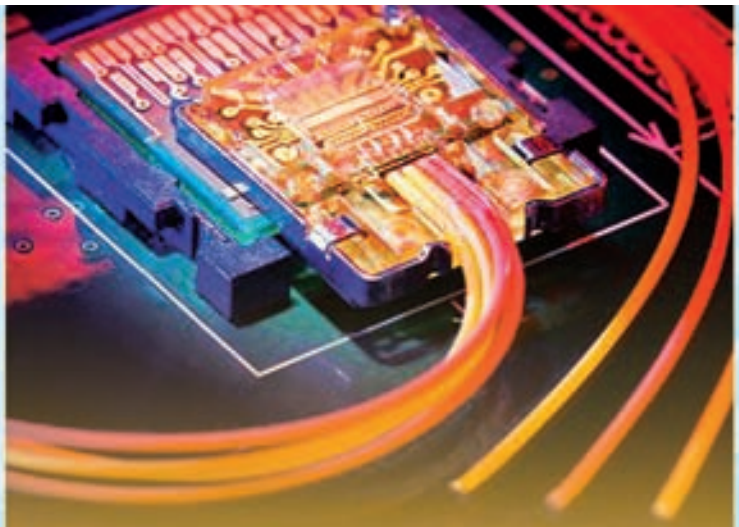


Department of Science and Technology

PCIEERD

Philippine Council for Industry, Energy and Emerging Technology Research and Development

# ANNUAL REPORT 2011

# PROFILE

The Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) is one of three sectoral planning councils of the Department of Science and Technology (DOST).

It is mandated to serve as the central agency in the formulation of policies, plans and programs as well as in the implementation of strategies in the industry, energy and emerging technology sectors through the following S&T programs:

- Support for Research and Development
- Human Resource and Institution Development
- S&T Information Dissemination and Promotion
- Support for Technology Transfer and Commercialization
- Policy Development and Advocacy

# VISION

A recognized leader in fostering new and emerging technologies and innovations in building science and technology collaborations for vibrant industry and energy sectors.

# PRIORITY AREAS

## INDUSTRY

- Electronic and Semiconductor Industries
- Mining and Minerals
- Metals and Engineering
- Food Processing

## ENERGY

- Alternative Sources of Energy
- Energy Efficiency
- Transportation

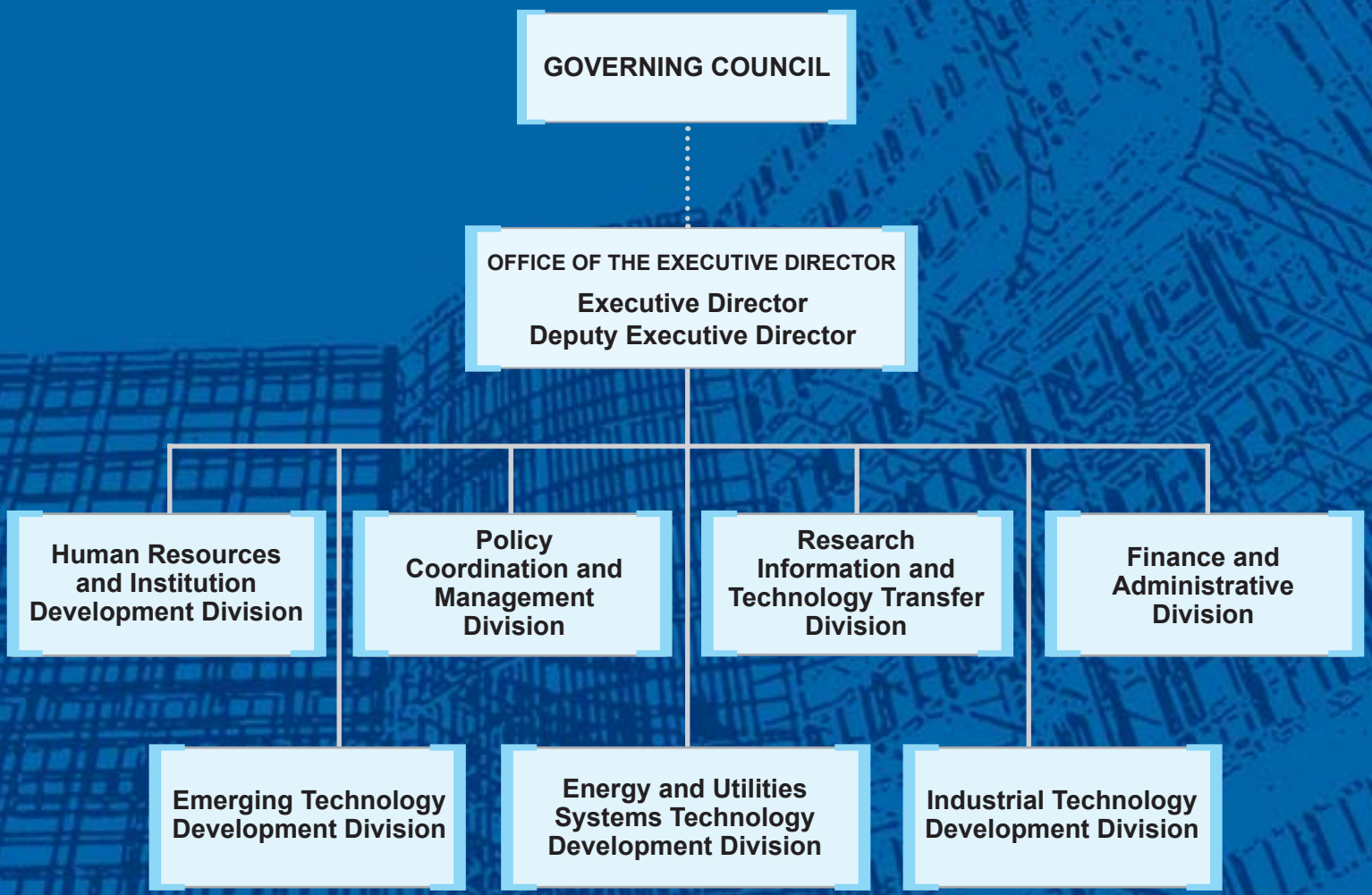
## EMERGING TECHNOLOGIES

- Nanotechnology/Materials Science
- Genomics
- Biotechnology
- Information and Communications Technology/ Space Technology Applications

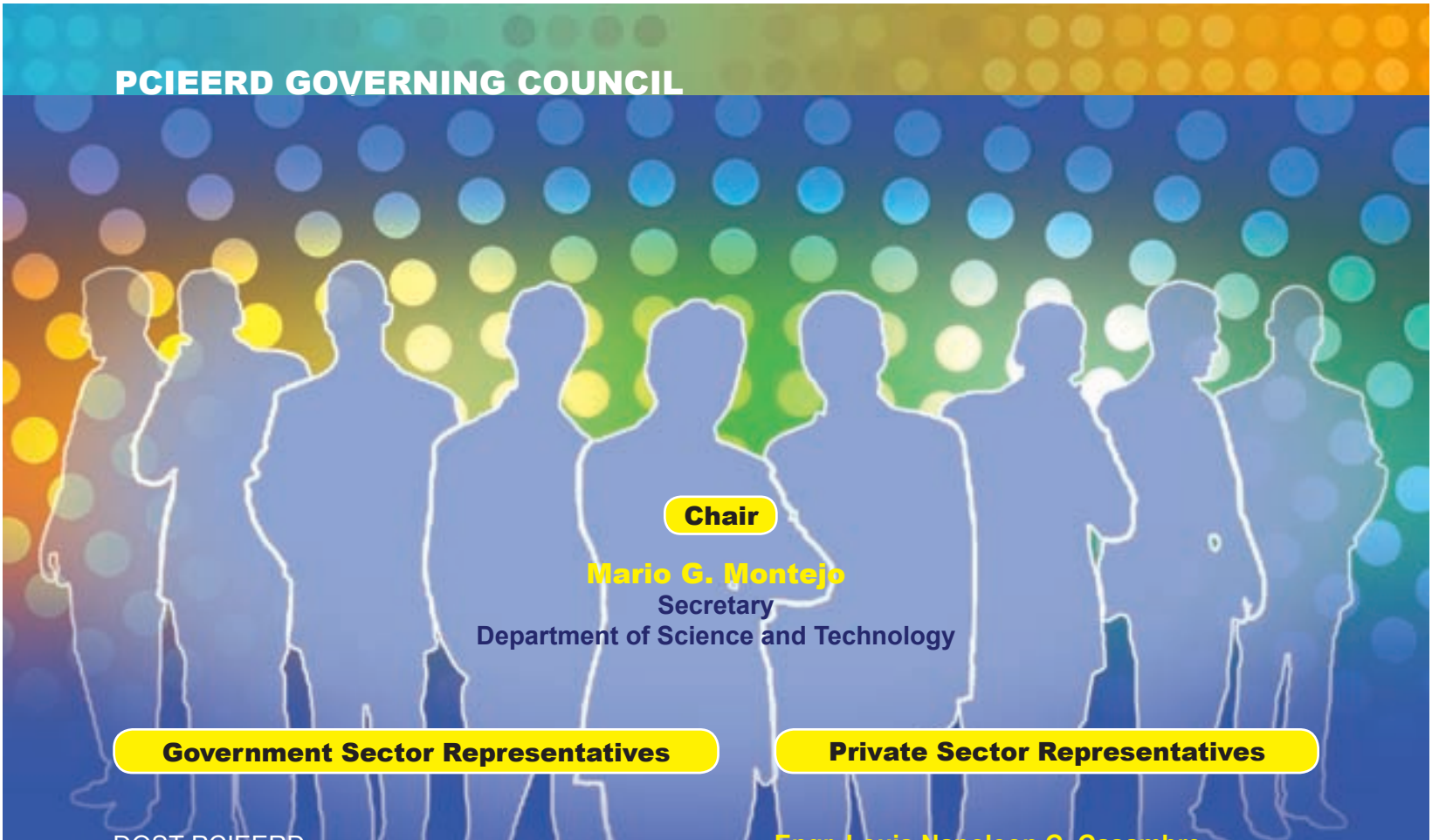
## SPECIAL CONCERNS

- Climate Change Adaptation
- Disaster Risk Management and Mitigation
- Environmental Issues

# ORGANIZATIONAL CHART



# PCIEERD GOVERNING COUNCIL



## Chair

**Mario G. Montejo**
Secretary
Department of Science and Technology

## Government Sector Representatives

DOST-PCIEERD
**Dr. Amelia P. Guevara,** Executive Director

Department of Energy
**Sec. Jose Rene D. Almendras**, Secretary
***Dir. Jesus T. Tamang***, *Alternate*

Commission on Higher Education
**Dr. William C. Medrano**, Commissioner
***Dr. Jean C. Tayag***, *Alternate*

Department of Trade and Industry
**USec. Cristino L. Panlilio**, Undersecretary
***Dir. Ma. Corazon H. Dichosa***, *Alternate*

Department of Public Works and Highways
**Sec. Rogelio L. Singson**, Secretary
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Department of Budget and Management
**USec. Mario L. Relampagos,** Undersecretary
***Dir. Estrellita G. Bangsal***, *Alternate*

## Private Sector Representatives

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Director/Division Manager (retired)
ROHM LSI Design Philippines Inc.

**Dr. Alma Bella P. Madrazo**
Country Manager
AECOM Technology Corporation

**Dr. Marita V.T. Reyes**
Clinical Professor
UP Manila College of Medicine

**Dr. Antonio B. Villaflor**
Manager
STMicroelectronics, Inc. Philippines

**Engr. Aniceto Abner S. Villahermosa**
Assistant Vice President (retired)
San Miguel Corporation

# PCIEERD EXECUTIVE COMMITTEE

**Dr. Amelia P. Guevara**
*Executive Director*
PCIEERD
(01 April 2011-present)

**Dr. Carol M. Yorobe**
*DOST Undersecretary for Regional Operations and Officer-In-Charge,* PCIEERD
(08 August 2010 – 31 March 2011)

**Engr. Raul C. Sabularse**
*Deputy Executive Director and Officer-In-Charge,*
Policy Coordination and Management Division

**Engr. Nelson P. Beniabon**
*Chief*, Emerging Technology Development Division

**Engr. Darwin M. Rosales**
*Chief*, Energy and Utilities Systems Technology Development Division

**Engr. Ermie M. Bacarra**
*Chief*, Human Resources and Institution Development Division

**Engr. Niñaliza H. Escorial**
*Chief*, Industrial Technology Development Division

**Dr. Virginia G. Novenario-Enriquez**
*Chief*, Research Information and Technology Transfer Division

**Ms. Maridon O. Sahagun**
*Officer-In-Charge*, Finance and Administrative Division

# MESSAGE FROM THE DOST SECRETARY

The country's development needs are strewn with domestic and global economic challenges. These include creating opportunities and enhancing productivity in key domestic industries along with SMEs that show potential for competitive development and growth in products or services that they currently offer. In many cases, there are systemic and technical gaps that need critical intervention to drive productivity upwards.

The Philippine Council for Industry, Energy and Emerging Technology Research and Development has an expanded and important enabling role in such development environment. In this light, it assumes a position that requires meticulous appraisal of evolving developments across a wide spectrum of socio-economic dynamics that are shaped or dependent on technology or knowledge stimuli. PCIEERD lugs a truly elaborate, sizeable, and consequential responsibility in this regard.

That's why 2011 was a tough year for the management and staff of PCIEERD. They've hauled themselves through organizational transformation while taking on new and expanded development mission. But these are all part of a process that's concededly de rigueur to align its vision and mandates to the Five-point DOST Priority Areas and the larger national development agenda under the Aquino administration.

Within the pages of this report are the activities over the preceding year that essentially defined PCIEERD today.

I believe that it can take more confident steps in its expanded development mission, including its programs and services, in the years ahead.

Mabuhay!

**MARIO G. MONTEJO**
Secretary
Department of Science and Technology

# MESSAGE FROM THE PCIEERD EXECUTIVE DIRECTOR

The past year was a challenging yet fulfilling year for the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD). With the dust still settling after the fusion of two distinct and dynamic Councils, PCIEERD faced several challenges on harmonizing policies and practices for operation as a newly consolidated agency under the Department of Science and Technology (DOST).

Despite these challenges, the management team and staff worked steadfastly in pursuing the Council's mandate of promoting knowledge creation, technology generation and information dissemination, and of pushing for the transfer and commercialization of R&D outputs and technologies.

The year 2011 also saw the Council maximizing its resources in steering government-funded research to provide cost-effective solutions and services. It continued to initiate and support programs and activities intended to bring positive impact to the country and the Filipino people. These programs and activities address some of the nation's pressing concerns such climate change, food and water safety, growing need for alternative sources of energy, and increasing demand for our industries to be more globally competitive.

Recognizing the value of human resource capital, PCIEERD continued to implement its Human Resource Development Program and the Accelerated Science and Technology Human Resource Development Program of the DOST. These programs enable local researchers and scientists to expand their knowledge base by providing grants for scholarships, fellowships, and overseas research and post-doctoral research activities.

The management and staff of PCIEERD would like to express our utmost thanks and appreciation to our partners and stakeholders for their robust support and cooperation. I would also like to commend the staff of PCIEERD for their unceasing commitment and dedication to the Council's mission.

**AMELIA P. GUEVARA**
**Executive Director**

# FOREWORD

This 2011 Annual Report documents the work of the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) the past year. It provides a snapshot of the Council's accomplishments and endeavors as it supports the Department of Science and Technology (DOST) in its vision of propelling national growth and development through science, technology and innovation.

This publication reports on the significant programs and activities the Council initiated and conducted in 2011. It highlights the vision of PCIEERD as well as identifies the research and academic institutions the Council has partnered with to effectively carry out and implement its programs and activities.

Specifically, this Annual Report provides a list of all projects and activities that PCIEERD supported and monitored the past year on human resource and institution development, research and development, technology commercialization and information dissemination.

In summary, this 2011 Annual Report encapsulates notable accomplishments and continuing initiatives of PCIEERD as the Council fulfills its vision of becoming a recognized leader in fostering new and emerging technologies and innovations in building science and technology collaborations for vibrant industry, energy and emerging technology sectors. This publication underscores the commitment of PCIEERD in nation-building through science, technology and innovation.

**RAUL C. SABULARSE**
Deputy Executive Director

# Table of Contents

# HIGHLIGHTS OF ACCOMPLISHMENTS

The Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) marked two major milestones in the year 2011. As one of the newest organizations under the Department of Science and Technology (DOST), the Council welcomed its new Executive Director and celebrated its 1st Anniversary the past year.

The Council, under the guidance of its new Executive Director Dr. Amelia P. Guevara, continued to align its research programs to the five (5) priority areas of the DOST – developing solutions to pressing national problems, shepherding the generation of technologies to create growth in the countryside, harnessing technology to improve industry competitiveness, using science and technology to enhance delivery of government services, and spurring emerging technologies to boost national competitiveness.

In 2011, PCIEERD continued to fully utilize its human and financial resources to advance research and development (R&D) in its priority areas, build-up human and institutional capability in science and technology (S&T), disseminate relevant and up-to-date S&T information, and promote technology commercialization.

For the year, the Council's total manpower was 96. This includes 65 regular employees and 31 project/contractual personnel. Likewise, PCIEERD's financial resources amounted to P625.098 million, which include approved appropriations per the 2011 General Appropriations Act (P141.5 million), funds transferred from the DOST (P24.39 million), Continuing Appropriation (P1.87 million), and funds from the Special Purpose Fund (P457.338 million).

## *Welcoming the New Executive Director*

On April 1, 2011, the long search for PCIEERD's Executive Director ended. Dr. Amelia Peralta Guevara, a professor of chemistry and immediate past Vice President for Academic Affairs of the University of the Philippines System, was appointed Executive Director on secondment at PCIEERD by President Benigno Simeon C. Aquino. She took her oath of office before DOST Secretary Mario G. Montejo.

An accomplished administrator, educator and scientist, Dr. Guevara is a long-time associate of the DOST. She has been involved in various critical positions in the Department as representative of the University of the Philippines (UP) to the Scientific Career Council, Board of Trustees of the Philippine Science High School, and Governing Council of the then Philippine Council for Advanced Science and Technology Research and Development (PCASTRD). She was also a member of the External Review Committee of the then Philippine Council for Industry and Energy Research and Development (PCIERD).

*Dr. Amelia P. Guevara (right) took her oath of office as the new PCIEERD Executive Director before DOST Secretary Mario G. Montejo last April 1, 2011.*

## *Steering S&T Research*

PCIEERD has the mandate to identify national development goals, formulate corresponding plans and policies, and set research priorities for the industry, energy and emerging technology sectors.

Counting among its important accomplishments in 2011 was the development of two new S&T Roadmaps for the emerging technology sector. In 2011, the Council convened scientists, researchers and experts in genetics, molecular biology as well as in nanotechnology to draft the country's first Genomics and Nanotechnology Roadmaps. Once finalized, these

Roadmaps are expected to help guide local scientists and researchers on what areas to pursue in genomics and nanotechnology research.

In 2011, PCIEERD also updated its S&T Water Environment Roadmap, which identifies specific activities, research projects and policies needed to meet the targets of assuring supply and access to safe and potable drinking water.


*During the Stakeholders Workshop on Genomics R&D Roadmap, DOST Secretary Mario G. Montejo emphasized the need to seize the strategic opportunity offered by genomics to discover the secret code of life and be able to apply this knowledge to understand and improve our health and environment.*

## Advancing Research and Innovation

Science, technology and innovation are the main drivers of national growth. In 2011, PCIEERD continued to fund and monitor R&D projects funded under the Grants-in-Aid (GIA) Program of the Council and of the DOST, including projects implemented under the Engineering Research and Development for Technology.

In the past year, the Council monitored 101 and 55 projects funded under DOST-GIA and PCIEERD-GIA, respectively. This includes 54 projects under the industry and energy sectors, and 89 projects focused on the emerging technology sectors. Thirteen projects under special concerns such as disaster risk reduction and management were also monitored.

## Upgrading R&D Facilities

Adequate facilities and equipment are essential infrastructure in R&D. In 2011, PCIEERD supported the laboratory upgrading of the National Institute of Physics of UP Diliman. The Council provided funding support of P3,000,000 for the project titled "Upgrading of the Femtosecond Laser Facility: Development of Terrahertz Time-domain Spectroscopy and Enhancement of Time-resolved Photoluminescence Spectroscopy."

## Developing S&T Capability

Recognizing the value of human resource capital in the development of the country, the Council continued to implement its Human Resource Development Program (HRDP) and the Accelerated Science and Technology Human Resource Development Program (ASTHRDP) of the DOST.

For School Year 2011-2012, ten (10) scholarships were awarded under PCIEERD's HRDP, while 104 were awarded under the DOST's ASTHRDP, including 35 for science and 69 for engineering.

Meanwhile, at PCIEERD, three (3) personnel pursued higher education. Ms. Mary Jane P. Salmorin and Ms. Marivic A. Legista continued their Master in Information Technology program at UP Los Baños, while Ms. Carminda R. Tandelcarmen started her Master in Public Administration program at the University of Makati.

## Ensuring Success of DOST's High-Impact Technology Solutions

In 2011, the DOST launched its High-Impact Technology Solutions (HITS) programs to help alleviate mass poverty, provide long-term solutions, strengthen industry competitiveness and contribute to national development.

Using science and technology, the 12 HITS projects monitored by PCIEERD address the need for better disaster preparedness and management, sustainability of transport systems, availability of alternative sources of energy, development and application of more environment-friendly mining practices, and easier access to potable water.

*One of DOST's High-Impact Technology Solutions projects is the water hyacinth harvester, which was developed due to the need for the mechanical removal of water hyacinth in inland bodies of water and river systems in the country.*

### *Pushing for Technology Commercialization*

The Technology Innovation for Commercialization (TECHNICOM) Program of the DOST is designed to enhance the process of spinning off technologies into enterprises by providing assistance for technology assessment and valuation, prototyping, pilot plant production, intellectual property rights protection, negotiation and licensing assistance, market testing and training/consultancy services. In 2011, PCIEERD actively managed nine (9) projects funded under TECHNICOM.

Likewise, PCIEERD continued to monitor four (4) Technology Business Incubator (TBI) projects; namely, DOST-PEZA Open TBI, DOST-UP Enterprise Center for Technopreneurship, DOST-UPLB TBI and DOST-UP Cebu TBI.

Moreover, PCIEERD monitored three (3) projects funded under the DOST's Small Enterprise Technology Upgrading Program (SETUP), which aims to encourage and assist micro, small and medium enterprises (mSMEs) in adopting technological innovations to improve their operations and thus boost their productivity and competitiveness.

### *Conforming to Quality Standards*

In 2011, PCIEERD applied for the renewal of its ISO 9001:2008 certification from TÜV SÜD PSB, Inc. The ISO 9000 family of standards relates to quality management systems and is designed to help organizations ensure they meet the needs of their clients and other stakeholders.

After months of preparation, the Council was awarded the ISO 9001:2008 certification by TÜV SÜD PSB Philippines, Inc. on September 30, 2011.
To enhance its delivery of services and promote customer satisfaction, PCIEERD is currently finalizing its Competency Development Framework, which aims to identify the key competencies necessary for all positions in PCIEERD as well as the minimum competency levels needed for each position. The move is in consonance with the Council's aim to meet standards of the Philippine Quality Awards (PQA), which is the highest level of national recognition for exemplary organizational performance comparable with the Malcolm Baldrige National Quality Award of the US. Together with the two other pilot agencies of the DOST for the PQA – Metals Industry Research and Development Center and DOST Regional Office No. IX, PCIEERD initiated its Competency Development Program.

