



Overcoming Barriers through Policy Advocacy & Investment Promotion: The Case of Ocean Thermal Energy-Driven Development in Malaysia

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Abstract

There are numerous barriers to anything new, the like of ocean thermal energy-driven development, even though it has been revealed over 1414 years ago, discovered in the early 19th century, demonstrated early in the last century, and revived in the Seventies, and is fast becoming an emerging technology in the 21st century. These barriers can be organised in four dimensions: legal-policy framework, institutional arrangement, finance, and technology. To overcome such barriers in Malaysia, UTM Ocean Thermal Energy Centre (UTM OTEC) is established since 3 January 2013; it undertakes, not like other R&D institutions, the reverse approach: commercialisation, first, to be followed by further development with the existing intellectual properties and research results, and more research to discover the required new advancement in knowledge and innovation. In order to commercialise the best commercially available technology, it conducts a number of activities, including a series of presentations to various stakeholders, including 69 government agencies, government linked companies, universities and research institutions, professional and scientific bodies, potential investors, locally and abroad, and others, through such processes so-called "policy advocacy" and "investment promotion". As a result, the establishment of the UTM OTEC has facilitated an easy access to various stakeholders by the order of 245%, that is, 49 post-2013 compared to only 20 over the period 2007-2012; the first Special Purpose Vehicle (SPV), for ocean thermal energy conversion to electricity or hydrogen (OTEC-H2), established since 18 November 2014, and by 1 June 2015, four more SPVs have been registered. The subject of "ocean energy" has been included in the 11th Malaysia Plan 2016-2020, for the first time ever, since the introduction of the first Five-Year Malaysia Plan back in 1965.






 **3rd International OTEC Symposium,
UTM KL, 1-2 September 2015**

**“OVERCOMING BARRIERS THROUGH POLICY ADVOCACY &
INVESTMENT PROMOTION:
THE CASE OF OCEAN THERMAL ENERGY-DRIVEN DEVELOPMENT IN
MALAYSIA”**

By
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 **OUTLINE OF PRESENTATION**

1. INTRODUCTION
2. BARRIERS
3. OVERCOMING BARRIERS
4. EFFORTS IN POLICY ADVOCACY & INVESTMENT PROMOTION
5. OUTCOME
6. THE WAY FORWARD

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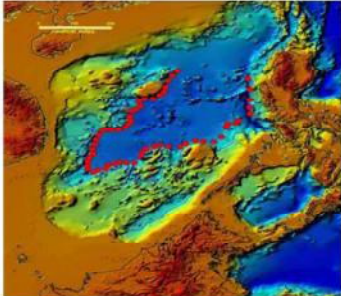


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1. INTRODUCTION

- OTEC Resource Assessment
- OTEC Potential in Malaysia
- The First Five Promising Sites for OTEC Projects in Malaysia

Malaysian Marine Survey in the South China Sea (MyMRS) (2006-2008)

