



Always A Pioneer, Always Ahead



# UTeM


UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## Kursus Wajib DS 51/52


## Pelaksanaan & Kepemimpinan Penyelidikan

Dewan UTeM 1, Kampus Teknologi UTeM  
23 September 2020












## Presentation outline



Always A Pioneer, Always Ahead

-  My background
-  Securing competitive grants
-  Types of KPT grants
-  FRGS Assessment Criteria
-  Writing a winning research proposal
-  Journey in securing UK EPSRC grant





## Background



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### ACADEMIC QUALIFICATIONS

1. BEng (Control and Instrumentation), Universiti Teknologi Malaysia. 2001
2. MEng (Electrical Engineering), Universiti Teknologi Malaysia. 2003
3. PhD (Power System), Imperial College London, UK. 2011



### PROFESSIONAL MEMBERSHIP

1. Professional Engineer (PEng) registered with the Board of Engineers Malaysia (BEM)
2. Chartered Engineer (CEng), the Engineering Council, UK
3. Senior Member, The Institute of Electrical and Electronics Engineers (IEEE, USA)

### PROFESSIONAL COMPETENCY

1. Qualified Person for Grid-Connected Photovoltaic (GCPV) System Design, Sustainable Energy Development Authority (SEDA), Malaysia
2. SEDA Certified Trainer for Wiremen and Chargeman



## Background (cont'd)



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### • Postgraduate supervision

- PhD (1 graduated; 1 waiting for viva, 3 on-going)
- MSc (6 graduated; 3 on-going)



### • Publication

- Google Scholar (H-index 17)
- Scopus (H-index 13)
- WOS (H-index 10)



### • Research funding

- Secured over RM1 million of funding as PI
- National (5 projects as PI)
- International (Malaysia PI for 1 project funded by EPSRC, UK)

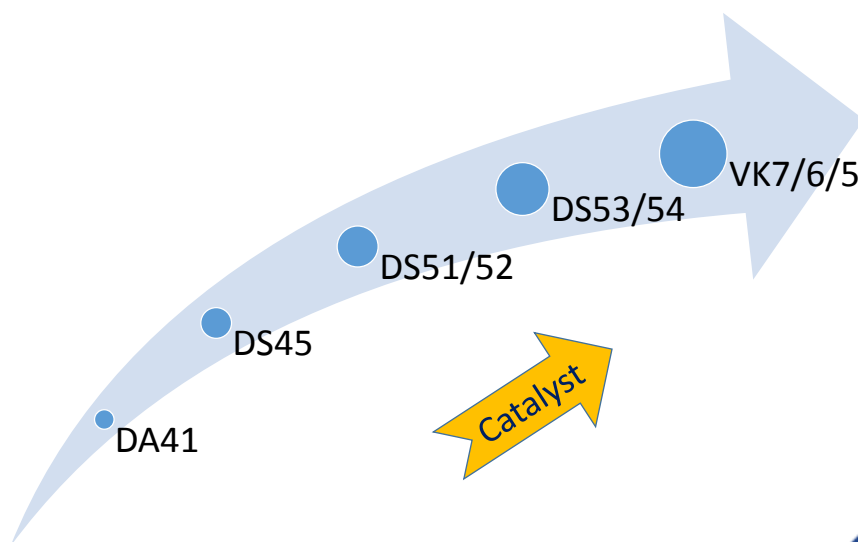


## List of grants (last 5 years)

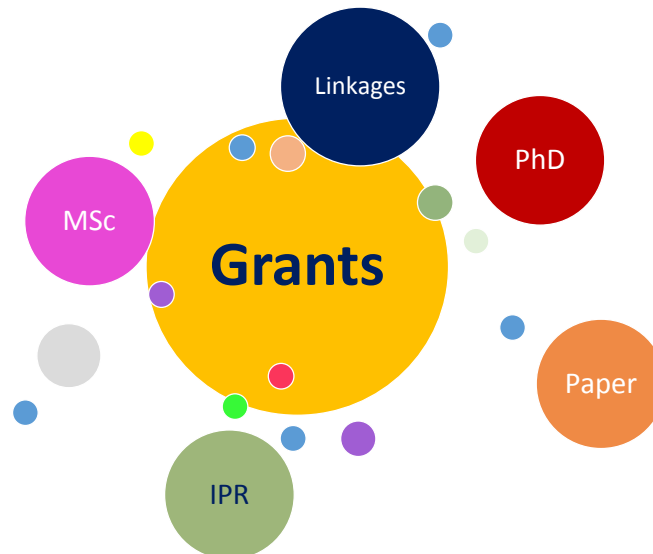
LIST OF GRANTS (last 5 years)

