Development Plans in the Emerging Downstream Natural Gas Industry

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Presentation Outline

- I. Overview of the Downstream Natural Gas Industry
- II. Policy Thrust/Directions
- III. Development Plans and Programs
- IV. Challenges in the Development Plans

Overview of the Downstream Natural Gas Industry



414 MW San Gabriel First Gen/ IPP



Shell Refinery



Malampaya Gas Field 2.7 TCF (2001)



Libertad Gas Field 0.6 BCF (2012)



97 MW Avion First Gen/ IPP



560 MW San Lorenzo First Gen/ IPP



1,000 MW Sta. Rita



1,200 MW Ilijan Power Plant NPC IPP(KEPCO)



IMPLEMENT. **MONITOR AND** INTEGRATE SECTORAL AND **TECHNOLOGICAL** ROADMAPS AND ACTION

EXPAND ENERGY ACCESS

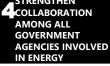
> PROMOTE A **LOW CARBON FUTURE**

LOW CARBON FUTURE

STRENGTHEN CONSUMER WELFARE AND 7PROTECTION

STRENGTHEN COLLABORATION **AMONG ALL GOVERNMENT IN ENERGY**

FOSTER **STRONGER** INTERNATIONAL 8 RELATIONS AND **PARTNERSHIPS**









DOE's 9-POINT PROGRAM



ACHIEVE 100% ELECTRIFICATION OF ALL UNELECTRIFIED HOUSEHOLDS



BUILD A "COMMON CARRIER" LIQUEFIED NATURAL GAS RECEIVING AND DISTRIBUTION **INFRASTRUCTURE ANCHORED AT A FUTURE** "CLEAN ENERGY CITY"



CONNECT THE MINDANAO GRID WITH THE CONNECTED VISAYAS AND LUZON GRIDS



PLAN AND BUILD AN APPROPRIATE PORTFOLIO OF INSTALLED AND DEPENDABLE POWER **CAPACITIES**



ACCELERATE THE TOTAL PRIVATIZATION OF **PSALM ASSETS**



ENSURE TRANSPARENCY AND PREDICTABILITY IN THE POWER GENERATION, TRANSMISSION AND DISTRIBUTION PERMITTING PROCESS



UNDERTAKE CAPACITY BUILDING OF HUMAN RESOURCES WITHIN THE "ENERGY FAMILY"



CONDUCT A NATIONWIDE IEC CAMPAIGN ON WAYS TO REDUCE ELECTRICITY AND FUEL CONSUMPTION



PURSUE ENERGY RESOURCE DEVELOPMENT

DOWNSTREAM NATURAL GAS INDUSTRY ROADMAP

(2018-2020)

(2021-2030)

Tender or sale of remaining volume of PNOC banked gas and new gas of Malampaya

Malampaya

Award three
(3) SC as a
result of PECR -5

Drilling and
testing of SC 37

Declaration of

Declaration or Commerciality of SC 49
 LNG importation by Energy World Corp. (EWC) with one storage tank

Phase 1 or Shell FSRU in Batangas

SC 49 SC 49 Drilling of Malampaya East Commercial use of gas

seepages

Distribution of LNG to satellite terminals in off-grid

Commercial production of

islands

Distribution of LNG Supply in Visayas and Mindanao

peration of LNG Termina

Phase 1, construction o Phase 2 in Bataan and

Bataan-Cavite Pipeline, Bataan-Subic Pipeline, Operation of Bataan-Manila

INFRASTRUCTURE DEVELOPMENT

Infrastructure Program for

power

Operation of Betaen-Hanile Pipeline, three purines and distribution lines for the transport section. The control transport section of the Terminals or break bulk Terminals or break bulk facilities in clustered islands for off-pird power plant inner to additional economic zones using natural gas construction and operation of distribution lines for construction and operation of distribution lines for construction and operation of satellite terminals and/or break bulk facilities for fiviliance and virtuals withing the properties of transport of transport properties of transport properties of transport properties to transport properties transport transport properties transport properties transport transport properties transport transport trans

of EWC Power Plant 400 MW Floating Power Plant of Vires

Proposed 450-MW as anchor for the Shell

Commissioning of :
- additional 800-HW
Greenfield LNG Batan
(Totals 2,400-HW)
- Correnting LNG Batan
(Totals 2,400-HW)
- Correnting Society See
- Greenfield Sucat Plant
(450-850 MW)
Conversion of 600 HW
Malays plant
Lorenting Society See
Lorenting Society See
Lorenting Society
Lore

