

PCIEERD R&D PROGRAMS/PROJECTS

Mandate/Function

VISION

The PCIEERD envisions to be recognized for the quality of its people, leadership and performance and contribute to the nation's productivity and competitiveness.

MISSION

To lead and partner with public and private institutions in generating S&T policies, strategies and technologies that will contribute significantly to national development.



Program and allocate government & other external funds for industry, energy, and emerging technologies



Support for Institution Development, R&D and S&T human resource pool



Transfer and commercialization of technologies and other research outputs for optimal utilization

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PCIEERD and the Aquino Social Contract





PCIEERD Thrust for 2014

- Competitive Industry and Manufacturing
- Environmentally Sustainable and Efficient Transport Program
- Sustainable Energy Program
- Climate Change Adaptation and Disaster Risk Reduction
- Increasing Agricultural Productivity



STRATEGIES IN SUPPORT TO DOST OUTCOMES



Outcome 2: Innovative, Cost-effective and Appropriate Technologies that Enable MSMEs to Develop and Produce Competitive Products that Meet World-Class Standards

Competitive Industry & Manufacturing

- Technological Support for the Upgrading of the Local Cacao and Cocoa Industry
- National R&D Program for Natural Rubber Processing and Rubber Products Manufacturing

Agricultural Productivity

- Abaca Functional Genomics: High Throughput Discovery of Genes and Molecular Markers
- Development of Nanostructured Materials for the Enhancement of Food And Agricultural Productivity and for Environmental Remediation







Outcome 3: State-of-the-art Facilities and Capabilities that Enable Local Industries to Move Up the Value Chain and Attain Global Competitiveness

Electronics Industry

- Advanced Materials Testing Laboratory (ADMATEL)
- Establishment and Operation of the Philippine Electronics Product Development Hub
- Establishment and Operation of a Philippine Institute for Integrated Circuits (PIIC)

Other Industries

- Establishment of the Philippine Genome Center DNA Sequencing Facility and the Bioinformatics Core Facility
- Strengthening the Testing and Analytical Capabilities of the Regional Laboratories to Support the Competitiveness of Local Industries









Outcome 7: Highly Skilled and Globally Competitive S&T Human Resources in Support of the National S&T Programs

Support to Industry Competitiveness

- Human Resource Enhancement for Globally Competitive
 Workforce
- Bridging the Human Resource Competency Gaps in Support of the National R&D Agenda
- COILS, CELLS AND GELS: Developing Capabilities for Biophysics Research





Outcome 8: SCIENCE-BASED INFORMATION ON WEATHER, CLIMATE CHANGE AND GEOLOGICAL HAZARDS TO ENSURE THE COUNTRY'S SURVIVAL AND FUTURE IN AN ERA OF EXTREME AND RAPIDLY CHANGING CLIMATE

Climate Change Adaptation & Disaster Risk Reduction

- Project NOAH
- Nationwide Disaster Risk Exposure Assessment for Mitigation (DREAM) Program
- Real-time gathering sensors, agromet and landslide sensors









PROJECT ACCOMPLISHMENTS FY 2013



Competitive Industry and Manufacturing



Advanced Device Materials Testing Laboratory (ADMATEL) Budget: Php385.19M (Phase I&II)

- ADMATEL has been fully operational since January 8, 2013
- The new testing facility was established to reinforce and upgrade the failure analysis and materials testing of products of our local semiconductor and electronics industry.

Beneficiaries:

Philippines Semiconductor & Electronics Industry

Outcome:

• Improving the competitiveness of our local companies, as well as, attract potential investors in the Semiconductor and Electronics Industry.



Competitive Industry and Manufacturing

Establishment and Operation of the Philippine Electronics Product Development Hub

Budget: Php 268.41M

The list of tools for the EMC facility is 100% complete while the list of PDC equipment is 50% complete.

Outcome:

 Serve as a catalyst for more R&D efforts from R&D institutions and schools research entities in the field of electronics.

