
Vietnam

CHALLENGES

We've brought together expert opinion, facts, videos and interviews on environmental, social and economic challenges of the 21st Century, all underpinned by the latest geographical research.

Low carbon energy

Climate change

Sustainability

Geoengineering

Overfishing

Plastic pollution in the oceans

Deforestation

Britain's biodiversity

Economic growth

Manufacturing

Education

Gender equality in education

Africa in the 21st Century

Globalisation and geopolitics

Air pollution

Global health

Global Futures Intelligence System (GFIS)

On-Going Programs

- What's New?
- State of the Future Index (Global and National SOFI)
- Real-Time Delphi (RTD)
- Global Lookout
- Listserv
- Internships
- Contact Us

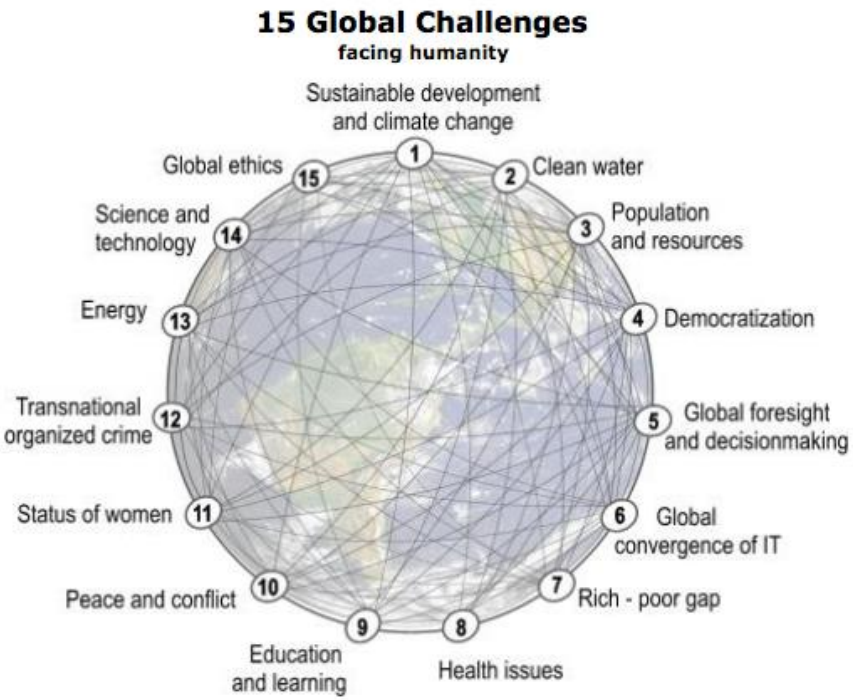
Special Studies

- Global Scenarios
- Some Elements of the Next Global Economic System
- Future Possibilities for Education and Learning 2030
- Future Global Ethical Issues
- Environmental Security
- Other Studies
- Presentations

Global Challenges for Humanity

The 15 Global Challenges updated annually continue to be ***the*** *best introduction by far to the key issues of the early 21st century.*

-- Michael Marien, editor, *Future Survey*



The 15 Global Challenges provide a framework to assess the global and local prospects for humanity. Their description, with a range of views and actions to addressed each, enriched with regional views and progress assessments are updated each year, since 1996. A short overview is published in the annual *State of the Future*,while continuous updates and details are available on the Global Futures Intelligence System website: https://themp.org. The 15 Global Challenges are a result of continuous research, Delphi studies, interviews, and participantion of over 4,000 experts from around the world, since 1996 -- see a short history.

The Global Challenges are transnational in nature and transinstitutional in solution. They cannot be addressed by any government or institution acting alone. They require collaborative action among governments, international organizations, corporations, universities, NGOs, and creative individuals. Although listed in sequence, Challenge 1 on sustainable development and climate change is no more or less important than Challenge 15 on global ethics. There is greater consensus about the global situation as expressed in these Challenges and the actions to address them than is evident in the news media.

NAE GRAND CHALLENGES FOR ENGINEERING

NATIONAL ACADEMY OF ENGINEERING

14 Grand Challenges for Engineering in the 21st Century

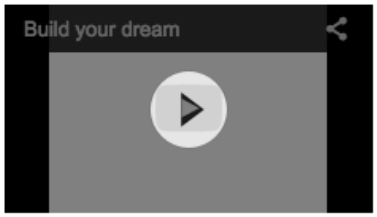
With input from people around the world an international group of leading technological thinkers were asked to identify the Grand Challenges for Engineering in the 21st Century.

