SIRIM

ENABLING BUSINESSES. ENHANCING LIVES.

ANNUAL REPORT 2014

CONTENTS

A Premier Total Solution Provider
in Quality and Technology Innovation

VISION

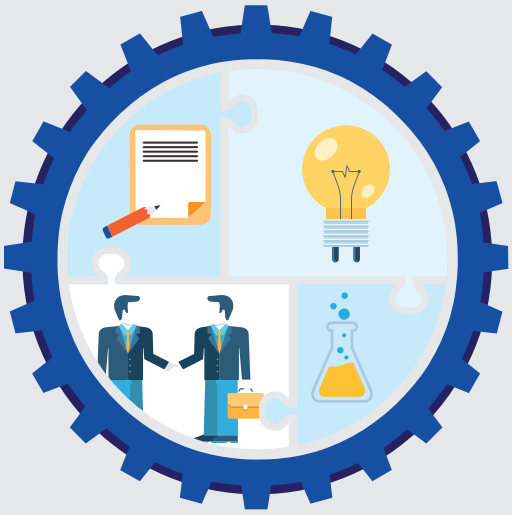
MISSION

As a Leader in Quality and Technology Development, we:

- Efficiently deliver customised technology and quality solutions to industry and the government, and support inclusive growth through innovations
- Enhance customers' business competitiveness and growth through applied industrial research and technology
- Facilitate trade, and enhance health, safety, environment and customer confidence through quality, standards and conformity assessment

FUNCTIONS

- Plan, develop, operate and manage national strategic facilities and programmes
- Develop, operate and manage strategic research programmes
- Operate testing laboratories and quality assurance schemes
- Undertake development programmes for small and medium-scale enterprises



ROLES

- The champion of quality
- A national research and technology development corporation
- A vehicle for technology transfer
- A provider of institutional and technical infrastructure for the government

OBJECTIVES

- To innovate and develop processes, products and technologies for the industry
- To promote standardisation and quality
- To provide technical services for the industry and the public

BOARD OF DIRECTORS

From left to right

- Datuk Hjh. Jamaliah Kamis *Chairman*
- Dato' Dr. Zainal Abidin Mohd Yusof
- Ahmad Shahab Din
- Tan Sri Dato' Dr. Mohamed Salleh Mohamed Yasin
- Datuk Dr. Ir. Abdul Rahim Hj. Hashim
- Dato' Dr. Mohd Azhar Hj. Yahya
- Khalimatun Saadiah Mohd Khalid
- Dato' Dr. Md. Khir Abdul Rahman
- Dato' Syed Ahmad Idid Syed Abdullah Idid

MANAGEMENT COMMITTEE

IR. DR. MOHAMAD JAMIL SULAIMAN
Vice President
Research and Technology Innovation Division

AZIM NG ABDULLAH
Vice President
Technical Services Division

DATO' DR. ZAINAL ABIDIN MOHD YUSOF

President and Chief Executive

HALIZA IBRAHIM

Vice President
Corporate Division

KHALIDAH MUSTAFA

Managing Director
SIRIM QAS International Sdn. Bhd.

CORPORATE STRUCTURE

BOARD OF DIRECTORS

Company Secretary

PRESIDENT AND CHIEF EXECUTIVE
Dato' Dr. Zainal Abidin Mohd Yusof

RESEARCH AND TECHNOLOGY INNOVATION DIVISION
(Vice President: **Ir. Dr. Mohamad Jamil Sulaiman**)

Vice President's Office
- Human Resource Section (Head: **Rajiah Mohamed Taib**)
- Finance Section (Head: **Vacant**)

Research and Technology Support Centre
(General Manager: **Abdul Basid Ramli**)
- Research Management and Business Support Section (Head: **Nor Anizar Zainal**)
- Project Management and Business Information Section (Head: **Zalinda Baharum**)

Secretariat Waitro
(Secretary General: **Dr. Rohani Hashim**)

National Metrology Laboratory
(Senior General Manager: **Dr. Osman Zakaria**)
- Secretariat (Head: **Zaharuddin Abdul Latiff**)
- Technical Services and Metrology Advisory Section (Head: **Irene Safinaz Hassan**)
- Electrical Metrology Section (Head: **Nazri Marzuki**)
- Thermophysical Metrology Section (Head: **Hafidzah Othman**)
- Flow Metrology Section (Head: **Dr. Abdul Rahman Mohamed**)
- Mechanical Metrology Section (Head: **Wan Aziz Wan Salleh**)
- Metrology in Chemistry Section (Head: **Haslina Abdul Kadir**)

Technology Commercialisation Centre
(General Manager: **Rosmina Mustafa**)
- Commercialisation and Venturing Section (Head: **Ruslina Shaidin Kadri**)
- Bio Composite Technology Business Unit (Head: **Nor Azlan Mohd Ramli**)
- SIRIM Micro Precision Unit (Head: **Ajmain Kasim**)

Energy and Environment Flagship
(Senior Director: **Dr. Chen Sau Soon**)

Renewable Energy Research Centre
(General Manager: **Mohd Fauzi Ismail**)
- Biomass Energy Technology Section (Head: **Azhar Abdul Raof**)
- Solar Technology Section (Head: **Vacant**)
- Energy Efficiency Section (Head: **Ir. Kasim Ahmad**)

Environmental Technology Research Centre
(General Manager: **Isnazunita Ismail**)
- Environmental Management Section (Head: **Wan Mazlina binti Wan Hussein**)
- Pollution Abatement Section (Head: **Tan Yong Nee**)
- Product Safety and Hazard Assessment Section (Head: **Mohd Helme Mohd Helan**)

Automotive Development Centre
(General Manager: **Zulkifli Zahari**)
- Virtual Engineering and Simulation Section (Head: **Vacant**)

Plant and Machinery Flagship
(Senior Director: **Dr. Wan Abdul Rahman Jauhari Wan Harun**)

System Design Centre
(General Manager: **Suhaimi Mahmood**)
- Intelligence System and RFID Section (Head: **Hasmafatiha Harun**)
- Plant Design Section (Head: **Md. Azhar Saad**)
- Industrial Automation and Robotics Section (Head: **Ahmad Nazri Said**)

Machinery Technology Centre (RASA)
(General Manager: **Md. Nizam Abd Wahab**)
- Machine Design Section (Head: **Zuriani Usop**)
- Foundry Technology Section (Head: **Romzee Ismail**)
- Tooling Technology Section (Head: **Adnan Md. Sharif**)

Industrial Design Centre
(General Manager: **Azhar Ahmad**)
- Design Engineering Section (Head: **Victor a/l S Devadass**)
- Product Design Section (Head: **Husaini Ismail**)

TECHNICAL SERVICES DIVISION
(Vice President: **Azim Ng Abdullah**)

Vice President's Office
- Marketing and Sales Section (Head: **Roslina Harun**)
- Human Resource and Administration Section (Head: **Lili Masni Ab. Jalil**)
- Special Project (Head: **Azlan Adnan**)
- IP Services Section (Head: **A Rahman Zuhri**)

Regional Affairs Department
- SIRIM Northern (Director: **Mohamad Nizam Zainuddin**)
- SIRIM East Coast (Director: **Zulkifli Mohd Sahalan**)
- SIRIM Southern (Director: **Mohamad Radzi Awang**)
- SIRIM East Malaysia (Director: **Khairan Untoh**)

Medical Technology Flagship
(Senior Director: **Dr. Azmi Idris**)

Advanced Materials Research Centre
(General Manager: **Dr. Mohd Radzi Mohd Toff**)
- General Manager's Office (Head: **Muhamad Nor Anazim Rejab**)
- Biomedical Materials Section (Head: **Dr. Kartini Noorsal**)
- Energy Materials Section (Head: **Dr. Mohd Ali Sulaiman**)
- Engineering Materials Section (Head: **Dr. Mohd Asri Selamat**)
- Technical Services and Consultancy Section (Head: **En. Mazlan Mohammad**)

Industrial Biotechnology Research Centre
(General Manager: **Dr. Ahmad Hazri Ab. Rashid**)
- Cosmetics and Natural Product Section (Head: **Sarifah Rejab**)
- Bioprocess Technology Section (Head: **Ishak Mohd Yusuff**)

AS AT DECEMBER 2014

Audit and Accounts Committee

Group Internal Audit Department

Standards Research and Management Centre
(Senior General Manager: **Abdul Aziz Long**)
- Engineering Standards Management and Consulting Services Section (Head: **Nor Hashimah Ismail**)
- Scientific Standards Management and Consulting Services Section (Head: **Vacant**)
- Standards System and Operation Section (Head: **Azlina Abdul Latif**)
- WTO/TBT Enquiry Point and Technical Advisory Services Section (Head: **Salmah Mohd Nordin**)

Packaging Design Centre
(General Manager: **Sulaiman Arshad**)
- Packaging Development Section (Head: **Abd Halim Yacob**)
- Green and Advanced Packaging Section (Head: **Vacant**)

Security Design Services Centre
(General Manager: **Azman Hassan**)
- Security Design Section (Head: **Fuziah Yusof**)

Malaysian Design Council Secretariat
(Senior Director: **Futom Shikh Jaafar**)

Facilities Management Centre
(General Manager: **Zahamruz Ahmad**)
- Administration and Assets Section (Head: **Azlin A Rahaman**)
- Security and Transportation Section (Head: **Mohd Abdul Murais bin Abdullah**)
- Building, Landscape, Renovation and Project Section (Head: **Yusdi Yusoff**)
- Design and Contract Section (Head: **Ir. Tarseh Hanapiah**)
- Mechanical & Electrical, Audio Visual and Telecommunication, Inspection and Compliance Section (Head: **Vacant**)

CORPORATE DIVISION
(Vice President: **Haliza Ibrahim**)

Vice President's Office
- Integrity Unit (Senior General Manager: **Mohd Ghazali Mohd Yunos**)

Group Planning and Business Development Department
(Senior General Manager: **Goay Peck Sim**)
- Strategic Planning Section (Head: **Rafidah Mokhdar**)
- Business Development Section (Head: **Ir. Mohd Salleh Ngah Mat Drus**)

Group Finance Department
(Senior General Manager: **Khairul Muphinora Mahizan**)
- Financial Management Section (Head: **Abu Hassan Othman**)
- Accounts Section (Head: **Junita Isa**)
- Procurement Section (Head: **Wan Fauziah Wan Abbas**)

Group Human Resource Department
(Senior General Manager: **Nik Rahini Nik Ishak**)
- Human Resource Planning and Development Section (Head: **Ani Alang**)
- Human Resource Support Section (Head: **Azlina Abd Aziz**)

Group Business Assurance Department
(General Manager: **Nor'afiza Saim**)
- Conformance and Assessment Section (Head: **Sharina Hanur Harith**)
- Business Process and Performance Management Section (Head: **Fauziah Abdul Ghani**)

Group Information Technology Department
(General Manager: **Zurina Mohd Bistari**)
- Application System Development Section (Head: **Rohazlin Md. Yassin**)
- System Operation and Maintenance Section (Head: **Zuraida Jamaluddin**)

Strategic Marketing Department
(Senior General Manager: **Zulkifli Abdullah**)
- Bumiputera Economic Development and Empowerment Unit (Head: **Khirul Salleh bin Marzuki**)
- Industry Section (Head: **Karuwaharan a/l M Rethinasamy**)

PRESIDENT'S OFFICE

Group Corporate Affairs Department
(General Manager: **Raja Yahya Raja Ariffin**)
- Corporate Communications Section (Head: **Ruhil Amani Zainal Abidin**)
- Corporate Promotions Section (Head: **Vacant**)

Group Internal Audit Department
(Senior General Manager: **Wan Mohd Silmi Mohd Yaacob**)

Group Legal and Company Secretarial Department
(Senior General Manager: **Muhammad Suria Doshi Abdullah**)

Special Project
- Angkasa Project (Senior General Manager: **Zulkifli Abdullah**)
- Keratong Project (Senior General Manager: **Abdullah Abd Hamid**)
- Higher Education Project (Senior General Manager: **Dr. Abd Rahim Saad**)

SUBSIDIARIES

- SIRIM QAS International Sdn. Bhd.
- SIRIM Training Services Sdn. Bhd.
- SIRIM Standards Technology Sdn. Bhd.
- National Precision Tooling Sdn. Bhd.
- SIRIM Measurements Technology Sdn. Bhd.
- SIRIM Tech Venture Sdn. Bhd.

CHAIRMAN'S ADDRESS

DATUK HAJAH JAMALIAH KAMIS
Chairman

ENABLING BUSINESSES. EHANCING LIVES.

Commemoration of public-private partnership

Technology and innovation are the key drivers in creating sustainable industries with a distinct competitive edge. As the nation moves towards an economy that is based on knowledge, high skills, expertise, creativity and innovation; research and development became increasingly critical to continued growth.

In tandem with development plans for Malaysia's key economic focus areas, SIRIM is advancing its service offerings to provide a solid leverage for greater economic progress.

SIRIM serves all Malaysians – companies and communities and our achievements are measured in quantifiable data through the economic indicators system. The economic indicators for 2014 depict a gain in momentum over 2013 in reaching out to more companies and communities. **In 2014, SIRIM assisted 8,023 companies**, a significant increase from the total of 7,658 in 2013. Assistance rendered covers a full spectrum of services **from training and certification, to developmental and technology transfer projects and incubation centre services**. On the socioeconomic front, SIRIM also improved livelihoods through technology and training programmes for a total of 43 communities.

The improvement in the economic indicators reflect SIRIM's success in accordance to its Strategic Transformation plan in order to best support the nation's growth targets. In response to the national agenda to raise productivity of SMEs through innovation, the SIRIM Industrial Innovation Model, a key initiative arising from the SIRIM-Fraunhofer Strategic Alliance was launched. The Model emphasises on collaboration with universities and research institutions in providing the innovation services to the industry. SIRIM is honoured to have been entrusted by the government in leading this very important effort for the country.

In support of the Ministry of Science, Technology and Innovation's Commercialisation Year, the 2014 SIRIM Commercialisation Roadmap has successfully brought forward SIRIM's technology and services to the forefront. More than 20 products and services were introduced to the market during the year which include the BioNG, a technology to produce bio natural gas derived from palm oil mill effluent, and the Inn'oCraft, a centre in Melaka dedicated for local handicrafts developed using SIRIM's technology. An award-winning micro precision grinding machine known as the TCG8 was also launched apart from a bio-composite technology using natural-based fibre for producing indoor and outdoor furniture.

SIRIM has also made significant contributions through the newly established Eco Industrial Design Centre (EIDC), in Bukit Jalil, Kuala Lumpur. The Centre provides support to SMEs in the E&E sector in areas of conceptual and design developments as well as prototyping services.

I am pleased to announce that the year 2014 has seen significant expansion for the SIRIM Group with the establishment of **two new subsidiaries, SIRIM Measurements Technology which offers total measurement technology solutions** and **SIRIM Tech Venture, a special purpose vehicle to drive commercialisation of SIRIM's technologies.** Meanwhile, SIRIM QAS International, the Group's certification, inspection and testing arm has launched four new certification schemes in 2014 in areas namely food manufacturing, environmental, steel fabrication works in the oil and gas as well as petrochemical industry.

Launching of new certification scheme

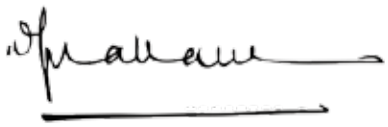
In enhancing its business appeal, SIRIM is not relying on the traditional patent licensing model that renders the business partner responsible for the entire business aspect with SIRIM playing the role of technical consultant. We are looking at other business options that allow our experts to be more directly involved such as joint-ventures or spin-off subsidiaries.

In line with the recommendations of the Government, SIRIM Integrity Unit was established on 1 January 2014 to uphold and enforce the principles of integrity and accountability towards better delivery system in the nation's public and private sectors. This Unit has since served to assist SIRIM management efforts to ensure that employees are empowered with high moral values as well as good and strong ethics.

The year 2015, the third year of SIRIM's five-year Strategic Plan implementation will be a turning point for SIRIM Berhad, especially the Research, Technology and Innovation Division. For 2015, SIRIM is making headway in the implementation of three main strategies namely focus on innovation, focus on business expansion and focus on productivity.

Clear and concise strategies and initiatives have been identified in the realisation of these three key strategies. With the commitment and dedication of all companies within the Group and staff at all levels, SIRIM is sure to meet specified goals and direction as it continues to steadfastly trek the path of further excellence.

