Opportunities for Cooperation in Myanmar Petroleum Energy Sector

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Energy Planning Department
Ministry of Energy

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(Ministry of Energy)
Organizations and Respective Responsibilities

Energy Planning Department (EPD)
- Technical Arm
- Coordination
- Management
- Regulation

Myanma Oil and Gas Enterprise (MOGE)
- Exploration
- Drilling
- Production
- Onland Oil and Gas Pipeline Network
- CNG

Myanma Petrochemical Enterprise (MPE)
- Refineries & Process
- Fertilizer Plants
- Methanol Plant
- CO2 and LPG Plants
- Waxing & Tar

Myanma Petroleum Products Enterprise (MPPE)
- Marketing
- Distribution
Institutional Framework

- Petroleum
- Electricity
- Coal
- Biomass and Fuelwood
- Renewable Energy

- MINISTRY OF ENERGY
  - MINISTRY OF ELECTRIC POWER (I)
  - MINISTRY OF ELECTRIC POWER (II)
  - MINISTRY OF MINES
  - MINISTRY OF ENVIRONMENTAL CONSERVATION AND FORESTRY
  - MINISTRY OF AGRICULTURE AND IRRIGATION
  - MINISTRY OF SCIENCE & TECHNOLOGY
  - MINISTRY OF INDUSTRY

* Ministry of Energy is a Focal Point of the Myanmar Energy Sector Cooperation in the Region
Petroleum Oil and Gas Sector
Exploration and Development of Petroleum

Petroliferous Basin

SEDIMENTARY BASINS
1. Rakhine Coastal
2. Hukaung
3. Chindwin
4. Shwebo-Monywa
5. Central Myanmar
6. Pyay Embayment
7. Ayeyarwady Delta
8. Bago Yoma Basin
9. Sittaung Valley
10. Mepale
11. Mawlamyine
12. Namyau
13. Hsipaw-Lashio
14. Kalaw
15. Rakhine offshore
16. Moattama offshore
17. Tanintharyi offshore

STATUS OF EXPLORATION
(Onshore)
A. Thoroughly Explored Basins
   1. Central Myanmar
   2. Pyay Embayment
   3. Ayeyarwady Delta
      (Only Part of the Basin)
B. Explored to Some Extent
   1. Chindwin
   2. Rakhine Coastal
C. Very Little Explored
   1. Hukaung
   2. Shwebo-Monywa
   3. Bago Yoma
D. Not Explored Yet
   1. Hsipaw-Lashio
   2. Namyau
   3. Kalaw
   4. Sittaung Valley
   5. Mawlamyine
   6. Mepale (Oil Shale)
Myanmar Petroliferous Basins

Significant Structural Features

1. Western Scarp Active Subduction Zone (Andaman Trench)
2. Thrust zone of Western Indo-Burman Ranges (Wedge)
3. Kabaw Right Lateral Fault Zone
4. Central Volcanic Arc
5. Sagaing Right Lateral Strike Slip Fault Zone (Shan Scarp Fault)
6. Nan-Ting (Momeik & ShweLi) Right Lateral Strike Slip Fault Zone
7. Papun-Wang Chao Left Lateral Strike Slip Fault Zone
8. Three Pagoda Left Lateral Strike Slip Fault
9. Ranong Right Lateral Strike Slip Fault
10. Andaman Sea Spreading Center, Rift segments & West Right Lateral Strike Slip Fault Zone
## Exploration and Development of Petroleum (Cont.)

### Summary

**Oil and Gas Fields (onshore)**
- Discovered (28) - 28 oil and gas fields
- Producing (22) - 17 oil fields and 5 gas fields
- Tested/Suspended (6) - 1 tested and 5 suspended oil fields
- Appraisal (1) - Southern Chindwin Basin

**Gas Fields (offshore)**
- Producing (2) - Yatana and Yetagun
- Ongoing (2) to mid of 2013 - Shwe A-1 & A-3, Zawtika Project M-9
- Plan (1) - A Project for domestic use in Block M-3
- Appraisal (1) - Block A-6