*PCIEERD was awarded the ISO 9001:2008 certification by TÜV SÜD PSB Philippines, Inc. on September 30, 2011.*


*PCIEERD celebrated its 1st Anniversary last June 29, 2011 at the DOST Executive Lounge with the theme "We are ONE!"*

## *Celebrating 1st Anniversary, Unveiling New Logo*

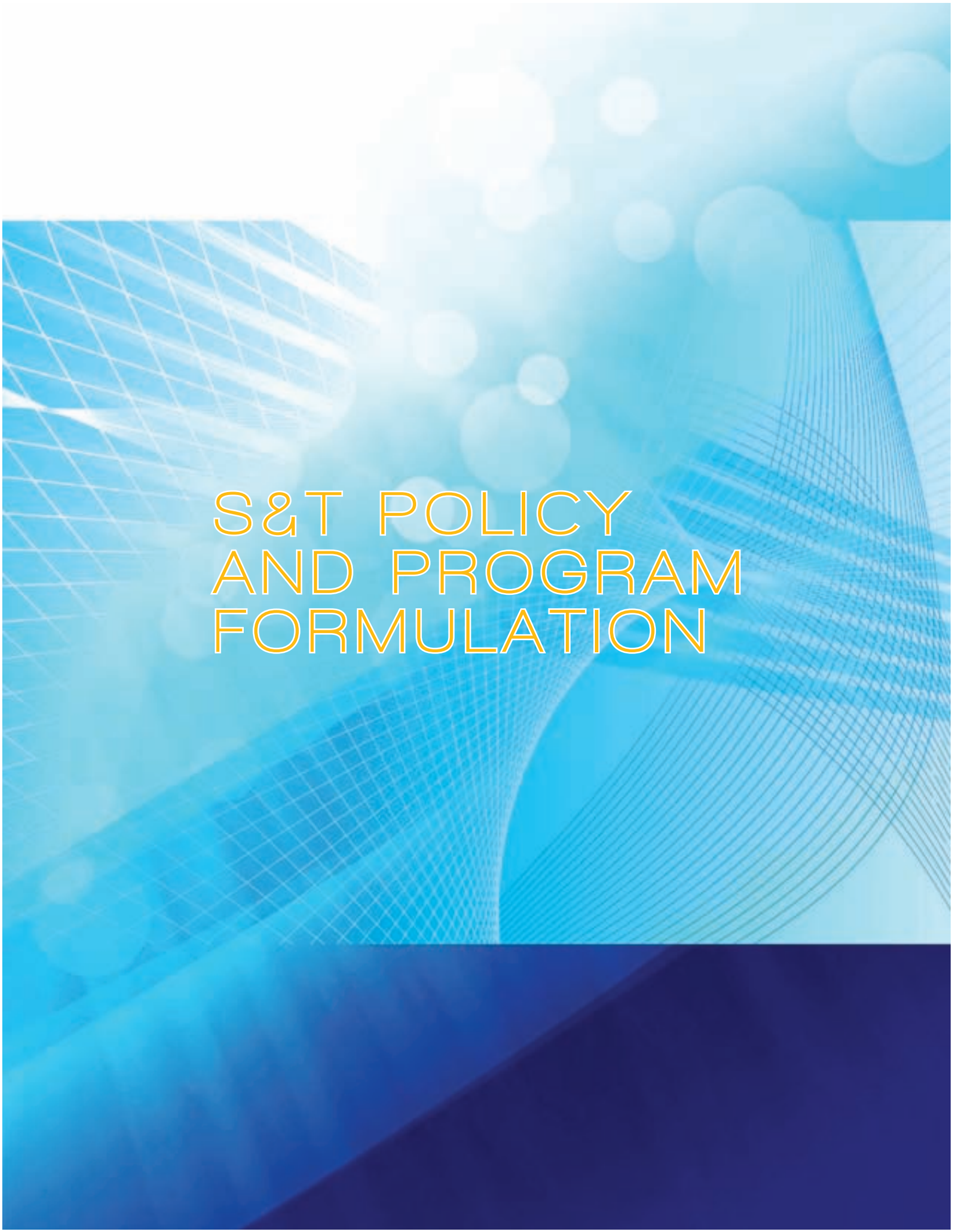
PCIEERD celebrated its 1st Anniversary last June 29, 2011 at the DOST Executive Lounge. With the theme "We are ONE!" PCIEERD Executive Director Amelia P. Guevara presented the Council's programs and services during the anniversary celebration. Also, STMicrolectronics Quality and Reliability Director Dr. Antonio B. Villaflor and UP Diliman's College of Engineering Dean Dr. Aura C. Matias shared their views on the role of the industry, energy and emerging technology sectors in the country's global competitiveness.

During its 1st Anniversary, PCIEERD unveiled its new logo showcasing the icons that represent the Council's priority areas. The logo is based on the design of the winning entry to the PCIEERD Logo Design Contest by Mr. Diosdado D. Buncab, a freelance graphic artist.

The icons at the center of the logo represent the following: mechanical gear for the industry sector, flame for the energy sector, circuit board for the emerging technology sector and flask representing the role of science in PCIEERD's priority areas.


*PCIEERD unveiled its new logo during its 1st Anniversary. The icons at the center of the logo represent the following: mechanical gear for the industry sector, flame for the energy sector, circuit board for the emerging technology sector and flask representing the role of science in PCIEERD's priority areas.*

# List of Tables and Pie Chart


S&T POLICY
AND PROGRAM
FORMULATION

PCIEERD has the mandate to formulate plans and policies and set research priorities within its sectoral coverage. The Council's Policy Coordination and Monitoring Division, headed by its Officer-In-Charge Engr. Raul C. Sabularse, is the group responsible for assessing and coordinating the plans of PCIEERD and in monitoring their implementation for consistency with the overall policy of the Council and with the DOST.

### *Monitoring and Evaluation System*

PCIEERD implements a monitoring and evaluation (M&E) system to ensure the relevance, alignment and significance of project proposals to help ensure the performance and effectiveness of its plans, programs and activities.

In 2011, the Council started the implementation of the project titled "Review and Enhancement of the Monitoring and Evaluation System of PCIEERD" that aims to improve the proposal evaluation process and ensure efficient and effective monitoring of PCIEERD's programs and projects. To accomplish this, the Council engaged the services of expert consultants Mr. Edgardo G. Atanacio and Mr. Rolando Ramon C. Diaz to identify gaps, problem areas and opportunities for improvement in the implementation of its current M&E process.

A detailed assessment of factors contributing to the problems and challenges of the current M&E process is expected to be completed by early 2012.

### *R&D Roadmaps for Emerging Technologies*

PCIEERD considers genomics as a technological platform that can revolutionize R&D in health, biotechnology, biodiversity, Filipino ethnicity, nutrigenomics and forensics. To draft the country's preliminary Genomics Roadmap for 2012 to 2018, the Council organized a "Stakeholders' Workshop on Genomics Research and Development Roadmap" in 2011. The workshop held at the DOST Executive Lounge in Bicutan, Taguig City last October 3, 2011 brought together scientists, researchers and experts in genetics and molecular biology. Once finalized, the Genomics Roadmap is expected to help guide local scientists and researchers on what areas to pursue in genomics research.

The Council also convened the "Stakeholders' Workshop on Nanotechnology R&D Roadmap" to identify the priority projects and expected tangible outputs in nanotechnology. The Nanotechnology Workshop was held at the DOST Executive Lounge in Bicutan, Taguig City last October 10, 2011. DOST Sec. Mario


*During the Stakeholders' Workshop on Genomics Research and Development Roadmap, Dr. William G. Padolina, former DOST Secretary and current Deputy Director General of International Rice Research Institute, stressed the need for rapid high-throughput tools in genomics. High-throughput tools refer to genetic tools that enable millions of genetic screening tests to be conducted at a single time.*

*Dr. Carmencita David-Padilla, Executive Director of the Philippine Genome Center, was one of the resource persons during the Genomics Workshop. Dr. David-Padilla discussed genomics R&D and its potential applications in the Philippines.*

G. Montejo was the special guest during the whole-day activity, while Dr. Fabian M. Dayrit of Ateneo de Manila University presented an overview of nanotechnology in the Philippines.

*Participants of the Stakeholders' Workshop on Nanotechnology Research and Development Roadmap identified priority projects and programs for nanotechnology in the country.*

### S&T Water Environment Roadmap

In 2011, PCIEERD updated its S&T Water Environment Roadmap, which is aligned to the Millennium Development Goals of cutting by half the number of people without sustainable access to safe drinking water. The Roadmap identifies recommended policies, research projects and activities needed to meet the targets of assuring supply and access to safe and potable drinking water.

### S&T Interventions on Disaster Risk Reduction and Management

The National Disaster Risk Reduction and Management Council (NDRRMC) is the national agency responsible for ensuring the protection and welfare of the people during disasters and emergencies. The DOST, through PCIEERD, is a member of the Technical Management Group of the NDRRMC.

On May 27, 2010, Republic Act 10121 or the Philippine DRRM Act was passed into law. Said law mandated the development of the National DRRM Framework upon which the National DRRM Plan shall be based.

After a series of consultative meetings all over the country to review the existing disaster management framework and revise it to align with the DRRM principles and policies stated in the DRRM Act, the National DRRM Framework was signed last June 16, 2011. The Framework is the basis for the formulation of the National DRRM Plan. It provides for a comprehensive, all-hazards, multi-sectoral, inter-agency and community-based approach to DRRM.

Promoting a responsive and proactive manner of addressing disasters, the Framework aims to raise awareness and understanding among local government and the people on the country's DRRM goal. It will provide a common direction towards addressing underlying causes of vulnerability to help reduce and manage the risks to disasters. It will also show that DRR and DRM efforts are not isolated activities but are inevitably linked to the development process and should converge and contribute towards attaining sustainable development.

### Ensuring Effective Implementation of the Clean Development Mechanism

DOST, through PCIEERD, is a member of the Clean Development Mechanism (CDM) Steering Committee that is led by the Department of Environment and Natural Resources (DENR) as the Designated National Authority for CDM.

The CDM Steering Committee is an inter-agency and multisectoral committee responsible for reviewing the assessment of CDM Technical Evaluation Committee(s) and providing advice to the DENR Secretary for the effective implementation and improvement of the Philippine CDM policy and framework in accordance with the provisions of Department Administrative Order (DAO) 2005-17 on the Implementation of CDM and amendments thereto.

As of March 2011, 50 projects from the Philippines are registered at CDM executive board, and 29 projects are at or after the validation stage. Leading the list of projects at CDM executive board are those on biogas (animal waste), biomass utilization, and methane recovery and utilization (landfill).

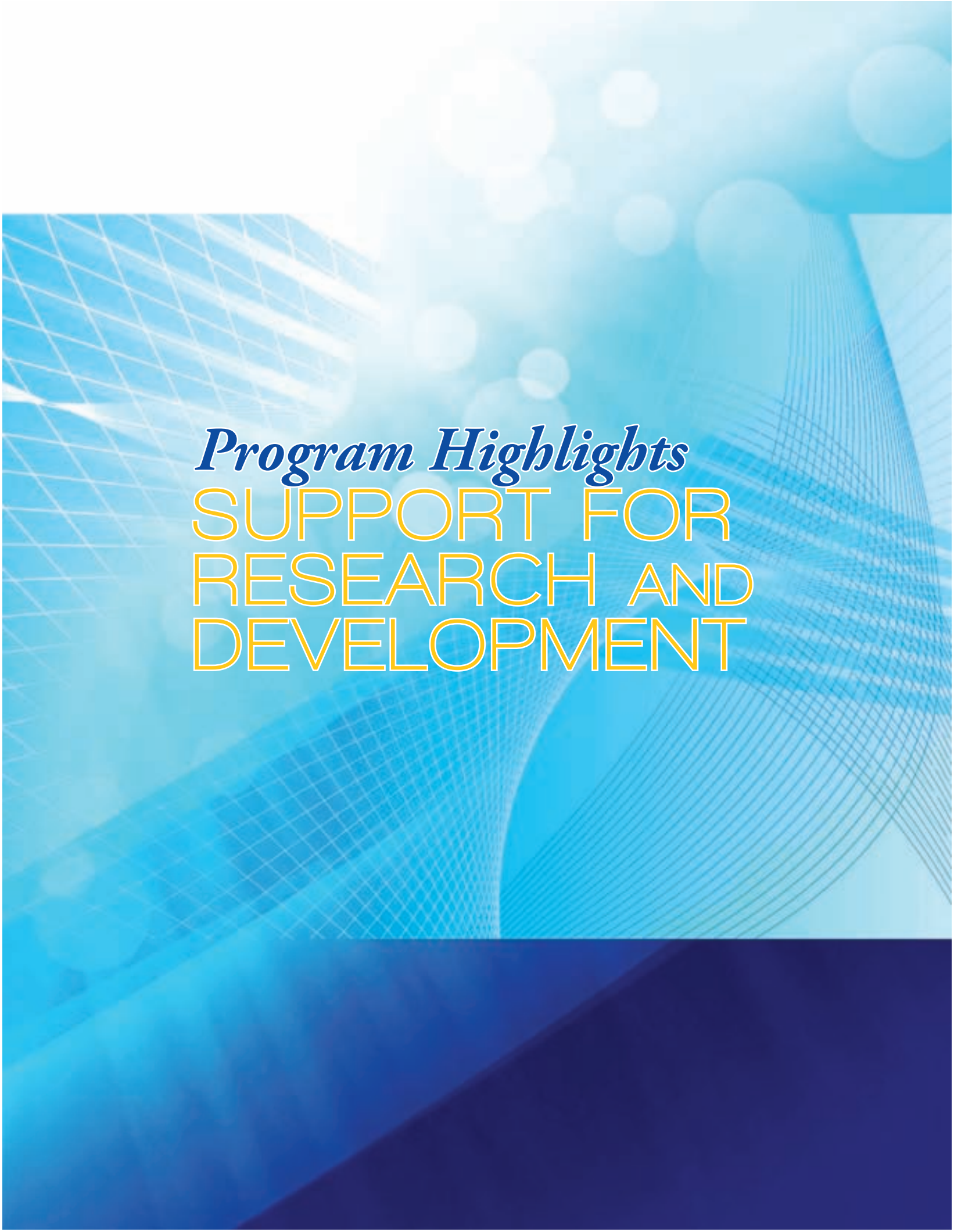
Also, three (3) Programme of Activities in the country are under validation. These are on biogas (animal waste), energy efficiency (compact fluorescent lamp distribution), and methane recovery and utilization (landfill gas).

## *Recognizing Initiatives and Achievements in the Mineral Sector*

The DOST, through PCIEERD, is a member of the Presidential Mineral Industry Environmental Award (PMIEA) Selection Committee. The PMIEA was first officially established in 1997 and re-established by virtue of Executive Order 374 on October 10, 2004. It recognizes the private sector's initiatives and exemplary achievements in the protection of the environment in the mineral sector.

As a member of the Committee, PCIEERD recommended Research and Development (R&D) as one of the areas for award under the Implementing Rules and Regulations of the PMIEA. This will give recognition to R&D undertaken by the mining and minerals sector to help promote the protection of the environment.

*The Presidential Mineral Industry Environmental Award recognizes the private sector's initiatives and exemplary achievements in the protection of environment in the mineral sector.*


Program Highlights
SUPPORT FOR
RESEARCH AND
DEVELOPMENT

The Department of Science and Technology (DOST) considers science, technology and innovation as the main drivers of national growth. This can be achieved by a strong research and development (R&D) program.

PCIEERD supports the implementation of scientific and technological activities in the industry, energy and emerging technology sectors. It funds and monitors R&D projects funded under the Grants-in-Aid (GIA) Program of the Council and of the DOST, including projects implemented under the Engineering Research and Development for Technology (ERDT).

The ERDT Program aims to address the country's need for more engineering R&D as well as for highly-qualified researchers and engineers. It involves a consortium of seven-member universities in the country that offer master's and doctoral degrees in various engineering fields. De La Salle University, Mapúa Institute of Technology, Ateneo de Manila University, Mindanao State University – Iligan Institute of Technology, University of San Carlos, Central Luzon State University, and the University of the Philippines Diliman constitute the consortium.

## *DOST's High-Impact Technology Solutions*

In 2011, the DOST launched its High-Impact Technology Solutions (HITS) projects to help alleviate mass poverty, provide long-term solutions, strengthen industry competitiveness and contribute to national development. Using science and technology, the HITS projects address the need for better disaster preparedness and management, sustainability of transport systems, availability of alternative sources of energy, development and application of more environment-friendly mining practices, and easier access to potable water. The 12 HITS projects actively monitored by PCIEERD during the year are listed in Table 1.

*A group of technicians from the Metro Manila Development Authority tested the harvester at a swamp near the Taguig Pumping Station. The harvester was developed to collect free-floating water hyacinth by cutting them onsite and conveying them to the platform hold.*

**Table 1. List of DOST's High-Impact Technology Solutions monitored by PCIEERD.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Completed*** | | |
| Development of Harvester for Water Hyacinth Management for Waterways and River Systems | DOST – Metals Industry Research and Development Center | The harvester was developed to collect free-floating water hyacinth by cutting them onsite and conveying them to the platform hold. The harvester addresses the need for the mechanical removal of water hyacinth on inland bodies of water and river systems in the country. |
| Alternative Technology for Processing of Laterite Ores: Fe-Ni Production | Mindanao State University – Iligan Institute of Technology | The objective of this project was to achieve a detailed understanding of nickel oxide and laterite ores reduction by methane-containing gas. Ore reduction is the size reduction of minerals. The project also assessed the feasibility of a new, more energy-efficient technology for the processing of laterite ores. |

**Table 1. List of DOST's High-Impact Technology Solutions monitored by PCIEERD. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Ongoing*** | | |
| Wind Power Generator System<br>*Project 1:* Permanent Magnet Generator for Variable Speed Wind Turbine System<br>*Project 2:* Power Electronics for Wind Power System<br>*Project 3:* Development of Wind Turbine Emulator | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | The program aims to produce a Filipino-crafted wind generator system with all parts and components developed locally. The system will be designed to operate under local prevailing conditions of wind speed, temperature and other environmental parameters. |
| Nanostructured Solar Energy Devices<br>*Project 1:* Nanostructures for Solar Cell Applications<br>*Project 2:* Transparent Electrodes for Solar Cell Applications<br>*Project 3:* Gallium Arsenide-based Solar Cell Devices<br>*Project 4:* Modification of Graphene for Nanostructured Photovoltaic Cells<br>*Project 5:* Solar Cell Characterization Facility | University of the Philippines Diliman and Ateneo de Manila University | The program focuses on solid state-based and dye-sensitized solar cells, which are low-cost and environment-friendly alternative energy sources. Fabrication and incorporation of nanosized materials will be pursued with the goal of improving the efficiency of the solar cells. |
| Development of Hybrid Weather Monitoring System and Production of Weather and Rain Automated Stations | DOST – Advanced Science and Technology Institute | The project will produce 80 automated weather stations (AWS) and 100 automated rain monitoring stations using local technologies. The developed AWS and automated rain monitoring stations will be deployed in key areas across the Philippines to complement the weather monitoring facilities of DOST – Philippine Atmospheric Geophysical and Astronomical Services Administration. |
| Disaster Risk Management Using Sensor Networks and Computing: Early Warning System for Landslides, Slope Failures and Debris Flows<br>*Project 1*: DYNASLOPE: Development of a Dynamical Model for Landslides, Slope Failures and Debris Flow<br>*Project 2:* SENSLOPE: Development of Alternative Cost-effective Instrumentation and Sensor Networks | University of the Philippines Diliman | In this research program, an alternative means for monitoring slopes that is both accurate and cost-effective is proposed. This approach uses wireless sensor networks deployed at strategic points covering the slope that periodically measure parameters such as ground movement, rainfall intensity, moisture content and pore water pressures. These collected data are transmitted to a central data repository for processing and analysis from which landslide forecasts and/or predictions can be made. |
| Field Monitoring System | DOST – Advanced Science and Technology Institute | The project aims to develop a water level monitoring station to be deployed for flood-related monitoring as well as to provide support and rehabilitation to the Metropolitan Manila Development Authority's Effective Flood Control and Operation System that is installed along the Pasig-Marikina River Basin. |
| Prototyping of Ceramic Water Filtration System: Ceramic Pot Filter with Colloidal Silver | DOST – Industrial Technology Development Institute | The project aims to produce 500 ceramic pot water filters lined with nanoparticles of metallic element for distribution to identified beneficiaries. Likewise, clay samples from different regions will be tested and analyzed for their suitability as raw material for the ceramic pot filter. |

**Table 1. List of DOST's High-Impact Technology Solutions monitored by PCIEERD. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Ongoing*** | | |
| R&D Program for Brown Rice Optimization, Functionality and Utilization in the Philippines | DOST – Food and Nutrition Research Institute | The project aims to identify the factors affecting the stability of brown rice, evaluate the combined effects of different variables on the shelf life and quality of brown rice, determine the optimum processing parameters, and determine the retention of nutrients, microbiological safety, texture and general acceptability of brown rice after processing and during storage. |
| Research Study on Low-cost Computing Solutions for Primary Education – PC Tablet | DOST – Advanced Science and Technology Institute | The project aims to pilot-test DOST tablet computers in selected schools in the country. It will also train teachers on how to use the computers. Consultative dialogues with various stakeholders will be conducted to validate if the design and specifications of the learning tool are appropriate for basic education. |
| Inter-disciplinary Signal Processing for Pinoys (ISIP) Program:<br>*Project 7:* Development of an English Language Training Software for Call Centers | University of the Philippines Diliman | The objective of Project 7 is to develop a stand-alone software that can be used to train call center applicants and students in listening, speaking fluency and proficiency in the English language. This can be used to improve the intake rate of hires in call centers Projects 1 to 5 are ongoing projects funded by PCIEERD-GIA. |
| Development of a Prototype Automated Guide-way Transit System | DOST – Metals Industry Research and Development Center and University of the Philippines Diliman | The project will demonstrate that the Automated Guide-way Transit is an alternative and efficient transport model in the Philippines. It will also identify collaborative projects that will promote and mainstream environment-friendly and sustainable transport systems. |

# PCIEERD's Priority Areas

In 2011, PCIEERD monitored 101 and 54 projects funded under DOST-GIA and PCIEERD-GIA, respectively. This includes 54 projects in the industry and energy sectors, and 89 projects in the emerging technology sectors. Twelve projects under special concerns such as disaster risk reduction and management were also monitored.

INDUSTRY

ENERGY

EMERGING TECHNOLOGY

SPECIAL CONCERNS

## INDUSTRY SECTOR

With the aim of promoting industry's global competitiveness, PCIEERD supports and monitors programs and projects for the food and food packaging, textile, metals and mining, process and environment sectors. These are managed by PCIEERD's Industrial Technology Development Division (ITDD) headed by Engr. Niñaliza H. Escorial.

In 2011, ITDD monitored 37 and eight (8) projects funded by the GIA program of DOST and PCIEERD, respectively. The projects focus on ensuring food safety, cleaning wastewater, and developing appropriate packaging technologies and better mining practices.

For instance, the project on ceramic pot water filter by DOST – Industrial Technology Development Institute aims to produce 500 ceramic pot water filters lined with nanoparticles of metallic element that will help ensure the quality of drinking water, particularly in areas with limited access to potable water.

On the other hand, the project being implemented by Mindanao State University – Iligan Institute of Technology aims to assess the feasibility of implementing a technology using methane-containing gas for the processing of laterite ores. The technology being developed aims to be more energy-efficient than traditional processes.

Likewise, ITDD monitored nine (9) projects under the Technology Innovation for Commercialization (TECHNICOM) Program of the DOST. Some of these projects focus on commercializing the production and utilization of the different food products, improving the nutrient quality and shelf-life of ready-to-drink fruit and vegetable juice blends, and pushing into the mainstream fashion market textiles that use natural fiber-blended yarns.

Moreover, ITDD monitored five (5) institution-development projects funded by DOST-GIA in 2011. These projects focus on expanding the adoption of laboratory management systems as well as environmental and quality management systems in various DOST agencies and research and development institutes (RDIs). The projects will enable the DOST's various agencies and RDIs to respond more quickly and efficiently to the requirements of their clients.

The projects monitored by ITDD are presented in Table 2A to 2J.