On behalf of the Board of SIRIM, I would like to extend my deepest appreciation to the management led by Dato' Dr. Zainal Abidin Mohd. Yusof and staff of the Group for their dedication and perseverance in delivering the best service to the stakeholders.



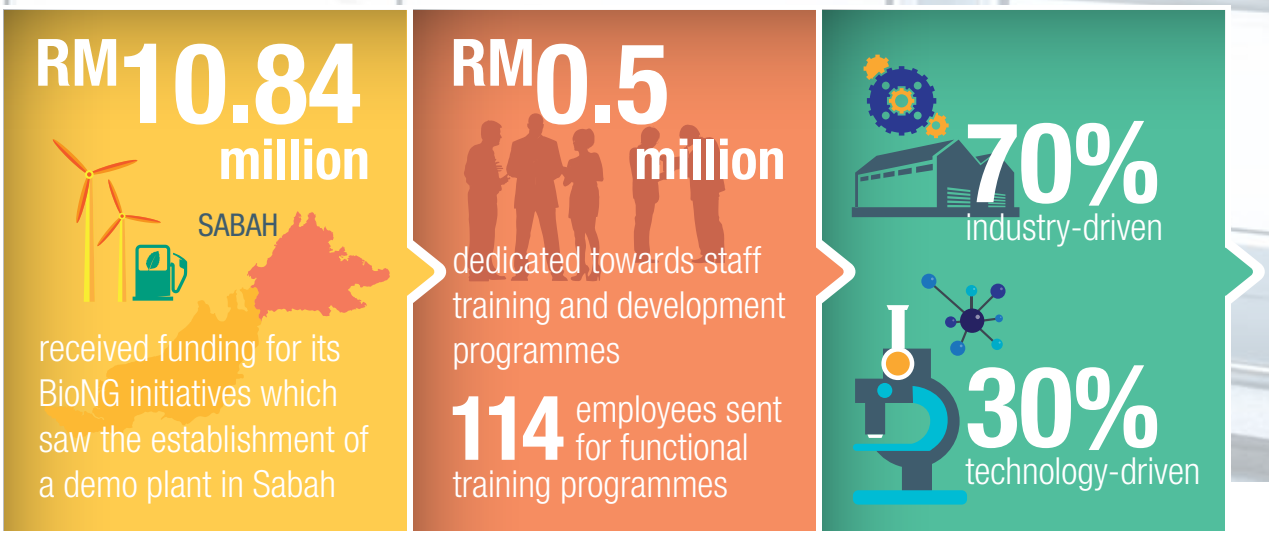
Datuk Hajah Jamaliah Kamis
Chairman

DATO' DR. ZAINAL ABIDIN MOHD YUSOF
President and Chief Executive

PRESIDENT & CHIEF EXECUTIVE'S ADDRESS

It has been an eventful year as SIRIM made good progress in 2014. The year marked the achievement of several new milestones which position SIRIM in readiness for a **new phase of expansion** in 2015. These include the establishment of **two new subsidiaries**, roll-out of **nine commercialised technologies** and the **development of a further 10 technologies**. The Group also delivered a respectable **RM13.28 million in profit after tax for the year**.

During the year, more than 80 Memorandums of Agreements and Memorandums of Understandings were entered into with partners that include local and international research institutes, industries, companies and various government agencies. These partnerships indicate our dynamic focus on enabling technology through strategic collaboration.



TRANSFORMATION PROGRESS

Launched in 2013, SIRIM's five-year strategic transformation plan keeps SIRIM in pace with Malaysia's rapidly changing economy, ensuring that SIRIM remains sustainable and competitive by providing required services in the market and contributing to the development and progress of the country. It aims to rejuvenate SIRIM's portfolio of services and focuses growth in three key technology areas; namely **Energy and Environment, Plant and Machinery** and **Medical Technology**.

The transformation plan calls for a focus on new strategic directions; company restructuring; rebranding of our Research, Technology and Innovation (RTI) division; uplifting standards of integrity and professionalism; and a redeployment of staff to enhance efficiency and productivity.

Several measures towards this end were implemented during the year under review.

NEW MANDATE: TECHNOLOGY PARTNER OF SMES

In 2014, SIRIM was also entrusted by the Government to be the main vehicle in driving technology innovation among local SMEs. During the tabling of the Budget 2015, the Prime Minister had announced the initiative to rebrand SIRIM as the implementer for SME technology penetration, upgrading and technology auditing programme.

We embrace this challenge, and further responded to the Government's call by developing the SIRIM Industrial Innovation Model which has been presented and accepted by central agencies such as Economic Planning Unit, Ministry of Finance and Ministry of Science, Technology and Innovation. The basis of the model encompasses working hand-in-hand with SMEs to increase their competitiveness to ensure that innovation services provided are relevant to them. Working in this scope as the Technology Partner of SMEs, eight programmes have been identified for implementation to date.

REBRANDING THE RESEARCH AND TECHNOLOGY INNOVATION (RTI) DIVISION

In delivering the new mandate, the RTI Division is being repositioned to be the focal point for technology intervention to help increase the productivity of SMEs. This is a game changing transformation as it requires a shift in focus from technology-push project, which currently makes up 80% of our focus, to industry-driven projects. As delivery is key to our success and sustainability, this poses an exciting new phase of transformation for SIRIM that we anticipate with undaunted commitment.

The German model of SME development to improve productivity has been chosen for Malaysia and in particular SIRIM, to adapt. A strategic alliance was formed with renowned German research institute, Fraunhofer Gesselschaft with the signing of a Memorandum of Understanding on 2 December 2014 to pull together resources towards mutual advantage in the fields of Health and Environment; Mobility and Transportation; Communication and Information; Energy and Resources; Production and Services; and Safety and Security.

MoU with Fraunhofer

ENHANCING PRODUCTIVITY

We recognise that our people are the greatest asset to achieve organisational performance and success in line with the needs of the future. The Group has a workforce of 2,177 as at 31 December 2014.

In order to ensure our staff are among the forefront of technological innovation, about RM0.5 million has been dedicated towards staff training and development programmes in 2014. In enhancing staff competency, 113 development programmes were held, while 114 employees were sent for functional training programmes related to SIRIM's business. In 2014, the Group engaged experts in Industrial Biotechnology, Environmental Technology and Biomedical Materials from international and local institutes namely University of Arizona, US; Indian Institute of Technology Madras, India, the Fraunhofer Institute and Universiti Malaysia Kelantan to expedite technology transfer. In addition, 10 employees were sent for attachment programmes in Japan, the US, Germany and Iran to pursue programmes related to their fields.

Beyond this, in 2014, a decision was made to ensure SIRIM remains sustainable through a staff redeployment exercise in line with our corporate restructuring activities. In a move to consolidate SIRIM Berhad's operations and services, a number of functions at the regional office have been taken over by the headquarters. A total of 131 staff have been redeployed or reassigned to different tasks and given re-skilling training.

MILESTONES AND ACHIEVEMENTS

The year reviewed saw the SIRIM Group expanding with the establishment of SIRIM Measurements Technology and SIRIM Tech Venture. The SIRIM group now consists of six subsidiaries including SIRIM QAS International (certification, testing and inspection services), SIRIM Training Services (training and consultancy), SIRIM Standards Technology (calibration) and National Precision Tooling. SIRIM Measurements Technology which commenced its operations on 15 Nov 2014, is a joint venture company between SIRIM Berhad and DreamCatcher Consulting Sdn Bhd, and ecosystem partner of Keysight Technologies (the Electronic Measurement Group Business Unit spun off from Agilent Technologies). Meanwhile, SIRIM Tech Venture was operationalised on 1 September 2014 with its first project of manufacturing the Type 4 Pressure Vessel for the BioNG project.

SIRIM Berhad's RTI Division secured 15 projects amounting to RM17.6 million in 2014. The projects

include 10 Science Fund, 3 Techno Fund, 1 DSTIN, 1 FRGS for the Energy and Environment Flagship (11 projects) and Medical Technology (4 projects).

Ten new technologies were developed throughout the year under the review, namely:

- Reference material for Standard Filter
- Analysis of metal contaminants in rice
- Supercapacitor Technology
- Use of LED Technology
- Calibration of clinical thermometer
- Seaweed Extract-based Cosmetic Product
- Analysis of mositure content in rice by oven method
- Analysis of moisture content in rice by moisture method meter
- Analysis of impurities in gas mixtures by GC-PDHID
- Biogas Plant Consultancy Services

Meanwhile, SIRIM also successfully commercialised nine technologies which include Wound Management Products such as Surface Wound – ChytoDerm Cream and Chyto Fil; Cavity/Deep Wound – Hydrogel Sheet and Hydrogel Paste which were licensed to Chitoplast Sdn Bhd. Skin Care Products using seaweed extract as the active ingredient were also commercialised namely Formulation Liquid Foundation, Formulation Day Cream, Formulation Night Serum, Formulation Toner and Formulation Facial Cleanser. The products were commercialised under multiple licensing to Hana Medic Sdn Bhd, Taz Beauty Cosmetic, Mentari Sayang Enterprise and Excellent Commerce Enterprise.

For the year reviewed, our research and technology efforts received further boost from the Ministry of Science, Technology and Innovation with the RM10.84 million funding for the bio-natural gas from palm oil mill effluent initiatives, or BioNG, which saw the establishment of a demo plant in Sabah. The RTI division filed 16 patents in 2014 and two were granted.

In the year under review, four new SIRIM Industry Standards were established which are standards developed by SIRIM for adoption by organisations (including government, industry and general public). The new SIRIM Standards developed are namely:

- SIRIM 1:2014, Garis panduan kebersihan tandas masjid dan surau
- SIRIM 2:2014, Garis panduan penarafan kebersihan tandas masjid dan surau
- SIRIM 3:2014, Code of practice for installation and maintenance of ceiling fan
- SIRIM4:2014, Good practices in implementing commuting safety management

It was also a year of achievements with the Group receiving a total of 11 awards from its participation in the International Invention, Innovation & Technology Exhibition (ITEX) 2014 and Malaysia Technology Expo (MTE) 2014. The continuing bevy of awards received reflect the high standards of research conduct by top of the class researchers within SIRIM; and the important role they play in nation building through research and development.

MOVING FORWARD

For 2015, SIRIM will focus on the implementation of three main strategies, namely, innovation; business expansion and productivity. This will call for SIRIM to continue undertaking key initiatives to rebrand SIRIM Research as the technology partner for SMEs while expanding the businesses of its subsidiaries and Technical Services Division through the strengthening of existing services, introduction of new services; operationalisation of new subsidiaries and exploring new joint ventures. SIRIM will also continue to implement people management programmes towards enhancing productivity and building a cost conscious culture to increase cost savings in all our operations.

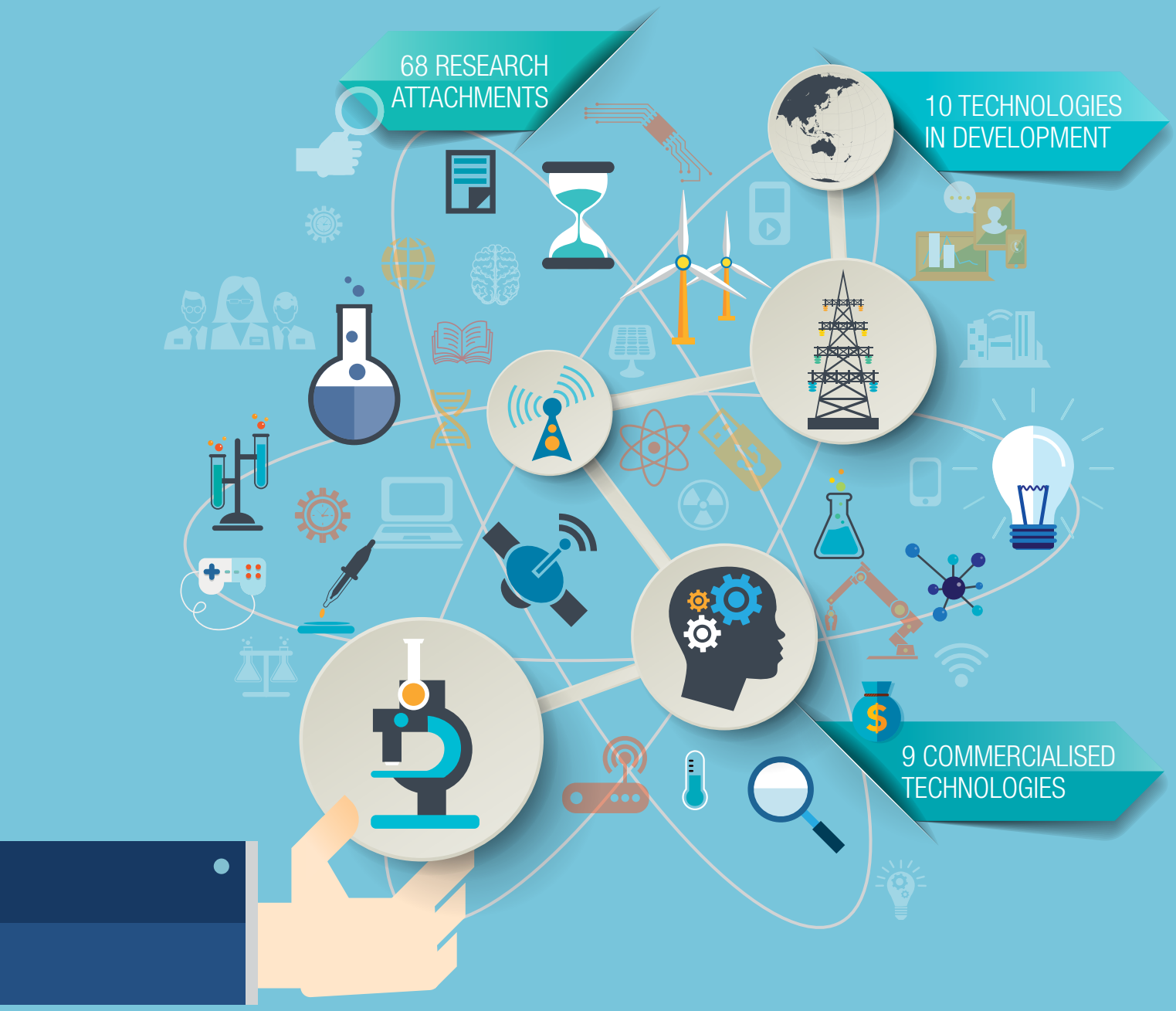
The execution of these strategies will need the commitment and support of our workforce. Having seen their commitment to raise their game in the last few years I am confident that we will be able to deliver on the third phase of our five-year plan.

Dato' Dr. Zainal Abidin Mohd Yusof
President and Chief Executive

RESEARCH AND TECHNOLOGY INNOVATION

TECHNICAL SERVICES DIVISION

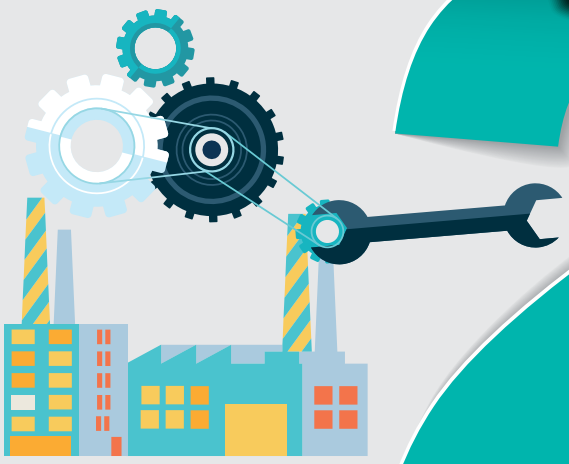
SUBSIDIARIES



RESEARCH AND TECHNOLOGY INNOVATION

ENERGY & ENVIRONMENT FLAGSHIP

- Energy generation
- Energy storage
- Eco-product development
- Environmental technologies



PLANT & MACHINERY FLAGSHIP

- Design and modelling
- Machine design
- Plant engineering
- System design
- Tooling and component development

MEDICAL TECHNOLOGY FLAGSHIP

- Drug delivery systems
- Implants/prostheses
- Medical devices and equipment

ENERGY AND ENVIRONMENT FLAGSHIP

SIRIM's **Energy and Environment Flagship** (EEF) continues to pro-actively pursue research and technology innovation in the areas of renewable energy generation, advanced energy storage, eco-product development and environmental technologies that support business sustainability while taking the role as enablers to the various economic transformation programmes.

