Future Fuels Ltd

Environmental Impact Assessment (EIA) for the construction and operation of a pilot plant for the production, storage, and compression of green hydrogen to be used as fuel, and the construction and operation of vehicles fueling station.

Photo: https://www.smartcitiesworld.net/news/news/initiative-to-develop-100bn-a-year-green-hydrogen-economy-by-2025-5829

Final Version

July 2022

Assessment Information

Context of the Assessment	**Environmental Impact Assessment (EIA)** for the construction and operation of a pilot plant for the production, storage and compression of green hydrogen and the construction and operation of a fueling station on the site of the plant located at the Industrial area of Aradippou, Municipality of Aradippou
Project Location	**Industrial Area of Aradippou, Larnaca District**
Applicant	**Future Fuels Ltd** Future Fuels, the applicant company specially registered as Legal Entity to execute the Sorokos Hydrogen project. 71, Larnakos Ave., Office 301 Aglantzia, 2101 Tel: +357 22 876699 email: ketonis@wincono.com
Consultant	**ideopsis Ltd** Environmental and Energy Consultants 7 Aristofanous Street, 1015 Nicosia Tel: + 357 22667760 email: info@ideopsis.com
Type of Report	**Environmental Impact Assessment Study (EIA)**
Date of application	**July 2022**
Copyrights	This EIA Study was prepared for a specific purpose and it may not be copied or used for any purpose other than the purpose indicated in this report without the prior written agreement of Future Fuels and ideopsis.

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Abbreviations

AEM	ANION EXCHANGE MEMBRANE
BoL	BEGIN OF LIFE
EAC	ELECTRICITY AUTHORITY OF CYPRUS
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EoL	END OF LIFE
ESR	EFFORT SHARING REGULATION
ETS	EMISSIONS TRADING SYSTEM
EU	EUROPEAN UNION
EV	ELECTRIC VEHICLES
GHG	GREENHOUSE GASES
HHV	HIGHER HITTING VALUE
IED	INDUSTRIAL EMISSIONS DIRECTIVE
LCLK	LARNACA AIRPORT
LCLK	LARNACA AIRPORT STATION
LCLK	LARNACKA METEOROLOGICAL STATION
MWWP	MUNICIPAL WASTEWATER TREATMENT PLANT
NECP	NATIONAL ENERGY AND CLIMATE PLAN
PA	PLOT AREA
PEM	PROTON EXCHANGE MEMBRANE
PPM	PLANNED POLICIES AND MEASURES
PV	PHOTOVOLTAIC
RED	RENEWABLE ENERGY DIRECTIVE
RES	RENEWABLE ENERGY SOURCES
RFNBO	RENEWABLE FUELS OF NON-BIOLOGICAL ORIGIN
RRF	RECOVERY AND RESILIENCE FACILITY
SAC	SPECIAL CONSERVATION AREA
SEA	STRATEGIC ENVIRONMENTAL ASSESSMENT
SPA	SPECIAL PROTECTION AREA
T/S	TRANSMISSION SUBSTATIONS
TS	TRANSMISSION SYSTEM
WHO	WORLD HEALTH ORGANISATION
WSA	WIDER STUDY AREA

Non-technical Summary

Type and purpose of the Future Fuels Green Hydrogen pilot project

The company Future Fuels, referred to this Environmental Impact Assessment as the applicant, plans the construction and operation of a pilot plant for the production (150 tonnes per year), storage (2 x 500 kg), and compression of "green" hydrogen to be used as fuel for transport, as well as the production of a fuelling station (referred to this assessment as the project), within the boundaries of the Municipality of Aradippou placed in the District of Larnaca. This project will be submitted for funding under the Innovation Fund call for small scale projects.

The aim of the project is to support the use of clean energy resources in the transportation sector and thus, contribute to the reduction of Greenhouse Gas Emissions (GHG) by reducing the necessity of using up conventional fuels for transportation. The hydrogen to be produced is said to be "green" as it will be produced by electricity supplied from renewable energy source, as the applicant has signed a contract with a supplier of green energy in Cyprus. Consequently, the operation of the project will contribute to the protection of the environment through the reduction of harmful emissions into the environment and at the same the project will contribute to the national targets for reducing the production of carbon dioxide produced by the transport sector and the country's dependence on conventional fuels, as well as increasing the use of renewable energy sources (RES) in the energy mix of Cyprus.

The present Environmental Impact Assessment needs to be carried out in the context of the application for the Planning permit of this project. This action falls into the categories 30 and 32 of the First Annex of the Basic Law on Environmental impact assessment by certain projects of 2018 and 2021 [N.127(I)/2018].

The EIA describes and analyses the physical and technical characteristics of the Project, the current situation of the main study area (100 metres from the site) and the wider study area (2 km from the site) in order to preliminary identify the direct and indirect effects on the environment and public health as well as to determine the measures to be taken to prevent and limit the impacts from the construction and operation of the plant.

Geographical position of the project

The Geographical position of the project is found north-east to the Municipality of Larnaca, south to the centre of Aradippou Municipality, it is located North to the municipality of Dromolaxia and Meneou, southwest to the municipality of Livadia and southeast to the community of Kalo Chorio. The construction of the plant and the refuelling station will be located on a land (rent by the applicant – 15 years agreement) with the number 371 (Φ/Σ – 55/25) in the area of Agios Fanourios. The total area of the plot is 2,077 m^2. The coordinates of the location are:

- Latitude 34.927726
- Longitude 33.576525

The plot area is described as a mixed zone with both industrial and economic activity in both the plot area and the wider area. In the wider area of the pilot project, there are also agricultural activities occurring.

Environmental impacts

The hydrogen production process has started during 1970-1980. Even if its production started so many years ago, it has recently started to be considered as an emerging energy source, as the EU energy and climate change policies are pushing towards a community with zero greenhouse gas emissions.

The transport sector in Cyprus is considered one of the most polluting sectors as it emits 25.4% of total greenhouse gases in the country for the year 2019[1], as well as other substances which are dangerous for the environment and for humans. This is why the Cypriot Legislation supports the reduction of greenhouse gas emissions for 2030 for the sectors outside the EU Emissions Trading System (including the transport sector) by -24% compared to 2005.

The production of "sustainable" hydrogen from RES, as well as the burning of hydrogen, have zero emissions. During the combustion of hydrogen, instead of emitting pollutants and dangerous substances, the engine emits water. In general, the European Union considers that hydrogen can contribute to the safe and secure energy supply of countries not only in transport but also in industry.

This specific pilot project can significantly contribute to the national targets of reduction GHG by:

- Reducing the usage of conventional fuels.
- Reducing GHG emissions.
- Reducing other pollutants.

Although the production of hydrogen and its use as a fuel can offer several advantages, at the same time it can also results into some negative impacts related to the implementation of the construction and operation of the plant.

In conclusion, the proposed project is considered to be environmentally sustainable if constructed in the designated area and operated in accordance with the proposed specifications and recommendations of this study.

[1] Cyprus National Greenhouse Gas Inventory, 2021, https://unfccc.int/documents/271515

Impacts from the construction of the project

The construction works during the implementation of the Project may have some effects on the environment. For this reason, the researchers studied and analysed all environmental aspects to identify possible significant impacts. The following table summarises the results of the assessment based on the methodology explained in Chapter 4.

Table 1: Summary of impacts during the construction of the project

Possible impacts	Impact severity before mitigation measures				Impact Severity after mitigation measures			
	Severity	Probability	Impact	Nature of Impact	Severity	Probability	Impact	Nature of Impact
Hydrology	-1	2	No impact	Negative	-1	1	No impact	Negative
Geology	-5	5	Severe impact	Negative	-5	2	Minimum Impact	Negative
Flora and fauna	-3	4	Moderate impact	Negative	-3	3	Minimum Impact	Negative
Atmosphere	-2	4	Minimum Impact	Negative	-2	3	Minimum Impact	Negative
Aesthetics	-2	5	Moderate Impact	Negative	-2	4	Minimum Impact	Negative
Noise pollution	-4	5	Severe Impact	Negative	-3	4	Moderate Impact	Negative
Safety	-5	2	Minimum Impact	Negative	-5	1	No impact	Negative

During the project construction the following types of waste are expected to be produced (which are presented in detailed in Chapter 2 and 4):

Excavated material, green residues, Welfare facility waste, Packaging materials, fuels and oils, Metals, Wastewater (cleaning activities) and General construction waste.

Impacts from the operation of the project

From the operational point of view of the project, similar assessment was carried out to identify all the impacts to all environmental aspects as the analysis as above. The following table summarises the results of the analysis.

Table 2: Summary of impacts during the operation of the project

Possible impacts	Impact severity before mitigation measures				Impact Severity after mitigation measures			
	Severity	Probability	Impact	Nature of Impact	Severity	Probability	Impact	Nature of Impact
Hydrology	-2	2	No impact		-2	1	No impact	
Geology	-3	3	Minimum Impact	Negative	-1	2	No impact	
Flora and fauna	-2	2	No impact		-2	2	No impact	
Atmosphere	+3	5	Severe Impact	Positive				
Aesthetics	-1	5	Minimum Impact	Negative	-1	5	Minimum Impact	Negative
Natural Resources	-3	5	Severe Impact	Negative	0	1	No Impact	
Noise pollution	0	5	No Impact		0	5	No Impact	
Safety	-5	3	Moderate Impact	Negative	-5	1	No impact	

During the project operation the following types of waste are expected to be produced (which are presented in detailed in Chapter 2 and 5):

Welfare facility waste, Packaging materials, fuels and oils, Metals, Wastewater (cleaning activities & water purification) and General waste.

1 Introduction

1.1 Background

The present EIA aims to examine and analyse the environmental impacts from construction and operation of a pilot project that aims to produce "green" hydrogen as a fuel and to recommend measures to mitigate any negative impacts.

More specifically, the company Future Fuels plans the construction and operation of a pilot plant for the production (150 tonnes per year of hydrogen), storage (2 x 500 kg), and compression of "green" hydrogen to be used as fuel for transport, as well as the construction and operation of a filling station, within the boundaries of the Municipality of Aradippou in the District of Larnaca. This project will be submitted for funding under the Innovation Fund call for small scale projects this year.