**Domestic Crude Pipeline Network**
- 535 km (Pre 1988; 450 km & Post 86 km)

**Domestic Gas Pipeline Network**
- Onshore (4” to 20”) - 2339 km (Pre 1988; 468 km & Post 1871 km)
- Offshore, Yadana to Yangon (24”) - 441 km (offshore 286.5+ onshore 149.7)

**Export Gas Pipeline to Thailand (PTTEPI)**
- Yadana to Metering Station (36”) - 410 km
- Yetagun to Metering Station (24”) - 274 km

**Myanmar –China Pipeline (Ongoing)**
- Crude Pipeline (32”) - 741 km
<table>
<thead>
<tr>
<th>SR NO.</th>
<th>OIL &amp; GAS FIELDS</th>
<th>YEAR OF DISCOVERY</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>YENANGYAUNG</td>
<td>1887</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>2</td>
<td>AYADAW</td>
<td>1893</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>3</td>
<td>CHAUK</td>
<td>1902</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>4</td>
<td>LANYWA</td>
<td>1902</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>5</td>
<td>YENANMA</td>
<td>1914</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>6</td>
<td>PYAYE (Pyay Embayment)</td>
<td>1924</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>7</td>
<td>PAYAGON (Ayeyarwaddy Delta)</td>
<td>1959</td>
<td>SUSPENDED</td>
</tr>
<tr>
<td>8</td>
<td>MYANAUNG (Ayeyarwaddy Delta)</td>
<td>1964</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>9</td>
<td>PYAY (Pyay Embayment)</td>
<td>1965</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>10</td>
<td>SHWEPYITHA (-do-)</td>
<td>1967</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>11</td>
<td>PYALO (-do-)</td>
<td>1969</td>
<td>SUSPENDED</td>
</tr>
<tr>
<td>12</td>
<td>MANN</td>
<td>1970</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>13</td>
<td>LETPANDO</td>
<td>1974</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>14</td>
<td>PE mpi</td>
<td>1976</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>15</td>
<td>HTAUKSHABIN</td>
<td>1978</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>16</td>
<td>HTANTABIN (Pyay Embayment)</td>
<td>1980</td>
<td>SUSPENDED</td>
</tr>
<tr>
<td>17</td>
<td>KANNI</td>
<td>1985</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>18</td>
<td>TAIN</td>
<td>1986</td>
<td>SUSPENDED</td>
</tr>
<tr>
<td>19</td>
<td>APYAUk (Ayeyarwaddy Delta)</td>
<td>1991</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>20</td>
<td>KYAUKKWET</td>
<td>1995</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>21</td>
<td>INDAING (Ayeyarwaddy Delta)</td>
<td>1996</td>
<td>SUSPENDED</td>
</tr>
<tr>
<td>22</td>
<td>NYAUNGNDON (-do-)</td>
<td>1999</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>23</td>
<td>THARGYITAUNG</td>
<td>2001</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>24</td>
<td>SABE</td>
<td>2001</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>25</td>
<td>INDAW (Chindwin basin)</td>
<td>2002</td>
<td>TESTED</td>
</tr>
<tr>
<td>26</td>
<td>D'AHATPIN</td>
<td>2005</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>27</td>
<td>HTASINGAING</td>
<td>2006</td>
<td>PRODUCING</td>
</tr>
<tr>
<td>28</td>
<td>MAUBIN (Ayeyarwaddy Delta)</td>
<td>2007</td>
<td>PRODUCING</td>
</tr>
</tbody>
</table>
Production, Supply and Consumption of Natural Gas (Onshore and Offshore)

Domestic Demand & Supply

<table>
<thead>
<tr>
<th>CRUDE OIL (BBL/D)</th>
<th>DEMAND</th>
<th>SUPPLY</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPEND</td>
<td>60,000</td>
<td>20,000</td>
<td>33%</td>
</tr>
</tbody>
</table>

GAS (MMCFD)

<table>
<thead>
<tr>
<th>DEMAND</th>
<th>SUPPLY</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>590</td>
<td>240</td>
<td>41%</td>
</tr>
</tbody>
</table>

Domestic Gas Supply Projects on 2013 (unit in mmcfd)