In 2014 the **EEF** made further headways in two renewable energy resources namely bio-natural gas (BioNG) and solar thermal energy. Following the successful application of BioNG for a passenger car, SIRIM was awarded a "*Dasar Sains Teknologi dan Inovasi Negara (DSTIN)"* fund amounting to RM10.84 million to implement a new project on *Boosting Bio-Natural Gas (BioNG) Utilisation for Energy Security* that will build a demonstration plant to produce BioNG for off-site application in Eastern Sabah, Tawau. The off-site application for this project will focus on supplementary replacement of diesel for power generation using lightweight composite tanks produced by SIRIM to transport the BioNG from the production site to the power plant.

The year also materialised a collaboration with the United Nationals Industrial Development Organisation (UNIDO), whereby **EEF** secured a Global Environment Facility (GEF) project titled *GHG Emissions Reductions in Targeted Industrial Sub Sector through EE and Applications of Solar Thermal Systems*. Contribution from GEF to the five year project amounts to USD4 million, while another USD20 million co-financing will be raised from several sources including SIRIM and government agencies contribution as well as from industry acquisition of the relevant technologies. Nationwide seminars on *Energy Efficiency and System Optimisation for Commercial Buildings and Industrial Sectors* were conducted to promote the potential cost-saving technologies and practices for business operations with high energy bills.

In the area of energy storage, SIRIM's **EEF** also expanded applications of its lithium-ion battery from mobile to high-power stationary applications targeting the telecommunication and renewable energy sectors. In positioning SIRIM as an enabler to support advanced energy storage as a new growth sector for the country, intensified technology innovations through 10 on-going research projects were carried out for the year 2014. These covered the use of nanostructured dopants and surface modification to enhance performance of electrode materials, development of super capacitors to complement the performance of lithium-ion batteries as well as battery management and charging systems.

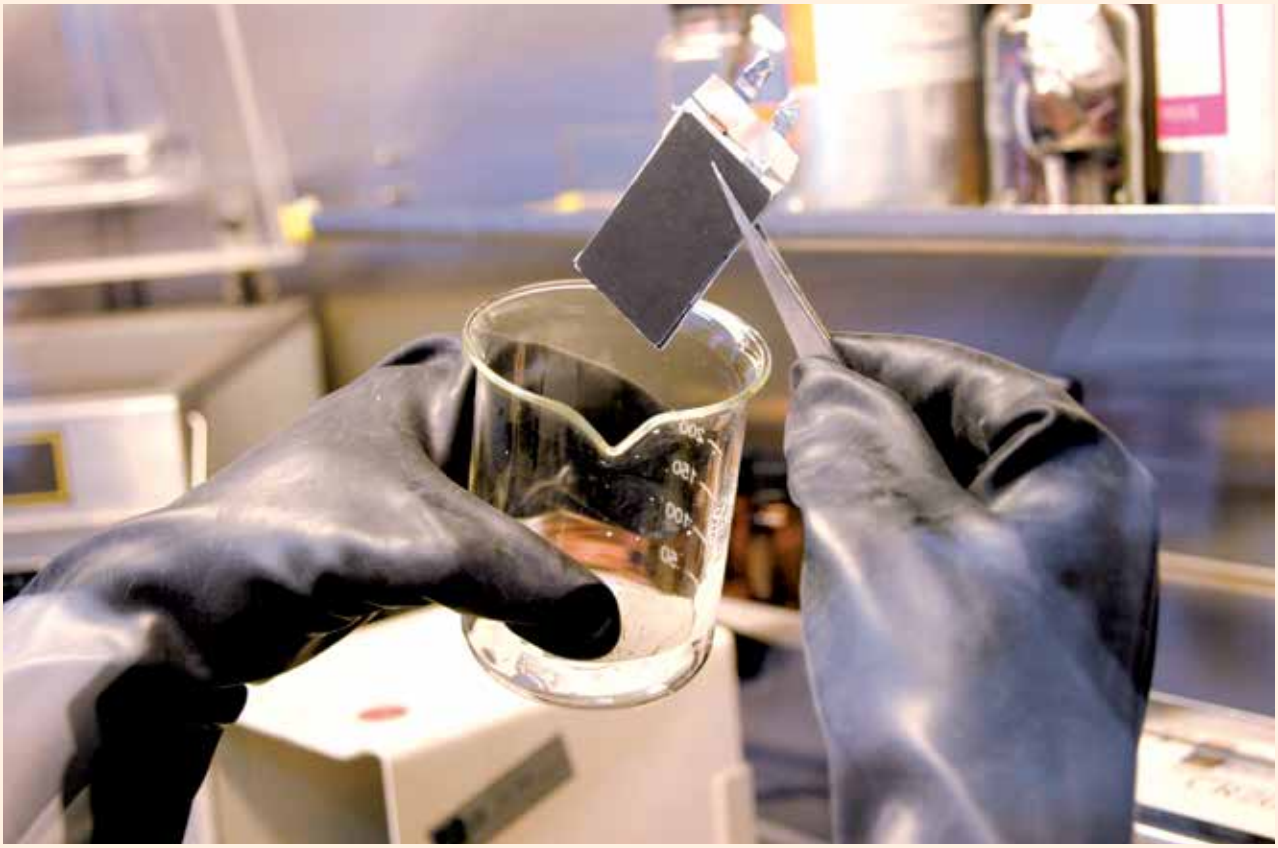
Through mobilising the expertise in production of BioNG, storage of high pressure gas in composite fibre tanks and storage of

electrochemical energy in lithium-ion batteries, SIRIM is now ready to contribute significantly to the realisation of green mobility in transportation through four projects amounting to RM1.65 million secured during the year; namely *Performance Assessment of Lightweight On Board Fuel Storage Tank For Enhanced Greenhouse Gas Reduction of BioMethane-Powered Car*, *Hybrid Electric and BioNG Scooter as a 2 Wheeler Vehicle for Urban Mobility*, *Design Requirements for Engine Control Unit Mapping for Long Term Performance of Dual Fuel Biogas /Diesel Engine for Mobile Application*; and *Establishment of Road Worthiness of Passenger Car Powered by Locally Manufactured Lithium Ion Battery (MyLIPOS)*. The SIRIM products will be tested in PROTON vehicles and locally modified 2-wheelers.

In the area of eco-product development, SIRIM's strength in industrial biotechnology continues on the upward trend in producing commercialisable bio-chemicals and bio-materials from renewable bio-resources. Under the Program Industri Rumpai Laut Negara (National Seaweed Industrial Programme) of Department of Fisheries, SIRIM developed a range of seaweed-based cosmetics and personal care products that were commercialised to eight local companies.

In jiving with the wide interest in nanotechnology applications to enhance functional performance of products, SIRIM's research has resulted in several successful developments that included filing a patent on a method for producing nanolipid formulation for skin care/ repair. Another nano-material in the pipeline is nano-crystalline cellulose (NCC) from lignocellulosic materials of agriculture residue, and applications in biopolymers to strengthen their performance as packaging materials.

Lithium Ion Battery testing facility



OECD compliant good laboratory practice

SIRIM's OECD-compliant Good Laboratory Practice (GLP) facility and SAMM-accredited laboratories serve to ensure development of eco-products will be well-supported with health and environmental safety studies and test data, including pre-clinical data that are acceptable internationally.

Another facet of eco-product development that has progressed well in 2014 are the Lifecycle assessment applications (LCA). Through the EU Switch Asia Project on *Environmental Declaration Scheme for Construction and Building Materials*, the first thirteen Product Criteria Rules (PCRs) in the country were developed for building/ construction materials and eight local SMEs were pioneer licensees of the CFP label. The SIRIM CFP Label, along with the SIRIM Ecolabel are environmental labels that will distinguish products for their declared or improved environmental performance in the open market.

In tandem with global development especially in the developed economies, LCA application in SIRIM has further evolved into the establishment of Eco-Innovation as the holistic approach towards sustainable consumption and production. The Eco-Innovation service of SIRIM was launched by Minister of Science Technology and Innovation (MOSTI), Datuk Dr. Ewon Ebin during the National Innovation Conference and Exhibition (NICE) on 31 October 2014. Eco-Innovation will spur eco-product development in the country through adoption of life cycle thinking in sustainable business models, while propagating ecodesign, ecomaterial, cleaner production and resource recovery to counter dwindling resources and climate change impacts.

SIRIM's Eco-innovation also received a boost through the Memorandum of Understanding (MoU) with Asia Europe Meeting (ASEM) SMEs Eco-Innovation Center (ASEIC) in Korea. The MoU formalised SIRIM as the local implementer of *ASEM SMEs Eco-Innovation Consulting in Malaysia* which provided advisory services and sharing of best-practices; in addition to creating new business opportunities for SMEs through a network of environmental experts in ASEM member countries.

To augment life cycle thinking in sustainable product development, SIRIM has also entrenched resource recovery as the preferred end-of-life treatment. The viability of resource recovery from waste was also well-illustrated through projects such as the EU FP7 project on *Turning Biowaste into Sustainable Products* where a biofertiliser and an effective microbe were successfully produced. Another project undertaken together with Subang Jaya Municipal Council was the production of biogas from food waste for on-site power generation. Resource recovery concept is also applied to water resource management where new pollutants such as endocrine disrupting chemicals and nano-engineered materials that can affect water supply are being investigated.

The implementation of 28 research and development and commercialisation projects, 15 contract research projects and various types of technical services under the purview of the **EEF** require multi-disciplinary inputs. Although anchored by several technology centres such as RERC, ETRC, IBRC and ADC, the implementation of these projects require competencies from all of the Technology Centres of RTI as well as other Divisions and Subsidiaries.

RENEWABLE ENERGY RESEARCH CENTRE

For the Renewable Energy Research Centre (RERC), 2014 was highlighted by the launch of BioNG – the first of its kind natural gas like-fuel from Palm Oil Mill Effluent (POME) that can be used as an alternative fuel for vehicles. BioNG was launched in conjunction with MOSTI Commercialisation Year 2014, which was held in SIRIM on 23 January 2014, and officiated by Datuk Dr. Ewon Ebin, Minister of Science Technology and Innovation. Subsequently, the Deputy Secretary General of MOSTI paid a visit to the SIRIM's Bio Natural Gas Pilot Plant – a collaborative research project with Sime Darby Research Sdn Bhd and funded by MOSTI TechnoFund Grant – located in Pulau Carey, Selangor. This was followed by the award of *Boosting Bio-Natural Gas (BioNG) Utilisation for Energy Security* project by DSTIN, to build a demonstration plant to produce BioNG. This marked a significant achievement for SIRM's Research and Technology Innovation Division.

BioNG Pilot Plant at Pulau Carey

Other achievements for the year included the approval of a new TechnoFund Project entitled *Performance Assessment of Lightweight On Board Fuel Storage Tank For Enhanced Greenhouse Gas Reduction of BioMethane-Powered Car* and approval of a National Project funded by Global Environment Facility (GEF) through UNIDO/SIRIM collaboration, entitled *GHG Emissions Reductions in Targeted Industrial Sub Sector Through EE and Applications of Solar Thermal*

Cleaner production audit on a rice mill by RERC

Systems. The latter is a five year project spanning from 2014-2019 with an overall project fund of USD24 million. As lead executing agency, SIRIM will head a Project Management Unit that will look into the following components:

a) Development of regulatory framework, support programme and financial incentives mechanism to facilitate solar thermal energy utilisation

b) Awareness raising and capacity building programme relating to process heating and cooling optimisation and solar thermal energy utilisation

c) Demonstration and scaling up of sector specific energy efficiency (EE) and solar thermal energy utilisation in targeted industrial subsectors

d) Monitoring and Evaluation.

To initiate industry and public awareness on this national project, seven seminars entitled *Energy, Efficiency and System Optimisation for Commercial Buildings and Industrial Sectors* were held across Malaysia, covering Shah Alam, Melaka, Penang, Johor, Pahang, Sabah and Sarawak. The seminars were jointly organised by SIRIM, UNIDO, KETTHA, ST, MIDA and SIRIM STS, and attracted over 250 industry representatives.

The RERC also secured a project from Department of Environment (DOE) to carry out Cleaner Production Audit on a rice mill and five small medium enterprises (SMEs) in Kedah. The audit was part of the government programme to help SMEs improve their manufacturing processes, energy management, waste minimisation and carbon footprint. Findings and recommendations based on the audit were discussed through a seminar, at the end of the project.

RERC also bagged three awards in 2014; two Silver Awards in ITEX 2014 and one Bronze Award in Biotechnology Asia 2014 which involved projects on BioNG from Palm Oil Mill Effluent (POME) and Hybrid Energy System from Solar and Wind. Staff of the RERC also presented papers and participated in various International Seminars Conference and Training throughout the year. These comprised Training on

Wind Energy at The Centre of Wind Energy Technology, Chennai, India; the APEC Smart City Forum held in Changzhou China; ASEAN Small Hydropower held in Bandung Indonesia; Asia Pacific Biogas Forum held in Kuala Lumpur; APEC Energy Efficiency Workshop in Taipei, Taiwan; and UNIDO Study Tour, Vienna, Austria.

ENVIRONMENTAL TECHNOLOGY RESEARCH CENTRE

ETRC within the SIRIM Ecolabelling Criteria Committee (SECC) has resumed its role as programme developer in developing the Product Criteria Documents; leading to a total of 41 SIRIM eco-labelling criteria for various product categories. The LCA approach was adopted to identify key environmental impacts and attributes that will differentiate environmental performance of products within the same product category and to ensure the expansion of the SIRIM Ecolabelling Scheme in further support of the national initiatives.

SIRIM was awarded an international grant under the EU Switch Asia Programme on Sustainable Consumption and Production; to implement a three year project on *Environmental Declaration Scheme for Construction and Building Materials*. The project has successfully launched a pilot carbon footprint labeling programme with completed first year milestone of establishing 13 Product Criteria Rules (PCRs) of building/construction materials. SIRIM and four project partners: Carbon Trust UK, Federation of Malaysian Manufacturers (FMM), Building Materials Distributors Association of Malaysia (BMDAM), and Malaysia Green Building Confederation (MGBC), together with SIRIM QAS International Sdn. Bhd. (SQAS); launched the first Carbon Footprint Certification Scheme in Malaysia on 21 November 2014. The project has assisted 10 eligible SMEs for CFP labeling scheme and eight companies had successfully obtained the first CFP certification by SQAS. The project has gathered expertise across Technology Centres and Divisions and seeing full participation from SDC, SRMC and SQAS and to some extent support from Group Finance to ensure effective delivery of the project milestones and project administration.

LCA applications evolved further with the PEMANDU approval of RM1.55 million to develop an eco-innovation facility that will enhance life cycle thinking in product design (i.e ecodesign) and facilitate LCA training activities. The Eco-Innovation services were successfully launched by YB Minister Datuk Dr. Ewon Ebin on 31 October and this is expected to spur eco-product development in the country by promoting ecodesign and ecomaterial research specifically to boost the Electrical and Electronic sector under the National Key Economic Areas (NKEA) initiatives.

Environmental and Health Hazard Assessment

ETRC has also been actively participating in many of the dialogue events organised by Ministries and government agencies to promote and market the OECD GLP facility especially to the Herbal and Cosmetic industries. This has also led us to secure a research grant from Ministry of Agriculture, which is a collaborative submission of proposal between ETRC and IBRC, to develop documents on codes of practices, technical specifications and test methods for selected herbs to strengthen our local herbal industry.

ETRC has spread its wing to penetrate the international GLP service via the signing of Service Contract with ICP Firefly Pty Ltd Australia. ICP Firefly will outsource to ETRC for the Bacterial Reverse Mutation Test to be conducted in compliance with OECD GLP. There is an increase in services provided for local and international manufacturers through the completed GLP studies and it is hoped through vigorous promotion, the GLP test facility will be able to sustain its operations. GLP is currently the only recognised quality assurance system for OECD's mutual acceptance of data for pre-clinical and environmental safety studies.

