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CARIBBEAN SUSTAINABLE ENERGY FORUM VIII:

Green Hydrogen, Integrating the Caribbean

Presented by:
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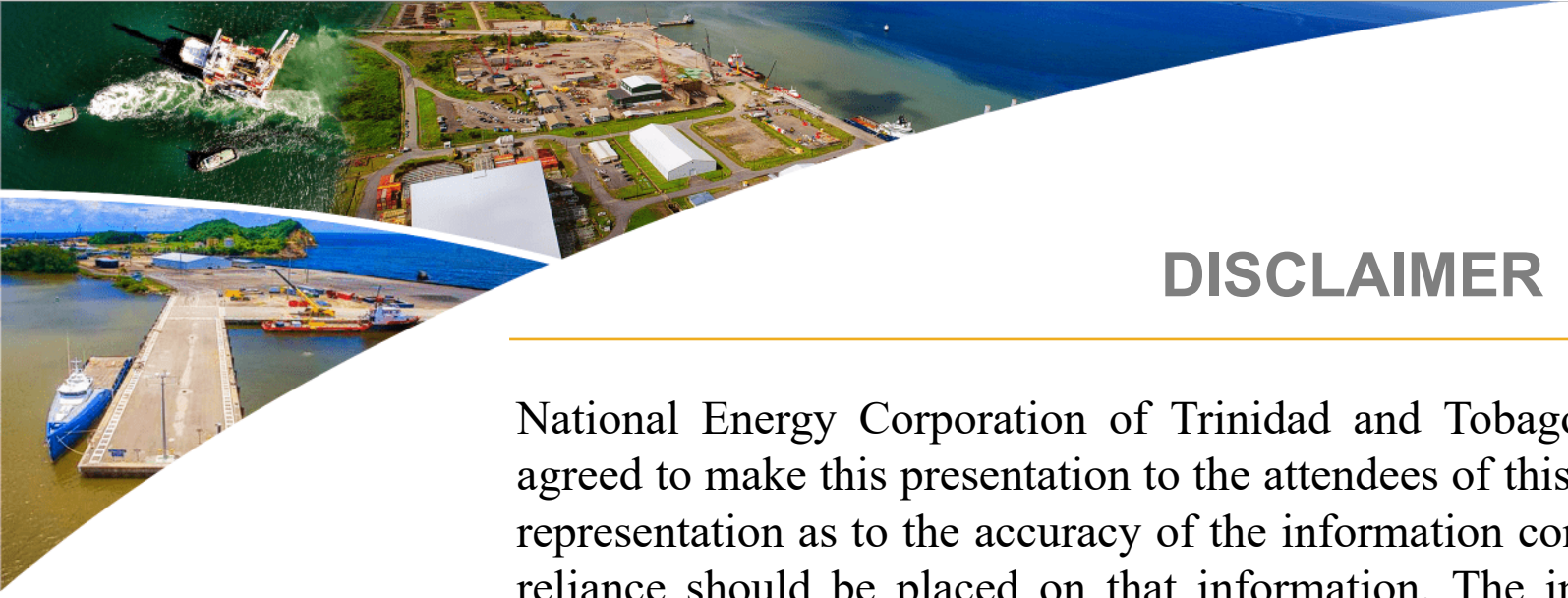
8th Nov 2023



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PRESENTATION OUTLINE

1. The NGC Group and National Energy
2. Hydrogen Development in the Regional
3. Trinidad and Tobago's Green Hydrogen Economy Development
4. What is Needed to Accelerate Green Hydrogen in the Region

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01 The NGC Group and National Energy

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The NGC Group

THE NATIONAL GAS COMPANY OF TRINIDAD AND TOBAGO LIMITED

Mandate

NGC is the sole purchaser, transporter and seller of natural gas in T&T's natural gas-based energy sector

Own and Operates:
4.4 BCF Pipeline network comprising 1000km of off-shore and on-shore pipelines and above ground installations
The Cross-Island Pipeline at 56", at the time of its commissioning in 2005, was the largest diameter pipeline in the Western Hemisphere

PHOENIX PARK GAS PROCESSORS LIMITED

Mandate

Natural gas processing, NGL aggregation, fractioning and marketing.

Facilities:
- 3 cryogenic natural gas processing plants – 1.95 bcf
- 2 Fractionate plants – 70,000 barrels/day
- 6 product storage tanks – 1,250,000 barrels
- 2 product loading docks (54,000 & 22,000 cbm)
- A 56km natural gas liquids ("NGLs) pipeline bet. Atlantic LNG and Point Fortin to Pt. Lisas processing plant.

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Mandate

To conceptualize, promote, facilitate and develop sustainable energy-based industries locally & internationally.

