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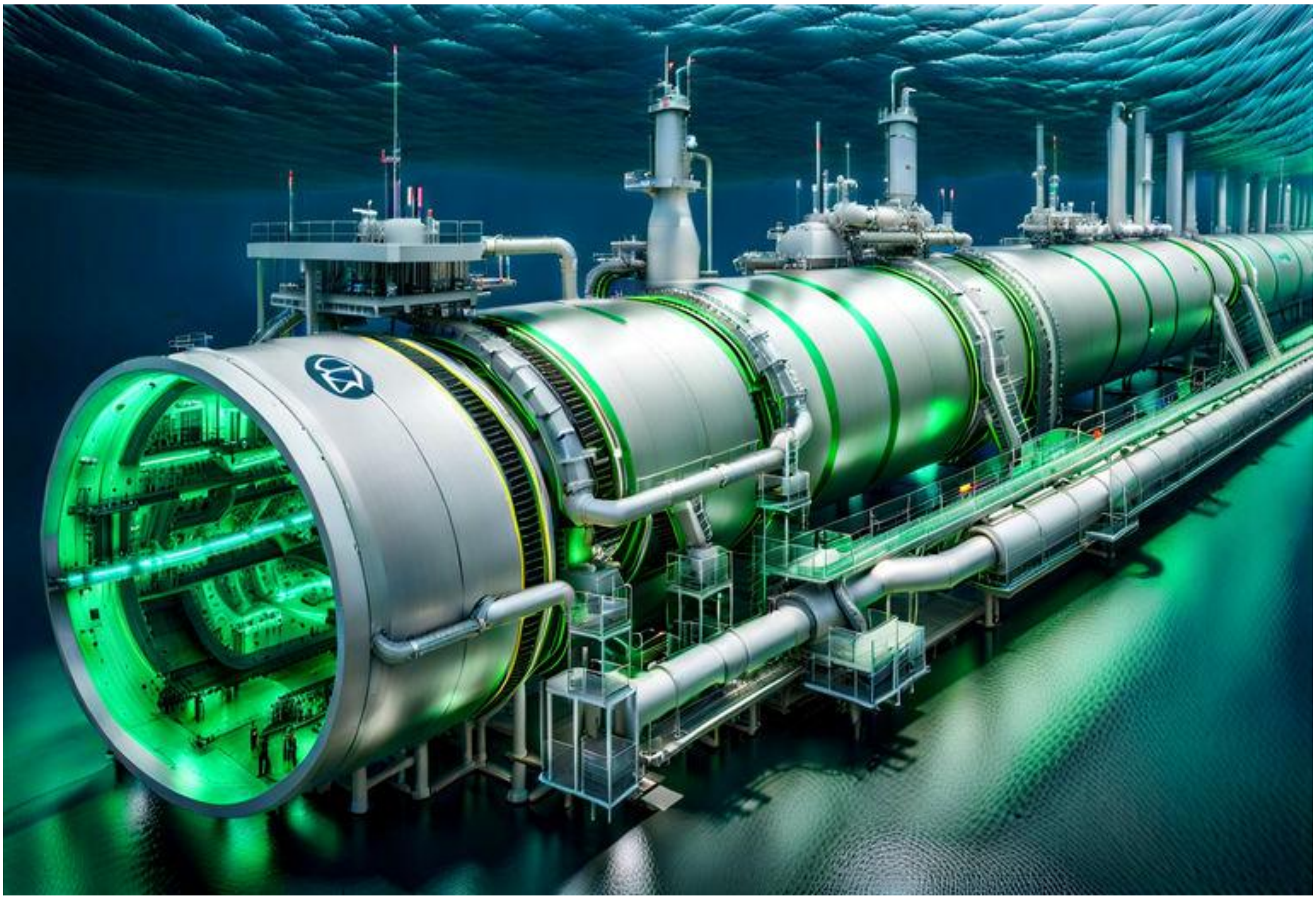
SUBMARINE TUNNEL TECHNOLOGY PROGRAM (STT-PRO)



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Contents

Utilizing State-Of-The-Art Submarine Tunnel Technology (STT) to Generate Green Hydrogen on a Large Scale within a Transformed Tunnel System (TTS)

Abstract

A Transformed Tunnel System (TTS) and submarine technology are combined in a novel concept called Submarine Tunnel Technology (STT). This integration makes it possible to transport freshwater, clean hydrogen, cargo, people, and other items across continents.

