

## Maximising the Value of Natural Gas in the Orange Basin

# *Increasing National Value from Natural Gas in a Developing Country*

## *- Lessons from Trinidad and Tobago*

**Anthony (Tony) Paul**  
**Future Energy Partners**

**deepwater**   
development consortium

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**Lessons from Trinidad and Tobago**

## Oil & Gas Value Addition and Retention Measures

### 1. Fiscal & Monetary Policies

### 2. Non Fiscal Measures

- Local Equity Participation
- Local Content (Backward linkages)
- Local Value Addition (Forward Linkages)
- Supporting other sectors (Lateral Linkages)
- Capacity Development

### 3. Operations

- Extracting more and cheaper
- Getting a higher price
- Increasing in-country activities and investments by foreigners (bigger tax base)
- Locals Participating in **out of country** activities
- Exporting local oil & gas goods & services

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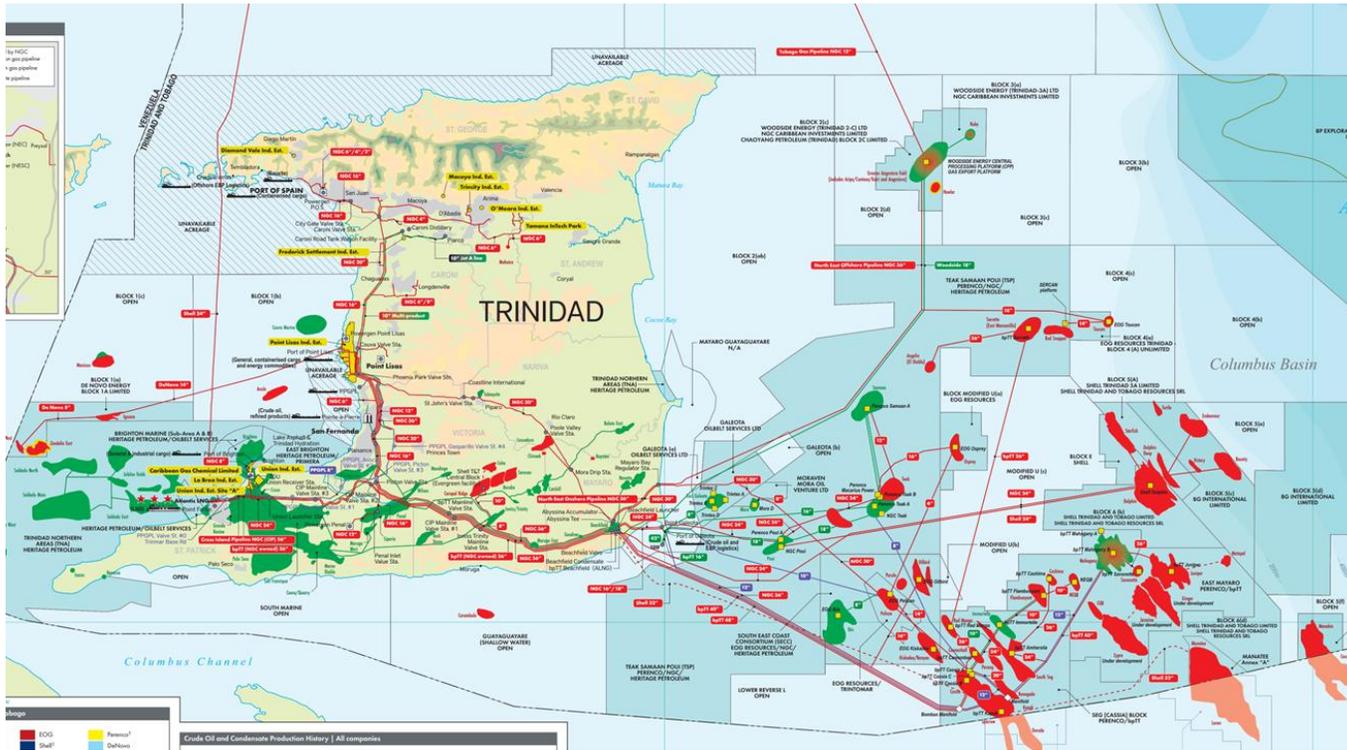
### 4. Risk Reduction (Good Governance)



