

# *The Role of Gas in Namibia's Energy Future; Unlocking Namibia's Natural Gas Potential*

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development consortium

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**Lessons from Trinidad and Tobago**

## 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)

## From exploration to action: Positioning Namibia as the next energy frontier Positioning Namibia as a Hub in Southern Africa

### 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

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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