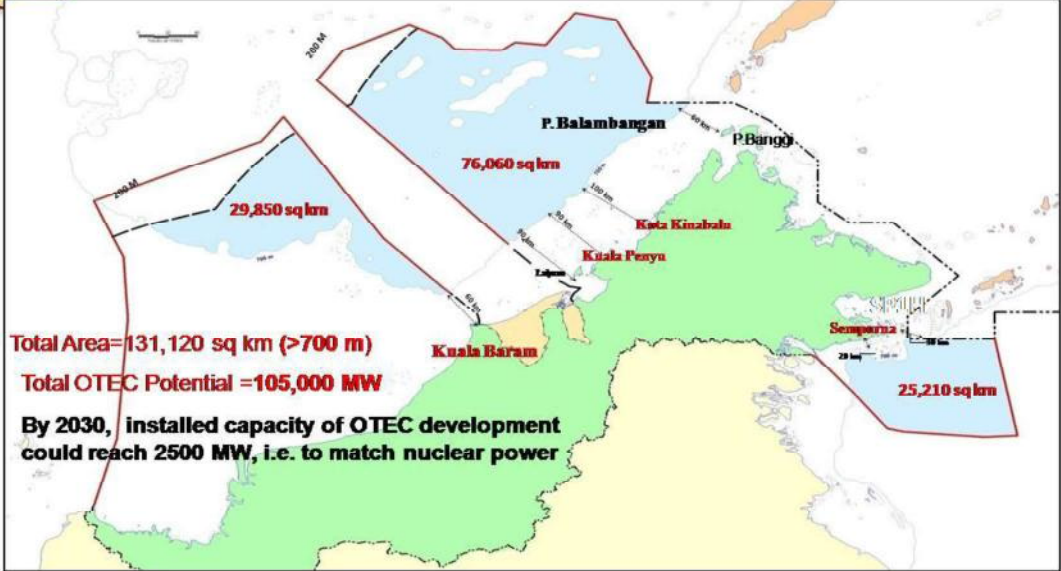



T1. Geohydrography

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OTEC POTENTIAL IN MALAYSIA



Total Area = 131,120 sq km (>700 m)
Total OTEC Potential = 105,000 MW
By 2030, installed capacity of OTEC development could reach 2500 MW, i.e. to match nuclear power

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2. BARRIERS

- “OTEC, not viable ...”, high initial capital requirement;
- “OTEC in Malaysia, also not viable ...”, the deep waters are very far (generally 60 km away from the nearest coastlines);
- “Energy = Electricity,” nothing else!
- “Technology not yet to be developed at commercial scale ...”;
- “No laws governing OTEC development in Malaysia ...”; and
- “No agency or institution, championing OTEC in Malaysia ...”

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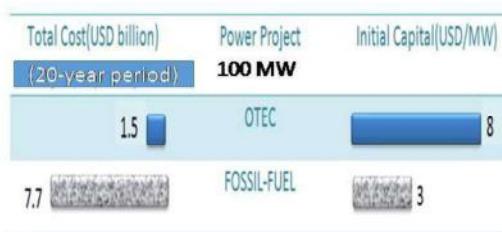
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3.1 OVERCOMING BARRIERS: HIGH INITIAL CAPITAL REQUIREMENT

COMPARATIVE OTEC vs. FOSSIL FUEL
LIFE-CYCLE COSTING



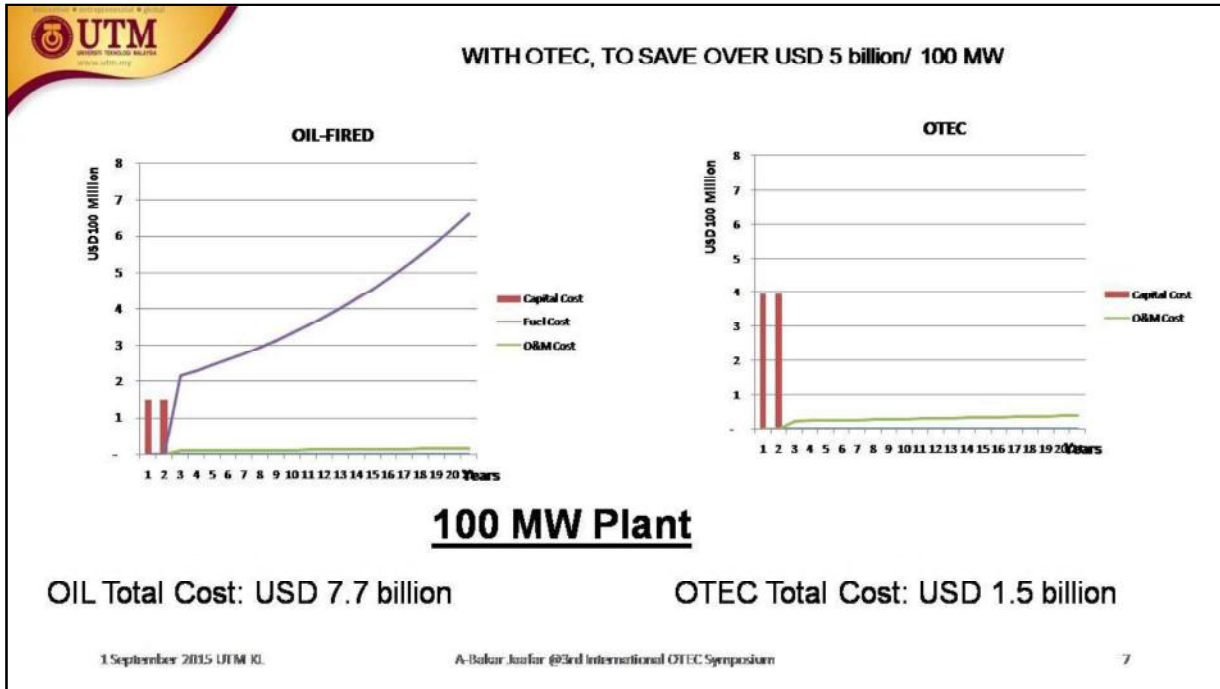
Note: Price of Oil : USD 100/barrel

- By introducing project-life costing;
- By realising that “renewable”, “virtually free”;
- By highlighting “cost-saving” over project life;