#NamibiaOGC25

Lessons from Trinidad and Tobago

# From exploration to action: Positioning Namibia as the next energy frontier



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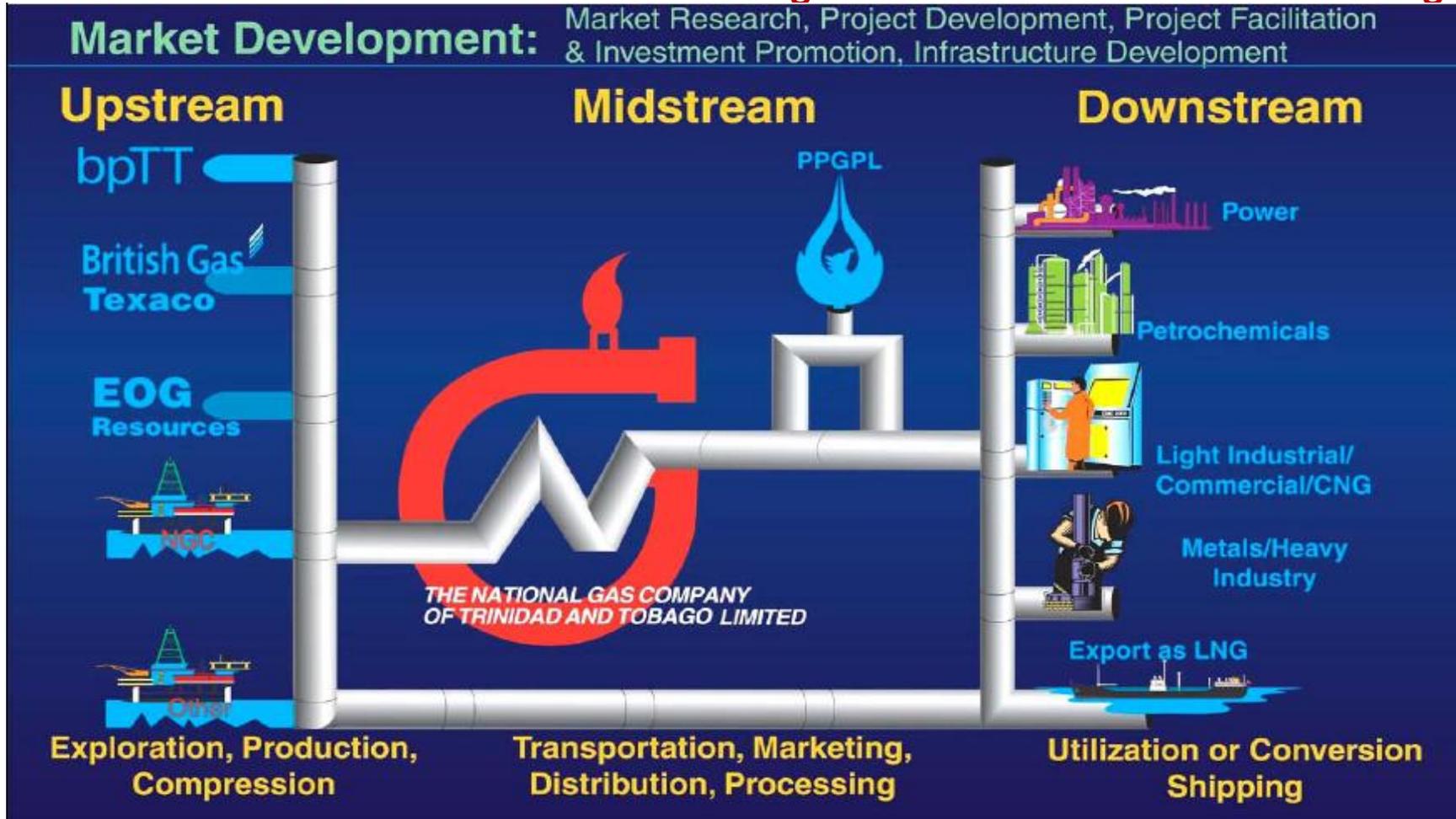
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**Lessons from Trinidad and Tobago**



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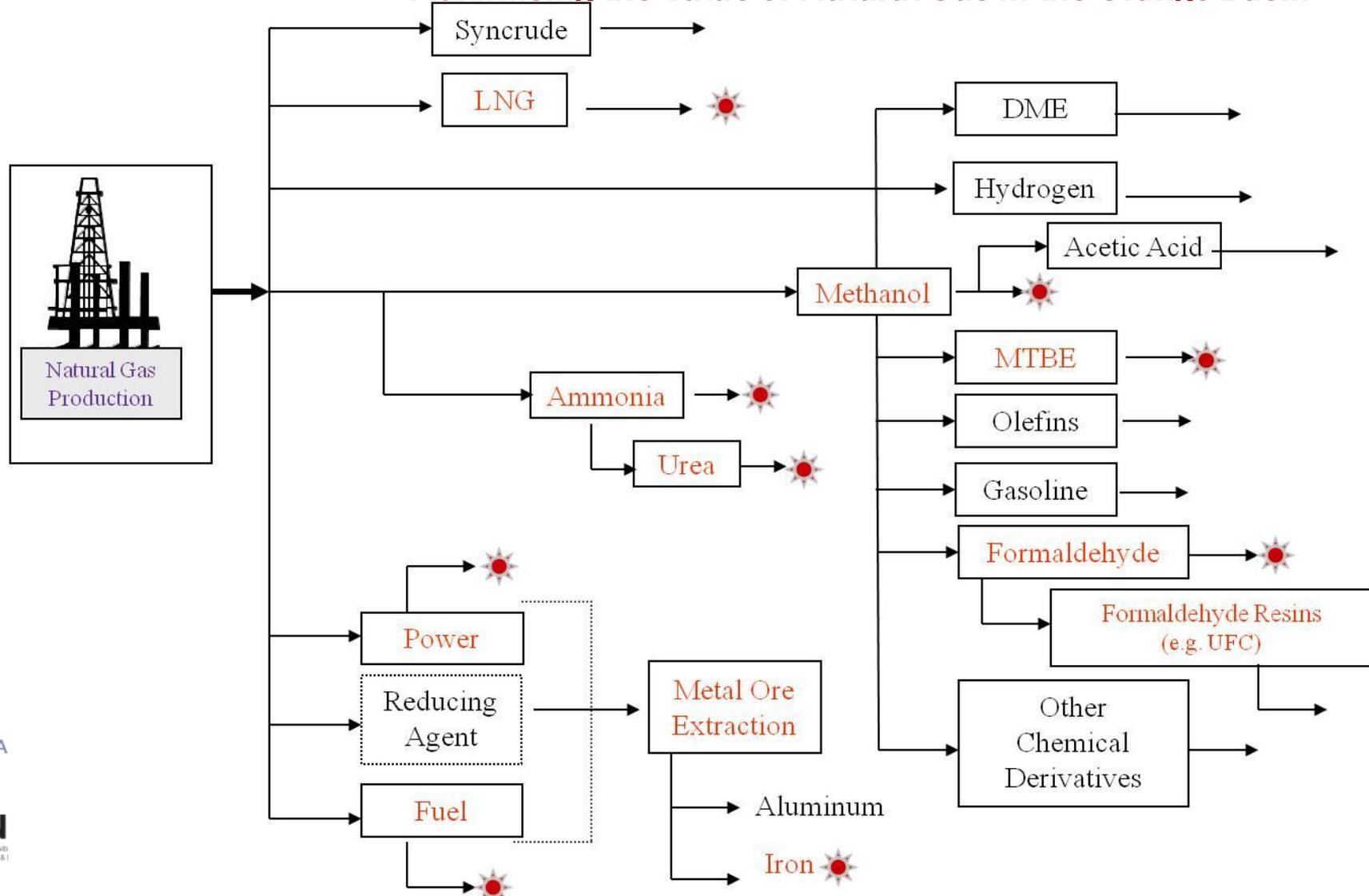