The EIA needs to be carried out in the context of the application for the Planning permit of this project. This action falls into the categories 30 and 32 of the First Annex of the Basic Law on Environmental impact assessment by certain projects of 2018 and 2021 [N.127(I)/2018].

The EIA describes and analyses the physical and technical characteristics of the pilot project, the current situation of the main study area and the wider study area to preliminary identify the direct and indirect effects on the environment and public health as well as to determine the measures to be taken to prevent and limit the impacts to be raised by the construction and the operation of the plant.

1.2 Renewable energy sources in Cyprus

Based on the data by the Ministry of Energy, Commerce, and Industry of Cyprus, the country has reached a 17% share of RES in the final consumption, overachieving the target of 13% for the year 2020. Nevertheless, the transport sector is not performing at the same level. The 7,4% share of RES in the final consumption of the transport sector for the year 2020, 2,6% lower than the national target for the corresponding year, has been covered using biodiesel (consumption equal to 26.948 toe).

Table 3: Sectoral share of RES in Cyprus for 2019 and 2020, Source: Ministry of Energy, Commerce, and Industry

	2019	2020
RES-Heating & Cooling	35,77%	37,9%
RES-Electricity	10,16%	12,62%
RES-Transport	3,3%	7,4%
Total share of RES	13,84%	17,04%

1.3 Road transportation in Cyprus

For the year 2020, according to the data published by Cyprus Statistical Service, the number of licensed vehicles reached the value of 759.268, from which 578.158 are passenger cars (saloon), 2.655 are motor coaches and buses and 116.280 are goods conveyance vehicles.

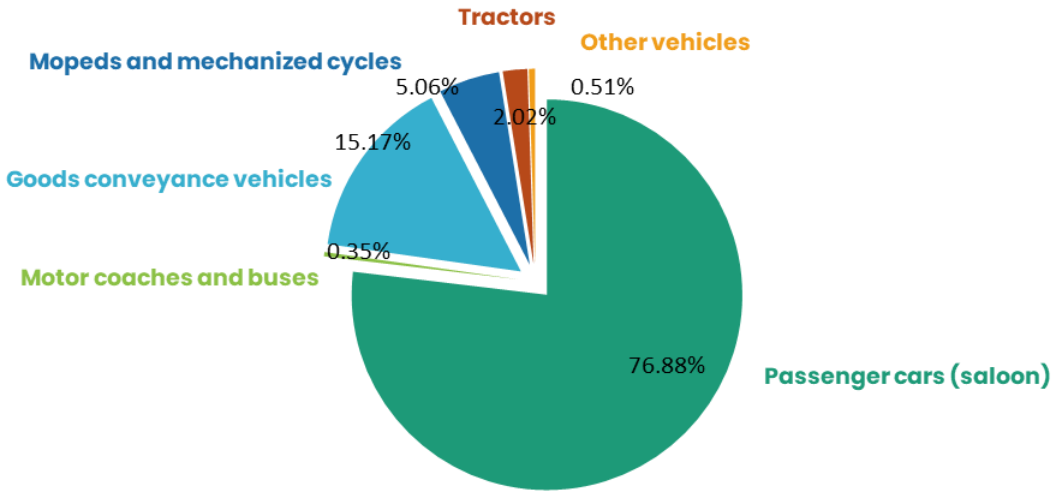


Figure 1: Share of different types of vehicles in the total number of licensed vehicles, Source: CYSTAT

The new registrations of motor vehicles for the year 2020 were 39.367, while the 38% was new cars and the remaining 62% was used vehicles. This figure is relatively similar since 2017.

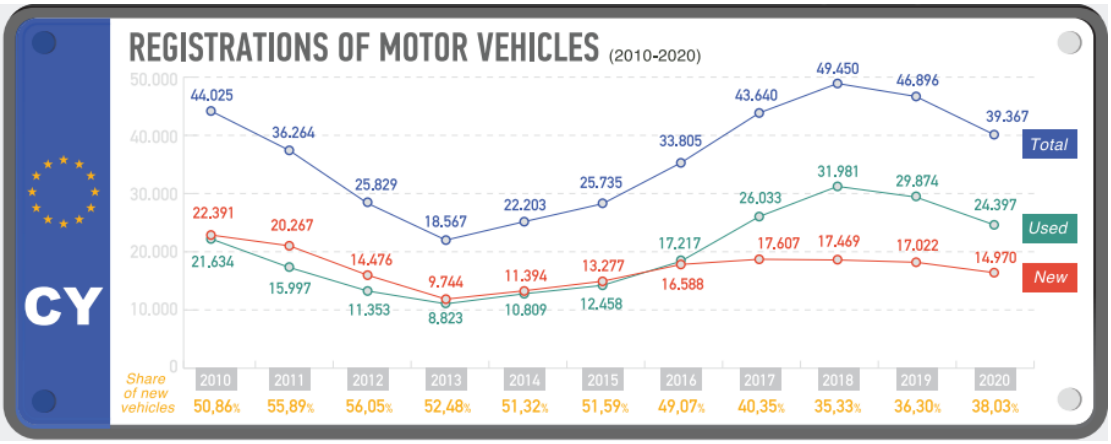


Figure 2: Number of new registrations of motor vehicles from 2010 up to 2020, Source: CYSTAT

From the aspect of fuel type of registrations, 48,52% are fuelled by gasoline and 44,84% are fuelled by diesel for 2020. Low-carbon vehicles hold a much smaller share of total registrations, 5,9% of the new registration were hybrid and only 0,68% were electric vehicles.

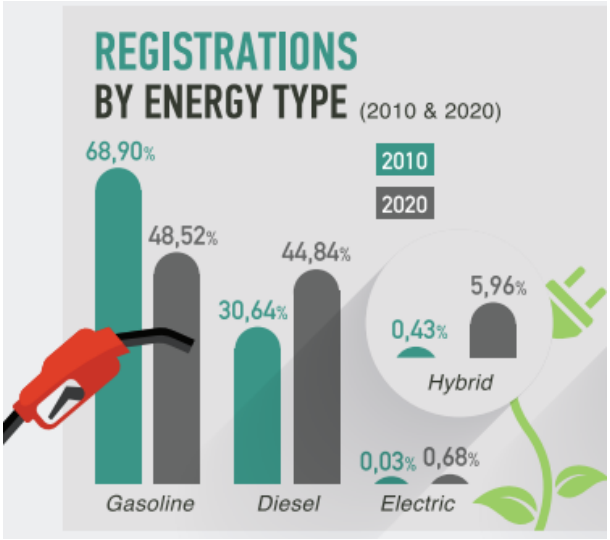


Figure 3: New registrations by type of energy for the years 2010 and 2020, Source: CYSTA

1.4 EU energy and climate change policy framework

1.4.1 2030 Climate and Energy Policy Framework

Under the 2030 Climate and Energy Framework, key targets were set:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels)
- At least 32% share for renewable energy
- At least 32.5% improvement in energy efficiency

Up to now, the greenhouse gas target was implemented by the EU Emissions Trading System (ETS) and the Effort Sharing Regulation and the Land use, land use change and forestry Regulation. The Effort Sharing Regulation (Regulation (EU) 2018/842) establishes binding annual greenhouse gas emission targets for Member States targeting greenhouse gas emissions from sectors not covered by the ETS of the European Union, including transport and agriculture.

The headline EU energy efficiency target for 2030 of at least 32.5% (compared to projections of the expected energy use in 2030), has been established by the amended Energy Efficiency Directive (EU) 2018/2002 that entered into force in December of 2018. The target translates into final energy consumption of 956 Mtoe and/or primary energy consumption of 1,273 Mtoe in the EU-28 in 2030.

Furthermore, the same year the recast Renewable Energy Directive 2018/2001/EU entered into force, as part of the "Clean Energy for all Europeans" package, establishing the corresponding target for the share of renewable energy.

1.4.1.1 Renewable Energy Directive II

Building on the 20% target for 2020, the Renewable Energy Directive 2018/2001/EU (REDII) established the new binding renewable energy target for the EU for 2030 of at least 32% in gross final consumption. Amongst others, it includes a transport-related target of 14% renewables share of the energy consumed in the sector by 2030, while strengthening the criteria for ensuring bioenergy sustainability.

The RED II lays down a definition of renewable liquid and gaseous transport fuels of non-biological origin that is referring to liquid or gaseous fuels which are used in the transport sector other than biofuels or biogas, the energy content of which is derived from renewable sources other than biomass. This definition also includes hydrogen for the purposes of calculating compliance with the targets set out in the directive.

1.4.1.2 Other Directives

The Alternative Fuels Infrastructure Directive 2014/94/EU establishes a common framework and sets out minimum requirements for the roll-out of alternative fuels infrastructure in the Member States, including refuelling points for hydrogen. The Fuel Quality Directive 98/70/EC indirectly promotes the use of hydrogen, by requiring fuel suppliers to reduce the life cycle greenhouse gas emissions per unit of energy by 6% by 31 December 2020. Furthermore, the Directive (EU) 2015/652 laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC directly impacts the hydrogen as a fuel, as is establishing an efficiency factor of hydrogen fuel cell electric powertrains and the GHG intensity of Compressed Hydrogen in a fuel cell.

1.4.2 EU hydrogen strategy

A dedicated strategy on hydrogen in the EU was adopted in 2020 to put forward a vision for the creation of a European hydrogen ecosystem in line with the European Green Deal. A roadmap of EU up to 2050, EU Hydrogen strategy, was developed, divided into three phases.

Figure 4: EU Hydrogen Strategy, Source: European Commission

In terms of installed production capacity, it has been suggested:

- 2020-2024, first phase: installment of at least 6 GW of renewable hydrogen electrolyzers, **production of up to 1 million tonnes of renewable hydrogen**.
- 2025-2030, second phase: installment of at least 40 GW of renewable hydrogen electrolyzers, **production of up to 10 million tonnes of renewable hydrogen**.