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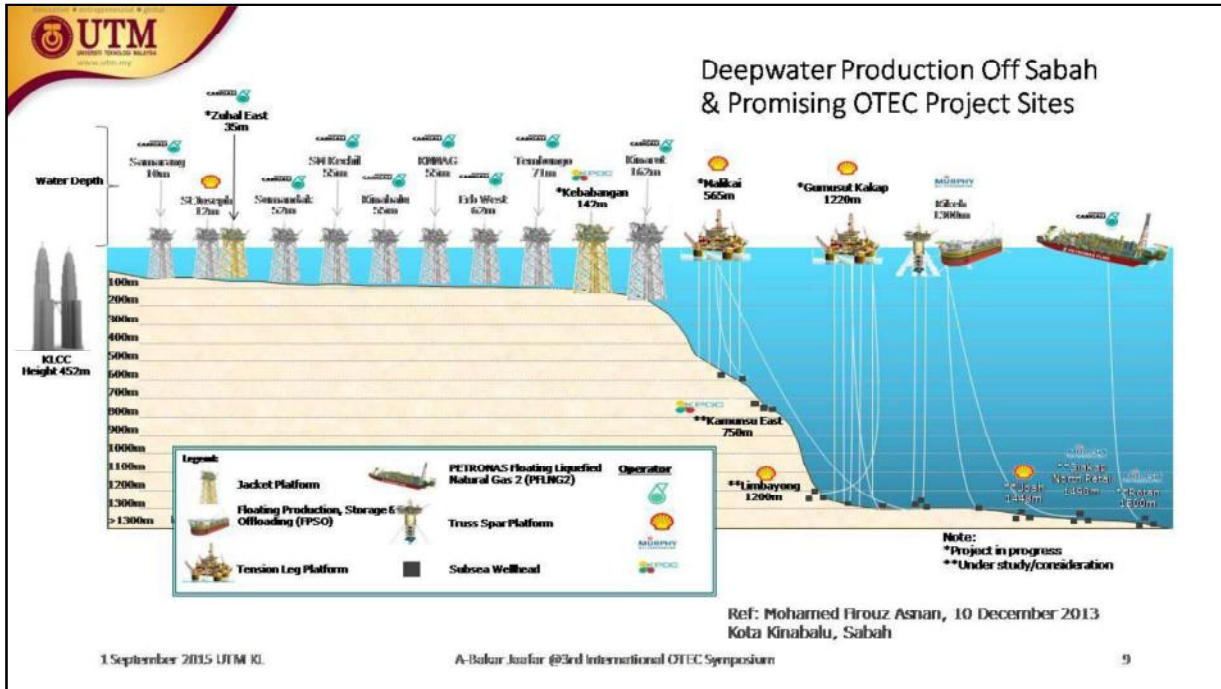


... 3.2 OVERCOMING BARRIERS:
OTECH in Malaysia, also not viable ...”, the deep waters are very far (generally 60 km away from the nearest coastlines)

- There are potential users of OTECH power in the deep waters of Malaysia, because there exists deep water oil & gas production;