**Lessons from Trinidad and Tobago**

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**Natural Gas Usage**  
(T&T uses in red)



**LESSONS FROM TRINIDAD AND TOBAGO**

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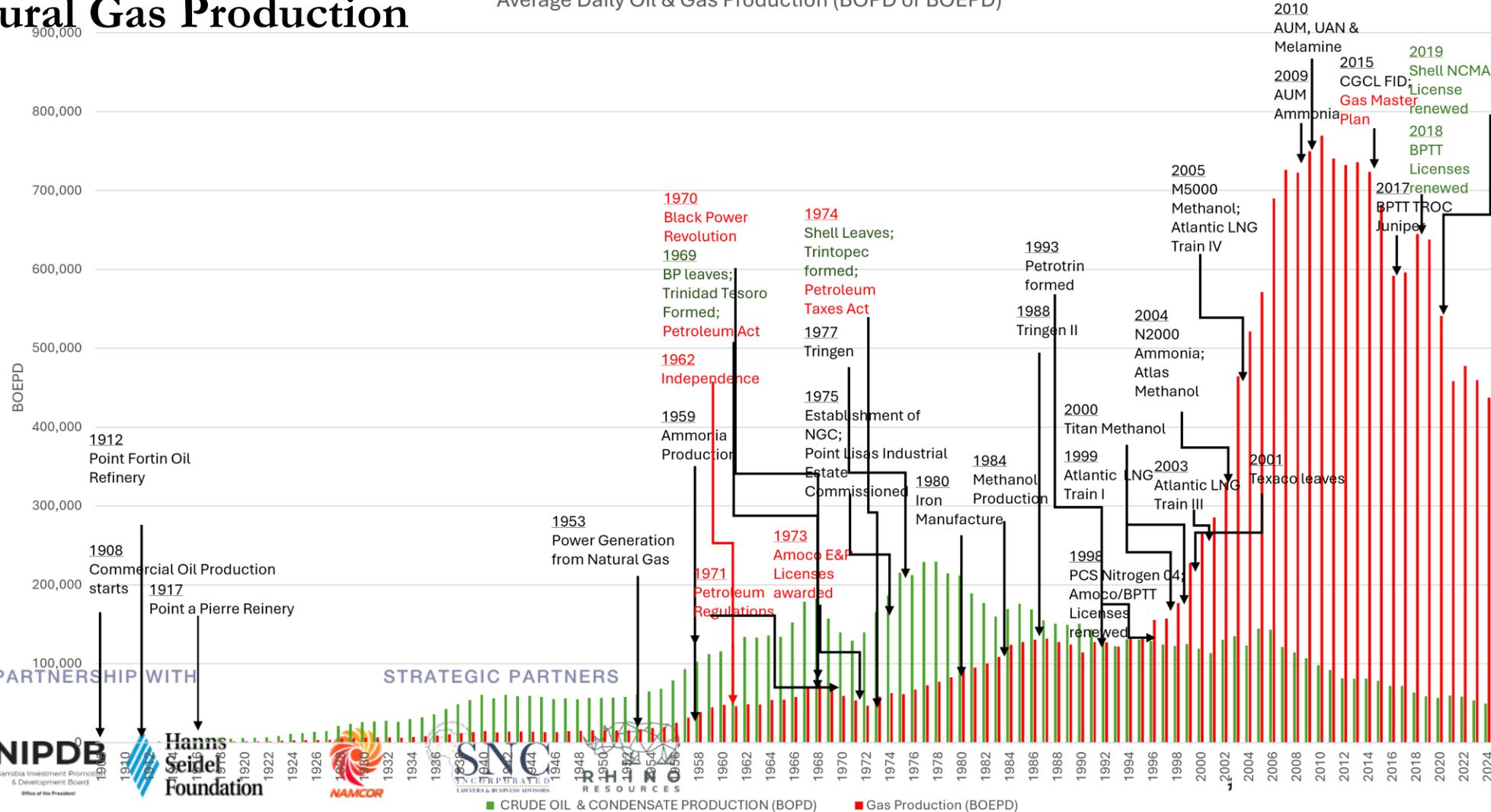
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**From exploration to action:  
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**T&T's Oil & Natural Gas Production  
1908-2024**

Average Daily Oil & Gas Production (BOPD or BOEPD)