Point Lisas:
Liquid & dry bulk
6 terminals; 9 berths
Brighton Port:
Storage Yard
Warehouse Facilities
307m dock with turning basin
Logistics
Union Industrial Estate:
Heavy & light downstream industries
Port of Galeota:
Logistics
Warehouse facilities

LABIDCO

Mandate

The promotion, development, and management of the La Brea Industrial Estate and associated maritime infrastructure facilities in support of energy sector development..

LABIDCO offers port and estate facilities for:

- Leased land
- Bioremediation and waste disposal services
- Import/export of petrochemicals, general and project cargo
- Logistics Services
- Open and covered storage
- Large-scale fabrication services (dockyard)

CNGC NGC CNG Company Limited

Mandate

To accelerate and expand the use of Compressed Natural Gas (CNG) as a major, alternative, transportation fuel in T&T.

Target:
TT$500M;
22 CNG service stations;
17,500 vehicles

CNG Network:
14 operating stations
3 Convertors (1pending)

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Areas of Focus Over the Next 5 Years

National Energy's commitment to the Energy Transition is real!

National Energy's Strategic Framework 2023-2027 was developed with a focus that aligns our goals and deliverables with the Sustainable Development Goals.

ESG AT THE CENTRE

Energy Export Services For Trinidad & Tobago

Focal Point for promotion of Trinidad & Tobago's energy services sector

Developing regional partnerships and investments

Strategic Investments

Equity Investment Opportunities - locally and internationally

Explore new business models for equity participation

Carbon Management to reduce the CO2 emissions of the company and leverage carbon financing

Offshore Logistics & Port Services

Provide services for the upstream and mid-stream energy sectors as a logistics support hub for both the energy and maritime industries

Low-carbon, integrated logistics hub to attract business

Energy Integration & Sustainable Petrochemicals

Adoption of lower carbon technologies, such as a Blue/Green Hydrogen economy, green ammonia etc..

Implementation of Green H2 Roadmap

Alternative Fuels

Energy Efficiency & Commercial & Industrial RE

Energy Efficiency strategic initiatives including Super ESCO.

Commercial and Industrial Solar PV installations

State sector RE & EE Project implementation

People, Innovation & Communication

Build key competencies in targeted areas. Establish innovation Teams

Strengthen corporate citizenship strategies aligned to drive company positioning

Implement Business Analytics

COMMITTED TO THE SAFETY AND SECURITY OF ALL STAKEHOLDERS

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02 Hydrogen Development in the Region

Hydrogen Deployment in Latin America and the Caribbean Region

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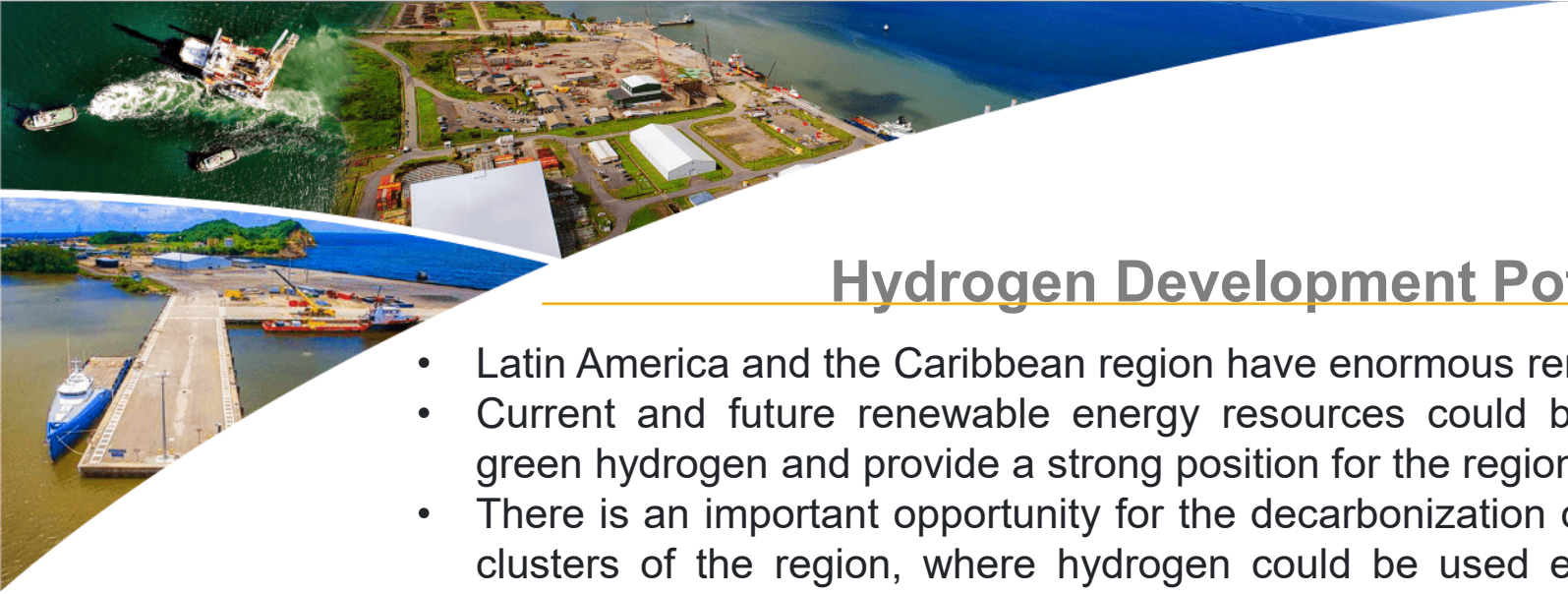
2021 Hydrogen Latin America and Caribbean Index – Aggregated Results