Expand the use of gas to transport, industrial, Commercial, Residential · CNG Vehicles to

Manila vehicles envisaged to have shifted to CNG

Initial 3 Ecozones in Batangas and Laguna to use natural gas Evolution of LNG Cold

Bilateral partnership with Academe and Industries to map out technical, legal/regulatory and commercial skills to develop and required in the

industry Bilateral partnership with

organization/institute for technological exchange leading towards skills development and enhancement for the

 Additional Ecozones/industries to use natural gas CNG applications in fishing boats and interistand passengers marine vassels
 Additional use of CNG in provincial buses
 Application of natural gas in commercial and residential sectors storage business Use of Adsorbed Natural Gas I(ANG)



POLICY DEVELOPMENT

MARKET DEVELOPMENT

required for the natural

support natural gas

program implementat on and

Revisit the Magna Carta Bill for Energy Workers instituting the development of Energy Institute and advocate its passage Revisit the proposed Nat Gas for

Draft supplemental guidelines to import LNG of the DC 2002-08-005

08-005

Draft DC on rules to implement the PNS on Natural Gas Quality

Draft DC to implement HSSE practices in the

Exchange program/on the job training for actual exposure of identified key regulator to develop the loop term skills program for ong term skills program fo natural gas

· Create TWG for the standards on

ancillary facilities Final draft of PNS on

BPS promulgation Draft DC on rules to implement the PNS or transmission and distribution pipeline LNG facility and

the Energy Institute • Commercia

operation of the Institute and institutionalize training/skills program and other services of the Energy Institute

· Draft IRR for the Natural Gas Bill Update the development plan for

natural gas industry as a requirement in the Natural Gas Bill Update Natural Gas

Develop standard or

technologies related to the transportation and storage of natural gas • Continuing updating of PNS on natural gas facilities



To increase the utilization of natural gas:

Expand Supply Source

-intensifying exploration for indigenous gas deposits and studying options for economically using imported LNG

Market Development

 vigorously promoting its use in the transportation, commercial and residential sectors

Develop Critical Infrastructures

- that will efficiently deliver gas to the demand centers

Establish Public-Private Partnership

- continue to encourage the private sector to assist government in developing the natural gas industry.

Capacity Building

- develop skills and competencies to manage the industry



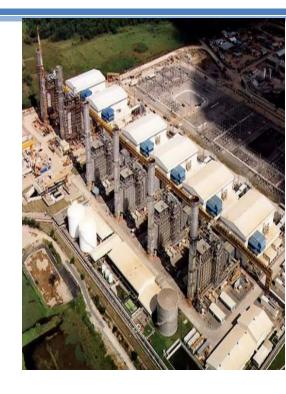






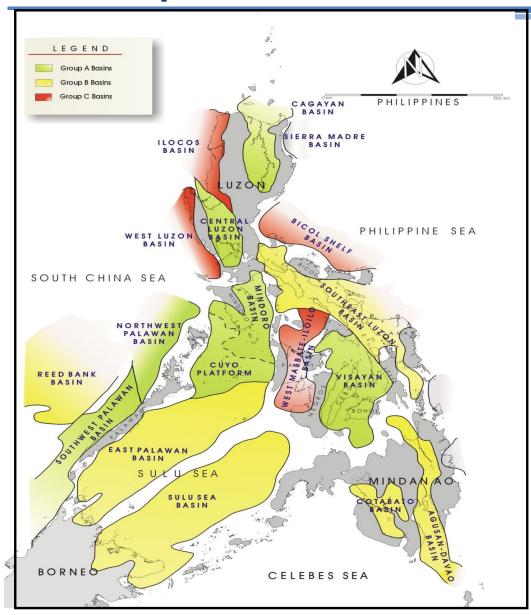


- Malampaya has six gas sales and purchase agreements
- Inflexible output from Malampaya with an average production of 380 million standard cubic feet (mmscf) per day
- Fuels 2,700 MW of power stations as baseload resources for the most part and additional 500+ MW operating as mid-merit and peaking plants and a refinery
- Given the production level and continuous drop in pressure, Malampaya gas field is expected to deplete in 2022.





- Recoverable Reserve end of field life is 3.08 to 3.29 TCF
- The Malampaya concession expires in 2024 and while it may have enough gas for some further expansion, this is not considered sufficient for more than about 5 years to provide the future natural gas requirements particularly on the plan to expand the application of natural gas in industrial, commercial, residential and transport sectors.