For the first phase, the electrolyzers could be installed near existing demand centres, e.g., larger refineries, steel plants, and chemical complexes. Furthermore, hydrogen refueling stations will be needed for the uptake of hydrogen fuel-cell buses and trucks at a later stage. At the second phase, the renewable hydrogen will start playing a role in balancing a renewables-based electricity system by transforming electricity into hydrogen when renewable electricity is abundant and cheap and by providing flexibility. In a third phase, from 2030 onwards and towards 2050, renewable hydrogen technologies should reach maturity and be deployed at large scale to reach all hard-to decarbonize sectors.

1.4.3 Climate Neutrality and Fit for 55

On 14 July 2021, the European Commission unveiled its plan to meet 55% emission reduction by 2030, first step of the carbon neutrality set for 2050, though the "Fit for 55" legislative package. The package of proposals aims to make the EU fit for the 55% reduction target and deliver the transformational change needed across economy, society, and industry.

The package consists of a set of inter-connected proposals, with existing legislation made more ambitious and with new proposals been introduced. Overall, the package strengthens eight existing pieces of legislation and presents five new initiatives, across a range policy areas and economic sectors: climate, energy and fuels, transport, buildings, land use and forestry. The proposed package includes a policy mix balanced between pricing, targets, standards, and support measures. For renewable hydrogen, the package suggests domestic production of 5.6 million tonnes.

1.4.3.1 Renewable Energy Directive III

Amongst others, the European Commission proposed a revision of the Renewable Energy Directive 2018/2001/EU. The revision seeks to ensure that all potentials for the development of renewable energy are optimally exploited providing the necessary condition to achieve the EU's objective of climate neutrality by 2050. Furthermore, it seeks to convert into EU law some of the concepts outlined in the Hydrogen Strategy published in 2020.

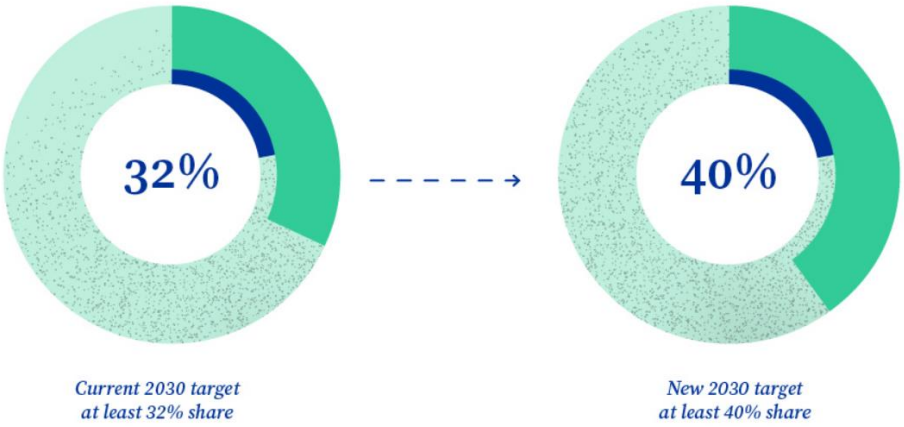


Figure 5: Infographic - Fit for 55: how the EU plans to boost renewable energy, Source: European Union, 2022

In line with the EU Climate Law, the overall renewables target is proposed to be increased to 40% by 2030, while the proposal promotes the use of renewable and low-carbon fuels, including hydrogen, in sectors where electrification is not yet a feasible option, such as transport. For the transport sector, it suggests that the amount of renewable fuels and renewable electricity supplied to the transport sector leads to a greenhouse gas intensity reduction of at least 13% by 2030. Additionally, it proposed that the share of renewable fuels of non-biological origin, including green hydrogen, will be at least 2,6% in 2030 which corresponds to 5.2% also with the addition of a multiplier (the share of renewable fuels of non-biological origin is multiplied by 2 when calculating the share of RES in the transport sector).

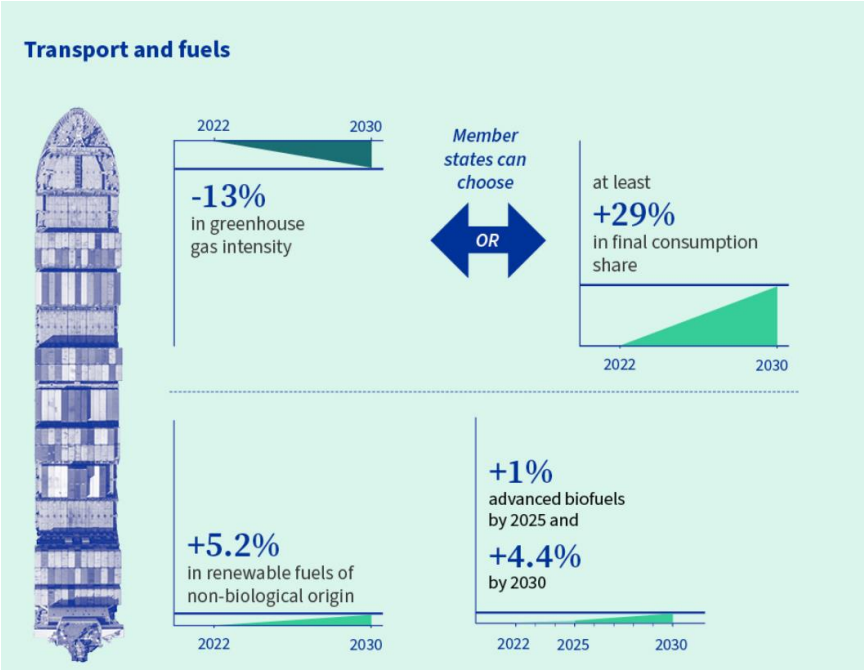


Figure 6: Infographic - Fit for 55: how the EU plans to boost renewable energy, Source: European Union, 2022

1.4.3.2 FuelEU Maritime

This proposal encourages the uptake of sustainable maritime fuels and zero-emission technologies by setting a maximum limit on the greenhouse gas content of energy used by ships calling at European ports. Targets are determined in relation to the average greenhouse gas emissions intensity of energy used on-board by ships in 2020 and the following reductions in greenhouse gas emissions has been suggested: 2% from 1 January 2025, 6% from 1 January 2030, 13% from 1 January 2035, 26% from 1 January 2040, 59% from 1 January 2045 and 75% from 1 January 2050.

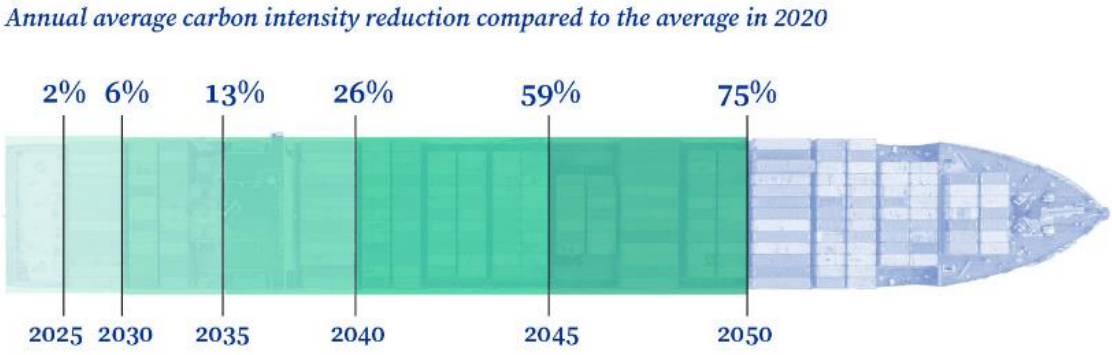


Figure 7: Infographic - Fit for 55: increasing the uptake of greener fuels in the aviation and maritime sectors, Source: European Union, 2022

1.4.4 REPowerEU Plan

In March 2022, the European Commission presented the REPowerEU Plan, that aims on rapidly reducing our dependence on Russian fossil fuels by fast forwarding the clean transition and joining forces to achieve a more resilient energy system in the EU. The REPowerEU builds on the full implementation of the "Fit for 55' proposals tabled on 2021, without modifying the ambition of achieving at least 55% reduction in GHG emissions by 2030 and climate neutrality by 2050 in line with the European Green Deal. It is clearly stated that a massive speed-up and scale-up in renewable energy is required in all sectors. For boosting renewable energy, the Commission proposes the following:

- An increased target in the Renewable Energy Directive of 45% by 2030, up from 40% in "Fit for 55" proposal. That can result into total renewable energy generation capacities to 1236 GW by 2030, in comparison to 1067 GW by 2030 foreseen under "Fit for 55".

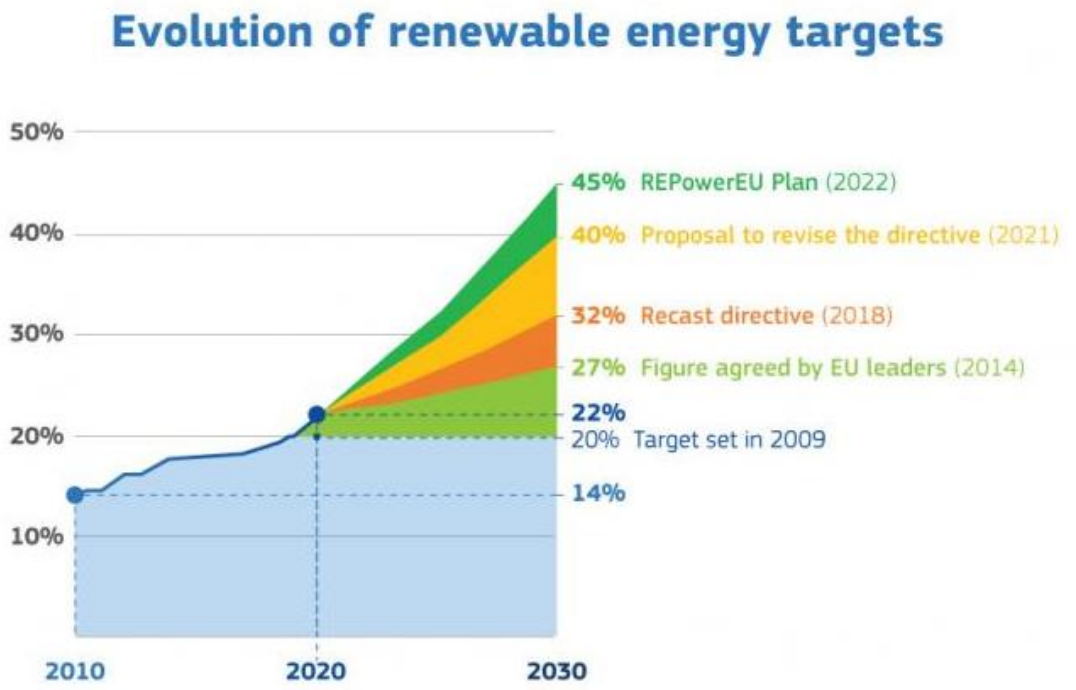


Figure 8: Evolution of renewable energy targets, Source: European Commission

For accelerating green hydrogen, the Commission proposes the following:

- A target of **10 million tonnes of domestic renewable hydrogen production and 10 million tonnes of renewable hydrogen imports by 2030.**
- Increased sub-targets for renewable fuels of non-biological origin under the Renewable Energy Directive for industry and transport with the REPowerEU ambition (75% for industry and 5% for transport) by 2030.
- Replacing 8 million tonnes of existing fossil-based hydrogen use.