From urban centers to remote corners of Earth, the depths of the oceans to space, humanity has always sought to transcend barriers, overcome challenges, and create opportunities that improve life in our part of the universe.

In the last century alone, many **GREAT ENGINEERING ACHIEVEMENTS** became so commonplace that we now take them mostly for granted. Technology allows an abundant supply of food and safe drinking water for much of the world. We rely on electricity for many of our daily activities. We can travel the globe with relative ease, and bring goods and services wherever they are needed. Growing computer and communications technologies are opening up vast stores of knowledge and entertainment. As remarkable as these engineering achievements are, certainly just as many more great challenges and opportunities remain to be realized. While some seem clear, many others are indistinct and many more surely lie beyond most of our imaginations.

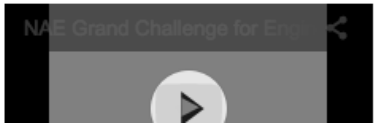
Today, we begin engineering a path to the future. For full Introduction **CLICK HERE**.

Engineers Can Make A World of Difference



BUILD YOUR DREAM

Build your dream



Office of Science and Technology Policy

21st Century Grand Challenges

Grand Challenges are ambitious but achievable goals that harness science, technology, and innovation to solve important national or global problems and that have the potential to capture the public's imagination.

Grand Challenges are an element of the President's *Strategy for American Innovation* because they help catalyze breakthroughs that advance national priorities. On April 2, 2013, President Obama called on companies, research universities, foundations, and philanthropists to join him in identifying and pursuing the Grand Challenges of the 21st century.

Grand Challenges Can:

- Help create the industries and jobs of the future;
- Expand the frontiers of human knowledge about ourselves and the world around us;
- Help tackle important problems related to energy, health, education, the environment, national security, and global development; and
- Serve as a "North Star" for collaboration between the public and private sectors.