Resource Recovery and Pollution Abatement

SIRIM through ETRC has signed an MoU with Asia Europe Meeting (ASEM) SMEs Eco-Innovation Center (ASEIC) of Korea in formalising the programme *ASEM SMEs Eco-Innovation Consulting in Malaysia*. The programme will provide advisory services and sharing of best-practice expertise, creating new business opportunities for SMEs and environmental experts in ASEM member countries and to build an international network for cooperation between Europe and Asia. Ten companies have successfully undergone technology audits and findings were disseminated through workshops hosted by SIRIM and the ASEIC appointed Korean consultant, Ecoeye Pte Ltd. The main focus of the collaboration between SIRIM and ASEIC for the next two years is to combine expertise, experience, manpower and organisation strength in providing eco-innovation consulting services to SMEs in Malaysia in the areas such as Resource & Energy Efficiency, Climate Change, Eco-design Developing Strategy, Environment Compliance, Green Marketing, Training and Education.

AUTOMOTIVE DEVELOPMENT CENTRE

The Automotive Development Centre (ADC), via its Virtual Engineering and Simulation Section, supports R&D activities related to the automotive industry.

BioNG as part of strategic EEF projects

In 2014, the ADC participated in the implementation of strategic **EEF** projects such as the SIRIM-PROTON Green Mobility Project and SIRIM BioNG Project; generating a statutory income of RM231,135.50 through its participation in these strategic projects. Another interesting project undertaken by ADC during the year, is the investigation into the failure of the Elevator Brake System in public high rise building undertaken for the Department of Safety and Health, DOSH. It could result in the formulation of new maintenance Standard Operating Procedures for lift operators in national public high-rise building projects.

However, ADC's new-found niche was in the field of automotive research and development. The centre ventured into autotronics research and managed to secure a total research grant of RM735,000 for the implementation of projects right into 2016. The two projects secured are; *TF 0314D033 (K2): Hybrid Electric and BioNG Scooter as a 2 Wheeler Vehicle for Urban Mobility* and *PKA0514D039: To Establish Design Requirements for Engine Control Unit Mapping for Long Term Performance of Dual Fuel "Biogas / Diesel" Engine for Mobile Application*. These projects are estimated to kick off by early 2015.

During the year, ADC also continued to organise joint networking sessions with potential collaborators and technical partners; as well as a joint seminar on *The Fundamentals of Acoustics and Vibration Engineering* with DAG. The seminar successfully attracted a total of 60 participant from government agencies, academia and consultants.

Towards the end of 2014 in December, ADC was relocated to its new facility at SIRIM Bukit Jalil, Kuala Lumpur. The sprawling facility now houses all three **EEF** Technology Centres with a combined research fraternity of 55 researchers and engineers.

Participants at the Seminar on The Fundamentals of Acoustics and Vibration Engineering

PLANT AND MACHINERY FLAGSHIP

The **Plant and Machinery Flagship** (PMF) plays a significant role in driving SIRIM technology centres to be competitive in undertaking relevant and high impact research and commercial projects to keep SIRIM at the forefront of technology. A key objective of our strategy is to focus Flagship activities on achieving outcomes relevant to national priorities. The three main focus areas for **PMF** are Design and Modeling, Machine Design and Plant Engineering.

In 2014, the Flagship's research and technology development agenda focused on areas such as Development of Manufacturing Systems in Compliance with GMP & Halal, Technology Innovation for Seaweed Industry, Mechanisation of Oil Palm Industry and *Malaysianisation* of Parts and Components for the Oil and Gas (O&G) Industry. **PMF** pursued this agenda by forming multidisciplinary teams within SIRIM technology centres, in partnership with universities, related research institutions and the private sector.

In order to strategise on relevant future activities of the Flagship, two studies were undertaken in the area of *Malaysianisation* of parts and components for O&G and on Enhancing Local Production of M&E Intermediate Goods for Energy & Environment and Resource Based Industries. As part of these studies, several engagement sessions were carried out with industry associations, Government agencies and relevant organisations and companies. A workshop was held with Petronas GTS and University Technology Petronas to identify projects related to the development of components and parts for O&G industry. Visits and discussions were made with local O&G and general engineering components manufacturers as part of the initiative to enhance the localisation process. As a long term initiative, a discussion has been initiated with KPRJ Petroleum on the collaboration for the setting-up of a One Stop Petroleum Service Centre, to be based in Pengerang, Johor.

Through the activities of the Flagship, we intend to concentrate on strategic research, knowledge and technology transfer that have the potential to deliver major, long-term social, economic and environmental benefits to Malaysia. In our effort to disseminate our technical expertise and share our facilities in production technology, the Flagship, together with Strategic Marketing and technology centres have initiated and presented two programmes to the Ministry of Education – STEM Awareness Through Innovation and RASA Teaching Factory. The concept and proposed programme for RASA Teaching Factory has been well accepted by selected polytechnics and the programme is expected to be operational by late 2015.

PMF coordinated the participation and showcased selected projects and services in at least 10 major exhibitions in 2014, such as DSA 2014, MOGSEC 2014, MTE, ITEX SME Showcase, Metaltech and Digital Lifestyle Expo. In order to enhance technology development and commercialisation activities, **PMF** has facilitated business discussions with at least three major companies dealing with national projects. As a follow-up of these discussions, at least three vendor audits were held to assess the capability of our technology centres at Bukit Jalil and RASA.

PMF has been actively involved in various technical working groups for the preparation of strategic papers and programmes to be implemented under the 11th Malaysia Plan. The groups, led by various ministries and agencies cover the areas of Robotics, Additive Manufacturing, Remanufacturing, Digital Opportunities, Manufacturing for Food Processing, metalworking and Upscaling.

Beginning the third quarter of 2014, the Flagship has been actively involved in formulating strategies and work plans for the rebranding of SIRIM through the SIRIM Industrial Innovation Model, in preparation for its implementation in 2015. **PMF** is expected to play significant roles, especially in the implementation of Technology Audit and upgrading of SMEs through Mechanisation and Automation programmes. **PMF** has also been actively involved with MITI in formulating procedures on the verification of machines and equipment for Automated Capital allowance incentive which is expected to be implemented in 2015.

SYSTEM DESIGN CENTRE

The System Design Centre (SDC) is actively involved in both commercial and research activities through collaboration with various government agencies, industries and communities to provide embedded system solutions, automation & industrial robotics and plant design to increase productivity and market needs.

With the restructuring exercise of SIRIM's RTI Section together with Plant Design Section, a better synergised team was established in 2014, leading to a dynamic first year for the SDC. These included the delivery of several commercial and research projects; and significant contribution to SIRIM's commercialisation activities.

The year also saw SDC being granted the new scope of extension under ISO 9001 Quality System Certification by the SAI Global for Provision of Commercial Contract Development and Engineering Services in the area of Advanced Manufacturing. Other achievements gained in 2014 include the receipt of a patent for *Method for Providing Multi Layered Security Control and An Apparatus for the Same*, two trademarks for SIRIM RoboKit® and Solaerator™, and winning a Silver award on *Ammonium Monitoring System for Sustainable Aquaculture Industry* from the Bio Innovation Competition Awards.

Spurring Malaysia's Robotics Industry

As members of the Ministry of International Trade and Industry (MITI) of Malaysia RMK11 Working Group, SDC's team of experts has actively participated in the brainstorming sessions under the Focus Group of Robotic and Industrial Automation. A strategy paper on Robotic and Industrial Automation has been successfully completed and submitted to MITI for final consolidation. The strategy paper include the development of a long-term and sustainable eco-system to spur the growth of Robotic and Industrial Automation industry and also to jumpstart the Robotic and Industrial Automation industry to gain early access to the market.

SDC also played an active role as a committee member in the Bilateral Industrial Cooperation between MITI and Ministry Of Trade, Industry And Energy (MOTIE) of Republic of Korea; with its involvement in programmes initiated under this cooperation such as in "*Seminar Kerjasama Malaysia-Korea dalam Industri Robotik di Bawah Bilateral Industrial Cooperation Malaysia-Korea*" which focused on Malaysian and Korean Industrial Competitiveness in Robotic Industry-Policies, Infrastructure, HR development, as well as developing business and technology collaboration opportunities. The event was followed by a Business Meeting between Malaysian Government Agencies and Korea whereby MOSTI, MIGHT, SIRIM, TPM and few universities took part in the discussion with MOTIE, KAR and Korea Robot Companies. The discussions on *Korean Industrial Competitiveness in Robotic Industry – Policies, Infrastructure and Human resource Development, Way Forward* was followed by the delegation's visit to SIRIM Bukit Jalil.

Solaerator installed at Tasik Shah Alam as part of a community project

SDC also took part in the *11th International Conference On Ubiquitous Robots And Ambient Intelligence (Urai 2014)* held on 12-13 November 2014 to present its paper on *Robotic Technology under SIRIM Berhad*.

In spurring its expertise and interest in the field, SDC's robotic experts have also become MOSTI's committee members in developing a National Robotic Technology Roadmap which aims at creating R&D working plans to support robotic technology, identifying IT and Robotic application capabilities and identifying gaps and weaknesses in the aspects of human capital and technology readiness. During the year under review, the committee organised two workshops to develop this roadmap further.

SDC's Commercial Projects In 2014

Most of SDC's commercial projects focus on assisting rural communities in setting up their own small enterprises producing local snacks such as banana and cassava chips. Towards this end, SDC provides services ranging from plant layout design for the purpose of acquiring GMP and Halal certifications; consultancy on production machine and equipment; and consultancy on process flow. In 2014, eight projects in this scope were offered to various state cooperatives and government agencies. These included SDC's involvement in the production of Bioflocculant for the National Hydraulic Research Institute of Malaysia (NAHRIM), a government agency under the Ministry of Natural Resources and Environment, responsible for R&D as well as consultancy services in the field of water and its environment.

NAHRIM subsequently won a gold medal for a bioflocculant product at the Ideas – New inventions International Trade Fair held in Nuremberg, Germany.

Flocculation in colloid chemistry refers to the process by which fine particulates are caused to clump together into a floc. The floc may then float to the top, or settle to the bottom of the liquid as sedimentation. Existing flocculants in water treatment are chemicals. The bioflocculant developed by NAHRIM is derived from the seeds of a plant available in Malaysia with most of the oil contents removed from the seeds.

NAHRIM managed to produce this bioflocculant only in limited quantity in the laboratory due to the manual activities and limited capacity of the laboratory equipment. SIRIM's involvement, through the SDC, has helped NAHRIM establish a processing setup that is more friendly and scalable in planning for larger commercial production.

One of the breakthroughs introduced was using a mechanical stone grinder to replace the manual activity of breaking the hard outer layer of the fruit without harming the softer seeds inside.

A preliminary study by NAHRIM in December 2014 had shown that the bioflocculant produced using the SIRIM processing setup is comparable to the bioflocculant it produced manually. This promising and positive finding will hopefully lead to more projects between SIRIM and NAHRIM to successfully commercialise the bioflocculant.

Other commercial projects embarked during the year comprise the development of quality management systems, provision of embedded design, Radio frequency identification (RFID) and Renewable energy solutions for various government and private organisations. SDC was involved in three renewable energy projects in 2014, a testament to the growing interest in this field. The projects were namely *Pre Commercialisation of Uninterrupted Battery Generated Operator (UBOG) Assisted Drying System for Aquaculture and Marine Application, Battery Management System (BMS)* and *Solaerator™* – a community project which has been successfully installed at Tasik Shah Alam, Selangor for the lake's aeration system.

SDC also successfully developed an Electronic Quality Management System (e-QMS) in ISO9001:2008 for ANGKASA to effectively help in managing all aspects of quality programs and continuous improvement of all across its business. In addition, it is involved in SIRIM Carbon Calculator Project in collaboration with ETRC and Carbon Trust under EU-Switch Asia project.

In line with expanding its reach and creating greater awareness of its expertise, SDC continues to conduct many trainings and consultancies on Embedded System, RFID Technology and online marketing to train the trainers, lecturers and engineers from both local and international countries. Beyond this, it collaborates with government agencies such as MITI and SKM, to assist SMEs in penetrating the realms of online shopping, stock management, billing and invoicing via its participation in annual events such as SDSI (Satu Daerah Satu Industri) and GroomBig Convention.

Strategic Research Projects & Activities

During the year SDC also secured three research grant projects funded by MOSTI; namely *Improved Li-ion Battery Management System (BMS) for Stand-Alone PV-application of BMS Chip, Development of peptide nucleic acid (PNA)/Quantum Dots using biochip technology for the detection of urinary cystatin C(CST3) gene – a biomaker for acute kidney infection (AKI) and chronic kidney disease (DKD)* and *Optical Biosensor for Ammonium Detection*.

SDR also submitted research proposals under SIRIM'S Medical Technology Flagship on *Building our robotic competitiveness in Medical and Healthcare: Development of robots for Assisted Recovery and Rehabilitation* and *Wearable Peritoneal Dialysis*. Other research proposals under **PMF** includes *SIRIM RoboKit Family, Housing Demand Prediction Systems* and *Security Enhancement in Data Transmission for Verifying Personal Identification Card using GQR Code Mobile Application*.

These paved the way forward in sustaining SDC's future capability planning in line with its research and impact strategies.

Commercialisation Products, Activities, Events

SDC has actively participated in promoting SIRIM Technologies and products (i.e. RoboKit® and Solaerator™) in 2014 by giving talks and sharing technology through Business Matching and national exhibitions as part of its effort and activities in product's commercialisation.

SDC took part in the following events to showcase and provide awareness to industries on its products and services:

1. GREAT 2014 (Gabungan Rakan Entrepreneur Aspirasi Terhebat) in Cyberjaya on 17-20 September 2014
2. MOSTI Commercialisation Conference & Exhibition (MCCE) on 13-15 August 2014
3. Science, Technology and Innovation (STI) Outreach Programme at Sekolah Kebangsaan Bukit Lintang, Melaka on 27 May 2014)
4. National Innovation Conference and Exhibition (NICE) 2014 on 31 October – 2 November 2014
5. Biotechnology Asia 2014 on 19-21 November 2014

Looking ahead, SDC will continue to play a significant role in SIRIM rebranding activities, particularly in technology penetration and upgrading as well as technology audit for SMEs which has been mandated by the government. To achieve this new mandate, SDC is concentrating on industrial research and introducing the latest advanced technology to SMEs to increase their productivity and competitive levels. To do so, SDC shall continuously provide competency building for staff to increase their skills and capabilities under the platform of education and training, mentoring and industrial attachment.

At the same time, SDC continues to undertake activities that enhance the competitiveness of Malaysian industries through the right application of the leading edge tools and technologies in automation & embedded systems, IT application & robotic technologies and plant engineering design. More

Robokit successfully introduced to the mass at the MCCE 2014

activities that support the RMK11 and national vision towards being a high income nation will be undertaken for various sectors such as agriculture, transport and construction. Efforts towards commercialising existing products such as SIRIM RoboKit® and Solaerator™ will also be made through SIRIM's Technology Commercialisation Centre.

MACHINERY TECHNOLOGY CENTRE

The Machinery Technology Centre (MTC) was established in 2014 and comprises the three sections of Foundry Technology Section, Tooling Technology Section and Machine Design Section.

Helmed by 60 staff, MTC generated commercial income of RM1.387 million contributed by 71 job/trend services, three projects and two socio-economic projects.

In 2014, MTC actively entertained visits from various stakeholders – two from government agencies, three from institutes of higher learning, five from industries and one from a government linked corporation (GLC). Year 2014 witnessed MTC signing four NDAs with four companies namely Duta Klasik Sdn. Bhd., Deftech Sdn. Bhd., NCM global and Searie Sdn. Bhd.

MTC participated in three national exhibitions; namely 14th Defence Service Asia 2014, GLC Explorace 2014 (MITI) and MOGSEC 2014 – fruitfully led to discussions with potential business partners and customers as well as to showcase products that MTC have developed with companies such as grenade launcher, controline protector and gas meter housing.

MTC is also involved in networking sessions on Technical Capabilities and Facilities Assessment to Support Malaysianisation of Parts and Component for Oil and Gas Sector; and Enhancing Local Production of M&E Intermediate Goods for Energy & Environment and Resource Based Industries organised by the National Project Secretariat.

In order to better serve the industry, one of MTC services i.e. provision of casting services has successfully continued to be certified as per the surveillance audit conducted by SAI Global. Furthermore, its technical capabilities were also audited by three companies which carried out vendor audit as a requirement as a service provider for their technical projects. On 4 March 2014, Machine Design Section gained industry recognition through Exhibition Material Competition 2014 (Vendor Category) conducted by Miyazu (M) Sdn. Bhd.

