ANNUAL REPORT 2015

SIRIM

MAKING LIVES BETTER

ENABLING BUSINESSES. ENHANCING LIVES

Contents

Vision

A Premier Total Solution Provider
in Quality and Technology Innovation

Mission

As a Leader in Quality and
Technology Development, we:

Efficiently deliver customised technology and quality solutions to industry and 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

1 Datuk Mohd Nasir Ahmad
2 Tan Sri Dato' Dr. Mohamed Salleh Mohamed Yasin
3 Datuk Dr. Ir. Abdul Rahim Hj. Hashim
4 Tan Sri Dr. Ir. Ahmad Tajuddin Ali FASc. (Chairman)
5 Dato' Dr. Mohd Azhar Hj. Yahya
6 Dato' Dr. Zainal Abidin Mohd Yusof
7 Saji Raghavan
8 Dato' Dr. Ir. Andy Seo Kian Haw
9 Khalimatun Saadiah Mohd Khalid

Datuk Hjh. Jamaliah Kamis
(Chairman until 20 May 2015)

Dato' Dr. Md. Khir Abdul Rahman
(until 29 May 2015)

Dato' Syed Ahmad Idid Syed Abdullah Idid
(until 29 May 2015)

Ahmad Shahab Din
(until 1 July 2015)

Management Committee

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

Ir. Dr. Mohamad Jamil Sulaiman
Vice President
Research and Technology Innovation Division

Azim Ng Abdullah
Vice President
Technical Services Division

Haliza Ibrahim
Vice President
Corporate Division

Khalidah Mustafa
Managing Director
SIRIM QAS International Sdn. Bhd.

Chairman's Message

MAKING LIVES BETTER

Tan Sri Dr. Ir. Ahmad Tajuddin Ali FASc.
Chairman

It is indeed a privilege to be back on board as Chairman SIRIM since my last involvement as Director-General of the then Standards and Industrial Research Institute of Malaysia from 1989 to 1996 when it was repositioned as a corporate entity. Since then, SIRIM has grown from strength to strength and the more recent transformation and growth was overseen by my predecessor YBhg. Datuk Jamaliah Khamis. I thank her for her commitment and in particular, ensuring a successful re-start for me.

2015 marked the third year of implementation of SIRIM's Five-year Strategic Plan 2013-2017 – on our journey towards "Making Lives Better" for everyone. Focus was on the execution of three main strategies, namely on innovation, business expansion and restructuring, as well as productivity enhancement.

We continued to make strides in rebranding SIRIM Research as the technology partner for SMEs. Optimising current resources, SIRIM also explored the expansion of the businesses of its subsidiaries and the Technical Services Division by strengthening existing services, introducing new services, and operationalising new subsidiaries to

meet emerging needs and exploring new joint ventures, domestically and globally.

A greater emphasis was also set on motivating workforce towards greater productivity in ensuring that the best practices are implemented and adhered to within our own businesses. People management programmes were implemented to elevate capabilities, capacity and create a more productive working culture. Last but not least, an internal restructuring of sorts has been activated to shape SIRIM's future as a Holding company and enhance greater commercialisation and autonomy among our Strategic Business Units (SBUs) and subsidiaries.

We continued to make strides in rebranding SIRIM Research as the technology partner for SMEs.

In supporting the nation's growth target in 2015, SIRIM assisted: more than 8,000 companies and nine beneficiary communities. Assistance rendered covers a full spectrum of services from training and certification, to developmental and technology transfer projects and incubation centre services; as well as improving livelihoods though technology and training programmes.

2016 OUTLOOK AND FOCUS

Year 2016 marks the turning point for SIRIM Group, as it will be the beginning of the implementation of the Holding Company approach. The Holding Company approach sets a clear delineation of developmental and commercial activities. As Chairman, my key objectives are to steer the Group towards long term sustainability, accelerate business growth by empowering and facilitating SBUs, and improve productivity and efficiency.

We continue to innovate, and build capabilities and capacities in new growth areas, with the support of the Government to facilitate market access for companies.

We have a clear strategy on building pathways toward future, sustainable and long term growth. Business units with developmental mandates pursue national agenda to steer local SMEs towards competing globally.

SIRIM will also focus on continuing to deliver the SIRIM Fraunhofer Programme to increase productivity of small and medium enterprises (SMEs) as mandated by the government. We will continue to build upon this initiative, to enhance technology upgrading and penetration by SMEs to improve their productivity. Our thrust will be providing technological solutions and developing market-driven research.

We expect commercial units to deliver income growth and profit target for financial stability of the Group, especially since the restructuring of the staff retirement scheme incurs additional costs. The weaker economic situation will exacerbate our financial concerns. We will also explore expansion into international markets.

We continue to innovate, and build capabilities and capacities in new growth areas, with the support of the Government to facilitate market access for companies. New laboratories for accredited biocompatibility tests for medical devices, testing of brake system and components and testing of compressed natural gas pressure vessels are being set up.

We will also further our relationship with the states. This will be the role of our state representatives – the window to SIRIM for the states: Sabah, Sarawak, and five other states.

Seeing how far SIRIM has fulfilled its transformation agenda to date, I am confident that SIRIM has the resources, capabilities and drive to mark new milestones in pursuing the above-stated goals.

I thank the President and Group Chief Executive and the management team, as well as all SIRIM staff for ensuring a seamless implementation of SIRIM's five-year plan and for their sterling discipline and commitment in "Making Lives Better" for all stakeholders.

Tan Sri Dr. Ir. Ahmad Tajuddin Ali, FASc.
Chairman

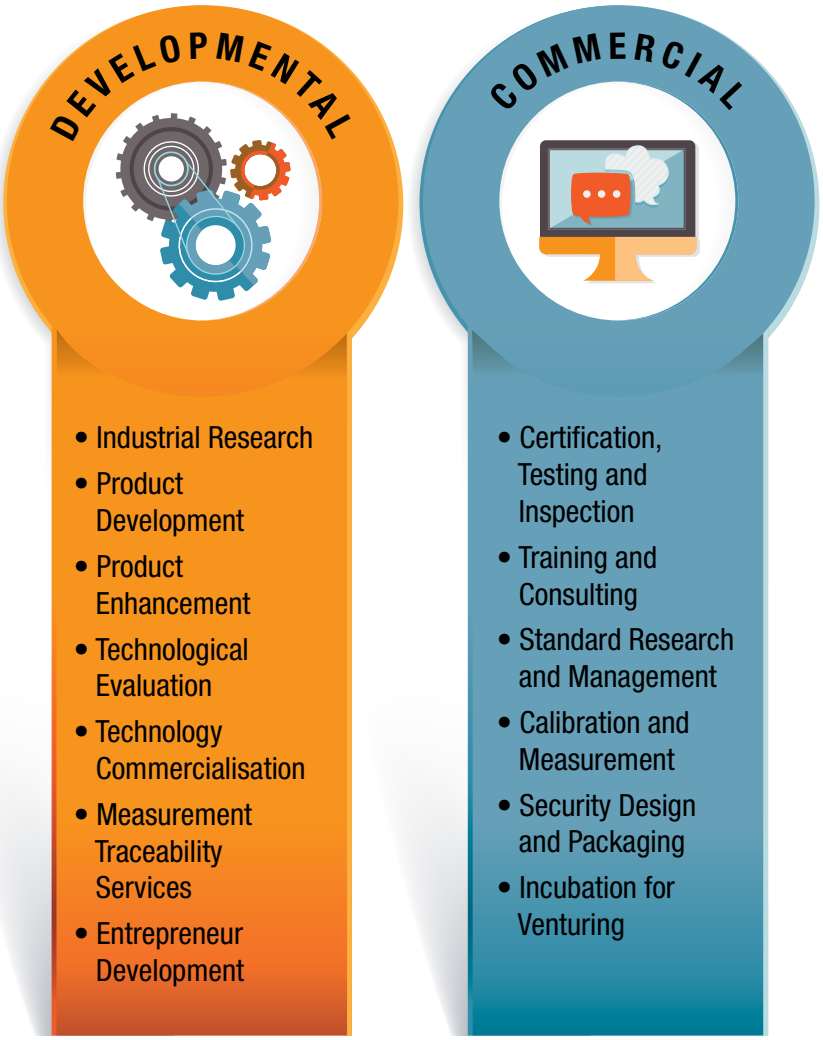
President & Chief Executive's Message

IT WAS A YEAR OF ACCOMPLISHMENTS WITH THE SIRIM GROUP GOING FULL SPEED AHEAD IN ITS EFFORTS TO RE-ENERGISE THE COUNTRY'S PREMIER RESEARCH ORGANISATION. SIRIM WILL HAVE TO TRANSFORM ITSELF FROM WORKING ON TECHNOLOGY-PUSH PROJECTS TO INDUSTRY-DRIVEN PROJECTS. THIS IS GAME CHANGING AND TO DO THIS, SIRIM WILL HAVE TO 'REVOLUTIONISE' THE WAY IT TRANSACTS BUSINESSES, INCLUDING PROCESSES, MIND-SETS AND COMPETENCIES.

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

2015 represented the fourth year of implementation for SIRIM's 5-year strategic plan (2013 – 2017). The main focus for the year was the operationalisation of a Holding Company approach whereby developmental and commercial activities are clearly delineated.

This has led to changes in SIRIM's corporate structure whereby concerted efforts were made to catalyse a culture of innovation among our workforce and a more dynamic focus on commercialisation, which led to the introduction of a new subsidiary, SIRIM Tech Ventures, during the year.

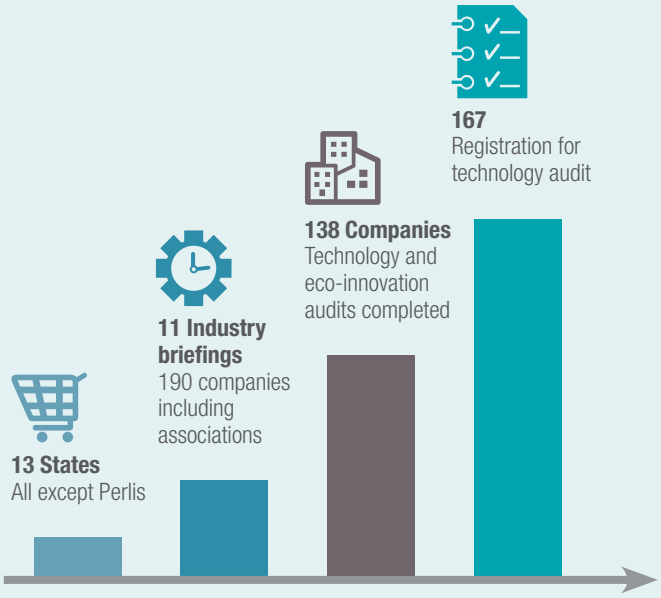


ADVANCING THE SIRIM FRAUNHOFER PROGRAMME

The government continues to provide strong support to SIRIM to deliver on its mandated roles, especially towards increasing the productivity of SMEs through the SIRIM Fraunhofer Programme, a collaboration between SIRIM Berhad and Fraunhofer IAO of Germany established in December 2014. This mandate has been stated as part of the Eleventh Malaysia Plan for 2016-2020 whereby SIRIM Fraunhofer is given the responsibility to act as an intermediary in encouraging small medium entreprises (SMEs) to innovate and improve their market competititiveness and productivity.

In 2015, the SIRIM Fraunhofer Programme kicked off its first collaborative effort with a Technology Audit programme to asses companies in terms of their technology management capabilities and capacities to improve productivity and competitiveness. A total of 150 SMEs were audited in 2015, encompassing 16 industry sectors such as food and beverages, automotive, electrical and electronics, engineering services and oil and gas. In addition, 11 industry briefings for 190 companies and associations were carried out across 13 states.

TECHNOLOGY AUDIT PROGRAMME 2015



We intend to continue our collaboration with Fraunhofer Institute and work towards reaching to 170 companies in our 2016 Technology Audit Programme.

DRIVING RESEARCH AND TECHNOLOGY INNOVATION

SIRIM's Research, Technology and Innovation (RTI) Division has been undertaking more applied research and technology projects in effort to reposition their activities to meet the needs of small and medium-sized enterprises (SME) and the industry. These continue to be focused on three main flagship focus areas: Energy and Environment, Plant and Machinery and Medical Technology Flagship. Besides collaborating with various research platforms to meet industry needs, we are increasing our efficiency in providing technology and services as a total solution to SMEs through our eight technology centres.

In 2015, 12 research projects in various areas of industrial biotechnology were funded under the various Ministry of Science, Technology & Innovation (MOSTI) and Ministry of Higher Education (MOHE) grants. A total of 11 cosmetics products developed by the researchers were successfully commercialised to local cosmetic entrepreneurs. Meanwhile, SIRIM also successfully commercialised six technologies which include deep wound, surface wound, Innocraft, SIRIM Karbon Kalkulator, BioNG and Pressure Vessel Cylinder. In addition, seven more technologies were developed in 2015, namely Chyto Sponge, SimbionteA, Measurement of oxygen transfer in clean water, Environmentally-Design Benchmark Tool, Toxicity Potential and Control of Engineered Nanomaterials, Recombinant Yeast Expression System and Bilayered 45S5 Bioglass.

Healthy progress is being made in SIRIM's Bio-Natural Gas (BioNG) ventures and we are currently in consultation and collaboration with Sime Darby Berhad to create the BioNG industry as a new bio-economic sector. Having established a demo plant in Sabah, we are now venturing towards supporting 30% of electricity demand in Sabah by 2017 and optimising transport applications.

During the year, SIRIM also assisted MOSTI in leading the Eco-Innovation initiative in offering economic and environmental benefits to local SMEs. An International Forum on Eco-innovation was organised on 19-20 November 2015 and it is the result of a collaboration between MOSTI, SIRIM and the United Nations Environment Programme (UNEP).

6 TECHNOLOGIES COMMERCIALISED

1. Deep wound
2. Surface wound
3. Innocraft
4. SIRIM Karbon Kalkulator
5. BioNG
6. Pressure Vessel Cylinder

8 TECHNOLOGIES DEVELOPED

1. Chyto Sponge
2. SIRIM Karbon Kalkulator
3. SimbionteA
4. Measurement of oxygen transfer in clean water
5. Environmentally-Design Benchmark Tool
6. Toxicity Potential and Control of Engineered Nanomaterials
7. Recombinant yeast expression system
8. Bilayered 45S5 Bioglass

In addition, SIRIM worked together with Majlis Perbandaran Subang Jaya for an alternative "green" solution to treat food waste generated from household and eateries located in the Taman Bukit Puchong, known as SimbionteA. Based on current productivity rates, SimbionteA shall be able to supply continuous energy to generate 5 kW of electricity.

A major rebranding effort was initiated in the year reviewed where the Research and Technology Division was rebranded to SIRIM Industrial Research. Under the exercise, technology adoption and adaptation will also be used to boost the commercialisation of technology and improve the productivity of SMEs through the SME Technology Penetration and Upgrading programme. Towards this end, a committee of internal and external experts from the industry and academia has been established to ensure their research proposals meet the relevant demand-driven criteria and have high potential for commercialisation to secure funding.

CONTRIBUTING TO INTERNATIONAL RESEARCH

SIRIM is also strengthening its prominence in technology research internationally through WAITRO (World Association of Industrial and Technological Research Organisations), GRA (Global Research Alliance) and other research institutes.

In 2015, we delivered an European Commission funded project under the SWITCHAsia Programme initiating the first Malaysian's product environmental footprinting to the local building materials manufacturing industries. The project, Environmental Declaration Scheme for Construction and Building Materials (MySuBuMa) implemented in the late 2012 until 2015 aimed to contribute towards the growth of a sustainable building materials and products in Malaysia. Thirty companies have been the direct beneficiaries through this exercise of the carbon footprinting (CFP) pilot programme and the CFP measurement toolkit, SIRIM Karbon Kalkulator was created.

LEADING THE WAY IN QUALITY

Four new SIRIM Industry Standards were developed for the Malaysian Palm Oil Council (MPOC), Perumahan Rakyat 1 Malaysia (PRIMA), Malaysia Automotive Institute (MAI) and Jabatan Penjara Malaysia. These were:

- Malaysian Sustainability Palm Oil Standard for MPOC
- Standard for PRIMA Homes for PRIMA
- Standard for 4R (Repair, Reuse, Recycle & Remanufacture) of vehicles and 2S (Sales and services) of workshops for the Malaysia Automotive Institute
- Standard for MYPRIDE products for Jabatan Penjara Malaysia

Meanwhile, new certification schemes have also been introduced by SIRIM QAS International Sdn Bhd for Asset Management and Product Carbon Foot Print; and the NANOVerify Programme. The Asset Management Certification provides certification against ISO 55001:2014 – Requirements for establishing, implementing, maintaining and improving a "management system for asset management"; while the Product Carbon Foot Print Certification supports the overall goal of environmental labels and declarations to encourage demand and supply of products (including services) that cause less stress on the environment, in particular emissions of greenhouse gases. The NANOVerify Programme is a voluntary certification programme for processes and products with claims of nano-elements in the range of 1 to 100nm. This programme was developed for NanoMalaysia Sdn. Bhd. and operated jointly by both NanoMalaysia and SIRIM QAS International Sdn. Bhd.