The Commission also published two Delegated Acts on the definition and production of renewable hydrogen to ensure that production leads to net decarbonisation. The first proposal, covering Renewable Fuels of Non-Biological Origin (RFNBO), lays down detailed rules for the production of renewable liquid and gaseous transport fuels of non-biological origin, in order to result into a fully renewable fuel. The second proposal on the methodology for greenhouse gas emissions savings puts forward a detailed scheme to calculate the life-cycle emissions of renewable hydrogen to meet the greenhouse gas emission reduction threshold set in the Renewable Energy Directive.

Figure 9: Promotion of green hydrogen within policies and measures up to 2030

1.5 Cyprus energy and climate targets

Under the Regulation on the governance of the energy union and climate action (EU)2018/1999, each EU country is required to establish a 10-year integrated national energy and climate plan (NECP). The NECP of Cyprus[2] elaborates on the five dimensions of the Energy Union, i.e., decarbonisation (which is broken down into two distinct sections: greenhouse gas emissions and renewable energy sources), energy efficiency, security of energy supply, internal energy market, and research, innovation, and competitiveness, while giving attention to the targets set by the 2030 Climate and Energy Policy Framework.

The NECP of Cyprus took its final form in January 2020 and it was formatted to serve the following national energy and environmental objectives for the period 2021-2030 in the context of EU policies:

Table 4: National energy and environmental objectives for the period 2021-2030

Reducing greenhouse gas emissions and environmental objectives
Emissions in the non-ETS sectors to be reduced by 20.9% compared to 2005. The non-ETS national target is going to be achieved by the use of flexible mechanisms provided by the ESR.
Emissions from land use, land use change or forestry are offset by at least an equivalent removal of CO_2 from the atmosphere.
Emissions in ETS sectors to be reduced by 24.9% compared to 2005
Attaining quantitative targets for reducing national emissions of specific air pollutants
Increasing the share of RES in energy consumption
Share of RES in gross final energy consumption to reach 23%
Share of RES in gross final electricity consumption can reach at least 26%
Share of RES in heating and cooling to reach 39%
Share of RES in the transport sector to reach 14%
Improving Energy Efficiency
Final Energy Consumption of 2.0 Mtoe in 2030, representing 13% reduction in final energy consumption

[2] https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en

Primary Energy Consumption of 2.4 Mtoe in 2030, representing 17% reduction in primary energy consumption
Achieving cumulative energy saving of 243.04 ktoe during 2021-2030

The key policy planning priorities identified in NECP of Cyprus regarding renewables in transport, are the following:

- Old vehicle scrapping scheme and financial incentives for the purchase of electric vehicles (both new and used).
- New bus contracts (using alternative fuels, electricity, gas, and biofuels B100),
- Use of biofuels (and biogas) in transport sector.
- Other indirect measures that will help to increase energy efficiency and thus, the RES Share in transport,
    - Amendment of the Motor Vehicles and Road Traffic Law for revision of the vehicle taxes and annual circulation taxes.
    - Telematics infrastructure.
    - Integrated fleet management.
    - EV charging points.
- Other indirect measures:
    - Net Metering Scheme will be extended to households for the installation of EV Charging.
    - Net Billing Scheme will be extended to companies for the installation of EV charging infrastructure in public/private spaces, including storage.

Based on the Planned Policies and Measures (PPM) Scenario of the NECP, the sectoral share of renewables from 2021 up to 2030 is evolving as follows:

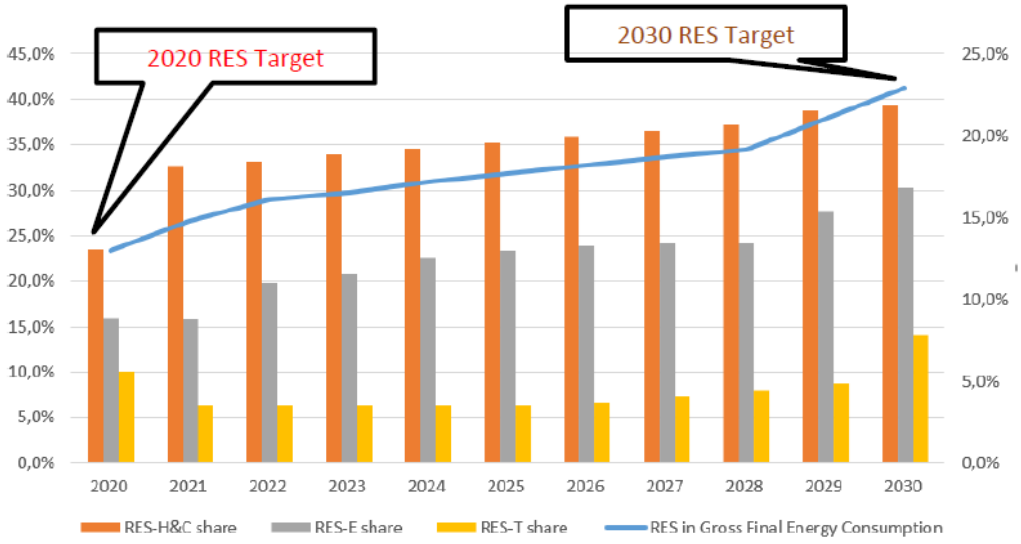


Figure 10 RES Sector evolvement from 2021-2030 based on NECP PPM Scenario

More specifically in the transport sector, the following trajectory for the sectoral share of renewable energy in final energy consumption from 2021 to 2030 has been suggested:

Table 5: RES share trajectory for the transport sector based on NECP PPM Scenario

2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
6,3%	6,3%	6,3%	6,3%	6,3%	6,6%	7,3%	8,0%	8,8%	14,1%

As we can see from the Table below, which includes the evolution of fuel consumption (PJ) in the transport sector up to 2030, **no Hydrogen has been suggested in the current version of the NECP.**

Table 6: Fuel consumption for the transport sector based on NECP PPM Scenario

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Biofuels	1.18	1.17	1.16	1.15	1.13	1.12	1.09	1.06	1.03	1.35
Diesel	11.72	11.57	11.41	11.30	11.10	11.24	11.11	10.97	10.83	10.50
Gasoline	16.02	15.90	15.78	15.65	15.53	14.98	14.26	13.56	12.86	12.02
LPG	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04
Natural gas	-	-	-	-	-	-	-	-	-	-
Electricity (road)	0.003	0.006	0.010	0.014	0.042	0.104	0.282	0.462	0.642	0.823
Electricity (rail)	-	-	-	-	-	-	-	0.033	0.033	0.033

For adaptation to significant changing conditions, the Regulation on the governance of the energy union and climate action (EU)2018/1999 requires that the NECP are updated by 2024. The importance of this provision is reflected in the new increased ambition under the "Fit for 55" Package and the need to revise the NECP of the member-states according to the new national targets and national contributions.

Is important to note that, the Commission proposes to make targeted amendments to the Recovery and Resilience Facility (RRF) Regulation to integrate dedicated REPowerEU chapters in Member States' existing Recovery and Resilience Plans (RRP). Cyprus is currently receiving technical assistance for the development of a Hydrogen Strategy for the country.

1.6 Legislative Framework for Green Hydrogen

EU legislation is linked with the deployment of a variety of hydrogen applications (production, storage, distribution etc.). The corresponding legislative acts have direct or indirect impact on hydrogen projects. Often, the projects are included within the scope of a wider regulatory area, covering health and safety, labour law and environmental law. An important number of these legislative acts are source of obligations to developers and manufacturers.

Due to the nature of the specific project, this chapter presents the legislative acts related only to:

- Production of Hydrogen.
- Storage of Hydrogen.

- Refueling of Hydrogen.

