MESTECC CALL FOR PROPOSAL NO 1/2018

GUIDELINES FOR APPLICATION

A. OBJECTIVE

On 29 August 2018, YB Minister of MESTECC has launched Roadmap Towards No Single-Use Plastic 2018 – 2030. The Roadmap intends to provide opportunities for the local industries to embrace new eco-friendly alternatives that could facilitate penetration to a wider global market as the world move towards adapting products and processes that can address plastic pollution.

To support the implementation of the Roadmap, applicants are invited to submit **ONE** proposal for pre commercialization from **ONE** of the following challenges:

a. ***Develop a cost effective, user-friendly, simple and rapid testing device to differentiate between biodegradable and compostable plastic with conventional plastic****.* Detailed information as per Attachment 1.

b. ***Establish a pre-treatment method to remove the moisture content and the greasy property without damaging the fibre content of EFB. The treated EFBs can then be directly used as a feedstock to produce low cost biodegradable and compostable food packaging products that comply with local and international standards.****"* Detailed information as per Attachment 2.

c. ***Produce bioplastic resins based on non-edible starch or crude palm oil (CPO) for the manufacturing of bioplastic products. Resins or products produced by these resins shall be completely biodegradable and***

compostable, and comply with standards such as EN 13432, ASTM 6400 and Eco Label 001. Detailed information as per Attachment 3.

B. APPLICATION PERIOD

The application period for this Call for Proposal is from **1** to **21 November 2018**.

C. FUNDING SUPPORT

MESTECC would co-fund the project according to the funding level and quantum shown below:

Technological Readiness Level (TRL)	**Pre Commercialization** (TRL 4 – 6)
MESTECC grant quantum	**70 percent** (capped at RM5 million per application)
Company financial contribution	**30 percent**

Funds will be disbursed as follows:

- The first 20 percent of the approved grant quantum by MESTECC will be disbursed upon signing of agreement; and
- The remaining 80 percent of the approved grant quantum will be disbursed upon the submission of the milestone reports, subject to verification and endorsement by MESTECC Expert Panel.

Scope of funding are as follow:

SCOPE	ITEM FUNDED	ITEM NOT FUNDED	NOTES
Pilot plant / prototype	• Only equipment directly related to the pilot plan/ prototype	• Capital asset such as land, building, vehicle and furniture • Lab apparatus • Equipment maintenance	Not more than **40%** of fund approved
Pre-clinical testing/clinical testing/field trials/stress test/user acceptance test	• Screening test • Payment for volunteers • Data analysis		
Intellectual Properties (IP)	• For registration in Malaysia only • IP resulting from the project i) Patent ii) Industrial Design	• Maintenance • Patent Cooperation Treaty (PCT)	

Market testing and evaluation	• Survey development • Data analysis • Sample size should follow the statistical standard	• Incentive for respondents • Facility rental and exhibition fee	• Not more than **10%** of fund approved
Raw materials /consumables directly related to the project	• Raw material • Consumable	• Product and packaging design • Brochure • Advertisement • Web design and development • Product launching	
Regulatory and standards compliance	• Registration of certification • Product testing and standard compliance		

Special Services	• Consultancy (agreement / letter of intent must be submitted together with the project proposal, details of the consultancy to be stated) • Consultant for market testing and evaluation • Sample testing and analysis • Data processing • IP incentive	• Production out-sourcing • Travelling and transportation • Organizing meeting • Stationery such as papers, books, etc. • Personal computer, laptop, printer, scanners, toner, etc. • Subscription to journals • Conference fee • Exhibition fee	Not more than **20%** of fund approved

D. ELIGIBILITY CRITERIA

- Project must be **conducted in Malaysia.**
- Company must have a minimum of **51 percent equity held by Malaysians.**
- Company must be in **operation for at least 2 years** from date of application.

- None of the **company directors or project team members** has been convicted of any fraudulent activities or the company has been declared bankrupt, under liquidation or placed under receivership.

- Only **Malaysian citizens employed by the company can apply and lead the project** but can include international organizations or expatriates working in any of the organizations mentioned above as part of their project team.

- The project team should consist of **members who are qualified and competent** on the technical aspects of the whole project.

- Company to **collaborate** with Malaysian Institution of Higher Learning, Research Institution or Science, Technology and Innovation Institution.

- Company is allowed to **implement only one project** throughout the duration of the contract.

E. EVALUATION CRITERIA

The proposals for R&D projects will be evaluated based on the following:

- Potential to **meet the objective** of this call;

- **Commercialization potential** of project;

- **Benefit and impact** to socio-economy; and

- **Technical competencies and experience** of project team members.