To continuously maintain public confidence in SIRIM Product Certification Scheme, SIRIM QAS International has fully implemented new SIRIM labels in June 2015 for the following certified regulated products: electrical appliances, motorcyclist safety helmets, seat belts for motorists and fire protection equipment.

TRANSFORMING OUR CULTURE

As part of SIRIM's Organisational Transformation efforts, SIRIM's Group Human Resource Department (GHRD) has continuously focused on uplifting our workforce which totalled 2,217 on 31 December 2015, after welcoming 89 new members during the course of the year. Programmes for SIRIM Shared Values were continually conducted to inculcate a culture of innovation culture, as part of our drive towards increased innovation as well as in making SIRIM Berhad a great place to work.

In order to ensure our staff are at the forefront of technological innovation, we have spent about RM0.4 million on staff training and development programmes in 2015. In enhancing competencies, 57 development programmes were held for 2,183 employees, while 195 employees were sent for a Functional Training programme related to SIRIM's business. In tandem with SIRIM's Technology Flagship, GHRD has engaged experts in Biomedical Materials and Metrology from the University College of London, University and the National Metrology Institute of Japan, respectively. These experts have been coopted to expedite the transfer of technologies to SIRIM Berhad. In addition, six SIRIM employees have been sent for attachment programmes in China, South Africa and Australia to nurture capabilities and expertise.

In line with the Group's strategy to strengthen the brand, a new SIRIM Corporate Values were introduced. The new values to be instilled among the staff strives to deliver the best to our internal and external customers by being Customer-focus, and emphasizes on Integrity and Teamwork.

AWARDS & ACHIEVEMENTS

At ITEX and MTE 2015, SIRIM technologies continued to be recognised and honoured. 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.

All these achievements pave SIRIM's journey onwards as we continue to advance towards our goal of becoming the nation's premier solutions provider in quality and technology innovation.

ITEX 2015 (GOLD)

1. Application of Potassium Carbonate as Space Holder for Metal Injection Molding Process of Open Pore Copper Foam
2. Quantum Dots Biosensor for Uric Acid Detection
3. Solaerator® for Sustainable Fish Farming
4. SIRIM Karbon Kalkulator: Environmental Declaration Scheme for Construction and Building Materials

ITEX 2015 (SILVER)

1. Optical biosensor reader for ammonium detection
2. Temperature Self-compensated Dissolved Oxygen Fiber Optic Sensor
3. Lanthanide Based Phosphors For White LED Encapsulation Material
4. Hollow Shape Ceramic Products Produced By Advanced Method of Integrated Slip Rotary Moulding
5. Development of Highly Durable Optrode Ammonium Sensor Based on Fluorescent Nanosphere for Aquacultural Conditioned Water

MTE 2015

GOLD AWARD

1. Fabrication of Hollow Ceramic Product by Advanced Technique of Integrated Slip Rotary Moulding (Special Award)
2. Wireless Optical Bio Sensor Reader for Ammonium Detection
3. Seaweed Based Bio-actives Cosmeceutical (Special Award)

SILVER AWARD

1. Fabrication of Open Pore Cell Copper Foam Via Metal Injection Molding Technique for Led Heat Sink Application

BRONZE AWARD

1. Simple, Fast Efficient Method to Authenticate Edible Bird Nest

MOVING FORWARD

2016 has been designated the Malaysian Year of Commercialisation of Technology and is thus set to be a busy year for SIRIM. For 2016, SIRIM will focus on expanding our engagement with the public and ensure potential business players know and understand our industry better. Only then can we better empower the productivity and efficiency of SMEs. This will call for SIRIM to continue undertaking key initiatives to rebrand SIRIM Industrial Research. More effort will also be placed on supporting the development of regional enterprises as well as joint organisation of conferences, workshops and seminars.

Several strategies have been identified to leverage on opportunities emerging in 2016. These include stimulating industry-led growth through collaborative efforts; providing industry-led training programmes to bridge the gap in the supply of quality local talent; adopting life cycle assessment to reduce use of raw materials and catalyse development of the remanufacturing industry; raising income generation potential by supporting entrepreneurship development programmes, enhancing demand-driven research via partnerships to solve specific problems within stipulated time and lower cost; and finally to promote Intellectual Property Rights (IPR) sharing and protection towards strengthening collaborative efforts with manufacturers.

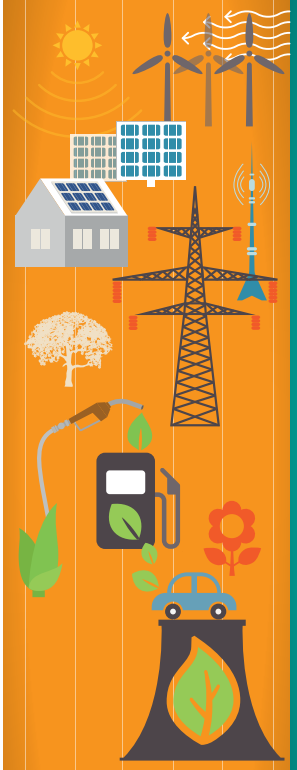
The execution of these strategies will be fuelled by the capabilities and commitment of our people. In line with the needs of the future, SIRIM will continue to emphasise on employee learning, development and welfare of our workforce, recognising that people are the greatest assets when it comes to achieving organisational performance and success.

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

SIRIM Flagships

ENERGY & ENVIRONMENT

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

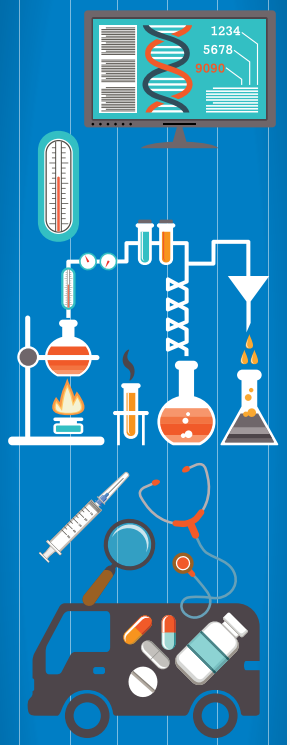


PLANT & MACHINERY

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

MEDICAL TECHNOLOGY

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



Energy & Environment Flagship

SIRIM's **Energy and Environment Flagship** (EEF) continues to focus on four core areas of sustainable technology namely Energy Generation, Energy Storage, Eco Product Development and Environmental Technologies.

In 2015, **EEF** had a portfolio of research and development projects worth about RM30 million anchored by over RM15 million worth of secured funding under the following DSTIN projects:

1. MYLIPOS for stationary High Power Energy Storage Applications
2. Sustainable Water Consumption Through Water Footprinting and Water Risk Management
3. Local proprietary Formulation of Polyacrylonitrile for Carbon Fiber Lightweight Tanks and Components

As of end December 2015, 20 Science Fund projects worth around RM4.5 million have been successfully completed and several potential projects have been identified for further pre-commercialisation activities.

In the area of eco product development, **EEF** made substantial progress in the research area of creating high value sustainable biobased chemicals from lignocellulosic biomass resources such as agro wastes and residues through genetic engineering of microbial strains to produce high purity bio-chemicals. **EEF** has also initiated research in the area of biobased polymers such as nano crystalline cellulose produced from lignocellulosic biomass and its many applications, and more recently looking into graphene and its industrial applications in energy and environmental sector.

Another significant achievement is the EU SWITCH-Asia Project on "Environmental Declaration Scheme for Construction and Building Materials" which successfully conducted five nationwide seminars to disseminate the Carbon Footprint Labelling and Certification scheme. Successes and lessons learnt from the Carbon Footprint certified companies in the pilot project were presented during these sessions in promoting the road towards sustainable consumption and production.

Plant & Machinery Flagship

The strategic objective of SIRIM's **Plant and Machinery Flagship** (PMF) is to focus on activities relevant to national priorities. In 2015, **PMF** played a key role to plan, coordinate and implement activities under the SIRIM-Fraunhofer programme while propelling the technical activities of SIRIM technology centres to be relevant to the needs of industries, especially the SMEs.

Together with our partner, Fraunhofer IAO of Germany, the team developed a Technology Audit programme which is the key programme in SIRIM's Industrial Innovation Model. Technology Audit is an assessment of a company in terms of its technology management capability and capacity that provides the company with an understanding of its strengths and weaknesses as well as potential areas for improvement in managing technology to improve productivity and competitiveness. About 80 technical staff from SIRIM were trained by Fraunhofer to be the auditors.

A total of 150 SMEs were audited in 2015, covering all 14 states in Malaysia and encompassing 16 industry sectors such as food and beverage, automotive, electrical and electronics, engineering services and oil and gas. In order to attract the participation of SMEs, 11 briefing sessions were held for these industries in various states. From the initial assessment of the audit results of 50 companies, 37 companies were identified and recommended to participate in the Technology Upgrading programme, which covers areas such as implementation of automation and mechanisation, energy efficiency, and upgrading of knowledge and skill in technology management. The technology upgrading programme will be implemented by relevant technology centres of SIRIM and if necessary, with relevant partners from local and overseas universities and research institutes. The outputs and outcome of the technology upgrading programme on SMEs that undergo Technology Audit will be monitored by SIRIM and the Malaysia Productivity Corporation.

PMF has also played an important role in planning for the implementation of another national initiative anchored by MITI and MIDA – the Automation Capital Allowance (A-CA). It has established the criteria and mechanism for the verification of machines and equipment applied under the A-CA scheme. In late 2015, PMF received about 30 enquiries on A-CA from companies and conducted one verification. The participation of this programme from eligible companies is expected to increase significantly beginning early 2016.

In order to synergise the technical capabilities in related focus areas, **PMF** has undertaken few engagement programmes with companies, universities and research institutes. In 2015, meetings and technical discussions were held with three universities, three companies and a research institute. **PMF** was invited by Agensi Nuklear Malaysia to prepare a proposal for a collaborative research and development project funded by the Newton-Ungku Omar fund under Innovate UK, together with partners from United Kingdom. Several discussions were also organised with companies on the possibility of forming a consortium to serve the Jobbing and Engineering services and for setting up of a Petroleum One Stop Centre.

Medical Technology Flagship

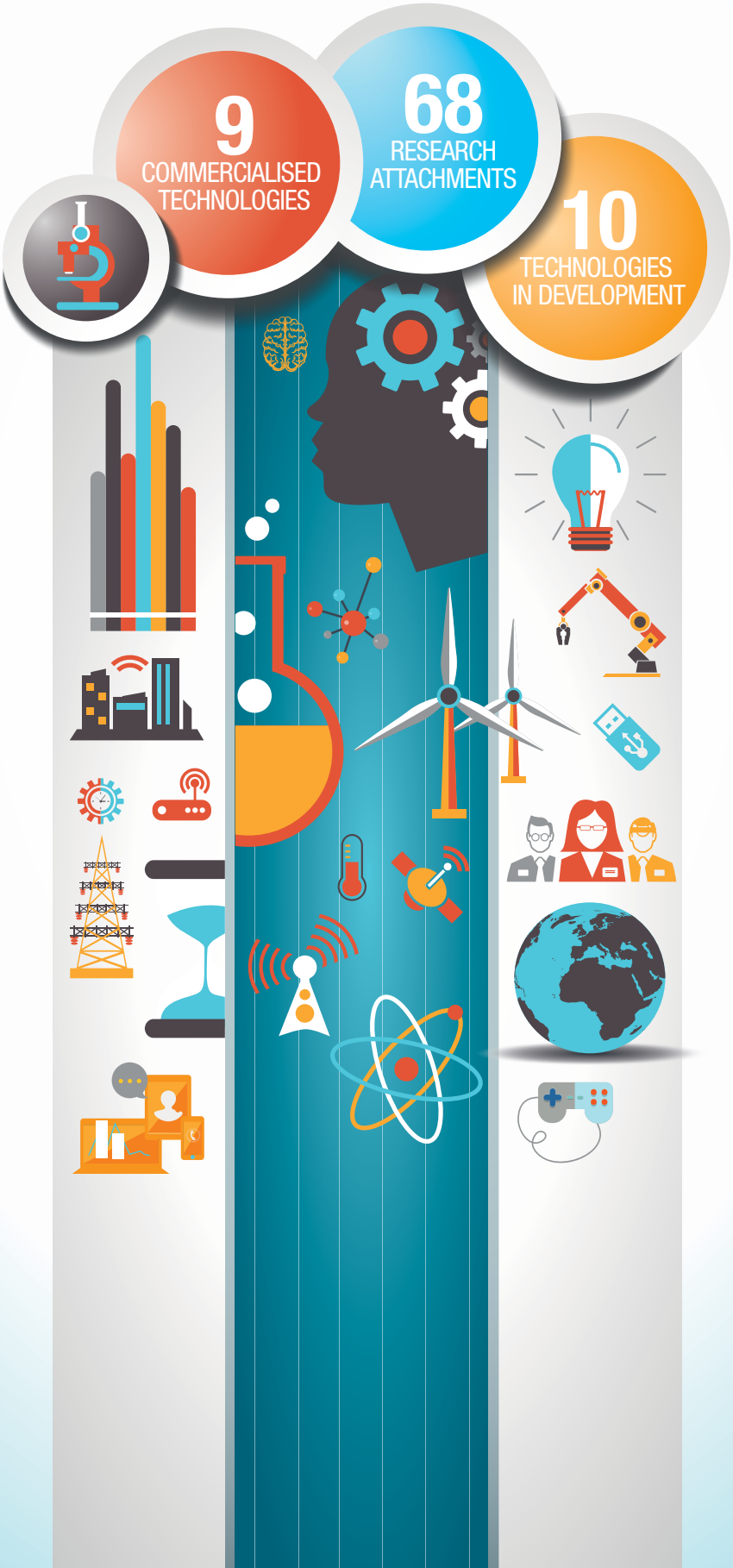
In 2015, SIRIM's **Medical Technology Flagship** (MTF) maintained its research focus on the areas of implant/prosthesis, delivery system and medical equipment. Services offered in the area of craniofacial and maxillofacial biomodelling, cytotoxicity and biocompatibility testing, and materials characterisation were well received and led to improved business performance for **MTF** during the year.

In the customised craniofacial and maxillofacial services provided to hospitals, the financial achievement recorded was much more than the targeted value, with 14 cases recorded for the year – more than double compared to only five cases in 2014. Significant contributions in supporting the implementation of the Medical Devices Act 737 (2012) were also observed. The ISO 17025 Certified Cytotoxicity and biocompatibility facilities available at the Industrial Biotechnology Research Centre (IBRC) served a total of 85 companies in year 2015 and most of the services came from 64 new customers.

To further enhance its laboratory capabilities in conducting testing services for medical devices, SIRIM is in the process of upgrading its existing laboratory facilities both at Shah Alam and Kulim to expand the scope under ISO 10993 certification which includes biocompatibility, microbiological, physical-chemical characterisation, morphology and degradation of medical devices.

A total of 16 R&D projects were implemented under **MTF** in year 2015 including three newly approved projects, all under the medical equipment research focus. The total secured grant for the three new approved projects was approximately RM5.3 million. The titles of the projects are "An Integrated Microfluidic System for Rapid Diagnostic of Dengue Virus Infection", "Fabrication of Prototype Home Care Biosensor for Uric Acid Detection" and "Development of Robots for Assisted Recovery and Rehabilitation."

Research And Technology Innovation



Research and Technology Innovation

Automotive Development Centre

2015 has been an interesting year for SIRIM's Automotive Development Centre (ADC) as two MOSTI-funded projects worth a total of RM735,000 were approved. This together with the delivery of RM159,450 worth of statutory projects and another sub-project worth RM158,000 from the RM10.0 million DSTIN BioNG Flagship Programme kept the centre busy for the year.

Commercial projects, which were mainly from the Advisory and Consultancy category, however met only 44% (RM21,908) of the business target of RM50,000. The difficulty in securing commercial jobs during the year was impounded by the drastic drop in fuel prices, as the mainstream commercial revenue of **ADC** had been fuel efficiency and on-the-road vehicle performance utilising **ADC** expertise in vehicle data logging using state-of-the-art LMS DAQ 32-channel instrumentation. Nevertheless, one year's loss has become another year's gain and an additional RM80,000 worth of jobs has been quoted with a good chance of being converted into Order Book for delivery in 2016.