*The project "Development of Dried Japanese Persimmon" produced a dried version of the fruit using different drying methods and pre-treatments.*

*The "R&D Program for Brown Rice Optimization, Functionality and Utilization in the Philippines" aims to identify the factors affecting the stability of brown rice, and evaluate the combined effects of different variables on the shelf-life and quality of brown rice.*

**Table 2A. Completed R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Environment*** | | |
| Pasig River Stewardship Initiatives through STS Advocacy Program<br>*Project 1:* Field Validation and Determination of Point Sources of Heavy Metals and PCBs Contamination at Selected Esteros<br>*Project 2:* Levels of Endocrine Disruptive Chemicals on Sediment Samples of Esteros de Pandacan<br>*Project 3:* Biochemical and Mechanical Remediation Techniques for the Rehabilitation of Estero de Balete<br>*Project 4:* Limnological Assessment of Estero de Balete<br>*Project 5:* Physico-chemical and Biodiversity Study of Estero De Paco<br>*Project 6:* Study on Technological Management Practices of Multi-sectoral Stakeholders in Estero de Paco<br>*Project 7:* Instilling Environmental Awareness through Waste Minimization and Waste Management among the Learning Institutions and Communities | DOST – Industrial Technology Development Institute, University Belt Consortium (Adamson University, Arellano University, Centro Escolar University, Far Eastern University, FEATI University, Jose Rizal University, Lyceum of the Philippines University, Manuel L. Quezon University, Mapúa Institute of Technology, National University, University of the East, University of Manila and University of Sto. Tomas), Pasig River Rehabilitation Commission and ABS-CBN Foundation Inc. | The program builds on the initial effort of the University Belt Consortium with the DOST-funded project "Application of Sediment Quality Guidelines in Assessing Metal Contamination of Tributaries along Pasig River." The initial undertaking on the application of sediment quality guidelines along the tributaries of the Pasig River collectively mobilized faculty and students in the sampling of sediments in their respective esteros and subsequent analyses of the heavy metals and polychlorinated biphenyls contents. |
| ***Food Packaging*** | | |
| Toxic Migrants in Canned and Plastic Packaged Foods and Beverages: Addressing the Safety Issues on Packaging-related Contaminants in Foods | DOST – Industrial Technology Development Institute | With the increasing concern on safety issues pertaining to packaging-related contaminants, this project provided scientific data on toxic migrants in canned and plastic packaged foods and beverages. |
| ***Process*** | | |
| Harnessing BIOTECH Microbial Strains for Bioethanol Production from Alternative Substrates<br>*Project 1:* Evaluation, Validation and Business Analysis of Ethanol Production from Alternative Substrates Using BIOTECH Strains<br>*Project 2:* Improvement of Yeast Strains for Industrial Ethanol Production<br>*Project 3:* High-cell Density Ethanol Fermentation from Appropriate Feedstock Materials Using Selected Yeast and Zymomonas Strains | National Institute of Molecular Biology and Biotechnology – University of the Philippines Los Baños | The programs aims to improve the fermentation technology for the production of ethanol by optimizing microorganism-substrate-process combinations. The improved fermentation technology will be assessed for its commercial potential. At the end of the program, it is expected that a more efficient process of ethanol production with higher ethanol yield can be achieved for industrial application. |

**Table 2B. Ongoing R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Environment*** | | |
| Performance and Safety Assessment of the Co-location of the Near Surface Radioactive Waste Disposal Facility and Borehole Disposal Concept in the Philippines | DOST – Philippine Nuclear Research Institute | The project aims to conduct assessment on long-term safety of a surface radioactive waste disposal repository. The role of the disposal system is to isolate the waste from the accessible environment; control releases of radionuclides that reach the accessible environment; and reduce the consequences of any unacceptable releases to the environment. |
| Development of Biological + Ozonation Process as Treatment for Effluents of Distillery and Large-water-demand Industries | College of Engineering, University of the Philippines Diliman | The project aims to treat wastewater from large-water-demand industries through the development of biological and ozonation process. The knowledge derived in the development of this process will give insights on how similar technologies can be applied to other types of wastewater with similar difficult-to-degrade compounds. |
| Water Purification System: Production and Field/Performance Testing of Ceramic Pot Filter | DOST Industrial Technology Development Institute | This project will produce and conduct field and performance testing of a ceramic pot filter that is treated with a formula that acts as an antibacterial agent to ensure safe-to-drink water. |
| ***Food*** | | |
| Development of Grits from Locally Grown Chickpea (Garbanzos) | Benguet State University | The project aims to identify suitable processing techniques to improve the functional properties and quality of food products using chickpea grits as substitute. It also aims to identify a suitable packaging material that can extend the shelf-life of chickpea grits. |
| Stabilization of Rice Bran Using Microwave Volumetric Heating for Emulsion-based Processed Meat | College of Home Economics, University of the Philippines Diliman | This project aims to adapt microwave volumetric heating to improve the stability of local rice bran for use as ingredient to emulsion-based processed meat. |
| Design and Development of an Automated Hot Water Treatment for Mango | Mariano Marcos State University | The project will develop a functional continuous-type automated hot water treatment (HWT) for mango. HWT is one of the accepted quarantine techniques in the world. It is effective in controlling two major diseases of mango: anthracnose and stem-end-rot. |
| Setting-up of Processing Facilities for the Production of Flours Made from Root Crops, Cereals, Legumes and Vegetables –Year 2 | DOST – Technology Resource Center and DOST – Food and Nutrition Research Institute | This project aims to setup processing facilities for the production of alternative flour from indigenous sources such as root crops, cereals, legumes and vegetables. |

**Table 2B. Ongoing R&D projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food & Process*** | | |
| Characterization of Philippine Sauces and Coffee Varieties | DOST – Industrial Technology Development Institute | The project will explore the advantages of using an electronic nose (e-nose) and electronic tongue (e-tongue) as a food control method for assessing the quality of selected Philippine ethnic food products. |
| ***Metals and Mining*** | | |
| Development of PE Nanofiber Membrane with Modified Nanoclay for Wastewater Treatment | College of Engineering, University of the Philippines Diliman | The research will develop a nanomaterial using locally mined montmorillonite, which is a mineral that typically forms in microscopic crystals. The project will also test the feasibility of using the produced material for removal of toxic heavy metals from wastewater. |
| Development and Testing of Coco Peat Filter Bed for Treatment of Heavy Metals | College of Engineering, University of the Philippines Diliman | From initial studies conducted using zinc as the contaminant, it has been shown that coco peat has good absorption qualities. It can be used as filter material in a filtration bed and can remove heavy metals from wastewater streams. |
| Copper Flotation Technology for Small-scale Mining Industry | College of Engineering, University of the Philippines Diliman | This study will develop a mine waste treatment program by determining a simplified process of recovering the copper (or other valuable metals) from the solid wastes and applying an integrated preventive environmental strategy to minimize the generation of waste. |
| Alternative Method to Amalgamation and Cyanidation for the Recovery of Gold | College of Engineering, University of the Philippines Diliman | The project aims to develop an alternative process of extracting gold from ores using flotation/gravity concentration technologies. This is to allow small-scale miners to conduct recovery activities at the lowest capital and operational expenditure. |
| Development of Philippine Montmorillonite Purification Technique for Nanocomposite | College of Engineering, University of the Philippines Diliman | This project aims to establish a process that will recover high-grade nanoclay material from local resources using new techniques in mineral processing. |
| Life Cycle Analysis for Small-scale Production Systems: The Case of Gold | College of Engineering, University of the Philippines Diliman | The use of life cycle thinking and time-to-market concepts is an effective approach in addressing concerns at the early stages of design for production systems. The life cycle analysis method will be applied to gold production and will be analyzed for its appropriateness. |
| Assessing Biosorption Performance of *E. Crassipes* and Other Aquatic Plants in Cleaning Mine Tailings | Department of Environmental Science, Ateneo de Manila University | The research aims to evaluate the capability of the macroalgae *Sargassum* sp. and *Turbinaria* sp. to remove heavy metals from mine tailings. |

**Table 2B. Ongoing R&D projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Metals and Mining*** | | |
| High Grade Ceramics Development Utilizing Kaolinite Clay Deposits from Ilocos Norte Province | Mariano Marcos State University and National Institute of Geological Sciences, University of the Philippines Diliman | The project is intended for water purification, particularly during emergency (i.e. calamities), and for domestic use. The porous ceramic filters made from kaolinite clay have the primary advantage of reusability, chemical and mechanical durability and low-maintenance cost over the commercially available water filters. It will also enhance and upgrade the quality and characteristic of Ilocos Norte ceramic industry, from basic pottery to nanotechnology-level products. |
| Modification of Natural Zeolite as Replacement of Sodium Tripolyphosphate (STPP) for Detergent Industry | DOST – Industrial Technology Development Institute | The project will process zeolite into new materials that can be used for detergent formulations. Zeolites are minerals commonly used as commercial adsorbents. |
| ***Process*** | | |
| Production of Plant Oils and Ester Using Super Critical Fluid Extraction Method | DOST – Industrial Technology Development Institute | The project aims to produce plant oils and methyl ester using supercritical fluid extraction method. |
| Synthesis of High-value Materials from Local Limestone | DOST – Industrial Technology Development Institute | The project will process marble and limestone into new materials (high-purity calcium carbonate) for industrial applications using cleaner production techniques. |

*The project "Development of Spondias Pinnata (Lubas) as Seasoning Mix" conducted sensory evaluation and consumer's general acceptability tests on the lubas leaves as an alternative seasoning mix.*

*The project "Development of Grits From Locally Grown Pigeon Pea (Kadyos)" developed a suitable processing technique for pigeon pea grits as substitute for snack chips.*

**Table 2C. New R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food*** | | |
| Phase 2: ISO/IEC 17043:2010 Accreditation as Proficiency Test Provider for Credibility Improvement and International Recognition of FNRI Proficiency Test Program | DOST – Food and Nutrition Research Institute | The project aims to improve the credibility and international recognition of proficiency tests conducted by FNRI and reference materials developed by the Institute. |
| ***Food Packaging*** | | |
| Enhancing the Competitive Identity of Unique Philippine Products through the Development of Packaging Design and Appropriate Packaging Technology | DOST – Industrial Technology Development Institute | This study will involve the development of a packaging design and the appropriate packaging technology to enhance the competitive identity of eight (8) unique Philippine products. |
| ***Metals and Mining*** | | |
| Screening and Identification of Biofilm Formers as Potential Microbial Remediators for Heavy Metal Contaminated Wastewater | Institute of Biological Sciences, University of the Philippines Los Baños | The study aims to screen and identify biofilm formers as potential microbial remediators of wastewater contaminated with heavy metals. The knowledge generated from this project will be applied in cleaning up heavy metal-contaminated wastewater. |
| ***Process*** | | |
| Characterization of Coconut Sap Sugar/Syrup as Functional Food | DOST – Food and Nutrition Research Institute | The project aims to determine the nutritional and health benefits of coconut sap sugar/syrup as functional food. |
| Screening and Optimization of Conditions for the Local Production of Food Colorants from Microbial Cultures | National Institute of Molecular Biology and Biotechnology – University of the Philippines Los Baños | The project aims to explore the production of organic colorants derived from locally available microorganisms. |

**Table 2D. Completed R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food*** | | |
| Development of *Spondias Pinnata (Lubas)* as Seasoning Mix | Universidad de Sta. Isabel | The project performed acid assay test to identify the kinds of acid present in the *lubas* leaves, and determined the concentration and pH level of acids in the leaves. It also conducted sensory evaluation and consumer's general acceptability tests on the lubas leaves as an alternative seasoning mix. |
| Development of Grits From Locally Grown Pigeon Pea *(Kadyos)* | Benguet State University | The project developed a suitable processing technique for pigeon pea grits as substitute for snack chips. |

**Table 2D. Completed R&D projects funded by PCIEERD-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food*** | | |
| Development of Dried Japanese Persimmon | Mountain Province State Polytechnic College | The study developed dried Japanese persimmon using different drying methods and pre-treatments. It also determined the physico-chemical properties and assessed the nutritional and microbial content of dried persimmon. |
| ***Packaging Sector*** | | |
| Development/Improvement of Transport Packaging Technology for Non-food Products | DOST – Industrial Technology Development Institute | The project developed and improved the packaging design (structure and cushion) of non-food products in the furniture and gift, toys and hardware (GTH) industry to be compliant with existing international standards. |

**Table 2E. Ongoing R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food*** | | |
| Product Optimization and Market Testing of Dessert Red Wine from Purple Taro and Black Rice | Visayas State University | The research aims to utilize the purple taro as substitute for red rice in production and optimization of the dessert red wine and determine its market potential in upscale production. The quality of the red wine from taro will be optimized and the market for and the overall feasibility of the improved red wine processing system will be determined. |

**Table 2F. New R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food*** | | |
| Development of Marine Foods in Eastern Samar | Eastern Samar State University | The study will develop seaweed-based food products such as *Sargassum* tea, seaweed-filled puto bagol and seaweed sweet and spicy sauce as well as conduct studies on their acceptability and quality. |
| ***Process*** | | |
| Preliminary Studies on the Production of Laccase for Food and Wine Applications | National Institute of Molecular Biology and Biotechnology – University of the Philippines Los Baños | The project aims to screen microbial isolates for the production of laccase for food and wine applications, and to optimize the conditions for the large-scale production of laccase from selected microbial isolates.<br><br>Widely distributed in fungi, higher plants and bacteria, laccase is an enzyme that has many possible applications such as in bioremediation, textile dyeing/finishing, wine cork making, teeth whitening and other industrial, environmental, diagnostic and synthetic uses. |

**Table 2F. New R&D projects funded by PCIEERD-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Process*** | | |
| Isolation, Characterization and Preservation of Rumen Microbes Associated with Hydrolysis Intended for Cellulose Ethanol Production | Philippine Carabao Center, Central Luzon State University | The project aims to elucidate the chemical and microbial processes during fermentation of lignocellulosic feedstocks using carabao rumen fluid, with the ultimate goal of optimizing and controlling the fermentation process. |

**Table 2G. Completed TECHNICOM projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food and Feed*** | | |
| Commercial Production and Utilization of Cassava Flour and Grates | Philippine Root Crops Research and Training Center | The project commercialized the production of fresh and dried cassava grates and flour in Bohol. |

**Table 2H. Ongoing TECHNICOM projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Food*** | | |
| Green Mussel *(Perna viridis)* Value-added Products Improvement for Commercialization | Samar State University | The project aims to improve the quality attributes of *tahongganisa*, *tahong* embutido and dried *tahong* from green bay mussel *(Perna viridis)*, commonly known as *tahong*, for commercialization. |
| Shelf-life Extension of Fortified Ready-to-drink Tropical Fruit and Vegetable Juice Blends Prepared by Aseptic Processing and Packaging | University of the Philippines Diliman | The study aims to improve the nutrient quality and shelf-life of the ready-to-drink tropical fruit and vegetable juice blends developed in the project previously conducted titled "Nutrient Fortification and Pilot-scale Optimization of Ready-to-drink Tropical Fruit and Vegetable Juice Blends Prepared by Aseptic Processing and Packaging." |
| Commercial-scale Production of Cassava Grates and Flour in Bohol | Visayas State University | This project aims to commercialize the production and utilization of the different food products from cassava flour and grates. |
| ***Furniture*** | | |
| Design and Fabrication of a Bamboo-flattening Machine | DOST – Forest Products Research and Development Institute | The project will design, fabricate and test the performance of a bamboo-flattening machine, which will be used to produce flattened bamboo with few or no traces of cracks or splits. The bamboo-flattening machine will help increase the market potential of the country's bamboo products. |

**Table 2H. Ongoing TECHNICOM projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Process*** | | |
| Establishment of Microbial Succession of Starter Culture for Rice Wine *(Tapuy)* Processing | University of the Philippines Los Baños | The main objective of the project is to establish microbial succession of starter culture for rice wine processing, and to adopt the resulting technology for bench-scale processing of tapuy. The results of this study will help local producers of tapuy in ensuring product quality. |
| **Program / Project Title** | **Implementing Agency** | **Description** |
| ***Textile*** | | |
| Commercial-scale Validation of the Enzyme Finishing Technology for Philippine Tropical Fabrics | DOST – Philippine Textile Research Institute | The project will conduct wear test evaluation on fabrics made from pineapple and abaca fibers that have been pretreated at the Natural Fiber Pilot Plant of the Philippine Textile Research Institute. |
| Development of Neo-ethnic Textiles Using Natural Fiber-blended Yarns and Eco-friendly Treatment and Dyeing Technologies | DOST – Philippine Textile Research Institute | The project aims to push into the mainstream fashion market neo-ethnic textiles that use natural fiber-blended yarns treated with eco-friendly techniques and dyeing technologies. |

**Table 2I. New TECHNICOM projects funded by PCIEERD-GIA.**

| Project Title | Implementing Agency | Description |
|---|---|---|
| Production of Nanoclay from Local Bentonite Ore as Additive in Polymer-clay Nanocomposite Systems | DOST – Industrial Technology and Development Institute | The project will establish a pilot-scale production set-up for nanoclay from bentonite ore sourced from Legaspi, Albay. It will also develop optimized parameters in the production of nanoclay for industrial application. |

*The project "Commercial Scale Production of Cassava Grates and Flour in Bohol" aims to commercialize the production and utilization of the different food products from cassava flour and grates.*

**Table 2J. Ongoing Institution-development projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| Enhancement of DOST X's Regional Standards and Testing Laboratories Capability to Conduct Shelf-life Evaluation Studies | DOST Regional Office X | The project will widen the experience of the staff of DOST Region X's Regional Standards and Testing Laboratory in shelf-life evaluation of food products in the region. |
| Upgrading of Facilities of the DOST Research and Development Institutes (RDIs) in Support to Research and Development and Scientific and Technological Services | DOST R&D Institutes:<br>* Food and Nutrition Research Institute<br>* Advanced Science and Technology Institute<br>* Forest Products Research and Development Institute<br>* Industrial Technology Development Institute<br>* Metals Industry Research and Development Center<br>* Philippine Nuclear Research Institute<br>* Philippine Textile Research Institute | This is the fourth project of the DOST program "Establishment, Implementation and Maintenance of Management Systems in all DOST RDIs and Regional Offices." The project will upgrade the existing R&D and testing facilities of DOST's RDIs to enable them to respond quickly and efficiently to the requirements of their clients. |
| Establishment, Implementation and Maintenance of Management Systems in all DOST Research and Development Institutes (RDIs) and Regional Offices<br>*Project 1*: Implementation and Maintenance of Laboratory Accreditation in all DOST Laboratories in Accordance with ISO/IEC 17025 | DOST R&D Institutes:<br>* Food and Nutrition Research Institute<br>* Forest Products Research and Development Institute<br>* Industrial Technology Development Institute<br>* Metals Industry Research and Development Center<br>* Philippine Nuclear Research Institute<br>* Philippine Textile Research Institute<br>and DOST Regional Offices | The project will establish, implement and maintain laboratory and quality management systems in all DOST RDIs and Regional Offices as well as environmental management systems in the RDIs. |
| Organizational Transformation of DOST Agencies Towards Performance Excellence | PCIEERD, DOST Regional Office X, DOST – Metals Industry Research and Development Center | The project aims to expand the adoption of quality management systems and provide mechanisms for the alignment and integration of various approaches and systems necessary for the transformation of the DOST agencies towards performance excellence. |
| Rationalized Upgrading Project of DOST Regional Standards and Testing Laboratories (RSTL) | DOST's 16 Regional Standards and Testing Laboratories | The project aims to upgrade the facilities and expand the scope of services of the DOST's RSTLs to sustain the delivery of relevant, timely and quality services to priority industries in the regions. |
| Rationalized Upgrading Project of DOST Regional Standards and Testing Laboratories (RSTL) | DOST's 16 Regional Standards and Testing Laboratories | The project aims to upgrade the facilities and expand the scope of services of the DOST's RSTLs to sustain the delivery of relevant, timely and quality services to priority industries in the regions. |

## ENERGY SECTOR

The primary supply of energy in the Philippines are imported petroleum, coal and natural gas as well as indigenous new and renewable energy resources (NRE), with the latter largely being biomass fuels. Aside from NRE, other principal forms of energy are hydro and geothermal energy.

With the end goal of increasing the country's level of energy self-sufficiency, PCIEERD, through its Energy and Utilities Systems Technology Development Division (EUSTDD) headed by Engr. Darwin M. Rosales, continues to focus on the development of safe alternative energy sources, and the promotion of efficiency in energy use.

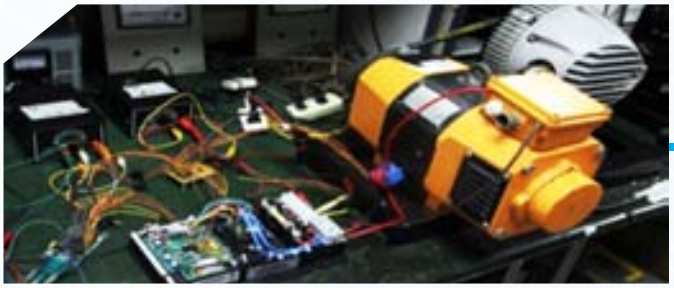
In 2011, EUSTDD monitored eight (8) projects under the energy sector that received funding from DOST-GIA and PCIEERD-GIA. The projects aim to develop low-cost energy solutions that are sustainable and applicable to local environmental conditions. One project being monitored by the Council is the wind power generator system being developed by the Electrical and Electronics Engineering Institute of UP Diliman. The wind generator system, which will have locally-manufactured parts and components, is designed to operate under the country's prevailing environmental conditions.

The Council also monitored a project that assessed the technical feasibility of using water hyacinth as substrate for biogas production and bioreactor composting. The research determined the optimum conditions that would result in maximum biogas production and shortest hydraulic retention time in the digester as well as highest compost yield in the bioreactor.

Meanwhile, the project "Capacity Building on Methane Emissions Recovery for Energy Production from Landfills in the Philippines" that received external funding, aims to address specific challenges to methane recovery such as raising awareness and improving local expertise and knowledge through training and seminar on the applicable technologies in the country and best management practices on methane recovery. Additionally, EUSTDD conducted project management and monitoring of two (2) projects under the transportation sector. The projects on automated guide-way transit system and local road vehicles focus on developing sustainable transport systems and modernizing utility vehicles.

The projects monitored by EUSTDD are presented in Tables 3A to 3D.