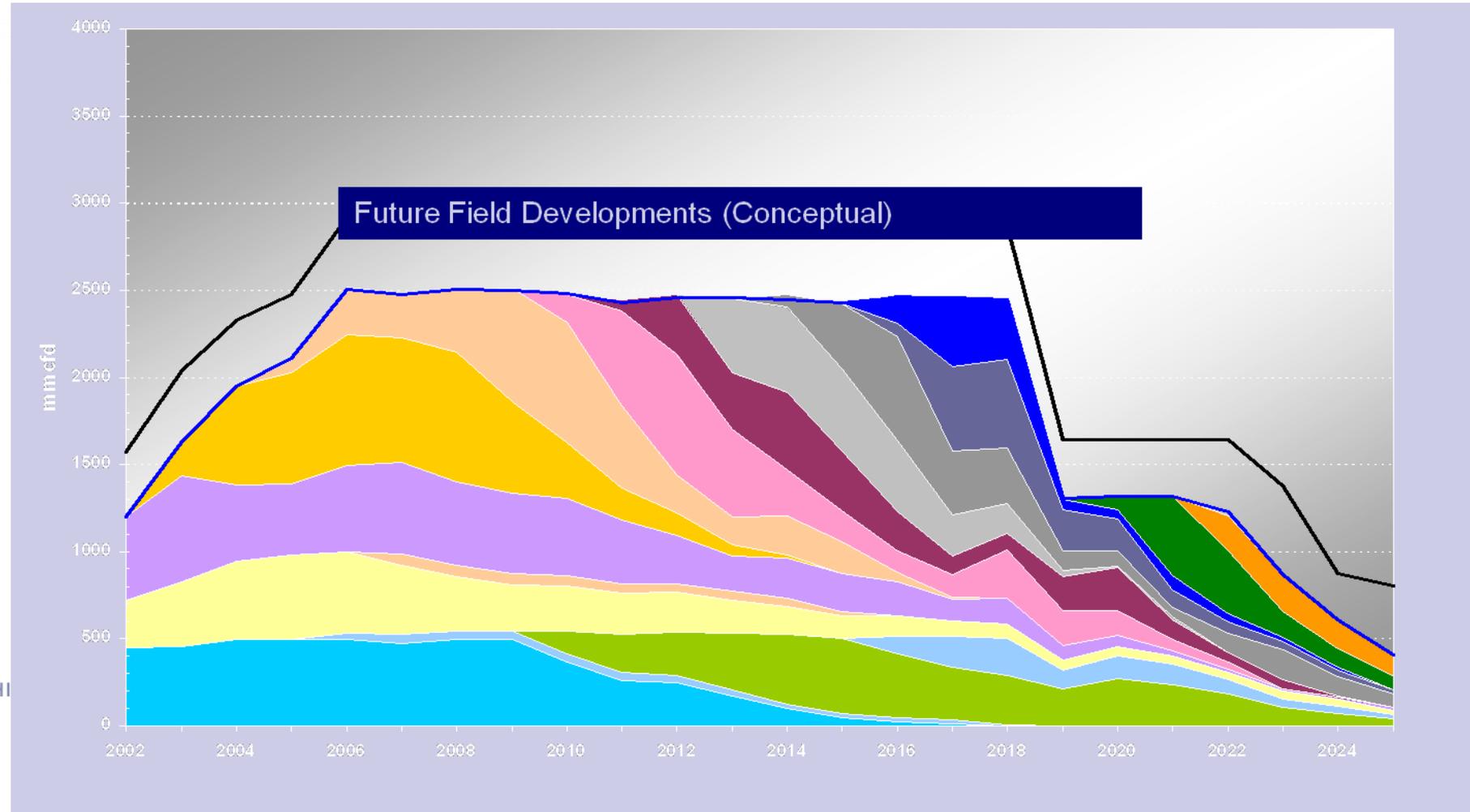


**Lessons from Trinidad and Tobago**

**From exploration to action:  
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Early 2000's -  
Sustained, continuous  
Upstream Growth  
- allows for access to  
exploration &  
development spend.

Maintaining a sustainable  
level of production was to  
have assured a sustainable  
level of activities and  
employment

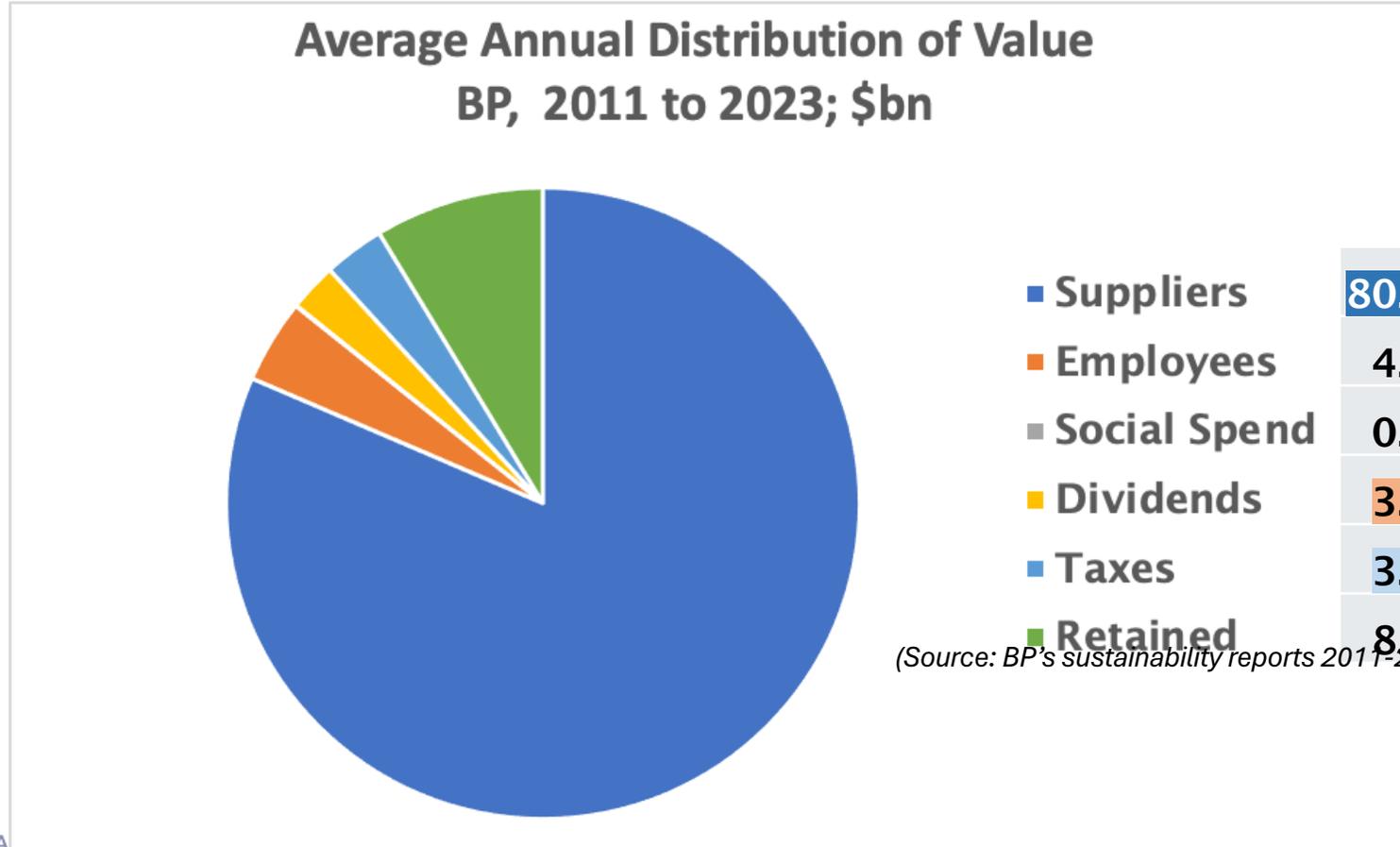


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# BP (Global) - Where Oil & Gas Revenue Goes