An Asean-level technical consultancy project for the Department of Science and Technology (DOST) and Metals Industry Research and Development Centre (MIRDC) of Philippines on Modal Analysis of Vehicle Exhaust System was conducted within the facilities of SIRIM's Bukit Jalil Complex, Kuala Lumpur, Malaysia on the 3 March 2015. **ADC**'s expertise which was previously gained from implementing an OE development project with AISB; a Tier-1 exhaust system supplier for PROTON; was put to good use during this training seminar.

The three MOSTI-funded projects and the sub-project from the BioNG Flagship Programme, which will be implemented into 2016 are;

1. **Developing Hybrid Electric and BioNG Scooter as a 2-Wheeler Vehicle for Urban Mobility** – worth RM650,000 with a delivery period of 18 months
2. **Establishing Design Requirements for Engine Control Unit Mapping for Long-Term Performance of Dual Fuel (Biogas/ Diesel) Engine for Mobile Applications** – worth RM85,000 with a delivery period of 18 month.
3. **Boosting Bio-Natural Gas (BioNG) Utilisation For Energy Security** – an inter-Technology Centres collaborative project worth RM10,847,060. ADC's project delivery portion is worth RM158,000 and will extend into 2016.

ADC also assisted the RTI Division in meeting its national mandate to deliver 150 Technology Audits under the SIRIM Industrial Innovation Model, an offshoot from the Prime Minister of Malaysia's 2015 Budget Speech. **ADC** assisted and undertook the technology audits of six companies under the SIRIM Fraunhofer Technology Audit Programme. The companies audited were;

a. Valiant Advance Technology Sdn. Bhd.
b. Dasar Jati Sdn.Bhd. (Automation Division)
c. Power Booster Engineering & Maintenance Sdn. Bhd.
d. Intotest Sdn Bhd
e. Hyrax Oil Sdn Bhd
f. Micro-Nano Precision Sdn. Bhd.

The audits conducted have the possibility of being translated into possible collaborative developmental and productivity improvement projects. Two projects have been identified with Dasar Jati Sdn. Bhd. (Automation Division), an engineering system integrator company, while PROTON continues to be **ADC**'s main engine test bed testing and maintenance client. The projects are expected to be jointly tabled in 2016.

ADC also delivered its statutory responsibility in activities pertinent to nation building, in relation to the development and betterment of Industrial R&D-related Value Chain through continued engagement with stakeholders; consultancy to SME Automotive Companies; Implementation and Delivery of MOSTI Techno Fund and DSTIN projects; and the preparation of three research proposals for MOSTI's disaster management programmes. These are:

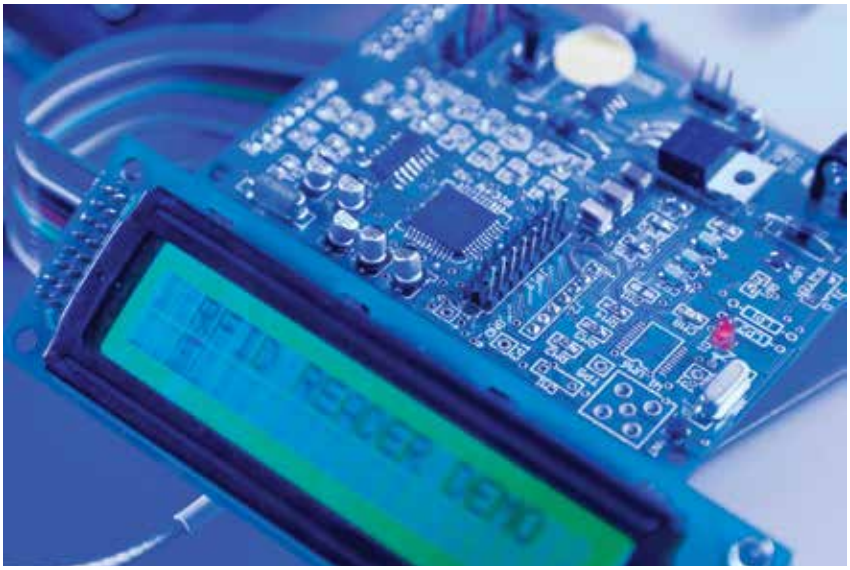
1. **Programme 3b: Appropriate Technologies For Disaster Mitigation And Management:**
   1.1. Project 3: Robust Lightweight On-Board Multi-Fuel Generator System For Emergency Utility Supply
2. **Programme 3c: Eco-Innovation For Sustainable Manufacturing**
   2.1. Project 1: Modelling of Closed-Loop Production Systems of Several SME-Manufacturing Sectors
   2.2. Project 2: Development of Sustainable Manufacturing Indicators and Product Assessment Methodology for Target Manufacturing Sectors

The outcome of the above proposals however is pending decision from MOSTI. Nevertheless, the experience gained in the preparation and participation in the above programmes has provided valuable learning opportunities for the relatively young workforce in **ADC**.

Research and Technology Innovation

System Design Centre

Year 2015 was another tough and challenging year for SIRIM's System Design Centre (SDC) which comprises three highly active sections namely Intelligence System and RFID Section (ISRS), Industrial Automation and Robotics Section and Plant Design Section (PDS). SDC was actively involved in both commercial and research activities through collaboration with various government agencies, industries and communities to provide engineering services, system, automation and IT solutions in order to increase productivity and fulfil market needs.



With a total of 35 engineers and researchers, **SDC** delivered many commercial and research projects, while also participating in commercialisation activities.

SDC successfully achieved its 2015 commercial target, however it fell short of its research and development (R&D) target due to unforeseen challenges in technical and project management of various R&D projects, especially the BioNG coordinated by the E&E Flagship.

Commercial projects for the year included the following:

i. The successful development of Electronic Meeting (e-Mesyuarat) in ISO9001:2008 for ANGKASA to effectively help in managing daily meetings in its business.
ii. The development of identification and traceability systems for RFID applications, such as the Seed Production Integrated Tracking System (SPITS) for Felda Agricultural System Sdn Bhd.
iii. Conducting training and consultancies on Embedded System and online marketing to train trainers (TOT), lecturers and engineers from MOSTI Innospace Programme and Institut Kemahiran Belia Negara; in order to raise the standards of knowledge of human capital.
iv. Assisting SMEs such as Koperasi through Groom BIG and actively participating in yearly events such as SDSI and Konvensyen of GroomBig, as part of its collaboration with MITI and SKM.
v. Involvement in the SIRIM Carbon Calculator Project in collaboration with ETRC and Carbon Trust under the EU-Switch Asia project.

vi. The successfull installation of the Solaerator® for the community at Tasik Shah Alam to harness renewable energy for a more sustainable and conducive environment.

vii. The successful completion and delivery of one unit of Integrated Vegetable and fruit processor.

To increase future capability planning linked to research and impact strategies, **SDC** experts have actively produced and submitted quality research and development proposals for DSTIN, Special Fund and Research Grants throughout the year. Through ISRS, **SDC** has collaborated with universities, industry and research institutions and together we have successfully secured one project under FLAGSHIP DSTIN PROGRAMME worth RM13.4 million titled "Building Our Robotic Competitiveness in Medical and Healthcare". In addition, **SDC** has also secured three R&D projects amounting to RM1.3 million to develop prototypes in aquaculture and service areas. These projects are funded by MOSTI under the Special Fund.

Since early June 2015, several series of MOSTI Workshop on Robotic Technology Advancement in collaboration with SIRIM and Malaysia Robotics and Automation Society have been conducted at SIRIM Bukit Jalil and Langkawi for the following purposes:

- To frame the User Requirements (from Market) for the Robotics Technology Development Projects under MOSTI Robotics Roadmap 2020
- To define the Strategic Robotics Project Specifications in terms of Scope, Time And Resource
- To establish Key Milestones for the Strategic Projects from Prototyping to Field Testing
- To establish the Human Capital Development Supply Chain for Robotics and Automation

The robotic technology and applications focus on six main sectors and market areas including Agriculture, Oil & Gas, SME/Industry, Medical/Healthcare, Edutainment and Defence.

In order to find the gaps in robotic technology, human capital and standards adoption, **SDC** through ISRS had successfully conducted a NPS project under MOSTI and produce a IC-Innovation Portal for information dissemination and sharing. Another NPS conducted is in the area of Recirculating Aquaculture System in collaboration with SIRIM's E&E Flagship.

It was a year of achievement as **SDC** won several awards during its participation at the ITEX and MTE 2015, MOSTI Commercialisation Conference & Exhibition (MCCE) and National Innovation Conference and Exhibition (NICE) 2015. These included the Gold Medal for Solaerator® for Sustainable Fish Farming and the SIRIM Karbon Kalkulator: Environmental Declaration Scheme for Construction and Building Materials; Silver and Bronze for Optical biosensor reader for ammonium detection and silver medal for the Rotary Oven project. This help drive **SDC**'s pursuit of greater product commercialisation for SIRIM.

SDC also gained Intellectual Properties rights under MyIPO for the Wireless Optical Biosensor Reader for Ammonium detection, SIRIM KK Trademark and Copyright and a patent for the Integrated Vegetable and Fruit Processor. On the publication front, **SDC** published the 'Journal of Theoretical and Applied Information Technology', submitted a paper on 'Optical Biosensor Reader for Detecting Ammonium' for review to JIT of SIRIM in June 2015, and another paper on RMK11 has also been presented to MOSTI entitled "Enhancing Laboratory, Workshop and Pilot Facilities: Development of High Impact Values SMEs Industry In Robotics & Industrial Automation through the establishment of Industrial Centre of Innovation for National Robotics (IC-I NR)".

During the year under review, **SDC** also contributed towards the success of re-certification of ISO9001:2008 on the scope of Provision of Commercial Contract Development and Engineering Services in the area of Advanced Manufacturing and received a consolation award for Presiden, ICC and Sijil Penyertaan ISO 9001 under the CQOSHE event. Furthermore, 15 **SDC** experts have qualified to become Technology Auditors under the Fraunhofer and SIRIM programme. All auditors had actively participated in all activities and discussions of SIRIM Industrial Innovation Model and conducted Technology Audits mandated upon SIRIM by the Government for Local Industries to help them move up the value chain.

SDC recognises the importance of staff skills and competency. Thus, two staff have also been trained under the Innovation Programme by Fraunhofer IAO and IC-Innovation programme, while four staff were sent for technology training to South Africa to gain knowledge and experience in Armoured Vehicle Technology for Military application. Staff have also been trained to increase their competency and capabilities in the areas of android application, embedded technology and software application.

Research and Technology Innovation

Machinery Technology Centre

The Machinery Technology Centre (MTC) was established in 2014, and comprises the Foundry Technology Section, Tooling Technology Section and Machine Design Section. With a total capacity of 62 staff, MTC generated commercial income of RM877 thousand in 2015, contributed by 75 job services, five projects, six socio-economic projects and three MSI projects.

During the year under review, **MTC** provided S&T services to 12 new customers and developed the following six prototypes:

1) Design & Development of 2 in 1 Thermoforming System for Solid Surface and Thermoplastic Materials
2) Production System for Pastry Tart
3) Processing of Fish Ball
4) Ablution Water Reuse System and Rainwater Harvesting
5) Design and Construction of Plastic Injection Mould for Braille Chess Set Demands For Blind People
6) Mechanisation of Kuih Bahulu Bengkulu Production Process

MTC's Foundry Technology Section (FTS) was the sub-implementer in the project 'Fabrication of Johor's crest reef shaping technology' led by SIRIM's Advanced Material Research Centre (AMREC). FTS took part in the fabrication of the moulds. The 13 tonnes of artificial coral reef made for Ibrahim Sultan Polytechnic in the form of the Johor state's coat of arms, was installed at Taman Dasar Laut Sultan Iskandar. FTS also managed to secure a MSI project entitled 'Improving the Capability of Manufacturing Palm Harvesting Sickles' that was intended to upgrade the conventional techniques used by the blacksmithing community of Pekan Darat, Seberang Perai Utara in the making of palm oil harvesting sickle. This project started in September 2015 and is due to end in March 2016.

The year also saw **MTC** participating in networking sessions on Technology Audits. In all, **MTC** visited over 30 companies for the audits. Other **MTC** achievements for the year 2015 included the achievement of Best Kaizen Award for Oxy-Acetylene Cutting Working Table, and being recognised as ICC Winner for Part P2-30A Cutting. **MTC** also filed the following three patents in 2015:

1) An Integrated Thermoforming Machine (7 Sept 2015): P12015703006
2) A Planar Waveguide Dicing Machine (16 Oct 2015): P12015703711
3) Malaysia Industrial Design 'Dicing Machine': DF2015-080002

Moving ahead, **MTC** is now involved in the research and development for the manufacture of Malaysian-made pumps for oil and gas applications after SIRIM signed an MOU with PROEIGHT Sdn. Bhd. on 19 March 2015.

Research and Technology Innovation

Renewable Energy Research Centre

In 2015, The Renewable Energy Research Centre (RERC) achieved major milestones in Research and Development, International Funded projects GEF/UNIDO, Consulting Services in Energy Efficiency and Solar Thermal and various Government Funded projects for SME and Communities.

1. Malaysian first Bio-Natural Gas (BioNG) Demonstration Plant

Following the successful TechnoFund pilot project that raw biogas produced by anaerobic digestion (AD) can be converted to a gaseous fuel such as natural gas BioNG, SIRIM started an innovative project to turn palm oil mill effluent (POME) into a sustainable fuel to power diesel engines such as pickup trucks, agro-vehicles and static engines. This project aimed at producing compressed BioNG that has a methane content of more than 96% and to infiltrate the local market with BioNG beyond 2016. The project Investment cost was around RM10 million, with anticipated test runs commencing middle of 2016. This project was funded by MOSTI under Dasar Sains Teknologi and Inovasi Negara (DSTIN) funding scheme. The project has started its construction of BioNG plant, located along kM 25 Jalan Kalabakan-Tawau in Kilang Kelapa Sawit Merotai in Tawau Sabah. The overall capacity of The BioNG plant will have daily production of 200mmbtu per day, or 5000 liter diesel equivalent per day could fill 400 pickup trucks or 25 transportation trucks. Partial of BioNG will be used internally and the balance will be sent to nearby diesel power plant.

2. GEF/UNIDO National project

As a leading agency of GEF/UNIDO National project on GHG Emissions Reduction in the targeted subsectors through the energy efficiency (EE) and application of solar thermal system, SIRIM has been tasked to provide direct technical support to around 40 plants of the selected sub-sectors to improve their EE through process optimisation and the use of solar thermal technology.

In March and April 2015, the **RERC** together with its Project Management Units, conducted numerous factory visits. The purpose of the visits were to identify suitable, committed and potential companies to participate in the National Project. Only selected companies will

go through subsequent energy audits to identify potential energy efficiency improvement measures and possibilities of application for the solar thermal system.

Visit to Ayam Ory Perak

In November and December 2015, a team from **RERC** successfully conducted energy audits for two companies, PPNJ poultry and Felda Johore Bulker, which had earlier signed agreements to participate in the project. These energy audits were carried out to assess and determine how efficient energy being consumed, to identify energy and cost saving opportunities and to highlight related potential process and productivity improvements. The data was collected through interviews with the manager and employees of the company, review of company records, processes and site investigation.

PMU and RERC visit to PPNJ Poultry in Macap

First visit and briefing at Felda Johore Bulkers Pasir Gudang

3. Project Management of Sustainable Energy and Energy Audit Review for Petaling Jaya City Council (MBPJ)

RERC was also appointed as a consultant to implement a project on sustainable Energy Management System and Energy Audit Review for Majlis Bandaraya Petaling Jaya (MBPJ). The project spanned seven months from Oct 2014 until May 2015. A certified training program to MPBJ Officials in Sustainable Energy Management System in accordance with ASEAN Energy Management Scheme (AEMAS) formed a part of the project. The training focused on setting up a sustainable energy management system, as well as planning, executing and monitoring various energy related activities throughout the organisation. In a separate exercise of energy review, **RERC** successfully implemented an energy audit and provided measures for improvement and recommendations based on the audit findings. Based on various implemented measures and recommendations, MBPJ managed to reduce the total energy consumption, in kWh for central air-conditioning, air-conditioning split units (ASCU) and total lighting by 2%. The project ended with an awareness seminar on Energy Management System ISO 50001 for MBPJ staff which took place at Hotel Dorsett Subang Jaya from 5-6 March 2015.

Onsite Energy Measurement & Seminar

4. Demonstration Project for the Implementation of Cleaner Production Practices in Jabi Rice Mill

In another commercial project funded by Department of Environment (DOE), Renewable Energy Research Centre was appointed as a consultant to carry out audit and implement Cleaner Production (CP) on SMEs in order to improve compliance with the Environmental Quality Act 1974 (EQA 1974). CP provides many benefits to the industry in terms of fuel savings, waste reduction, increased productivity and increased competitiveness. Similarly, consumers and the environment are also safeguarded by the implementation of CP. The main objective of this demonstration project was to set a benchmark to other rice millers in Malaysia in Cleaner Productions Practices. This project has successfully identified a total of 94 options Green Industry Practices for all categories. Some of these options have been exercised by the factory with help and guidance from the DOE and SIRIM's **RERC**. Among the options that have been implemented include training and implementation of 5S practices, training, workplace safety and health, the use of personal protective equipment (PPE), translucent wall installation, repair husk silo and piping system and lastly the installation of new and high technology machine which include the Paddy Pre cleaner, Husk Separator and Auto Huller.