The following table summarizes the EU legislation related to the production, storage and refueling of Hydrogen:

Table 7: EU legislation related to the production, storage and refueling of Hydrogen

EU LEVEL EN
Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances (so-called SEVESO Directive) *Annex I, Part 1, establishes Hydrogen as a dangerous substance and lists the quantity of hydrogen for the application of lower-tier requirements (≥ 5t) and upper-tier requirements (≥ 50t).*
Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (recast) (so-called ATEX Equipment)
Directive 1999/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (so-called ATEX Workplace)
Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (IED)
Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage ** The Directive applies to the production to Hydrogen by reference to Annex I, point 4.2 of Directive 2010/75/EU on industrial emissions*
Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive)
Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds
Regulation 1272/2008/EC of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (so-called CLP

regulation)
Directive 2014/68/EU on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment
Directive 2014/94/EU on the deployment of alternative fuels infrastructure (AFID)
Directive 2014/29/EU on simple pressure vessels

The main national legislations are the following (in Greek):

- Οι περί Ασφάλειας και Υγείας στην Εργασία (Αντιμετώπιση Κινδύνων Ατυχημάτων Μεγάλης Κλίμακας Σχετιζομένων με Επικίνδυνες Ουσίες) Κανονισμοί του 2015 (Κ.Δ.Π. 347/2015)
- Το περί Ασφάλειας και Υγείας στην Εργασία (Καθορισμός Τέλους Υποβολής της 'Εκθεσης Ασφάλειας) Διάταγμα του 2015 (Κ.Δ.Π. 376/2015)
- Οι περί Πολεοδομίας και Χωροταξίας (Ατυχήματα Μεγάλης Κλίμακας Σχετιζόμενα με Επικίνδυνες Ουσίες) Κανονισμοί του 2017
- Οι περί των Βασικών Απαιτήσεων (Συσκευές και Συστήματα Προστασίας που Προορίζονται για Χρήση σε Εκρήξιμες Ατμόσφαιρες) Κανονισμοί του 2016 (Κ.Δ.Π. 199/2016)
- Οι περί Ασφάλειας και Υγείας στην Εργασία (Ελάχιστες Απαιτήσεις για την Προστασία των Προσώπων στην Εργασία από Κινδύνους από Εκρήξιμες Ατμόσφαιρες) Κανονισμών του 2002 (Κ.Δ.Π. 291/2002)
- Οι περί Βιομηχανικών Εκπομπών (Ολοκληρωμένη Πρόληψη και Έλεγχος της Ρύπανσης) Νόμοι του 2013 έως 2021
- Ο περί της Εκτίμησης των Επιπτώσεων στο Περιβάλλον από Ορισμένα Έργα Νόμος του 2018 (127(I)/2018)
- Ο περί Προώθησης και Ανάπτυξης των Υποδομών Εναλλακτικών Καυσίμων Νόμος του 2017 (N. 59(I)/2017)

Based on the Regulation on the governance of the energy union and climate action (EU)2018/1999 the NECP of the country formulated in 2020, underwent a Strategic Environmental Assessment (SEA). A second SEA was performed, focusing only on the positioning of renewable energy sources projects for the scenarios analyzed and promoted in the NECP of Cyprus for 2021 up to 2030. The SEA resulted into a revised locational policy regarding RES projects.

2 Description of the pilot project

2.1 Background information on hydrogen production

Global decarbonisation in the transportation, industry and electricity generation sectors is crucially needed to mitigate anthropogenic climate change. There is abundant availability of renewable sources used in hydrogen production; however, the variable and intermittent nature of these resources is the major challenge in the transition towards a hydrogen economy.

More than 100 current and planned hydrogen production technologies are reported to date, with over 80% of those technologies are focused on the steam conversion of fossil fuels and 70% of them are based on natural gas steam reforming. However, to minimise carbon footprint emissions, a wider range of hydrogen extraction processes, such as methane pyrolysis and seawater electrolysis using alternative energy sources, must be addressed. All hydrogen production routes are highlighted in figure below.

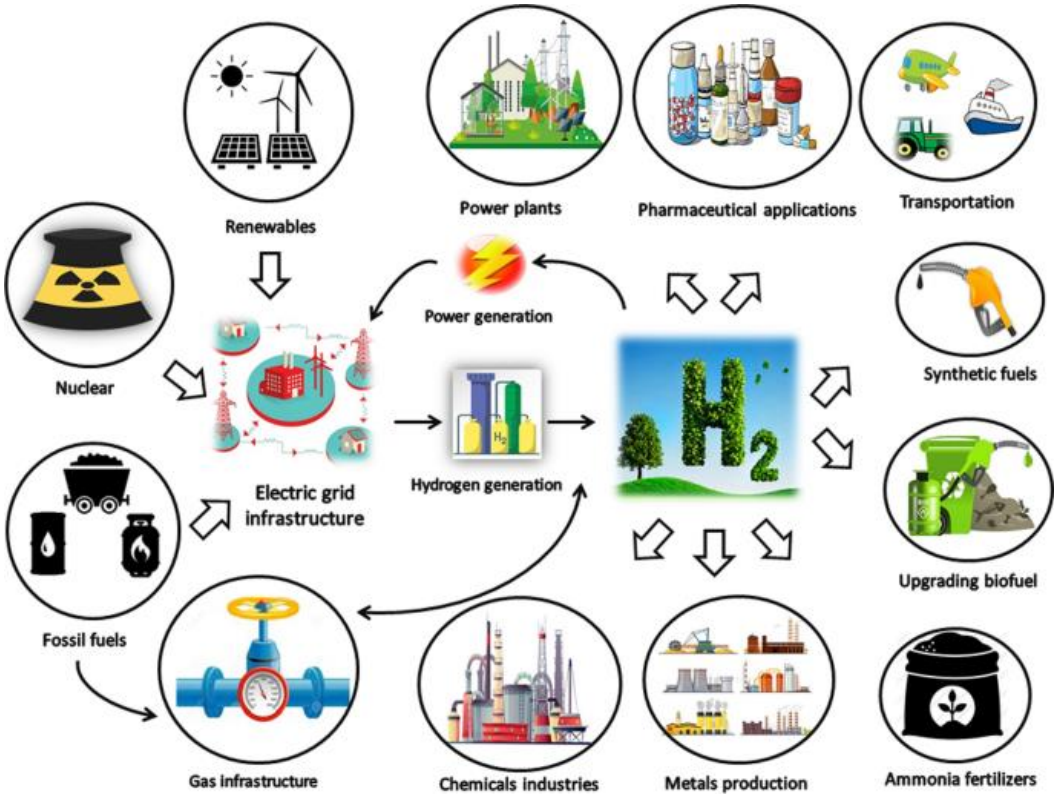


Figure 11: Hydrogen production

Hydrogen is the most abundant element in the universe, and due to its reactivity, it only exists on earth in compounds such as water and organic materials. It is an odourless, flammable and colourless gas, which is leading to its safety concern, especially if a leak is not detected and gas collects in a confined area; it can ultimately ignite and causes explosions.

The higher heating value (HHV) of hydrogen is 141.8 MJ/kg at 298 K, and the lower heating value is 120 MJ/kg at the same temperature. This is significantly higher than that of most fuels such as gasoline with a value of 44 MJ/kg at 298 K. However, liquid hydrogen has a lower energy density by volume than hydrocarbon fuels such as gasoline by a factor of four with a density of 8 MJ/l versus density of 32 MJ/l. While hydrogen gas has a high energy density by weight but a low energy density by volume compared to hydrocarbons, it requires a larger tank to store. For example, as opposed to liquified natural gas, liquified hydrogen contains 2.4 times the energy but takes 2.8 times the volume to store. At the same time, the low temperature for liquified hydrogen storage at ambient pressure and a temperature of −253°C raises quite a few risks. When exposed, it can cause cold burns; furthermore, leakage can result in a combination of liquefied air and hydrogen, resulting in an explosive mixture or the formation of flammable or explosive conduits.

Water is typically purified and then sent to an electrolyser, which produces hydrogen and oxygen. The hydrogen is then dried, purified, and compressed from a 10.3 to 413.7 bar pressure, and then stored in a tank. Although the electrolysis pathway offers a 100% renewable route for hydrogen production, it represents less than 5% of worldwide hydrogen production [3]. Despite this low percentage contribution, water electrolysis is gaining momentum for various reasons such as zero-carbon emissions, the absence of unwanted by-products such as sulphates, carbon oxides and nitrogen oxides, and high hydrogen purity. The cost of producing hydrogen through electrolysis would be reduced by approximately 70% over the next decade, allowing for the widespread adoption of a green hydrogen production approach.

By 2040, the worldwide market for hydrogen electrolysers is expected to have grown by 1000-fold. Aurora Energy Research predicted that about 213.5 gigawatts of projects will be completed over the next 19 years; this compares to an estimated 200 megawatt that is currently in service. They reported that 85 % of anticipated projects are in Europe, with Germany accounting for 23 % of expected global electrolyser capacity. The European Union has already set a goal of 40 gigawatts of electrolyser capability by 2030 (Research, 2021). If all this power is available, it will supply up to 32 million tons of hydrogen per year, which is already half of the currently demanded hydrogen. In a 1.5-degree climate change mitigation scenario, meeting 24% of energy demand with hydrogen will necessitate massive amounts of additional renewable electricity generation. To power electrolysers in this scenario, approximately 31,320 terawatt-hours of electricity would be required, i.e., more than is currently produced globally from all sources combined[4]. Besides, an

[3] Han W-B et al (2021) Directly sputtered nickel electrodes for alkaline water electrolysis. Electrochimica Acta. 386:138458. https://doi.org/10.1016/j.electacta.2021.138458

[4] BNEF, Hydrogen Economy Outlook, Key messages, March 30, 2020, https://data.bloomberglp.com/professional/sites/24/BNEFHydrogen-Economy-Outlook-Key-Messages-30-Mar-2020. pdf, accessed on 20–5–2021. 2020, https://data.bloomberglp. com/professional/sites/24/BNEF-Hydrogen-Economy-Outlo ok-Key-Messages-30-Mar-2020.pdf

investment of more than $11 trillion in manufacturing, storage and transportation infrastructure would be required.

Proton exchange membrane (PEM) along with alkaline anion exchange membrane (AEM) and concentrated potassium hydroxide solution KOH are the most common techniques used in low-temperature water electrolysis. The key benefit of alkaline anion exchange membrane electrolysis over other methods is lower cost since no platinum group metals are used as catalysts herein. The main challenge, however, is the low rate of hydrogen production and the instability of the alkaline method owing to its susceptibility to pressure drop[5,6]. A typical electrolysis system consists of two metal electrodes, an anode, and a cathode, separated by a membrane and immersed in an electrolyte solution[7]. As an electric current flows through the solution, oxygen and hydrogen bubbles rise above the anode and cathode, respectively. Both electrodes are typically coated with a catalyst to reduce the amount of energy needed to liberate hydrogen from water.