BP's Average Annual Revenue 2011-2023:

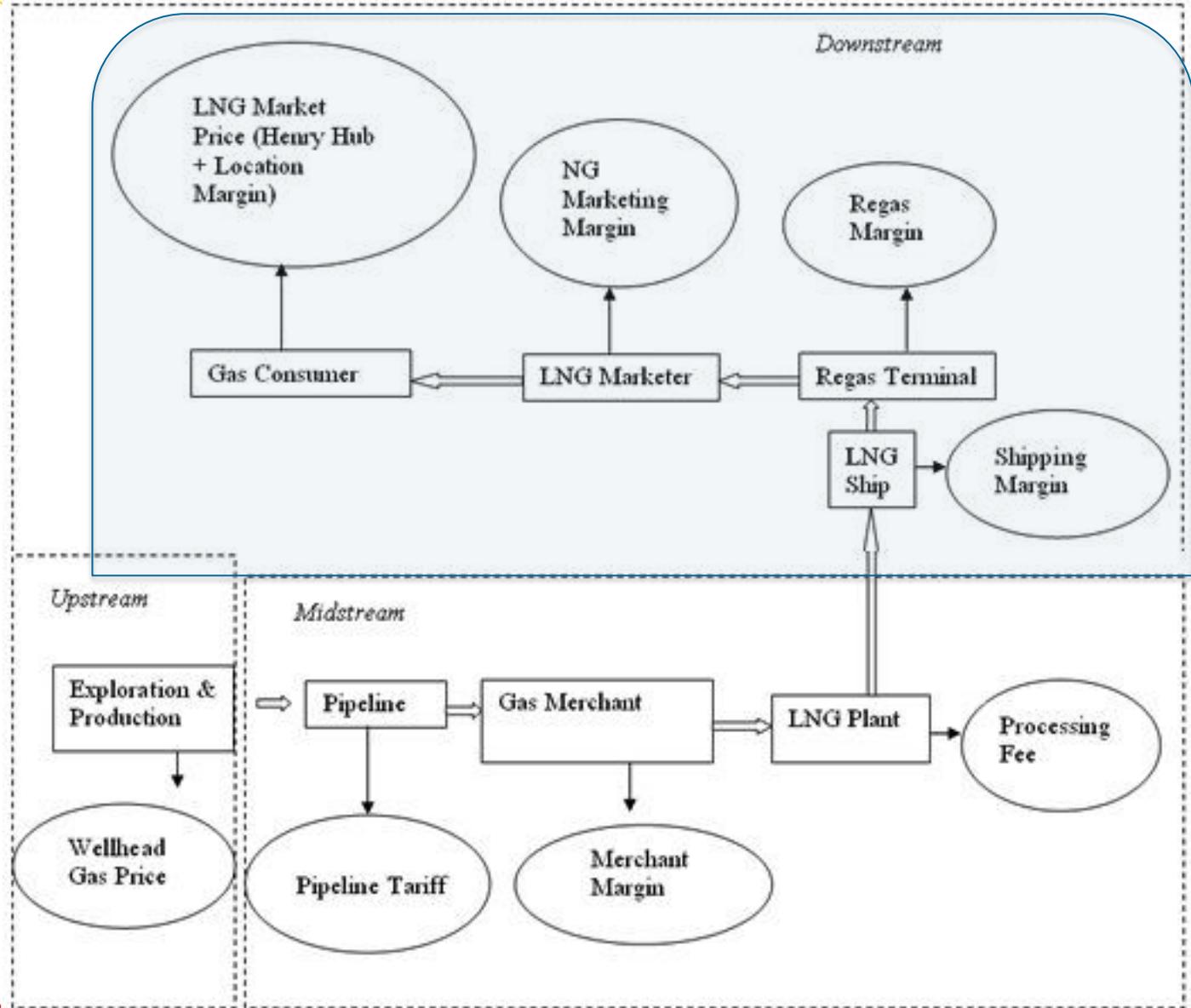
- ✓ \$277.2 Billion
- ✓ Upstream ~25%
- ✓ **Downstream >70%**
- ✓ *much outside producing countries*



- This split represents the whole value chain, globally
- Upstream sector may return a higher share in taxes, varying from State to State
- Upstream 3<sup>rd</sup> party supplier share is similar.