<table>
<thead>
<tr>
<th>Project</th>
<th>Demand</th>
<th>Supply</th>
<th>Supply Ratio (%)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onshore+Offshore</td>
<td>590</td>
<td>240</td>
<td>41</td>
<td>Present</td>
</tr>
<tr>
<td>Zawtika Project</td>
<td>73</td>
<td>60</td>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>Shwe Project</td>
<td>130</td>
<td>100</td>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>Total</td>
<td>793</td>
<td>400</td>
<td>51</td>
<td>2013</td>
</tr>
</tbody>
</table>

61% of Total Natural Gas supply to Gas Turbines
20% of Total Electricity are generated by Gas Turbines
## Current Onshore Activities

<table>
<thead>
<tr>
<th>Company / Operator</th>
<th>Block</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nobel Oil (Russia)</td>
<td>PSC-A</td>
<td>(Hukau ng)</td>
</tr>
<tr>
<td>CNOOC (China)</td>
<td>PSC-B1</td>
<td>(Uyu)</td>
</tr>
<tr>
<td>SIPC Myanmar (China)</td>
<td>PSC-D</td>
<td>(Mahudaung)</td>
</tr>
<tr>
<td>North Petro-Chem (China)</td>
<td>F</td>
<td>(Ngahlaingdwin)</td>
</tr>
<tr>
<td>GOLDPETROL (Indonesia)</td>
<td>IOR-2</td>
<td>(Chauk Oil Field)</td>
</tr>
<tr>
<td>MPRL E&amp;P (British Virgin Island)</td>
<td>MOGE-1</td>
<td>(Yenangyaung Oil Field)</td>
</tr>
<tr>
<td>ESSAR (India)</td>
<td>PSC-L</td>
<td>(Sittwe)</td>
</tr>
<tr>
<td>SNOG, UPR (Singapore)</td>
<td>PSC-R</td>
<td>(Oil Shale, Kayin State)</td>
</tr>
<tr>
<td>EPI (Holding) Limited (Hong Kong)</td>
<td>RSF-10</td>
<td>(Kanma-Nattaung)</td>
</tr>
<tr>
<td>Geopetrol Intl. (Switzerland)</td>
<td>RSF-9</td>
<td>(Pyalo-Paukkong)</td>
</tr>
<tr>
<td>Petronas (Malaysia)</td>
<td>RSF-2</td>
<td>(Tuyintaung, Mying S)</td>
</tr>
<tr>
<td>Jubilant Oil &amp; Gas Pvt. (India)</td>
<td>PSC-I</td>
<td>(Gwegyo-o-Ngashadaung)</td>
</tr>
<tr>
<td>PTT EPI (Thailand)</td>
<td>E[-2]</td>
<td>(Hintada)</td>
</tr>
<tr>
<td>Asia Orient Intl. Ltd. (Hong Kong)</td>
<td>PSC-E</td>
<td>(Myingyan)</td>
</tr>
</tbody>
</table>

In onshore area, 19 Contracts are active in 19 onshore blocks with 22 foreign companies from 9 countries.
Current Offshore Activities

<table>
<thead>
<tr>
<th>Company / Operator</th>
<th>Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>- M-5, M-6</td>
</tr>
<tr>
<td></td>
<td>(Yadana Project)</td>
</tr>
<tr>
<td>PETRONAS</td>
<td>- M-12, M-13, M-14</td>
</tr>
<tr>
<td></td>
<td>(Yetagun Project)</td>
</tr>
<tr>
<td>DAEWOO INTERNATIONAL</td>
<td>- A-1, A-3</td>
</tr>
<tr>
<td></td>
<td>(Shwe Project)</td>
</tr>
<tr>
<td>PTTEPI</td>
<td>- M-3, M-11,</td>
</tr>
<tr>
<td></td>
<td>- M-9 (Zawtika Project)</td>
</tr>
<tr>
<td>CNOOC</td>
<td>- M-10</td>
</tr>
<tr>
<td>CNPC INTERNATIONAL LTD</td>
<td>- AD-1, AD-6, AD-8</td>
</tr>
<tr>
<td>MPRL E&amp;P</td>
<td>- A-6</td>
</tr>
<tr>
<td>RIMBUNAN PETROGAS</td>
<td>- M-1</td>
</tr>
<tr>
<td>PETROVIETNAM</td>
<td>- M-2</td>
</tr>
<tr>
<td>DAEWOO INTERNATIONAL</td>
<td>- AD-7</td>
</tr>
<tr>
<td>PETRONAS OVERSEA</td>
<td>- MD-4, MD-5, MD-6</td>
</tr>
<tr>
<td>KMDC</td>
<td>- A-5, A-7, M-15, M-16</td>
</tr>
</tbody>
</table>