The results of the effectiveness of this project can also be combined with a reduction of approximately 18,415 kWh / month which is equivalent to a reduction in carbon emissions by 12.7 tons of carbon dioxide a month. This is equivalent to 152 tons of carbon dioxide not released for a year. The achievement of the project resulted in the followings:

- Reduction of CO2 emissions of 152 tons a year
- Avoid burning 29.5 barrels of oil (Barrels)
- Avoid burning of coal by 13.6 tonnes

5. Solar Drying Chamber for Marine Based Products at Pulau Pangkor.

The Solar Drying Chamber system has been introduced and installed at Jetty Sg Pinang Kechil for the community PNK (Persatuan Nelayan Kawasan Pangkor) to further improve the product quality and increase productivity of their most popular salted fish, Talang as a community potential product. The project was fully funded by LKIM and implemented by RERC. The system consists of a house built from a roof (collector) of 40m^2 black corrugated absorbance plate, placed on the top of the chamber. The temperature of the collector was recorded to have achieved more than 100°C during hot day. The chamber was built from insulated wall, with two rooms of 9m^3 each and having equal

capacity of drying 250 kg (wet) of Talang Fish each, equipped with auxiliary units like ventilation fans, exhaust fans and heaters.

This project was successful firstly because of its right placement in the area that receives the most sun rays every day; secondly the system itself was designed in accordance to the drying criteria of salted fish, controllable, without jeopardising product quality. The daily attracted sun rays at that area has fully supported the system to harness the optimum energy for drying process and of all the tests performed during commissioning about 90% showed that the chamber temperature has been raised solely by thermal energy for space heating process. The result was very good with drying time for the selected fish (Talang) shortened by 50% (conventional drying process, 24 hours), whilst for other fishes like anchovies, gelama, cencaru, the drying time has halved, from 8 hours to approximately 3-4 hours. Backed by these results, it was recommended that the process run at twice the current process. The whole operation was installed, and commissioned with training workshops. These have been delivered to the community in June 2015.

Solar Thermal Drying Technology installed at Jetty Sg Pinang Kechil, Pangkor

MOSTI Social Innovation

In 2015, **RERC** successfully implemented one community project, involving the Installation of 8kW FIT(Feed In Tariff) Solar Photovoltaic system for Madrasah Simpang Bugis, Teluk Mas, Melaka. In this project, electricity generated from renewable resources is directly injected into the National grid and in return, TNB pays for the energy sold to the premise owner, Madrasah Simpang Bugis for 21 years. In doing so, SIRIM and MOSTI are indirectly helping the underprivilleged community to raise the socioeconomic condition of the community by means of appropppriate technology application.

Research and Technology Innovation

Advanced Materials Research Centre

During the year under review, the Advanced Materials Research Centre (AMREC) continued to deliver advanced materials services covering activities in government funded research, contract research, consultancy and technical services to relevant industries. It was an eventful year with numerous research projects granted, patents achieved, good commercial revenue gained and several awards won by our researchers.

AMREC completed 20 science fund projects during the year, while continuing to implement 10 Science Fund and Techno Fund projects granted in 2014. Over and beyond that it was granted another five new projects (2 DSTIN & 3 science fund) by MOSTI, with a total worth over RM12 million. All in all, a total of three patents were filed in 2015, adding to **AMREC**'s list of Intellectual Property achievements.

Five socio-economic projects granted in 2014 were approved to be continued in 2015 at a total cost of RM182,050. These supported small and medium technopreneurs in upgrading their skills and knowledge, and expanding their businesses to benefit local communities in rural areas. An additional new socio economic project, amounting to RM50,000, was granted during the year.

AMREC also successfully gained nine MOSTI Social Innovation (MSI) projects amounting to RM851,000, to be completed within six months. These projects allow **AMREC** to collaborate with the communities in innovative areas of technology development, product, process and services. Concurrently, **AMREC** also spearheads research and development (R&D) in identified focus areas, related to advanced materials and nanotechnology, which are market driven and deliver research outputs/products that are able to be commercialised. Currently, **AMREC** has proposed more than 25 new research projects and is continuously extending its socio economic and MSI projects to ensure that the target groups gain tangible benefits from the projects.

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. This is important for **AMREC**'s long-term sustainability and in realising its role in contributing to the social and economic development of the country. Towards this end, **AMREC** actively participates in exhibitions and organises seminars, workshops, conferences and trainings to further promote its technological capabilities and facilities available to the industry, institutions of higher learning, and other research institutions and government agencies. Furthermore, **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).

Innovation Composite Drain Cover

Innovation Wear Rubber Tapping Knife

Innovation Ceramics Terracotta as Water Storage

In 2015, **AMREC** provided training to future trainers, technopreneurs and the public in the areas of energy, biomedical and engineering materials under various programmes such as the GMI-KKTM, KIOSMEC, MID Sarawak, MID Sabah and Socio Economy Projects. It also successfully organised the following technological conference, workshops and seminars:

- Workshop on Nanomaterials; Synthesis & Characterisation
- Workshop on myLIPOS (SIRIM-PROTON); lithium ion battery
- Workshop on Nanomaterials Characterisation (Nano Summit)
- Workshop Sol-Gel 2015
- Advanced Powder Metallurgy Symposium 2015 (APMS2015)
- Workshop on Solid State Lighting Tech; for Luminaire System
- Workshop on Nanomaterials; Synthesis Strategy and Characterisation

AMREC's breakthrough achievements are also gaining added repute. During its participation at ITEX 2015, **AMREC**'s researchers were honoured for various achievements:

- **Gold Medal** – Application of Potassium Carbonate as Space Holder for Metal Injection Molding Process of Open Pore Copper Foam
- **Silver Medal** – Temperature Self-compensated Dissolved Oxygen Fiber Optic Sensor
- **Silver Medal** – Lanthanide Based Phosphors For White LED Encapsulation Material
- **Silver Medal** – Hollow Shape Ceramic Products Produced By Advanced Method Of Integrated Slip Rotary Moulding
- **Silver Medal** – Development of Highly Durable Optrode Ammonium Sensor Based on Fluorescent Nanosphere for Aquacultural Conditioned Water

The year also saw **AMREC**'s involvement in technology audits whereby 12 auditors from **AMREC** Kulim audited almost 20 small and medium companies and proposed new processes for them to enhance their productivity. In addition, **AMREC** 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 among others.

Towards enhancing our capabilities, **AMREC** was granted RM4,050,000 by MOSTI to develop and upgrade our laboratories for the certification of ISO 17025 in the scope of medical devises. This project is still in progress and scheduled to be completed by April 2016.

Research and Technology Innovation

Industrial Biotechnology Research Centre

In 2015, SIRIM's Industrial Biotechnology Research Centre (IBRC) 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.

These projects hold great potential value for industries in many sectors including energy, organic chemicals, polymers and healthcare products. Additionally, 12 research projects in various areas of industrial biotechnology were funded under various MOSTI and MOHE grants. A total of six technical papers were published, and three disclosures were approved for patent filing in 2015. **IBRC** was also involved in research and development and commercialisation activities of cosmeceutical products. A total of 11 cosmetics products developed by the researchers were successfully commercialised to local cosmetic entrepreneurs.

While **IBRC** successfully maintained its ISO 9001 certification after being audited by SAI Global, it increased its ISO 17025 accreditation testing from Standards Malaysia for medical devices to continually stay competitive in the area of technical services. Researchers from the centre were also awarded a gold and bronze award during the Malaysia Technology Invention and Innovation Award 2015.

Research and Technology Innovation

Environmental Technology Research Centre

Through its Environmental Technology Research Centre (ETRC), SIRIM continues to deliver on several key projects during the year under review. This includes the European Commission funded project under the SWITCHAsia Programme initiating the first Malaysian product environmental footprinting for the local building materials manufacturing industry.

The Environmental Declaration Scheme for Construction and Building Materials (MySuBuMa) project, implemented in the late 2012 until 2015, aimed to contribute towards the growth of sustainable building materials and products in Malaysia. It provided tools and guidance leading to product environmental footprinting; and case studies on carbon footprinting that will support green public procurement in Malaysia.

The project provided the avenue to the industries to be involved in the carbon footprinting processes in order to enhance the awareness on how their industrial activities affect the environment, for example via carbon emissions or global warming. Close to 30 companies have been the direct beneficiaries through this carbon footprinting (CFP) pilot programme. The project enabled the industry to identify the environmental hotspots contributing to greenhouse gas emissions throughout their products' complete life cycle – extending way beyond the activities within the production plant. The results help companies to look into business initiatives to reduce the carbon burden by improving production processes, opting for alternative sources of materials or energy, and facilitating product changes through eco-design or eco-innovation.

One of the key outputs of the project is the CFP calculation tool kit – SIRIM Karbon Kalkulator (www.karbonkalkulator.com). This was created through a matrix collaboration of SIRIM technology centres, namely Environmental Technology Research Centre and System Design Centre. This tool kit creates a systematic network system that connects the industry, CFP practiotioners and CFP verifiers in delivering the whole carbon footprinting task leading to the award of the CFP label. This toolkit received the Gold Medal in Innovation award during ITEX 2015.

With the achievement, **ETRC** can now support industries in declaring their product environmental performance in a more effective manner. Ultimately, the success of this development is the ability to support our local SMEs towards improved sustainability and economic performance.

Phase	Emission ($kgCO_2$/unit)	Percentage	Graph
Raw Material	0.5905	12.8456%	
Fuel	1.1905	25.8979%	
Utilities	2.1049	45.7896%	
Packaging	0.2223	4.8359%	
Waste	0.1519	3.3044%	
Transportation	0.3368	7.3267%	
Total	**4.5969**	**100%**	

Carbon footprinting profiles in manufacturing phases

Phase	Emission ($kgCO_2$/unit)	Percentage	Graph
Production	12.7794	74.4096%	
Distribution	0.1364	0.7944%	
Use	3.1635	18.4198%	
End of Life	1.0951	6.3762%	
Total	**17.1744**	**100%**	

Carbon footprinting profiles in life cycle phases of a product

ETRC has assisted MOSTI in leading the Eco-Innovation initiative in offering economic and environmental benefits to local SMEs. An International Forum on Eco-innovation was organised on 19-20 November 2015 as a result of a collaboration between MOSTI, SIRIM and the United Nations Environment Programme (UNEP). Experiences and results of the application of eco-innovation were presented during the Forum, which gathered government officials and technical experts from 15 countries. The International Forum was held in conjunction with the Global meeting of partners of the UNEP Eco-innovation global project aimed at incorporating economic, social and environmental targets into business strategies. It is a powerful approach to enable companies to gain competitive advantage, access new market segments, or increase their revenue streams, according to the UNEP study "The Business Case for Eco-innovation".

SIRIM Karbon Kalkulator and a Toolkit for Carbon Footprinting

Malaysia is one of the nine developing countries involved in a Global UNEP project and has been selected to pilot the application of Eco-innovation among SMEs. Among UNEP's aspirations is for Malaysia to take the leading role in disseminating the Eco-innovation experience and knowledge among other countries in the region and at the global level. With the support from UNEP, **ETRC** was able to deliver a series of life cycle datasets according to international standards in terms of format, content and documentation. UNEP technical support also encompasses the international peer review of 20 datasets, with the objective of enhancing their interoperability and the international relevance, and the review was coordinated by the co-chairs of the UNEP Life Cycle Initiative flagship on databases. **ETRC** has joined effort with MOSTI in organising the 4th Meeting of the International Forum on Life Cycle Assessment (LCA) Cooperation in Putrajaya with emphasis on identifying the role of LCA in policy and the needs for international collaboration. Our ambition is to identify what are the key areas/aspects where international cooperation is required to promote LCA in policies; capacity building of Malaysian government officials and a clear international framework for consideration of sustainability in international trade.

During the year, **ETRC** continued its role as local implementer of Asia-Europe Meeting (ASEM) SMEs Eco-Innovation Consulting in Malaysia. For the second year, ASEM SMEs Eco-Innovation Centre (ASEIC) via Ecoeye Co Ltd, Korea returned to SIRIM to join hands in providing eco-innovation assessment to SMEs in Malaysia. This 6-month project which ran from 1 April to 30 September 2015, was aimed at providing advisory services and sharing of best-practice expertise. An introductory workshop was held on 9 April 2015 at SIRIM and 13 SMEs expressed interest to participate in this project. SIRIM and Korean consultants visited those companies and 10 were selected for further in-depth assessments. Final eco-innovation reports and certificates were presented in a ceremony on 11 September 2015 at KLCC together with a business/technical matching session with several Korean companies. Two of the local SMEs, WT Plastic Products Sdn Bhd and Bodibasixs Manufacturing Sdn Bhd received invitations to share their eco-innovation studies at the 19th Forum of Eco-Innovation organiSed by European Commission, which was held in Seoul, Korea on 27-28 October 2015.

On 3 March 2015, SIRIM entered into an agreement with an Australian GLP Test Facility, ICP Firefly Pty Ltd. This signified the first recognition of an international contract research organisation (CRO) on the SIRIM ETRC Test Facility's capabilities in carrying out preclinical studies. The Master Services Agreement, signed defines ICP Firefly Pty Ltd as the Sponsor and SIRIM Berhad as the Contractor to conduct studies that meet the requirements of OECD Principles of Good Laboratory Practice (GLP). **ETRC** offered the initial scope of work which was the Bacterial Reverse Mutation Test. During the year, GLP studies were completed on two test items for ICP Firefly.

The International Forum organised in conjunction with the Global meeting of partners of the UNEP Eco-innovation global project

In 2016, **ETRC** plans to expand its preclinical services to cover the following test methods in view of the increased demands of product safety studies especially for cosmetic and other chemical products;

- In Vitro Mammalian Chromosomal Aberration Test
- Reconstructed human Cornea-like Epithelium (RhCE) test method for identifying chemicals not requiring classification and labelling for eye irritation or serious eye damage
- Bovine Corneal Opacity and Permeability Test Method for Identifying
  - i) Chemicals Inducing Serious Eye Damage and
  - ii) Chemicals Not Requiring Classification for Eye Irritation or Serious Eye Damage

ETRC has successfully secured a RM1.5 million research project from the Ministry of Agriculture and Agro-based Industry to strengthen the local herbal industry. Together with E&E Flagship and IBRC, the team will work towards developing documents on codes of practices, test methods and technical specifications of selected herbs as one of the national initiatives to standardise the practices within the herbal industry.

ETRC is also involved in the field test whereby a portable reactor is deployed for purifying wastewater; employing solar cell powered UV or blue LEDs for use with nanostructured TiO2 and other materials. This is part of SIRIM's proposed project of Photo-catalytic Materials for the Destruction of Recalcitrant Organic Industrial Waste Berhad in collaboration with different consortiums under the Brokerage Event: EU FP7–South East Asia Symposium on Photocatalysis for Depollution Technologies. Led by Cardiff University, the project unites cross disciplinary teams based in ASEAN and EU countries resulting in a sharing of expertise between centres of excellence to generate new knowledge on photo-catalyst materials and processes. The project, due for completion in February 2017, aims to provide a cost effective solar powered method for mineralising the recalcitrant organic pollutants that biological methods cannot remove from the wastewater of agricultural and seafood industries particularly those situated in rural areas where power is scarce and access to infrastructure is limited.

ETRC is also involved in SIRIM's feasibility study of Solid Waste Management Facility for the district of Sungai Petani, Yan, Baling, Kulim Bandar Baharu and surrounding districts. This project, implemented on 4 August 2014 until 3 March 2015, aimed to determine and identify reasonable solution methods to the existing problems of solid waste management, which would determine the type of solid waste management facilities that would be constructed at a strategic location. The outputs of the study included providing an overview of the current status of the management, service and disposal of existing waste; advising and assisting the Government in assessing the technical aspects, technology, cost and the environment based on the principles BATNEEC (Best Available Technique Not Entailing Excessive Cost); summarising and listing the concepts, options and services of viable waste management, including waste management technologies for consideration by the Department and other parties responsible; as well

SimbionteA System located in Pusat Biomass Bersepadu MPSJ in Bandar Bukit Puchong, Selangor

as developing an implementation plan, financial model (development and operating costs) and operational frameworks to support options and waste management services, as well as technology expectations.