**T&T LNG Value Chain**  
- value downstream of processing/manufacturing

*incl. Trading, Marketing, Shipping, Insurance,*



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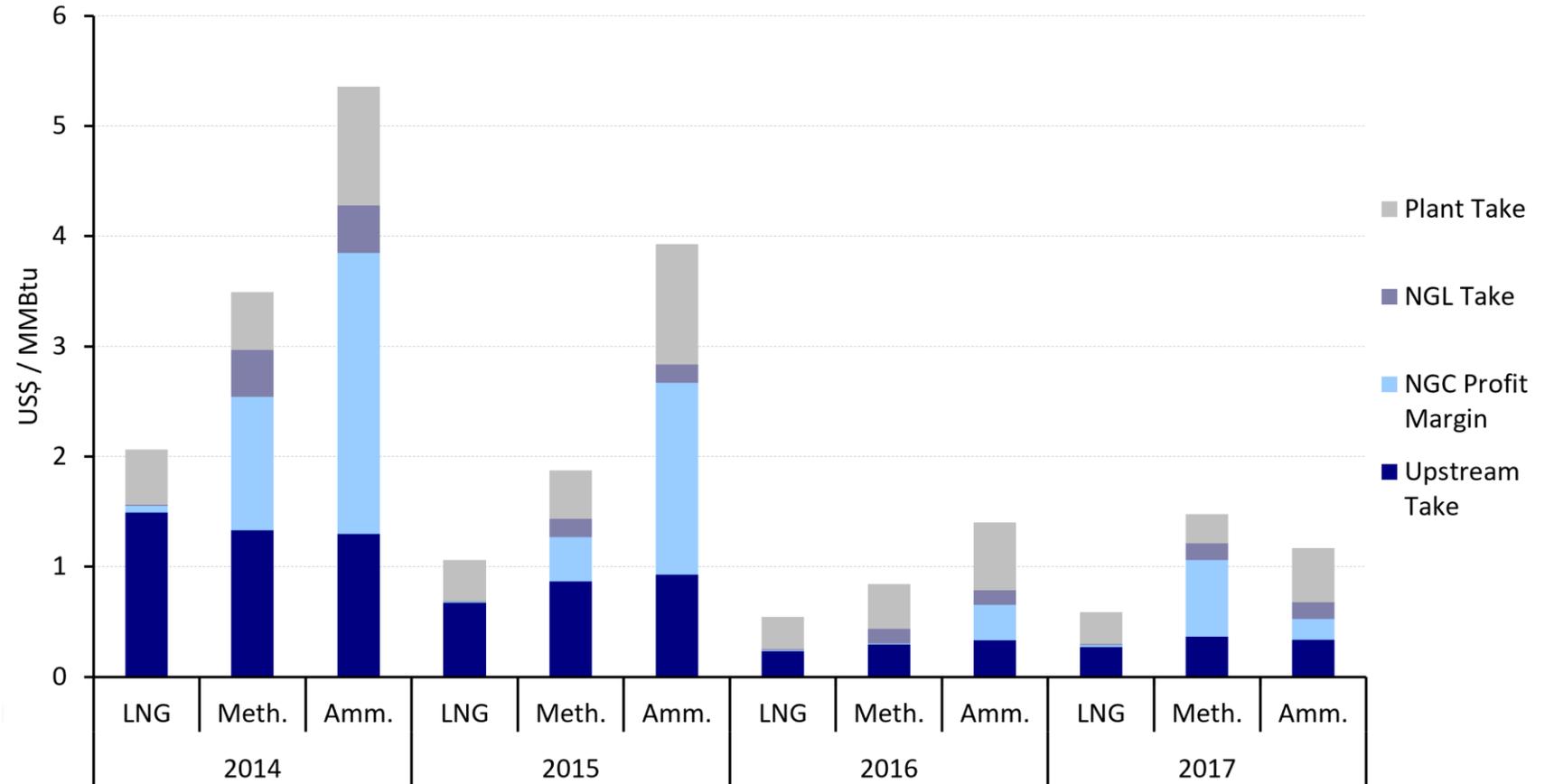
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**More Value Captured  
from Manufacturing  
than from Export of  
Raw Material (LNG)**

**Breakdown of Estimated Total GORTT Take from Gas Value Chain**



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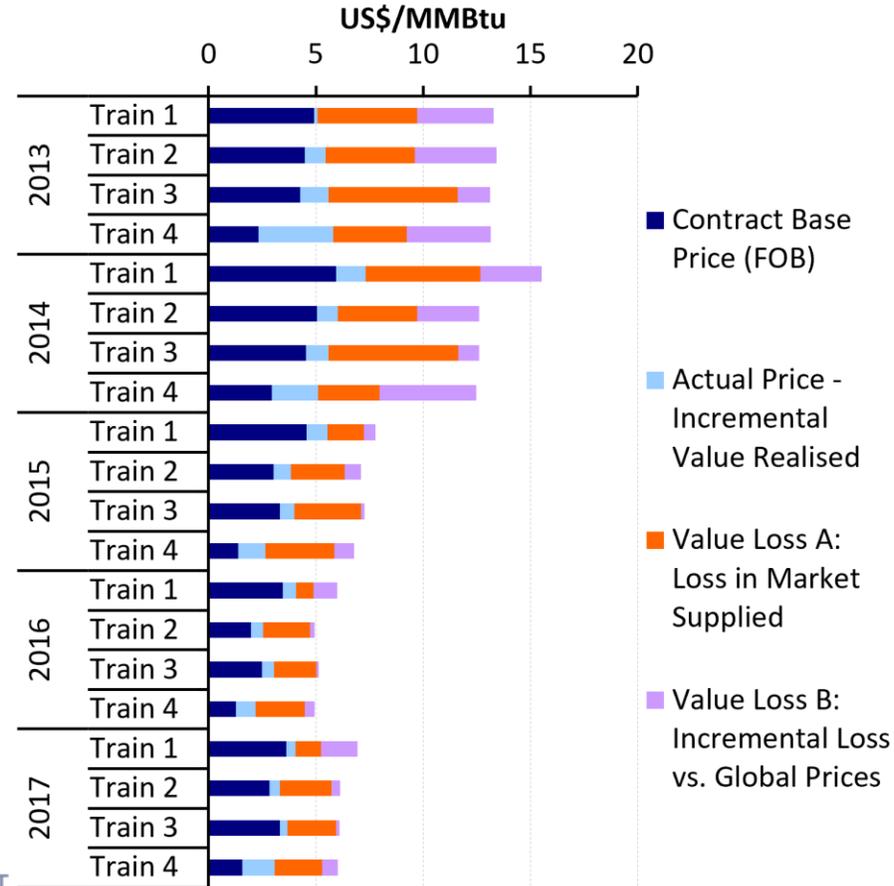
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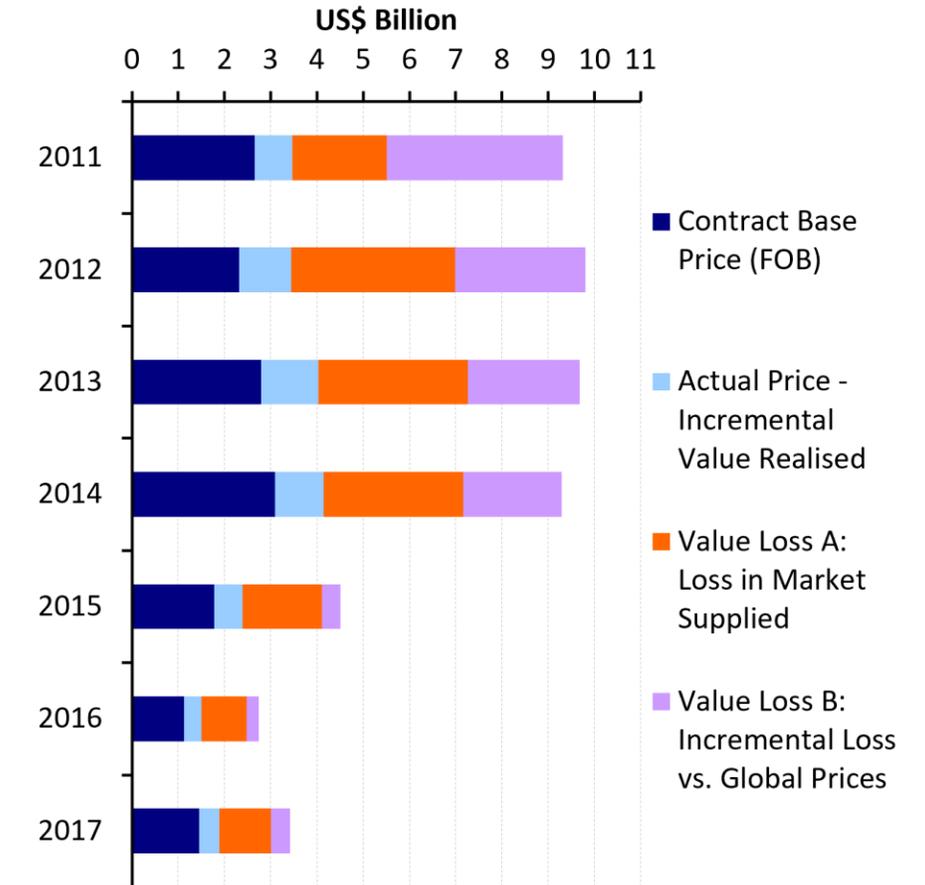
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Transfer Pricing -  
Significant value  
in the LNG chain  
has not been  
realised in T&T