In offshore area, **24** Contracts are active in **25** offshore blocks with **19** foreign companies from **11** countries.
Available Offshore Blocks (25 blocks)

- Rakhine Offshore Blocks (2 blocks)
  - A-2, A-4 (around to Shwe Gas Field)

- Mottama/Taninthayi Blocks (6 blocks)
  - M-4, M-7, M-8, M-17, M-18, YEB
    (Vicinity of M3, Yatana, Yetagun & Zawtika gas fields and prospective areas)

- Rakhine Offshore (12 blocks)
  - Deep Water Blocks
    - AD-2 to AD-5
    - AD-9 to AD-16

- Mottama/Taninthayi Offshore (5 blocks)
  - Deep Water Blocks
    - MD-1, MD-2, MD-3, MD-7, MD-8

8 shallow water blocks and 17 deep water blocks are open for new investors.
Cleaner Fossil Energy Programme

CNG Program for AUTOMOTONS in Cities

- Initiated in Myanmar since 1986
- 1986 – August 2004 (5 CNG Refueling Stations)
  - 587 NGVs (Converted from petrol buses)
- CNG/NGV Programme was reactivated in August 2004
- 45 CNG Refueling Stations in Myanmar-
  - 27,472 NGVs (Converted from both petrol/diesel cars)

Future

CNG Refueling Stations will be installed along the existing domestic pipeline corridor.

2 mmcf of Offshore Natural Gas mix with 20 mmcf of onshore gas for supply CNG Program
Petrochemical Industry Sectors (Downstream)
### Summary of Petrochemical Industry

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Capacity/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Refineries</td>
<td>-</td>
<td>(total capacity 51,000 bbl/day)</td>
</tr>
<tr>
<td>3 LPG Plants</td>
<td>-</td>
<td>(50 mmscfd)</td>
</tr>
<tr>
<td>5 Fertilizer Plants</td>
<td>-</td>
<td>(Ammonia 1340 MTD &amp; Urea 2012 MTD)</td>
</tr>
<tr>
<td>1 Methanol Plant</td>
<td>-</td>
<td>(450 MT, under rehabilitation)</td>
</tr>
<tr>
<td>1CO₂ Recovery Plant</td>
<td>-</td>
<td>(Liquid 24 Ton &amp; Dry ice 6 Ton/day)</td>
</tr>
</tbody>
</table>
Petroleum Products Sector
Fuel Transportation and Facilities

Modes of transportation of petroleum products

1. Tankers to coastal terminals
2. Oil barges from refineries to fuel terminal and shops
3. Rank lorries
   - 12 Filling Stations for Government Sector
   - 260 Filling Stations are privatized since 2010 June
   - 179 New Filling Stations are already distributed and 540 New Filling Stations are still under construction by private sector
Opportunities
Opportunities for Cooperation (in Petroleum E&P)

1. New Prospects in Petroliferous Onshore & Offshore Blocks for Exploration and Production under PSC Basis
   - Direct Negotiation to Offshore Blocks
   - International Bidding Round Year 2012 for most of available blocks will be lunching on next 2-3 months.

2. Rendering for Oil Field Services based on technical & commercial reliability through International Tendering

3. Indispensable equipments for pipeline, gas compressor, separator, production units and CNG kit etc.

4. Research and Development

Managing Director
Myanma Oil and Gas Enterprise (MOGE)
Fax: 95-67-411125, 411178
E-mail: mogemd@mptmail.net.mm
Procedures to Conduct Petroleum Operations in Myanmar Onshore Areas 
On Production Sharing Contract (PSC)

1. Submit Letter of Expression of Interest
2. Credentials:
3. Documents are to be endorsed for authenticity by Representative Embassy of the Republic of the Union of Myanmar at the place of Company’s registration (or) establishment or nearest
5. Address to:

   Director General,
   Energy Planning Department, Ministry of Energy
   Building No.6, Nay Pyi Taw, The Republic of the Union of Myanmar
   Fax: +95 67 411 113, Email: myanmoe@mptmail.net.mm
6. The potential bidders will be selected into shortlist
7. MOGE will present “General Data Overview” for Bidding Blocks
8. EPD will explain the preferable “Standard Terms and Conditions”
9. Cooperate (Joint operating) with at least one Myanmar National Owned Company which has been registered in Ministry of Energy
10. Not more than 3 blocks are limited to propose
11. Terms and Conditions, Production Sharing Contract and complementing with MOU or MOA or DOA for cooperated Myanmar companies to submit for each proposed blocks.