PETROLEUM BASIN PROSPECTIVITY MAP

Most Prospective Basins

- NW Palawan Basin
- SW Palawan Basin
- Sulu Sea Basin
- 4. Cagayan Basin
- 5. Visayan Basin
- Central Luzon Basin
- 7. Mindoro-Cuyo Platform

Prospective Basins

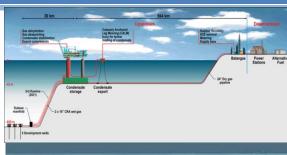
- East Palawan Basin
- Reed Bank Basin
- 3. SE Luzon Basin
- 4. Agusan-Davao Basin
- Cotabato Basin

Frontier Basins

- West Luzon Basin
- West Masbate-Iloilo Basin
- 3. Ilocos Basin
- 4. Bicol Shelf Basin

- In the short term, there are not sufficient resources from Malampaya or other potential developments to justify new infrastructure development
- New gas might come from domestic resources, but the volumes and timing are unpredictable
- The only sure source of new gas in the medium term (through 2020) would be imported liquefied natural gas (LNG) to ensure supply security and sustainability of natural gas
- The Philippines today cannot access the LNG market: there are no existing or operational import facilities
- Much cheaper than oil, competitive with coal in the mid-cycle, and once import facilities are built, industrial, commercial, and transportation users can also gain access to gas

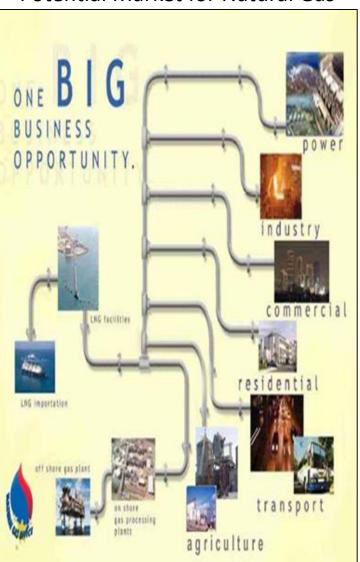
The commercialization challenge: develop a market for LNG that can justify the investment in the LNG importation facilities



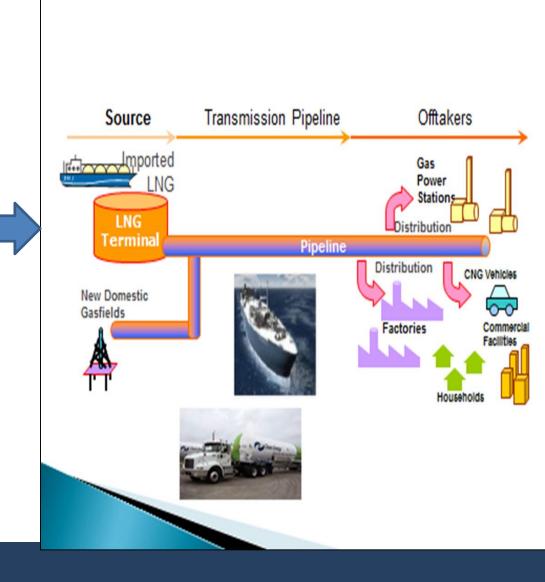




Potential Market for Natural Gas



Strategic Infrastructure in Luzon



Integrated LNG Terminal



Project Cost: PHP 100 billion Targeted Completion: 2020

- Safeguard against the anticipated depletion of the Malampaya gas facility in 2024.
- Initial 200-MW
 power plant,
 storage facilities,
 liquefaction and
 regasification units.
- Output will serve PEZA areas.

Development Initiatives

- Natural Gas Quality Standard
- Creation of Inter-Agency Health, Safety, Security Environment (HSSE) Inspection Team
- Organized the Natural Gas Coalition Group
- Ongoing drafting of the LNG Department Circular











Challenges in the Development Plans

- Limited supply of Natural Gas
- Power generation sector remains to be the main driver to natural gas industry development
- Lack of Available Natural Gas Infrastructure Network
- Absence of Natural Gas Law
- Lack of Gas Related Policy and Legislative framework
- Shortcomings of current Regulatory framework
- Lack of Locally Industry Standards
- Capacity build-up for the DOE and the natural gas industry







Thank You!

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