YEAR AWARDED	TITLE OF PROJECT	TYPE OF GRANT	AMOUNT (RM)
2019	A NEW FRAMEWORK OF VIRTUAL MICROGRID DEPLOYMENT USING COMMUNITY ENERGY STORAGE IN PHOTOVOLTAIC RICH RESIDENTIAL NETWORKS UNDER MALAYSIA'S ELECTRICITY CONTEXT	GERAN PACER (NATIONAL)	59300
2019	A TECHNICAL LOSSES EVALUATION METHODOLOGY FOR SYSTEM WIDE MALAYSIAN POWER DISTRIBUTION NETWORK BASED ON REPRESENTATIVE NETWORK AND ENERGY FLOW MODEL	GERAN PACER (NATIONAL)	59300
2019	A NEW METHOD TO QUANTIFY SOLAR RESOURCE VARIABILITY AND FORECAST PV POWER OUTPUT FOR GRID-CONNECTED PV SYSTEMS IN MALAYSIA	GERAN FRGS (NATIONAL)	91500
2019	SOLAR IRRADIANCE MODELLING AND FORECASTING USING GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) RECEIVER	GERAN FRGS (NATIONAL)	118000
2019	A NEW LOCAL SEARCH ALGORITHM FOR MINIMUM SPAN FREQUENCY ASSIGNMENT IN MOBILE COMMUNICATION	GERAN FRGS (NATIONAL)	48800
2019	LOSS OF MAINS DETECTION TECHNIQUE USING RATE OF CHANGE OF POWER AND VOLTAGE UNBALANCED FOR DISTRIBUTED GENERATION	GERAN FRGS (NATIONAL)	48150
2019	INVESTIGATION ON THE POTENTIAL BENEFITS OF ENERGY STORAGE SYSTEM FOR MALAYSIA FUTURE POWER SYSTEMS	GERAN FRGS (NATIONAL)	70400
2018	DEVELOPMENT OF GRID-CONNECTED SOLAR PHOTOVOLTAIC SYSTEM WITH BATTERY ENERGY STORAGE	GERAN INDUSTRI (INDUSTRY)	100000
2018	TERSE: TECHNO-ECONOMIC FRAMEWORK FOR RESILIENT AND SUSTAINABLE ELECTRIFICATION	GERAN ANTARABANGSA (INTERNATIONAL)	729999
2018	GERAN SANJUNGAN INSENTIF PENERBITAN JURNAL 2018	GERAN SANJUNGAN INSENTIF PENERBITAN JURNAL (UTEM)	3000
2017	INTEGRATING CLOUD-BASED MONITORING, CONTROL AND ANALYSIS SYSTEM FOR SOLAR PHOTOVOLTAIC RENEWABLE SYSTEM	SHORT TERM (UTEM)	20000
2017	A NEW OPTIMIZATION TECHNIQUE OF SUPPORT VECTOR MACHINE FOR ELECTRICITY MARKET PRICE FORECASTING	GERAN FRGS (NATIONAL)	80266
2018	FEASIBILITY STUDY ON THE IMPLEMENTING OF 33KV PARABOLIC DISH BASED CONCENTRATING SOLAR POWER UNDER MALAYSIA ENVIRONMENT	HIGH IMPACT (UTEM)	44000
2018	FUNDAMENTAL STUDIES OF ENHANCED BATTERY MANAGEMENT SYSTEM (BMS) FOR ELECTRIC VEHICLE	HIGH IMPACT (UTEM)	50000
2016	SMART GRID APPLICATION VIA HOME AUTOMATION SYSTEM	SHORT TERM (UTEM)	20000

## The academic career path ...



## The importance of securing grants



## Impacting society, industry, government and academia

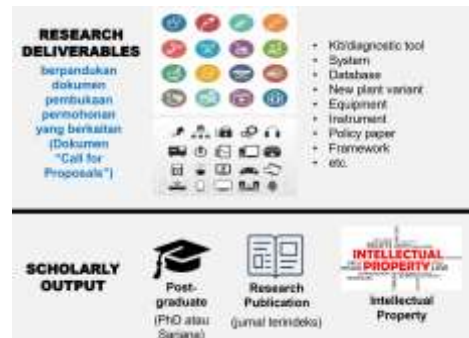



"Ahli akademik perlu mengubah corak pemikiran dari 'ilmu untuk ilmu' kepada 'ilmu untuk masyarakat dan negara'.

Dalam konteks ini, hala tuju penyelidikan perlu sejajar dengan cabaran dan mengupas persoalan yang dihadapi oleh komuniti setempat, bangsa dan masyarakat seagat," katanya.


## The grant journey ...

- Aware and follow the grant calls, locally and internationally
- Always keep abreast with the latest development
- Grant hunting (KPT, Industry, MTUN, International)
- Have a well-balanced team
- Writing a winning proposal
- Project execution
- Deliverables







KEMENTERIAN PENDIDIKAN TINGGI MALAYSIA  
MINISTRY OF HIGHER EDUCATION MALAYSIA



MyGRANTS  
MALAYSIA GRANTS BERSAMA-SAMA MELAKSANAKAN TRANSFORMASI




GCRF  
Global Challenges Research Fund



Universities UK  
INTERNATIONAL

Utama Profil Korporat Info MyGRANTS Geran Penyelidikan Output Carian MyGRANTS Kerjaya


**BIDANG FOKUS (FOCUS AREA) | PRGS 2.0 TAHUN 2020**  
Pembukaan permohonan 7 Domain Penyelidikan KPT dan 21 Bidang Fokus



Portal Rasmi  
Kementerian Sains, Teknologi Dan Inovasi (MOSTI)

Utama Profil Korporat Informasi Program Dana & Geran

Dana R&D  
Dana Kolaborasi Antarabangsa (ICF)  
Dana Program Malaysia  
Social Innovation (My...)