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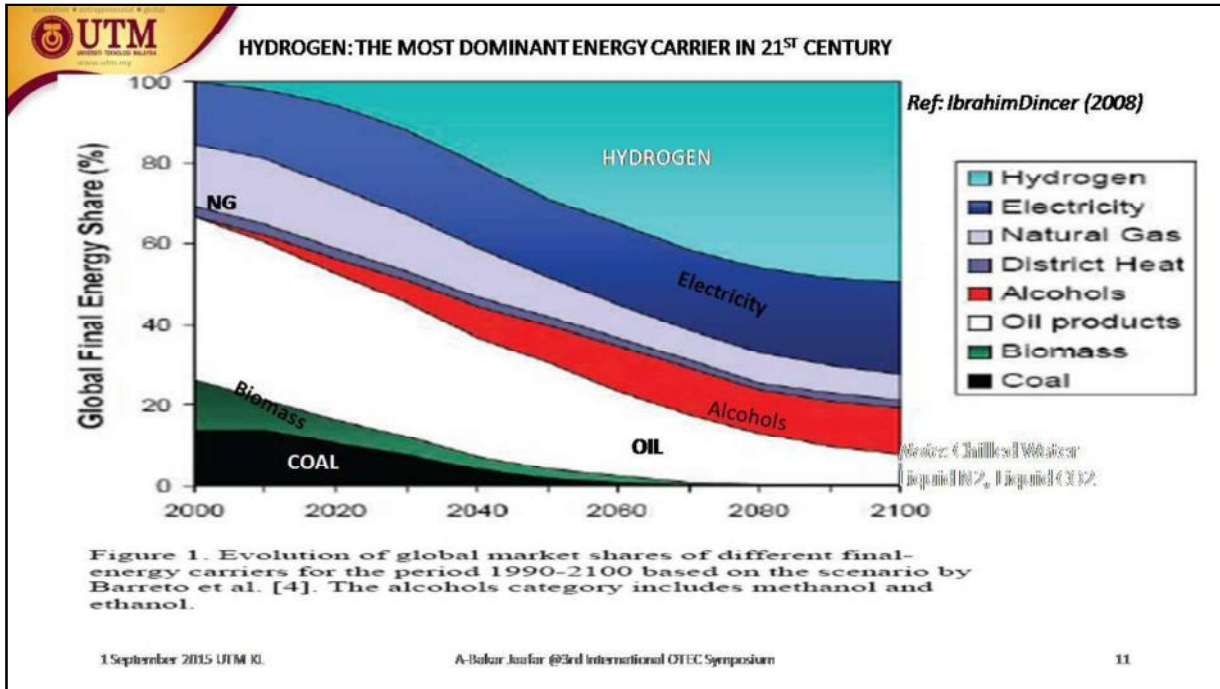


... 3.3 OVERCOMING BARRIERS: ENERGY=ELECTRICITY, NOTHING ELSE

- If there is no immediate take-up of the generated electricity, it would be used, by electrolysis, to generate hydrogen fuel;
- Why H2 fuel?

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... 3.4 OVERCOMING BARRIERS: OTEC TECHNOLOGY NOT YET DEVELOPED @COMMERCIAL SCALE

- Blue Rise of the Netherlands
- DCNS of France
- Energy Island of UK
- KRISO of the Republic of Korea [ROK]
- Lockheed-Martin of USA
- [Technip of France]
- Xenesys Inc of Japan/POSCO of ROK

- Not quite true;
- Offshore 10 MWe net is to be commissioned by 2018

[Refer presentation by Mr Thierry Bouchet of DCNS]

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... 3.5 OVERCOMING BARRIERS: NO LAWS GOVERNING OTEC DEVELOPMENT IN MALAYSIA

There exists:


1. Territorial Sea Act of 2012; or
2. Exclusive Economic Zone Act of 1984.

[Refer presentation by Datin Sharina Shaukat of MIMA & Mohd Haris Rani of UTM OTEC]

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..... 3.6 OVERCOMING BARRIERS: "NO AGENCY & INSTITUTION, CHAMPIONING THE CAUSE ..."



Our Vision:
 From Three Columns of Knowledge to
 Three Towers of Prosperity
 for Sustainable Future

OCEAN OF DISCOVERY
KNOWLEDGE & THE SOURCE OF KNOWLEDGE
 (Al-Quran 24:40; 18:109; 31:27)


On
 3 January
 2013,
 University of
 Technology
 Malaysia
 established
 Its
 Ocean
 Thermal
 Energy
 Centre

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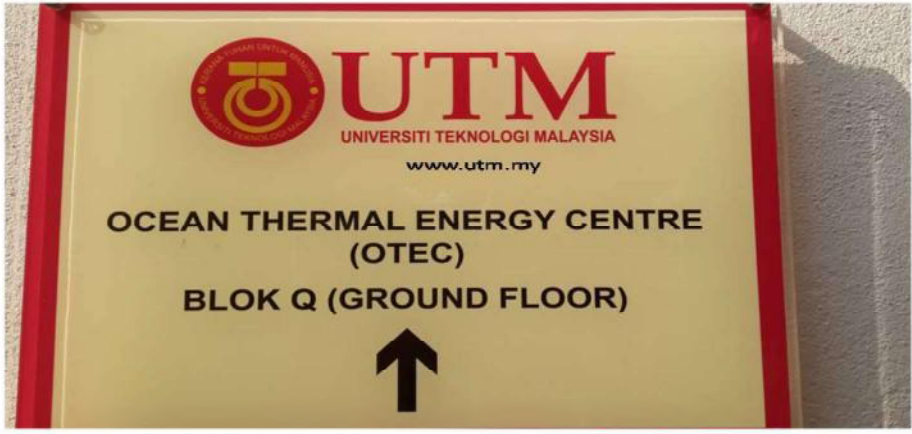
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@UTM OTEC: The Preferred Path, with Existing Knowledge of Technology, for Commercialisation=>Development=>Research