SIRIM, with **ETRC**, has also been working together with Majlis Perbandaran Subang Jaya (MPSJ), to come out with an alternative "green" solution to treat food waste generated from household and eateries located in the Taman Bukit Puchong. Currently, the most common method of disposing food waste is through disposing it in open landfills. Eventhough landfilling is the most established and straight forward method being practised worldwide, it possesses many adverse environmental impacts especially in the release of greenhouse gas (GHG) emission, which leads to the global warming of the Earth. In order to overcome such problems, **ETRC** has proposed an alternative solution to dispose food waste by treating these waste under anaerobic digestion (AD). Such treatment has the advantage of utilising the food waste to generate biogas which contains high concentration of methane that can then be used as renewable energy to produce electricity using a biogas generator.

Earlier Feeding System of SimbionteA System

On 5 November 2015, **ETRC** has successfully handed over the AD system also known as SimbionteA to MPSJ. The system is located in Pusat Biomass Bersepadu MPSJ in Bandar Bukit Puchong, Selangor. Based on current observed productivity, once the system reaches its full capacity of 500kg/day, SimbionteA shall able to supply continuous energy to generate 5 kW of electricity.

With this promising advancement, MPSJ is further extending this project. The second phase of the project is currently on-going with the expected outcome of a new semi-automated feeding system, which once completed, will allow food waste to be fed directly into the SimbionteA system without the need of manpower. This will ensure a cleaner system, and reduces cost and time.

Research and Technology Innovation

WAITRO

SIRIM is the secretariat of the World Association of Institute and Technological Associations (WAITRO). This is an independent association of industrial research organisations founded under the auspices of the United Nations.

WAITRO fosters links between member organisations through the following objectives:

- To encourage research 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 2015, SIRIM was involved in seven programmes in line with **WAITRO**'s mission in 2015.

LIPI Delegation Visits WAITRO Secretariat

A delegation of seven researchers from the Research Centre for Electrical Power and Mechatronics (TELIMEK) of the Indonesian Institute of Sciences (LIPI) visited the **WAITRO** Secretariat office located in SIRIM's headquarters in Shah Alam on 6 May 2015. The delegation led by Dr. Eng. Budi Prawara, the Director of TELIMEK, is the team in LIPI that implemented the WAITRO-ISESCO project on Basic Technology Adoption for Young Grassroots Leaders implemented at the Baiturrahman Islamic Boarding School in Ciparay, a remote area in West Java, Indonesia. Other members of the delegation were Mr. Aep Saepudin, Mr. Arifin Santosa, Ms. Henny Sudibyo, Ms. Arini Wresta, Ms. Dian Andriani and Mr. Yaya Sudrajat.

Dr. Eng. Budi Prawara gave a comprehensive presentation and report on the implemented project at the **WAITRO** Secretariat office.

While the delegates were at the SIRIM headquarters, they were taken to visit the SIRIM Gallery where products and services offered by SIRIM are showcased. The delegates also visited the Environment and Bioprocess Technology Centre headed by the General Manager, Dr. Ahmad Hazri Ab Rashid, who gave a briefing on the centre's activities and a tour around the centre's pilot plant, the Colour Cosmetics Laboratory, Analytical Biochemical Laboratory and Toxicology Laboratory.

Indonesian Institute of Science (LPI) delegation visited SIRIM headquarters

Head of Cosmetics Programme of SIRIM, Malaysia Provides Special Lecture at TISTR, Thailand

On 8 May 2015, Ms. Sarifah Rejab, SIRIM's Head of Cosmetics Programme, visited TISTR, Thailand, a fellow **WAITRO** member in Bangkok to provide a special lecture on 'The Potential of Halal Cosmetic' for TISTR researchers and personnel. The lecture covered areas including introduction of halal, halal cosmetics standard, current size and growth of the potential of halal cosmetics, criteria for certified products, halal cosmetics ingredients, and examples of halal cosmetics. In addition, Ms. Sarifah and respective TISTR executives and researchers also discussed on future collaborative activities with focus on halal product testing.

Head of Cosmetics Programme of SIRIM, Malaysia Provides Special Lecture at TISTR, Thailand

Symposium on Manufacturing Capacity of China and International Industrial Co-operation – Hangzhou, China

International manufacturing co-operation is an activity which was recently identified in China aside from the existing West Lake Small and Medium Enterprises Conference. Due to the increasing numbers of China enterprises going abroad to invest in business, causing an increase in international business cooperation, the China Institute for Small and Medium Enterprises (CISME) of the Zhejiang University of Technology organised the Symposium on Manufacturing Capacity of China and International Industrial Cooperation in Hangzhou from 8 to 9 May 2015 with full financial support from the Ministry of Foreign Affairs of China, National Development and Reform Commission of China. SIRIM, as a **WAITRO** member, was invited to attend the symposium which attracted over 100 participants from 12 countries.

The symposium also comprised a plenary session followed by four parallel sessions during which many companies shared their experience in international industrial co-operation while professors both from China and abroad shared their insights on international industrial co-operation. As the symposium received positive feedback, CISME will continue this event in 2016 and more **WAITRO** members will be invited to participate in the international manufacturing co-operation conference.

WAITRO Management Programme 2015

A total of eight middle-management assistants were nominated by the Executive Board Members and Regional Focal Points (RFPs) to participate in the WAITRO Management Programme (WMP) 2015, from 9 to 13 June 2015, to facilitate in performing **WAITRO**-related responsibilities undertaken by Board Members and RFP organisations as these personnel often have very tight schedules due to their senior positions. It was the third time the **WAITRO** Secretariat has organised the WMP in Shah Alam, with the objective of it becoming a platform to generate general ideas for further discussion for the **WAITRO** Regional Work Plan. The WMP also was organised with the aim of providing participants a deeper understanding of **WAITRO**'s functions and activities.

The WMP 2015 was participated by Mr. Alex Bob Tumwizere from the Uganda Industrial Research Institute; Mr. Dominik Reinertz from Fraunhofer-Gesellschaft of Germany; Ms. Julie Jemille Mohammed from the Caribbean Industrial Research Institute of Trinidad and Tobago; Mr. Felix Adigwe from the Raw Materials Research and Development Council

of Nigeria; Ms. Pimprapai Supornrat from Thailand Institute of Scientific and Technological Research; Ms. Lina María Niebles-Anzola from the Center for Research and Technological Development of the Power Industry of Colombia; Prof. Dr. Tang Linjia from China Institute for Small and Medium Enterprises, Zhejiang University of Technology as well as Dr. Khaled Abdel-AalSelim from Central Metallurgical Research and Development Institute of Egypt.

Over the four days, participants were also given an overview of the bigger picture of **WAITRO** – its activities, its mid- and long-term goals as well as challenges faced by **WAITRO**. Other presentations delivered during the programme included the SWOT Analysis of **WAITRO** and Challenges Faced by **WAITRO**; Terms of Reference for Board Members and RFPs; **WAITRO** Membership Financial Matters and **WAITRO** Website. Participants also shared information on their organisations to familiarise themselves with the services of each organisation as well as past and future **WAITRO** initiatives of their organisations in relation to promoting **WAITRO**. Participants of the programme were privileged to also have Prof. Charles Kwesiga the President of **WAITRO** share with them his vision for **WAITRO** as the President.

WAITRO Management Programme 2015

During the programme, participants also discussed, identified, planned in their assigned regional groups before presenting their input on the following topics:

- Activation of existing and recruitment of new members;
- Cleaning-up and updating of the regional database;
- Identification of suitable regional programmes and relevant regional funding agencies for collaboration with **WAITRO** as well as regional project initiatives to be implemented in co-operation between **WAITRO** and an international funding agency; and
- Identification of suitable conference or workshop addressing regional issues using only resource persons/experts from the **WAITRO** network.

Training Attachment on Commercialisation, Technology Transfer, International Co-operation, Innovation, and Patent for CMRDI, Egypt Personnel by SIRIM

Ms. Samah Saleh Abdullah, an Assistant Researcher at the Mineral Beneficiation and Agglomeration Laboratory of the Central Metallurgical Research and Development Institute (CMRDI), Egypt participated in the proceedings of the Global Intellectual Property Valuation Conference 2015, which was held in Kuala Lumpur from 9 to 10 June, 2015. Among others, the conference discussed how to prepare Intellectual Property Rights (IPR) documents, and how to use IPRs as a means for the development of nations and the impact of technological development, as well as how to acquire IPRs in university research centres. The conference also shared ways of commercialising technology and how to prepare a technology marketing file as well as the role of Intellectual Property (IP) in a sustainable business development administration.

Upon request by Prof. Nagui A. Abdel-Khalek, the Acting President of CMRDI; the Technology Commercialisation Centre located at the SIRIM headquarters in Shah Alam, had designed a training course for Ms. Samah in Process Management from 11 to 12 June 2015. This was to familiarise her with the Malaysian system in the context of technology commercialisation process and methods of preparation and registration for patent. As part of the syllabus, Ms. Samah was given exposure to topics including commercialisation policies and procedures; technology description; technology evaluation analysis; financial analysis; IP and IP management; commercialisation agreement; business linkages; as well as technology fee and royalty collection.

As part of her training arrangement, Ms. Samah was taken to visit a few licensee factories which commercialise technologies developed by SIRIM, one of which is GranuLab Sdn. Bhd. GranuLab produces GranuMas, a patented bone-replacement material. Ms. Samah was also brought to visit Sireh Emas Sdn. Bhd. that produces cosmetics made of natural ingredients such as plants and herbs. Another factory Ms. Samah visited is a bio-composite factory that produces wood from a combination of materials such as rice husk and other materials to make furniture.

Biowaste 4SP Final Project Meeting, Rabat

The final project meeting of the Biowaste 4SP was held on 15 September 2015 in the Doctoral School Conference Room at the *Institut Agronomoque et Veterinaire* (IAV) Hassan II, Rabat Morocco. The meeting led by Dr. Anne Belinda from the Danish Technological Institute was attended by 25 project partners from 15 organisations including SIRIM. Each Work Package leader made a 15-minute presentation to highlight the results of their work package. Dr. Belinda was pleased with the overall achievement of the project where all partners successfully completed their tasks as per the work package description.

Biowaste 4SP Final Project Meeting, Rabat

The meeting in Rabat was made possible with the support and co-ordination by Prof. El Houssine Bartalli from IAV Hassan II, Morocco, a key partner of the Biowaste 4SP Project.

DTI, Denmark Vice President of Energy and Climate Visits SIRIM Berhad

Mr. David Tveit, the Vice President of Energy and Climate of the Danish Technological Institute (DTI), who is also the **WAITRO** Regional Representative for Europe, visited SIRIM on 26 October 2015.

Dr. Mohammad Jamil Sulaiman, the Vice President of Research and Technology Innovation (RTI) Division of SIRIM and the senior management of RTI received Mr. Tveit and conducted a discussion as a follow-up on an earlier discussion held between the Presidents of the two organisations in Denmark in September 2014. The main agenda of the discussion was to share the future strategic direction of DTI and SIRIM for potential collaboration between both **WAITRO** Members. Both organisations were part of a consortium that was involved in the recent concluded European Union Biowaste 4SP Project.

After the discussion, Mr. Tveit was taken to visit the **WAITRO** Secretariat Office, the SIRIM Gallery where models and replicas of selected SIRIM technologies are displayed as well as the Solar House located inside the SIRIM campus.

It is hoped that future business collaboration between both parties continue to prosper.

Research and Technology Innovation

National Metrology Institute of Malaysia

The National Metrology Institute of Malaysia (NMIM), formerly known as SIRIM's National Metrology Lab (NML-SIRIM) is the national authority on physical and measurement standards and Malaysia's premier laboratory for measurement science and technology.

It acts as the reference point for all metrological activities in the country and is the one-stop centre where all the national physical and chemical standards for the SI units of mass, length, time, temperature, luminous intensity, resistance, voltage and mole are established and maintained.

NMIM's role in the industry encompasses the following:

- To coordinate the national measurement system
- To establish, maintain and upgrade the national measurement standards
- To pursue and undertake technical cooperation with international metrology organisations
- To conduct research and development in measurement technology
- To disseminate and promote measurement technology and services

In 2015, **NMIM** developed five new calibration and measurement capabilities; calibrated 5,309 equipment in total together with corresponding calibration reports, published seven technical papers and gained 34 pattern approvals. **NMIM** also engaged in five international comparisons, three international cooperations on Technical training courses. The Institute continued to play an important role at regional and international activities as part of its focus on international networking; and organised 12 local training courses while inviting 22 visitors into its premises. Its success in ensuring the quality of its operations and services led to the achievement of several awards by SIRIM Berhad such as the 5 Star Best 5S award, OSH consolation award and another consolation President's Quality Award.

Dr. Osman Zakaria, Senior Director of National Metrology Institute of Malaysia (NMIM) briefing Dr. Martin Milton, Director of BIPM on NMIM's activities

Workshop on Meeting Requirements on Traceability of Chemical Analysis

The World Metrology Day (WMD), held on the 20th May each year, was one of the main celebrations for **NMIM** in 2015, marked by several activities that extended though the year. WMD 2015 adopted the theme "Measurements and Light", and events were held at **NMIM** on 20 May then at the Ministry of Domestic Trade, Cooperatives and Consumerism on 10 June and at the Chemistry Department on 20 October. A Metrology@ One Utama event was held on 23 May followed by a coffee talk session with Dr. Martin Milton, the Director of BIPM.

Some of the other activities **NMIM** engaged in during the year included:

- Proficiency Testing (PT) Post Implementation Workshop (23 Dec)
- Workshop on "Meeting Requirements on Traceability of Chemical Analysis in ISO 17025"
- Visit by MOSTI Secretary-General, Dato' Seri Dr. Noorul Ainur
- Participation in National Plantation Industry Conference & Exhibition
- Visit by Chairman of SIRIM Berhad, Tan Sri Datuk Dr. Ir. Ahmad Tajuddin Ali
- Dialogue Session with Accredited Laboratories

Moving forward, **NMIM** 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, **NMIM** 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.

Technical Services Division

Technical Services Division

Standards Research And Management Centre

As the national standards development agency, SIRIM is tasked with overseeing the National Standards Infrastructure on behalf of the Department of Standards Malaysia (Standards Malaysia), and to manage the country's participation in international standards development activities, thus protecting the nation's interests in world trade and commerce.

The **Standards Research and Management Centre** (**SRMC**) has been established as the main inquiry point for businesses seeking to meet the international technical regulations and product standard requirements for world trade as established by the World Trade Organisation's (WTO) Agreement on Technical Barriers to Trade (TBT). Over the years, **SRMC** has developed thousands of standards to support the country's industrial development both locally and abroad. It also protect consumers and society by benchmarking product specifications against acceptable standards and ensuring that they comply to industry regulations.

In 2015, **SRMC** developed and delivered a total of 62 Malaysian Standards (MS) to Standards Malaysia, the national standards body for Malaysia, out of which 33 are new standards and 29 are revised standards. The cumulative total of MS is now 6,178 (Source: Standards Malaysia website as at 30 September 2015). More Malaysian standards are developed to meet the demand of regulators to support acts and regulations for security, safety and protection of the Malaysian public.

SRMC has also started a new business line on the development of SIRIM Industry Standards and to date has published the following eight standards:

No.	SIRIM Industry Standard No.	Title
1.	SIRIM 1:2014	*Garis Panduan Kebersihan Tandas Masjid dan Surau*
2.	SIRIM 2:2014	*Garis Panduan Penarafan Kebersihan Tandas Masjid dan Surau*
3.	SIRIM 3:2014	*Code of practice for installation and maintenance of ceiling fan*
4.	SIRIM 4:2014	*Good Practices in Implementing Commuting Safety*
5.	SIRIM/DVS 1-1: 2012	*Traceability of Edible-Birdnest (EBN) Products: Part 1 – Requirements*
6.	SIRIM/DVS 1-2: 2012	*Traceability of Edible-Birdnest (EBN) Products: Part 2 – Specification for Packaging, Radio Frequency Identification (RFID) Reader and Tag*
7.	SIRIM/DVS 2:2014	*Requirements for Traceability of Raw Edible-Birdnest (EBN)*
8.	SIRIM/DVS 3:2015	*Specification for Raw-Unclean Edible-Birdnest (EBN)*

SRMC organised 21 workshops on MS development in 2015

It is currently also working closely with Department of Agriculture and Department of Veterinary to develop Codes of Good Practices. Other ongoing projects are development of standards for PR1MA and for MY Pride products for Jabatan Penjara Malaysia.

The year also saw **SRMC** organising 21 workshops on MS development and 13 workshops on reviewing of Malaysian Standards, in addition to 10 training sessions as part of its new service on standards implementation training. The sessions training focused on SIRIM 4:2014, *Good Practices in Implementing Commuting Safety*, for SOSCO.

In the international standardisation arena, SIRIM through Standards Malaysia participated actively in 350 technical committees in ISO and IEC with 162 technical committees as participating member and 188 as observer (O) member and resulting in 2,200 votes for ISO and IEC draft international standards.