*A Groundbreaking Ceremony and Signing of Memorandum of Agreement (MOA) for the project Automated Guideway Transit was held at UP Diliman last July 18, 2011. DOST Secretary Mario G. Montejo (rightmost in the photo) and PCIEERD Executive Director Amelia P. Guevara (leftmost) was among those who led the Groundbreaking Ceremony.*



*For the project "Wind Power Generator System," a partial hardware setup of the wind emulator system was devised to initially test the performance of a wind generator system without the actual wind turbine.*

**Table 3A. Completed R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Energy*** | | |
| Utilization of Water Hyacinth for Biogas Production and Bioreactor Composting | DOST – Industrial Technology Development Institute | The project assessed the technical feasibility of using water hyacinth as substrate for biogas production and bioreactor composting. It also determined the optimum conditions that would result in maximum biogas production and shortest hydraulic retention time in the digester as well as highest compost yield in the bioreactor. |
| Transesterification of *Jatropha curcas* Oil and Coconut Oil by Microwave Irradiation | De La Salle University | The study found out that, compared with conventional heating, the microwave process can break down triglycerides with methanol and sodium hydroxide faster, which leads to higher yields of methyl esters. Results of the study also indicated that methyl ester showed higher yield when using *Jatropha curcas* oil as feedstock compared to coconut oil. |

**Table 3B. New R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Energy*** | | |
| Solar Fluid Heating System Dish Development for Drinking Water Project | Confederation of Scientific and Professional Organization – Region 7 (COSPO 7) | The main objective of the project is to develop a low-cost solar-powered fluid heating system (SPFHS) for drinking water using a mirror-film parabolic dish with a solar tracking device. The project will also conduct performance testing of the SPFHS and efficiency testing of the mirror-film as a reflector system. |

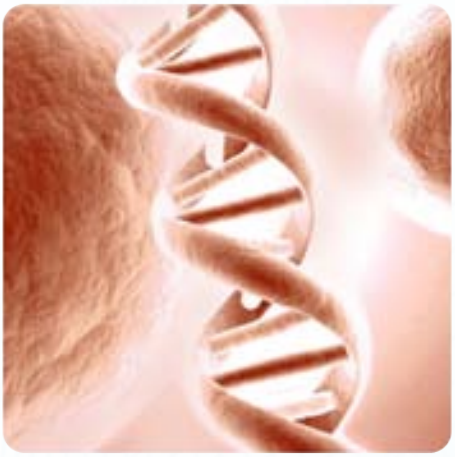
**Table 3C. Completed R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Energy*** | | |
| Pico-hydro Systems for Sitio Electrification | Camarines Norte State College – Daet | In support of the government's Expanded Rural Electrification Program, the project evaluated the techno-socio-economic application of the pico-hydro energy system for sitio/*purok* communal application. The pico-hydro energy system harnessed the energy potential of small streams/waterfalls and irrigation canals to generate clean and affordable electricity (200W to 1,000W). |
| Improvement of Degumming Process for Filtered Crude Coconut Oil | Philippine Coconut Authority | This project was implemented to upgrade the degumming process for the production of filtered crude coconut oil (FCCNO) currently installed in the municipality of Jomalig in Quezon. FCCNO is being used as a biofuel in stationary engines, providing electricity to 56 households. By the end of the project, a new reactor tank will be installed onsite, including a mechanical stirrer, temperature gauge, sight glass and piping systems. |

**Table 3D. New R&D projects with external funding.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Energy*** | | |
| Capacity Building on Methane Emissions Recovery for Energy Production from Landfills in the Philippines | PCIEERD, National Solid Waste Management Commission and DOST Regional Offices III, IV-A, IV-B, VI, VII, X and XI | The project aims to address specific challenges to methane recovery such as raising awareness as well as improving local expertise and knowledge through training and seminar on the applicable technologies in the country and best management practices on methane recovery.<br><br>Specifically, the project will identify cost-effective opportunities to recover methane emissions from landfills, identify the largest relevant emission estimates, and promote methane recovery and utilization projects for improvement of the local and global energy environment. |
| ***Transportation*** | | |
| Development of Customized Local Road Vehicle Standards | PCIEERD and DOST Regional Offices III, IV-A, IV-B, VI, VII, X and XI | The overall objective of this project is to modernize the customized local road vehicle fleet in the Philippines. It will focus on the utility vehicle category through the development and implementation of standards on vehicles and parts to ensure an environment-friendly and roadworthy motor vehicle fleet. |

*The project "Improvement of Degumming Process for Filtered Crude Coconut Oil" was implemented to upgrade the degumming process for the production of filtered crude coconut oil currently installed in the municipality of Jomalig in Quezon.*



## EMERGING TECHNOLOGY SECTOR

The Philippines has the potential to be a major player in the global arena of information and communications technology (ICT), biotechnology, nanotechnology, semiconductor and electronics industries. Due to the sustained efforts of the government, through the DOST, the country's R&D community has continuously produced innovations and advances in the emerging technology sector.

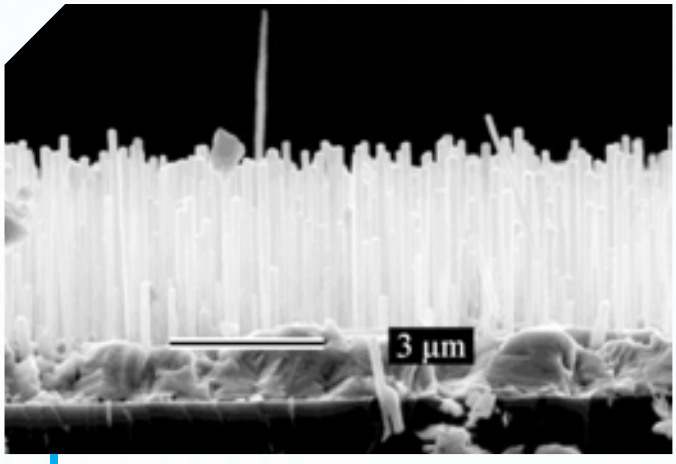
In 2011, PCIEERD, through its Emerging Technology Development Division (ETDD) headed by Engr. Nelson P. Beniabon, monitored 47 and 42 projects in the emerging technology sectors funded by DOST-GIA and PCIEERD-GIA, respectively. These projects focus on expanding the use and application of space technology, photonics, biotechnology, nanotechnology, genomics, materials science, ICT, semiconductor and electronics in the Philippines.

For instance, the projects on flood and weather monitoring systems as well as on landslide warning systems make use of advanced technologies such as wireless sensors and satellite communication. It is hoped that with ICT-backed projects, the country will be more prepared for natural disasters such as floods and landslides.

Meanwhile, the project on automated rapid reef assessment aims to create an underwater machine vision system that will allow more efficient surveys and appraisals of threatened reefs as well as shorten time required to do reef classification. Once completed, the computerized reef assessment system can be deployed to coastal managers to enhance their capability in assessing the state of their coral reefs.

The projects monitored by ETDD are presented in Tables 4A to 4F.

*Local residents assist the project team in setting up an early warning system for landslides, slope failures and debris flow.*




*The ongoing project "Nanostructured Solar Energy Devices" aims to develop new innovations in solar cell energy research based on nanotechnology. Photo shows a scanning electron microscope image of Gallium Arsenide (GaAs) nanowires on silicon substrates produced via molecular beam epitaxy. GaAs nanowires enhance solar cell performance.*

**Table 4A. Completed R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Biotechnology*** | | |
| Database and Systems Biology for Selected Plants and Associated Arthropods in the Four Subcatchments of Mt. Isarog National Park<br>*Project 1:* Inventory and Documentation of Some Plants and Their Associated Arthropods in MINP | Ateneo de Naga University and University of the Philippines Manila | Project 1 of this program conducted an inventory and documentation of existing plants and their associated arthropods in Mt. Isarog National Park. Projects 2 to 4 are ongoing. |
| ***Materials Science – Smart and Functional Materials*** | | |
| High Value-added Materials for the Semiconductor and Electronics Industry<br>*Project 1:* Modification of Surface Properties of Polymer Materials by Plasma Treatment<br>*Project 2:* Deposition of Superior Metallization Layers by Pulse-plating Technique<br>*Project 3:* Nanomaterials from Indigenous Sources of the Semiconductor and Electronics Industry | Department of Mining, Metallurgical and Materials Engineering, University of the Philippines Diliman | The program was able to modify the surface property of polymers through treatment in an ion shower facility to make them more wettable or hydrophilic in nature. Further, through the program, a locally fabricated pulse plating system was used to deposit a layer of tin with target applications for PCB coat as replacement for electroless nickel gold technology. |

**Table 4B. Ongoing R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Project Objectives |
|---|---|---|
| ***Biotechnology*** | | |
| Database and Systems Biology for Selected Plants and Associated Arthropods in the Four Subcatchments of Mt. Isarog National Park<br>*Project 2:* Multi-modal Network Database and Analysis System for Data Acquisition and Systems Biology<br>*Project 3:* Chromatographic and Spectrophotometric Profiling and Chemical Marker Identification of Selected Plants and Associated Arthropods of Interest<br>*Project 4:* Protein Profiling and Genomic Studies of Selected Plants and their Responses to Associated Arthropods | Ateneo de Naga University and University of the Philippines Manila | The program aims to create a database management system and systems biology network for genomic, proteomic and chemical profiles of existing plants and their associated arthropods in Mt. Isarog National Park. |

**Table 4B. Ongoing R&D projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Electronics*** | | |
| Eye C: Design of a Vision Capable Microcontroller Integrated Circuit (IC) for a Robot Explorer<br>*Project 1:* Microcontroller Design for Micro-mouse Applications<br>*Project 2:* Charge-coupled Device Interface with Color to Monochrome Image Conversion<br>*Project 3:* An 18-bit Oversampling Audio Delta Sigma D/A Converter Design<br>*Project 4:* Design of a High-power Supply Rejection Ratio Two-stage Operational Amplifier | Electrical and Electronics Engineering Institute, University of the Philippines Diliman, University of San Carlos, Mindanao State University – Iligan Institute of Technology and Mapúa Institute of Technology | The program aims to move-up university electronics research in the Philippines by providing Engineering for Research and Development for Technology (ERDT) member universities access to the tools and experience in implementing and testing their own IC designs. |
| Digital Design and Interfacing for ERDT's Semiconductor and Electronics Track<br>*Project 1:* Application-specific Integrated Circuit and System Level Design<br>*Project 2:* Interface Module Design<br>*Project 3:* High-speed Printed Circuit Board Design | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | The program aims to come up with a system integration solution. The design of the high-speed system solutions will start with the system level design using programmable devices such as field programmable gate arrays. |
| Chip Design for ERDT's Semiconductor and Electronics Track<br>*Project 1:* Radio Frequency Complementary Metal-Oxide Semiconductor (RF CMOS) Design<br>*Project 2:* Analog and Mixed Signal Integrated Circuit design<br>*Project 3:* Low-power Reduced Instruction Set Computer (RISC) Design | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | The program aims to design system-on-chip (SoC) solutions for a wide range of consumer requirements. Aside from the SoC solutions, a direct output of this program would be the increase in the number of highly skilled engineers that would be needed by the country's electronics industry. |
| SODERA: Development of Software-defined Radio Platforms and Techniques for Enabling Next Generation Wireless Communication Networks | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | The project will develop wireless technology through software-defined radio research and communications signal processing. The technology will be at the core of defensible and differentiated wireless products that can be offered in the global wireless market. |
| ***Information and Communications Technology*** | | |
| Innovation and Design for Manufacturability of Microwave (MW) and Millimeter (MM)-wave Radio Modules Through Industry Collaboration | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | The project aims to design and characterize prototypes of functional passive and active MW and MM wireless communication system blocks that incorporate design generated from industry. |

**Table 4B. Ongoing R&D projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Information and Communications Technology*** | | |
| Rain Monitoring and Alarm System Using Hybrid Wireless Networks | Ateneo de Manila University | The project aims to do a proof of concept of a rain-related alarm system based on hybrid technologies (Wifi/Smart broadband, wireless IP Access System (WIPAS), Global System for Mobile Communication (GSM)) using acoustic sensors and tipping buckets with user interfaces for web access and mobile phone service. |
| Development of an Educational Data Mining (EDM) Workbench | Ateneo de Manila University | The project will develop the EDM workbench and test it with tutors in at least five domains. The EDM workbench is a software tool that will accept as input raw data from intelligent tutors, pre-process it according to the specifications of researchers and analysts, and output it into formats that other analysis tools can read. |
| Access Control for Collaborative Internet-based Digital Content | Department of Computer Science, University of the Philippines Diliman | The project aims to investigate access control models for Internet-based collaborative platforms. |
| LEAP: Learning While Playing | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | The project aims to study the current learning models, theories, and pedagogical classifications of existing educational game and apply it in a local setting. |
| Towards a Context-aware Classification and Retrieval System of e-Learning Materials | Department of Computer Science, University of the Philippines Diliman | The project aims to define a context-aware classification system of e-Learning materials for the Philippines' school system. The said system will also be used for retrieval of e-Learning materials from various sources. |
| Program: Inter-Disciplinary Signal Processing for Pinoys (ISIP)<br>*Project 6:* Philippine Languages Database for Mother Tongue-based Multilingual Education and Applications | Electrical and Electronics Engineering Institute, University of the Philippines Diliman | Project 6 aims to create Philippine languages corpora that will jumpstart the preservation of the many languages of the Philippines through recorded, spoken and written text. |
| ***Nanotechnology*** | | |
| Nanostructured Ultrathin Films Based on Electrochemically Grafted Polymer Brushes | Institute of Chemistry, University of the Philippines Diliman | The project aims to pursue the systematic design, synthesis and characterization of new dendritic-linear block copolymers with electropolymerizable functional groups of various dendron generation and linear block molecular weights. The output will be applied in display and photovoltaic devices. |

**Table 4B. Ongoing R&D projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Photonics*** | | |
| Automated Rapid Reef Assessment *Project 2:* Computerized Reef Assessment and Visualization | National Institute of Physics, University of the Philippines Diliman | With the completion of the first project, Project 2 aims to create an underwater machine vision system, which can provide automated reef assessment in a rapid manner. |
| Preparation of Tc 99m Radiopharmaceuticals and Radio-labelled Compounds for Medical Applications | DOST – Philippine Nuclear Research Institute | The project aims to develop protocols for the preparation of 99mTc biomolecules and radio-labeled compounds for medical research applications. |
| ***Space Technology Applications*** | | |
| Satellite and Field Detection and Analysis of Ground Subsidence in KAMANAVA and Metro Manila | National Institute of Geological Sciences, University of the Philippines Diliman | The project aims to determine the extent and rates of ground subsidence in Metro Manila, particularly the KAMANAVA area and nearby coastal areas such as Hagonoy and Obando, Bulacan, where lowering of the ground surface levels are at alarming rates. |

*The project "Cloning of the Cry1Ab Cadherin Receptor Gene for Detection of Bt Corn Resistance Development in the Asian Corn Borer Ostrinia furnacalis (Guenee)" aims to clone Cry1Ab cadherin receptor gene from the 4th instar larvae of the Asian corn borer Ostrinia furnacalis to detect development of Bt corn resistance from said corn borer*

*The water level monitoring station being developed by the DOST – Advanced Science and Technology Institute will be deployed in critical flood-prone areas throughout the Philippines for flood monitoring and forecasting.*

**Table 4C. New R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Information and Communications Technology*** | | |
| ICT R&D Roadmap and Rationalized Program Preparation | DOST – Information and Communications Technology Office | The project aims to produce a medium-term development plan for ICT research and development and its linkages to the ICT industry, e-governance infrastructure and information system plan. |
| ***Nanotechnology*** | | |
| Novel Polyaniline (PANI) Synthetic Transition Metal Smectite Nanocomposites | Mariano Marcos State University | The project aims to prepare PANI-synthetic transition metal clay minerals and determine their novel advantages over traditional PANI-montmorillonite and PANI-hectorite nanocomposite. Further, it aims to produce a prototype of the PANI-clay nanocomposites from different clay types. |
| ***Space Technology Applications*** | | |
| Nationwide Disaster Risk Exposure Assessment for Mitigation (DREAM) Program<br>*Project 1:* Light Detection and Ranging (LIDAR) and Interferometric Synthetic Aperture Radar (InSAR) Data Acquisition<br>*Project 2:* LIDAR and InSAR Data Calibration and Validation<br>*Project 3:* Extracting Digital Elevation Models and Salient Features for Flood Modeling<br>*Project 4:* Integrating High Resolution Digital Elevation Models into Geographic Information System-based Flood Modeling<br>*Project 5:* Training for LIDAR Acquisition and Flood Modeling | Training Center for Applied Geodesy and Photogrammetry, University of the Philippines Diliman | The program aims to produce three-dimensional flood and hazard maps for the major watersheds and river systems in the Philippines. It will also acquire "state-of-the-art technology" that will be used to gather and provide accurate and up-to-date weather information and real-time flood forecasts. |

**Table 4D. Completed R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Biotechnology*** | | |
| Plant Growth-promoting Factors from Rhizobacterial Strains of Sago Year 2 | University of the Philippines Los Baños | The project determined the morphological, biochemical and molecular identification of various rhizobacteria from sago. Further, the hormone-like activity of the rhizobacteria from sago was quantified and the growth-promoting mechanisms of the rhizobacterial strains were also characterized. |

**Table 4D. Completed R&D projects funded by PCIEERD-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Electronics*** | | |
| Field Programmable Gate Array-based Wireless Protocol and Sensor Applications | Bughaw Electronic Solutions and Technologies, Inc. | Seven (7) daughter-boards were developed with the following protocols with each to be connected to an FPGA-based motherboard: (1) Bluetooth, (2) infrared, (3) Zigbee, (4) Global Positioning System, (5) accelerometer, (6) temperature, humidity and carbon monoxide sensors, and (7) motors (DC, stepper and servo). |
| ***Materials Science – Smart and Functional Materials*** | | |
| Printable Solar Cell Device Coupled with a Supercapacitor Energy Storage Device | Ateneo de Manila University | A technology for a printable solar cell device was developed. The technology was based on the dye-sensitized solar cell design and was coupled with a supercapacitor as energy-storage device. |
| Production of Carbon Nanotubes (CNTs) in the Presence of Magnetic Field and Other External Factors by Microwave Enhanced Chemical Vapor Deposition | De La Salle University | The project performed preliminary experiments on the effect of magnetic fields on the alignment of CNT produced in the microwave-induced plasma-assisted chemical vapor deposition. |
| ***Nanotechnology*** | | |
| Nanozeolites from Rice Hull Ash for Application to Protein Studies | Institute of Chemistry, University of the Philippines Los Baños | The project synthesized nanozeolites from rice hull ash for use in protein isolation and purification studies. |
| Nanomaterials from Indigenous Sources for the Removal of Arsenic from Ground Water | Institute of Chemistry, University of the Philippines Los Baños | Utilization of nanomaterials from indigenous sources was explored for remediation of groundwater from arsenic contamination. |
| Development of Biodegradable Starch-clay Nanocomposites for Advanced Food Packaging | DOST – Industrial Technology Development Institute | The project developed biodegradable nanocomposites for use in advanced food packaging. |
| Development of Hemicellulose-chitosan-tripolyphosphate Nanocomposite Coating for the Postharvest Life Extension of Papaya *(Carica papaya)* | Institute of Chemistry, University of the Philippines Los Baños | Nanocomposite coating from hemicelluloses isolated from pineapple crown leaves and chitosan-tripolyphosphate nanoparticles was prepared for the postharvest life extension of papaya. |

**Table 4E. Ongoing R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Project Objectives |
|---|---|---|
| ***Biotechnology*** | | |
| Cloning of the Cry1Ab Cadherin Receptor Gene for Detection of Bt Corn Resistance Development in the Asian Corn Borer *Ostrinia furnacalis* (Guenée) | National Institute of Molecular Biology and Biotechnology, University of the Philippines Los Baños | The project aims to clone Cry1Ab cadherin receptor gene from the 4th instar larvae of the Asian corn borer *Ostrinia furnacalis* to detect development of Bt corn resistance from said corn borer. |

**Table 4E. Ongoing R&D projects funded by PCIEERD-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Information and Communications Technology*** | | |
| Towards the Development of a Self-improving and Ambient Intelligent Emphatic Space: Data-centric, Multi-modal Emphatic Modeling from a Pluridisciplinary Perspective (Year 3)<br>*Project 1:* Development of Scalable Computing System for an Ambient Intelligent Emphatic Space<br>*Project 2:* An Adaptive Multimodal Affect Recognition System in the Emphatic Space<br>*Project 3:* Using Body Movement for Automatic Human Identity and Emotion Recognition in the Emphatic Space<br>*Project 4:* Adaptive and Self-improving Emphatic Responses for an Ambient Intelligent Emphatic Space<br>*Project 5:* Developing an Adaptive Music-based Affect Model for Self-improving Ambient Intelligent Emphatic Space<br>*Project 6:* Adaptive Emphatic Feedback in an Intelligent Tutoring System for Object-oriented Programming | De La Salle University | The program aims to develop a self-improving, ambient intelligent emphatic space using a data-centric, multi-modal emphatic modeling from pluridisciplinary disciplines. |
| Development of Affect-sensitive Interfaces (Year 2) | Ateneo de Manila University | The project aims to develop several emotionally intelligent embodied conversational agents (ECAs) that can recognize and respond sensitively to user affect. The development of ECAs in general is significant to the field of human-computer interaction because it provides users with a human-like interface metaphor capable of exhibiting human-human interactions. |
| ***Materials Science – Smart and Functional Materials*** | | |
| Development of a Microwave-induced Atmospheric Plasma Jet | University of the Philippines Manila | The project aims to develop an atmospheric plasma jet replacing the plasma chamber and vacuum systems from conventional low-pressure plasmas with customized tapered waveguide and gas nozzle system. To test the capability of the plasma jet assembly, various industrial surfaces such as metals, polymers, plastics, wood and glass will be treated by various plasma jets for enhanced wettability characteristics. Atmospheric plasma jets are being used for fast and easy plasma cleaning, activation and etching of various semiconductor and electronic materials. |

**Table 4E. Ongoing R&D projects funded by PCIEERD-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Materials Science – Smart and Functional Materials*** | | |
| Magnetic Susceptibility Characterization on Yttrium Barium Copper Oxide (YBCO) Superconductor Under Alternating Current (AC) and Direct Current (DC) Magnetic Field | National Institute of Physics, University of the Philippines Diliman | The project aims to investigate the effect of adding low DC magnetic field to the AC magnetic susceptibility behavior of a polycrystalline YBCO superconductor. Further, a mechanism will be proposed for the losses observed in the susceptibility data that includes the effect of the DC field to the behavior observed. |
| ***Nanotechnology*** | | |
| Syntheses of Hybrid Nanocomposites from Coconut Fatty Acid for Polymer and Environmental Use (Year 1) | Institute of Chemistry, University of the Philippines Diliman | The project aims to use locally available materials like coconut fatty acid in combination with locally abundant montmorillonite in producing nanocomposites. Nanocomposite is a manmade material designed for enhanced performance in any number of applications: structural, functional or cosmetic. |
| Conjugated Diblock Copolymer Nanocomposite Heterojunctions-Nanostructured Materials for Improved Photovoltaics (Year 1) | Institute of Chemistry, University of the Philippines Diliman | The project aims to design, fabricate, and characterize a novel set of conjugated polymer nanocomposites, where there will be control over the morphology, nanoparticle dispersion, nanoparticle spatial distribution, and biphasic interface. |
| Development of Electrochemical Surface Plasmon Resonance (SPR) Sensing Using Electroploymerized Molecularly Imprinted Polymer (MIP) and Nanomaterials for Detecting Endocrine-Disrupting Contaminants (EDCs) and Chemical Contaminants (CCs) | Institute of Chemistry, University of the Philippines Diliman | The project aims to develop a sensor based on novel ultra-thin films of molecularly imprinted polymer-nanomaterial composite as recognition elements for a variety of CCs and EDCs. |
| Optical Sensor for Cd (II) ions Based on Gluthathione-capped Gold Nanoparticles | Research Center for Natural Sciences, University of Santo Tomas | The project aims to develop an optical sensor for the detection of Cd(II) ions based on the localized surface plasmon resonance of glutathione-capped gold nanoparticles. |
| Synthesis of Nanosilica from Local Silica from High Performance Concrete | DOST – Industrial Technology and Development Institute | The project aims to develop nanosilica from natural resources for high-performance concrete. |
| Development of Nanostructured Composite Coatings by Electrodeposition | DOST – Industrial Technology and Development Institute | The project aims to obtain a zinc (Zn) nanosized inorganic composite coating on mild steel substrate and to fabricate a prototype/sample product (component or part) of electrodeposited Zn-inorganic nanoparticle composite steel. |
| Preliminary Investigation on the Development of Fire Retardant from Nanostructured Inorganic Materials | DOST – Forest Products Research and Development Institute | The project aims to determine the possibility of developing fire retardants from nanostructured indigenous materials. |

**Table 4F. New R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Biotechnology*** | | |
| Capability-building in Research and Development on Genomics<br>*Project 1:* Establishment of the Philippine Genome Center Deoxyribonucleic Acid (DNA) Sequencing Core Facility (DSCF)<br>*Project 2:* Establishment of the Philippine Genome Center Core Facility for Bio-informatics (CFB) | University of the Philippines Diliman | As part of the country's capacity-building in genomics and bioinformatics, the program aims to establish a research and service infrastructure for Next-generation DNA Sequencing technologies. At the beginning, the core facilities will initially service the immediate needs of the heath, agriculture, forensics and ethnicity, and biodiversity programs of the Philippine Genome Center and other clients in the public and private sectors. |
| Sago Bioresource Conservation and Sago Flour Production<br>*Project 1:* Clonal Propagation of Sago Palm<br>*Project 2:* Flour Production from Sago for Food and Non-food Uses | University of the Philippines Mindanao | The program aims to continue research efforts on sago palm micropropagation. It also aims to produce flour obtained from sago for food and non-food uses. |

*The program "Sago Bioresource Conservation and Sago Flour Production" aims to continue research efforts on sago palm micropropagation. It also aims to produce flour obtained from sago for food and non-food uses.*

**Table 4F. New R&D projects funded by PCIEERD-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Biotechnology*** | | |
| Utilization/Conversion of Sago Starch into Value-added Products: Lactic Acid and Ethanol<br>*Project 1:* Cloning and Expression of Raw Starch-digesting Amylase Genes from *Saccharomycopsis fibuligera* and *Saccharomycopsis bubodii* for Direct Ethanol Fermentation<br>*Project 2:* Ethanol Fermentation of Sago Starch Using Raw Starch-digesting Amylases: Strategies for Ethanol Production without the Costly Starch Pre-treatment<br>*Project 3:* Direct Lactic Acid Fermentation of Sago Starch Without the Costly Starch Pretreatment Using *Enterococcus faecium* DMF78: Pilot Scale Costing of the Process | University of the Philippines Mindanao | The program aims to isolate genes from natural sago processors – such as microorganisms and enzymes and express these in another bacterium. This research is important in processing sago starch into valuable products. The research program will utilize a microorganism that is capable of converting starch directly into lactic acid and ethanol in a fermentation process. |
| Emergency Distribution of Hydro-meteorological Devices in Hard Hit Areas in the Philippines | DOST – Advanced Science and Technology Institute | The project aims to produce and distribute hydrometeorological devices to forecast the onslaught of rising waters as well as establish a reliable network in which the data can be transmitted. |
| Inter-disciplinary Signal Processing for Pinoys (ISIP) Program<br>*Project 1:* Digital Database of Filipino Words<br>*Project 2:* Automatic Detection of Code-switching from English to Filipino<br>*Project 3:* Real-time Closed Captioning for Broadcasted News in Filipino<br>*Project 4:* Development of an Automated Filipino Essay Grader<br>*Project 5:* Implementation of a Real-time Filipino Speech Synthesizer | University of the Philippines Diliman and De La Salle University | The focus of this program is Filipino language and speech as these relate to education and different-abled person. Its objective is to address the pressing issues in the country's educational system by technology intervention in language and speech. |
| ***Space Technology Applications*** | | |
| Sago Bioresource Assessment for Sustainable Industry Utilization Using Remote Sensing, Geospatial, and Suitability Analyses<br>*Project 1:* GIS-assisted Assessment of Yield of Sago for Sustainable Industry Utilization<br>*Project 2:* Biophysical, Structural and Spectral Characterization of Sago and its Environmental Conditions | University of the Philippines Mindanao | The program aims to assess the current and potential yield of sago as well as map its habitats for a sustainable sago starch-based industry. Further, it will determine the biophysical, structural and spectral characteristics of sago palm. |

## SPECIAL CONCERNS

It is important to have a systematic approach in identifying, assessing and reducing the risks of disaster.