MTC continued its active national and international level participation as working committee members in various committees and disciplines such as Focus Group for TWG Manufacturing for Food Processing for the preparation of Strategy Paper for RMK11, MOSTI Technical Panel (Technofund, Sciencefund, Innofund and PMT for DISTIN Flagship Fund project) and SIRIM Quality Awards on Products. In the 10th ASEAN Skills Competition 2014, MTC was appointed as country expert/judge in the area of Mechanical Engineering Design CAD which was held in Hanoi, Vietnam.

Going forward, MTC will focus on establishing collaboration with the industry by providing D&D activities in Mechanisation & Automation for the manufacturing industry; undertaking R&D collaborative projects; and production services including machining and fabrication of parts and components for potential partners from the Oil & Gas, defence and manufacturing sectors. Our experts in foundry technology, tooling technology and machine design will provide customised training to the industry, private-owned and government vocational institutions in order to cater for the industry needs. MTC will also provide long-term rental services of their facilities.

INDUSTRIAL DESIGN CENTRE

The Industrial Design Centre (IDC) was formed in 2013 with the consolidation of Design Engineering Section and the Product Design Section. The objective of the centre is to boost the technological and innovation level of Malaysian SMEs by increasing their technology uptake, enhancing and to upscale the commercialisation of their products.

In 2014, the Product Design Section shifted its operation from Building 24 of SIRIM HQ campus in Shah Alam to SIRIM Bukit Jalil. Hence, with the Design Engineering Section already based in Bukit Jalil, Industrial Design Centre now operates under one roof. This not only promotes better management of resources, but more importantly, it provides a better environment to synergise the different knowledge and expertise of the two sections. Although IDC is under the **PMF**, its involvement with the other flagships are significant too.

With an income target of RM3,529,400, IDC has managed to achieve a 75% performance. Its Customer Satisfaction Index (CSI) KPI has been maintained at 90% and timely project delivery has increased to 90%.

IDC formally introduced model making as another product line to capitalise on its expertise in industrial design, reverse engineering and rapid prototyping. A 1:100 scaled 3-D model of a marine vessel was produced with 2D engineering drawing and photographs as inputs. The challenge was to produce a model with removable decks so that the client could brief their prospects on its capabilities.

Utilising additive manufacturing technology in the form of the EOS Formiga P110 machine, finished components had been produced for use by the automotive industry. This is now possible due to the use of engineering-grade polymers with selective laser sintering technology in producing working parts – a great step forward from the traditional models for 'form-and-fit' prototypes.

Finished components using selective laser sintering technology

In 2014, the services provided under the **Medical Technology Flagship**, are for Bio-modelling services. A total of 31 cases for craniofacial, maxillofacial and its related areas were conducted for a total of seven hospitals including one from Brunei Darussalam.

The future direction of IDC will aim to further promote and implement state-of-the-art eco-based design innovation to push and support the SMEs to be successful. These initiatives will enable the SMEs to be ahead of the curve in producing sustainable high-value added eco-based innovative products. In order to facilitate the SMEs to excel and to be the forefront in designing, developing and producing eco-innovative products, IDC will need to spearhead the following research, development and application of the followings:

a. Advancement of Innovative Eco-design Method
b. Knowledge Management: Capture, Storage and Retrieval of Design Rationale
c. Eco-Friendly Process Management: Modelling the Eco-Design Process
d. Change Management: Modelling Change in Eco-based Products
e. Computational Design: Integrated Optimisation and Engineering Analysis Methods and Tools for Eco-Products
f. Healthcare and Bio-Medical Design and Application: Design for Patient Safety, Design for Patient Comfort, etc.
g. Advancement and Direction of Additive Manufacturing and their impacts on Conventional Manufacturing.

Eco Industrial Design Centre

Design programs and projects which focuses on environmental or eco-design issues are managed by the Eco-Industrial Design Centre (EIDC). This centre, established in 2013, synergises expertise from three centres, namely Industrial Design Centre, Environment Technology Research Centre and System Design Centre.

As part of EIDC establishment targets, five Memorandum of Understandings (MOUs) with major industrial associations were signed to enhance cooperation within the industry. Upon the signing of these MOUs, the IDC has embarked on an ambitious 2014 target to support the local industry with at least 100 rapid prototyping services. The centre exceeded this target by achieving 120 services in 2014. In addition to this, EIDC embarked on three major Eco-Industrial Design projects; and joint programmes with two local universities. These included a carbon footprint calculation training programme for lecturers of Universiti Tun Hussein Onn, and providing a key resource person for a joint workshop on LCA – Life Cycle Assessment under the purview of SeGI University and Ensearch Malaysia.

Green packaging

Among other things, EIDC offers:

i. Assistance to SMEs from E&E sector to move up the design and manufacturing value chain by providing affordable, approachable services in the areas of conceptual & design developments and prototyping services;

ii. Assistance to local industries in the production of environmental-friendly products through eco innovation; hence enhancing the industries' global competitiveness; and

iii. Creates a pool of industrial designers through talent development programmes in collaboration with local training institutes.

EIDC also conducts training of Life Cycle Assessment and promotes product life cycle consulting services and Greenhouse Gases accounting/carbon footprint.

As an expansion of the current technical services that include environmental performance evaluation of products, ecodesign and rapid prototyping offered by EIDC, SIRIM will be expanding its Eco-innovation Service to embed sustainability into business strategies and business models that will also cover identification of new market segments for eco-products.

The IDC through the EIDC project currently assists and supports SMEs by providing resources, facilities, workshops and eco-innovation consultations to them in the area of developing eco-based products through advanced technologies such as LCA study, design, modeling, engineering analysis (linear and non-linear stress analysis and computational fluid dynamics analysis) and rapid prototyping. These supports are in the form of highly advanced technological services that will benefit SMEs who wish to upgrade their business as more eco-friendly and innovative to meet the demanding stringent market requirements in regulations and those markets with high environmental-awareness.

MEDICAL TECHNOLOGY FLAGSHIP

SIRIM's **Medical Technology Flagship** (MTF) is focused on advancing innovative technologies for the healthcare industry via home-grown solutions for drug delivery systems, implants/prostheses and medical equipment. This keeps SIRIM in tandem with the future needs of the nation as the country's healthcare sector is being pressured to deliver more cost effective products and services for a growing aging population. Indeed, the Malaysian healthcare market was worth USD2.25 billion in 2012 and is expected to grow to USD3.65 billion by 2018.

Through the utilisation of more home-grown medical technologies of international standards, our medical institutions and industries can become less reliant on expensive foreign made devices and solutions and improve their competitiveness. SIRIM researchers have made important advances in the areas of drug delivery systems, implants/prostheses and medical equipment over the years. In 2014, several new milestones were achieved under the **MTF**.

During the period under review, the Flagship submitted high impact projects such as on the development of wearable peritoneal dialysis system, establishment of metallic implants production for the treatment of musculoskeletal diseases, biosensor for rapid diagnosis of dengue virus infection and home care biosensor for uric acid detection to the Ministry of Science, Technology and Innovation (MOSTI) under the National Policy on Science, Technology and Innovation (DSTIN) and Flagship Funds. It also secured a total of 11 research projects with a grant of more than RM5 million, won seven innovation awards, filed six patents and was granted three patents.

ADVANCED MATERIALS RESEARCH CENTRE (AMREC)

Serving SIRIM's **MTF**, AMREC continues to deliver advanced materials services covering activities in government funded research, contract research, consultancy and technical services to relevant industries. The year 2014 was a very promising year for AMREC with research projects granted, commercial revenue earned and awards won by our researchers. To further enhance SIRIM's capability in providing the biological evaluation of medical devices, the government had also approved developmental budget of more than RM4 million for AMREC to upgrade its facilities in Kulim to be in compliance to ISO 17025 requirements.

A total of five projects ended in 2014, while 20 more science-funded projects granted in 2013 continue to be implemented. AMREC was granted another 10 projects by MOSTI, which amounted over RM5 million.

The year also saw AMREC being granted seven socio economic projects, to a total cost of RM509,000, targeted towards supporting small and medium technopreneurs in upgrading their skills & knowledge and expanding their businesses to benefit local communities, especially those in rural areas. AMREC continues to extend these socio economic projects in ensuring those target group gain the benefit of the projects.

On the research front, in 2014, AMREC continued to carry out R&D in the focus areas of advanced materials and nanotechnology. These are identified as market driven sectors where research outputs and products delivered have greater potential of being commercialised.

In serving the industry, AMREC also received more than 500 requests for technical services in testing contract, testing services for ceramic materials as well as other testing services using high-end equipment such as XRD, SEM, TEM, FTIR, FESEM and VPSEM.

Lithium Ion battery fabrication at AMREC plant

AMREC contributes to the National Human Resource/ (Capital) Development Programme by providing training to future trainer, technopreneurs and public in the areas of energy, biomedical and engineering materials under various programs such as the GMI-KKTM, KIOSMEC, MID Sarawak, MID Sabah and Socio Economy Projects. AMREC through its expertise, also contributes as a panel evaluation for Techno fund and science fund and nanotechnology related projects under the National Nanotechnology Directorate (NND).

In order to share its research findings, knowledge, facilities and experiences as well as to further enhance networking with the industries, research institutions and universities; AMREC continued to participate in exhibitions and organise seminars, workshops and conferences throughout the year. Events organised included:

- Workshop on Biomaterials: Current Activities and Future Direction
- Workshop on Supercapacitor: Fabrication & Characterisation
- Advanced Materials Conference (AMC 2014)
- Workshop on Metal Injection Molding (WorMIM 2014)
- Signing of MoU between AMREC and Institute of Fraunhofer Advance and Manufacturing Bremen Germany in research collaboration.
- Photocatalyst Seminar – AMREC in collaboration with Japan Fine Ceramics Association.

It is hoped that more contract R&D, consultancy, trainings and technical services projects will be captured and implemented by AMREC for the related industries in the coming year. This is important for the long term sustainability of AMREC and to fortify its role in contributing to the social and economic development of the country.

BIOTECHNOLOGY RESEARCH CENTRE

The **MTF**'s Industrial Biotechnology Research Centre (IBRC) very actively participated in commercial biotechnology projects with international and local organisations for production of bio-chemicals, bio-materials and bio-fuels from renewable bio-resources that hold great potential value for industries in many sectors including energy, organic chemicals, polymers and health-care products. Twelve (12) research projects in various areas of industrial biotechnology were funded under the various MOSTI and MOHE grants. A total of six technical papers were published, one patent was granted and four were filed in 2014. IBRC was also deeply involved in commercialisation activities where negotiations on the licensing of a range of wound management product were finalised at the end of the year and expected to be signed in 2015. A total of 41 cosmetics products developed by the researchers were also placed in the market by licensee companies.

In 2014, IBRC was awarded the ISO 17025 certification from Standards Malaysia for a number of test in cytotoxicity, microbiology and chemical and physical chemistry. Researchers from the centre was also awarded a bronze award in BioInnovation during Biomalaysia 2014.

NATIONAL METROLOGY LABORATORY (NML)

Maintaining Excellence In Calibration Services

In meeting technology development and demand for new areas of calibration services, as well as providing traceability in these areas, the National Metrology Laboratory (NML-SIRIM) continuously upgrades and develops its measurement standards as well as its calibration and measurement capabilities. Eight calibration and measurement capabilities were developed in 2014.

During the year, NML-SIRIM also participated in six inter-laboratory comparisons of measurement standards, as part of the compliance for calibration and measurement capabilities claims under CIPM-MRA; and continued to play an important role at seven regional and international activities as part of its focus on international networking; and published three papers.

NML-SIRIM activities in measurement technology dissemination and calibration of high precision courses also covers training in specific areas including electrical, thermophysical and mechanical field to government agencies, industries and individuals. Over 935 clients, from various sectors, have benefited from our scientific and industry services.

World Metrology Day sheds light on the function and importance of metrology

World Metrology Day 2014 on 20 May 2014 was one of the highlights in NML-SIRIM's calender last year. The day was marked by NML-SIRIM participating in media awareness programmes and opening its laboratories at the Sepang campus to invited visitors. Technical presentations and discussions with stakeholders and other agencies formed a main focus of the day's itinerary.

NML-SIRIM also continued to receive visits by international industry compatriots and industry leaders such as Weights and Measures Tanzania (United Republic of Tanzania); Deputy General Director of CMS/ITRI, Dr. Tzeng-Yow Lin; MTCP Standards and Conformance Infrastructure For African Countries 2014; Emirates Metrology Institute, Abu Dhabi; UNIDO's NQIP – National Steering Committee (Nigeria; and participants of the *Senior Management Programme on Managing Technological Research Organisation (RTOS)* in collaboration with WAITRO. There were also numerous local visits by government agencies, industry and universities.

Moving forward, NML-SIRIM will continue to participate actively in international inter-comparison programmes and capacity building through upgrading of standards and enhancement of capabilities and staff competency. In upgrading its measurement capabilities, NML-SIRIM is looking to expand into new areas and cooperate with other National Metrology Institutes, simultaneously disseminating and promoting measurement parameters and measurement technology. An intensified focus on metrology activities will also be carried out via courses and seminars on measurement technology and calibration to government agencies, industries and individuals. NML will also continue providing technical support to the Department of Standards Malaysia by coordinating proficiency testing (PT) programmes and measurement audits (MA) at national and international levels.

WAITRO

Enabling Global Action Oriented Partnerships

SIRIM is recognised the world over as a global research and standards development organisation.

We are one of the nine founding members of the Global Research Alliance (GRA), a cooperation of leading knowledge-intensive technology organisations from **nine countries in four continents**. The alliance has a combined strength of more than **50,000 scientists and technologists** committed to **developing global knowledge networks for industry and industrial sectors** to enhance their competitiveness.

SIRIM is also the secretariat of the World Association of Industrial and Technological Organisations (WAITRO), an independent association of industrial research organisations founded under the auspices of the United Nations. It currently has **160 members in 80 countries**.

WAITRO fosters links between member organisations through the following objectives:

- To encourage and facilitate transfer of research results and technical know-how
- To promote exchange of experience in research and technology management
- To enhance capabilities in management of research and technological organisations
- To identify and promote fields of research suitable for international collaboration, new opportunities and markets
- To promote technological research and capability building in the developing countries

In 2014, playing its role as WAITRO's Secretariat, SIRIM was involved in seven programmes in line with WAITRO's mission.

Malaysian Technical Cooperation Programme (MTCP) 2014

9 June 2014, Shah Alam, Malaysia

A Malaysian Technical Cooperation Programme (MTCP) programme was designed for 14 senior Research Technology Organisations (RTOs) management officers to strengthen their competencies in managing and leading their RTOs, with the theme 'Science, Technology and Innovation for Wealth Creation'. RTOs from Pakistan, Nigeria, Egypt, Indonesia, Thailand, Kenya, Botswana, the Philippines, Uganda, Morocco and China participated in the programme which included study visits to SIRIM facilities including its bio natural gas pilot plant, the National Metrology Laboratory and GranuLab (M) Sdn. Bhd. Presentations were also made by resource speakers from Malaysian WAITRO member organisations SIRIM, MTDC and FRIM as well as GranuLab, who shared their knowledge and expertise on the topics covered.

Regional Workshop on Technology Foresight for ISESCO Member Countries

13 – 15 2014, Amman, Jordan

The Workshop on Technology Foresight for ISESCO Member States was held with a view to implement the Strategy for Promoting S&T Innovation in Islamic countries. Participants from nine ISESCO member countries (Jordan, Morocco, Tunisia, Egypt, Nigeria, Palestine, Lebanon, Sudan and Malaysia) attended the workshop hosted by the Royal Scientific Society (RSS), Jordan. The objective of the workshop was to discuss the technology foresight concept, methodology and techniques. Paper presentations and discussions covered topics such as future technologies and commercialising of research and development outputs in line with new technologies and innovations expected in the future, as well as technology foresight and its applications to national industries.

WAITRO, as a collaborator of ISESCO, was represented by Dr. Wan Abdul Rahman Jauhari Wan Harun (from SIRIM Berhad), who presented two papers on the 'Systematic Approach for Developing Technology Roadmap' and 'A Malaysian Case Study on the Technology Foresight in Practice'. Resolutions were made at the end of the workshop in the area of advancement and application of technology foresight for follow-up actions. The workshop ended with a visit to RSS laboratories. Dr. Wan Abdul Rahman and Dr. May El Batran from Egypt were given the honour to meet the Founder and Chairman of RSS, HRH Prince El Hassan bin Talal, who shared his thoughts on current issues on social and technology development of Islamic countries.