Source: Hincio 2021

No country scored higher than 50 in the first round. That essentially means that there is a huge potential for growth and improvement for hydrogen in LAC.

With its wealth of solar, wind, and hydroelectric resources, LAC has the potential to produce sufficient green hydrogen to export renewable power to markets in Europe..



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Hydrogen Development Potential

- Latin America and the Caribbean region have enormous renewable energy resources.
- Current and future renewable energy resources could be directed to the production of green hydrogen and provide a strong position for the region.
- There is an important opportunity for the decarbonization of the main industrial and mining clusters of the region, where hydrogen could be used either directly or through energy carriers such as methanol or ammonia.

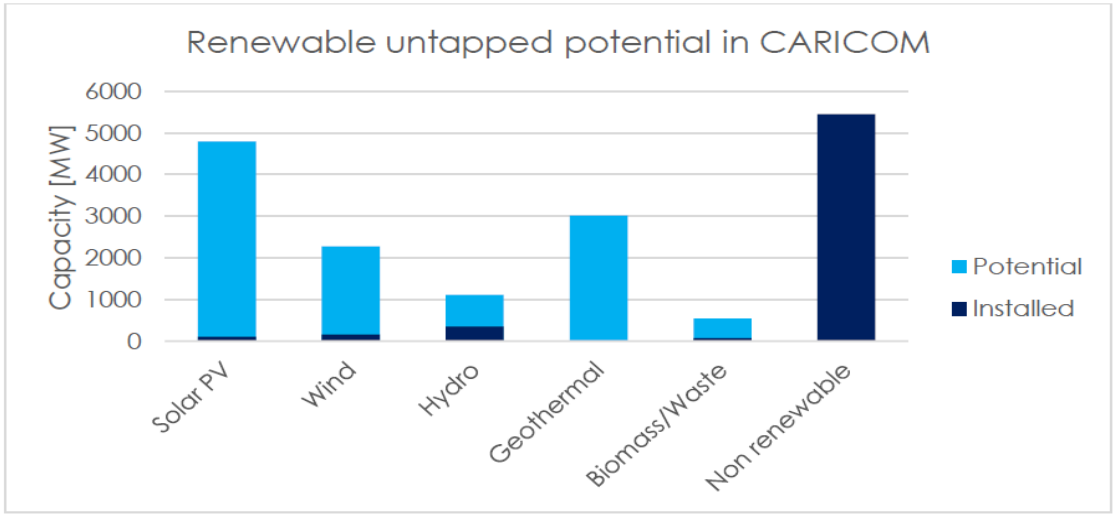
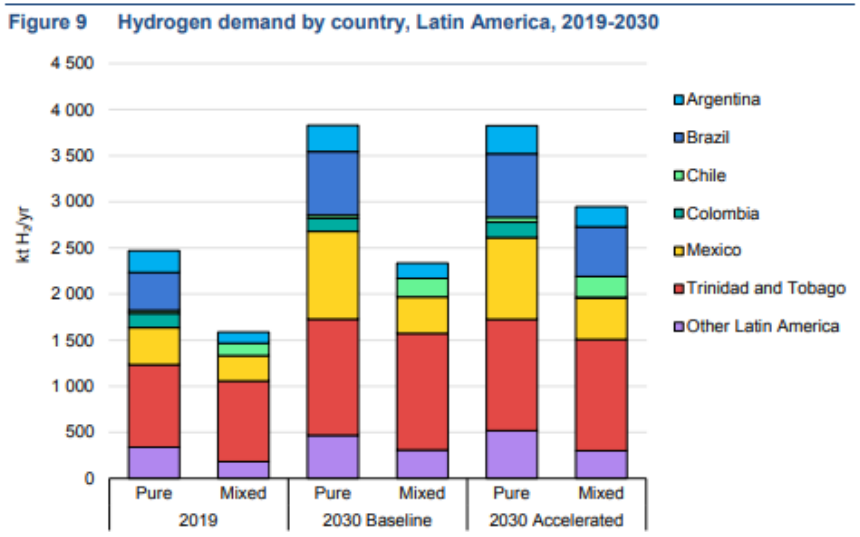
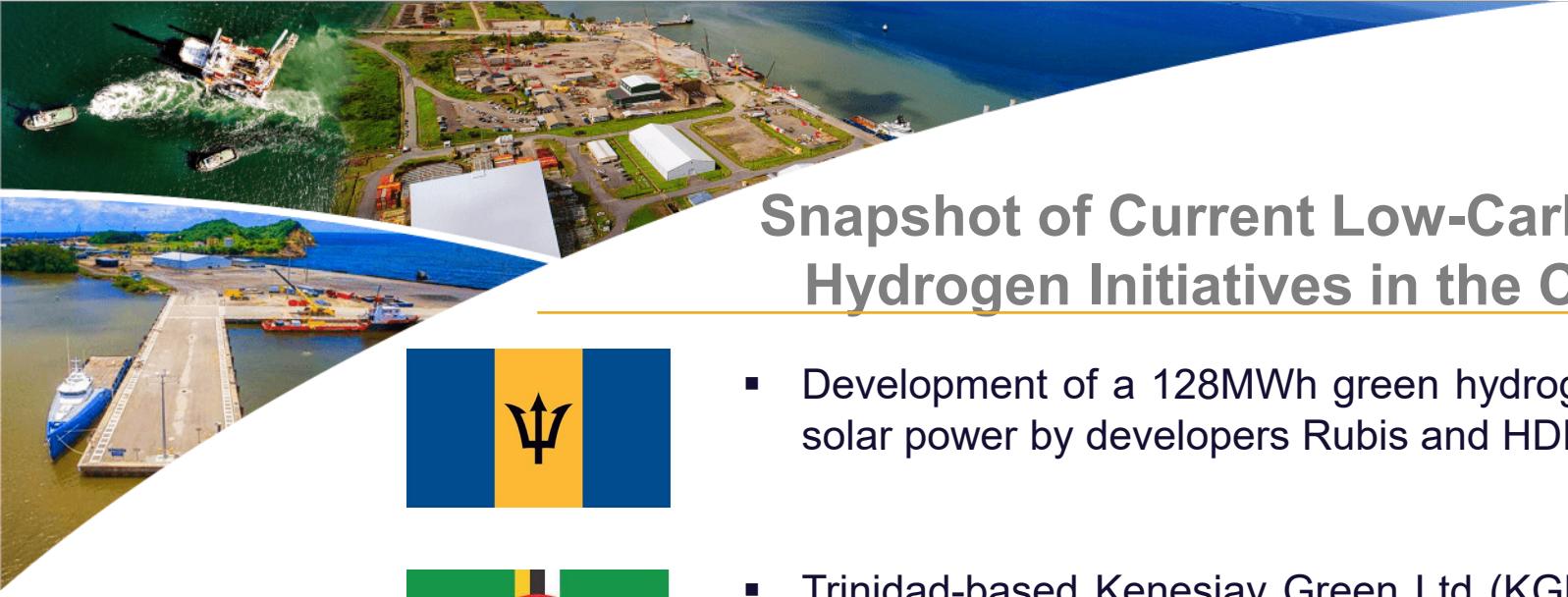