In 2011, the Council, through EUSTDD, monitored 12 projects aimed to reduce the country's socio-economic vulnerabilities to disasters, and to enhance the government's capability to deal with environmental and other hazards that trigger them.

For instance, the project at UP's Training Center for Applied Geodesy and Photogrammetry aims to integrate a flood model in a Geographic Information System platform, and design a tool for identifying evacuation routes, rescue strategies and other useful strategy-building efforts. Another project being monitored by PCIEERD aims to develop a low-cost and sustainable off-shore meteorological buoy system capable of real-time data acquisition. Once completed, the system will help improve maritime safety and enhance the weather forecasting system in the Philippines.

The projects on disaster risk reduction and mitigation are presented in Tables 5A to 5C.

*The project "Geology of an Overriding Plate: Constraints from Field Geology, Sediment Geochemistry and Paleontology" aims to decipher the geologic evolution of the Masbate, Samar and Negros Islands. Shown in the photos are field researchers conducting geologic field, sediment geochemical and paleontological investigations in the target areas.*


*The project "Philippine-Taiwan Integrated Predictive Studies of Geometeorological Hazard" aims to refine the ClimateX software, which provides forecasts of rainfall events based on historical statistical data, and infrared and water vapor images.*

**Table 5A. Completed R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Disaster Management*** | | |
| Determination of Water Impoundment Capacity Along the Wawa Reservoir for Flood Control and Mitigation | Training Center for Applied Geodesy and Photogrammetry, University of the Philippines | The study obtained the topographic and elevation data within the Wawa Reservoir to determine its capacity. These information will help improve the government and local communities' flood monitoring, forecasting and warning systems. |
| Establishment of Spillover Elevation Along Flood Prone River System: Marikina-Pasig River | Training Center for Applied Geodesy and Photogrammetry, University of the Philippines | The project established the evaluation levels within the vicinity of the flood monitoring stations along the Marikina-Pasig River. It determined the location of existing standard horizontal reference points and benchmarks nearest to the water level monitoring stations. These were used as point of reference or baseline of the surveys conducted. |

**Table 5B. New R&D projects funded by DOST-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Disaster Management*** | | |
| Philippine-Taiwan Integrated Predictive Studies of Geometeorological Hazards | National Institute of Geological Sciences, University of the Philippines Diliman | The project aims to refine the ClimateX software, which is designed to provide forecasts of rainfall events based on historical statistical data, and infrared and water vapor images. The software will be improved by including other data sources in its calculations. |
| Geology of an Overriding Plate: Constraints from Field Geology, Sediment Geochemistry and Paleontology | National Institute of Geological Sciences, University of the Philippines Diliman | The project will decipher the geologic evolution of the Masbate, Samar and Negros Islands. Specifically it will conduct geologic field, sediment geochemical and paleontological investigations in target areas in each island. The results of this study will also comprise the primary framework for geohazard evaluation. |
| Linking Active Margin Tectonics and Overriding Plate Dynamics: A Look at the Geochemical Nature of the Central Philippines | National Institute of Geological Sciences, University of the Philippines Diliman | The research project will look into the more salient features of an overriding plate, in particular, its volcanic history and how the introduction of magmatic materials have shaped the region and their implications to present-day environmental conditions, geohazard risks and mineralization potentials. The results of this study will also be used to generate geohazard susceptibility maps. |
| Retracing the Central Philippine Overriding Plate Motion | National Institute of Geological Sciences, University of the Philippines Diliman | The project will collect substantial geochronologic data that will not only help with paleomagnetic studies but also augment the scarce Philippine data on absolute ages. It will also help in delineating crustal boundaries, which is a significant indicator for geohazard potentials and for tracing mineral distributions and extensions. |

**Table 5B. New R&D projects funded by DOST-GIA. (cont.)**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Disaster Management*** | | |
| Geophysical Characterization of an Overriding Plate: Arc Continent Convergence and its Implications for Nature Hazards and Resource Distribution in Central Philippines | National Institute of Geological Sciences, University of the Philippines Diliman | The study aims to characterize the effects of past plate motions of the Central Philippines' overriding plate segment on the geophysical character of the different lithologic units in Central Philippines. Through the project, gravity and magnetic surveys will be conducted to delineate the different geologic terranes, particularly their boundaries (i.e. faults and shear zones). |
| Modeling of Flashflood Events by Integrated Geographic Information System (GIS) and Hydrological Simulations | Training Center for Applied Geodesy and Photogrammetry, University of the Philippines | The project will integrate a flood model in a Geographic Information System platform, and will design a tool for identifying evacuation routes, rescue strategies and other useful strategy-building efforts. |
| Development of Geospatial Analysis Tools for Catchment Runoff Responses to Extreme Rainfall Events and Applications for Disaster and Environment Management | Training Center for Applied Geodesy and Photogrammetry, University of the Philippines | The project will develop a dynamic Geographic Information System data model for hydrological simulation of the Agos River Basin. Hydrological simulation is a mathematical model used to simulate river or stream flow. In addition, the project will establish the relationship between rainfall canopy interception and soil infiltration on location and degree of landslide occurrences. It will also establish a rainfall-runoff response that can serve as an input source for flood forecasting and as a guide for disaster contingencies during extreme rainfall events. |
| Development of a Low-cost and Locally-designed Meteorological Buoy | DOST – Advanced Science and Technology Institute | The project aims to develop a low-cost and sustainable off-shore meteorological buoy system capable of real-time data acquisition. The system that will be developed will help improve maritime safety and enhance the weather forecasting system in the Philippines. Two prototypes of the meteorological buoy will be fabricated and tested. |

**Table 5C. Completed R&D projects funded by PCIEERD-GIA.**

| Program / Project Title | Implementing Agency | Description |
|---|---|---|
| ***Disaster Management*** | | |
| Quantified Flood Forecasting through Rain Rate Estimation Using Satellite Imagery and Generalized Watershed Runoff Calculations | National Institute of Geological Sciences, University of the Philippines Diliman | The study calibrated the spectral values of selected satellite imagery of the Pasig-Marikina and San Roque River basins with ground data to estimate and forecast rain rates. It also established flood threshold values and developed flood hazard protocols for the water basins. Additionally, the project replicated and expanded the methodology to other flood-prone areas in the Philippines. |


*Program Highlights*
HUMAN RESOURCE
AND INSTITUTION
DEVELOPMENT

PCIEERD recognizes the value of human resource capital in the development of the country. The Council, through the Human Resources and Institution Development Division headed by Engr. Ermie M. Bacarra, provides grants for scholarships, fellowships, and overseas research and post-doctoral research activities. Financial assistance for the conduct of conferences and seminars is also provided.

### *Scholarship Program*

In 2011, the Council continued to implement its Human Resource Development Program (HRDP) and the Accelerated Science and Technology Human Resource Development Program (ASTHRDP) of the Department of Science and Technology (DOST). Both programs provide scholarships for MS and PhD studies in engineering and advanced science and technology fields.

**Table 6. Distribution of scholars in the graduate program for SY 2011-2012.**

| Category | PCIEERD's Human Resource Development Program | DOST's Accelerated Science and Technology Human Resource Development Program | |
|---|---|---|---|
| | | Science | Engineering |
| Masters in Science (Total – 80) | | | |
| New MS | 1 | --- | --- |
| Ongoing MS | 7 | 21 | 51 |
| Doctor of Philosophy (Total – 34) | | | |
| New PhD | --- | --- | --- |
| Ongoing PhD | 2 | 14 | 18 |

**Table 7. Distribution of graduates under DOST's Accelerated Science and Technology Human Resource Development Program.**

| Category | Graduated in 2011 | | Total Number of Graduates (as of end of 1st Sem SY 2011-2012) | |
|---|---|---|---|---|
| | Science | Engineering | Science | Engineering |
| MS | 49 | 24 | 88 | 36 |
| PhD | 2 | 1 | 2 | 1 |
| Total | 51 | 25 | 90 | 37 |

**Table 8. Distribution of graduates under PCIEERD's Human Resource Development Program.**

| Category | Graduated | Total Number of Graduates (as of end of 1st Sem SY 2011-2012) |
|---|---|---|
| MS | 7 | 340 |
| PhD | 5 | 118 |
| Total | 12 | 458 |

### *Fellowships in Advanced Science and Technology (FAST)*

In 2011, PCIEERD provided financial assistance to three (3) scholars for the conduct of their thesis or dissertation in universities abroad as part of the Overseas Research Enrichment Program/Sandwich Program and Post-doctoral Program under the Fellowships in Advanced Science and Technology (FAST).

Ms. Emelda A. Ongo and Mr. Jonyl L. Garcia completed their sandwich programs at the University of Brescia in Italy in August 2011 and National Central University in Taiwan last April 2011, respectively. The title of the research work conducted by Ms. Ongo was “Headspace Analysis of Philippine Civet Coffee Using Gas Chromatography Mass Spectrometry and Electronic Nose,” while Mr. Garcia worked on “Electropolymerization of 3,4- ethylenedioxy-thiophene on Bare and Iodine-Modified Pt(111) Single Crystal Electrode: Electrochemical and Surface Studies.”

Ms. Rosalie B. Reyes is currently completing her PhD program at the Asian Institute of Technology in Thailand, specializing in remote sensing. Her research is titled “Defining the Height System and Vertical Datum in Metro Manila Based on an Equipotential Surface.”

### *Overseas Research Enrichment Program and Post-doctoral Program*

The Council administers the Overseas Research Enrichment Program/Sandwich Program and Post-doctoral Program under the DOST-ASTHRDP for science and engineering components.

One (1) PhD scholar, Ms. Lilia M. Fernando, was sponsored in her sandwich program at Michigan State University to conduct her research titled ”Biogenic Synthesis of Nanoparticle and its Use as Transducer in the Fabrication of Biosensor for the Rapid Detection of *E.coli* 0157:H7.”

Meanwhile, Dr. Gay Jane P. Perez completed her post-doctoral program at the NASA Goddard Space Flight Center in Maryland, USA in November 2011. The title of Dr. Perez’s research work is “Variability and Trend Studies of Vegetations and Plankton Concentrations in the Philippines.” PCIEERD also provided partial support to Dr. Perez under the Council’s Fellowships in Advanced Science and Technology program.

*PCIEERD provided financial support to the activity “Global Conference on Ethics in Science and Technology” that was held at the University of Santo Tomas in Manila last October 20-22, 2011. The conference was organized to provide a platform for the discussion of ethical issues and concerns in the development and application of the new fields of science and technology.*

**Table 9. Technical seminars/conferences supported by PCIEERD.**

| Title of Conference/ Seminar | Date | Institution |
|---|---|---|
| First Philippine Nutrigenomics Conference | January 19-20, 2011 | DOST – Food and Nutrition Research Institute |
| Seminar on Bioanalytical Nanotechnology | January 31 February 11, 2011 | Research Center for the Natural Sciences, University of Santo Tomas |
| 6th Asian-Pacific Organization for Cell Biology Congress: Challenges in Cell Biology: Health, Agriculture, Industry and Education | February 25-28, 2011 | Philippine Society for Cell Biology |
| 11th Annual Philippine Computing Science Congress 2011 | March 4-5, 2011 | Computing Society of the Philippines |
| 5th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management | March 10-13, 2011 | De La Salle University |
| SEAMS-Manila School on the Applications of Algebra and Analysis | April 4-15, 2011 | Institute of Mathematics, University of the Philippines Diliman |
| Training-Workshop on Basic and Advanced GPS Data Analysis and Modeling for Scientific and Practical Applications | October 17-24, 2011 | Training Center for Applied Geodesy and Photogrammetry, University of the Philippines Diliman |
| 13th Samahang Pisika ng Visayas at Mindanao National Physics Conference | October 20-22, 2011 | Samahang Pisika ng Visayas at Mindanao |
| Global Conference on Ethics in Science and Technology | October 20-22, 2011 | University of Santo Tomas |
| 29th Annual National Physics Congress of the Samahang Pisika ng Pilipinas | October 24-26, 2011 | Samahang Pisika ng Pilipinas |
| 4th AUN/SEED-Net Regional Conference on Natural Resources and Materials | October 27-28, 2011 | College of Engineering, University of the Philippines Diliman |
| Capability Enhancement of Energy Audit Team in Region 2 | November 8-11, 2011 | DOST Regional Office II |
| 38th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology | December 8-9, 2011 | Philippine Society of Biochemistry and Molecular Biology |

### *Support for Seminars/Conferences*

Out of the 26 requests evaluated for funding assistance for the conduct of scientific seminars and conferences, PCIEERD provided financial assistance to 13 conferences/seminars amounting to P1,968,410. Table 9 presents these seminars/conferences.

### *Research Fellowships Under the Re-entry Program*

In 2011, PCIEERD provided financial support to Dr. Jose H. Bergantin of the Research Center for Natural Sciences at the University of Santo Tomas, and Dr. Ryan B. Balili of the Physics Department of Mindanao State University – Iligan Institute of Technology for their research projects on nano-particles and hydrophobic materials, respectively. Dr. Bergantin's project is titled "Development of a Homogenous Assay for the Saxotoxin-based Light Scattering Signals from Gold Nano-particles, while the project of Dr. Balili is titled "Optical Micro Structuring of Hydrophobic Materials."

### *Management of DOST-GIA Projects*

The Council's Human Resource and Institution Development Division (HRIDD) continued to evaluate and monitor projects funded by the Grants-In-Aid (GIA) Program of the DOST. Table 10 lists the institution development and capability-building projects monitored by PCIEERD in 2011.

**Table 10. List of institution development and capability-building projects monitored in 2011.**

| Program/Project Title | Implementing Agency |
|---|---|
| eDOST: Institutionalizing ICT within the DOST System Program (ASTI)<br>*Project 1:* e-DOST: Upgrading of ICT Infrastructure and Interconnectivity Network (e-DOST Infra)<br>*Project 2:* e-DOST: Upgrading of DOST Information System (eDOST-INFOSYS)<br>*Project 3:* e-DOST: Programs and Change Management and Implementation of Open Standards to DOST (eDOST OPEN STANDARDS) | DOST – Advanced Science and Technology Institute |
| Philippine e-Grid Program (ASTI)<br>*Project 1:* Boosting Grid Computing Using Reconfigurable Hardware Technology | DOST – Advanced Science and Technology Institute |
| Mindanao Opportunities for Vitalized Education and Upgrading of Science (MOVE-UPS) Year 3 | DOST – Science Education Institute |
| Enhancing Interoperability in the DOST Enterprise Year 2 | DOST |
| DOST's Grants to Outstanding Achievements in S&T Year 2 | DOST – National Academy of Science and Technology |
| DOST IT Enhancement Program Year 1 | DOST |
| MICROED NORTH: Enhancing Microelectronics Education in the Philippines Year 1 | Electrical and Electronics Engineering Institute, University of the Philippines Diliman |
| Development of Interactive Science and Mathematics Courseware for Secondary Level Schools Year 1 | DOST – Science Education Institute |

## INSTITUTION DEVELOPMENT PROGRAM

For research to flourish, academic or government research institutions must be adequately equipped to enable them to deliver meaningful research outputs. Working on this premise, PCIEERD has continuously given support for laboratory upgrading. In 2011, the Council provided funding support to the National Institute of Physics of the University of the Philippines Diliman in the amount of P3,000,000 for the project titled "Upgrading of the Femtosecond Laser Facility: Development of Terrahertz Time-domain Spectroscopy and Enhancement of Time-resolved Photoluminescence Spectroscopy."

*In 2011, PCIEERD supported the laboratory upgrading of the National Institute of Physics (NIP) of the University of the Philippines Diliman. Through the funding assistance, NIP will upgrade its femtosecond laser facility to be able to perform terahertz time-domain spectroscopy. Shown in the photo are the current femtosecond laser and frequency doubler at NIP.*

*Program Highlights*

# S&T INFORMATION DISSEMINATION AND PROMOTION

PCIEERD is committed to promoting science and technology as key to national development. The Council, through the Research Information and Technology Transfer Division (RITTD) headed by Dr. Virginia G. Novenario-Enriquez, maintains its efforts to keep the public informed on its latest activities and R&D projects through information dissemination. This is done through participation in exhibits, conduct and/or support of seminars, production of information materials and use of the mass media.

### *Disseminating Information on S&T Research and Developments*

In 2011, PCIEERD released its institutional brochure that features the mandate, vision, priority areas, and programs of the Council. Press releases were published in leading newspapers like the Manila Bulletin, Philippine Star, Philippine Daily Inquirer and Business Mirror, and were also picked up by online news channels.

Also, PCIEERD coordinated the discussion/feature of the 7th National Biotechnology Week and the Philippine Pharmaseas Drug Discovery Program at the teleradyo program DZMM-Bago Yan Ah!, with Dr. Virginia G. Novenario-Enriquez of PCIEERD's Research Information and Technology Transfer Division and Dr. Gisela Padilla-Concepcion, PharmaSeas Program Leader, as resource persons.

Also, as part of PCIEERD's information dissemination and advocacy program, the Council conducts and/or supports seminars and trainings designed to raise awareness on local technologies and innovations. Table 11 shows the seminars/conferences supported by PCIEERD.

### *Marketing Technologies thru Exhibitions*

PCIEERD participates in exhibitions to showcase its completed projects as well as promote the Council's priority fields and programs. Table 12 shows the various fairs/activities participated in by PCIEERD.

*PCIEERD coordinated the interview of Dr. Gisela Padilla-Concepcion, PharmaSeas Program Leader, in the teleradyo program DZMM-Bago Yan Ah!*


*Last March 9, 2011, the Council participated in the Smart Wireless Engineering Education Program which was held at the SMX Convention Center in Pasay City.*

**Table 11. PCIEERD-funded information projects/activities.**

| Activity | Organizer | Date |
|---|---|---|
| Making Geosciences Work for Society | Geological Society of the Philippines | March 30, 2011 and June 9, 2011 |
| Energy Summit 2011 | Physics Society, De La Salle University | March 31 – April 2, 2011 |
| 6th Annual Meeting and Scientific Convention of Outstanding Young Scientists, Inc. | Outstanding Young Scientists, Inc. | July 12, 2011 |
| 33rd Annual Scientific Meeting | DOST – National Academy of Science and Technology | July 13-4, 2011 |

**Table 12. List of exhibitions/fairs where PCIEERD participated in 2011.**

| Activity | Date | Venue |
|---|---|---|
| FEATI S&T Expo 2011 | February 16-19, 2011 | FEATI University, Manila |
| Physiklaban | February 26, 2011 | De La Salle University, Manila |
| Smart Wireless Engineering Education Program | March 9, 2011 | SMX Convention Center, Pasay City |
| Energy Summit 2011 | March 30 – April 3, 2011 | De La Salle University, Manila |
| 15th National Scout Jamboree | May 26-31, 2011 | Mt. Makiling, Laguna |
| Entrepreneurship Workshop for Scientists and Engineers in the Philippines | May 30 – June 3, 2011 | University of San Carlos, Cebu City |
| 33rd Annual Scientific Meeting | July 13-14, 2011 | Manila Hotel, Manila |
| 2011 National Science and Technology Week | July 27-30, 2011 | SMX Convention Center, Pasay City |
| Philippine Die & Mold, Machine Tools Exhibition | August 17-20, 2011 | World Trade Center, Pasay City |
| Stakeholders' Workshop on Genomics Research and Development Roadmap | October 3, 2011 | DOST Executive Lounge, Taguig City |
| Stakeholders' Workshop on Nanotechnology R&D Roadmap | October 10, 2011 | DOST Executive Lounge, Taguig City |
| 7th National Biotechnology Week | November 21-26, 2011 | Department of Environment and Natural Resources, Quezon City |

In particular, PCIEERD played a key role in the conduct of the National Science and Technology Week 2011 as co-chair of the S&T Stakeholders' Summit held on July 29, 2011. The activity had Senator Edgardo J. Angara as Keynote Speaker where he emphasized the importance of innovation in driving productivity and efficiency of the country's industry/business sector toward "record" levels of economic growth.

The S&T Stakeholders' Summit also featured other notable speakers representing different sectors. The speakers were ASEAN Director for Science and Technology Division Dr. Alexander A. Lim, representing ASEAN; House Committee on Science and Technology Chair Congressman Julio A. Ledesma IV representing the legislative sector; Mr. Ryan Patrick G. Evangelista from the Philippine Chamber of Commerce and Industry, representing the industry and business sectors; Dr. Josef T. Yap from the League of Cities of the Philippines, representing the local government units; UP Diliman College of Engineering Dean Dr. Aura C. Matias, representing the academe; Philippine Foundation for Science and Technology President Engr. Filemon T. Berba, representing non-government organizations; and DOST-SEI scholar Ms. Bernadette G. Toledo, representing the youth sector.


*Participants in the S&T Stakeholders' Summit listened attentively to the insights shared by the resource persons from the government, business, youth and academic sectors. Dr. Filemon T. Berba, President of the Philippine Foundation for S&T Inc., shared his insights on the role of science and technology from the perspective of a non-government organization.*

### *PCIEERD Marks 1st Anniversary*

PCIEERD, as the newest agency under the Department of Science and Technology (DOST), celebrated its 1st Anniversary with the theme "We are ONE!" last June 29, 2011 at the DOST Executive Lounge. PCIEERD is the result of the consolidation of the Philippine Council for Advanced Science and Technology Research and Development (PCASTRD) and the Philippine Council for Industry and Energy Research and Development (PCIERD).

During the program, PCIEERD Executive Director Amelia P. Guevara presented the Council's programs and services during the anniversary celebration. Also, STMicrolectronics Quality and Reliability Director Dr. Antonio B. Villaflor and UP Diliman's College of Engineering Dean Dr. Aura C. Matias, shared their views on the role of the industry, energy and emerging technology sectors in the country's global competitiveness.