F. APPLICATION PROCESS

All applications must submit a proposal summary in the form of Concept Note attached as **Appendix 4**. Completed Concept Note must be submitted to Fund Division (Evaluation Section) at helpdesk-edana@mestecc.gov.my. Any request for amendment after submission of the Concept Note will not be entertained.

Candidates whom proposal summary are selected will be notified and invited to submit a full proposal, including relevant supporting documents and evidences, for assessment and evaluation.

G. OTHER INFORMATION

MESTECC has the right to reject any application or claims and its decision is final.

For further information, please contact Fund Division, MESTECC at helpdesk-edana@mestecc.gov.my or phone no: 03-8885 8305/8322/8704/8666.

Attachment 1

TITLE	STRENGTHENING ENFORCEMENT OF BIOPLASTIC WITH THE RAPID TESTING KIT
PROBLEM STATEMENT	Several local municipal councils and state governments have taken proactive initiatives to ban non-biodegradable or fossil fuel based hydrocarbon plastic bags. They have introduced biodegradable and compostable plastic bags as alternatives. Currently there are 10 biodegradable and compostable plastic bag manufacturers that have been certified by SIRIM under the Eco Label 001:2016 scheme. These manufacturers are the supplier to the respective states and local municipal councils that have enforced the use of biodegradable and compostable plastic bags. List of states and their respective usage of bioplastic: 1. Melaka state (Biodegradable and compostable plastic products) 2. Wilayah Persekutuan (Biodegradable and compostable plastic products) 3. Johor (Oxo-biodegradable plastic products) Currently the verification of biodegradable and compostable plastic is through visual inspection. As the enforcement bodies foresees the risk of having conventional plastic being labelled as biodegradable or compostable plastic, there is a need to develop a kit that can be use during site inspection to differentiate and verify the authenticity of the biodegradable or compostable plastic.

SPECIFICATION	To develop a cost effective, user-friendly, simple and rapid testing device to differentiate between biodegradable and compostable plastic with conventional plastic.
JUSTIFICATION	According to figures published in 2015, it's estimated that 8 million tonnes per year of plastic litter the world. Plastic is a major global pollution issue and many countries have taken measure to address this matter. A study published in Science (2015), highlighted that out of 192 coastal countries in the world, Malaysia is the eighth largest producer of mismanaged plastic wastes. Hence there is a dire need to minimise the use conventional plastic and its pollution and mismanagement that threatens biodiversity and takes up land fill space. While reducing usage of conventional plastic is ideal but as an interim we may need to provide an alternative which are friendlier to the environment. Degradable plastic are categorised into 4 types: biodegradable, compostable, oxo-degradable and photodegradable. However, only biodegradable and compostable plastics are deemed as safe to the environment because they will degrade in the presence of microbes. Several local municipal councils and state government have taken initiatives to ban conventional plastic bags and some had introduced the biodegradable and compostable plastic bags as alternatives. Ministry of Federal Territories (KWP) and the local municipal councils under its purview, Kuala Lumpur City Hall (DBKL), Putrajaya Corporation (PPj) and Labuan Corporation are among those that have embarked on this initiative. Ministry of Federal Territories (KWP) will take a five-pronged approach to ensure that the ban is

	enforced. These are: revoking license, imposing a penalty, forfeiting deposit, confiscating goods and imposing jail term. KWP had made three major amendments to the law to nab those not following the rules. For Putrajaya and Kuala Lumpur, the local councils will use the 1Wilayah Licensing by-laws in the Local Government Act 1976 to carry out enforcement, and licence holders who failed to adhere to the to the ruling will be compounded up to RM2,000. Meanwhile in Labuan, compounds will be issued under the Trades Licensing Ordinance 1948. To assist in the enforcement by these organisations, a rapid testing kit that can differentiate real biodegradable/compostable plastic bag is very much in need. The kit should be very simple, easy to use and cost effective.
STAKEHOLDERS	KWP, DBKL, PPj, PL, other state governments and local authorities