SIRIM's Participation in International Standardisation

Membership Type	ISO	IEC	Total
P-member	133	29	162
O-member	111	77	188
Total	244	106	350

Committee	No. of Documents Voted
ISO	1725
IEC	475
Total	2200

More than 270 companies and associations currently enjoy the benefits of joining the SIRIM Library membership programme

The national enquiry and notification point for WTO/TBT managed by **SRMC** has served the government and industry by circulating more than 1,800 notifications from other WTO member economies through the newly developed Export Alert System. The local industries benefitted from these early alerts on changes of regulations and standards of foreign countries. At present, there are over 540 subscribers who receive timely notifications through this system.

During the year, 14 notifications on new and/or revised Malaysian measures were managed and forwarded to WTO. These were notifications on parts and accessories of motor vehicles (by MOT/JPJ), communications equipment (by SKMM), toys (by KPDNKK) and food & beverage products (by MOH).

The Enquiry Point has also organised a half-day networking seminar with the industries on trade barriers technical information. The participants of the seminar were briefed on the significance of the WTO/TBT Agreement and how the industries can benefit from the implementation of the agreement, the roles of the Enquiry Point, and how and where trade barrier technical information can be obtained.

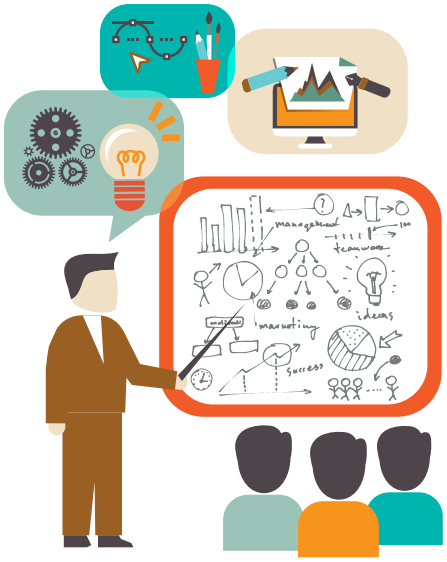
In addition, the Enquiry Point is also involved in the study “Economic impact on the usage of standards for electrical; & electronic, food & beverage and agriculture sectors” commissioned by Standards Malaysia.

Moving forward, **SRMC** will continue to grow its future viability by sustaining existing business and developing new income streams.

Technical Services Division

Packaging Design Center

In 2015, SIRIM's Packaging Design Center (PDC) fared much better than the previous year, bringing in increased revenues of up to 126%. A total of RM5,052,407 in income was earned in 2015 compared RM3,892,872. During the year, a total of 1,431 entrepreneurs attended training and 285 entrepreneurs were developed through programmes (incubator) that have been implemented.



The programmes were implemented in accordance to the level of entrepreneurship. At Level 1 a total of 209 entrepreneurs were developed, while Level 3 comprised 57 entrepreneurs, and there were 19 entrepreneurs at Level 6. In addition, PDC expects to receive several Malaysia Good Design Mark awards for designs that were produced by the centre throughout the year.

PDC was established to meet the increasing demand for well conceptualised packaging designs, especially in the field of product packaging design for small and medium entrepreneurs (SMEs). Helmed by 21 members of different backgrounds and expertise; nine of whom are creative designers; **PDC** is also responsible for growing new possibilities for the SME sector, with strategic assistance in design quality and brand development. The slogans 'We Make Your Business Perform Better' and 'Better Food for Better Business' reflect **PDC**'s role as a catalyst in producing designs that help entrepreneurs achieve their business objectives.

Agencies that worked with **PDC** through its 2015 Product Packaging programmes included:

1) **ECERDC** – East Coast Economic Region Entrepreneurship Development Programme (ECER Entrepreneur)

2) **ANGKASA** – Transformation Programme for Entrepreneur Development and Cooperatives Product Quality Improvement

3) **SUK** – Capability Enhancement Programme for Entrepreneur Product Packaging Design (4P)

4) **Johor State Agriculture Department (JPNJ)** – Financing Programme for Packaging Development, Branding and Product Labelling Processes for Johor Agriculture Department

5) **MARA Perak** – Development and Improvement of Entrepreneur Packaging Programme

6) **MARA Pahang** – Entrepreneur Packaging Development Programme under the Business Standard Development Scheme

7) **MARA Johor** – Entrepreneur Packaging Development Programme under the Development Scheme

8) **Mara Negeri Sembilan** – Entrepreneur Packaging Development Programme under the Development Scheme

9) **MARA Perlis** – Entrepreneur Packaging Development Programme under the Development Scheme

10) **Cooperative Development of Sabah Fisheries and Fishermen (Ko-Nelayan)** – Development Programme for Entrepreneur Packaging, Branding and Labeling

11) **MITI** – Groom Big Programme, Sarawak 2015

12) **MITI** – Strengthening the GroomBig Cooperative Programme

13) **Ministry of Domestic Trade, Cooperatives and Consumerism** – Development Programme for Product Design and Printing Services for SMEs

Due to the overwhelming response from the industry, in 2016, **PDC** is set to be more aggressive in introducing new services where appropriate. Six services such as the Biz Transformation Programme, Quality Professionals Programme, Pre-Innopack Programme, Innopack Programme 1, Innopack Programme 3, Innopack Programme 6, and the Greenpack programme will be introduced for the purpose of business development, particularly for microbusinesses and small entrepreneurs.

It is hoped that in the years to come, **PDC** will continue to progress and be more active in helping entrepreneurs, especially SMEs, to ensure more entrepreneurs engage in creative and innovative quality products that are comparable to these in international markets.

Technical Services Division

Malaysia Design Council

The Malaysia Design Council (MRM) paved another year of boosting the future of innovation and design for Malaysia by spearheading design programmes in the country to boost the industry's design expertise, capabilities and standards. During the course of the year, this was delivered through continued focus on education, competition and promotion as well as providing recognition via the Malaysia Good Design Mark.

The year kicked off with the Malaysia Design Competition – an annual affair that catalyses innovative thinking among design professionals as well as nurtures the creativity of younger generations.

The central theme of Malaysia Design Competition 2014 was 'Learning through Design'. It challenged local designers to propose and interpret design ideas that are problem-solving in nature, which in turn would prove beneficial to the Ministry of Education and other related agencies. Close to 169 entries were received for three categories of school students, students from institutions of higher learning, and professionals. Out of these, 19 ideas were chosen as winners and displayed during a reception graced by the Deputy Minister of Science, Technology and Innovation Datuk Dr. Abu Bakar Mohamad Diah. He was accompanied by **MRM**'s Chairman Dato' Prof. Dr. Ahmad Haji Zainuddin.

In April 2015, 31 companies were successfully certified as the Malaysia Good Design Mark 2014 in a truly meaningful event that honoured 42 products deemed creative and innovative. The momentous event, held at Putrajaya, was meant to celebrate the effort and commitment of the Malaysian industrial sector in producing products that are appealing in design, innovative, of high quality and are highly competitive in both local and international markets.

The companies were bestowed the Malaysia Good Design Mark recognition by the Minister of Science, Technology and Innovation, Datuk Dr. Ewon Ebin, who also graced the inaugural Universal Design Product Showcase @ JKM-MRM – a product showcase organised hand in hand by **MRM** and the Welfare Department of Malaysia.

Winners of Malaysia Design Competition

Discussion carried out with Vietnamese designers

The collaboration was in line with the aspirations of the Government to encourage cooperation amongst the government agencies. Held at the Industrial and Rehabilitation Training Centre or Pusat Latihan Perindustrian dan Pemulihan (PLPP) in Bangi, the showcase event was established to make known the concept and importance of the use of Universal Design amongst the society of Malaysia. Dato' Azizah Dun, Deputy Minister of the Ministry of Women, Family and Community Development, also graced the event.

The spirit of collaboration was further fortified by the emergence of a Malaysia-Vietnam Design Sharing project in 2015. The collaborative venture was spurred by the active participation of **MRM** in the Asia Design Sharing Council Meeting. This caught the attention of the Vietnam Trade Promotion Agency (VIETRADE) and prompted it to initiate a joint-venture with the agency to elevate the design quality of Vietnam products and produce.

MRM took the opportunity to promote professional designers from Malaysia, through the organisation of various workshops, which were held in multiple cities in Vietnam, such as Hanoi, Ho Chi Minh City and Da Lat. This initiative proved to be worthy with some companies from Vietnam having appointed Malaysian designers as consultants for some of the projects they are currently working on. For **MRM**, this was a milestone achievement in emerging Malaysia as a design and innovation hub for the region. It also reflected a coming of age for **MRM** with its impact on regional rather than a national scale. This spells a positive outlook for **MRM**'s growth in the near future.

Subsidiaries

Subsidiary

SIRIM QAS International Sdn. Bhd.

SIRIM QAS International's wide range of service offerings in the areas of certification, inspection and testing across all economic sectors has helped the Company to not only weather the challenging global economic situation in 2015, but also to deliver a solid performance. The commendable performance was mainly from its services in technology driven sectors.

There were also several new developments related to certification of communications and multimedia products.

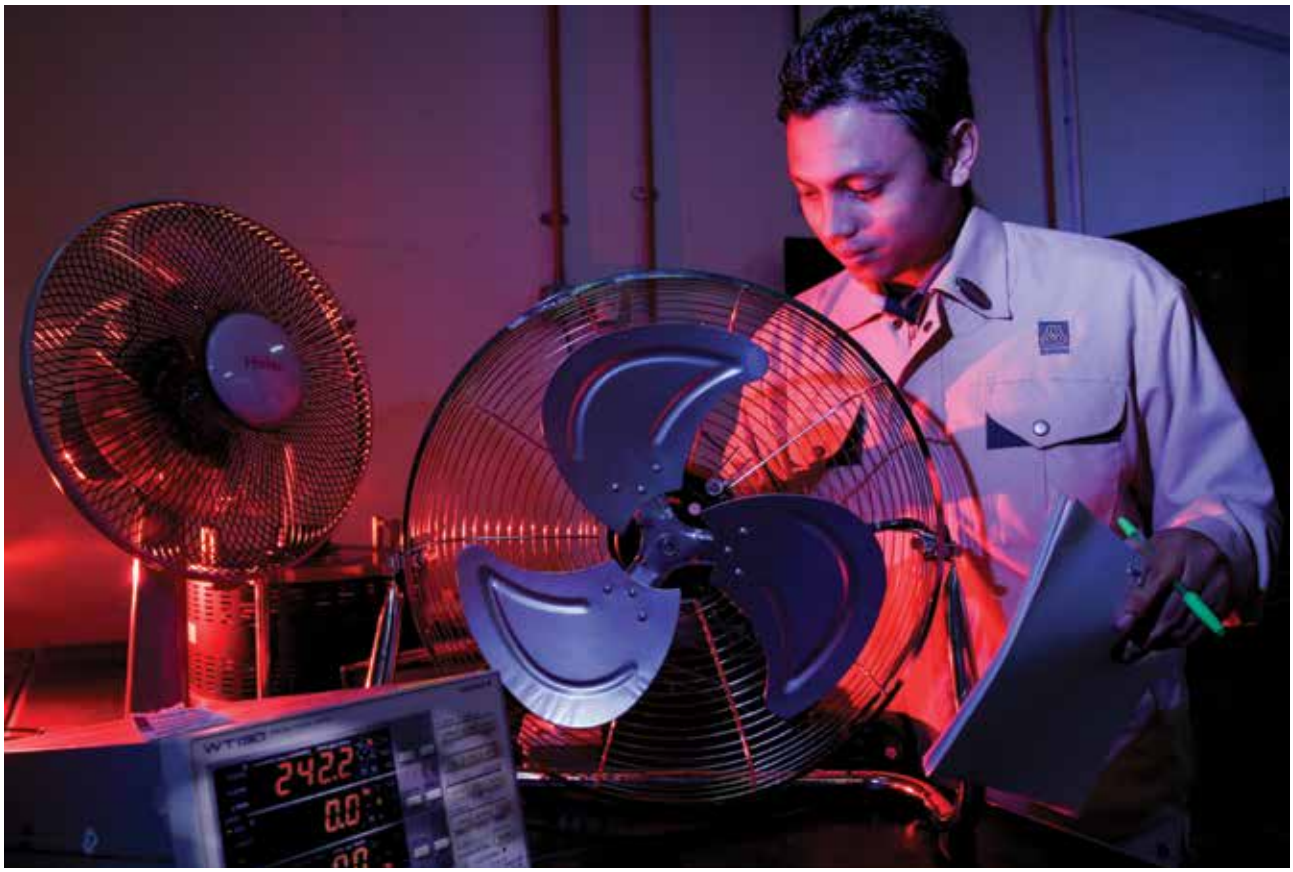
With the amendment in the Customs (Prohibition of Imports) (Amendment) (No. 4) Order 2015 on Hybrid Products which prohibits the importation of hybrid products unless these products are certified under the Communications and Multimedia (Technical Standards) Regulations 2000, the range of products to be certified by **SIRIM QAS International** was further expanded to include hybrid products.

In addition, Malaysian Communications and Multimedia Commission (MCMC) together with **SIRIM QAS International** launched the Self-Labelling Programme (SLP) for certified communications and multimedia products on 24 February 2015. The Self-Labelling Programme, which was fully implemented effective 1 June 2015, replaces the present labelling programme using physical labels issued by **SIRIM QAS International**.

Besides that, in line with the Malaysian Government's plan to transition to digital broadcasting, MCMC has introduced a voluntary DTTB Receiver Consumer Label to indicate to the consumers that the DTTB receiver, such as Integrated Digital TV and Set Top Box, which carries the label is able to receive digital transmission. **SIRIM QAS International** has been appointed by MCMC as the custodian to manage the distribution of the DTTB Receiver Consumer Label.

While striving to cater to industry needs, **SIRIM QAS International** continues to play a pivotal role in ensuring the safety of Malaysian consumers through its Product Certification Scheme. The SIRIM mark remains a widely recognised certification mark in Malaysia, symbolising product quality and safety. To continuously maintain public confidence in the SIRIM Product Certification Scheme, **SIRIM QAS International** has fully implemented new SIRIM labels in June 2015 for the following certified regulated products: electrical appliances, motorcyclist safety helmets, seat belts for motorists and fire protection equipment. The replacement of existing SIRIM labels which have been in use for the last 10 years was a timely intervention to address the issue of existing SIRIM labels being forged and appearing on substandard and potentially unsafe products in the market.

While **SIRIM QAS International** continues to offer its existing range of testing services to support both the Malaysian industry and the regulatory bodies, it also expanded its testing services to include testing of digital terrestrial television, primary batteries and coating of pipeline for oil and gas.



Electrical testing

Meanwhile, the Asset Management System Certification Scheme is **SIRIM QAS International**'s latest service offering among its wide range of management system certification services. The new scheme was launched by MOSTI Minister, Datuk Seri Panglima Madius Tangau during SIRIM Industry Night 2015. The certification scheme is based on the ISO 55001 standard, which specifies requirements for establishing, implementing, maintaining and improving an organisation's asset management system. The Asset Management System Certification Scheme would appeal to an organisation that invests heavily in assets and for which good asset management practice is critical in delivering its products and services to ensure that the overall organisational objectives can be met.

Besides that, Nano Malaysia Berhad has appointed **SIRIM QAS International** to operate its recently launched maiden scheme, which is the NANOVerify Programme. The scheme is a voluntary certification scheme for products with claims of nano-elements in range of 1 to 100 nanometres' and is owned by Nano Malaysia Berhad.

Through its collaboration with Lux Certify Asia Sdn Bhd, **SIRIM QAS International** can now assist electrical and electronics manufacturers in Malaysia to obtain CE Marking and penetrate the EU market by offering one-stop solutions for testing and CE Marking technical services. Specifically, **SIRIM QAS International** will be providing testing services, while Lux Certify Asia will be providing consultancy and technical services on CE Marking, including the preparation of technical files.

Mechanical testing – helmet testing

SIRIM QAS International's services are recognised by numerous national and international bodies such as the Department of Standards Malaysia (Standards Malaysia), United Kingdom Accreditation Service (UKAS), International Automotive Task Force (IATF), Accreditation Services International (ASI), APM Group, United Nations Framework Convention on Climate Change (UNFCCC), among others. These accreditations and recognitions not only demonstrate the competence of its certification personnel and the impartially of its certification processes, but also ensure the international recognition and acceptance of its certificates globally.

SIRIM QAS International continues to successfully maintain all its existing accreditations and in some cases, has even extended the scope of its accreditations. In addition, it added another accreditation under its belt when it was successfully accredited as a Medical Device Quality Management System Certification Body by the Department of Standards Malaysia. The electrical laboratory in its Sarawak branch and the mechanical laboratory in its Johor branch also obtained accreditation to MS ISO/IEC 17025:2005 under Skim Akreditasi Makmal Malaysia (SAMM) by the same accreditation body in the same year.