Capturing the wind energy generated by the trains in TTS is one of STT's main features; this could transform infrastructure and global connectivity. This technology could bring about a revolution. Obtaining the renewable energy produced by the motion of trains is the process of generating wind energy in TTS. Technology like wind turbines positioned alongside railroad tracks can help achieve this. Train movement creates airflow that can be used to generate electricity, offering a renewable energy source. This creative strategy demonstrates how transportation networks can support the production of clean energy.

STT's groundbreaking advancement, which draws on the patent "Sayed Ajaj Transformation Structural Method for converting traditional structural elements to transforming structural systems (SATSM)," seamlessly integrates TTS and submersible functionalities. This promising development is driving towards a future that is not only cleaner and more efficient, but also more interconnected. The potential of this innovative method to revolutionize diverse industries and enhance the overall human experience is significant.

This strategy not only encourages the production of sustainable energy but also makes transportation more efficient and improves global communications networks. Our economically viable STT provides a cost-effective solution for underwater transportation, infrastructure development, and the production, export, and distribution of hydrogen at a competitive price of 2-3 Euros per kilogram of H2, and frequently even less. This eliminates the requirement for costly R&D or R&I for systems like direct seawater electrolysis, making it a financially viable option for a variety of industries. STT can have a big impact on a lot of different industries and open the door to a more sustainable and connected world if the right kind of investment and cooperation are made. This innovative technology holds promise for addressing the increasing demand for clean energy and promoting international cooperation for a greener future.

Keywords: Green Hydrogen Production, Green Hydrogen Export, Green Hydrogen Transport, Green Hydrogen Distribution, Large-scale green hydrogen storage and transportation technology, Sayed Ajaj Transformation Structural Method (SATSM).

Introduction

Producing hydrogen from seawater presents several challenges. One of the main challenges is the high energy input required to separate the hydrogen from the water through a process called electrolysis. Additionally, the presence of impurities in seawater, such as salt, can affect the efficiency of the electrolysis process and lead to the degradation of the electrodes. Furthermore, the cost of implementing large-scale seawater electrolysis facilities and the environmental impact of extracting large volumes of seawater are also significant challenges that need to be addressed. Despite these challenges, research and development efforts are ongoing to find innovative and sustainable solutions for producing hydrogen from seawater.

The Submarine Tunnel Technology Program (STT-Pro) is a groundbreaking initiative with four main research and innovation projects as following:

- **Transformed Tunnel System Project (TTS-P)** aims to revolutionize composite transformed tunnel systems for underwater use.
- **Autonomous Underwater Vehicle Project (AUV-P)** focuses on developing autonomous self-constructed Transformed Tunnel Systems (TTS).
- **The Fuel Cell Electric Vehicle Project (FCV-P)** seeks to utilize fuel cell technology for electric vehicles operating in Transformed Tunnel System environments, creating airflow for electricity generation and transportation of goods and passengers, as well as hydrogen distribution.
- **Large-Scale Green Hydrogen Project (LGH-P**) aims to create a prototype for producing green hydrogen on a large scale to power various aspects of the transformed tunnel infrastructure. These projects represent cutting-edge innovations that will drive the advancement of **Submarine Tunnel Tech. (STT)**, and have the potential to revolutionize underwater transportation and infrastructure.