*Dr. Amelia P. Guevara, PCIEERD Executive Director, said that the union of the two Councils would result in the optimization in the use of resources; efficiency in the transfer, application and commercialization of research outputs; and creation of a culture of sharing ideas and experiences.*

### *Unveiling PCIEERD's New Logo*

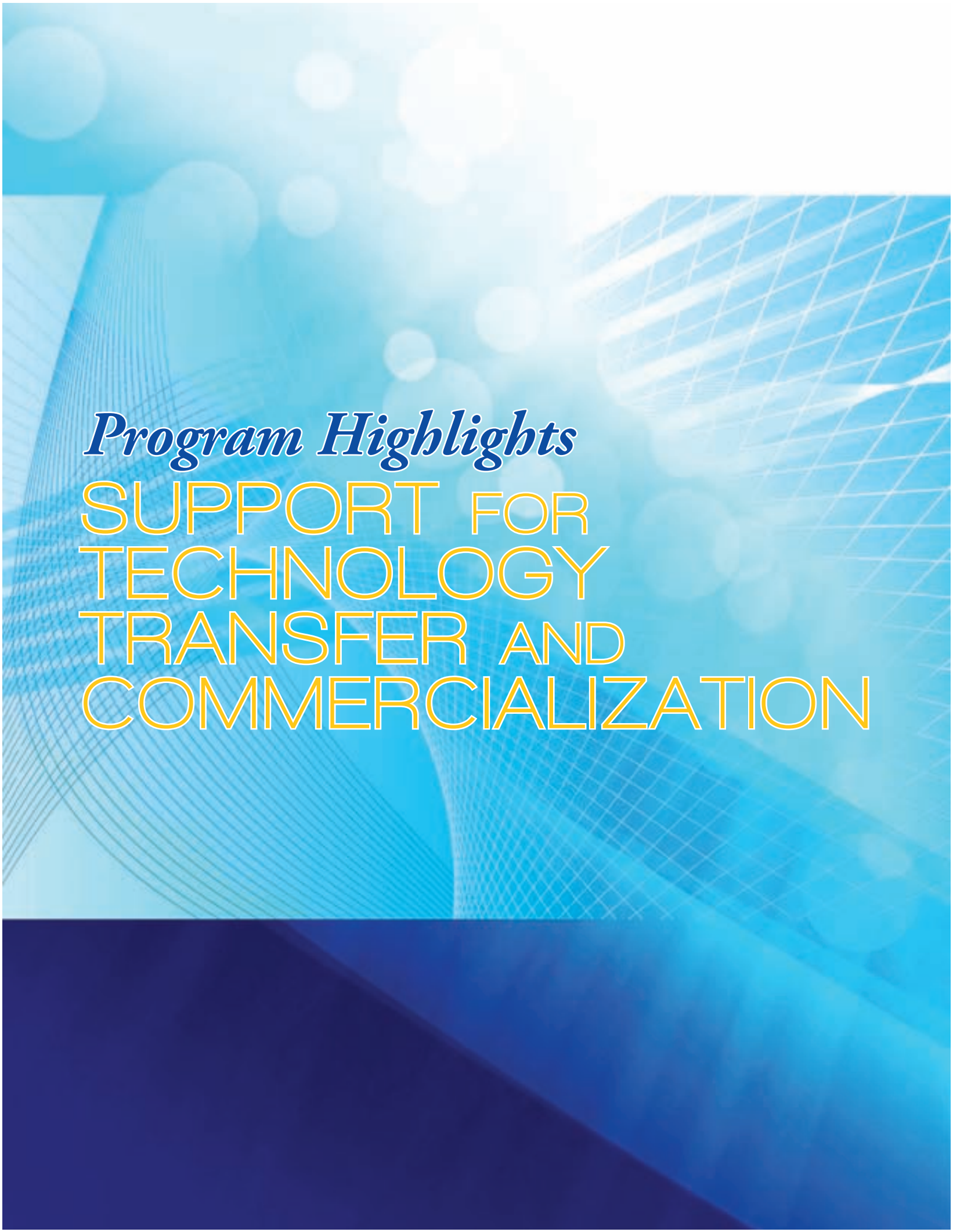
During its 1st Anniversary, PCIEERD unveiled its new logo showcasing the icons that represent the Council's priority areas. The logo is based on the winning design in the PCIEERD Logo Design Contest of Mr. Diosdado D. Buncab, a freelance graphic artist.

The logo shows the key elements of the DOST logo as basic pattern. The four circles represent the four guiding principles in the country's S&T development: Excellence, Relevance, Cooperation and Cost-effectiveness. Meanwhile, the three-color scheme represents truth and enlightenment (white), progress (cyan) and the unknown (black). On the other hand, the icons at the center of the logo represent the following:

- Mechanical gear – Industry sector
- Flame – Energy sector
- Circuit board – Emerging technology sector
- Flask – Role of science in PCIEERD's priority areas

The entry of Mr. Buncab bested 303 entries after seven rounds of judging. For submitting the winning entry, he received a cash prize of P50,000 (net of tax) and a Plaque of Recognition from PCIEERD.

*PCIEERD's Logo was unveiled during the celebration of PCIEERD's 1st Anniversary. The logo is based on the winning design of Mr. Diosdado D. Buncab (shown in the photo), a freelance graphic artist, in the PCIEERD Logo Design Contest.*


Program Highlights
SUPPORT FOR TECHNOLOGY TRANSFER AND COMMERCIALIZATION

PCIEERD serves as a support institution for its network of research and academic institutions in facilitating the utilization and commercial application of their research outputs. The Council, through the Research Information and Technology Transfer Division (RITTD) headed by Dr. Virginia G. Novenario-Enriquez, forges partnerships with the business/industry sector as well as with non-governmental organizations to assist in enhancing the competitiveness of small and medium enterprises (SMEs) thru advanced technology utilization and/or adoption.

*The DOST-PEZA Open Technology Business Incubator provides business development trainings to its incubatees to further equip them with skills for techno-enterprise development.*

## *Fostering Technology Entrepreneurship*

PCIEERD recognizes that entrepreneurship and market-driven solutions are effective tools for economic growth and poverty alleviation. Thus, the Council supports efforts that would further develop technology entrepreneurs and enhance their business potential.

## *Technology Business Incubation Program*

Technology Business Incubation (TBI) has been widely recognized as an effective strategy to hasten transfer of innovations to the market. TBI facilities provide business development services to start-ups.

In 2011, PCIEERD monitored four (4) DOST and PCIEERD-supported technology business incubators. Table 13 shows the DOST-TBI supported projects monitored by PCIEERD.

The DOST-PEZA Open TBI hosted 22 start-ups/ incubatees relating to information and communications technology (ICT) and electronics. The incubatees were provided trainings on Internet marketing, accounting, strategic planning, and knowledge management.

On the other hand, the UPLB TBI building is being renovated to accommodate more start-ups engaged in biotechnology as well as in information and communication technology. At present, the TBI has four (4) locators; namely, O'Mark Enterprise, PhilHybrid Inc., BioSpark Corp. and Bagong Sibol Farms.

Meanwhile, three (3) startups at the DOST-UP Cebu TBI commercialized one technology each. The startups are Rameses (online software program/tool for teachers), Pindoco (online design service) and Techjobs (online job board).

**Table 13. DOST-supported TBI projects monitored by PCIEERD.**

| Project | Implementing Agency | Location |
|---|---|---|
| Establishment of the DOST-PEZA Open TBI (Year 2) | DOST – Advanced Science and Technology Institute and DOST Technology Resource Center | University of the Philippines Diliman, Quezon City |
| Support for the Establishment of the UPVCC-DOST Technology Business Incubator at the University of the Philippines Cebu (Year 1) | University of the Philippines Cebu | University of the Philippines Cebu, Cebu City |
| DOST-UP Enterprise Center for Technopreneurship (Year 1) | University of the Philippines Diliman | University of the Philippines Diliman, Quezon City |
| Support for the Establishment of UPLB TBI (Year 1) | University of the Philippines Los Baños | University of the Philippines Los Baños, Laguna |

## *Small Enterprise Technology Upgrading Program (SETUP)*

The DOST's Small Enterprise Technology Upgrading Program (SETUP) assists to SMEs in adopting technological innovations to improve their operations and thus boost their productivity and competitiveness.

In 2011, PCIEERD performed proposal evaluation, management and monitoring of three (3) SETUP projects. These project are presented in Table 14.

*Shown in the photos are samples of neo-ethnic textiles developed using natural fiber-blended yarns and eco-friendly treatment and dyeing technologies.*

## *Boosting Technology Commercialization*

To ensure that the transfer of technologies proceeds smoothly in accordance with agreements, PCIEERD assists various technology transfer activities. In 2011, the Council provided support in the renewal of licensing agreement between DOST's Food and Nutrition Research Institute and Moondish Foods Inc. on canned pinakbet technology.

PCIEERD also conducted a technology demonstration on non-cyanide electroplating technology at the Nueva Ecija University of Science and Technology (NEUST) in Cabanatuan City last March 16-17, 2011.

**Table 14. SET-UP supported projects monitored by PCIEERD.**

| Project Title | Implementing Agency | Description |
|---|---|---|
| DOST-Enhancement Program for Micro/Small and Medium Enterprises (mSMEs) Through Technology Transfer Program and Services | DOST – Industrial Technology and Development Institute | The project aims to enhance the technological capability of micro, small and medium enterprises (mSMEs) through technology transfer and technical intervention/services. Additionally, it aims to undertake extensive analysis on the experiences of existing enterprises on the adaptation and commercialization of technologies developed by DOST-ITDI. |
| Technical Assistance and Training Support for SMEs for CY 2011 | DOST – Metals Industry Research and Development Center | The project aims to provide technical assistance and consultancy services as well as training programs to firms under the metals and engineering industries. It will also evaluate project proposals submitted by the various DOST Regional Offices for possible assistance. |
| Consultancy for Agricultural and Manufacturing Productivity Improvement (CAMPI) Program | DOST – Technology Application and Promotion Institute | The consultancy services provided by DOST-TAPI through its Manufacturing Productivity Extension and Consultancy for Agricultural Productivity Enhancement Programs will help mSMEs in the regions increase overall productivity and boost their competitiveness. Through these intervention programs, mSMEs will enhance their operations and bring their products to world-class quality, which will enable them to progress into exporting firms. |

*Last March 16-17, 2011, PCIEERD, together with the DOST's Metals Industry Research and Development Center, conducted a technology demonstration on non-cyanide electroplating technology in Cabanatuan City. Photo on the right shows some jewelry pieces that underwent non-cyanide electroplating.*

### *Commercializing Innovations thru TECHNICOM Program*

PCIEERD supports DOST's Technology Innovation for Commercialization (TECHNICOM) Program. This is designed to enhance the utilization of commercially promising innovations. In support of the program's objectives, RITTD actively managed two (2) projects funded under the TECHNICOM program. These projects are presented in Table 15.

PCIEERD also supported projects for diffusion of knowledge and technologies as well as capacity-building. The projects are presented in Table 16.

**Table 15. TECHNICOM projects monitored by RITTD.**

| Project Title | Implementing Agency | Description |
|---|---|---|
| Market Testing and Process Optimization of Industrial Prototype Plasma-enhanced Chemical Vapor Titanium Nitride Coating Technology (formerly Process Optimization, Piloting and Market Development of Plasma-enhanced Chemical Vapor Deposition for Titanium Nitride Coating) | University of the Philippines Diliman | The project will market test the titanium nitride (TiN) coating technology, which has many advantages over other coating technologies. TiN increases the surface hardness of tools, protecting it against abrasion and the damaging effects of friction. It is also environment-friendly. |
| Capacity Building and IP Protection for Technologies Generated by DOST RDIs and Network Institutions | DOST – Technology Application and Promotion Institute | The project aims to develop the in-house capability of DOST-TAPI in patent drafting. This will enable DOST-TAPI to better assist technology generators/developers in obtaining Intellectual Property Rights protection for their technologies/inventions. |

**Table 16. Technology transfer-related projects funded by PCIEERD.**

| Project Title | Implementing Agency | Description |
|---|---|---|
| Entrepreneurship Workshop for Scientists and Engineers in the Philippines | Samahang Pisika ng Visayas at Mindanao | An entrepreneurship workshop was conducted at the University of San Carlos in Cebu City. Participants from different universities and institutions in the country attended the workshop, which featured 17 local and international speakers. |
| Communicating the Philippine Technology Transfer Act of 2009 and Its Implementing Rules and Regulations to Stakeholders | DOST – Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development | The project will conduct a coordinated public awareness campaign on the Philippine Technology Transfer Act of 2009, together with its Implementing Rules and Regulations, in order to promote its advantages and benefits to researchers, scientists, R&D institutions, funding agencies and other stakeholders. |
| Promoting BIOTECH-UPLB and Biotechnologies Using Various Media | National Institute of Molecular Biology and Biotechnology – University of the Philippines Los Baños | The project aims to increase public awareness on biotechnology, BIOTECH-UPLB and its achievements, products, technologies and services. |

## *Supporting Advocacy on Biotechnology*

Biotechnology is one of the key tools in meeting the challenges of providing energy, food, water, health care and clean environment worldwide. PCIEERD capitalizes on the immense potential of biotechnology by supporting activities that promote this branch of science.

In 2011, PCIEERD participated in the celebration of the 7th National Biotechnology Week (NBW) that was spearheaded by the Department of Environment and Natural Resources (DENR) as Chair and the Department of Health as Co-chair. Anchored on the theme *"Bioteknolohiya para sa Kalikasan, Kalusugan, Kagandahan, Kabuhayan at Kaunlaran! Ok ang 5K sa Biotek! Suportahan at Tangkilikin Natin"* the celebration was held from November 21-26, 2011 at the DENR in Diliman, Quezon City.

*DOST's NBW Focal Person Dr. Virginia G. Novenario-Enriquez (third from left) accepted the Plaque of Appreciation from DENR-ERDB Director Marcial C. Amaro during the Closing Ceremonies of the 7th NBW at the DENR in Quezon City.*

*The NBW S&T Forum was attended by 370 participants from the government, R&D institutes, academe, NGO, LGU and private sectors.*

PCIEERD was tapped by the DOST Secretary Mario G. Montejo to be the DOST's Focal Agency for the celebration of 7th NBW. To come up with activities for 7th NBW, PCIEERD coordinated with the following DOST agencies: Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development, Philippine Council for Health Research and Development, National Research Council of the Philippines, Industrial Technology and Development Institute, and Technology Application and Promotion Institute.

The participation of the DOST during 7th NBW comprised of the Science and Technology Forum (S&T Forum) and an exhibit. The DOST also partnered with the Department of Trade and Industry (DTI) in the conduct of a Business Forum.

The S&T Forum was held at the Social Hall of the DENR last November 22, 2011. The morning session highlighted topics relating to advances in biotechnology research and development, while the afternoon session featured researches in bioremediation. Meanwhile, the DOST exhibit showcased nine (9) R&D projects on genomics and five (5) bioremediation projects that are supported and/or spearheaded by various DOST agencies.

The Business Forum, which was conducted in partnership with the DTI, featured four DOST-generated technologies that are available for commercialization. The forum was attended by researchers, businessmen and interested entrepreneurs.

Also, as part of the 7th NBW celebration, a roundtable discussion was conducted last November 26, 2011 to revisit and review Presidential Proclamation No. 1414 (PP 1414). PP 1414 is titled "Declaring Every Last Week of November of Every Year as National Biotechnology Week." PCIEERD, as the DOST's Focal Agency for 7th NBW, attended the roundtable discussion to share inputs and recommendations from the Council as well as from other DOST agencies.

*During the Science and Technology Forum that was held at the 7th National Biotechnology Week (NBW), DOST Secretary Mario G. Montejo noted the Department's efforts in advancing biotechnology through increased investments, infrastructure and human resource development to make a positive contribution to the country.*

*The DOST exhibit showcased nine (9) R&D projects on genomics and five (5) bioremediation projects that were supported and/or spearheaded by various DOST agencies.*


*PCIEERD Executive Director Dr. Amelia P. Guevara posed questions during the Roundtable Discussion that reviewed and revisited Presidential Proclamation No. 1414, which declares every last week of November as National Biotechnology Week.*


PARTNERS AND
LINKAGES

## MAINTAINING LOCAL PARTNERSHIPS

To realize its vision and goals for national development, PCIEERD establishes and sustains collaborative ties with co-stakeholder institutions across the country. For its national capability-building program, PCIEERD partners with institutions that have the potential to offer graduate degree programs in the Council's priority areas. The National Science Consortium includes universities that offer degree programs for science, while members of the Engineering Research and Development for Technology (ERDT) Consortium offer master's and doctoral degrees in various engineering fields.

| National Science Consortium | ERDT Consortium |
|---|---|
| Ateneo de Manila University<br>Central Luzon State University<br>De La Salle University<br>Mapúa Institute of Technology<br>Mindanao State University-Iligan Institute of Technology<br>University of the Philippines Diliman<br>University of the Philippines Los Baños<br>University of the Philippines Manila<br>University of the Philippines Visayas<br>University of San Carlos<br>University of Santo Tomas<br>Visayas State University | Ateneo de Manila University<br>Central Luzon State University<br>De La Salle University<br>Mapúa Institute of Technology<br>Mindanao State University – Iligan Institute of Technology<br>University of the Philippines Diliman<br>University of San Carlos |

To implement its R&D Agenda, PCIEERD has close ties with the following universities and R&D institutions.

| Universities | R&D Institutions |
|---|---|
| Ateneo de Manila University<br>De La Salle University<br>Mindanao State University-Iligan Institute of Technology<br>Siliman University<br>University of the Philippines Diliman<br>University of the Philippines Manila<br>University of the Philippines Los Baños<br>University of San Carlos<br>University of Santo Tomas<br>Xavier University | Advanced Science and Technology Institute<br>Industrial Technology Development Institute<br>Metals Industry Research and Development Center<br>Philippine Atmospheric, Geophysical & Astronomical Services Administration<br>Philippine Institute of Volcanology and Seismology<br>Philippine Nuclear Research Institute |

Additionally, to promote increased involvement of the science community at the regional level, PCIEERD established relationships with R&D institutions through Regional R&D Consortia. The Consortia serve as the coordinator among member agencies in the preparation of proposals and the conduct of activities in the regions.

## STRENGTHENING INTERNATIONAL LINKAGES

### ** ASEAN Committee on Science and Technology (COST)*

Last May 3-4, 2011, the different Sub-committees under the ASEAN Committee on Science and Technology (COST) were convened in Bandung, Indonesia along with the Advisory Body on the ASEAN Plan of Action in Science and Technology (ABAPAST). The meeting was held to draft implementation plans for the six (6) ASEAN-COST Flagship Programs, namely: functional food, early warning system for disaster risk reduction, biofuels, application and development of open-source software, and climate change. Engr. Ermie M. Bacarra and Engr. Nonilo A. Peña of PCIEERD, chair of SCMST and SCNCER respectively, attended the workshop together with other DOST officials.

Participants of said workshop were grouped into different breakout sessions corresponding to the Flagship Programs. Engr. Bacarra was assigned to the Early Warning System (EWS) group, while Engr. Peña joined the Biofuels group.

The EWS group agreed to come up with an implementation plan that will cover assessment of existing capabilities, data exchange, information dissemination including putting up of the necessary infrastructure, and human resource development in the identified common disasters that plague the ASEAN region.

Lead countries were identified as follows to shepherd the implementation of plans in the ASEAN region:

- Earthquake – Indonesia
- Tsunami – Indonesia
- Tropical Cyclone – Philippines
- Flood – Thailand
- Drought – Indonesia
- Forest Fires – Indonesia

On the other hand, PCIEERD Deputy Executive Director Raul C. Sabularse, together with DOST Undersecretary for R&D Graciano P. Yumul Jr., DOST Undersecretary for Regional Operations Carol M. Yorobe, DOST's Director for Internal Audit Service Zenia G. Velasco, attended the 62nd Meeting of the ASEAN COST held November 23-24, 2011, and the ASEAN Ministerial Meeting on Science and Technology in Vietnam held November 26, 2011.

*DOST delegates pose with Dr. Alexander A. Lim (sixth from left), head of the ASEAN Secretariat S&T Unit, and Mr. Emir Rio Krishna (farthest left) during the Workshop held in Bandung, Indonesia last May 3-4, 2011 on Drafting the Implementation Plan for the ASEAN-COST Flagship Programs.*

The ASEAN Ministerial Meeting reviewed the activities carried out since the last meeting held in Krabi, Thailand in December 2010. The December 2010 meeting endorsed the "Krabi Initiative" as a strategic direction for raising competitiveness in order to attain a sustainable and inclusive ASEAN using science, technology and innovation. Further, the plan of action for 2012-2017, including the ASEAN flagship programs, was discussed.

### *ASEAN-Sub Committee on Materials Science Technology (SCMST)*

Relating to ASEAN-SCMST activities, PCIEERD's Engr. Bacarra attended the ASEAN-Pakistan Conference on Materials Science at the Vietnam Academy of Science and Technology (VAST) in Hanoi, Vietnam last April 26-27, 2011. The technical conference carried three (3) themes, namely: photocatalytic materials for health and environmental applications, nanomaterials for agriculture and biomedical applications, and advanced green materials for green energy. The participants toured the Institute of Materials Science (IMS), a VAST member-institute. One of the more successful researches of IMS is the quantum dots, which they have developed for environmental applications. These quantum dots are already being sold to its intended users.

Engr. Bacarra also attended the Meeting of the ASEAN Sub-committee on Materials Science Technology in Siem Reap, Cambodia last May 9-10, 2011. During the Meeting, she stressed that SCMST can make contributions in biofuels, functional food and climate change. Further, the

Philippines was requested to organize workshops in order to finalize proposals on Cancer Nanotechnology as well as on Nanosilica projects.

On May 23, 2011, DOST Secretary Mario G. Montejo appointed PCIEERD Executive Director Amelia P. Guevara as the country's new Focal Person to the ASEAN-SCMST.

*During the Meeting of the ASEAN Sub-committee on Materials Science Technology (SCMST) in Cambodia last May 9-10, 2011, the Philippines was requested to organize workshops in order to finalize proposals on Cancer Nanotechnology as well as on Nanosilica projects. PCIEERD's Engr. Ermie M. Bacarra (leftmost in the photo) stressed that SCMST can make contributions in biofuels, functional food and climate change.*

### *ASEAN-Sub Committee on Non-Conventional Energy Research (SCNCER)*

Under the Regional Collaboration of the ASEAN Committee on Science and Technology (COST), the Philippines, through PCIEERD, has served as the SCNCER chairperson for the past three years. (SCNCER Chairmanship was turned over to Singapore in the middle of the year). The SCNCER provides continuing linkages among research and development institutes in the ASEAN Region and its dialogue partners on energy S&T development. It fosters and strengthens regional S&T activities through technical information exchange, capacity building and technology transfer.

From November 29 to December 2, 2011, Engr. Loreto C. Carasi, Senior Science Research Specialist at PCIEERD, joined Philippine delegates who attended the ASEAN-China Science and Technology Cooperation Conference on New and Renewable Energy Development and Promotion for Combating Climate in Kunming, China. For the implementation of the ASEAN Plan of Action on S&T Flagship Program on Biofuels, a situational biofuels program of ASEAN Member States was prepared, that highlights the current national policies, feedstock use, incentives and biofuel standards.

*Delegates from Pakistan, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Singapore, Thailand, Vietnam and the Philippines attended the ASEAN-Pakistan Conference on Materials Science in Hanoi, Vietnam last April 26-27, 2011. The group agreed to pursue research collaboration on nanomaterials for agricultural applications.*

### *Science and Technology Coordinating Council Committee on Space Technology Applications (STCC-COSTA)*

Engr. Raul C. Sabularse, PCIEERD Deputy Executive Director, attended the Kick-off Meeting for the Regional Cooperative Mechanism on Disaster Monitoring and Early Warning, Particularly Drought held at Beijing China last March 15-17, 2011. The Mechanism was officially launched under the Regional Space Applications Programme (RESAP) in September 2010.

The meeting focused on the following items: development of the database for drought profiling of the region, procedures for sharing basic data, and steps to go ahead with its functions to provide dedicated data services.