Apart from that, **SIRIM QAS International** was also approved as a fully licensed FSSC 22000 Certification Body by the Foundation for Food Safety Certification after it obtained accreditation for its FSSC 22000 Food Safety Management System Certification Scheme from the Department of Standards Malaysia.

SIRIM QAS International's appointment by 20 foreign certification bodies, including the recent appointment by Korea Testing Certification (KTC), to conduct inspections on their behalf for their product certification schemes further attests to its competency and credibility in the areas of conformity assessment.

Moving forward, **SIRIM QAS International** will continue to focus on facilitating market accessibility for its customers and enhancing consumer confidence in their products and services through the provision of professional and seamless services.

Subsidiary

SIRIM Training Services Sdn. Bhd.

For 2015, **SIRIM Training Services** (STS) has successfully organised 754 training courses for 1,585 organisations, involving a total of 14,152 participants. Of these organisations, 242 were made up of SMEs. In terms of guidance and consultation, STS has secured 49 new consulting or collaborative projects.

STS continues to focus on core guidance and training services related to quality, technology and best practices. These include guidance and training for Systems Based Management Standards such as ISO 9001, MS 1900, MS 2300, ISO 14001, ISO/IEC 17025, ISO 27001, ISO 15189, ISO 13485, HACCP, ISO 22000, ISO 50001, TS 16949, OHSAS 18001 Integrated Management System, GMP, GHP and Halal.

In addition, **STS** also offers guidance and training for Tools, Techniques and Best Practices such as TQM, TPM, 5S, Green 5S, 7QC Tools, SPC, ICC/QCC, 6-Sigma, Kaizen, Customer Service Management and Lean Manufacturing. **STS** has also implemented technology-related training such as Certified Programme on API, Certified Welding Engineers-AWS, Certified Welding Inspectors-AWS, Certified Programme on NDT and COMPTia.

Services for SME development include the Groom Big Programme and Vendor Innovation Programme under the sponsorship of the Ministry of International Trade and Industry (MITI). Welding activities are more geared to welding training in collaboration with the National Youth Skills Institute in Bandar Penawar and Pekan.

In collaboration with TESDEC, SIRIM has implemented four Industrial Skill Enhancement Programme (INSEP) programmes in 2015. A total of 92 graduates of universities or colleges have been trained between four to six months in various fields of system management based on standards such as IS/TS 29001, ISO 50001, and OHSAS 18001. The results of this theoretical and practical training for selected organisations will help students to enter the job market with more knowledge and confidence.

Several new products and services were introduced in 2015. Among them are the Personnel Certification Programme such as Certified Quality Manager, Certified Quality Professional and Certified Internal Auditor; and Standards-Based Management Systems such as MS 2400 and ISO 55001. Through smart partnership with AIMST University, **STS** launched the first Quality Certified Professional programme for 20 participants. Certified Quality Manager was implemented through a smart partnership with Open University Malaysia and 20 students from its Masters of Quality programme participated in the programme.

Seminars effectively carried out throughout the year

In 2015, a total of 34 organisations have been successfully guided towards obtaining various certifications and recognitions. 12 SMEs have achieved 5S certification, six organisations have achieved ISO 9001, four organisations have received Green 5s Recognition, four SMEs received QMS certification, two organisation received the ISO 27001 certification, and one organisation each received ISO 13485 certification and ISO certification/TS 16949. A company was certified OHSAS 18001 and an organisation certified to ISO/TS 29001. One of the organisations completed a Mystery Shopper project, while another has received TPM certification.

STS also organised a seminar on Quality, Standards and Best Practices (QBEST) for the third time. The event was attended by 53 participants.

During the course of the year, **STS** also successfully implemented a series of training at an international level through smart partnership with PIQC Institute of Pakistan and WHO. A Road Traffic Safety Management System (RTS) training was executed in Pakistan while ISO 9001 training was implemented in Vietnam, Cambodia, Korea and Laos.

STS also successfully organised a total of six Malaysian Technical Cooperation Programmes (MTCP) under the sponsorship of the Ministry of Foreign Affairs. A total of 77 participants from 35 countries participated in the programmes. The programmes implemented were related to Halal, Plastics Technology, Green 5S, Non-destructive Testing (NDT) and Innovation.

Subsidiary

SIRIM Standards Technology Sdn. Bhd.

Year 2015 has been a challenging year for **SIRIM Standards Technology** (SST) in sustaining its businesses. However, despite continued global economic uncertainties, the slowdown of oil and gas sectors and increased competition in the traditional market of low accuracy calibration, SST managed to attain certain achievements throughout 2015.

SST maintained its position as the market leader with the widest range of calibration and measurement services; a pool of expert Inspectors and Engineers; and status as the approved training provider/centre for Non-Destructive Testing (NDT) under Jabatan Pembangunan Kemahiran (JPK) and Perbadanan Tabung Pembangunan Kemahiran (PTPK). In 2015, **SST** continued to ably serve thousands of local and international customers from various industries in meeting their customised needs.

Apart from its well-known services in calibration and measurement, **SST** is also gaining renown for its failure investigation and NDT inspection services and related training, such as Ultrasonic and Radiography Inspections and specialised technical training services in calibration and measurement. Leveraging on its good track record, in 2015, **SST** successfully extended its service contracts with key industry players, such as Petronas Group of Companies, Maxis, and Proton. On top of that, **SST** attracted new clients such as Exxon Mobile and Malaysia LNG.

During the year, **SST** also signed a Memorandum of Understanding (MoU) with Sabatiara Corporation to collaborate in calibration, verification, service and repair of submarine test instruments. This strategic collaboration is a starting point for **SST** to expand its business in the field of calibration of submarine instrumentation.

Another success was the achievement of the new ISO/IEC 17025 Laboratory Accreditation by the Department of Standards Malaysia (STANDARDS MALAYSIA) award, under the National Laboratory Accreditation Scheme (SAMM). The award was for the Standard test method for measurement of metal and oxide coating thickness under **SST**'s failure investigation and inspection services. The accreditation's scope was successfully extended to its Calibration Lab in Penang. These accreditations demonstrate the competence of **SST**'s personnel, and ensure the international recognition and acceptance of **SST** certificates and reports globally.

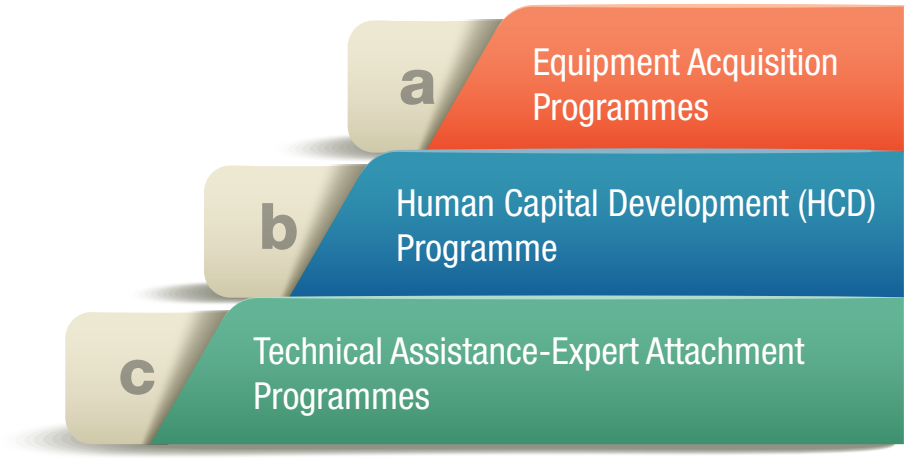
Moving forward, **SST** aspires to play a more active role in supporting local and international industry players through its calibration and measurement activities, material integrity and analysis and NDT Inspection and Training. By offering customised services for targeted niche markets, such as the military, aviation, sub-marine, and oil & gas, **SST** is intent on delivering another successful year in 2016.

Subsidiary

National Precision Tooling Sdn. Bhd.

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 (the 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), Prime Minister's Department had initially provided an allocation of RM50 million in 2009 and 2010 for the 1st phase of its implementation. This was followed with an additional allocation of RM30 million provided in late 2012 as part of the 2nd phase of its implementation.

In line with the advice of the EPU, **NPT** expanded the number of vendors who are qualified to be provided with funding assistance under the TDM Project. In 2015, two new vendors were approved from a list of seven companies which were initially evaluated.

Hartford Blockbuster Pro-4210AG CNC Machining Centre

During the year, **NPT** received and evaluated five new Equipment Acquisition Programme proposals of total value RM9,624,524 from qualified vendors. Of these, four proposals totalling RM4,433,563 were approved for implementation. Two of these proposals were from the new vendors. Additionally, an 800-ton Hydraulic Try-out Press Machine costing RM1,608,750 procured in 2014, was delivered, installed, tested and commissioned at the premises of the approved beneficiary company in July 2015 as scheduled. The year also saw another beneficiary company completing the procurement process of a 1,600-ton Mechanical Try-out Press Machine costing RM8,000,000 which has been approved for partial funding up to a maximum of RM4,495,000 from the TDM Project allocation.

In total, since its inception in 2009, the 1st and 2nd phase of the TDM Project have seen the implementation of 36 Equipment Acquisition Programmes with a total value of RM48,765,063 for 16 beneficiary companies.

A total of 10 Human Capital Development Programmes were implemented; comprising five overseas training programmes involving 19 trainees from five beneficiary companies, and five local training programmes involving 77 trainees from eight beneficiary companies. The total cost of Human Capital Development Programmes funded using the TDM Project allocation was RM3,464,729.

Additionally, four Technical Assistance-Experts Attachment Programmes were implemented involving the attachment of eight experts at nine beneficiary companies and the participation of 114 technical staff in the various technology transfer activities conducted by the experts. Total cost of the four Technical Assistance-Experts Attachment Programmes funded using the TDM Project allocation was RM4,052,866.

For 2016, **NPT** plans to fully utilise the balance of the uncommitted TDM Project allocation amounting to about RM19 million to implement additional development programmes that would help close some of the gaps still existing within the industry and within potential companies.

Subsidiary

SIRIM Measurements Technology Sdn. Bhd.

SIRIM Measurements Technology (SMT) is a new subsidiary of SIRIM Berhad, established as part of the ETP initiative on public-private partnership between government and industry. SMT focuses on providing measurement instrumentation solutions, as well as technical services such as product start-up assistance and support, training, consultation, test system development and integration, calibration and repair of multi-vendor measurement products for scientists, engineers and researchers.

As a strategic technology partner with the world leading Test and Measurement companies – Keysight Technologies and Agilent Technologies – **SMT** provides a wide spectrum of technologies and solutions ranging from electronics to life sciences and chemical analysis. This is to enable discoveries and push the frontiers of science.

SMT also collaborates with local institutions of higher learning to develop talents and industry-ready graduates. The collaboration includes the joint setup of industry relevant teaching labs with industry-led curriculum, providing technical or career talks for students, contributing as industry adjunct lecturers, participating in industry advisory panels, partnering in structured internship programmes and graduate employments.

In 2015, through the above collaboration model, **SMT** successfully partnered with University Malaysia Perlis (UniMAP) in jointly setting up a teaching laboratory for their Bachelor Degree of Technology in Telecommunication (BTEC) courses, and with University Kuala Lumpur (UniKL) in setting up a RF Microelectronics teaching lab. **SMT** has also signed several MoUs (Memorandums of Understanding) and NoUs (Notes of Understanding) with several universities and the Department of Polytechnic Education in the Ministry of Higher Education with the intent of developing talent pools that align with industry needs, thus enhancing graduate employability. One of the MoUs was with University College Technology of Sarawak (UCTS) on its Corporate Talent Development (CTD) programme. Under this programme, **SMT** supports and contributes to UCTS' industry-academia partnership initiative with the objective of not only developing top talent pools, but also ensuring that these graduates are well-equipped with industrial knowledge and exposure.

In addition, **SMT**'s Chief Executive Officer (CEO) has been appointed as the Industry-CEO (or ICEO) for the Faculty of Electrical & Electronics in Polytechnic Seberang Perai. The ICEO programme, which is part of the Malaysia Education Blueprint 2015-2025 (Higher Education), ropes in senior industry leaders to teach and share industry knowledge in public institutions of higher learning to increase the marketability of graduates towards achieving a target of more than 90% employment within three years for the polytechnic.

On the research and development (R&D) front, **SMT** collaborates with a few institutions of higher learning and government R&D agencies by jointly identifying research opportunities, creating solutions, and solving

Joint teaching lab for sharing of industry knowledge

Memorandum of Understanding between SMT and UniKL

Corporate Talent Development Initiative (CTD)

SAINS on Wheel Programme at University Technology Petronas

challenges. A few of the partnerships formed in 2015 include the joint-research partnership with University Technology Malaysia (UTM) in establishing a 5G channel propagation research laboratory. With the support from Keysight Technologies, the lab enables the research of the channel path loss and propagation characteristics in the microwave and millimeter wave frequencies for future 5G wireless communication.

In addition, through the initial phase of collaborating with Universiti Malaysia Kelantan (UMK), **SMT** together with Agilent Technologies have jointly set up an advanced veterinary research lab that enables the advanced study, analysis and research of natural plants and products to be used as animal feed with the motivation to significantly improve the health and growth of animal produce.

Besides talent development and research activities, **SMT** also contributed actively to cultivating interest in science and technology among younger children in primary and secondary schools to inspire their development as future engineers and scientists. In this initiative, **SMT** has partnered with the Multimedia Development Corporation (MDeC), University Technology Petronas (UTP), University Malaysia Kelantan (UMK) and Curtin University of Technology Sarawak (UCTS) to implement activities related to Science, Technology, Engineering, and Mathematics (STEM), as well as the SAINS on Wheels programmes for young school children. In 2015, more than 1,000 primary and secondary school students and teachers from rural areas in Peninsular and East Malaysia participated in these programmes together with **SMT**.

Moving forward, **SMT** plans to maximise its partners' existing market space, brand and footprint to reach out and grow its existing customer base, and expand into adjacent market segments. This includes venturing beyond Malaysia in both its solutions and service businesses. Through technology and knowledge transfer from its partnerships with world leading companies in measurement technologies, **SMT** hopes to be a world-class one-stop centre for measurement solutions and services in the country. In the meantime, **SMT** will continue to contribute to the development of the nation's talent pools, which meets the government's agenda of emerging a high-income nation through science, technology and innovation.

Subsidiary

SIRIM Tech Venture Sdn. Bhd.

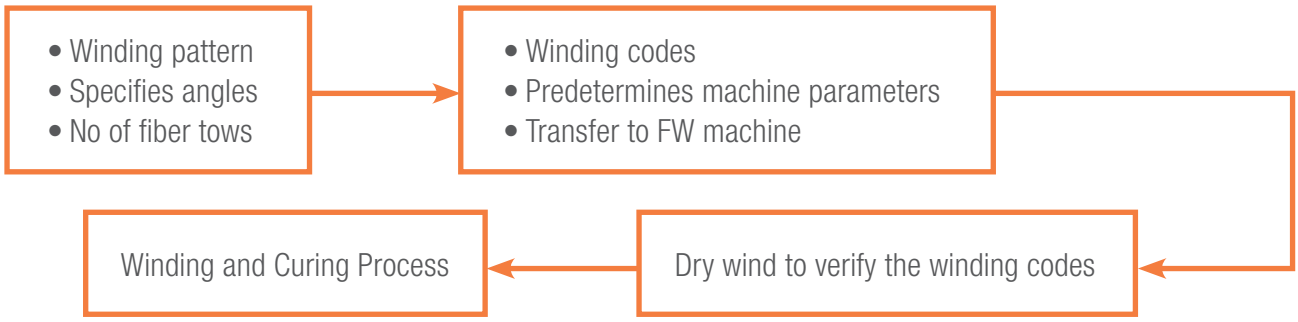
SIRIM Tech Venture (STV) is a new subsidiary of SIRIM Berhad, established in September 2014 as part of SIRIM's commercialisation initiative. Initially focusing in Filament Winding Technology (FWT) to produce composite pressure vessel and/or tank with pressure capacity up to 300 bar, STV has now been mandated to act as a special purpose vehicle in driving technology commercialisation into the open market.

In 2015, **STV** faced great challenges in establishing its critical foundation as a start-up company, heavily reliant on regulatory requirements. Nevertheless, **STV** managed to provide technical and advisory services related to composite development jobs. In this, **STV** focused on working with local universities and private companies dealing with CNG conversion kits.