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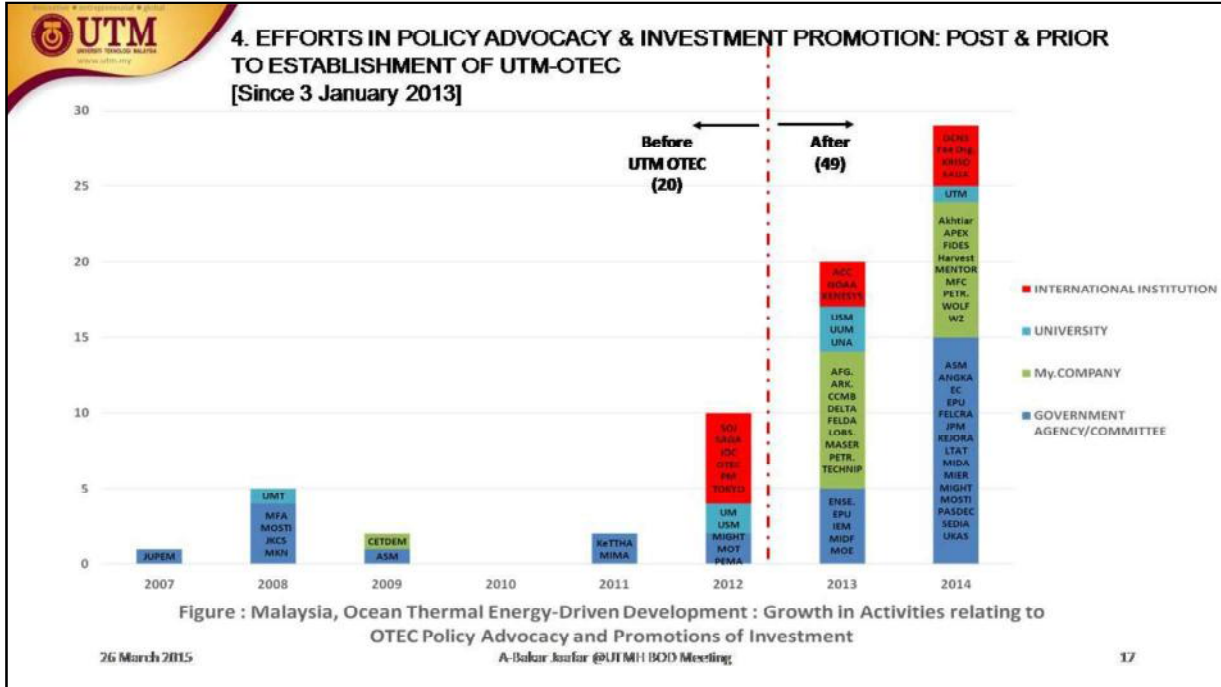


OCEAN THERMAL ENERGY CENTRE
(OTEC)
BLOK Q (GROUND FLOOR)
↑

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- ### A-Z INSTITUTIONS BRIEFED BY UTM OTEC
- ACC-Arab Construction Corporation of Dubai
 - AFG-AFG Listings of New York
 - Akhtiar-AKHTIARJAYA
 - ANGKA-ANGKASA Co-Op
 - APEX-ENIGMA
 - ARK-ARKITEK JURURANCANG
 - ASM-Akademi Sains Malaysia
 - CCMB-CCM Bhd
 - CETDEM
 - DCNS
 - DELTA-DELTA MARINE
 - EC-Energy Commission
 - ENSE-ENSEARCH
 - EPU
 - FELCRA CEO
 - FELCRA Chairman
 - FELDA FIC
 - FIDES-FIDES Advisory
 - Harvest-Harvest Crest Industries Bhd
 - IEM
 - IOC-WESTPAC
 - JKCS-JAWATANKUASA KEBANGSAAN CONTINENTAL SHELF
 - JPM-YB Senator Dato' Sri Abd Wahid Omar
 - JUPEM
 - KEJORA
 - KETHA
 - KRISO-Korean Research Institute of Ships & Ocean Engineering
 - Kumpulan Modal Perdana(KMP)
 - LTAT
 - LOBS-LOBSTERS AQUA TECHNOLOGIES
 - MASER-MASER MARINE
 - MENTOR
 - MIDA
 - MIER