HAKIKEDAN

For more information about the UK government's website

**GCRF Bulletin**

The Global Challenges Research Fund (GCRF) is a £4.5bn UK Government fund delivered by UKRI: Academy of Medical Sciences, Royal Society, British Academy, Royal Academy of Engineering and UK Space Agency.

Please complete this form to subscribe to GCRF email updates from Universities UK International (UKI).

First Name:

Deadline	Delivery Partner	Call
27 August 2020, 4pm UK time	UKRI (ESRC)	<b>COLOMBIA</b> <a href="#">Enhancing understanding and support for mental health challenges in Colombia</a>
27 August 2020, 5pm UK time	British Council	<b>MALAYSIA</b> <a href="#">Newton Professional Development and Engagement Programme</a>

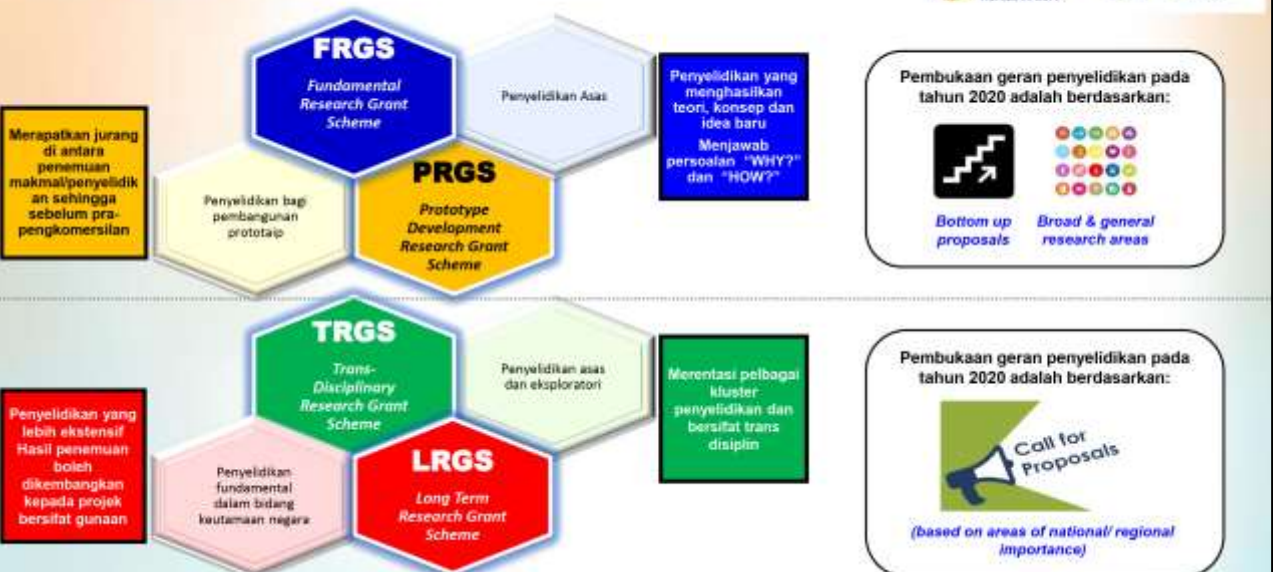


## Brainstorm a research topic

- Identify key challenges within your subject / expert area
  - Attend workshop, seminar, conference
  - Iqra – Read : Technical papers, reports, magazine etc
  - Follow : Facebook, Instagram, Twitter etc
- Always be ready, start writing down ideas

To have an opportunity  
VS  
Prepared for an opportunity

### SKIM UTAMA GERAN PENYELIDIKAN



Source: Jabatan Pendidikan Tinggi, KPM

## DEFINISI SKIM UTAMA GERAN PENYELIDIKAN FRGS, PRGS, TRGS & LRGS



KEMENTERIAN  
PENDIDIKAN  
MALAYSIA

**JPT**

JABATAN  
PENDIDIKAN  
TINGGI

### FRGS - Skim Geran Penyelidikan Fundamental

FRGS dapat menggalakkan penyelidikan asas untuk menjana ilmu yang mampu menyumbang terhadap peningkatan tahap intelektual, penciptaan teknologi baru dan penyuburan budayayang dinamik selaras dengan aspirasi negara.

FRGS bertujuan untuk **melonjakkan penjaanaan teori, konsep dan idea baru** yang dapat menjadi pemangkin kepada penemuan baru yang menerobos sempadan ilmu dan penciptaan inovatif.

### PRGS - Skim Geran Penyelidikan Pembangunan Prototaip

PRGS diwujudkan untuk membantu merapatkan jurang antara penemuan penyelidikan dan pengkomersilan bagi tujuan penciptaan teknologi baru selaras dengan keperluan K-Ekonomi dan pelaksanaan Model Ekonomi Baru.

PRGS dapat merapatkan jurang di antara penemuan makmal/penyelidikan sehingga sebelum pra-pengkomersilan. Ini termasuk pembuktian konsep (proof of concept), penilaian (evaluation), skala naik (up-scaling), ujian pra-klinal (pre-clinical testing) dan ujian lapangan (field testing).