Figure 15 Renewable energy potential per source for the CARICOM countries aggregated. Data source: (CCREEE, 2020)





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Snapshot of Current Low-Carbon/ Green Hydrogen Initiatives in the Caribbean

- Development of a 128MWh green hydrogen storage project coupled with 50MW of solar power by developers Rubis and HDF Energy.

- Trinidad-based Kenesjay Green Ltd (KGL) to undertake a green hydrogen country assessment for Dominica with focus on creating a roadmap for utilisation of its geothermal resource.

- The Center for the Study of Renewable Energy Technologies has begun studies for the application of hydrogen as an energy source.

- Study to facilitate the establishment of a green hydrogen market in Trinidad and Tobago and Public Launch of Trinidad and Tobago Green Hydrogen Roadmap in 2022. GORTT approval for implementation of Phase 1.
- Development of the NewGen Low Carbon Hydrogen Project.

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03 Trinidad & Tobago Green Hydrogen Economy Development

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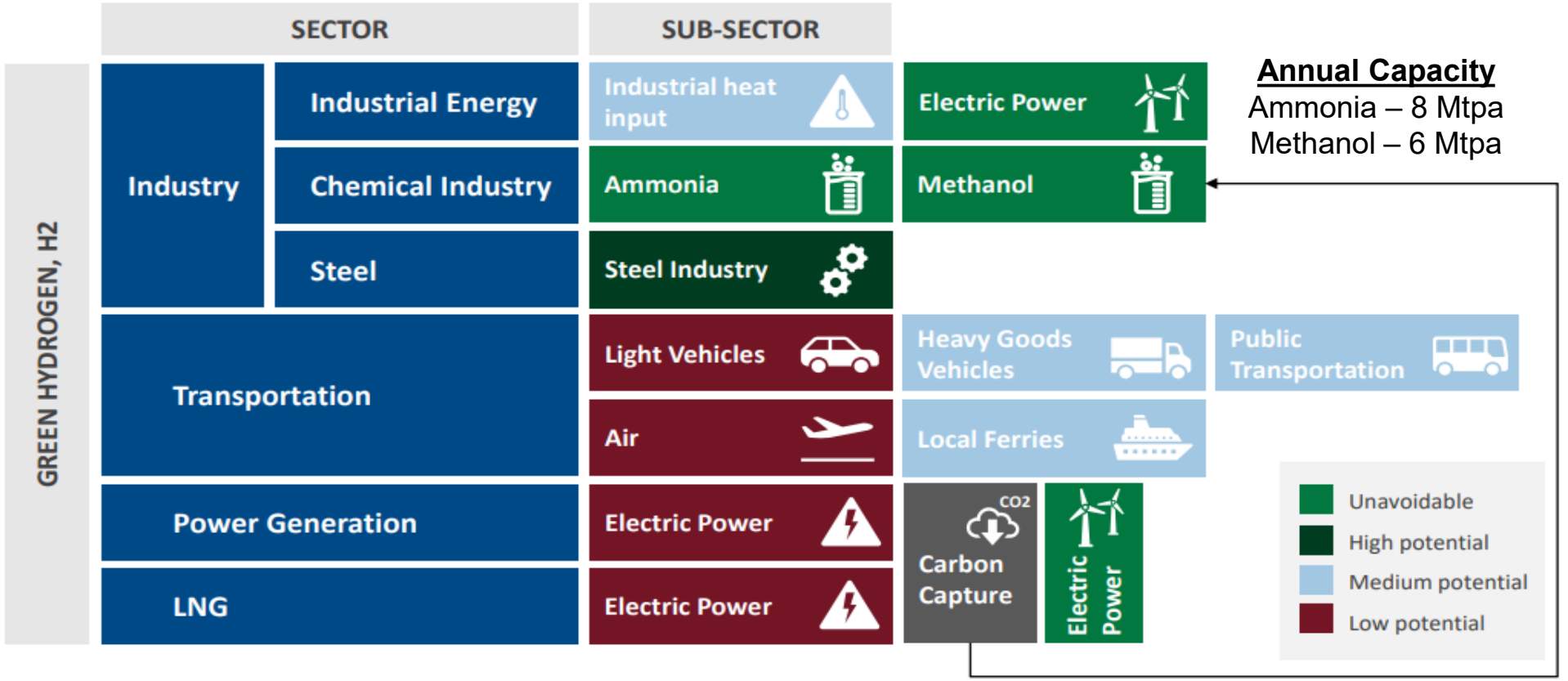
Green Hydrogen Prioritization

As of 2020, grey hydrogen production in Trinidad and Tobago was approximately 1.7 mtpa

T&T's Hydrogen Study identified top priorities for green hydrogen as a substitute for grey hydrogen and natural gas in a decarbonized future.



