



PTI

Parque Tecnológico
Itaipu

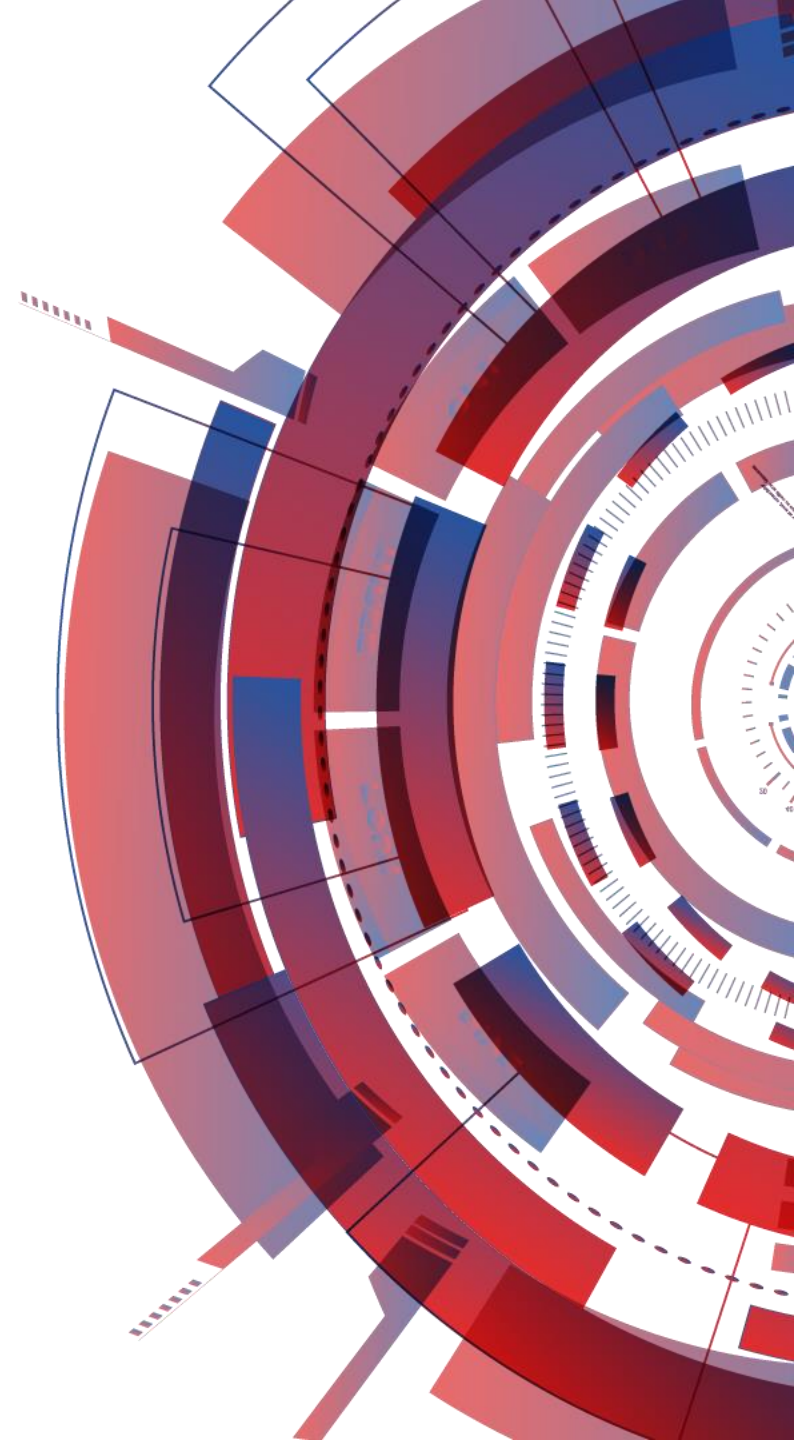


United Nations
Educational, Scientific and
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UNESCO Chair on Innovative
Sustainable Clean Energy
Research and Education at
the University of Genoa, Italy

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Parque Tecnológico
de Itaipu (PTI)
200 Has