LNG Prices Realised & Est. Value Loss per Train\*



LNG Revenues Realised & Est. Value Loss – Totals



\* Value Loss A: Difference between the price realized from the market actually supplied and Poten's estimate of the prevailing price in that market  
Value Loss B: Poten's estimate of the incremental price that could have potentially been realized by selling FOB at an oil-linked price (11.5 – 12%)

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## Hub Opportunities for Natural Gas Value Addition

### 1. Gas Supply & Processing Infrastructure - Shared assets:

- Gas reception terminal (pipeline tie-in, custody transfer metering)
- Gas treatment & processing facilities (acid gas removal, dehydration, NGL recovery)
- Gas compression stations
- Pipeline distribution network within the estate
- Storage (Product storage, LNG tanks, CNG storage)

### 2. Energy & Utility Systems

- Power generation plant (gas turbines/combined cycle), with:
  - Centralized electricity distribution network
  - Backup/standby power systems
- Steam and hot water generation for process heating
- Cooling water systems (centralized cooling towers, chilled water plant)
- Instrument air and plant air systems
- Nitrogen production & distribution
- Industrial gases (oxygen, argon, hydrogen if produced as by-products)
- Water supply (treated industrial water, potable water)
- Wastewater collection & treatment (process effluent, sanitary wastewater)
- Firewater network (hydrants, pumps, storage tanks)

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### 3. Storage & Logistics Facilities

Common materials-handling and transport infrastructure:

- **Bulk storage tanks** (for LPG, LNG, condensate, liquid feedstocks, intermediates)
- **Solid product warehouses** (fertilizer, plastics, packaged goods)
- **Truck and rail loading/unloading stations**
- **Port/marine terminal** for export/import (if coastal)
- **Pipeline corridors** for liquid and gaseous products
- **Internal road network** for heavy and light vehicles

### 4. Shared Services & Support Facilities

Services that reduce overhead and improve coordination:

- **Central control room / SCADA monitoring**
- **Laboratories** for product testing and quality control
- **Maintenance workshops** (mechanical, electrical, instrumentation)
- **Emergency response center** (fire, medical, security)
- **Waste handling facilities** (hazardous waste storage, recycling, incineration)
- **IT and telecommunications backbone**
- **Training and conference facilities**
- **Administration buildings** and common office space

### 5. Environmental & Safety Systems

- Shared systems to meet regulatory and safety requirements:
- **Flare systems** (main process flare, cold vent stacks)
- **Environmental monitoring stations** (air, water, noise)
- **Gas detection & alarm systems**
- **Stormwater management systems**
- **Green buffer zones** for noise and emissions control

### 6. Potential Shared Product Streams

Where processes produce overlapping or complementary outputs, sharing can be economical:

- **Steam** from a co-gen plant to multiple process units
- **Industrial gases** from large-scale production units
- **Recovered by-products** (e.g., CO<sub>2</sub> for beverages or EOR; sulfur for sulfuric acid)
- **NGLs and LPG** separated from the natural gas stream

## Synergies with Hydrogen

If a hydrogen production facility is located close to a **natural gas-based industrial estate** and both are linked to **export markets by sea**, the overlap creates a lot of scope for **shared infrastructure, integrated processing, and downstream diversification.**

### 1. Shared Energy & Utility Infrastructure

Hydrogen production and natural gas-based industries often require similar core utilities:

- **Power generation**
- **Cooling systems**
- **Water supply and treatment**
- **Industrial gases**
- **CO<sub>2</sub> handling**

If hydrogen is “blue” (from NG with CCS), CO<sub>2</sub> capture, compression, storage or utilization facilities can also serve NG-based plants (e.g., for urea, beverages, or synthetic fuels)

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### 2. Shared Logistics & Export Infrastructure

- **Marine terminal**
- **Pipeline corridors**
- **Bulk storage tanks** (cryogenic for LH<sub>2</sub>, ammonia, methanol; pressurized for LPG/NGL)
- **Common loading/unloading bays**