In relation to the said activity, Dep. Exec. Dir. Sabularse attended the 15th Session of the Intergovernmental Consultative Committee (ICC) on the Regional Space Applications Programme for Sustainable Development that was held in Colombo, Sri Lanka last October 27, 2011. The ICC Meeting was held a day after the Consultative Meeting on Regional Cooperative Mechanisms on Space Applications towards an Effective Disaster Management and Sustainable Development.

The 15th Session of the ICC was organized by ESCAP's Information and Communications Technology and Disaster Risk Reduction Division and hosted by the Arthur C. Clarke Institute for Modern Technologies, Ministry of Technology, and the Government of the Sri Lanka. Participants in the Consultative Meeting

reviewed and discussed regional cooperative mechanisms to come up with affordable access to and effective use of space-based information products and resources for disaster management and sustainable development in the Asia-Pacific region, with special reference to the countries with special needs.

### *ASEAN – European Union*

Engr. Bacarra also attended the Symposium on Photocatalysis for Depollution Technologies at Tam Dao, Vietnam held last July 13-14, 2011. The symposium was intended to be a matchmaking event for forming consortia of European Union (EU) and ASEAN researchers that will make a bid for the Framework Programme 7 Call for Proposals specifically on "photocatalysis for pollution technologies."

From the various presentations of the participants, especially from the European Union, Engr. Bacarra has seen the urgency of equipping local R&D institutions with state-of-art facilities to enable Filipino researchers to conduct studies that are at par with other countries. Among major recommendations is to further equip DOST's Industrial Technology Development Institute to make it the country's prime materials development and nanotechnology center and likewise the Mindanao State University-Iligan Institute of Technology in southern Philippines.


*The ASEAN-China Science and Technology Cooperation Conference on New and Renewable Energy Development and Promotion for Combating Climate focused on the implementation of the ASEAN Plan of Action on S&T (APAST) Flagship Program on Biofuels. Engr. Loreto C. Carasi, Senior Science Research Specialist at PCIEERD, was one of the delegates from the Philippines.*

*The Symposium on Photocatalysis for Depollution Technologies, which was held at Tam Dao, Vietnam last July 13-14, 2011, was intended to be a matchmaking event for forming consortia of European Union and ASEAN researchers that will make a bid for the Framework Programme 7 Call for Proposals specifically on 'photocatalysis for pollution technologies.'*

### *2nd e-Asia Joint Research Forum*

Last October 5-7, 2011, Exec. Dir. Guevara attended the 2nd e-Asia Joint Research Forum in Tokyo, Japan. The Forum brought together various funding organizations, including governmental bodies and independent funding agencies, of the 10 countries constituting the ASEAN plus eight countries. These countries are Australia, China, India, Japan, New Zealand, Republic of Korea, Russian Federation and United States of America.

The Forum agreed to strengthen existing research collaborations and to pursue new research cooperation with the aim of consolidating knowledge and human resources to make the East Asia region a leader in the fields of nanotechnology/materials science, plant science, infectious diseases, renewable energy, and natural disaster prevention and mitigation.

After the Forum, the participants were assembled into four (4) groups for the Science Talk group discussion. Assigned to the Nanotechnology and Materials Science group, Dr. Guevara presented the priority research areas of the Philippines such as nanostructures for solar energy applicable to devices and storage, and nano-based materials for environmental applications.

### * Japan International Cooperation Agency (JICA)-Disaster Management Cooperation

PCIEERD has maintained its strong relationship with JICA particularly in projects relating to disaster management. Last December 16-18, 2011, PCIEERD's Engr. Peña, together with three (3) other Philippine delegates, attended the 2nd Experts Group meeting on the Great East Japan Earthquake in Tokyo, Japan. The meeting focused on the lessons learned from the Great East Japan earthquake from three (3) perspectives: (1) Early warning systems and public awareness and education; (2) Resilience of critical infrastructures and society; and (3) Organizing response and recovery.

Further, a back-to-back ASEAN-Japan Disaster Management Cooperation meeting was convened by JICA with the ASEAN Member States and ASEAN Coordinating Center for Humanitarian Assistance on Disaster Management. JICA proposed research collaboration with ASEAN Member Countries in the following areas: research on disaster-proof infrastructure optimization, comprehensive disaster risk assessment of mega-cities in ASEAN, disaster vulnerability assessment and business continuity plan of major industrial areas in ASEAN, and worst-case scenario simulation and learning from the Great East Japan earthquake.

### * Manila Economic and Cultural Office –Taipei Economic and Cultural Office (MECO-TECO)

Exec. Dir. Guevara attended the 3rd Manila Economic and Cultural Office –Taipei Economic and Cultural Office (MECO-TECO) Joint Science and Technology Commission Meeting held on October 25-27, 2011 in Taipei. Dr. Guevara attended said meeting to explore genomics and nanotechnology as possible research areas for collaboration with Taiwan for 2012.

The Philippines has been an active partner of TECO in the implementation of various geology-related projects in the country.

### * International Atomic Energy Agency

Dep. Exec. Dir. Sabularse attended the Regional Workshop on Establishing Nuclear Safety Infrastructure for a National Nuclear Power Program organized by the International Atomic Energy Agency (IAEA) in collaboration with the Asian Nuclear Safety Network (ANSN) last July 4-15, 2011 in Vienna, Austria.

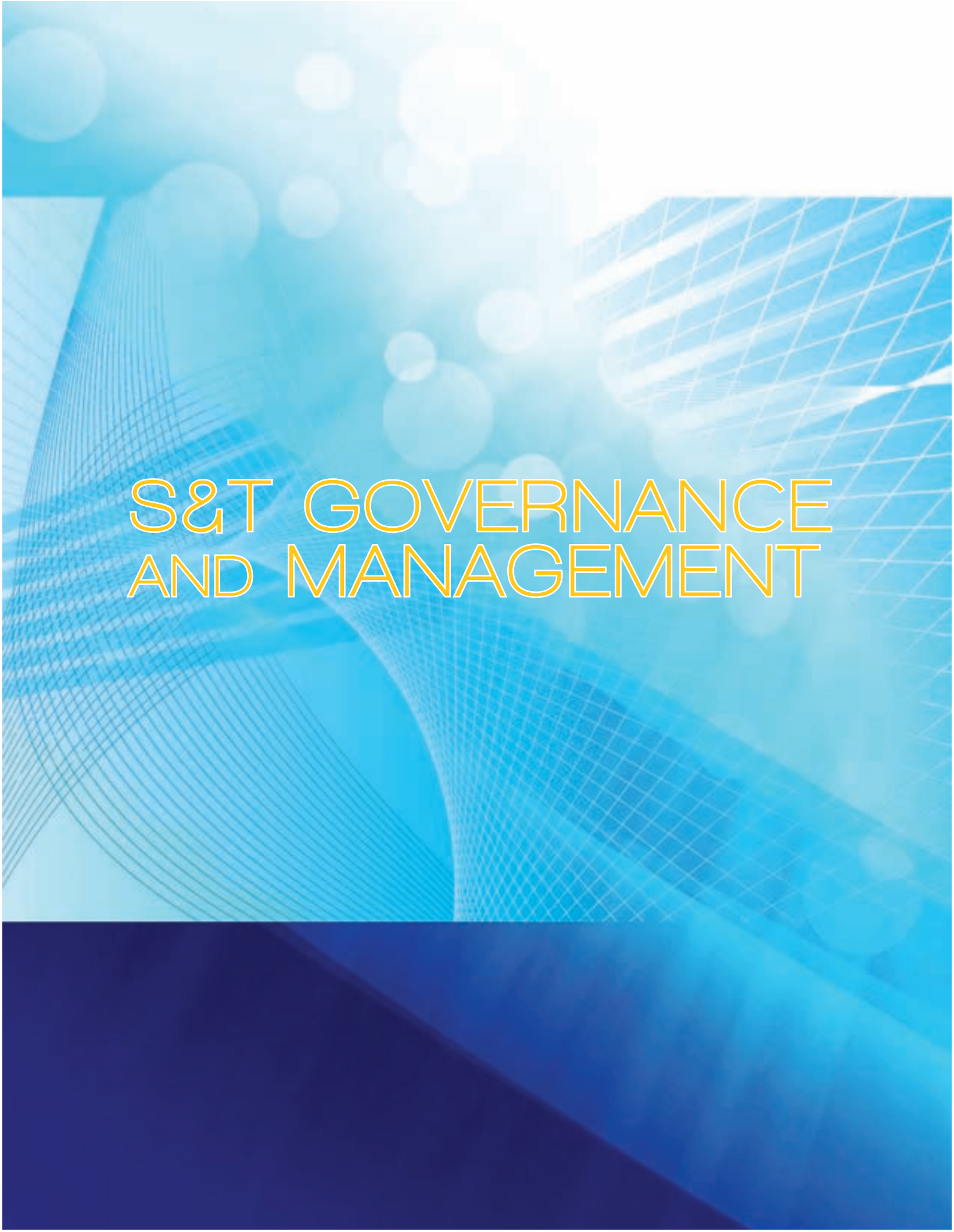
The workshop was attended by senior officials from government and regulatory bodies of ANSN Member Countries embarking on a nuclear power program. The countries represented were Poland, Bangladesh, Indonesia, Kazakhstan, Malaysia, Thailand, Vietnam and the Philippines.

The workshop provided countries embarking on nuclear power program with a broad overview of the institutional, organizational and technical elements and conditions that are needed for a country to establish a sound foundation for a sustainable high level of safety based on the application of the IAEA standards. Further, the workshop was aimed at encouraging the development of national action plans for capacity-building and infrastructure development for a Nuclear Power Program.

### * Radiation Processing of Polymeric Materials

Dep. Exec. Dir. Raul Sabularse also attended the Regional Executive Meeting for Policy Makers and End-users of Super Water Absorbent, Toxic Metal Absorbent and Plant Growth Promoter for Agriculture Applications. The meeting was held at the Takasaki Advanced Radiation Research Institute last October 3-7, 2011 in Takasaki, Japan.

The meeting aimed to provide information for the industrial application of radiation processing to senior government officials and end-users of products. Further, the meeting was organized to raise awareness on the socio-economic and environmental benefits of value-added products produced by eco-friendly and energy-efficient radiation process.


S&T GOVERNANCE
AND MANAGEMENT

To further enhance its capability to implement plans, programs and activities through an engaged and competent workforce, PCIEERD encourages its staff to avail of and participate in capability-building activities and trainings that will build their knowledge and skills.

### *Promoting Continuous Learning*

PCIEERD personnel are encouraged to pursue higher education aside from participating in local and foreign seminars and trainings for their personal and professional growth.

In 2011, three (3) PCIEERD personnel pursued graduate studies. Ms. Mary Jane P. Salmorin and Ms. Marivic A. Legista continued their Master in Information Technology program at the University of the Philippines Los Baños, while Ms. Carminda R. Tandelcarmen started her Master in Public Administration studies at the University of Makati.

### *Building a Culture of Teamwork*

Teamwork influences the quality of work and performance of individuals and the divisions. As part of the Council's efforts to promote a culture of teamwork, PCIEERD organized a team-building activity with the theme "One PCIEERD" last May 19-20, 2011 at the Blue Coral Beach Resort in San Juan, Batangas. Ms. Niña Maria B. Estudillo, an expert trainer and consultant for building and sustaining a culture of performance excellence through productivity and quality, was the resource person/facilitator of the team-building activity.

During the team building activity, PCIEERD management and staff participated in various activities designed to foster better interaction with each other, and to remind PCIEERD team members of the need to leverage their strengths and work out opportunities for improvement together as members of one organization.

*PCIEERD management and staff engaged in a weekend of fun and camaraderie during the Council's team-building activity at the Blue Coral Beach Resort in San Juan, Batangas last May 19-20, 2011.*

*During the team building activity, PCIEERD management and staff participated in various activities designed to foster better interaction with each other.*

## *Assessing and Developing Competency*

PCIEERD is monitoring and implementing the project "Organizational Transformation of DOST Agencies Towards Excellent Performance," which aims to raise the competitiveness of the DOST via organizational performance enhancement through Quality Management (QM). The QM initiative is intended to boost the DOST's bid to attain standards of the Philippine Quality Award (PQA). The PQA is the highest level of national recognition for exemplary organizational performance comparable with the Malcolm Baldrige National Quality Award of the US.

As part of the project, that was started in July 2010, PCIEERD initiated its Competency Development Program in 2011 together with the two (2) other pilot agencies of the DOST for the PQA – Metals Industry Research and Development Center and DOST Regional Office No. IX.

*PCIEERD management and staff participated in a Competency Development Training at the DOST Executive Lounge last September 20-22, 2011.*

On September 20-22, 2011, a Competency Development Training was conducted for PCIEERD management and staff at the DOST Executive Lounge. Mr. Jerald H. De La Rosa, a PQA expert, was the resource person for the three-day activity. Mr. De La Rosa is currently assisting PCIEERD in the finalization of its Competency Development Framework. The Competency Development Framework aims to identify the key competencies necessary for all positions in PCIEERD as well as the minimum competency levels needed for each position.

*All PCIEERD key personnel attended the Competency Development Training.*

*Mr. Jerald H. De La Rosa, a Philippine Quality Award expert, was the resource person for the three-day activity.*

### *Maintaining Compliance to International Standards*

In 2011, PCIEERD applied for the renewal of its ISO 9001:2008 certification from TÜV SÜD PSB Philippines, Inc.

The ISO 9000 family of standards relates to quality management system (QMS) and is designed to help organizations meet the expectations of their clients and other stakeholders.

To ensure conformance of PCIEERD with the said standards, the Council created a QMS Task Force for full implementation of QMS. The Task Force is composed of the Quality Council, Quality Management System Core Team and Internal Quality Audit Team.

After months of preparation, PCIEERD was awarded the ISO 9001:2008 certification by TÜV SÜD PSB Philippines, Inc. on September 30, 2011.

*ISO evaluators from TÜV SÜD PSB Philippines, Inc. awarded the ISO 9001:2008 certification to the PCIEERD Management Team last September 30, 2011.*

### *Ensuring Security of Information Systems and Databases*

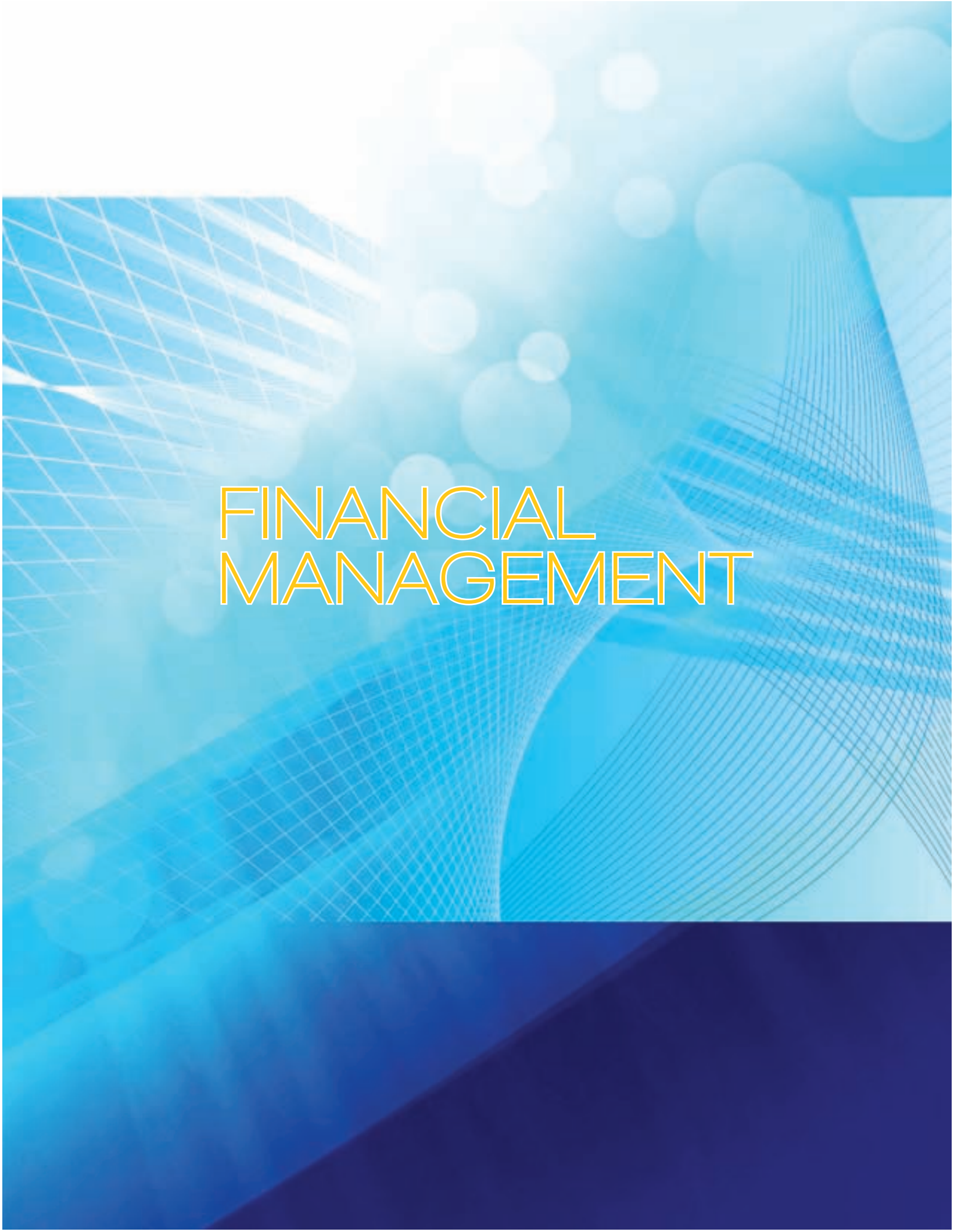
PCIEERD, as the country's lead agency in research and development of the emerging technology sector, puts a premium on having a reliable and efficient information technology (IT) system.

*In 2011, the Council continued to focus on its IT management, network infrastructure, information systems, and IT support and services. The critical aspects of the year's IT activities included monitoring of Internet connectivity and power performance as well as periodic backing-up of systems.*

In 2011, the Council continued to focus on its IT management, network infrastructure, information systems, and IT support and services. The critical aspects of the year's IT activities included monitoring of Internet connectivity and power performance as well as periodic backing-up of systems.

Additionally, the IT Group established a common network infrastructure suitable for the requirements of the consolidated agency and also administered servers and user accounts. Configuration of one LAN for the whole Council, activation of a common proxy server and roll out/ update of anti-virus program in all computers were also accomplished. Likewise, continuous maintenance and update of the Council's websites, databases and information systems, and conduct of training on the use of in-house application systems were done.

Further, the Information Systems Strategic Plan (ISSP) for Year 2012-2014 was developed. The ISSP will serve as the blueprint of IT initiatives in the Council.


FINANCIAL
MANAGEMENT

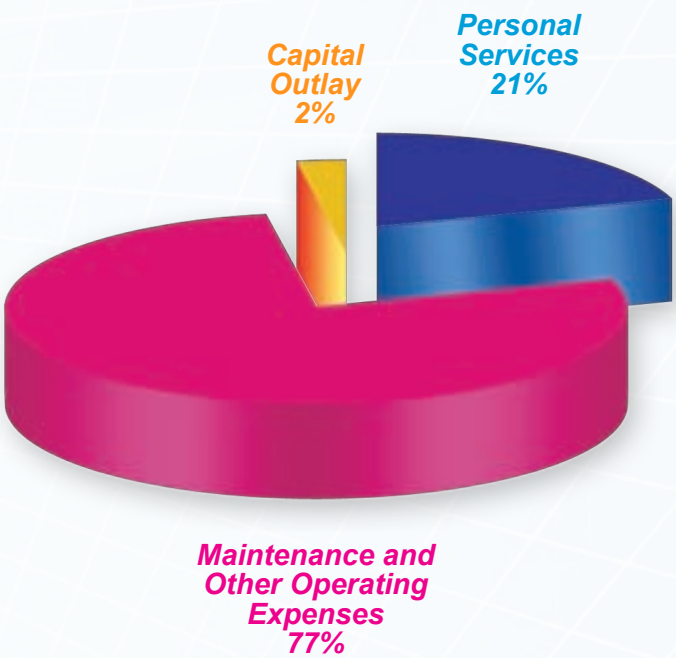
For the year 2011, PCIEERD's financial resources amounted to P625.098 million, distributed to Personal Services (PS); Maintenance and Other Operating Expenses (MOOE); and Capital Outlay at 6.5%, 93% and 0.5%, respectively.

The Council's financial resources included approved appropriations per the 2011 General Appropriations Act (P141.5 million), funds transferred from the Department of Science and Technology (P24.39 million), Continuing Appropriation (P1.87 million), and funds from the Special Purpose Fund (P457.338 million).

The Special Purpose Fund includes the P450 million from the Department of Budget and Management for the implementation of the projects "Establishment of the Advanced Device and Materials Testing Laboratory for the Semiconductor and Electronics Manufacturing Industries" and "Development and Deployment of Hydrometeorological Devices for Flood Sensors." It also includes P7.338 million for salary increases, personnel benefits and the corresponding increase in government share in insurance premiums.

Overall fund utilization for the year was 99%.

**Chart 1. Breakdown of PCIEERD's 2011 budget.**




**Note:** Per 2011 General Appropriations Act.

### *Grants-In-Aid Funds*

A major component of the Council's approved budget is its Grants-In-Aid (GIA) Funds, which amounted to P95.747 million and an additional P450 million for the two abovementioned projects. The GIA Funds were used to support projects in research and development, human resource development, technology transfer and commercialization, information dissemination, policy development and advocacy.

### *External Funds*

In 2011, PCIEERD generated a total of P586.258 million from the GIA Program of the Department of Science and Technology (DOST) to implement various programs and projects within the Council's sectoral priorities. Of this amount, P31.3 million was directly transferred to PCIEERD to implement the engineering and science components of DOST's Accelerated S&T Human Resource Development Program.

Also received were a P5 million grant from the US-Environment Protection Agency for a two-year project on capacity building on methane emissions recovery and utilization from landfills in the Philippines, and P5 million from the Department of Transportation and Communications for the development of customized local road vehicle standards.