Itaipu Hydroelectric Dam

World record clean energy production

103.098 GW (in 2.016)



OVERVIEW OF PARAGUAY'S ELECTRIC SECTOR



Hydroelectric Power Plants

ITAIPU BINATIONAL
14,000 MW



ACARAY
250 MW



YACYRETA BINATIONAL
3,200 MW



National
Interconnected
System



Renewable Energy
59.000 GWh/year

Export: 73%



National: 27%

Green H2 &
Electromobility

Top 6 planned Green H2 projects

Ranking	Country	Planned capacity (GW)	Scheduled
1	Australia	27	2028
2	Alemania	11	2035
3	Países Bajos	10	2030
4	China	5	2021*
5	Arabia Saudita	4	2025
6	Chile	2,74	2024
	Paraguay	8,1	Available

Hydro-methane and methanol combined production from hydroelectricity and biomass: Thermo-economic analysis in Paraguay

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Development and assessment of a distribution network of hydro-methane, methanol, oxygen and carbon dioxide in Paraguay

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Article

Clean Hydrogen and Ammonia Synthesis in Paraguay from the Itaipu 14 GW Hydroelectric Plant

Massimo Rivarolo ^{1,*}, Gustavo Riveros-Godoy ², Loredana Magistri ¹ and Aristide E. Massardo ¹

Research partners



Prof. Massardo Aristide,
Ph.D



Thermochemical Power Group

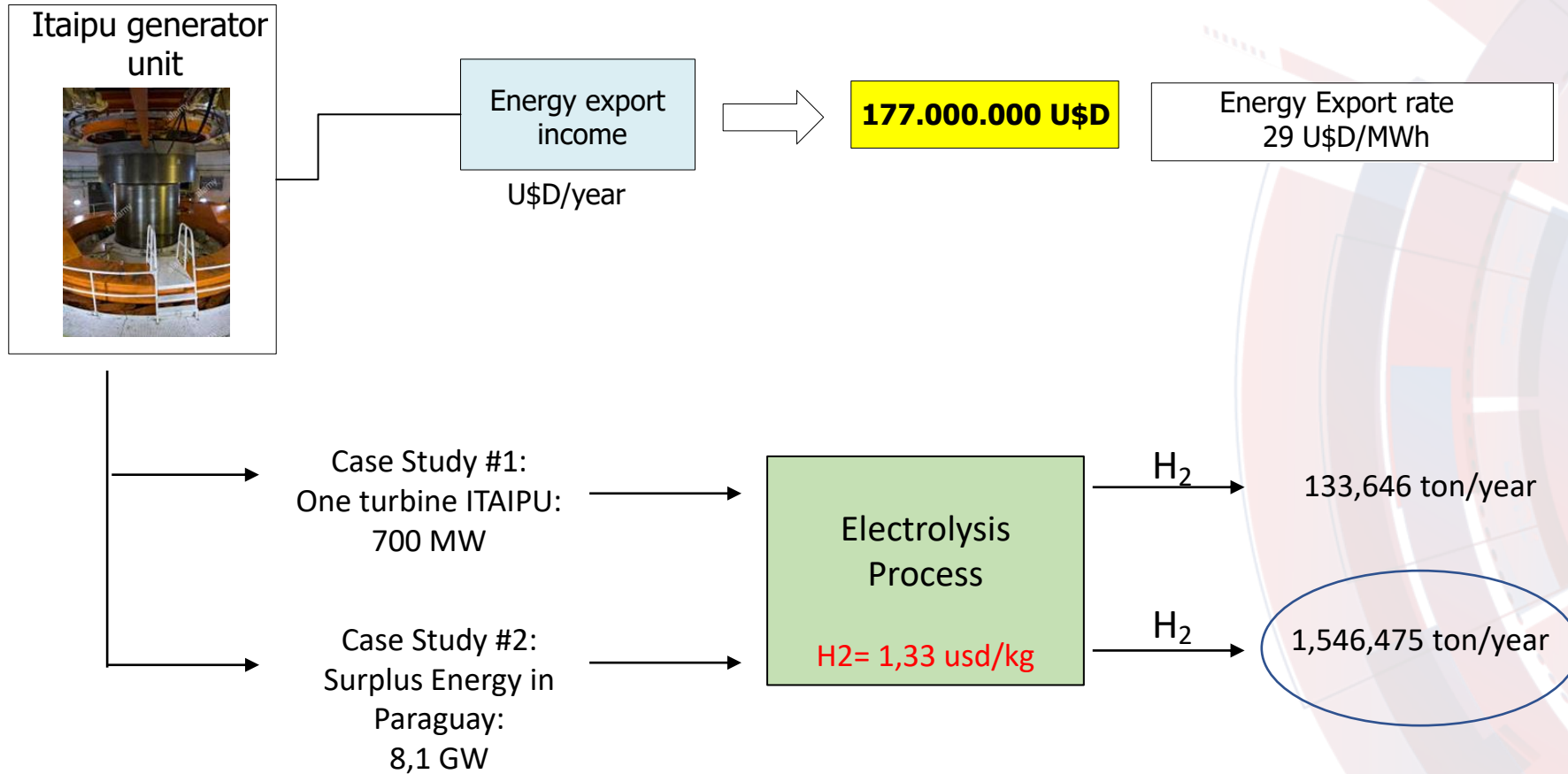
Dean, Polytechnic School of
Engineering and
Architecture, University of
Genoa, Italy