### TRGS - Skim Geran Penyelidikan Transdisiplinari

TRGS adalah penyelidikan fundamental dan eksploratori yang dapat menggalakkan penjaanaan ilmu yang mampu menyumbang terhadap peningkatan tahap intelektual, perkembangan sempadan ilmu, penciptaan teknologi baharu dan penyuburan budaya yang dinamik selaras dengan aspirasi negara.

TRGS dapat membina kerjasama keserakanan **merentasi pelbagai domain penyelidikan dan bersifat transdisiplin**, bagi meletakkan Malaysia dalam peta dunia dari segi penyelidikan fundamental dalam kluster tertentu.

### LRGS - Skim Geran Penyelidikan Jangka Panjang

LRGS adalah penyelidikan fundamental yang melibatkan skop lebih ekstensif, dan tempoh masa yang panjang serta memerlukan komitmen yang tinggi. LRGS boleh menghasilkan teori dan idea baru yang terkehadapan dalam nic-nic yang strategik untuk perluasan sempadan ilmu.

LRGS dapat membina kerjasama keserakanan **merentasi pelbagai institusi dan bersifat antara disiplin (interdisciplinary)**, bagi meletakkan Malaysia dalam peta dunia dari segi penyelidikan fundamental dalam bidang-bidang fokus tertentu.

Source: Jabatan Pendidikan Tinggi, KPM



## DPF – BIDANG KEUTAMAAN TAHUN 2020

Setiap permohonan hendaklah memenuhi salah satu NPA, Kluster Penyelidikan dan Domain Penyelidikan



KEMENTERIAN  
PENDIDIKAN  
MALAYSIA

**JPT**

JABATAN  
PENDIDIKAN  
TINGGI

National Priority Area (NPA)	Research Cluster DP KPM 2019 - 2020	Research Domain DP KPM 2019 - 2020
Food Security	Social & Economic Wellbeing	<div>Pure and Applied Science</div> <div>Technology &amp; Engineering</div> <div>Social Science</div> <div>Information &amp; Communication Technology</div> <div>Clinical &amp; Health Science</div> <div>Arts &amp; Applied Arts</div> <div>Natural and Cultural Heritage</div>
Energy Security	Food Safety & Security	
Plantation Crops	Infrastructure	
Cyber Security	Climate Change & Environment	
Water Security	Health	
Biodiversity	Education & Knowledgeable Civil Society	
Healthcare & Medicine	National Security	
Environment & Climate Change	Frontier Technologies & Advanced Manufacturing	
Transportation & Mobility		

Penyelidik wajib untuk memilih salah satu NPA, salah satu Kluster Penyelidikan dan salah satu Domain Penyelidikan bagi setiap permohonan geran penyelidikan pada tahun 2020 (melalui MyGRANTS).

Source: Jabatan Pendidikan Tinggi, KPM



# The 17 Goals to Transform Our World



Source: <https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/>

# Wawasan Kemakmuran Bersama 2030

**WAWASAN KEMAKMURAN BERSAMA 2030**

**DEFINISI**  
Iltizam menjadikan Malaysia sebuah negara terus membangun secara mampan seiring dengan pengapungan ekonomi yang adil, inklusif dan semua peringkat kumpulan pendapatan, etnik, wilayah & rantau bekalan

**MATLAMAT**  
Menyediakan taraf hidup yang wajar kepada semua rakyat pada 2030

**OBJEKTIF KEMAKMURAN BERSAMA**

<p><b>1 PEMBANGUNAN UNTUK SEMUA</b></p> <p>Membina ekonomi yang lebih progresif berkeadilan etnik &amp; sosial bagi dengan penyertaan masyarakat yang menyumbang di semua peringkat</p> <p><b>MENSTRUTUR EKONOMI</b></p>	<p><b>2 MENANGANI JURANG KEKAYAAN &amp; PENDAPATAN</b></p> <p>Memangani jurang ekonomi antara kumpulan pendapatan, etnik, pembangunan wilayah &amp; rantau. Inklusif untuk memulau &amp; meningkatkan: kesepakan semua rakyat supaya tiada yang tertinggal</p> <p><b>MENANGANI KETIDAKSAMPAHAN</b></p>	<p><b>3 NEGARA BERSATU, MAKAMUR &amp; BERMARUAH</b></p> <p>Menjadikan Malaysia sebuah negara yang berkeadilan, inklusif dan berkeadilan dengan semua rakyat mencapai taraf hidup yang lebih tinggi</p> <p><b>MENBINA NEGARA</b></p>
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Integrasi Bersama

Source: <https://www.pmo.gov.my/ms/2019/10/wawasan-kemakmuran-bersama-2030/>



# Summary of FRGS Assessment

Assessment Criteria	Marks (%)
Title	5
Executive Summary	10
Research Background	15
Objectives	15
Methodology	25
Expected Result	10
Track Record and Composition of Team	5
Quality of Proposal	10
Elements of FRGS Criteria	5
Total	100