UTM ... M-Z INSTITUTIONS BRIEFED BY UTM-OTEC

<ul style="list-style-type: none"> 35. MIDF 36. MIGHT 37. MFA-MINISTRY OF FOREIGN AFFAIRS-Permanent Representative to UN 38. MKN-Secretary of National Security Council 39. MOE – Ministry of Education 40. MOSTI-Ministry of Science, Technology, and Innovation 41. MOT-Ministry of Transport 42. MFC –MUAMLAH FINANCIAL CONSULTING 43. NUSANTARA 44. NOAA-US National Oceanographic & Atmospheric Administration 45. OTE C-OTE Corporation USA 46. PASDEC 47. PEMA-PEMANDU 48. PETR-PETRONAS 49. PETR-Petronas Chemicals Bhd 	<ul style="list-style-type: none"> 50. PM –MIMA Notes & Letter to YAB PM 51. SAGA-Institute of Ocean Energy of Saga University (IOES) 52. SOJ-Secretariat to Japanese Cabinet on Ocean Policy 53. SEDIA–Sabah Economic Development and Investment Authority: CEO & Board 54. SEKRETARIAT KEPADA MAJLIS KESELAMATAN NEGARA 55. TECHNIP 56. TOKYO, University of Tokyo 57. UKAS, JPM 58. UM University of Malaysia 59. UMT-UniversitiMalaysia Terengganu 60. UNA-UNIVERSITY OF NEWCASTLE ALUMNI 61. UPM–UniversitiPutra Malaysia 62. USM–Universiti Sains Malaysia 63. UTM–Universiti Teknologi Malaysia 64. UTM Holdings Sdn Bhd 65. UUM–Universiti Utara Malaysia 66. WOLF -WOLF INDUSTRIES 67. WZ-WZ SATU BHD 68. XENESYS –Xenesys Inc. (Japan) 69. YEE PRECAST DESIGN-[Yee Dsg.]
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2007 - 2014

Institution Type	Percentage
GOV.MY	45%
COM.MY	33%
INT.	17%
UNI	10%

■ GOVERNMENT AGENCY/COMMITTEE (GA)
 ■ My.COMPANY (My)
 ■ INTERNATIONAL INSTITUTION (INT.)
 ■ UNIVERSITY (UNI)

Figure 2. Stakeholders' Engagement by Type of Institution in Malaysia and Abroad, 2007-2014

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5.1 OUTCOME: INVESTMENT PROMOTION

OTEC has been promoted in Malaysia since 2007;
 But, since the establishment of UTM OTEC in January 2013, the number of activities has increased by 140% in the last two years over the first 6-year period of 2007-2012; and

- As a result: the first four or 5 SPVs have been incorporated, namely,
 - Deep Sea Thermal Solutions Sdn Bhd [(90-X%) PASDEC; (X+10 in kind) % UTM Holdings Sdn Bhd];
 - UTM OTEC Sdn Bhd;
 - UTM OTEC Solutions Sdn Bhd;
 - Pro-Active MH Resources Sdn Bhd; and
 - [Sustainable Ocean Thermal Energy Resources Sdn Bhd (SOUTHER)]

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5.2 OUTCOME OF POLICY ADVOCACY

- The subject of “ocean energy” has been incorporated in 11th Malaysia Plan (2016-2020):

Exploring New Renewable Energy Sources

17.78 Studies will be conducted to identify new RE sources to diversify the generation mix. In the Eleventh Plan, new RE sources such as wind, geothermal and ocean energy will be explored. Currently, the national wind mapping exercise is underway and it is expected to be completed by 2016. The exercise will further enable a study on the feasibility of wind energy to be developed. Geothermal potential will also be further explored with the discovery of a 12 square kilometres geothermal field in Apas Kiri, Sabah. Viability of ocean energy will be explored to take advantage of Malaysia’s geographical position of being surrounded by sea.