# APPENDICES

## SCHOLARS SUPPORTED UNDER PCIEERD's HRDP FOR SY 2011-2012

| Name | Level (MS or PhD) / Field of Study | University |
|---|---|---|
| Lagunay, Rachel Anne E. | MS Chemistry | Mindanao State University – Iligan Institute of Technology |
| Omega, Neil Aldrin G. | MS Information Technology | Mindanao State University – Iligan Institute of Technology |
| Figura, Elvirg C. | MS Information Technology | University of San Carlos |
| Dequilla, Cristina A. | MS Chemistry | University of Santo Tomas |
| Torres, Jan Vincent T. | MS Energy Engineering | University of the Philippines Diliman |
| Calamba, Katherine M. | MS Materials Science | University of the Philippines Diliman |
| Rabajante, Jomar F. | MS Mathematics | University of the Philippines Diliman |
| Umali, Lester Charles A. | MS Mathematics | University of the Philippines Diliman |
| Gasparin, Raylee J. | PhD Math | De La Salle University |
| Fernando, Lilia M. | PhD Biochemistry | University of the Philippines Los Baños |

## SCHOLARS SUPPORTED UNDER DOST-ASTHRDP FOR SY 2011-2012

| Name | Level (MS or PhD) / Field of Study | University |
|---|---|---|
| Alata, Eden Joy P. | MS Biology | De La Salle University |
| Angustia, Sheila Marie T. | MS Biology | De La Salle University |
| Caldo, Laarni E. | MS Biology | De La Salle University |
| Marquez, Ariziel Ruth D. | MS Chemical Engineering | De La Salle University |
| Angeles, Reymundo A. | MS Chemistry | De La Salle University |
| Calixto, Jose Iñigo R. | MS Civil Engineering | De La Salle University |
| Mondejar, Jeffrey | MS Computer Science | De La Salle University |
| Alejandrino, Marlene Q. | MS Electronics & Communications Engineering | De La Salle University |
| Bandala, Argel A. | MS Electronics & Communications Engineering | De La Salle University |
| David, Donato A. | MS Electronics & Communications Engineering | De La Salle University |
| De Luna, Robert G. | MS Electronics & Communications Engineering | De La Salle University |
| De Ocampo, Anton Louise P. | MS Electronics & Communications Engineering | De La Salle University |
| Dimaala, Fernando M. | MS Electronics & Communications Engineering | De La Salle University |
| Espiritu, Niño M. | MS Electronics & Communications Engineering | De La Salle University |
| Galang, Kassandra V. | MS Electronics & Communications Engineering | De La Salle University |

| Name | Level (MS or PhD) / Field of Study | University |
|---|---|---|
| Jaballas, Morris Martin M. | MS Electronics & Communications Engineering | De La Salle University |
| Maniulit, Ramil T. | MS Electronics & Communications Engineering | De La Salle University |
| Ordoña, Aries E. | MS Electronics & Communications Engineering | De La Salle University |
| Prudencio, Kenneth Aldrin O. | MS Electronics & Communications Engineering | De La Salle University |
| Ramirez, Maria Katrina A. | MS Electronics & Communications Engineering | De La Salle University |
| Ramos, John David M. | MS Electronics & Communications Engineering | De La Salle University |
| Revilla, Marvin James I. | MS Electronics & Communications Engineering | De La Salle University |
| Teologo Jr., Antipas T. | MS Electronics & Communications Engineering | De La Salle University |
| Torregoza, Mark Lorenze D. | MS Electronics & Communications Engineering | De La Salle University |
| Virtudez, Kristine Jean A. | MS Electronics & Communications Engineering | De La Salle University |
| Baranda, John Carlo B. | MS Industrial Engineering | De La Salle University |
| Brillante, Jamica B. | MS Industrial Engineering | De La Salle University |
| Enriquez, Norbert S. | MS Industrial Engineering | De La Salle University |
| Go, Paul Anthony S. | MS Industrial Engineering | De La Salle University |
| Mesa, Ivan Robie V. | MS Industrial Engineering | De La Salle University |
| Perez, Marc Louis C. | MS Industrial Engineering | De La Salle University |
| Pring, Marie Dawn Charisse S. | MS Industrial Engineering | De La Salle University |
| Red, Rachelle P. | MS Industrial Engineering | De La Salle University |
| Tan, Kent Edward C. | MS Industrial Engineering | De La Salle University |
| Fontanilla, Gio Kristofer A. | MS Manufacturing Engineering & Management | De La Salle University |
| Sta. Agueda, Joseph Rey H. | MS Manufacturing Engineering & Management | De La Salle University |
| Magpantay, Daryl M. | MS Mathematics | De La Salle University |
| Biceda, Glenda G. | MS Computer Engineering | Mapúa Institute of Technology |
| Garcillanosa, Leo F. | MS Computer Engineering | Mapúa Institute of Technology |
| Oldan, Billy Ray M. | MS Electrical Engineering | Mapúa Institute of Technology |
| Atienza, Janice V. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Bilbao, Jaycee B. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Destacamento, Ronjo M. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |

| Name | Level (MS or PhD) / Field of Study | University |
|---|---|---|
| Escalona, James Alfred M. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Gayol, John Adam B. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Majarucon, Trinnette V. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Maleriado, Mary Ann G. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Marco, Danilo B. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Milleza, Macario Jr. M. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Tronco, Maria Leovina S. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Yao, Cameron B. | MS Electronics & Communications Engineering | Mapúa Institute of Technology |
| Bo, Bryan Julius A. | MS Environmental Engineering | Mapúa Institute of Technology |
| Saiyari, Donamel M. | MS Environmental Engineering | Mapúa Institute of Technology |
| Asuncion, Harold T. | MS Materials Science & Engineering | Mapúa Institute of Technology |
| Burce, Michelle N. | MS Materials Science & Engineering | Mapúa Institute of Technology |
| Ingusan, Eufrosena Arzenith Z. | MS Materials Science & Engineering | Mapúa Institute of Technology |
| Medroso, Mae R. | MS Materials Science & Engineering | Mapúa Institute of Technology |
| Mariano, Andrew B. | MS Chemistry | University of Santo Tomas |
| Vicente, Ma. Rachel S. | MS Chemistry | University of Santo Tomas |
| Mingo, Francis Leo T. | MS Applied Mathematics | University of the Philippines Diliman |
| Mosqueda, Sonny Jr. M. | MS Materials Science and Engineering | University of the Philippines Diliman |
| Aquino, Angelo I. | MS Physics | University of the Philippines Diliman |
| Dasallas, Lean L. | MS Physics | University of the Philippines Diliman |
| Empizo, Melvin John F | MS Physics | University of the Philippines Diliman |
| Ermino, Marc Alvin | MS Mathematics | University of the Philippines Diliman |
| Filipinas, Jae Lord Dexter C. | MS Physics | University of the Philippines Diliman |
| Vargas, Ray M. | MS Physics | University of the Philippines Diliman |
| Guhit, Jhoelle Roche M. | MS Physics | University of the Philippines Diliman |
| Jose, Mark Anthony I. | MS Physics | University of the Philippines Diliman |
| Torres, Mark Gil T. | MS Statistics | University of the Philippines Diliman |
| Katimbang, Meggy Lou B. | MS Genetics | University of the Philippines Los Baños |
| Danila, Florence R. | MS Molecular Biology and Biotechnology | University of the Philippines Los Baños |
| Barroca, Renyl B. | Doctor of Engineering | Mindanao State University – Iligan Institute of Technology |

| Name | Level (MS or PhD) / Field of Study | University |
|---|---|---|
| Ciruela, Reynante T. | Doctor of Engineering | Mindanao State University – Iligan Institute of Technology |
| Closas, Adonis A. | Doctor of Engineering | Mindanao State University – Iligan Institute of Technology |
| Daroy, Joselito O. | Doctor of Engineering | Mindanao State University – Iligan Institute of Technology |
| Fuentes, Nelson C. | Doctor of Engineering | Mindanao State University – Iligan Institute of Technology |
| Fenecios, Jonald P. | PhD Mathematics | Ateneo De Manila University |
| Patacsil, Crismar P. | PhD Physics | Ateneo De Manila University |
| Espinelli, Dinah L. | PhD Chemistry | De La Salle University |
| Azcarraga, Judith J. | PhD Computer Science | De La Salle University |
| Esguerra, Armie E. | PhD Electronics and Communications Engineering | De La Salle University |
| Malazarte, Darwin S. | PhD Industrial Engineering | De La Salle University |
| Reyes, Victor Paolo C. | PhD Industrial Engineering | De La Salle University |
| Sio, Dhesirey Beryl K. | PhD Industrial Engineering | De La Salle University |
| Lubguban, Alona A. | PhD Mathematics | De La Salle University |
| Penaflor, Randy A. | PhD Mathematics | De La Salle University |
| Mananghaya, Michael R. | PhD Physics | De La Salle University |
| Aquino, Ruth R. | PhD Environmental Engineering | Mapúa Institute of Technology |
| Bernabe, Dante P. | PhD Environmental Engineering | Mapúa Institute of Technology |
| Eleazar, Elisa G. | PhD Environmental Engineering | Mapúa Institute of Technology |
| Mapua, Aristides R. | PhD Environmental Engineering | Mapúa Institute of Technology |
| Santos, Rolly G. | PhD Environmental Engineering | Mapúa Institute of Technology |
| Ligaray, Corazon V. | PhD Environmental Engineering | University of the Philippines Diliman |
| Camacho, Melissa Angelica C. | PhD Materials Science & Engineering | University of the Philippines Diliman |
| Rillera, Hannah P. | PhD Materials Science & Engineering | University of the Philippines Diliman |
| Caga-anan, Randy L. | PhD Mathematics | University of the Philippines Diliman |
| Campano, Wendell Q. | PhD Statistics | University of the Philippines Diliman |
| Lansangan, Joseph Ryan G. | PhD Statistics | University of the Philippines Diliman |
| Villar, Teofila D. | PhD Biochemistry | University of the Philippines Los Baños |
| Acil, Rachel Y. | PhD Genetics | University of the Philippines Los Baños |
| Doblas, Glenda Z. | PhD Genetics | University of the Philippines Los Baños |
| Ilagan, Fatima C. | PhD Microbiology | University of the Philippines Los Baños |

## STAFF ATTENDANCE IN SEMINARS/CONFERENCES

| Participant/s | Seminar/ Training Attended | Date | Venue |
|---|---|---|---|
| Kristina Paula Y. Anacleto<br>Paula Jean T. Cansino | Cluster II Symposium on Microbes in the Environment: Issues and Solutions | January 22, 2011 | De La Salle University, Manila |
| Eric B. Casila<br>Arlene A. Romasanta<br>Ramir D. Sarmiento | 2011 Philippine IPv6 Conference and Training | January 24-27, 2011 | Makati Shangri-La Hotel, Manila |
| Engr. Nelson P. Beniabon<br>Mary Grace D. Gonzales<br>Laarni P. Habal<br>Desiree D. Vera | Seminar on Bioanalytical Nanotechnology | January 31 – February 4, 2011 | University of Santo Tomas, Manila |
| Emelita A.S Dimapilis<br>Russell M. Pili | Practical Project Management in Global Market Course | February 14 – March 23, 2011 | Asian Institute of Management, Makati City |
| Engr. Ermie M. Bacarra<br>Paula Jean T. Cansino<br>Aleah M. Penilla | 72nd PIChe National Convention: Unleashing the Masked Potentials of the Filipino Chemical Engineer | February 16-18, 2011 | L' Fisher Hotel, Bacolod City |
| Divina B. Almazar<br>Darwin V. Santos<br>Ryan Christopher P. Viado | OpenOffice.org Training | March 2-4, 2011 | ASTI Building, Diliman, Quezon City |
| Eric B. Casila | DOST Webmaster Consortium Workshop | March 7-8, 2011 | ASTI Building, Diliman, Quezon City |
| Mary Jane P. Salmorin | Adobe Power Cube of Graphic Design | April 6, 2011 | InterContinental Hotel, Makati City |
| Janet Rosalie Anne H. Polita<br>Mary Jane P. Salmorin | 2nd DOST Clients/ Partners Information System User Acceptance Testing Workshop and End User Training | April 6-7, 2011 and April 11-13, 2011 | ASTI Building, Diliman, Quezon City |
| Raymundo H. Habal<br>Paolo Martin I. Tulalian | HVAC System Audit Training Course | April 13-14, 2011 | Technopark Hotel, Sta. Rosa City, Laguna |
| Engr. Nelson P. Beniabon<br>Dr. Virginia G. Novenario-Enriquez<br>Dr. Amelia P. Guevara<br>Laarni P. Habal<br>Edna C. Nacianceno | 26th Philippine Chemistry Congress: Chemistry: Providing Solutions to Global Challenges | April 13-15, 2011 | Waterfront Hotel, Cebu City |
| Sonia P. Cabangon | Financial Management Reforms for Effective Governance | April 13-15, 2011 | Bacolod Pavilion Resort Hotel, Bacolod City |
| Kashmir G. Iyo<br>Sonia P. Cabangon<br>Elaine Annette P. Salma | 9th Course on Food Safety | May 9-13, 2011 | UP Manila, Manila |
| Carminda R. Tandelcarmen | 33rd Annual National Convention: Government Association of Certified Public Accountants (GACPA): Responding to the Call for Change | May 11-13, 2011 | Limketkai Mall, Cagayan de Oro City |
| All PCIEERD Employees | PCIEERD 1st Team-building Activity | May 19-20, 2011 | Blue Coral Beach Resort, Batangas |
| Engr. Loreto C. Carasi<br>Engr. Albert G. Mariño<br>Engr. Nonilo A. Peña | 10th Philippine Society of Mechanical Engineer (PSME) National Mid-year Annual Convention | May 27-28, 2011 | Boracay Eco Village Resort & Convention Center, Malay, Aklan |

| Participant/s | Seminar/ Training Attended | Date | Venue |
|---|---|---|---|
| Russell M. Pili | International HALAL Assurance Seminar | June 2-3, 2011 | InterContinental Hotel, Makati City |
| Marivic A. Legista | System Administration (SysAd) Demonstration and End-user Training | June 7-9, 2011 | ASTI Building, Diliman, Quezon City |
| Engr. Katrina B. Landicho<br>Paolo Martin I. Tulalian | Symposium on Hunt for Ore Deposits: Recent Findings and Current Trends | June 9-10, 2011 | Tavern Hotel, Surigao City |
| Dr. Amelia P. Guevara | PhilDev Forum: Innovation and Entrepreneurship for Globally Competitive Philippines | June 14, 2011 | InterContinental Hotel, Makati City |
| Dr. Amelia P. Guevara | 31st Annual Philippine-American Academy of Science & Engineering (PAASE) Meeting and Symposium | June 15-18, 2011 | National Institute of Physics, UP Diliman, Quezon City |
| Anthony D. Dela Cruz<br>Joanna Rose A. Guardiano<br>Marivic A. Legista<br>Annaliza R. Monterey<br>May-Rose B. Pariñas<br>Ruel A. Pili<br>Mary Ann L. Pullan<br>Arlene A. Romasanta<br>Mary Jane P. Salmorin<br>Jayson Ryan G. Salunson<br>Carminda R. Tandelcarmen<br>Joselito B. Velasquez<br>Rolando A. Yanquiling<br>Val L. Zabala | OpenOffice/ Libre Training | June 22-24, 2011 | ASTI Building, Diliman, Quezon City |
| Marie Christie B. Santos | eDOST-INFOSYS End-user Training | June 27-30, 2011 | Microtel Inn & Suites, Davao City |
| Kristina Paula Y. Anacleto<br>Aleah M. Penilla | 37th Food Nutrition Research Institute (FNRI) Seminar Series on Food and Nutrition Researches and S&T Activities | July 4-5, 2011 | Food and Nutrition Research Institute, DOST Compound, Taguig City |
| Grace F. Estillore<br>Fatima Jhoan S. Ibarreta<br>Kashmir G. Iyo | 50th Philippine Association of Food Technologies Annual Convention | July 6-8 2011 | SMX Convention Center, Pasay City |
| Arlene A. Romasanta<br>Rommel V. Visperas | Information Systems Strategic Planning | July 13-15, 2011 | National Computer Center, Diliman, Quezon City |
| Ruel A. Pili | Statistics for Project Monitoring and Evaluation | July 18-22 and July 25-27, 2011 | J&S Building, Diliman, Quezon City |
| Mary Grace D. Buenavides | Philippine Wellness Congress | August 4-5, 2011 | SMX Convention Center, Pasay City |
| Joseph R. Escorial<br>Mary Ann F. Bangunan | World Conference on Science and Technology | September 13-14, 2011 | Manila Hotel, Manila |
| Jayson Ryan G. Salunson | Internal Control System for Property and Supply Management (Appraisal and Disposal) | September 14-16, 2011 | Hotel Kimberly, Manila |
| Kristina Paula Y. Anacleto | Food Safety and Hygiene Quality Standards Adapting to the Changing Microbial World | September 17, 2011 | University of the East, Manila |

| Participant/s | Seminar/ Training Attended | Date | Venue |
|---|---|---|---|
| All PCIEERD Key Personnel | Competency Development Training for PCIEERD | September 20-22, 2011 | DOST Executive Lounge, DOST Compound, Taguig City |
| Raissa Roa L. Aguilera | 15th Monitoring and Evaluating Programs and Projects | October 10-14, 2011 | UP Institute for Small-Scale Industries, Diliman, Quezon City |
| Paolo Martin I. Tulalian | National Seminar on Energy Management and ISO: 50001 | October 11-12, 2011 | Philippine Institute of Volcanology and Seismology, Diliman, Quezon City |
| Rommel V. Visperas | Personnel Officers Association of the Philippines (POAP): Basic Human Resource Management | October 11-14, 2011 | Harbor Lights Hotel, Cagayan de Oro City |
| Divina B. Almazar<br>Isidro V. Querubin Jr.<br>Darwin M. Rosales | Association of Government Internal Auditors (AGIA) Annual Convention cum Seminar: Global Challenges: AGIA Rocks! | October 12-14, 2011 | Legend Hotel, Puerto Princesa City |
| Vilma Rose C. Borja<br>Magdalena F. Frando<br>Maridon O. Sahagun<br>Carminda R. Tandelcarmen | International Conference on Green Urbanism | October 18-20, 2011 | Heritage Hotel, Pasay City |
| Rommel V. Visperas | Administrative Rules of Procedure for Disciplinary Cases in the DOST System | October 20, 2011 | DOST Executive Lounge, DOST Compound, Taguig City |
| Engr. Nelson P. Beniabon<br>Jonathan G. Muñoz | ISO 19011: Internal Audit Training (Quality) | October 20-21, 2011 | Orient Square Building, Pasig City |
| Engr. Efren V. Reyes | 59th National Convention of the Philippine Society of Mechanical Engineers | October 25-28, 2011 | SMX Convention Center, Pasay City |
| Arlene A. Romasanta | eDOST INFRA IPv6 Training for DOST Network Administrators | October 26-27, 2011 | DOST Executive Lounge, DOST Compound, Taguig City |
| Michelle Dhian M. Chua<br>Desiree D. Vera | Joint Society of Metallurgical Engineers of the Philippines(SMEP) Metallurgical Conference 2011 and 4th AUN-SEED NET Conference on Natural Resources and Materials | October 27-28, 2011 | Subic Bay Travelers Hotel, Olongapo City |
| Dr. Virginia G. Novenario-Enriquez<br>Magdalena F. Frando<br>Ruel A. Pili | Training of Trainers Programme on Planning and Implementing Technology Transfer Projects | November 7-9, 2011 | Heritage Hotel, Manila |
| Rommel V. Visperas | Basic Statistical Research and Development | November 8-10, 2011 | DOST Executive Lounge, DOST Compound, Taguig City |
| Raissa Roa l. Aguilera<br>Engr. Marvin Eric O. Dela Cruz | Regional Workshop in Innovation, Technology Transfer and Successful Technology Licensing in Research and Development Institutions | November 28 – December 1, 2011 | Traders Hotel, Manila |
| Julieta H. Lacsa<br>Allen Z. Manibog | Government Association of Certified Public Accountants (GACPA): Enhancing the Culture of Integrity, Accountability and Transparency | December 1-3, 2011 | A&A Plaza Hotel, Puerto Princesa City |
| Janet Rosalie Anne H. Polita | Basics of Project Management Seminar | December 5-9, 2011 | TAPI Audio-Visual Room, DOST Compound, Taguig City |

## PARTICIPATION IN FOREIGN CONFERENCES

| Participant/s | Seminar/Training Attended | Date | Venue |
|---|---|---|---|
| Engr. Raul C. Sabularse | Kick-off Meeting on the Regional Cooperative Mechanism on Disaster Monitoring and Early Warning, Particularly Drought | March 15-17, 2011 | Beijing, China |
| Engr. Ermie M. Bacarra | ASEAN-Pakistan Conference on Materials Science | April 26-27, 2011 | Hanoi, Vietnam |
| Russell M. Pili | Genetic Resources and Intellectual Property Rights | May 2-20, 2011 | Malmo, Sweden |
| Engr. Ermie M. Bacarra | ASEAN Committee on Science and Technology (COST) Workshop on Drafting the Implementation of the Flagship Programs | May 3-4, 2011 | Bandung, Indonesia |
| Engr. Ermie M. Bacarra | Meeting of the ASEAN Sub-committee on Materials Science Technology | May 9-10, 2011 | Siem Reap, Cambodia |
| Engr. Emelita A.S Dimapilis | Workshop on Renewable Energy | June 20-24, 2011 | Nadi, Fiji |
| Dr. Amelia P. Guevara | ASEAN-Quality Assurance Project Meeting and 1st ASEM Expert Seminar on Regional Quality Assurance | July 2-7, 2011 | Bonn, Germany |
| Engr. Raul C. Sabularse | International Atomic Energy Agency (IAEA)/Asian Nuclear Safety Network (ANSN) Regional Workshop on Establishing a Nuclear Safety Infrastructure for a National Nuclear Power Programme | July 4-15, 2011 | Vienna, Austria |
| Engr. Ermie M. Bacarra | Symposium on Photocatalysis for Depollution Technologies | July 13-14, 2011 | Tam Dao, Vietnam |
| Engr. Patrick E. Montero | Asia Pacific Economic Cooperation (APEC) International Biogas Resources Development and Utilization Science and Technology Cooperation Forum | August 15-17, 2011 | Kunming, China |
| Arlene A. Romasanta | 3rd Asia Pacific Economic Cooperation (APEC) Seminar on Protection of Cyberspace to Better Defend Our Economies | September 7-9, 2011 | Seoul, Korea |

| Participant/s | Seminar/Training Attended | Date | Venue |
|---|---|---|---|
| Engr. Raul C. Sabularse | Regional Executive Management Meeting for Policy Makers and End Users on Super Water Absorbent, Toxic Metal Absorbent and Plant Growth Promoter for Agriculture Applications | October 3-7, 2011 | Takasaki, Japan |
| Ryan Christopher P. Viado | Training Program on Climate Change and Sustainability | October 3-21, 2011 | Gurgaon, India |
| Dr. Amelia P. Guevara | 2nd e-ASIA Joint Research Forum | October 5-7, 2011 | Tokyo, Japan |
| Dr. Amelia P. Guevara | 3rd Manila Economic and Cultural Office –Taipei Economic and Cultural Office (MECO-TECO) Joint Science and Technology Commission (JSTC) Meeting | October 25-27, 2011 | Taipei |
| Engr. Raul C. Sabularse | Consultative Meeting on Regional Cooperative Mechanisms on Space Applications Towards an Effective Disaster Management and Sustainable Development and 15th Session of the Intergovernmental Consultative Committee on the Regional Space Applications Programme for Sustainable Development | October 25-27, 2011 | Colombo, Sri Lanka |
| Russell M. Pili | Genetic Resources and Intellectual Property Rights Phase III | November 20-27, 2011 | Nairobi, Kenya |
| Engr. Raul C. Sabularse | 62nd Meeting of the ASEAN Committee on Science and Technology | November 23-25, 2011 | Vietnam |
| Engr. Loreto C. Carasi | China-ASEAN Science and technology Cooperation Conference on New and Renewable Energy Development and Promotion for Combating Climate Change | November 29 – December 2, 2011 | Kunming, China |
| Engr. Loreto C. Carasi | Climate Change Sustainability Energy Management | December 5-16, 2011 | Singapore |
| Engr. Nonilo A. Peña | Japan-ASEAN Disaster Management Seminar and 2nd Expert Group Meeting on the Great East Japan Earthquake | December 16-18, 2011 | Tokyo, Japan |

*Design and Layout*
**Tony B. Carandang**

## CREATIVE & PRODUCTION STAFF

**Editorial Consultant**
**Engr. Raul C. Sabularse**

**Editor-in-Chief**
**Dr. Virginia G. Novenario-Enriquez**

**Managing Editor**
**Janet Rosalie Anne H. Polita**

**Copy Editor**
**Margarette T. Maceda**

**Writers**
**Margarette T. Maceda**
**Janet Rosalie Anne H. Polita**

**Researchers**
**Raissa Roa L. Aguilera**
**Joanna Rose A. Guardiano**

**Photo Editor**
**Margarette T. Maceda**

**Proofreaders**
**Raissa Roa L. Aguilera**
**Engr. Marvin Eric O. Dela Cruz**

**Contributors**
**Magdalena F. Frando**
**Maridon O. Sahagun**
**Ma. Elena A. Talingdan**

**Circulation**
**Engr. Efren V. Reyes**
**Rodolfo A. Veloso**
**Rolando A. Yanquiling**

**Other Sources of Photos**
DOST – Advanced Science and Technology Institute
DOST – Metals Industry Research and Development Center
Department of Philosophy, University of Santo Tomas
National Institute of Physics, University of the Philippines Diliman

www.pcieerd.dost.gov.ph

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**Philippine Council for Industry, Energy and Emerging Technology Research and Development**
4th and 5th Levels, Science Heritage Bldg., Science Community Complex, Gen. Santos Ave., Bicutan, Taguig City
Direct Lines: 837-2926, 837-2935, 837-3168, 837-7516, 837-7522
Trunkline: 837-2071 to 82, Locals 2100 to 09, 2120, 2121 Fax Nos: 837-3925, 837-6154