Ing. Remo Pertica



THE GREEN HYDROGEN ECONOMY AT PARAGUAY



World Price for green hydrogen: from 2,8 to 4 usd/kg

World production of hydrogen: 40 millones ton/year

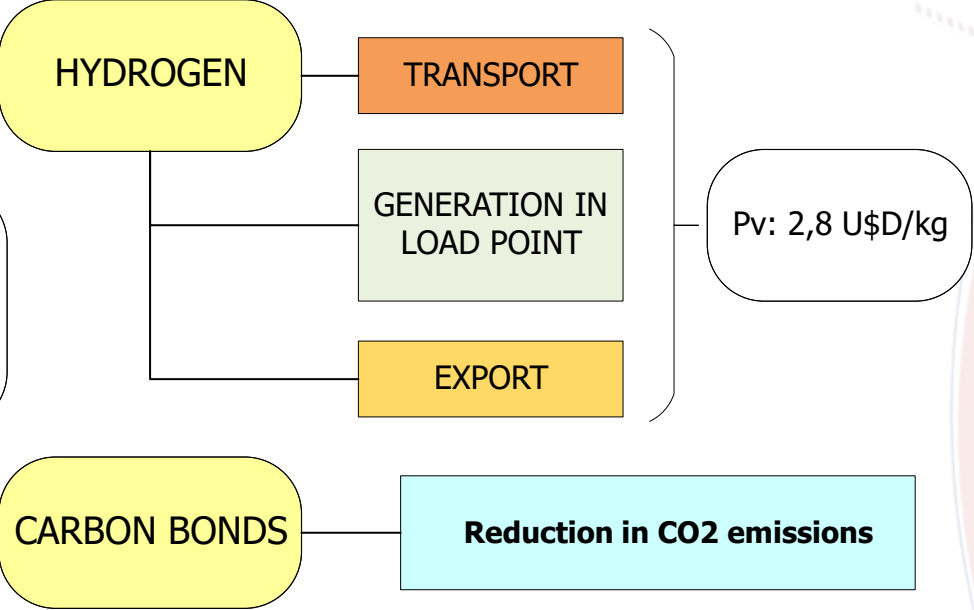
Only 4% from electrolysis (1,6 tons/year)

Case 1: Hydrogen market

Energy Cost
177.000.000 USD



HYDROGEN
133.646 tn/Year
Cp: 1,33 U\$D/Kg

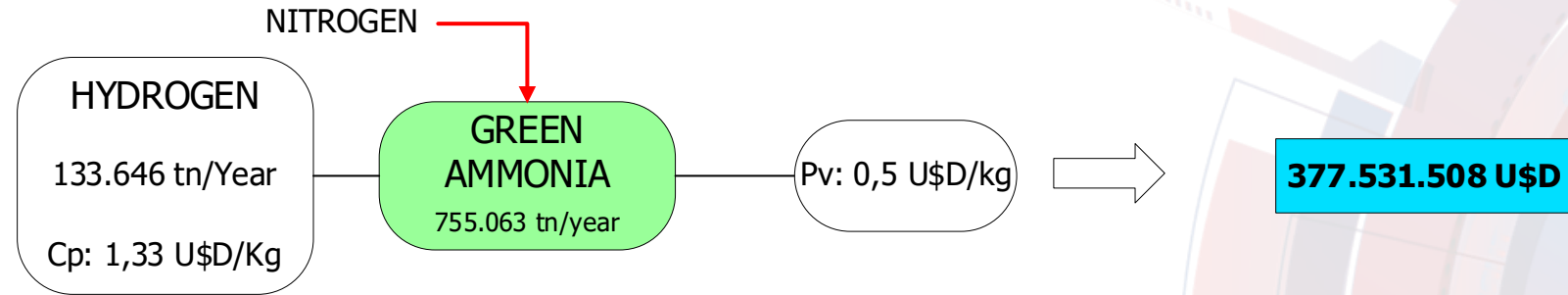


379.555.077 U\$D

Use of Hydrogen	
Hydrogen generation capacity of 1 Itaipu turbine	133.646 tons/year
Possible economic benefits from the use of hydrogen in the national energy system	379.555.077 U\$D
Possible Carbon Bonds benefits (for Itaipu)	50.000.000 U\$D