### 3. Multiuse Process Plants & Equipment

- **Ammonia plants** - Can run on hydrogen from NG reforming, hydrogen from electrolysis, or blends. Acts as a “carrier” for hydrogen exports and a feedstock for fertilizers
- **Methanol plants** - Can take syngas from NG or green hydrogen + captured CO<sub>2</sub>
  - Supports synthetic fuels (e-methanol) production
- **Synthetic fuel plants** (Fischer-Tropsch, e-kerosene, e-diesel) - Can integrate hydrogen from both NG and renewables, plus CO<sub>2</sub> from other processes
- **Industrial heat networks** using high-temperature heat from hydrogen production or NG-fired cogeneration

#### 4. Downstream Manufacturing Opportunities

Combining hydrogen and NG feedstocks enables a **more diversified product base**:

- **Fertilizers**
  - Ammonia → urea, ammonium nitrate, ammonium phosphate
- **Plastics & polymers**
  - Methanol → olefins → polyethylene, polypropylene
  - Hydrogen in hydrogenation steps for specialty chemicals
- **Metals processing**
  - Direct Reduced Iron (DRI) using hydrogen or NG syngas
  - Steelmaking with lower CO<sub>2</sub> emissions
- **Synthetic fuels**
  - Green/blue hydrogen + CO<sub>2</sub> → e-kerosene, e-diesel, marine fuels
- **Glass, ceramics, and float glass**
  - Can use hydrogen or NG for process heat
- **Electronics & semiconductor gases**
  - **HOST IN PARTNERSHIP WITH** Hydrogen and nitrogen supply for chip manufacturing or solar PV production

#### 5. Shared Support & Safety Systems

- **Centralized control rooms** monitoring hydrogen and NG facilities
- **Fire and emergency response systems** designed for both cryogenic and flammable gas hazards
- **Hazardous waste handling & neutralization**
- **Training & certification centers** for handling LNG, LH<sub>2</sub>, ammonia

#### 6. Strategic Benefits

- **Economies of scale** in utilities, port handling, and pipeline infrastructure
- **Flexibility in feedstock sourcing** (e.g., switch ammonia plant from NG-derived H<sub>2</sub> to electrolytic H<sub>2</sub> over time)
- **Resilience** through diversification — both sectors can serve energy, chemical, and material markets
- **Lower carbon footprint** by integrating blue and green hydrogen into existing NG value chains

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## How T&T could have done better:

- a better understanding of the values and modus operandi of companies:
  - how they view and manage the value-chain
  - how they negotiate (that is often very different to how governments see it);
- managing the consequent contracts that we negotiate;
- understanding how to offset short term benefits for the longer- term;
- understanding the full life cycle of major projects, from front-end design to operations, and the implications for local value-addition;
- understanding the markets and value-chains;
- better regulating and overseeing the contracts and operations
- Reviewing and keeping up to date policies, legislation and operating procedures of the government
- Improving efficiency in revenue collection;
- Learning from others

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## Recommendations for Namibia

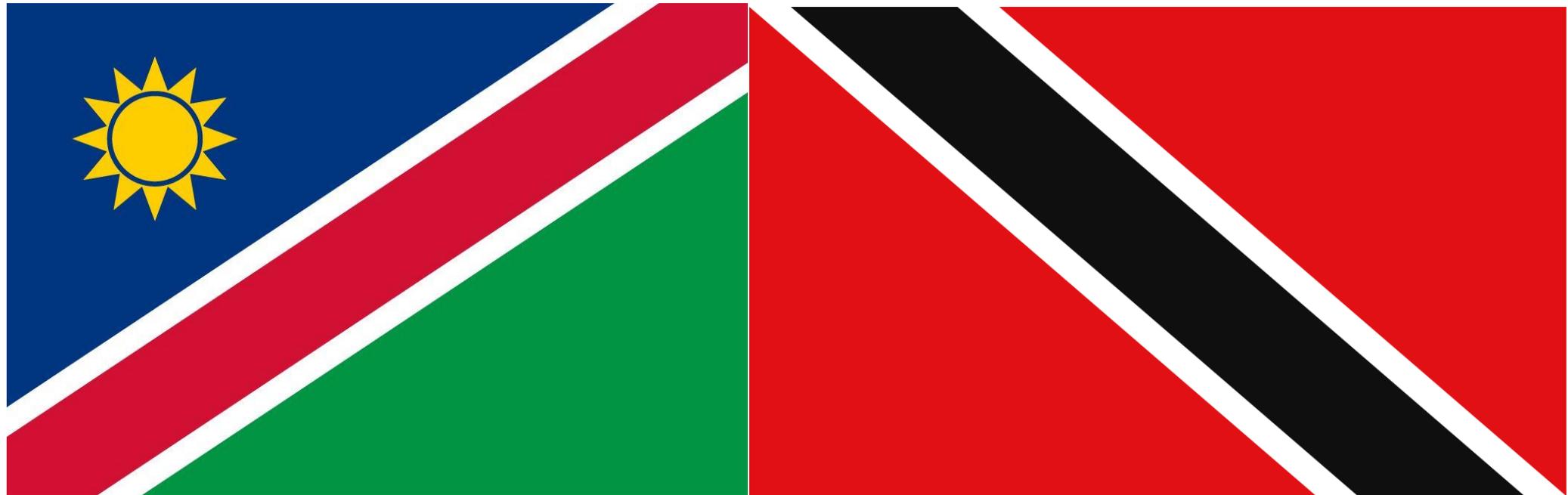
1. Have clear Policies
  - Revisit and review regularly
2. Have effective Governance Systems (Legal and Administrative)
3. Have Namibian Gas Master Plan, that:
  - a. Contributes to and aligns with Regional Gas Master Plans
  - b. Contributes to and aligns with Industrialisation Plan
  - c. Contributes to National Development Plan
  - d. Integrates Upstream – continuous exploration & appraisal to keep project flow
  - e. Manages pace of development, production and new project development
4. Hold Regulators Accountable
5. Ask for Help
  - a. Learn how to ask questions
  - b. Learn from Mistakes
  - c. Choose supporters wisely

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Thank you for the opportunity to share and for your kind attention



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