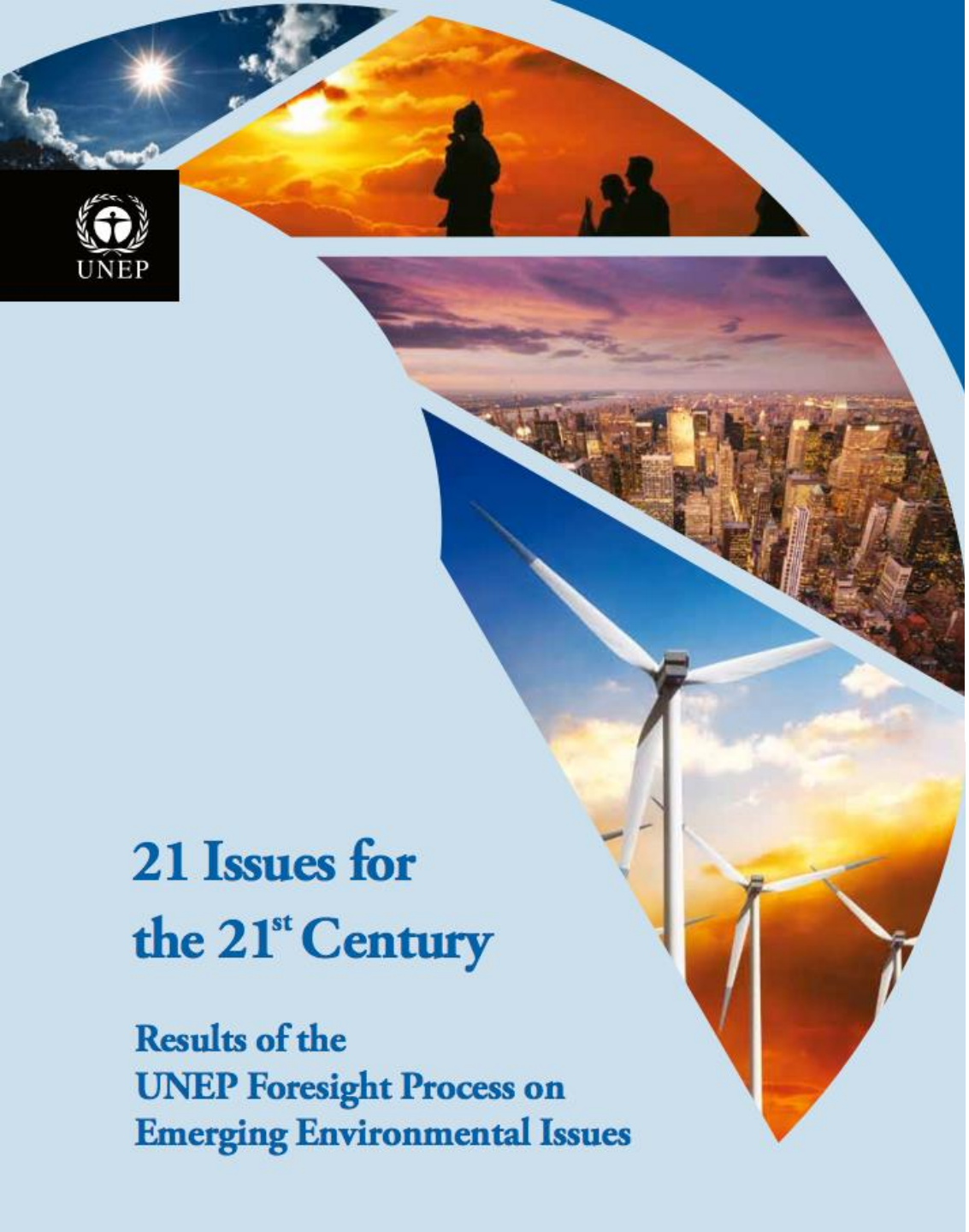


Table 1: The 21 Emerging issues

Issue ID	Issue Title	Ranking*
	Cross-cutting issues	
001	Aligning Governance to the Challenges of Global Sustainability	1
002	Transforming Human Capabilities for the 21st Century: Meeting Global Environmental Challenges and Moving Towards a Green Economy	2
003	Broken Bridges: Reconnecting Science and Policy	4
004	Social Tipping Points? Catalyzing Rapid and Transformative Changes in Human Behaviour towards the Environment	5
005	New Concepts for Coping with Creeping Changes and Imminent Thresholds	18
006	Coping with Migration Caused by New Aspects of Environmental Change	20
	Food, biodiversity and land issues	
007	New Challenges for Ensuring Food Safety and Food Security for 9 Billion People	3
008	Beyond Conservation: Integrating Biodiversity Across the Environmental and Economic Agendas	7
009	Boosting Urban Sustainability and Resilience	11
010	The New Rush for Land: Responding to New National and International Pressures	12
	Freshwater and marine issues	
011	New Insights on Water-Land Interactions: Shift in the Management Paradigm?	6
012	Shortcutting the Degradation of Inland Waters in Developing Countries	15
013	Potential Collapse of Oceanic Systems Requires Integrated Ocean Governance	13
014	Coastal Ecosystems: Addressing Increasing Pressures with Adaptive Governance	19
	Climate change issues	
015	New Challenges for Climate Change Mitigation and Adaptation: Managing the Unintended Consequences	7
016	Acting on the Signal of Climate Change in the Changing Frequency of Extreme Events	16
017	Managing the Impacts of Glacier Retreat	21
	Energy, technology, and waste issues	
018	Accelerating the Implementation of Environmentally-Friendly Renewable Energy Systems	7
019	Greater Risk than Necessary? The Need for a New Approach for Minimizing Risks of Novel Technologies and Chemicals	10
020	Changing the Face of Waste: Solving the Impending Scarcity of Strategic Minerals and Avoiding Electronic Waste	14
021	The Environmental Consequences of Decommissioning Nuclear Reactors	17

* Ranking based on scoring by the UNEP Foresight Panel and after considering the polling results of more than 400 scientists worldwide.

OBJETIVOS DE DESARROLLO SOSTENIBLE

1 FIN DE LA POBREZA

2 HAMBRE CERO

3 SALUD Y BIENESTAR

4 EDUCACIÓN DE CALIDAD

5 IGUALDAD DE GÉNERO

6 AGUA LIMPIA Y SANEAMIENTO

7 ENERGÍA ASEQUIBLE Y NO CONTAMINANTE

8 TRABAJO DECENTE Y CRECIMIENTO ECONÓMICO

9 INDUSTRIA, INNOVACIÓN E INFRAESTRUCTURA

10 REDUCCIÓN DE LAS DESIGUALDADES

11 CIUDADES Y COMUNIDADES SOSTENIBLES

12 PRODUCCIÓN Y CONSUMO RESPONSABLES

13 ACCIÓN POR EL CLIMA

14 VIDA SUBMARINA

15 VIDA DE ECOSISTEMAS TERRESTRES

16 PAZ, JUSTICIA E INSTITUCIONES SÓLIDAS

17 ALIANZAS PARA LOGRAR LOS OBJETIVOS

OBJETIVOS DE DESARROLLO SOSTENIBLE