Beneficiaries:

Philippines Semiconductor & Electronics Industry







Sustainable Energy

The Smart Wire Program

Budget: Php 27.65M

- Designed a 2-channel Data Acquisition (DAQ) verified at the schematic and layout level/modelling
- Integrated design for fabrication/ simulation/layout
- Specified the target specifications for the sub-blocks
- Identified the different blocks to be used for the computation and communication subsystem
- Specified the target specifications for the sub-blocks

Outcome:

• Enabling the Philippine Energy Sector to better adopt Smart Grid solutions

Beneficiaries:

Energy Sector, Semiconductor Industry, Academe





Efficient Transport

Rapid Electric Vehicle Charging (CharM)

Budget: Php 25.91M

- E-trikes drive cycle acquisition completed
- 6 units of a single brand of Li-ion battery were characterized for slow charging mode
- Slow discharge profiling of 6 units of Li-ion

Outcome:

• Low carbon emitting technologies for public transport



Beneficiaries:

Public and Transport Sectors



Efficient Transport

Development of a Prototype Automated Guide-way Transit (AGT) System Budget: Php 65.65M

- Constructed three (3) temporary maintenance & loading platforms
- Four (4) guide wheel frames were subjected to Magnetic Particle testing to check quality of welding (in accordance to ASTM E709-08)
- Conducted demonstration run for the President, MMDA Chairman, DPWH Secretary & DOTC Undersecretary

Beneficiaries:

Public Transport & LGU



Outcome:

• Contribute to the stabilization of GHG concentrations in the atmosphere by reducing the amount of GHGs generated by the public transport utility sub-sector.



Climate Change Adaptation and Disaster Risk Reduction



Outcome:

• The project will produce high-resolution flood hazard maps and install integrated flood early warning systems (iFEWS).

Nationwide Disaster Risk Exposure Assessment for Mitigation (DREAM) Program

Budget:Php 1.6B

- Acquired over 22,000km², finishing 17 major river basins out of the 18 target areas.
- Ground surveys and databasing for Mandulog, Iponan, Angat-Pampanga, Agno, Iligan and Bicol river
- LIDAR data for Agno, Pampanga, Davao, Bicol, and Portion of Bulacan Flood Plain
- Processed LIDAR digital models of Pampanga, Bicol Cagayan de Oro, Tacloban, Iponan, Iligan and Mandulog





Climate Change Adaptation and Disaster Risk Reduction

Regional Disaster Science and Management S&T Capacity Development for SUCs

Budget: Php 18.78M

Conducted Rapid Earthquake Damage Assessment System (REDAS) training in 14 SUCs for the creation of database regarding hazard prone areas

Outcome:

 Enhanced disaster risk management capability of the LGUs through the SUCs in drafting appropriate CCA-DRR streamlined plans, programs and projects

Beneficiaries:

SUCs (Region II, III, XI)





PCIEERD- GIA Investment per Sector





PCIEERD-GIA Allocation for 2014





R&D Priorities for 2015



PCIEERD PRIORITY THRUST





Electronics, Semiconductor and ICT Industry

- Sensors and Transducers Materials Development for Food Quality Monitoring, Detection of Chemical, and Industrial Process Controls, Health and Medical Diagnostic Kits
- IC Sensors for Water Level, Chemical Detection and Proximity Detection
- Cost-effective and environmentally-friendly Process for Refining of Copper from Electronics and Semiconductor Wastes to 99.9999% Purity
- Client-Based Educational and Gaming Application Software for K to 12 Using Thin Client Platform









Food Industry

Development of Intermediate Food Ingredients From Local Materials Sources

- ▶ Bench Scale Verification of the Production and Testing of:
 - 1. Nano Sensors for Food, Virus Detection for Banana, Detection for Bisphenol A
 - 2. Nano-Biodegradable Packaging Materials for Food Application
 - 3. Food Grade Nano-Precipitated Calcium Carbonate from Limestone
 - 4. Nano-Encapsulated Plant Growth Promoter for High Value Crops
- Discovery of Gene/Molecular Markers Associated with:
 - 1. Improvement of High-Value Staple Crops: Mango, Banana and Tropical Fruits (Jackfruit, Papaya, Durian)
 - 2. Increased Production, and Diagnostics for Rapid Screening of Diseases of Selected Livestock (e.g. Broilers/Endemic Wild Chicken and Buffalo)