Annual Capacity
Ammonia – 8 Mtpa
Methanol – 6 Mtpa

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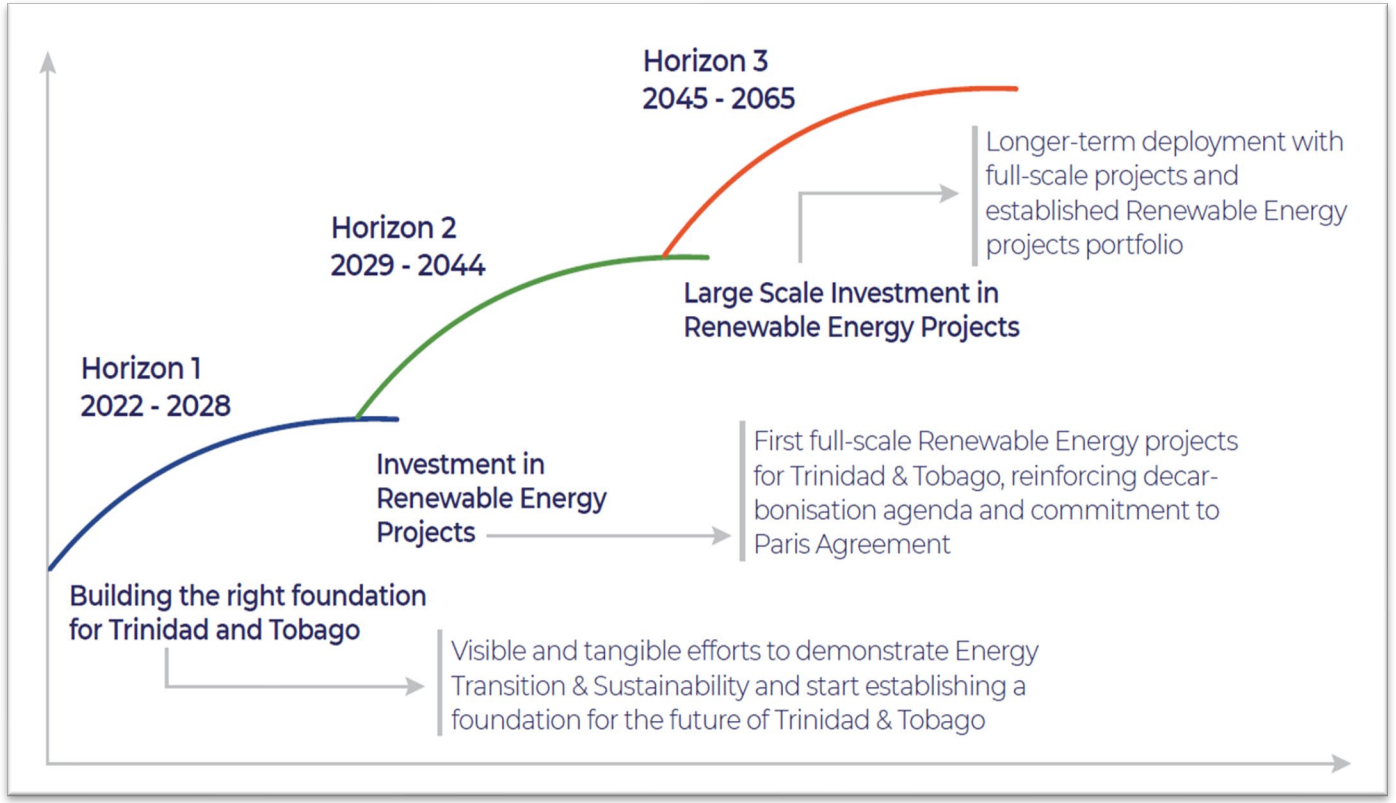
Trinidad and Tobago's Green Hydrogen Roadmap

The Roadmap for a Green Hydrogen Economy in Trinidad and Tobago – Launched November 2022

Offshore wind energy was identified as the renewable energy source with the highest potential for Trinidad & Tobago, with the potential to deliver 57GW in installed capacity and 25GW in average output.

This will require deployment of fixed, floating conventional and floating deep wind energy generation technologies, and green hydrogen production facilities over a 35-year period, in a phased approach.



Source: The Roadmap for a Green Hydrogen Economy in Trinidad and Tobago, 2022

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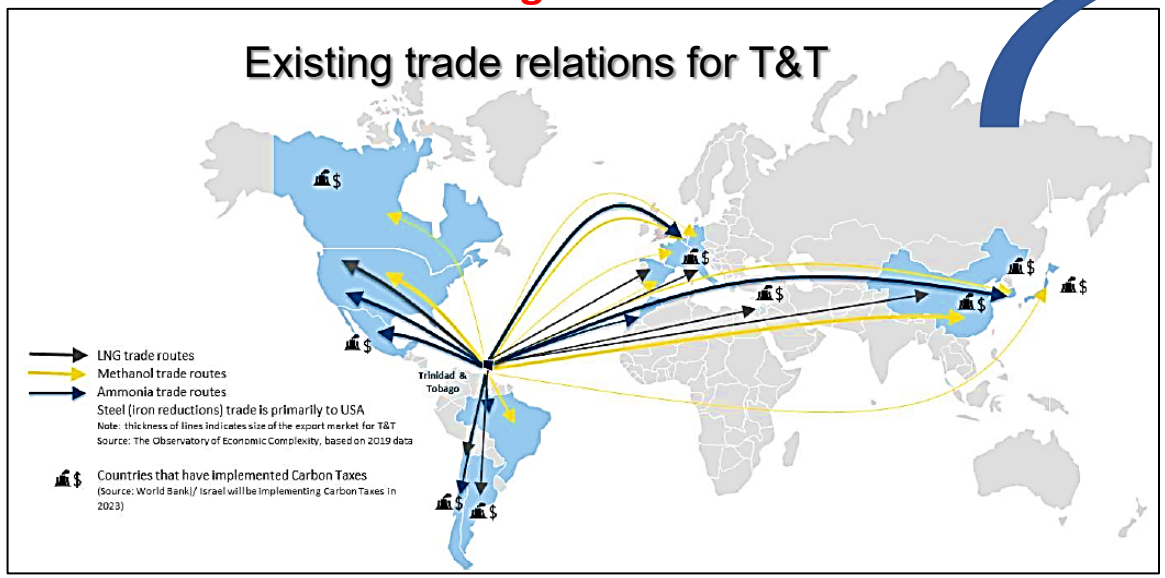
A Green Hydrogen Hub

T&T is well positioned to be a Green H2 Hub by leveraging our geographical location, oil and gas legacy, and the strengths of our existing energy sector…

It is anticipated that T&T's existing trade relations and export routes are likely to remain unchanged until 2030 / 2035, which is when most green projects announced to date will start operations and build-up the supply of green products in the market. This provides an opportunity for T&T in terms of time to develop and set-up the right environment to enable large scale renewables investment and hydrogen production to penetrate the green products market.