“Ocean Energy”=>

- Ocean thermal energy;
- Offshore wind energy;
- Tidal movement;
- Oceanic current;
- Wave energy; and
- Salinity gradient

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... 5.2 OUTCOME OF POLICY ADVOCACY

- An OTEC project can gain access up to RM 200 million of Facilitation Fund under the Public-Private Partnership Unit, Prime Minister's Department;
- A proposed OTEC project can be submitted to Malaysian Investment Development Authority (MIDA), under one-stop approval centre, and be eligible to a range of incentives, including Investment Tax Allowance, Exemption of Import Duties etc;
- An OTEC project is eligible for a "green certificate" issued by Malaysia Green Technology Corporation (MGTC) for a 2% reduction in loan interest rate; and
- OTEC, is the next choice, over nuclear energy

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6. THE WAY FORWARD

- The 1st Public-Funded OTEC Project off Pulau Layang-Layang under 11th Malaysia Plan (2016-2020)
- The 1st Private-Funded OTEC Project supplying power to deep water oil & gas production, the surplus of which to generate H2 fuel

Pulau Layang-Layang

Deepwater Production Off Sabah & Promising OTEC Project Sites

Note:
*Project in progress
**Under study/consideration

Ref: Mohamed Firouz Asnan, 10 December 2013
Kota Kinabalu, Sabah

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11th MALAYSIA PLAN: OTEC-CITY off PULAU LAYANG-LAYANG

[Proposed to be commercialised, with RM 350m OTEC Plant, Public Funded]

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With
Water,
Food,
Energy +++

“... to sustain human habitation or “ with “the economic life of their own.” [UNCLOS, 1982 Article 121 (3)]

OTEC POTENTIAL IN MALAYSIA & THE FIRST FIVE OTEC POTENTIAL SITES

Total Area = 131,120 sq km (>700 m)

Total OTEC Potential = 105,000 MW

By 2030, installed capacity of OTEC development could reach 2500 MW, i.e. to match nuclear power

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Temperate Produce
"Import Substitutions"
High Value Produce