Attachment 2

TITLE	THE PRODUCTION OF BIOMASS-BASED FOOD PACKAGING USING EMPTY FRUIT BUNCH
PROBLEM STATEMENT	Empty fruit bunches (EFB) which are waste material from the palm oil milling process are a huge environmental pollutant in Malaysia. Currently, in Malaysia 20 million MT of EFB are being generated by the palm oil industry per annum. As to date, huge volumes of EFB that are generated are being dumped in landfills where they contribute to enormous amount of environmental and emission problems. In other developed countries such as the US and Europe, their agriculture waste such as sugar cane bagasse, corn stover and many other type of waste are reintroduced into the economic chain by processing the waste into downstream products such as bio based packaging products, biochemicals, etc. EFB are one of the major wastes that is generated by the agriculture industry in Malaysia. Unlike other agriculture waste such as sugar cane bagasse or corn stover, EFB appears to be a challenging feedstock to be further processed into downstream products such as bio based food packaging products or other disposable products. This is due to the nature of EFB itself where they have a very high moisture content and greasy property. In addition to that, the current treatment method for EFB that is available right now is to produce EFB pellets and papers, this form of processed EFB has very low value and is not suitable to be used as a feedstock to produce biodegradable and compostable food packaging

	products. This is due to the composition of fibers that are not suitable to be used for food packaging products as the quality of the fibers gets damaged due to the processing factors and it is also expensive to buy as a feedstock. Hence processing it further to produce biomass based packaging or other value added products becomes very challenging.
SPECIFICATION	To establish a pre - treatment method to remove the moisture content and the greasy property without damaging the fibre content of EFB. The outcome of this project is the establishment of a controlled pre - treatment process where the treated EFB's can be directly used as a feedstock to produce biodegradable and compostable food packaging products that could replace polystyrene in both local and international market. With the outcome of this project, EFB can replace the current feedstock that is being used to produce biodegradable and compostable food packaging products. The current feedstock that is being used currently by the industry is kraftliner which cost about RM1,500 per ton. On the other hand, EFB will only cost less than RM100 per ton. The final product should comply with local and international standards, and at a low comparable cost.

JUSTIFICATION	The demand for the usage of biodegradable and compostable food packaging is increasing locally and globally. The global biodegradable and compostable packaging is witnessing steadfast growth over the past few decades owing to the numerous applications of biodegradable and compostable packaging across several end-use industries. The biomass based packaging market is primarily driven by the growth of the packaging industry and shift in consumer preference for eco-friendly packaging solutions. Currently, several states in Malaysia have banned the usage of polystyrene as food packaging. Malaysia has abundant of EFB which generated as waste from palm oil mills can be utilised as feedstock for biodegradable and compostable food packaging. EFB of palm have scarcely been in use and have been just cast away. For producing 1 ton of palm oil, 1.07 ton of EFB is generated. Therefore the amount of EFB just thrown away every year in Malaysia comes up to 20 million ton. Currently, EFB is not used as feedstock in biodegradable and compostable food packaging manufacturing in large scale due to several technical hurdles, such as no matured technology that could convert EFB into food packaging products. EFB fibers are naturally occurring composites consisting primarily of rigid, crystalline cellulose microfibers which are embedded in a soft matrix of hemicellulose and lignin. This property of EFB fibers that has a non-uniformed distribution of short and long fiber makes it very complex to be molded into packaging material. Proper technology of EFB by various mechanical, chemical and biological methods should be

	established to enhance the uniformity of fiber distribution. If the issue of using EFB as feedstock can be solved, it can help the palm oil industry to add value on the EFB thus helps in reducing the disposal issue and also benefiting the biodegradable and compostable food packaging industry by having locally sourced feedstock. The usage of EFB as feedstock might reduce the total production cost thus making biodegradable and compostable food packaging more practical as a replacement for polystyrene food packaging. The success of this project will be an enabler for the biodegradable and compostable packaging industry to get access to a locally sourced feedstock with a better quality at a significantly cheaper price than the alternatives feedstock that is expensive and some also has to be imported from overseas (such as sugarcane bagasse, tapioca starch, etc).
STAKEHOLDERS	Food industries Food business operators

Attachment 3

TITLE	TECHNOLOGY FOR PRODUCING STARCH BLENDED/ CRUDE PALM OIL BASED RESIN FOR THE MANUFACTURING OF BIOPLASTIC PRODUCTS
PROBLEM STATEMENT	Environmental problems related to plastic waste has become a major problem in Malaysia where it has been ranked as 8th among the countries with top ten of mismanaged plastic waste in the world. The increase in the local production and consumption of single-use plastic carrier bag has led to the increase in the volume of mismanaged plastic waste. The mismanaged plastic waste directly contributes to the land and water pollution which has resulted in enormous amount of plastic waste accumulation in our landfills and marine environment. Subsequently, the demand for alternative products that are environmentally friendly has also been increasing gradually in Malaysia and also in many other countries around the world. In addition to that many state governments in Malaysia such as Selangor, Penang, Wilayah Persekutuan and Johor have also been trying to promote alternative options to curb the environmental problems in their respective regions. However, there is a misalignment in the policy in various states where each of the states decided to use their respective mechanism to curb the environmental problems. The list of the states and the choices of alternative product/mechanism are listed as below.