…..Moving from this



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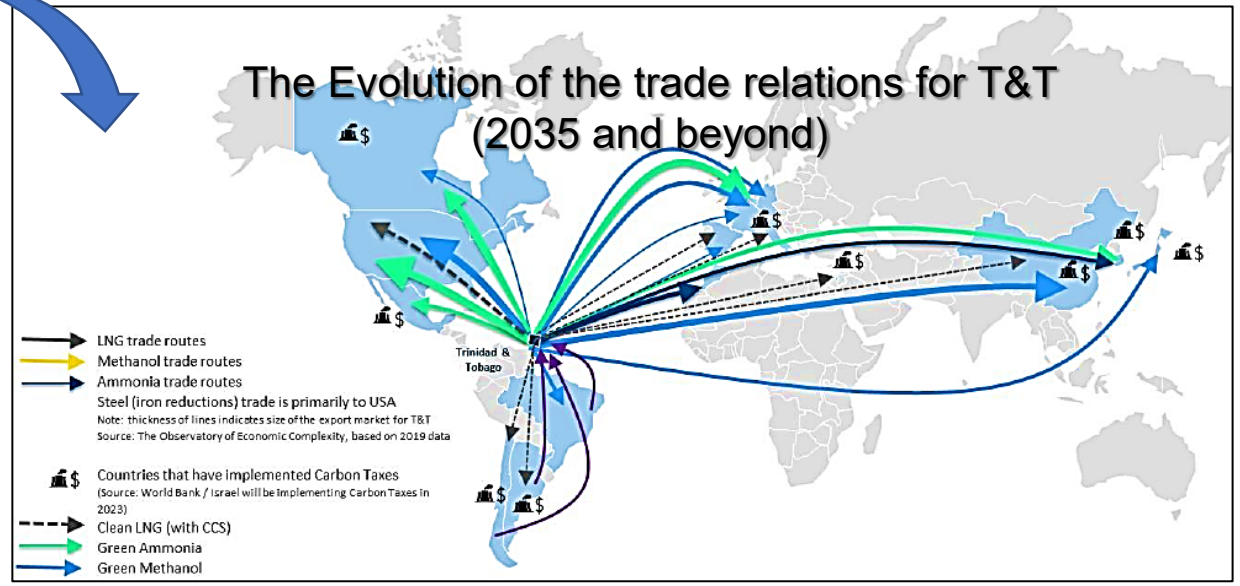

Source: KBR Report 1, 2022

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Horizon 1 – A Foundation for the Future

Cabinet agreed to implementation of activities of Horizon 1 of the Roadmap. Design of IDB programme operation is ongoing and National Energy has been appointed as the executing agency for the IDB programme.

IDB Operations Design & Approvals

Stakeholder Engagement

Procurement

Launch of The Roadmap for Green Hydrogen Economy

Onshore and Offshore WRAP

Framework for enabling the green economy in Horizons 2 & 3

Demonstration Programme

2023

2028

ENABLERS

Engagement and Promotion to raise awareness of investment opportunities, and facilitate the establishment of green hydrogen industry

Policy and Regulatory Framework

Investment Incentivization Policies

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04 What is Needed to Accelerate Green Hydrogen in the Region

Accelerating the Adoption of Low-Carbon Hydrogen

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International Cooperation Established for Accelerating the Adoption of Low-Carbon Hydrogen

REGIONAL PUBLIC GOODS
IDB
The RPG Initiative finances joint solutions to shared development challenges through regional cooperation
www.iadb.org/rpg

The RPG initiative finances joint solutions to share development challenges through regional co-operation

IPHE
International Partnership for Hydrogen and Fuel Cells in the Economy

MI CLEAN HYDROGEN MISSION

Build a dynamic and ambitious alliance between countries, businesses, investors and research institutes to accelerate innovation on clean hydrogen.

GLOBAL PROGRAMME GREEN HYDROGEN IN INDUSTRY
Innovative | Decarbonized | Inclusive

Aims to accelerate global strategic dialogue. And enhance the exchange, development and distribution of knowledge on policies, technical guidelines and standards.

H2 lac

A collaborative platform that seeks to promote the development of green hydrogen in Latin America and the Caribbean

Facilitate and accelerate the transition to clean and efficient energy and mobility systems using hydrogen and fuel cell technologies across applications and sectors.

IEA Technology Collaboration Programme
Advanced Fuel Cells

Examines opportunities and barriers to fuel cell commercialisation to foster the international development of technologies and their applications.

CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

Investigates how hydrogen can contribute to cleaner energy systems while promoting sustainability, resiliency and energy security

International co-operation is necessary to devise a transparent hydrogen market with coherent standards and norms that contribute to climate change efforts meaningfully.

How Can the Region Accelerate Low-Carbon Hydrogen Development

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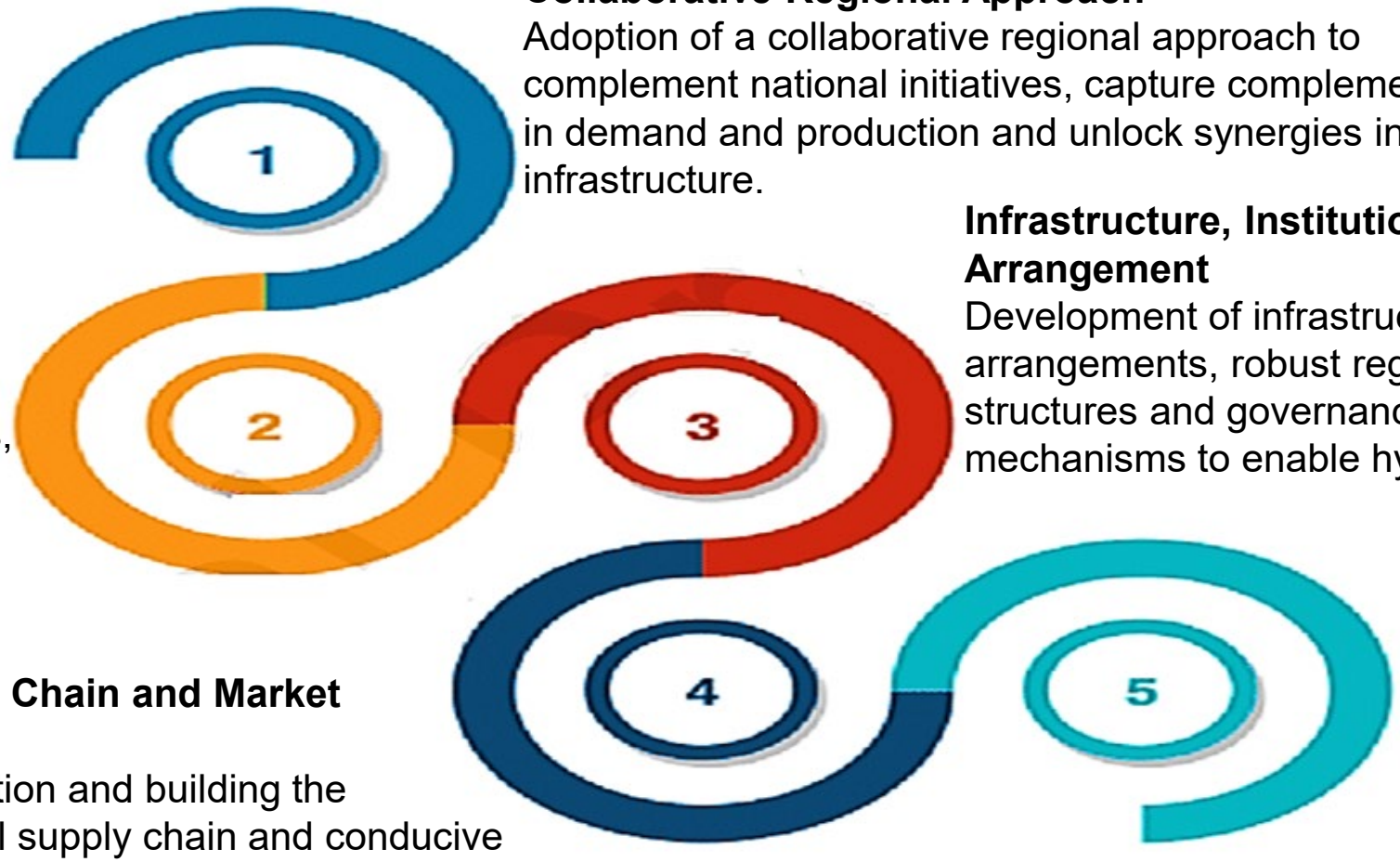
Collaborative Regional Approach
Adoption of a collaborative regional approach to complement national initiatives, capture complementarities in demand and production and unlock synergies in infrastructure.

Infrastructure, Institutional & Funding Arrangement
Development of infrastructure and institutional arrangements, robust regulations, market structures and governance, as well as funding mechanisms to enable hydrogen development.

Development of Policies, Strategies & Pilot Projects
Development of policies, regional strategies and pilot projects to foster hydrogen use as an energy carrier.



Building Supply Chain and Market Environment
Focus on production and building the necessary overall supply chain and conducive market environment.

Regional Hydrogen Hub
Establishment of a regional hub for production of competitive hydrogen from renewable electricity for regional supply and export.

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THANK YOU

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