WAITRO-ISESCO Research Fellowship Programme in the Field of NDT Ultrasonic Testing and Evaluation 2014

19 May – 27 June 2014, Malaysia

This WAITRO-ISESCO Research Fellowship is a collaboration programme among WAITRO, ISESCO and SIRIM Berhad as an effort to increase capability in S&T in developing member countries of WAITRO and OIC. In 2014, eight candidates from Yemen (two candidates), Jordan, Thailand, Egypt, Uganda, Nigeria and Sri Lanka were selected to receive the fellowship scholarship. However only four passed the examinations.

This programme has enabled WAITRO and ISESCO, through SIRIM Standards Technology Sdn. Bhd., to prepare participants to take the NDT Ultrasonic level 2 (Direct Access) Certification and Qualification examination, a scheme that is in accordance to ISO 9712, adopted by all EU Member States, Australia and the International Committee for NDT members in Qualification and Certification of Personnel in NDT. Professionals who qualify are highly regarded and sought after throughout the NDT industry.

WAITRO 22nd Biennial Congress and General Assembly

17-18 September 2014, Copenhagen

WAITRO, in collaboration with Danish Technological Institute (DTI), Fraunhofer, IVL and TNO, organised its 22nd Biennial Congress with the theme "Horizon 2020 and Beyond… RTOs in International Collaboration". At the opening ceremony, speeches were delivered by DTI President, Mr. Søren Stjernqvist; WAITRO President, Prof. R. K. Khandal; Danish Minister for Foreign Affairs, Mr. Martin Lidegaard and SIRIM Berhad President and Chief Executive (as host of the WAITRO Secretariat),

Dato' Dr. Zainal Abidin Mohd Yusof. Many prominent speakers from key European and international organisations supporting research and innovation globally advocated opportunities for international collaboration, funding, policy and regional strategies during the event.

DTI, Fraunhofer, IVL and TNO also shared their experience of working on international collaborative projects in partnership with industry and on 'inclusive, innovative and reflective societies'; using case studies under the five societal challenges (health, demographic change and wellbeing; food security and bio-economy; secure, clean and efficient energy; smart, green and integrated transport; and climate action, resource efficiency and raw materials). This was followed by a discussion on ideas for collaboration and joint brainstorming sessions on the five societal challenges to form more concrete plans for future co-operation.

Following the Congress, the 22nd WAITRO General Assembly congregated with attendance of WAITRO members from 22 countries.

SIRIM Training Attachment on Capabilities in Environmental Services for CARIRI

25-30 September 2014, Malaysia

The Caribbean Industrial Research Institute (CARIRI), a WAITRO member, approached the WAITRO Secretariat to assist in its capacity building in the area of environmental services. The Environmental Technology Research Centre (ETRC) of SIRIM Berhad was requested to design a training attachment to expose CARIRI technical personnel to the subject area.

The training attachment at the ETRC was specifically planned, developed and customised to the needs of CARIRI's technical personnel. The programme encompassed lectures cum discussions, hands-on/ practical laboratory experiments and site visits. The trainers and resource persons responsible in delivering the programme comprised senior researchers, researchers and research assistants with hands-on experience in the field of industrial and environmental services. The participants were also taken to visit the SIRIM Ceramics Centre at Block 18 and a pilot plant operation of photocatalytic treatment of groundwater in Cameron Highlands.

Dr. Lorenz Kaiser from Fraunhofer

Signing of MoU between WAITRO Members: SIRIM Berhad, Malaysia and Fraunhofer Gesellschaft, Germany

2 December 2014, Putrajaya

SIRIM Berhad has established a strategic partnership with another WAITRO Member, the Fraunhofer Gesellschaft Institute, Germany, which is the largest application-oriented research in Europe. This partnership aims to strengthen the development of SMEs in Malaysia through adapting the German ecosystem of SME development, and co-operating in advanced technologies, commercialisation and business improvement.

An MoU for the co-operation was signed on 2 December 2014 by SIRIM President and Chief Executive, Dato' Dr. Zainal Abidin Mohd Yusof and Fraunhofer Management Board Member, Dr. Lorenz Kaiser at the Malaysian Prime Minister's Office in Putrajaya; witnessed by the Malaysian Prime Minister, Datuk Sri Mohd Najib Tun Abdul Razak. SIRIM and Fraunhofer will co-operate for two years in the fields of Health and Environment; Mobility and Transportation; Communications and Information; Energy and Resources; Production and Services as well as Safety and Security.

The events provided opportunities for WAITRO members to build better relationships and collaborative programmes. During the 22nd WAITRO Biennial Congress in Copenhagen, Dato' Dr. Zainal Abidin Mohd Yusof, President and Chief Executive of SIRIM (WAITRO Secretariat host) and Ir. Dr. Mohamad Jamil Sulaiman, SIRIM Research and Technology Innovation Division Vice President took the opportunity to discuss on potential business collaborations between their organisations with Mr. Søren Stjernqvist, President of DTI (22nd WAITRO Biennial Congress host), and Mr. David Tveit, Energy and Climate Management Vice President in Taastrup. Areas of discussion included Horizon 2020 project topics and sharing of good management practices in running a successful RTO.

Prof. Charles Kwesiga from UIRI

On 14 August 2014, the Executive Director of Uganda Industrial Research Institute (UIRI), Prof. Charles Kwesiga, paid a courtesy call on the President and Chief Executive of SIRIM Berhad, Dato' Dr. Zainal Abidin Mohd. Yusof to discuss the growing relations between the two organisations, especially in the field of technician training in petroleum operations, inspection, calibration, NDT, technology transfer and business incubation. This visit was a follow-up on the MoU signed between SIRIM and UIRI on 22 October 2013 in Zhejiang, China. The visit ended with both parties expressing hope that the meeting will represent a significant step towards a beneficial long-term relationship between UIRI and SIRIM.

This was followed up by a working visit from the Technology Development Centre Director of UIRI, Dr. Dick Kamugasha in September 2014 to discuss on further possible collaborations between the two WAITRO member organisations. Areas of interest discussed were Joining Technology and NDT; Ceramics Technology; Manufacturing and CAD/CAM; Micro-hydro; Foundry and Machinery and Fabrication and Partnership with WAITRO. The other SIRIM centres were also requested to prepare immediate, short-term and long-term action plans or proposals for collaboration with UIRI before a further discussion takes place between the two WAITRO members.

Tools and cutter grinder machine

TECHNOLOGY COMMERCIALISATION CENTRE

Gaining Momentum In Commercialisation

SIRIM's effort to commercialise its home grown technologies gained significant momentum in 2014 with 10 technologies undergoing SIRIM's commercialisation processes of technology evaluation, market feasibility, business linkages, and negotiations. Out of these 10 technologies, two products from Wound Management Technology were successfully commercialised. These were Deep Wound Management and Surface Wound Management.

Technology takers for Filament Winding Machine Technology, Innocraft and Nanolipid Carriers have also been identified and are now at various stages of commercialisation process. It is expected that the commercialisation of these three products will be completed by the second quarter of 2015. As for Slow Release Fertiliser (SRF) technology, SIRIM has signed an IP sharing agreement with Ecopha Sdn. Bhd. as its partner for the commercialisation of the technology.

On the commercialisation effort for TCG8, SIRIM is in the midst of signing a strategic alliance agreement with the intention of collaborating with potential technology takers to market the products. The agreements for the collaboration will be signed in 2015. As a testimony of its superior technology innovation, TCG8 has won Bronze Medal in ITEX 2014: Integrated Spiral Grinding Articulated Attachment for TCG8 (iSGAA-TCG8), Gold Medal and Special Gold from Jury in MTE 2014: Intelligent Online Operation Inspection and QC System for TCG8 (iO2iQ-TCG8). Further to that, SIRIM is actively pursuing use of TCG8 as a training tool for the education sector and to penetrate the international scene. The signs are encouraging and it is envisaged that with continuous efforts and enhanced awareness, TCG8 will enter a more interesting and vibrant phase from 2015 onwards.

In ensuring successful commercialisation of its technologies, SIRIM participated in MOSTI Commercialisation Year 2014 on 23 Jan 2014 at SIRIM Shah Alam. Together with this event, SIRIM launched three technologies – Craniofacial, Bio-Natural Gas (Bio-NG) with Compressed Natural Gas (CNG) Composite Pressure Vessel and Lithium Ion Battery (LIPOS).

SIRIM also launched its Pilot Plant of Bio-NG Carey Island Project on 30 Jan 2014 at Sime Darby, Pulau Carey. During this event, the Minister of MOSTI was given the opportunity to test drive the car powered by Bio-NG. Following that, the CE Mark for GranuMas product was officially announced at Granulab Sdn. Bhd. premise located at Kota Kemuning, Shah Alam in conjunction with a working visit by the Minister of MOSTI on 17 April 2014. Prior to its commercialisation, GranuMas had successfully obtained a CE mark medical class III product certified by BSI, UK in 2013.

SIRIM Eco-Innovation Services was launched by Minister of MOSTI on 31 October 2014. The event took place at Putra World Trade Centre (PWTC) in conjunction with the National Innovation Conference and Exhibition (NICE) 2014. A SIRIM Eco-Innovation Services booklet – which showcases innovations at the product level, market approach and even organisation structure – was launched during the event.

The momentum continues into 2015 with the MOA signing on Strategic Alliance Agreement (SAA) for Wood Polymer Composite Technology (WPC), TCG8 and Nano Lipid Carrier (NLC). These are among the several anticipated events that will elevate the progression of SIRIM's technology commercialisation in the near future.

Launching of SIRIM Eco-Innovation Services

Biocomposite Technology

2014 marked the second year for the commercialisation of SIRIM's biocomposite technology through formation of a business unit for manufacturing of WPC. As testament to its capabilities in running a full scale manufacturing facility, SIRIM had obtained the manufacturing license from MBSA with the scope covering the processing and production, storage as well as sale and service of goods and building materials.

The global market for applications of biocomposites is projected to grow from USD2.5 billion in 2014 to USD4.6 billion by 2019, rising at a robust annual growth rate of 13.8%. North America is the largest consumer followed by Asian and European regions. Growth in building and construction sectors coupled with the implementation of stringent environmental regulations is expected to drive the global biocomposite market. Similar trends are expected in Malaysia and with increasing consciousness on environmental issues, biocomposite is emerging as a substitute for natural timber in creating upmarket building materials and furniture.

Riding on this development, SIRIM had embarked on an aggressive marketing drive targeting the building and construction as well interior designing and architectural sectors. The response has been encouraging and has translated into requests for installations and invitations to participate in larger construction projects. This positive market reaction bears testimony of the acceptance of SIRIM's biocomposite products.

A stylish deck made from Wood Polymer Composite

Besides making inroads in the sectors mentioned above, SIRIM is actively pursuing other areas in which the use of biocomposite is deemed attractive such as in the hospitality, eco-tourism, landscaping and beautification as well as furniture. The signs are encouraging and the team is working with not just the industry player but also the government sectors, GLCs, state governing agencies, town planners as well as city councillors and local authorities. With continuous efforts and enhanced awareness, the use of biocomposites will enter a more interesting and vibrant phase with greater acceptance in all sectors.

While it is undeniable that establishing oneself in the local market is crucial, presence in international markets is highly advantageous. In this regard, SIRIM is now working on a strategic alliance with a private entity for marketing and sale of its products. With complementary abilities and resources, the strategic alliance will pave the way for enhanced market presence.

SIRIM is well-prepared to meet the stringent international requirement and among other things, is now working for Green Label certification for its biocomposite products. Beside enhanced market penetration, the collaboration is expected to pave the way for possible joint-venture to ensure increased capacity in the coming years.

Innocraft

Innocraft is a project funded by MOSTI with the objective to assist local craft entrepreneurs to improve their craft products through SIRIM's technologies. Apart from that, it is also a platform for marketing and commercialising Malaysian-made craft products. The project was completed and launched on 21 February 2014 by Datuk Hasan Abd. Rahman, on behalf of Datuk Seri Ir. Hj. Idris Haron, Chief Minister of Melaka.

The newly launched Innocraft has attracted local and international visitors since its opening and continue to gain popularity for its quality Malaysian made craft products, technologies displayed and innovative activities conducted at the centre. The various promotional efforts conducted in 2014 has resulted in more than 2,000 visitors visiting the centre. It is envisaged that with aggressive promotion and packaged activities, the centre has the potential to attract more visitors. Amongst promotional activities planned for 2015 are thematic events with local movie idols, innovation competitions and 'Waste to Craft' competitions.

As part of SIRIM's commercialisation efforts and long term sustainability, SIRIM is continuing its initiatives to commercialise the centre through formation of joint ventures or appointment of operators with private entities in 2015.

TECHNICAL SERVICES DIVISION

RESEARCH AND TECHNOLOGY INNOVATION

SUBSIDIARIES

TECHNICAL SERVICES DIVISION

ADVANCING THE NATION

STANDARDS RESEARCH AND MANAGEMENT CENTRE

Setting Standards as a Measure of Success

SIRIM's Standards Research and Management Centre (SRMC) helps raise safety, security and protection standards of the Malaysian public via continuous development of new and enhanced Malaysian standards as well as SIRIM Industry Standards.

With the year's addition of 134 Malaysian Standards (MS) developed and delivered to the Department of Standards Malaysia (Standards Malaysia), the nation now has a cumulative total of 6,199 standards to meet the evolving demand of regulators. For instance, the provisional MS 2571:2014 (P) on Aluminium composite panel for exterior and interior wall, was developed to support the enforcement made by Customs (Prohibition of Imports) Order 2011 to standardise the quality of aluminium composite panel used in buildings. Out of the 134 MS introduced in 2014, 80 are new standards and 54 are revisions of earlier standards.

As for the development of SIRIM Industry Standards, SIRIM has to date published four standards. These are SIRIM 1: 2014 and SIRIM 2:2014 on *Guidelines and Ratings on Toilet Cleanliness for Mosques and Suraus*; SIRIM 3:2014 on *Code of Practice for Installation of Ceiling Fan*; and SIRIM 4:2014 on *Good Practices in Implementing Commuting Safety Management*. Codes of Good Practices for the Department of Agriculture and Department of Veterinary are next in the pipeline.

During the course of the year, SIRIM organised two workshops on MS development and three workshops on SIRIM Industry Standards development; and was involved in 21 promotional seminars to promote the awareness and implementation of MS among stakeholders from the government and industry sectors. The standards promoted targeted diverse sectors which included Fresh Fruits and Vegetables, Herbs, Aquaculture, Energy Efficiency, Road Traffic Safety, Medical Devices and Quality Management System.

Code of practice for Installation of Ceiling Fan. The blue and brown wires will dislodge during mishap and cut the power.

In the international standardisation arena, SIRIM through Standards Malaysia participated actively in 377 technical committees in ISO and IEC. In 169 of such technical committees, SIRIM acted as a participating member, while functioning as an observer in the other 208. This has resulted in 2,659 votes for ISO and IEC draft international standards.

The national enquiry and notification point (Enquiry Point) for World Trade Organisation Technical Barriers to Trade (WTO/TBT), managed by SIRIM, has served the government and industry well by circulating more than 1,800 notifications from other WTO member economies through the Export Alert System. Eighteen

were Malaysian notifications forwarded by SIRIM. Local industries are benefitting from the Export Alert System as it provides the earliest awareness on possible changes of regulations and standards of foreign countries. About 215 more local industries requested for foreign notifications in 2014.

Two half-day networking seminars with the industries on trade barriers technical information were also organised during the year. Participants of the seminar were briefed on the significance of the WTO/TBT Agreement and how they can benefit from the implementation of the agreement. In addition, SIRIM was also involved in the UNIDO and MTCP Trainings organised by Standards Malaysia.

Meanwhile, more than 300 companies and associations enjoyed the benefits of joining the SIRIM Library membership programme. This value added service is in line with SIRIM's focus on enhancing existing businesses for future viability.

PACKAGING DESIGN CENTRE

Supporting the Growth of SMEs

SIRIM established its Packaging Design Centre on 1 January 2014 to offer quality design and brand development services to Small and Medium Enterprises (SMEs), and help boost the growth of the SME sector, in line with the aspirations of the Malaysian government.