	Penang	Levy on consumers	Total ban of single-use plastic carrier bags every day of the week started in 2011. Imposing a charge of RM0.20 for each single-use plastic carrier bags requested over checkout counter.
	Selangor	Levy on consumers	Total ban of single-use plastic carrier bags every day of the week started in 2017. Imposing a charge of RM0.20 for each single-use plastic carrier bags requested over checkout counter.
	Melaka	Ban	Total ban of single-use plastic carrier bags made from petroleum by-products every day of the week started in 2016. Made mandatory for business premises to use only biodegradable and compostable single-use plastic carrier bags and food containers. Made mandatory for business premises to use only biodegradable

			and compostable single-use plastic carrier bags certified with ECO label 001 by SIRIM.
	Wilayah Persekutuan	Ban	Total ban of single-use plastic carrier bags made from petroleum by-products every day of the week started in 2017. Made mandatory for business premises to use only biodegradable and compostable single-use plastic carrier bags certified with ECO label 001 by SIRIM. All business premises are also prohibited from charging RM0.20 to the shoppers.
	Johor	Ban	Total ban of single-use plastic carrier bags made from petroleum by-products every day of the week started in 2018. Made mandatory for business premises to use only oxo-biodegradable, biodegradable and compostable single-use

			plastic carrier bags and food containers. All business premises are also prohibited from charging RM0.20 to the shoppers.

Although conventional plastic products come with a very cheap price for the consumers, the back end problems faced by the local municipalities in many states nationwide includes the cost to collect, remove, and dispose or recycle the plastic waste has been enormous for the government of Malaysia.

The existing technology to produce environmentally friendly products such as biodegradable and compostable plastic products comes with a high cost and lower tensile strength if compared to conventional plastic products.

There is a strong drive from the market for a technology that could produce biodegradable and compostable plastic products which are also affordable that comes with good tensile strength.

SPECIFICATION	To establish a technology to produce bioplastic resins for the manufacturing of bioplastic products with strong tensile strength, and may be used in several plastic industries, extrusion, injection moulding, thermoforming etc. Bioplastic resins are precursor materials that will be used to produce bioplastic products. Non edible starch or crude palm oil (CPO) will be used as a feedstock to produce the bioplastic resins. The starch-based bioplastic resins produced at the outcome of this project will be completely biodegradable and compostable and shall comply

	with international standards such as the EN 13432 and ASTM 6400 and local standard SIRIM Eco Label 001. The resins can also be blended and compounded according to the industry specification as the resins can be used to produce a wide range of products transparent natural colour and coloured bioplastic products such as bioplastic straws, cutlery, trays, cups and food containers etc.
JUSTIFICATION	Plastics have been used widely for packaging material since long time ago. However, plastic waste can pollute the environment because of its resistance to be biodegraded by microorganisms. Efforts have been conducted to develop environmentally friendly plastics from renewable resources. Starch is one of the most studied and promising raw materials for the production of biodegradable plastics, because starch is quite cheap, abundant, biodegradable and edible. Starch blended bioplastic nowadays can produce finished products that have a good mechanical strength, glossy surface, perfect elongation strength, good flexibility and toughness the challenge is to develop different grades for different applications. By having different grades, more product diversification can be produced. An analysis of a new market research report stated that “starch blends are expected to account for the largest share in the market” from 2015 to 2020. Out of the 2.05 million tons of bioplastics produced in 2017 worldwide, starch blends accounted for 18.8%. The success of this project will result in a breakthrough in the bioplastic industry where many problems in the industry such as the, low tensile strength of products and the high manufacturing cost of bioplastic polymers will be addressed and solved

	accordingly. Although the raw materials to produce this resin are non-edible starch which has to be imported, establishing a local biodegradable and compostable resin industry will create a substantial value addition mechanism for the existing plastic industry in Malaysia where the industry could capitalise the existing infrastructure of the conventional plastic industry. Besides that, CPO which is a locally available raw material is also another potential feedstock that could replace non- edible starch in the long run. Considering the fact of the increasing demand for biodegradable and compostable resins globally, the success of this project will also become an enabler for Malaysia to become a manufacturing hub for biodegradable and compostable resins in the ASEAN region.