However, large amounts of freshwater would be needed to generate hydrogen, and these supplies are already depleted worldwide; thus, the utilisation of seawater will be an option to overcome this issue, if only the energy used for water desalination comes from RES. However, seawater utilisation in hydrogen production is associated with challenges such as the corrosion of chloride ions in seawater to the anode metal. Hung et al. reported a solution to this issue by designing the anode material as a porous nickel foam pan collector coated with an active and inexpensive nickel and iron catalyst, which showed strong conductivity and corrosion resistance. It is worth noting that, while using freshwater is more expensive than using seawater, the cost of water usually accounts for less than 2% of the total cost of hydrogen production via electrolysis[8]. Moreover, it is important to find sustainable ways of using water and one of those is the treated effluent from Municipal Wastewater Treatment Plants (MWWP).

2.2 Description of the green hydrogen pilot project

2.2.1 Scope of pilot project

There are various processes by which hydrogen can be produced, but for the purpose of the Project, the method of choice is through electricity generated from renewable energy sources. Hydrogen is a chemical substance that is free in nature as well as in water since the composition of water is H_2O. Electrolysis is the method followed when hydrogen

[5] Dvoynikov M et al (2021) New concepts of hydrogen production and storage in arctic region. Resources. https://doi.org/10.3390/resou rces10010003
[6] Yu L et al (2019) Non-noble metal-nitride based electrocatalysts for high-performance alkaline seawater electrolysis. Nat Commun 10:5106. https://doi.org/10.1038/s41467-019-13092-7
[7] Zhu C et al (2019) Construction of CDs/CdS photocatalysts for stable and efcient hydrogen production in water and seawater. Appl Catal B: Environ. 242:178–185. https://doi.org/10.1016/j.apcatb. 2018.09.096
[8] Milani D et al (2020) Renewable-powered hydrogen economy from Australia's perspective. Int J Hydrog Energy. 45

production is based on electricity. Thus, with the help of electrolysis, a substance can be broken down into its basic elements, just as with the electrolysis of water, which can be broken down into hydrogen (H_2) and oxygen (O_2).

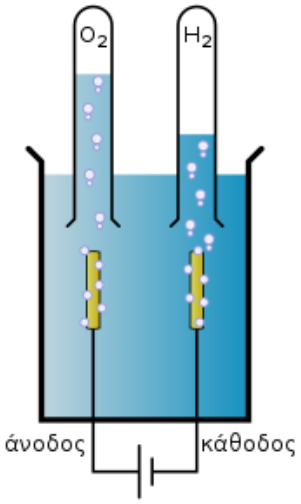


Figure 12: Electrolysis of H2O

As shown in the Figure above, during the electrolysis of water, hydrogen is produced at the cathode and at the anode the water is oxidized to oxygen. This method supplies with electricity which can be produced from conventional fuels or from RES. In the case of this project, where the electricity is generated from wind energy and solar PV, the hydrogen produced is considered "renewable", "sustainable", "clean" hydrogen as the greenhouse gas emissions during its production are almost zero.

The scope of the pilot project is to produce and make available in the Cypriot market "green" hydrogen. The project aims to support the use of clean energy resources in the transportation sector and thus, contribute to the reduction of GHG emissions by reducing the necessity of using up conventional fuels for transportation. The hydrogen to be produced is said to be "green" as it will be produced by electricity supplied from renewable energy source. Consequently, the operation of the project will contribute to the protection of the environment through the reduction of harmful emissions into the environment and at the same the project will contribute to the national targets for reducing the production of carbon dioxide produced by the transport sector and the country's dependence on conventional fuels, as well as increasing the share of RES in total energy consumption in Cyprus.

2.2.2 Position of pilot project

The Geographical position of the project is found north-east to the Municipality of Larnaca, south to the centre of Aradippou Municipality, it is located North to the municipality of

Dromolaxia and Meneou, southwest to the municipality of Livadia and southeast to the community of Kalo Chorio and the community of Kochi.

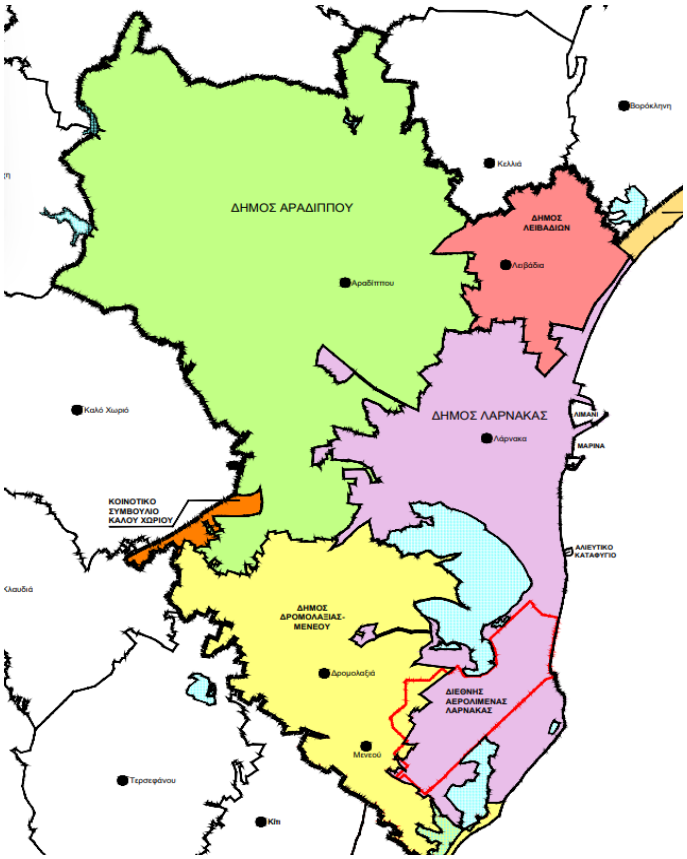
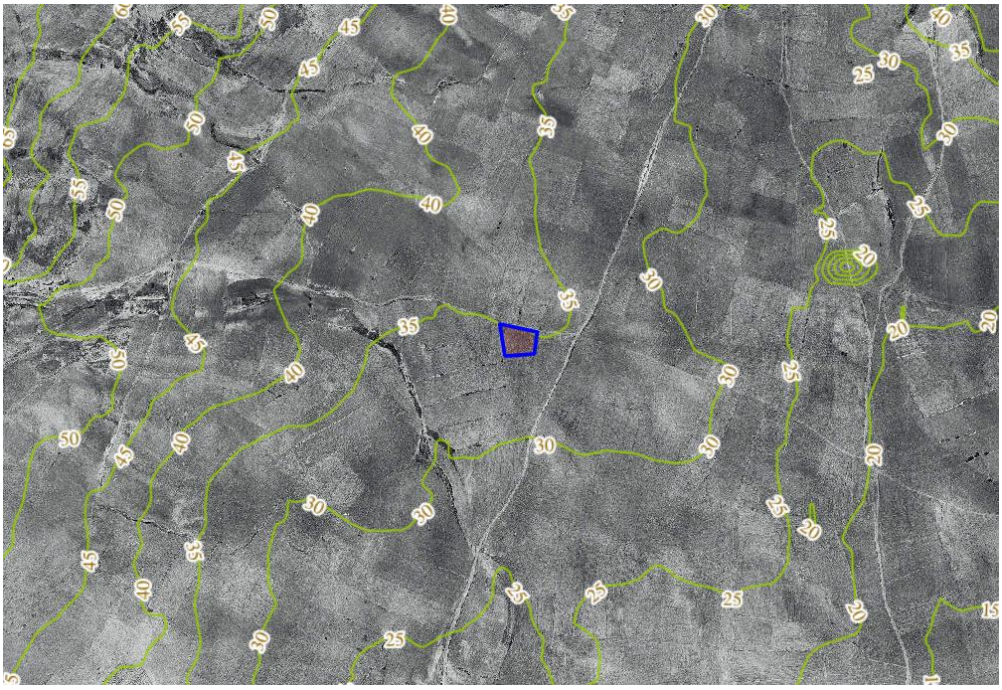


Figure 13: Location of plot near communities and municipalities

The position of the plot is found east from the main road to the Larnaca airport and is also found on the left side of the main road.

Map 1: Plot near the main road shown with blue

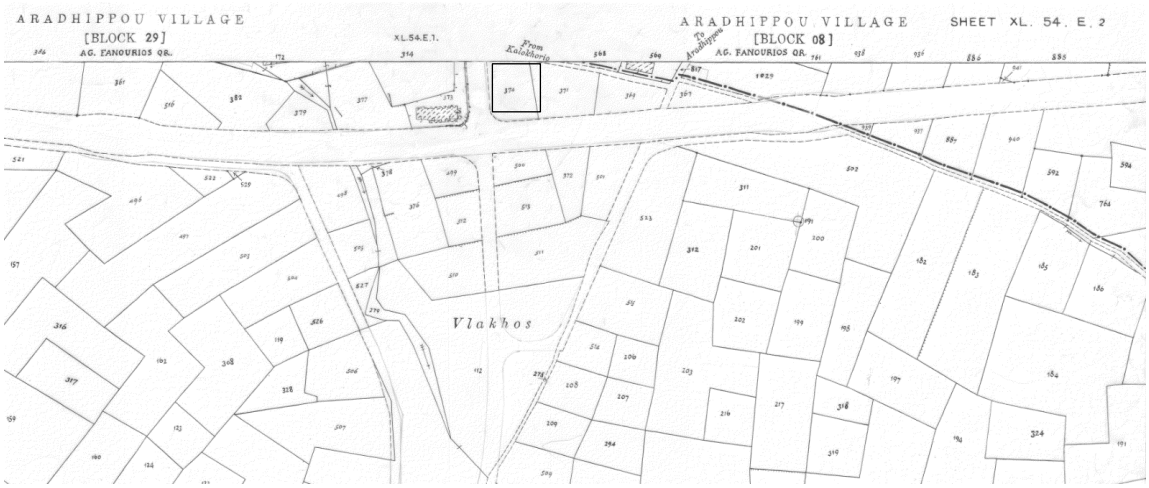
The soil surface of the plot under study is flat and it is characterized as lowland with an altitude of approximately 30-35 m above sea level.