The Packaging Design Centre achieved its set targets for the year by successfully attracting the participation of 338 SMEs and agencies through its implemented development programmes on packaging design, product ergonomics and branding. Some of the resulting work from these programmes have been sent to the Malaysian Design Council and nominated for the Malaysian Good Design Mark.

Many of the agencies participating in these programmes have undergone consultancy, coaching and training with SIRIM's SME Services Centre previously and their continued participation is a testament to the credibility and trust that they place in SIRIM. These included the Economic Region Development Council (ECERDC), Ministry of International Trade & Industry (MITI) and Yayasan Sabah Group. SIRIM also organised packaging development programmes in collaboration with Negeri Sembilan State Secretary Office, Johor State Department of Agriculture (JPNJ), MARA Melaka, Rubber Industry Smallholders Development Authority (RISDA) and National Space Agency (ANGKASA).

The focus on packaging services for the SME sector is expected to be sustained by the current supportive climate of growth for small and medium industries.

Committed to its slogan of 'We Innovate the Best Packaging Design Solution for Industries', the Packaging Design Centre is expanding to include services such as Innopack Programme, Quality Improvement Packaging and Green Blue Packaging. These are the identified next steps in ensuring the Packaging Design Centre remains at the forefront of excellence in aiding entrepreneurs to meet increasingly sophisticated market demands, both at home and abroad.

SECURITY DESIGN SERVICES CENTRE

Centred On Security

An increasingly competitive marketplace has resulted in greater product security and safety issues whereby consumer protection is vital. SIRIM's Security Design Services Centre continues to provide security solutions to tackle negative activities and protect consumers from duplications, brand counterfeiting, plagiarism, piracy and alterations made to products and important documents.

While its core focus is on the production of safety labels for SIRIM subsidiaries, the Centre also extends its services to government and industrial agencies. Services offered now include a wider scope of government security and documents of high corporate value. In 2014, the Centre enjoyed a significant revenue increase by making inroads into new market sectors. It was awarded several supplier contracts by local authorities leveraging on the trusted relationships SIRIM has built over the years. This was followed by the achievement of design and printing contract for certificates and transcripts of several public and private higher education institutions.

Security design feature found in certificates of higher education institutions

In order to provide more comprehensive and competitive services, the Centre also collaborates with the Smart Systems Centre. Through this collaborative package, the services offered encompass not only the physical design and security printing, but also incorporates elements of intelligent system software. This two-pronged strategy is to ensure that the solutions offered by the Centre can surpass those of existing competitors in the market.

In line with the latest technological developments, in 2014, security labels have been enhanced with a new design and the latest security features. These new labels have been launched during the SIRIM-Industry Night and will be put into use in early 2015.

MALAYSIA DESIGN COUNCIL

Nurturing a Culture of Innovation

Bringing forth creative minds among young designers; Malaysia Design Council (MRM) organises design competitions and festivals as a platform to showcase the creativity of Malaysian designers. The competition encourages the development and creation of innovative ideas by inventive Malaysians who are passionate about introducing new concepts and ideas to the market.

The year kicked off with the culmination of the National University Design Challenge 2013. Through this programme, MRM challenged participants to propose innovative ideas to enhance the quality of public service offered by government agencies. At the end of the competition in January 2014, a total of 20 design students received their awards from Tan Sri Haji Muhyiddin Haji Mohd Yassin, Deputy Prime Minister, together with Dato' Dr Ewon Ebin, Minister of Science, Technology and Innovation (MOSTI) and Dato' Prof. Dr Ahmad Haji Zainuddin, Chairman of Malaysia Design Council.

April heralded the finale of the Malaysia Good Design Mark 2013, an event that celebrates the creative efforts of corporate Malaysia. MRM received more than 80 submissions from various categories for evaluation and 23 products were shortlisted to receive the 'Malaysia Good Design Mark' as they fulfilled the required specifications. Dato' Dr Ewon Ebin, Minister of Science, Technology and Innovation (MOSTI), did the honours of bestowing the Malaysia Good Design Mark 2013 certification to 21 local companies for their success in creating products that are creative, innovative and have attractive and appealing designs.

Malaysia Good Design Mark 2015

Catalysing international networking

In September 2014, MRM joined hands with five other Malaysian design associations – namely, Malaysian Institute of Interior Designers (MIID), Malaysian Institute of Architects (PAM), Institute of Landscape Architect (ILAM), Graphic Design Association of Malaysia (wREGA) and Industrial Design Association of Malaysia (PEREKA) – to organise the inaugural Malaysia Design Festival or MADE 2014. Set at the Kuala Lumpur Library, the MADE Festival 2014 brought together various designers from diverse creative areas under one comprehensive platform that included talks on design, showcased creativity and innovative ideas, highlighted experimental projects and provided design demonstrations.

The year also saw the launch of the Asia Design Sharing Furniture Project – a collaboration between MRM, Korea Institute of Design Promotion (KIDP) and Ideation Sdn. Bhd. Held in November at Menara MATRADE, the one week project challenged 20 Malaysian and Korean designers to propose a practical, innovative and commercially viable furniture for use in Malaysian university dormitories.

Many MRM design workshops were organised during the course of the year in collaboration with both government and private agencies. One of the most outstanding programme was the MRM @ Penjara workshop where MRM helped to increase design awareness and enhance design skills among prisoners.

As one of the members to Asia Design Sharing Council Meeting, International Council of Societies of Industrial Design (ICSID) and International Council of Design (icoD), MRM continued to play an active role in promoting Malaysian design and designers in various international platforms in 2014, including design expos, meetings and a host of forums.

SUBSIDIARIES

RESEARCH AND TECHNOLOGY INNOVATION

TECHNICAL SERVICES DIVISION

SUBSIDIARIES

SIRIM QAS INTERNATIONAL SDN. BHD.

To ensure long-term business growth and sustainability, **SIRIM QAS International Sdn. Bhd.** (SIRIM QAS International) has launched several new certification and testing solutions catering to the changing needs of the industry.

In June 2014, **SIRIM QAS International** introduced the FSSC 22000 Food Safety System Certification Scheme to help the Malaysian food manufacturing industry gain greater market acceptance overseas. FSSC 22000 is a robust, ISO-based, internationally accepted certification scheme for auditing and certification of food safety in the food manufacturing industry. FSSC 22000 uses the ISO 22000 and ISO 22003 standards as well as the technical specifications for sector Pre-requisite Programmes (PRPs).

SIRIM QAS International then launched the Carbon Footprint Certification Scheme in November 2014, for organisations that are keen to communicate their products' carbon footprint information to their internal and external stakeholders in an accurate and objective manner. The scheme is a Type III environmental declaration scheme and is operated according to ISO/TS 14067: 2013 standard. The Carbon Footprint Certification Scheme was developed as a result of the Switch-Asia Grant to SIRIM Berhad for the development of an Environmental Declaration Scheme for Construction and Building Materials.

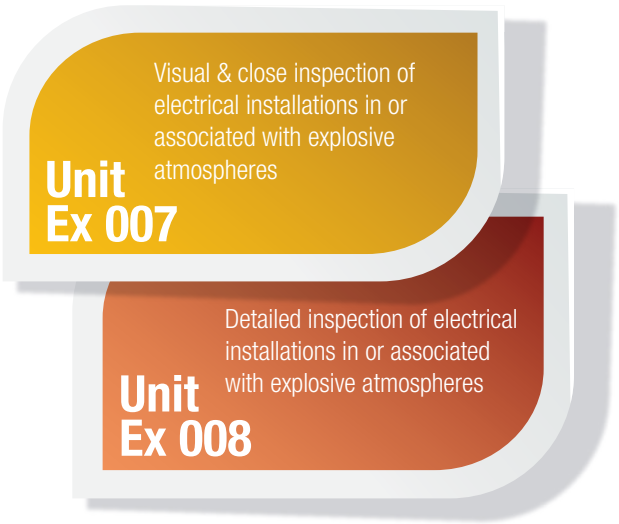
SIRIM QAS International also supports the nation's human capital development through the expansion of its range of personnel-related competency certification. In 2014, **SIRIM QAS International** launched both the Personnel Competency Assessment for Welder Certification Scheme and the Personnel Certification Scheme for Installer of Pressurised Hot Work Enclosure (PWHE), both of which are relevant for the steel fabrication works in the oil and gas as well as petrochemical industry.

The Personnel Competency Assessment for Welder Certification Scheme is based on ISO 9606 which provides a set of technical rules for a systematic qualification test for welders. The qualification demonstrates that the welder is skilled to make production welds that meet the quality requirements of a Qualified/Approved Welding Procedure Specification (WPS) and fabrication standard.

On the other hand, through the Personnel Certification Scheme for PWHE Installer, the installer is assessed on his knowledge and competency to ensure that the PWHE is properly installed to reduce potential risks from hot work conducted in a hazardous explosive environment.

Personnel Competency Assessment for Welder Certification Scheme

In addition, **SIRIM QAS International** was granted two additional scopes under its maiden personnel-related certification scheme, which is the IECEx Certification of Personnel Competencies (CoPC) Scheme:



Besides that, **SIRIM QAS International** also offers certification to RSPO Principles and Criteria (P&C) for Sustainable Palm Oil Production in Malaysia and Indonesia and RSPO Supply Chain certification worldwide. This is made possible with the successful accreditation of **SIRIM QAS International** by Accreditation Services International (ASI) in 2014 for both certification schemes.

The year 2014 saw **SIRIM QAS International** investing in new test equipment to meet the testing needs of the industry. This include the installation of the Electrodynamics Shaker System which can assess product fragility and its ability to withstand the rigors of the product's intended use as well as the rigors of shipping and transportation. In addition, low relaxation test, chipping resistance test, tile adhesive test and testing of concrete admixtures were also introduced in 2014. Other investment in testing facilities include the installation of luminaire testing facility in its Penang branch as well as the enhancement of the material testing facilities for steel and rope products in its Johor branch.

Throughout the year 2014, **SIRIM QAS International** had been developing its capacity and capability to establish the Asset Management Certification Scheme based on ISO 55001 standard. The scheme, which will be offered in 2015, would appeal to organisations wishing to implement a systematic and optimised approach to asset management to gain significant cost and performance improvement.

While striving to cater for industry needs, **SIRIM QAS International** continues to play a pivotal role in ensuring the safety of Malaysian consumers through its Product Certification Scheme.

SIRIM QAS International will be introducing new SIRIM labels to replace the existing SIRIM labels effective January 2015. The introduction of the new design of SIRIM labels is timely as it has been 10 years since **SIRIM QAS International** introduced the current design of SIRIM labels. The new labels has additional security features which will help to address the public's concern on fake SIRIM labels and help to boost consumer confidence that the certified products affixed with SIRIM label which they had purchased are indeed safe to use.

SUBSIDIARIES

SIRIM TRAINING SERVICES SDN. BHD.

In early 2014, a number of activities previously controlled by SIRIM Bhd were transferred to **SIRIM Training Services Sdn. Bhd.** (SIRIM Training) as related services for SME development, training and testing of welding services, and higher education programmes.

As a result of this expansion in scope, there was a marked increase in activities during the year as **SIRIM Training successfully** organised a total of **908 training courses for 13,225 participants**; out of which 264 were made up of SMEs. This was an **increase of 87 courses** from the previous year. SIRIM Training also **secured 63 new consultation projects** and **collaboration programmes**.

Trainees from Ministry of Defence, Oman

SIRIM Training's core activities continue to be focused on training and advisory services relating to quality, technology and best practices. Its quality services include consultancy and training services for standards-based management system such as ISO 9001, EN 1900, ISO 14001, ISO / IEC 17025, ISO 27001, ISO 15189, ISO 13485, HACCP, ISO 22000, TS 16949, OHSAS 18001, Integrated Management System, GMP, GHP and Halal.

In addition, **SIRIM Training** offers training and advisory services for tools, techniques and best practices such as TQM, TPM, 5S, 5S Green, 7QC Tools, SPC, Benchmarking, Value Engineering, ICC/QCC, 6-Sigma, Kaizen, Customer Service Management and Lean Manufacturing. **SIRIM Training** has also implemented technology-related training such as Certified Programme on API, AWS Certified Welding Engineers, AWS Certified Welding Inspectors, Certified Programme on NDT and CompTIA.

Services for SME development included the 'Groom Big' and Vendor Innovation programmes, sponsored by MITI; while welding services focused on welding training in collaboration with the National Youth Training Institute.

In 2014, in collaboration with TESDEC, **SIRIM Training** implemented six INSEP Programmes (Industrial Skill Enhancement Programmes). A total of 120 university or college leavers were trained between four to six months in various fields, including management systems based on ISO 29001, TS 16949, OHSAS 18001, ISO 50001, ISO 17025 and ISO 27001 standards. The theoretical and practical training offered was geared at making the students more confident and knowledgeable when they entered the job market.

Several new services were also introduced in 2014. These included the Productive Maintenance Recognition Scheme (Total Productive Maintenance – TPM), TRIZ, MS 2300 and Master of Quality Management. The Master of Quality Management represents SIRIM's first higher education programme in collaboration with the Open University Malaysia.

During the course of the year, a total of 37 organisations were successfully guided to obtain various certifications and recognitions. Twenty-two organisations achieved 5S certification, eight received Green 5S recognition, two were QMS-certified and another two were ISO 9001 certified; while the remaining three received ISO 50001 certification, OHSAS 18001 certification and TQFTM recognition, respectively.

As part of its annual calendar, **SIRIM Training** once again successfully organised the national-level Quality, Standards and Best Practices Seminar (QBEST) that was attended by 230 participants.

At the international level, **SIRIM Training**'s series of training for organisations in Oman and Brunei continued to enjoy a successful run. In addition, **SIRIM Training** has signed a memorandum of understanding to undertake training and consultancy services for IQC Institute of Pakistan as part of its efforts to further expand the company's international business. This joint training programme will be implemented in early 2015.

CERTIFICATION AND RECOGNITIONS

SUBSIDIARIES

SIRIM STANDARDS TECHNOLOGY SDN. BHD.

In 2014 the calibration business market continued to be hampered by local and international economic uncertainties. With crude oil plummeting to its lowest in six years during the middle of the year, **SIRIM Standards Technology Sdn. Bhd.**'s (SST) oil and gas business was negatively impacted. Demand for its oil and gas services at Pasir Gudang was low amidst a hesitant and less active market.

A majority of multinational companies, who are key customers, have implemented extended cost reduction exercises in view of this uncertain scenario. Low orders from defense, automotive and government departments have also affected the overall performance of the company during the year; even as **SST**'s oil and gas services successfully expanded to include Failure Investigation and Non-Destructive Testing, in line with SIRIM Group's transformation exercise.

Nevertheless, there is a slight business improvement from the healthcare industry as the year saw **SST** signing an MOU with Polytechnic Shah Alam under the Ministry of Education, on 20 April, to provide accredited calibration for medical test instrument from the healthcare industry. This laboratory is the first in the country to be accredited in this field. The business potential for this service is very high with the implementation of the Medical Device Act 2013 across the nation's healthcare industries.

Another opportune venture was realised when a new subsidiary under **SST**, SIRIM Measurements Technology Sdn. Bhd. (SMT), was officially launched in December 2014 in Penang. This is a joint venture company between **SST** and Dream Catcher Consulting Sdn Bhd, an eco-system partner under Keysight Technologies Sdn. Bhd. (previously known as Agilent Technologies Sdn. Bhd.). The main business of SMT is to provide solutions and technical services covering radio frequency equipment and test systems. SMT has been appointed as an eco-system and technology partner for Keysight Technologies Sdn. Bhd. In addition, SMT has been appointed as the sole service provider for the government sector and universities in the country. As such, the business opportunities for SMT is tremendous.

Moving forward into 2015, **SST** has started discussing to form a collaboration with an established service provider under the Royal Malaysian Air Force for the calibration and verification of test instruments. The market potential is good considering the size of test instruments available in the military sector. **SST** also intends to venture into a new service sector that relates to the regulatory functions under the Ministry of Domestic Trade. This regulation covers all industries within the food and manufacturing sector. As it is a niche market with specialised requirements, the business potential is very promising.

Advancing ahead, S**IRIM Standards Technology Sdn. Bhd.** continues to be the leading ISO 17025 accredited commercial calibration service provider in the country; and also the most competent and qualified Failure Investigation and Non Destructive Testing service provider.

SUBSIDIARIES

NATIONAL PRECISION TOOLING SDN. BHD.