## Assessment Criteria

<p><b>Assessment Criteria</b></p> <p><b>Title (5%)</b></p> <p>Specific to nature reflecting fundamental issues to be investigated</p> <p>Brief and reflects the nature of the proposal</p> <p><b>Executive Summary (10%)</b></p> <p>Problem statement</p> <p>Objectives</p> <p>Methodology</p> <p>Expected outputs/outcome/implication</p> <p>Significance of output</p> <p><b>Research Background (15%)</b></p> <p>Elaboration of the:</p> <p>Clarity of problem statement and research question/hypothesis/thesis</p> <p>Check most recent (last 5 years) related references</p> <p>In line with government policy, national agenda and global aspiration (can help identify problem at local, national or world level)</p> <p><b>Objectives (10%)</b></p> <p>Specific, Measurable, Achievable, Realistic and within Time frame (SMART)</p> <p>Focus to address statement/research question</p> <p><b>Methodology (25%)</b></p> <p>Clear and detailed description of methodology (may consist of both work sampling techniques, interview session, analysis, etc work of different phases, experimental process, statistical analysis)</p> <p>Able to achieve research objectives</p> <p>Include research design, flow chart, draft chart, activities and milestones</p>	<p><b>Expected Result (10%)</b></p> <p>New theory or new findings/knowledge</p> <p>Publication in indexed journals (top tier)/intellectual property</p> <p>Talent - masters or PhD</p> <p>Impact on society, economy and nation</p> <p><b>Quality of Proposal (10%)</b></p> <p>Meticulous</p> <p>Proper use of language (grammar, spelling, sentence construction)</p> <p>Good formatting and presentation</p> <p><b>Elements of FRGS Criteria (5%)</b></p> <p>Novel, cutting edge, high impact</p>
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Each criteria must have score at least 5 to be eligible as Recommended / Highly Recommended

## Bonus (5%)

- Patent Search (2%)
- Collaboration (2%)
- Risk Assessment (1%)

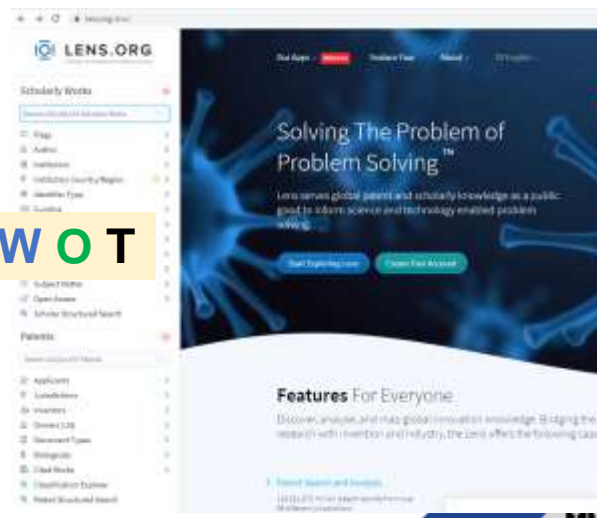
**FRGS**

CARIAN PATEN      Ditolakkan

KOLABORASI      Ditolakkan

PENGURUSAN RISIKO      Ditolakkan

**SWOT**



**MyUTeM**

## Evaluation (rating)

Rating	Kriteria Pemarkahan	Keputusan
1	Markah 59% dan ke bawah	<b>Not Recommended (NR)</b> (79% dan ke bawah)
2	Markah diperolehi 60% – 64%	
3	Markah diperolehi 65% – 69%	
4	Markah diperolehi 70% – 74%	
5	Markah diperolehi 75% – 79%	
6	Markah diperolehi 80% – 84%	<b>Recommended (R)</b> 80% – 84%
7	Markah diperolehi 85% – 89%	<b>Highly Recommended (HR)</b> (85% – 100%)
8	Markah diperolehi 90% – 94%	
9	Markah diperolehi 95% – 99%	
10	Markah diperolehi 100%	

Cadangan perakuan projek adalah  
**markah 80% dan ke atas**

# Quality of a good research proposal

- Catchy title
- Concise and solid objectives (3-4 objectives)
- Problem-oriented research background
- Cohesive research methodology
- Reflective milestone and project activities
- Relevant and up-to-date references
- Detailed and convincing budget
- Well balanced team

## Example

A. Application Details	
Application ID	213895-267164
Reference Code	FRGS/1/2018/TK04/UTEM/02/5
A(i). Selected Grant	FRGS 2018-1
A(ii). Title Of Proposed Research Project	Investigation on the potential benefits of energy storage system for Malaysia future power systems
A(iii). Keyword	Battery storage, Solar PV, Smart Grid

**Title – catchy and timely topics**

**Keywords- portray the outcome of the research work;**

**Must follow through and pop-up in ALL the sections**

## Executive Summary

Please include the following:

1. What drives this proposed work (**problem statement**)
2. What is the aim of this research (**objectives**)
3. How to achieve the objective (**methodology**)
4. What is the expected outcome
5. Potential impact of the research work
6. Avoid citing reference in this section

## Sample of Executive Summary

The Malaysian government has the ambition to increase the renewable generation mix in the country to 30% by 2025 with 1,250MW of solar energy. The high penetration of such renewable resources will inevitably introduce new challenges to the control and operations of the Malaysian future electricity system. In particular, solar photovoltaic plant with no rotational parts has zero inertia and the solar output is highly intermittent. This will significantly increase the occurrence of power mismatch in the system with concern on the short-term frequency stability problem. However the current regulatory instrument – The Grid Code for Peninsular Malaysia 2016 has yet to recognize these challenges in their latest revision. With the emergence of grid-scale energy storage technology, it opens up the opportunity to examine the effectiveness of energy storage system as the solution to the abovementioned challenges.