Conceptual Design Phase (CDP)

(3 months), (€205,000.00) (SAFESAT)

The Submarine Tunnel Technology Program (STT-Pro) is in its conceptual design phase, where the initial idea is being formally defined. This program comprises four main research and innovation projects. The Transformed Tunnel System Project (TTS-P) aims to revolutionize composite transformed tunnel systems for underwater use like Autonomous Underwater Vehicle (AUV). The Autonomous Underwater Vehicle Project (AUV-P) focuses on developing autonomous of self-constructed Transformed Tunnel System (TTS). The Fuel Cell Electric

Vehicle Project (FCV-P) seeks to harness fuel cell technology for electric vehicles operating in Transformed Tunnel System environments as train to creates airflow that can be used to generate electricity and to carry goods, passengers and to carry and distribute hydrogen to work as mobile distribution station . Lastly, the Large-Scale Green Hydrogen Prototype Project (LGH-PP) aims to create a prototype for producing green hydrogen on a large scale to power various aspects of the transformed tunnel infrastructure. These projects represent the cutting-edge innovations that will drive the advancement of STT.

The conceptual design phase formally defines the initial idea for the Submerged Tunnel Technology Program (STT-Pro) which consists of 4 main research and innovation projects as follows:

CDP of TTS-P -WP1

- **Transformed Tunnel System Project (TTS-P)**
  =€200/hr X 6hr/day X 22days/month X 1 expertise=€26,400.00

CDP of AUV-P -WP2

- **Autonomous Underwater Vehicle Project (AUV-P)**
  =€200/hr X 6hr/day X 22days/month X 2 expertise=€52,800.00

CDP of FCV-P -WP3

- **Fuel Cell Electric Vehicle Project (FCV-P)**
  =€150/hr X 4 hr/day X 22days/month X 6 expertise=€79,200.00

CDP of LGH-P -WP4

- **Large-Scale Green Hydrogen Prototype Project (LGH-P)**
  =€50/hr X 6hr/day X 22days/month X 6 technician=€39,600.00

- The minimum average cost of the Project Management Office (PMO) over 3 months is €7,200. This is calculated based on 3 PMO members working 2 hours per day for 8 days in a month at a rate of €50 per hour.

Detail Design Phase (DDP)

(6 months), (€…………………) (SAFESAT,…………..,……………,………)

During the Engineering, Manufacturing, and Development (EMD) phase of STT, the main focus is on development, building, testing, and evaluation of TTS-P, AUV-P, FCV-P, and LGH_PP. This phase also provides decision support for production, deployment, and maintenance. The EMD phase is divided into four work packages to ensure a systematic and efficient approach to achieving the project's goals.

DDP of TTS-P –WP1

All the necessary details for the TTS project will be determined in the upcoming detailed design phase.

DDP of AUV-P –WP2

In the upcoming detailed design phase, all necessary details for the AUV-P project will be established. This phase is crucial for finalizing project specifications and requirements to ensure it meets objectives and standards. Thorough analysis, planning, and decision-making will lay the foundation for successful project execution.

DDP of FCV-P –WP3

The specific details for the FCV-P project will be finalized during the upcoming detailed design phase.

DDP - LGH-P -WP4

Throughout the forthcoming phase of detailed design, comprehensive attention will be given to establishing and outlining all crucial details for the LGH-P project. This phase will be pivotal in molding the project and guaranteeing thorough consideration and resolution of all essential aspects.

Engineering Manufacturing and Development (EMD) Phase (EMDP)

(24 months), (€…………………) (SAFESAT,…………….,……………,………)

During the Engineering, Manufacturing, and Development (EMD) phase of STT, the main focus is on development, building, testing, and evaluation of TTS-P, AUV-P, FCV-P, and LGH_PP. This phase also provides decision support for production, deployment, and maintenance. The EMD phase is divided into four work packages to ensure a systematic and efficient approach to achieving the project's goals.

EMDP of TTS-P –WP1

Development, building, testing, and evaluation TTS prototype

EMDP of AUV-P –WP2

Development, building, testing, and evaluation TTS prototype

EMDP of FCV-P –WP3

Development, building, testing, and evaluation TTS prototype

EMDP- LGH-P -WP4

Development, building, testing, and evaluation LGH prototype