Case2: Green Ammonia Production

Energy Cost
177.000.000 USD

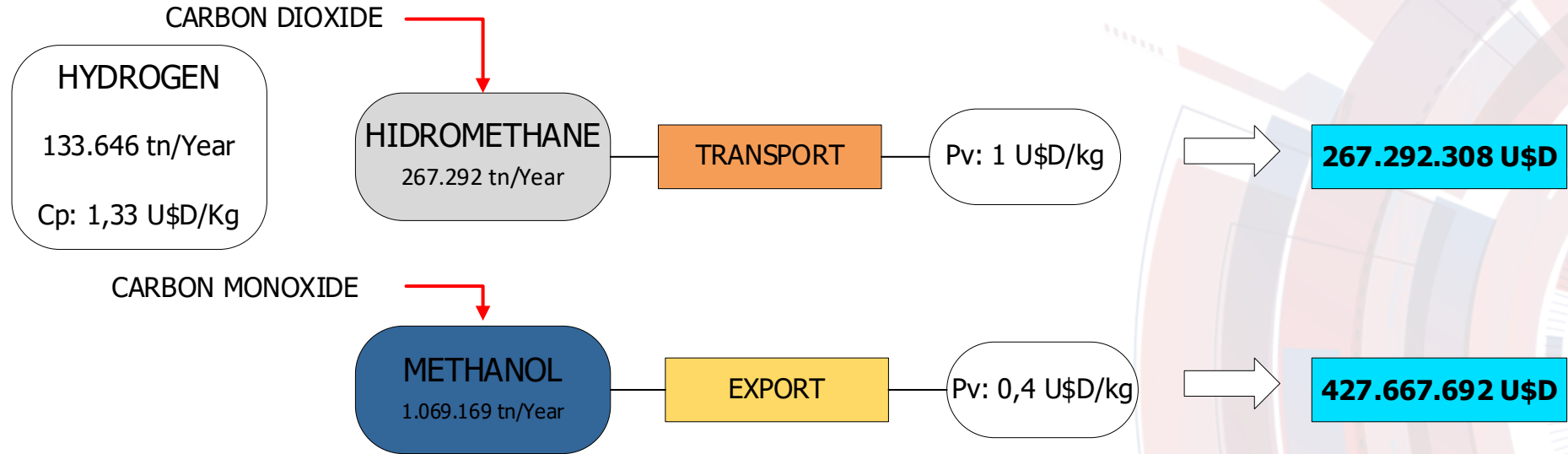


Green Ammonia Production	
Hydrogen generation capacity of 1 Itaipu turbine	133.646 tons/year
Current Paraguayan input demand for nitrogen fertilizers	133.000 tons/year
Green Ammonia production capacity	755.063 tons/year
Possible sales value of total production	377.531.508 U\$D

Market Price (Ref: 691 USD/ton)

Case 3: Hidromethane and Methanol production

Energy Cost
177.000.000 USD



Methanol and Hydromethane production	
Methanol production capacity	1.069.169 tons/year
Hydromethane production capacity	267.292 tons/year
Possible sales value of total production of Methanol	427.667.692 U\$D
Possible sales value of total production of Hydromethane	267.292.308 U\$D
Number of vehicles that can be served with this hydromethane production (15.000 km/year)	356.000 Vehicles
Amount allocated by the Paraguayan government in 2020 to purchase petroleum products	812.000.000 U\$D



THE PTI GREEN HUB PROJECT

- Promote and participate at a worldwide GREEN HYDROGEN cartel
- Support Research with universities and others for generation, storage, distribution and transformation of green hydrogen (amonia, hydromethan)
- Offer a complete ecosystem for foreign investors to produce H2 at Paraguay
- Lead Paraguay to the top 5 worldwide green H2 producers until 2.028
- Partnerships with world players



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