The **National Precision Tooling Sdn. Bhd.** (NPT) is a special purpose vehicle mandated by the Government to be the lead collaborator in implementing the Development of Bumiputera Automotive Tool, Dies and Moulds (TDM) Industry project (TDM Project).

The main objectives of the TDM Project are to expedite the capability and capacity development and enhancement of the bumiputera automotive TDM industry clusters, and increase their participation in the TDM business, specifically with respect to opportunities presented by the local automotive manufacturing sector for import substitution, as well as export potential, and targeted to be achieved through the following development programmes:

In mandating the TDM Project to **NPT** through SIRIM Berhad, the Government through the Economic Planning Unit (EPU) of the Prime Minister's Department had initially provided an allocation of RM50 million in 2009 and 2010 for the first phase of its implementation. Subsequently, the Government followed-up with an additional allocation of RM30 million in late 2012 to enable the Company to implement new development programmes to further enhance the impact of the TDM Project on the bumiputera TDM industry as part of the second phase of its implementation.

During the year, **NPT** completed and subsequently submitted to the EPU a report on the achievement of the first phase of the TDM Project which took off in mid-2009 with the RM50 million allocation. The report was titled "Laporan Pencapaian Projek Pembangunan Industri Alat, Dai dan Acuan Automotif Bumiputera Fasa 1, Sehingga 31 Disember 2013". Other than outlining the various development programmes that were implemented for 14 beneficiary companies, the report more importantly, presented the impact and outcome of the Project on the automotive bumiputera TDM industry as a whole as measured against seven key performance indicators (KPI) as well as on the specific TDM sub-sectors and individual companies as measured against nine KPIs.

Generally, the report showed that the Project has had a positive impact on the business, capabilities and capacities of the individual beneficiary companies, the respective TDM sub-sectors and the bumiputera automotive TDM industry as a whole, as most of the KPIs with specific targets were met or exceeded. However, the report also indicated that gaps still existed within the companies as well as the bumiputera TDM industries that need to be bridged in order for them to provide more comprehensive services and product range to their clients.

Upon securing EPU's approval on the proposed breakdown of the additional RM30 million allocation between TDM sub-sectors and the three categories of development programmes in April 2014, **NPT** proceeded with the second phase of the TDM project. Subsequently for 2014, **NPT** managed to approve and implement four new development programmes for the acquisition of two machinery and two CAD/CAM systems worth a total value of RM2,331,750 for three beneficiary companies. One machinery and the two

CAD/CAM systems have been successfully delivered and commissioned, while the other machinery is scheduled to be delivered and commissioned in July 2015.

NPT had also approved another new equipment acquisition programme valued at RM4.5 million during the year, but with a new funding mechanism, and is awaiting the agreement of the applying company for its implementation.

For 2015, **NPT** plans to fully utilise the balance of the additional allocation of RM30 million provided by the Government to implement development programmes that would help to close some of the gaps within the industry as well as potential companies as indicated from the above-mentioned achievement report. Consequently, **NPT** expects to commit RM16.7 million on Equipment Acquisition Programmes and RM5.3 million on Human Capital Development and Technical Assistance-Experts Attachment Programmes before the year ends.

SUBSIDIARIES

SIRIM TECH VENTURE SDN. BHD.

SIRIM Tech Venture (STV) Sdn. Bhd. is wholly-owned subsidiary of SIRIM Berhad. It was formed as a special purpose vehicle to drive commercialisation of SIRIM's technologies.

Pressure Vessel Technolgy and Testing Unit (PVTTU) is one of the business units under **STV** focusing on the manufacturing of Type 4 Pressure Vessel and provision of testing services for pressure vessels optimising on a home grown technology developed by SIRIM Berhad. The main purpose is the delivery of the DSTIN Project titled *Boosting Bio-Natural Gas(BioNG) Utilisation for Energy Security-Demo Plant for BioNG Generation for Off-site Application*.

This unfired pressure vessel required a certificate of fitness (CF) before it can be operated. As a result, approval by DOSH must be obtained in advance at the design stage in order for **STV** to become a local manufacturer of unfired pressure vessels. Local manufacturers of pressure vessels must be registered as a manufacturer. The certification process requires testing protocols that will be witnessed by both the certification body, e.g. SIRIM QAS International Sdn. Bhd. and DOSH. Ocelot Engineering Services Sdn. Bhd. has been appointed as the consultant for applying the license from DOSH. There are three critical milestone to achieve along this registration process which are factory registration (part 1 and 2), unfired pressure vessel registration and demo vessel. Several trainings have been conducted and paperwork is in progress to prepare all documents before submission to SAMM Malaysia.

STV is also capable of manufacturing pressure vessels for application in gas transportation. It is the only centre in Malaysia with testing facilities for pressure vessels in compliance to ISO 11439:2013 for high pressure vessels and compliance to BS EN 14427:2004 for low pressure vessels. In order to be a local manufacturer of unfired pressure vessels, i.e. the carbon fibre Type 4 pressure vessels, several potential projects have been targetted for 2015 such as collaboration with POS Malaysia and TOPAZ for development of LPG tanks.

CALENDAR **2014**

LAUNCHING OF BIO NATURAL GAS IN CONJUNCTION WITH THE LAUNCH OF MOSTI COMMERCIALISATION YEAR 2014

23 January 2014

SIRIM launched the world's first natural biogas (BioNG) from palm oil mill effluent (POME) in conjunction with the launch of MOSTI Commercialisation Year 2014. The BioNG was successfully produced within SIRIM's Natural Biogas Processing Plant in Carey Island, Selangor which has a biogas production capacity of 500Nm^3 per day (equivalent to 500 liters of petrol a day). Other SIRIM technology products introduced at the launch included the LIPOS Battery (Lithium-ion technology Phosphate), Craniofacial Reconstruction Services and Titanium Implants.

TCG8 WINS GOLD MEDAL IN MALAYSIA TECHNOLOGY EXPO (MTE) 2014

21 February 2014

Ajmain Kassim and his team of experts from the Micro Precision Unit won the Gold Medal with Commendation from the Jury Panel as well as the MTE 2014 Gold Medal for the *Integrated Online Operation, Inspection and QC Vision System for Multi Orientation of Tool and Cutter Grinder* project (iO^{2}iQ-TCG8).

SIRIM also won the Silver Medal for its *Silica Sand Moulding for Aluminum Alloys and Copper Alloys Precision Casting* (TSiS) project led by Siti Zaleha Mohd Nor. This project focuses on the potential of local silica which has characteristics suitable for foundry moulds for casting metal. SIRIM also won second place for Best Booth Design.

SEMINAR ON IMPLEMENTATION OF ROAD TRAFFIC SAFETY MANAGEMENT SYSTEM ISO 39001 IN MALAYSIA

3 March 2014

Jointly organised by the Institute of Road Safety Research (MIROS) and officiated by Azim Ng Abdullah, Vice President, Technical Services Division; this seminar aimed to provide a description of the requirements outlined in EN ISO 39001 for road safety management and practical exposure in respect of the implementation of the standard – based on the sharing of information from the four pilot organisations that have received the MS ISO 39001 certification. A total of 211 participants attended the seminar. Speakers included Professor Dr. Wong Shaw Voon, Director General and Chairman of the MIROS Steering Committee for the implementation of ISO 39001; Dr. Azlan Darus, Social Security Organisation (SOCSO) and representatives of the Royal Malaysian Police, PUSPAKOM Sdn. Bhd., Centry Logistic and Shell Malaysia Trading Sdn. Bhd.

WORKING VISIT BY MITI'S DEPUTY MINISTER, YB IR. HJ. HAMIM SAMURI TO THE PETROCLAMP MANUFACTURING FACILITY

2 April 2014

Deputy Minister of International Trade and Industry (MITI), YB Ir. Hj. Hamim Samuri, conducted a working visit to the Petroclamp manufacturing facilities in SIRIM Rasa, Hulu Selangor. The visit was primarily to view the Petroclamp product manufacturing technology called *Controline Protector*. Produced entirely by local companies in collaboration with SIRIM for the use of an oil and gas company of international standing, the prototype development of *Controline Protector* has been implemented in the SIRIM Rasa foundry using *Sand Casting* technology. The success of the Petroclamp highlights the vital role SIRIM Berhad plays in providing infrastructure support and R&D expertise towards industrial development.

WORKING VISIT BY MOSTI'S DEPUTY MINISTER, DATUK DR. ABU BAKAR MOHAMAD DIAH
3 April 2014

A delegation led by Deputy Minister of Science, Technology and Innovation (MOSTI) Datuk Dr. Abu Bakar Mohamad Diah visited SIRIM QAS International's Energy Efficiency Laboratory and laboratories in the Civil & Construction Section within SIRIM complex. The Deputy Minister also inaugurated the *Environmental Test Chamber for Refrigerator* during his visit.

LAUNCHING OF SIRIM STANDARDS FOR HYGIENE AND RATING OF MOSQUE AND SURAU TOILETS
21 June 2014

SIRIM Standards for cleanliness and rating of mosques and surau toilets were launched at Masjid Sultan Salahuddin Abdul Aziz Shah by the then Menteri Besar of Selangor, Tan Sri Abdul Khalid Ibrahim in conjunction with the 1435 H Ramadhan Month Moreh Contribution programme and the 2013 5-Star Classification Award for Selangor Mosques, which was organised by the Selangor Islamic Religious Department.

Both SIRIM standards aim to improve the quality of sanitation facilities in mosques and places of worship. For a start, mosques and suraus under the auspices of the Selangor Islamic Religious Department are expected to use these Standards' guidelines to improve their toilet cleanliness ratings.

WORKING VISIT BY THE PERUVIAN AMBASSADOR TO MALAYSIA
24 July 2014

SIRIM welcomed the Peruvian Ambassador to Malaysia, His Excellency Marco V. Balarezo, to a meeting and discussion with SIRIM's President and Chief Executive, Dato' Dr. Zainal Abidin Mohd Yusof. His Excellency Balarezo also visited SIRIM's galleries to view innovations and products produced by SIRIM.

CHARITABLE DONATIONS FOR TRAXXFM WELFARE HOMES
24 July 2014

SIRIM initiated a charity programme in collaboration with Radio TRAXXfm's *Touches Your Heart* campaign. The programme to raise donations in cash and kind for the Al-Fikrah Senior Citizens Home was implemented from 18 to 23 July 2014. Thanks to encouraging response from all SIRIM employees, a contribution of RM5,200 and a 5kg bag of rice was handed over to Dr. Nawiyah Che Lah, Director of Radio Programmes at Wisma Radio RTM, Angkasapuri Kuala Lumpur.

GREAT 2014 (GREAT ASPIRING ENTREPRENEURS FRIEND NETWORK)
17-20 September 2014

SIRIM joined GREAT 2014 in Cyberjaya to leverage on its platform for business networking and knowledge sharing as well as showcase SIRIM products and services. The exhibition was inaugurated by Prime Minister, Dato' Sri Mohd Najib Tun Haji Abdul Razak. SIRIM focused on products and services such as 3D printing, Robokit, cosmetics, end to end solutions and Flagship.

INNOCRAFT OPENS ITS DOORS TO KIDS
29 September 2014

Innocraft opened its doors to children from several kindergartens in Melaka, be entertaining them with various creative activities such as Hydrostone coloring, batik and 3D puzzles.

SIRIM FLAG AT THE ANNAPURNA BASE CAMP, NEPAL
25 October 2014

SIRIM's flag fly high at the Annapura Base Camp when SIRIM's staff, Aznal Bakesh Ahmad Nazari joined a group of 22 Malaysian climbers in a five-day expedition up the mountainous Himalayas. The group stopped at two schools during their climbing trip to deliver contributions to students of the Rising Sun Academy and Shree Shree Himalaya Secondary School. The group reached Annapurna Base Camp, at an elevation of 4,130 meters above sea level, on 25 October.

SIRIM – INDUSTRY NIGHT 2014
21 November 2014

Three new initiatives were launched at SIRIM – Industry Night 2014. These were the new label for Goods Certification Scheme, the Carbon Footprint Certification Scheme and Food Safety System Certification (FSSC 22000). The Deputy Minister of MOSTI, Datuk Dr. Abu Bakar Mohamad Diah also presented the 2014 SIRIM Quality Award to seven organisations that achieved a high level of quality management, product excellence and international standard level of production.

SIRIM SPORTS CARNIVAL 2014
29 November 2014

SIRIM Sports Carnival 2014, organised in collaboration with the Department of Human Resources, Corporate Affairs Department, PEKASA Association and PERKIS, created a sense of unity and cooperation across all levels of SIRIM employees, in line with the theme of *One Big Happy Family*. The opening ceremony was officiated by Ir. Dr. Mohamad Jamil Sulaiman, Vice President Research and Technological Innovation. Various fun events for adults, children and families enlivened the carnival. Health checks for employees and family members were also offered. The carnival ended with the presentation of prizes to winners by Dato' Dr. Zainal Abidin Mohd Yusof, SIRIM's President & Chief Executive.

MEMORANDUM OF UNDERSTANDING (MoU) BETWEEN SIRIM BERHAD AND THE FRAUNHOFER-GESELLSCHAFT INSTITUTE
2 December 2014

SIRIM established a 2-year strategic cooperation with Fraunhofer Gesellschaft Institute (Fraunhofer), Europe's largest application-oriented research organisation. This cooperation is aimed at strengthening the development of Small and Medium Enterprises (SMEs) in the country through the adoption of a German-based eco-system model for SME development.

The MoU was signed by SIRIM's President and Chief Executive Dato' Dr. Zainal Abidin Mohd Yusof and a member of Fraunhofer Management Board, Dr. Lorenz Kaiser, in a ceremony held at the Prime Minister's Office in Putrajaya. This was witnessed by Prime Minister Dato' Sri Mohd Najib Tun Abdul Razak.

ADVANCED MATERIALS CONFERENCE (AMC2014)
25-26 December 2014

AMC2014 held at the Bayview Hotel, Langkawi, was inaugurated by SIRIM's President and Chief Executive, Dato' Dr. Zainal Abidin Mohd Yusof, representing the Deputy Minister of MOSTI, Datuk Dr. Abu Bakar Mohd Diah. The 2-day conference received tremendous response from 240 participants comprising researchers, scientists, academics, research officers, postgraduates and individuals directly involved in the field of advanced materials from various local and overseas universities such as Hazard Islamic University of Iran, Semnan University, Silpakorn University, University of the Punjab, and also TUBITAK from Turkey. The Malaysian Rubber Board, the Department of Mineral Malaysia and Tenaga Nasional Berhad also participated in the event. Keynote speakers for the conference were Dr. Thomas Hartwing from Fraunhofer and Prof. Dr. Hanafi Ismail from Universiti Sains Malaysia.

ACHIEVEMENTS

1. **ITEX Gold** – Fabrication of Carbon-Copper Composites via Powder Metallurgy Route for Electrical and Electronic Applications
2. **ITEX Silver** – Hybrid Solar and Wind System for Eco Resort
3. **ITEX Silver** – Novel Bilayered Scaffold for Osteochondral Tissue Engineering Applications
4. **ITEX Silver** – Integrated Spiral Grinding Articulated Attachment-TCG8 (ISGAA)
5. **ITEX Silver** – Bio Natural Gas from Palm Oil Mill Effluent (POME)
6. **ITEX Silver** – Composite Pressure Vessel Type-3 for High Pressure Application
7. **ITEX Silver** – Economically Feasible Sodium Ion Battery for Large-Scale Stationary Energy Storage
8. **ITEX Bronze** – Injection Moulding of Inconel718 Parts for Aerospace Application using Novel Binder System based on Palm Oil Derivatives
9. **ITEX Special Award Silver** – Best Booth Design
10. **MTE Gold & Special Jury Award** – Integrated Online Operation, Inspection and QC Vision System for Multi Orientation of Tool and Cutter Grinder (iO²iQ-TCG8)
11. **MTE Silver** – Local Silica Sand Moulding for Aluminium Alloys and Copper Alloys Precision Casting (TSiS)
12. **MTE Bronze** – Fabrication of C-CU Composites via Powder Metallurgy Route for Electrical & Electronic Applications (C-CU Composites)
13. **ITEX Special Award Silver** – Best Booth Design
14. **Bio Asia Silver** – Ammonium Monitoring System for Sustainable Aquaculture Industry
15. **Bio Asia Bronze** – Bio Natural Gas (BioNG) Demo Plant

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