Therefore, the primary aim of this work is to explore the potential of grid-scale energy storage for the future power system in Malaysia that is characterized by more intermittent renewables. To achieve this, an improved multi-objective optimization technique will be developed to optimally allocate the energy storage system that will simultaneously minimize the solar output variability and satisfying other network constraints such as frequency deviation and voltage limit. In addition, various future development scenarios will be developed to examine the robustness of the optimized energy storage in response to different levels of solar penetrations and different generation mix. Lastly, the full value of energy storage system will be identified and quantified in the Malaysia context. This includes arbitrage, power balancing, frequency response provision and network support. It is expected that the findings of this research will provide valuable scientific evident to the Malaysian power utility on the benefits of energy storage system can provide to our future electricity power system.



## Literature review

- Research background and literature review should LEAD to the problem statement
- Should always relate to the proposed **Title** and **Executive Summary**
- **Avoid** introducing new idea
- Provide credible (prestigious journal in the relevant area) and up-to-date references

## Objective (s) of the research

Some good words to start with:

- To formulate .....
- To establish .....
- To correlate .....
- To investigate .....
- To design .....
- To examine .....

## Sample of Research Objective

1. **To devise** improved multi-objective optimization technique for energy storage system sizing that can minimize the intermittency of solar output and at the same time providing adequate reserve for frequency response service.
2. **To examine** future renewable contribution scenario in Malaysia renewable energy mix and the associated emerging technology, such as demand response in providing inertial response and frequency service to the system.
3. **To investigate** the possibility of coupling the energy storage system with the existing synchronous generator for both over and under frequency events.

## Further tips ...

- Tip 1: Read the grant call guidelines, do not ever assume !!!
- Tip 2: Fill up all the sections
- Tip 3: Honest budgeting



# NANUM Project

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## WHERE

- Kampung Tual, Kuala Lipis, Pahang, a 3-hour drive from KL
- Kampung Tual has **Pusat Didikan Komuniti (PDK)**, a learning centre run by 2 fulltime teachers
- It's also being used for other community activities
- Total population is 600 (80 children; 1-13 years old and 220 youth: 14-35 years old)

## WHAT

- Basic utility still lacking is **electricity**
- Electricity is needed to help the children learn at night and use computers
- It will also help the community to improve their economic livelihood by working on ethnic crafts for sales

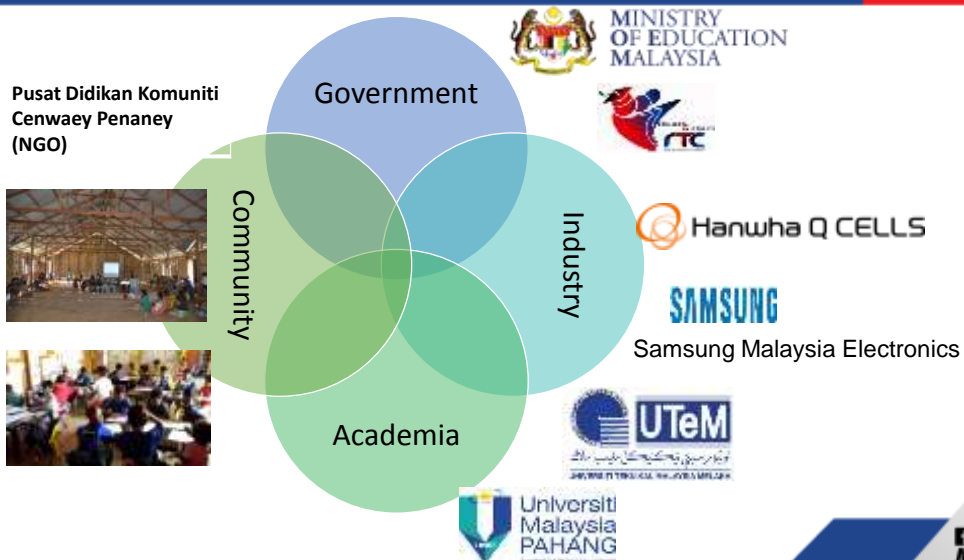
## HOW

- Provide electricity by:
  - installing **solar panel** with 4 kW capacity to PDK



# Example of Quadruple Helix Model

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## Best Academia-Industry Collaboration Award



## Example of a UK grant call

### Resilient and sustainable energy networks for developing countries

**Call type:** Invitation for proposals

**Closing dates:**

**Expression of Interest:** Thursday 17 August 2017 at 16:00

**Full proposal:** Thursday 21 September 2017 at 16:00

**Funding Available:** Up to £7.5 million is available from EPSRC for this call through the Global Challenges Research Fund. We aim to fund 6-8 research projects through this activity.

**How to apply:** Applicants must submit an Expression of Interest via the call page on the EPSRC website by 16:00 on 17 August 2017 to be considered through this call. Full proposals must be submitted by 16:00 on 21 September 2017.

Proposals will undergo peer review and assessment at a prioritisation panel.