Process Industry

- Utilization of Abaca as Natural Fiber Reinforced Composites for the Automotive and Other Allied Industries
 - 1. Development and Upgrading of Treatment Technologies for Abaca Fiber Reinforced Polymer Composites
 - 2. Application of Abaca Fiber Reinforced Matrix Composites as Alternative Materials for Automotive and Allied Industries
- Diversification of the Nonwoven Applications of Philippine Fibers for Industrial and Manufacturing Sector
- Production of Manila Elemi Oil and other High Value Products from Pili
 - 1. Development of extraction process and equipment for elemi oil including raw material preparation, testing and packaging
 - 2. Development of high value products from by-products of elemi oil processing
 - 3. Nano-based Preservatives from Pili Resin (*Canarium luzonicum*)
- Nano-based Preservatives from Essential Oils of Plantation Grown Lemon-Scented Gum (Corymbia citiodora)





Manila Elemi





Process Industry

- Technology Development for the Upgrading of the Local Cacao and Cocoa Industry
 - 1. Pilot scale production and multi-location field testing for the starter culture formulation for cacao fermentation
 - 2. Design and Fabrication of processing line for bitter chocolate
 - 3. Development of test kits for quality determination e.g. aroma and flavor
- Natural Rubber Processing and Manufacturing
 - 1. Development of field- test kits for dry rubber content/moisture and dirt content in cup lumps
 - 2. Fabrication of dies, molds machineries for rubber manufacturing
 - 3. Development of specialty rubber and modified rubber products for ecofriendly applications
 - 4. Development of new formulations using nanomaterials for rubber tires, rubber products and industrial rubber products
 - 5. Innovations in process engineering and localization of equipment and parts for rubber manufacturing
- Optimization and Bench Scale Production of Fire Retardant from Nanostructured Inorganic Materials



w Cocoa Powder mixe



Minerals Industry

- Development of Value-Adding Technologies for Copper, Iron, Chromite, Nickel, Chromium and Gold Minerals for Industrial Application
- Bench Scale Verification of the Production and Testing of Nano Silica as Material for Fertilizers, Coolant, Food Packaging and Arsenic Removal

Metals & Fabrication Industry

- Cost Efficient Manufacturing Processes and Equipment to Increase Local Content of Automotive and/or Train Parts and Components
- Development of Processes for Cupola and Value Added Products
- Design, Development and Prototyping of Food Processing Equipment for Micro, Small and Medium Enterprises (MSMEs)



Sustainable Energy

- Smart Energy Efficient Systems for Low Carbon Economy
 - Localized energy efficient smart and green system technologies for:
 - 1. MSMEs $\geq 20\%$
 - 2. Residential to Commercial buildings $\geq 10\%$
- Renewable Energy Systems
 - ➤ Local development of micro-hydro (up to 100kWe) high-efficiency turbines ≥ 75%
 - Bench Scale Fabrication of Polymer Electrolytes from Carrageenan. Carbon nanotubes Heterojunctions, Conjugated Diblock Heterojunctions and Graphene for Solar Cells and Solar Panel ≥ 24%
- Indigenous Bioenergy Systems
 - Biofuel handling testing, engine performance & durability testing of higher blends
 - 1. 10% & 20% biodiesel
 - 2. 20% bioethanol





Sustainable Mass Transport

- Public Utility Vehicle (PUV) Sustainable Road Transport
 - ▶ PUJ weight & fuel consumption reduction $\geq 20\%$
 - Localized low carbon power driven PUVs
- Intelligent Transport System
 - Improve mobility by 20%
 - ▶ Reduction in travel time $\ge 20\%$
 - PUV on-board monitoring system with console data processor
- Water Transport
 - Cost-effective sea-worthy hull design for bancas
 - Cost-effective power-to-hull size-to-weight ratio improvement for small to large size capacity motorized bancas







Environment, Climate Change Adaptation and Disaster Risk Reduction

- Bench –Scale Verification of the Production and Testing of Nano Sensors for Gas Detection and Environmental Application and Arsenic Detection
- Use of Multispectral Data from Microsatellite Data for Various Applications
- Use of LIDAR Data for Various Applications
- Development of a community-managed risk assessment system for multi-hazard observation and monitoring for an integrated end-to-end early warning, alarm and decision support systems
- Development of an integrated urban flood inundation model for highly urbanized communities
- Development of Compact Systems for Pre- and Post-Treatment of Industrial Wastewater (to meet at least Class C Water Quality)
- Design and prototype of a cost-effective motorized amphibious light vehicle for 8-10 people capacity for urban flood rescue with estimated unit cost of P1.0M or less





THANK YOU