Health & Cosmetics

Lithium Production

Mineral H2O

OTEC-H2

Smart-Grid With All Renewables

**FURTHER INNOVATION WITH THE REST OF EMERGING TECHNOLOGIES:
 => OTEC SPIN-OFF INDUSTRIES**

Capture-Fisheries

Ms Earth Japan, 2012

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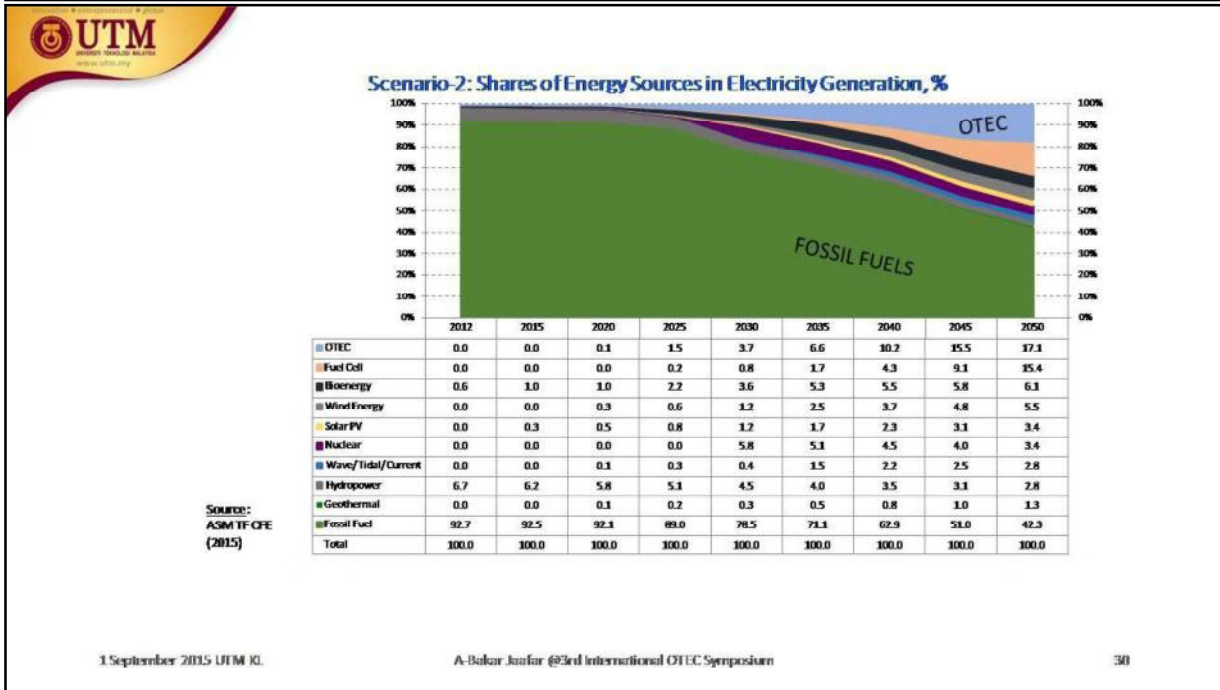
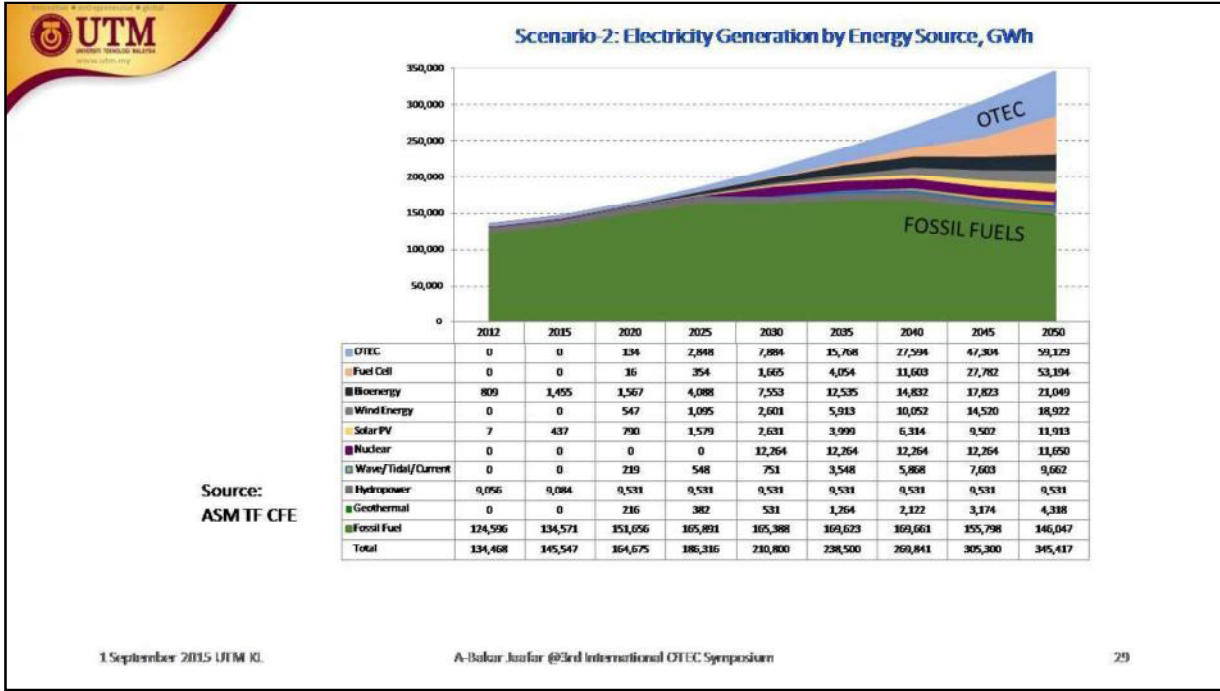
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Future Target and Proposed Roadmap for OTEC in Malaysia 2020-2050 [As at 24 April 2015][Revised after ASM CFE Workshop by Dato' Ir Dr A Bakar Jaafar]

Year	Capacity (MW)	Growth Rate (%)	Remark
2020	20	-	2x10 MW public-private RMK-11
2025	850	-	For 7% reduction in carbon intensity
2030	2500	14	To match nuclear power
2035	5000	14	To match nuclear power
2040	10000	14	To meet H2 demand
2045	20000	14	
2050	40000	14	

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3W Micro-OTEC @UTM OTEC Block Q Commissioned on 22 May 2015

TERIMA KASIH

*From Three Columns of Knowledge
 Three Towers of Prosperity
 For Sustainable Futures*

**GRACIAS
 MERCI
 SPASBO
 SYUKRAN
 THANK YOU
 XIE-XIE**



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