**Key Dates:**

Activity	Date
Call for proposals issued	28 June 2017
Deadline for Expressions of Interest	17 August 2017, 16:00
Deadline for full proposals	21 September 2017, 16:00
Panel meeting	February/March 2018
Funding decision	March-April 2018
Grant start date (fixed)	01 May 2018

**Additional information:**

- As the funding is provided through the Global Challenges Research Fund, the research activity proposed must be in line with Official Development Assistance (ODA) guidelines, and evidence of ODA compliance must be provided in the application. For further ODA guidance, please see <http://www.rcuk.ac.uk/documents/international/gcrfodaguidance-pdf/>.
- Proposals to this call must focus on sustainable local energy networks, including off-grid to grid transitions



## Experience in securing UK grant



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**Before**

**During**

**After**



## TERSE Project Partners



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### United Kingdom



The University of Manchester

Prof Pierluigi Mancarella, Prof Duncan Shaw, Dr Mathaios Panteli



Prof Richard Dawson, Prof Qiuhua Liang

### Overseas Partners



廈門大學能源學院  
College of Energy - Xiamen University

Prof Fengyan Zhang



UTeM  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Dr Chin Kim Gan





## TERSE Supporting Partners



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### Chile (external research partner):



### Malaysia:



### China:



## From Quadruple to Quintuple helix



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SOCIETY



INDUSTRY



GOVERNMENT



ACADEMIA

MANCHESTER 1824  
The University of Manchester

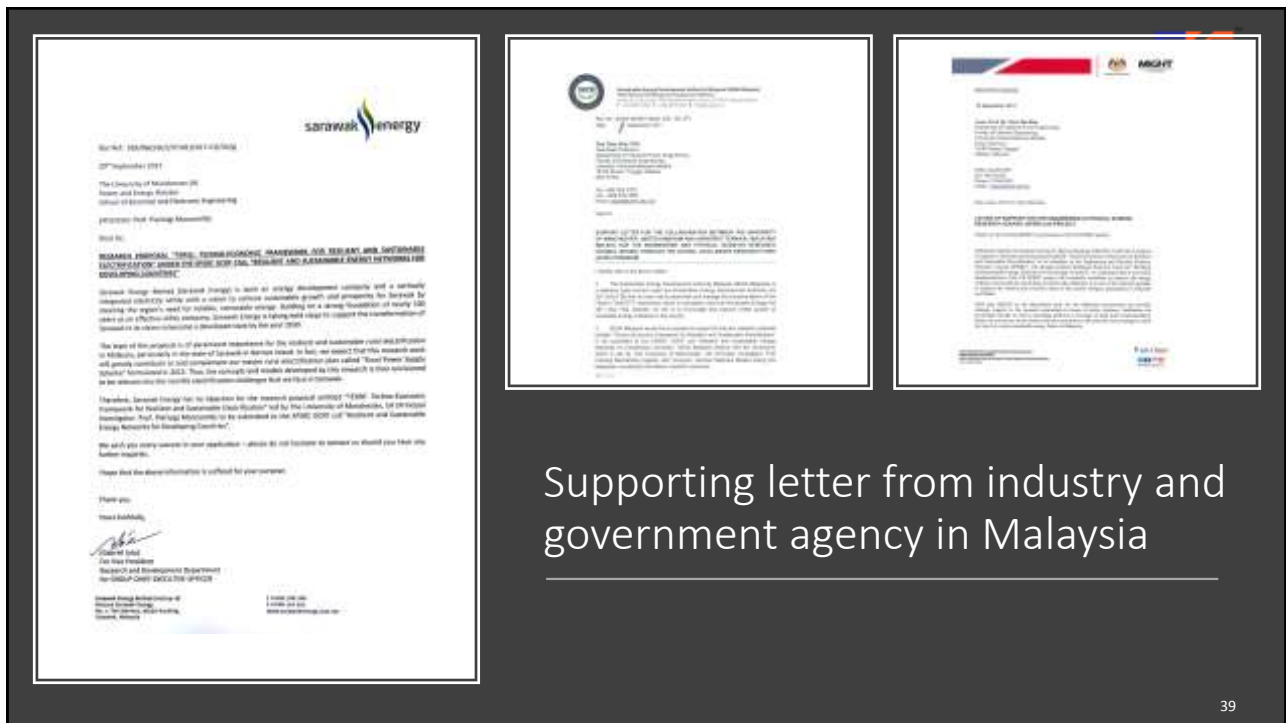


廈門大學能源學院  
College of Energy, Xiamen University



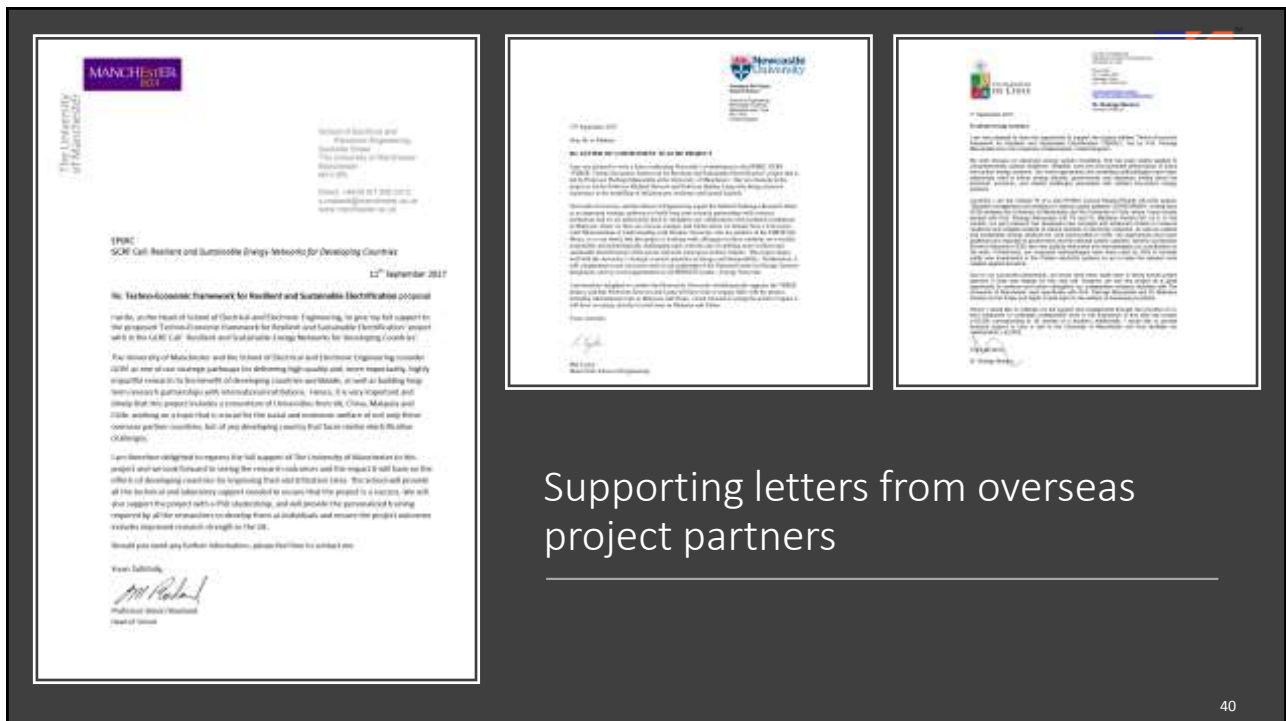
CLIMATE CHANGE





## Supporting letter from industry and government agency in Malaysia

39



## Supporting letters from overseas project partners

40



## Just after the grant was granted

Project starts date: 01 May 2018

- ✉ Mesyuarat #1 JKTSPi 23 Mei 2018 - Penerimaan
- ✉ Mesyuarat #2 ME 6 August 2018 - Pendahuluan