STV testing facilities have also been set up during the year to comply with the ISO 14439:2013 and BS EN 14427:2000 standards, as tabulated below:

Section According to ISO 11439	Test Description	Duration (days)	Cylinders
10.5.2.3	Hydrostatic Pressure Burst Test	1	3
10.5.2.4	Ambient Temperature Pressure Cycling Test	3.5	2
10.5.2.5	Leak-Before-Break (LBB) Test	12	3
10.5.2.6	Bonfire Test	1	1
10.5.2.7	Penetration Test (outsource)	1	1
10.5.2.8	Environmental Test	4.5	1
10.5.2.9	Flaw Tolerance Test	4	1
10.5.2.10	High Temperature Creep Test	8.5	1
10.5.2.11	Accelerated Stress Rupture Test	42	1
10.5.2.12	Extreme Temperature Pressure Cycling Test	5	1
10.5.2.14	Impact Damage Test	4	1
10.5.2.16	Permeation Test	20	1
10.5.2.17	Natural Gas Cycling Test	29	1
		Total	18

Furthermore, with its experienced manpower and complete fabrication and testing facilities, **STV** has been given the opportunity to provide services in delivering 120 units of 120L Low and High Pressure Vessels to the DSTIN-BioNG project in Sabah. The prime purpose of this project is to store natural gas from POME effluent plant and transport it to the filling station in Sandakan, Sabah.



Generating Winding Code Process

Moving forward, **STV** has expanded into another area of technology development in January 2016 by merging with the technology business unit, SIRIM Micro Precision, which focuses on Micro Precision Grinding Technology (MPGT). The multi orientation of micro precision grinding machine also known as TCG8™ is the product of this technology. TCG8™ is able to precisely grind even harder materials such as Tungsten Carbide to a tight accuracy of ±2 microns and surface roughness of 0.01 microns.

The business model for TCG8™ is to penetrate the education and industrial sectors that are partially involved in grinding and/or precision machining activities. The effort made years before its inclusion into **STV**, has been fruitful in the context of a human development programme in which this technology has been accepted into the revision of NOSS 2015. The strategy is to be able to deliver TCG8™ to all training centres under Ministry of Human Resources which uses NOSS as the guiding syllabus in creating skilled graduates.

Calendar of Events

A mission to help families affected by floods in Kelantan was accomplished with the help of donations by SIRIM's caring staff. Carrying contributions in cash and kind for 200 families, a convoy of 20 SIRIM employees travelled to Kuala Griff, Kampung Dabong, Gua Musang, Kelantan accompanied by an Alhijrah TV team. They were flagged off by Dato' Dr. Zainal Abidin Mohd Yusoff, President and Chief Executive of SIRIM on 8 January 2015. The volunteers also helped clean up some of the affected areas.

8-10 JANUARY

POST-FLOOD RELIEF MISSION TO KELANTAN BY SIRIM EMPLOYEES

4 FEBRUARY

MOSTI MANAGEMENT MEETING AND INTEGRITY COMMITTEE MEETING

SIRIM hosted a MOSTI Management and an Integrity Committee meeting, both of which were chaired by the Secretary-General of MOSTI, Tan Sri Dr. Noorul Ainur Mohd Nur. The meetings were attended by both the Deputy Secretary Generals of MOSTI, Chief Executive Officers of agencies and departments under MOSTI, and ministry officials. Also present was the President and Chief Executive of SIRIM, Dato' Dr. Zainal Abidin Mohd Yusof. The meetings' delegation also visited the IBRC Cosmetics Laboratory, to gain a better understanding of SIRIM's cosmetic products and technology.

A Memorandum of Understanding (MoU) was signed between SIRIM and ProEight Sdn. Bhd. The MoU was signed by Dato' Dr. Zainal Abidin Mohd Yusof, President and Chief Executive of SIRIM and Ir. Azhar Zainal Abidin, Managing Director of ProEight Sdn. Bhd.; and witnessed by Dzulkifli Mahmud, Deputy Chief Executive of MATRADE. The objective of the MoU is cooperation in the field of research and development for made-in-Malaysia pump components for oil and gas applications.

19 MARCH

MEMORANDUM OF UNDERSTANDING BETWEEN SIRIM AND PROEIGHT SDN. BHD.

8 APRIL

LAUNCH OF SIRIM3: 2014, CODE OF PRACTICE FOR THE INSTALLATION AND MAINTENANCE OF CEILING FANS

SIRIM and Panasonic Manufacturing Malaysia have addressed issues related to unsafe installation of ceiling fans, through the development of an industry standard SIRIM3: 2014, Code of Practice for Installation and Maintenance of Ceiling Fans. The launch of SIRIM3: 2014 was held in conjunction with a seminar organised by SIRIM in collaboration with the Energy Commission and Panasonic Manufacturing Malaysia. The launch was officiated by Elmi Anas, Director of Regulatory Electrical Safety, Energy Commission. SIRIM3: 2014 provides guidance to employees on how to install a ceiling fan safely with an emphasis on compliance to good practices before installation, including the use of appropriate pipes supplied with the fans purchased from manufacturers.

SIRIM hosted a visit by Tan Sri Dr. Mohd Irwan Serigar Abdullah, Secretary General of Treasury. He was accompanied by the Secretary General of the Ministry of Science, Technology and Innovation, Tan Sri Dr. Noorul Ainur Mohd Nur. This working visit by Tan Sri Dr. Mohd Irwan kicked off with a briefing on SIRIM activities by Dato' Dr. Zainal Abidin Mohd Yusof, President & Chief Executive of SIRIM Berhad. At the gallery, he was briefed on SIRIM's product and technology innovation by SIRIM's researchers. Among the displays were technologies that have already been commercialised, such as artificial bone material, Wood Polymer Composite, and TCG8 Multi Orientation of Precision Micro Grinding Machine, BioNG technology which produces natural biogas from palm oil mill effluent, and lithium-ion battery technology for LIPOS vehicle. Tan Sri Dr. Mohd Irwan also visited the Industrial Biotechnology Research Centre and witnesed the fermentation operations at its pilot bio-fertiliser plant and cosmetics technology laboratories.

7 MAY

VISIT BY TAN SRI DR. MOHD IRWAN SERIGAR ABDULLAH, SECRETARY GENERAL OF TREASURY

13-14 MAY

NATIONAL QUALITY SUMMIT 2015

In conjunction with the National Quality Summit 2015, SIRIM Industry Standards were launched by the Deputy Minister of Science, Technology and Innovation (MOSTI), Datuk Dr. Abu Bakar Mohd Diah. SIRIM Industry Standards are important for quality control, facilitating product acceptance, organisational or industrial management, as well as, the safety and health of the community. It is also part of SIRIM's overall efforts to help industries and businesses meet local and international needs and practices. The National Quality Summit 2015 provides an opportunity for organisations to discover the importance of making changes through quality initiatives in maintaining competitiveness and facilitating global market penetration in the manufacturing, education and healthcare sectors.

The entire world experienced the leap second phenomenon at 23:59:59 according to Coordinated Universal Time (UTC) on 30 June 2015 (Tuesday). In Malaysia, the jump occurred at 7:59:59 on 1 July 2015 (Wednesday) due to time zone difference. To date, 25 seconds have been added to UTC since it was introduced in 1972. The last jump was added on 30 June 2012. The leap second was added by SIRIM's National Metrology Institute of Malaysia (NMIM) , as the operator of the National Standard Time. The caesium atomic clock maintained at NMIM, Sepang was scheduled to enter the second into the Malaysian Standard Time. This phenomenon occurs due to the rotation of the earth on a slower axis.

1 JULY

LEAP SECOND PHENOMENON

20 AUGUST

LAUNCH OF THE NATIONAL PROJECT "GHG EMISSION REDUCTION TARGETING INDUSTRY SUB-SECTORS THROUGH ENERGY EFFICIENCY AND USE OF SOLAR THERMAL SYSTEM IN MALAYSIA"

SIRIM has been appointed as the lead agency for the nation's industrialisation of solar thermal technology under the national project "GHG Emissions Reduction Targeting Industry Sub-Sectors through Energy Efficiency and the Use of Solar Thermal System in Malaysia". MOSTI together with some other ministries and agencies will work together with the Global Environment Facility (GEF) and the United Nations Industrial Development Organisation (UNIDO) to promote the application of solar thermal technology in the country. This five-year project aims to focus on improving energy efficiency and solar thermal technology applications for specific sectors for heating and cooling by industries in Malaysia. This project will support the initiative and contribute towards the reduction of carbon dioxide emissions.

A handover ceremony for SIRIM's contribution to the 2015 'Ibadah Qurban' Project in Palestine was held on 21 September 2015 at SIRIM Shah Alam. A donation of RM5,000 was presented to the Shah Alam Branch Manager of Palestine Aman, Muhd Farhan Muhd Fadhil by Senior General Manager, SIRIM Strategic Marketing Division, Zulkifli Abdullah as a representative of the SIRIM management. The 2015 'Ibadah Qurban' Project in Palestine was organised by Palestine Aman Malaysia to distribute sacrificial meat to those in need, such as orphans, poor families, the families of martyrs and Palestinian fighters who strove to liberate the Al Aqsa Mosque in Jerusalem. It is hoped that this small contribution can help the needy and launch more such 'Ibadah Qurban' projects.

21 SEPTEMBER

CONTRIBUTION HANDOVER CEREMONY FOR THE 2015 'IBADAH QURBAN' PROJECT IN PALESTINE

15 OCTOBER

SIRIM AND FRAUNHOFER CO-HOST SEMINAR ON PRODUCTIVITY AND SME DEVELOPMENT

SIRIM and Fraunhofer Gesellschaft, Europe's largest research institute organised a seminar on Productivity and Development of SMEs to support and assist SMEs in Malaysia in becoming more proficient in the field of innovation. The seminar brought together successful companies and speakers from Germany and Australia, as well as, local agencies, to share their knowledge and successful practices with Malaysian SMEs so that they can achieve better productivity and grow sustainably. The core content of the seminar included cases of good practices and lessons presented by speakers, as well as the results of research on Malaysian development and productivity by SIRIM-Fraunhofer. This seminar was one of the initiatives under the SIRIM Technology Audit as part of the SME Technology Penetration and Improvement Programme, developed specifically for SMEs in Malaysia by SIRIM and the Fraunhofer Institute.

SIRIM Industry Night 2015 was held to celebrate the government agencies, industries and companies that have successfully obtained certification from SIRIM QAS International via various certification schemes and quality assurances from November 2014 to October 2015. In addition, a new quality management scheme was also launched, namely the Asset Management System Certification Scheme ISO 55001. The presentation of SIRIM Quality Awards to seven outstanding organisations and launch of the ISO 55001 was officiated by the Minister of Science, Technology and Innovation, Datuk Seri Panglima Madius Tangau. Also present were the Chairman of SIRIM, Tan Sri Dr. Ir. Ahmad Tajuddin Ali, FASc, and SIRIM's President and Chief Executive, Dato' Dr. Zainal Abidin Mohd Yusof.

13 NOVEMBER

SIRIM INDUSTRY NIGHT

2 DECEMBER

VISIT FROM THE 3rd HIGH COUNCIL MEETING OF THE DEVELOPING-8 TECHNOLOGY TRANSFER AND EXCHANGE NETWORK (D-8TTEN) DELEGATION

A delegation from the 3rd High Council Meeting of D-8TTEN visited SIRIM's Industrial Biotechnology Research Centre, headed by His Excellency, Dr. Seyed Ali Mohammad Mousavi, Secretary General of the Group of Eight Developing Countries (D-8). D-8 is an organisation that was established by the Declaration of Istanbul on 15 June 1997 and comprises eight developing Muslim countries namely Bangladesh, Indonesia, Iran, Malaysia, Egypt, Nigeria, Pakistan and Turkey. D-8 aims to enhance the socio-economic development and improve the cooperation and trade between member states. D-8TTEN aims to improve the cooperation and technology transfer between the member states in the fields of Science, Technology and Innovation (STI).

Contacts

MAIN CAMPUS

SIRIM Berhad
1, Persiaran Dato' Menteri, P.O. Box 7035
Section 2, 40700 Shah Alam,
Selangor
Toll Free: 1-300-88-7035
Tel: (603) 5544 6000
Fax: (603) 5544 6694

SIRIM QAS International Sdn. Bhd.
Block 8, SIRIM Complex
1, Persiaran Dato' Menteri, P.O. Box 7035
Section 2, 40700 Shah Alam
Selangor
Tel: (603) 5544 6400
Fax: (603) 5544 6810

National Precision Tooling Sdn. Bhd.
1st Floor, Building 25, SIRIM Complex
1, Persiaran Dato' Menteri, P.O. Box 7035
Section 2, 40700 Shah Alam
Selangor
Tel: (603) 5544 5097
Fax: (603) 5544 5094

SIRIM STS Sdn. Bhd.
1st Floor, Building 2, SIRIM Complex
1, Persiaran Dato' Menteri, P.O. Box 7035
Section 2, 40700 Shah Alam
Selangor
Tel: (603) 5544 6203 / 6202
Fax: (603) 5544 6348

OFF CAMPUS

SIRIM Standards Technology Sdn. Bhd.
Lot 10-20, Kawasan MIEL, Fasa 2
Jalan Beremban 15/12
40000 Shah Alam
Selangor
Tel: (603) 5510 9066
Fax: (603) 5510 9077

SIRIM Measurements Technology Sdn. Bhd.
Lot PT 5285 Off Lebuhraya Puchong-Sg Besi
Bukit Jalil, 57000 Kuala Lumpur
Tel: (603) 8994 1568
Fax: (603) 8994 1528

SIRIM Tech Venture Sdn. Bhd.
Lot 13, Jalan Pahat 16/8A, Seksyen 16
40200 Shah Alam
Selangor
Tel: (603) 5510 0433
Fax: (603) 5510 2488

National Metrology Institute of Malaysia
Lot PT 4803, Bandar Baru Salak Tinggi
43900 Sepang
Selangor
Tel: (603) 8778 1605
Fax: (603) 8778 1616

Automotive Development Centre
Lot PT 5285, Off Lebuhraya
Puchong-Sg Besi
57000 Bukit Jalil
Kuala Lumpur
Tel: (603) 8992 6043
Fax: (603) 8992 6190

System Design Centre
Lot PT 5285, Off Lebuhraya
Puchong-Sg Besi
57000 Bukit Jalil,
Kuala Lumpur
Tel: (603) 8992 6043
Fax: (603) 8992 6190

Industrial Design Centre
Lot PT 5285, Off Lebuhraya
Puchong-Sg Besi
57000 Bukit Jalil
Kuala Lumpur
Tel: (603) 8992 6043
Fax: (603) 8992 6190

Advanced Materials Research Center
Lot 34, Jalan Hi-Tech 2/3
Kulim Hi-Tech Park
09000 Kulim
Kedah
Tel: (604) 4017 101
Fax: (604) 4033 225

Machine Technology Centre
No. 1A, Persiaran Zurah
Kawasan Perindustrian RASA
44200 Hulu Selangor
Selangor
Tel: (604) 6063 6000
Fax: (604) 6063 6163

STATE OFFICE

SIRIM Northern Region (Pulau Pinang Office)
Lot PT 483 Mukim 6,
Jalan Permatang Pauh,
13500 Permatang Pauh,
Pulau Pinang
Tel: (604) 5377435
Fax: (604) 5377436

SIRIM Northern Region (Perak Office)
Lot 67 & 68, Jalan Johan 1/1,
Kawasan Perindustrian Pengkalan II,
Fasa 1, 31550 Pusing,
Perak Darul Ridzuan
Tel: (605) 3669035 / 3669036
Fax: (605) 3663037

SIRIM Melaka
No. 1112-1,
Kawasan Perindustrian
Batu Berendam,
75350 Melaka
Tel: (603) 8992 6043
Fax: (603) 8992 6190

SIRIM Johor
No. 3, Jalan Teknologi 5,
Taman Teknologi Johor,
81400 Senai,
Johor Darul Takzim
Tel: (607) 5990033 / 5990077
Fax: (607) 5998366

SIRIM East Coast Region (Pahang Office)
Jalan Pintasan
Kuantan-Kuala Terengganu,
Kawasan Perindustrian Gebeng,
26100 Kuantan,
Pahang Darul Makmur
Tel: (609) 5836336 / 5837600
Fax: (609) 5836767

SIRIM East Coast Region (Terengganu Office)
Lot 1929P,
Kawasan Perindustrian Chendering,
21080 Kuala Terengganu,
Terengganu Darul Iman
Tel: (603) 8778 1600
Fax: (603) 8778 1661

SIRIM Sarawak
Lot 802,
Tmn Perindustrian Demak Laut,
Jln Bako, Peti Surat 3292,
93764 Kuching, Sarawak
Tel: (6082) 439052 / 439054
Fax: (6082) 439060

SIRIM Sabah
Beg Berkunci 2072,
88999 Kota Kinabalu,
Lot 1, Fasa 1,
Zon Perdagangan (KKIP),
Jalan Timur 6, 88450 Sabah
Tel: (6088) 497082 / 490873
Fax: (6088) 496357


SIRIM

www.sirim.my

SIRIM Berhad
No. 1, Persiaran Dato' Menteri, Seksyen 2, Peti Surat 7035, 40700 Shah Alam, Selangor Darul Ehsan
Tel: 603 5544 6000 Toll-Free: 1 300 88 7035 Fax: 603 5510 8095