- The proposed Terms and Conditions will be assessed by EPD
- The best offered Terms and Conditions will be selected for awarding blocks
- The Model “Production Sharing Contract (PSC)” will be provided to Awarded Potential Bidders
Production Sharing Contract (PSC)

Onshore and Offshore

General Terms and Condition of PSCs

Technical Evaluating Agreement (TEA), 2 Years only for Offshore deep water blocks

Exploration Period (Initial term) - 3 years (contractor will have the option to back-off)
- 1st. Extension - 2 years (contractor will have the option to back-off)
- 2nd. Extension - 1 year (contractor will have the option to back-off)

Production Period - 20 years (or based on reserve)

Royalty - 12.5%

(Royalty is available Petroleum depend on water depth for deep water offshore blocks)

Income Tax - 25% on CONTRACTOR’s Net Profit

(3 years Tax Holiday starting from the Production)

Domestic requirement - 20% of Crude Oil and 25% of Natural Gas of CONTRACTOR’s share of profit petroleum at 90% Fair Market Price

State Participation - 15% of undivided interest and MOGE has the option to extend up to 25% at its own discretion.

Governing Law - Laws of the Republic of the Union of Myanmar

Arbitration - Myanmar Arbitration Act 1944, UNCITRAL Arbitration Rules
Opportunities for Cooperation  
(in Petrochemical Sector)

1. New Refinery capacity of 56,000 bpd by using Imported Crude from Myanmar-China Crude Oil pipeline 2 Million MT/year
2. New Liquefied Petroleum Gas (LPG) Plant (on surplus natural gas)
3. New LNG project in Made Island
4. Joint venture of Thanlyin Refinery
5. Material Supply for Petrochemical Plants
6. Research and Development, e.g. Laboratory, Process etc.
7. New Petrochemical Plants (as a result of discovered gas fields and surplus domestic gas)
8. Indispensable equipments for Petroleum Industries

Managing Director  
Myanma Petrochemical Enterprise (MPE)  
Fax: 95-67-411126  
E-mail: mpeho@mptmail.net.mm
Opportunities for Cooperation
(in Petroleum Products Marketing)

1. Supply of Petroleum Products to Government Sector when tender invited for spot purchase

2. Contemporary Transportation Units, tanker & fuel barge etc. in tender basic

3. Indispensable equipments for Petroleum Products transportation and distribution systems

Managing Director
Myanma Petroleum Products Enterprise (MPPE)
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E-mail : mppe.ho2@mptmail.net.mm
Energy Saving Target

- To reduce Energy Consumption by 5% in 2020 and 8% in 2030 relatively with existing BAU (Business As Usual) scenario
- To Improve Energy Efficiency 7% in 2020, in the residential sector and 16% in all sectors at 2020
- To achieve 15~18% of Renewable Energy in the total power installed by 2020
Public Private Partnership Opportunities

- Filling Stations, Storage Tanks and Jetty for LPG business
- Marketing of Petroleum Products
- Lease for Thanlyin Lube Blending Plant

Email: mptaoffice@goldenland.com.mm
      myanmar.mpta@gmail.com
**Conclusion**

- Exploration and Production of Onshore and Offshore Blocks is highly prominence.
- Services in E & P of Petroleum.
- Joint Venture in Petrochemical Industry.
Contract Focal Point for Energy Business

Person: Director General
Energy Planning Department
Ministry of Energy

Address: Building No.6, Nay Pyi Taw
Fax. 95 - 067 - 411 113
Ph. no. 95 - 067 - 411 057
95- 067 - 411 099
Email: myanmoe@mptmail.net.mm
Thank For Your Time & Attention