- ✉ Mesyuarat #3 JKTSPi - MoA 17.08.2018
- ✉ Mesyuarat #4 JK Tetap Kewangan 24 August - Pendahuluan
- ✉ Mesyuarat #5 Senat - MoA 29.08.2018
- ✉ Mesyuarat #6 Transformasi - MoA 7.Sept.2018

### EPSRC GCRF COLLABORATION AGREEMENT

THIS AGREEMENT dated 22<sup>nd</sup> November 2018

is made BETWEEN:

- 1) THE UNIVERSITY OF MANCHESTER whose administrative offices are at Oxford Road, Manchester, M13 9PL UK (hereinafter "Lead Party"); and
- 2) THE UNIVERSITY OF NEWCASTLE UPON TYNE whose administrative offices are King's Gate, Newcastle upon Tyne, NE1 7RU (hereinafter "UoN"); and
- 3) UNIVERSITI TEKNIKAL MALAYSIA MELAKA whose administrative offices are at Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia (hereinafter "UTeM"); and
- 4) XIAMEN UNIVERSITY whose administrative offices are at Xiamen University, No. 422, Siming South Road, Xiamen, Fujian, China. 361005 (hereinafter "XU"); and
- 5) LOUGHBOROUGH UNIVERSITY an exempt charity established by Royal Charter with number RC000332, whose office is Ashby Road, Loughborough, Leicestershire LE11 3TU (hereinafter "LU")

each a "Party" and collectively "the Parties".

Parties 2 to 5 collectively referred to as the "Collaborating Organisations"

#### WHEREAS

- A. The Lead Party was the lead applicant in a proposal to the Funding Body, for a research project called "TERSE: Techno-Economic Framework for Resilient and Sustainable Electrification" ("the Project") as set out in Schedule 1; and





UTeM



The University of Manchester



MIGHT



Sarawak Energy

## International grant: TERSE project meeting

43

## Sarawak Project Site Visit



44



Sarawak Energy Berhad

Ministry of Utilities  
Sarawak

**CONCEPT**

**T.U.N.A.I**  
**TECHNOLOGY**  
**@UNIVERSITY**  
**ADVANCING**  
**INDUSTRY AND SOCIETY**

**A University that produces highly skilled technologists and enhances inventions, thus impacting industries and society.**

**Majlis  
PERUTUSAN  
NAIB CANSOLOR  
2020**

*Menjuarai Teknologi,  
Merealisasikan Aspirasi*

  
VCUTeM

## UTeM's 7 Strategic goals



# Thank You



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