Map 2: Isometric curves

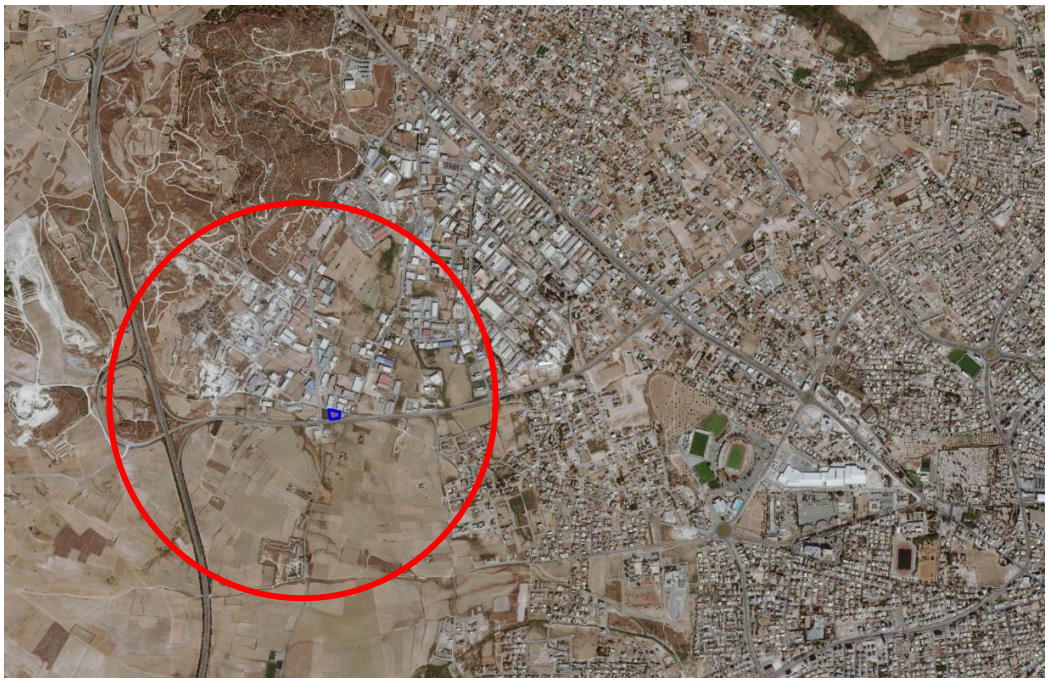
The construction of the plant and the refuelling station will be located on land (rent by the applicant – 15 years agreement) with the number 371 (Φ/Σ – 55/25) in the area of Agios Fanourios. The total area of the plot is 2,077 m². The coordinates of the location are:

- Latitude 34.927726
- Longitude 33.576525



Map 3: Cadestral map

Figure 14: View of the plot area with pink



Map 4: Shows the location of the plot and the wider area around it

The plot area is described as a mixed zone with both industrial and economic activity in both the plot area and the wider area. In the wider area of there are also agricultural activities occurring. The planning zones are seen in the figure below, where:

- Β3 – Industrial activities
- Βα3/Βε1 – Mixed industrial and economic activities
- Γα4 – Agricultural zone

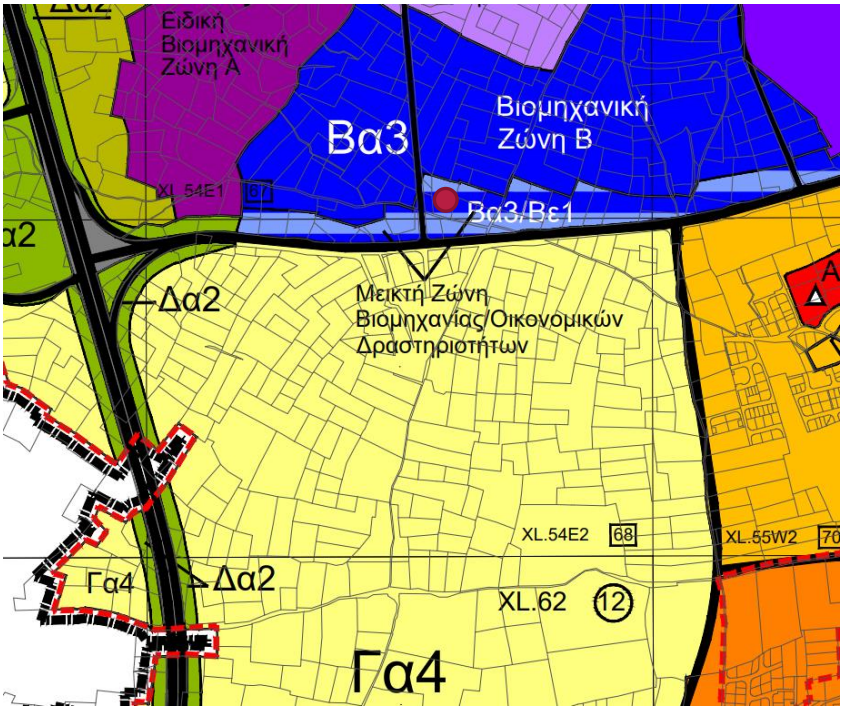


Figure 15: Planning zones around the plot area marked with red dot

2.2.3 Description and technical characteristic of pilot project

From a technical perspective, the Future Fuels Pilot Project entails for the installation and operation of a 3 MW (scalable) Proton Exchange Membrane (PEM) electrolyser consisted of 3 electrolysis stacks, 1 MW each. The hydrogen production plant is expected to produce 150 tonnes of hydrogen fuel per year. That is equivalent to 500,000 litres of diesel fuel per year, if we considered that the fuel switch will take place between diesel-fuelled vehicles and hydrogen-fuelled vehicles.

The project will include additionally two storage units (2 x 500 kg) and a refuelling station for the fuel to be accessible to users (see figure below for rough estimation of the plot area needed). A technology overview of production plant and filling station can be found in Annex obtained from the corresponding quotations from NEUMAN & ESSER ltd in Germany.

Main technical specifications of PEM electrolysis plant are presented in the following table:

Table 8: Main technical specifications of PEM electrolysis plant

Parameter	Details
Electrolysis Technology	PEM (Proton Exchange Membrane)
Electrolyte	Polymer-like. No other liquid substances, besides water, are necessary or found inside the integrated hydrogen production plant

Parameter	Details
Life Expectancy of the Electrolysis Stacks	90,000 h (about 10 years, according to the assumptions adopted for the End-of-Life conditions)
Power Requirements	
BoL (Begin-of-Life):	54.0 kWhDC/kg H_2 59.0 kWhAC/kg H_2
EoL (End-of-Life):	65.0 kWhDC/kg H_2 73.2 kWhAC/kg H_2
Process water specific consumption	about to 0.9 L/Nm3 of H_2 or 10 lt/kg of H_2
Process Water Production Module	capable to provide water with resistivity above 10 MΩ/cm and TOC < 30 ppb.
Feed Water Specification	The Process Water Purification Module is customizable technology and able to handle the water available at each site.
Waste and Environmental Aspects	Gas exhaust consisting of the oxygen stream (if this stream is not used) and Liquid drainage consisting of the reverse-osmosis and piloting air pre-treatment rejected water. Regular maintenance generates saturated deionizing resin and water filtration cartridges, harmless for human contact and/or regular disposal. Eventual replacement of UV-lamps, from process water treatment and polishing, will generate a disposable lamp. Reverse-osmosis membrane and electrochemical cells (used for gas analysis) should be replaced in a 1-2 year interval, without harmful wastes. There is no replacement interval for catalysts and molecular sieves used for hydrogen purification, all over the system's lifetime.
System Rated Lifetime	25 years

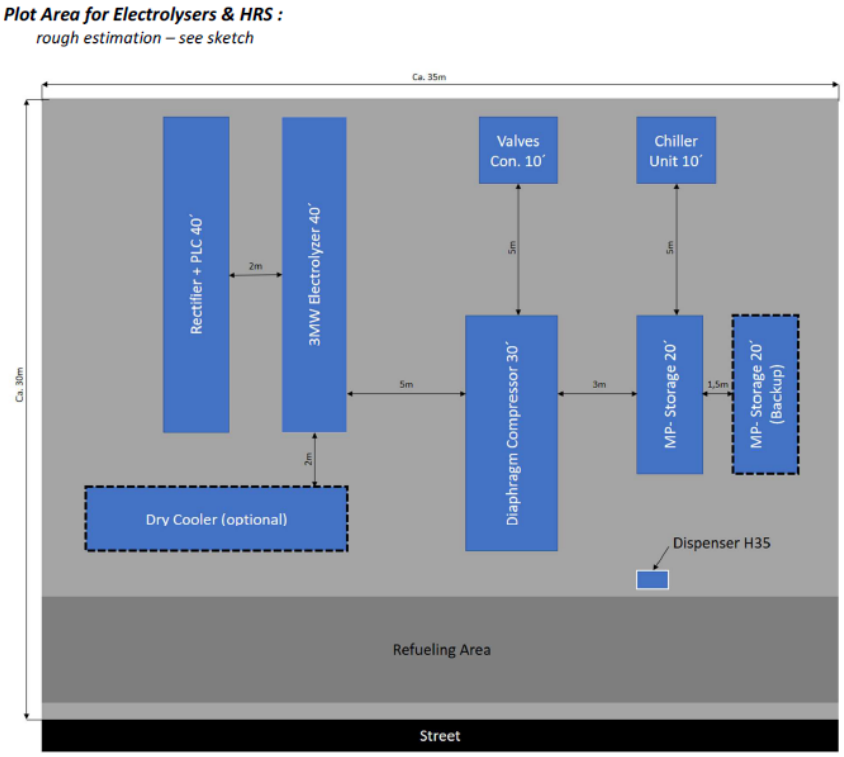


Figure 16: Plot area for electrolyzer and hydrogen filling station recommended by manufacturer, Source: NEUMAN & ESSER Deutschland

Regarding the **outline** of the production plant and filling station the following sizing information is available:

- Process: 12.19 m x 2.44 x 2.59 m (L x W x H)
- Rectification: 12.20 m x 2.44 x 2.59 m (L x W x H)
- Storage: 6.1 x 2.44 x 2.8 m (L x W x H)
- Storage: 6.1 x 2.44 x 2.8 m (L x W x H)
- Dispenser: 2.2 x 0.7 x 2.2 (L x W x H)
- Compressor: 9152 x 4.1 x 2.90 m (L x W x H)
- Valves: 3.0 x 2.44 x 2.59 m (L x W x H)
- Chiller: 3.0 x 2.44 x 2.59 m (L x W x H)
- Water tanks: 2 x 2 m diameter

Furthermore, the pilot project involves the following auxiliary facilities:

- Office/store/storage: 12.90 x 6.65 m (L x W)
- Electricity meter (station) room: ≈ 10 m²
- Parking spaces: 7.2 x 4.8 m (L x W)

- Filling station: 10 x 3.5 m (L x W)
- Fences: 185 m
- Cameras: 4 security cameras will be installed

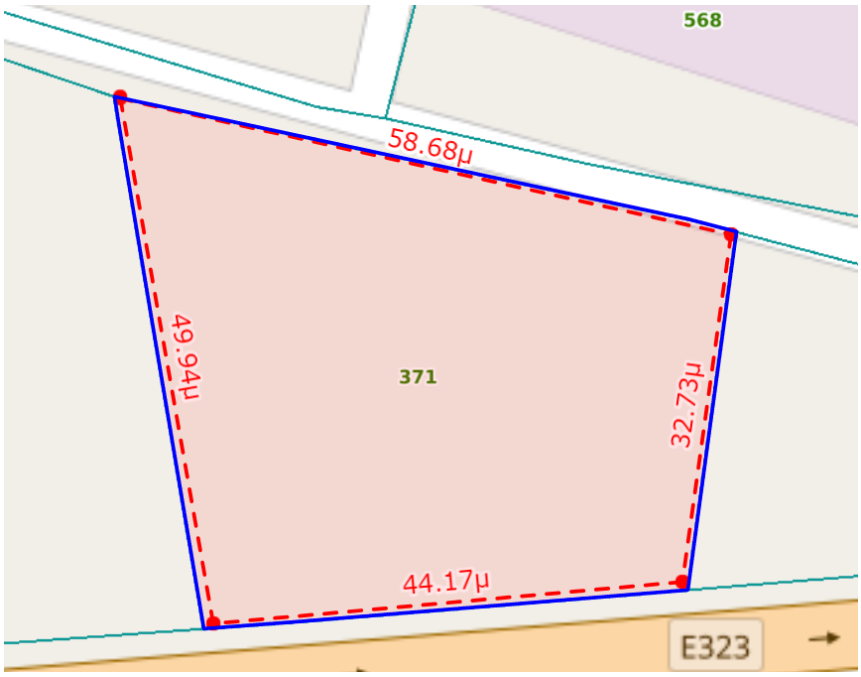


Figure 17: Length of fence required for the plot area

The spatial planning and design of the plot area is shown in the following figures.

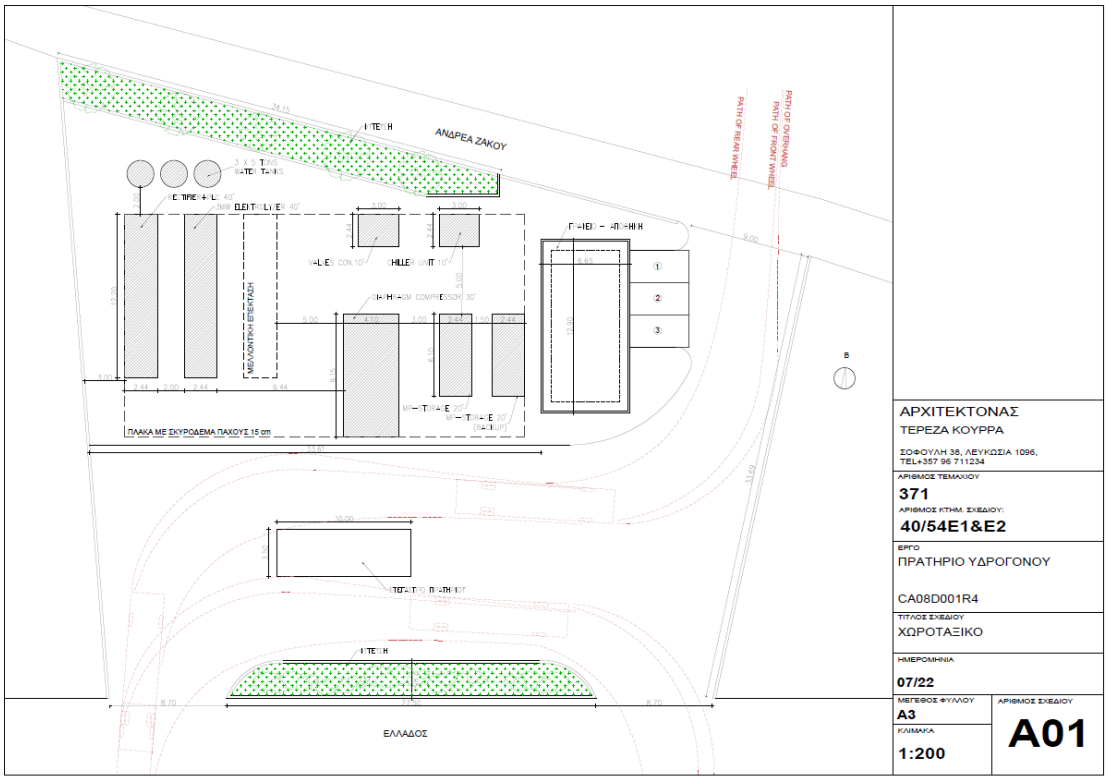


Figure 18: Spatial planning of the production plant and refueling station within the plot area.

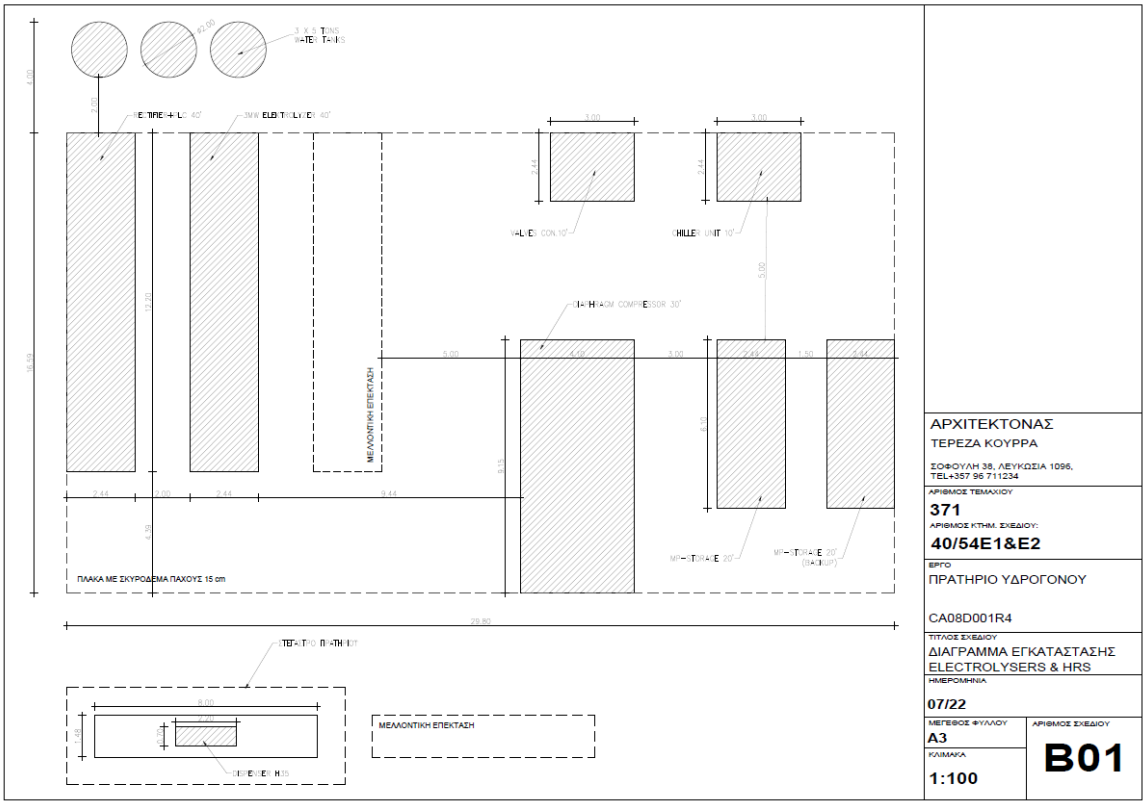


Figure 19: Diagrams of electrolyser, storage, and filling station for pilot project

2.2.4 Timetable of pilot project

The proposed project is expected to follow the schedule shown below:

Table 9: Preliminary timetable of the project

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Preparation of EIA																				
Apply for planning permit																				
Apply to Ministry of Energy, Commerce, and Industry for production of fuel																				
Submission of EIA																				
Apply to Innovation Fund Small Scale Projects																				
Relevant approvals by authorities																				
Start of construction (plot configuration)																				
Instalment of units																				
Start production and refuelling																				

As you can see from the timeline, the pilot project will be submitted to Innovation Fund Small Scale for this year's call (submission in August of 2022). In the context of preparation for the submission, Future Fuels requested Letter of Support from Governmental Departments involved in energy and climate change issues. Refer to Annex for Letter of Support received from:

- Ministry of Energy, Commerce, and Industry
- Deputy Ministry of Research, Innovation and Digital Policy
- Ministry of Agriculture, Rural Development, and Environment.

2.2.5 Description of works during the construction stage of the project

2.2.5.1 Plot configuration

In the area where the equipment will be placed, a flat work area will be created where deemed necessary. The shaping of the work areas includes the compaction of the surface using a paver and the coating with backfill material to cover all irregularities. Landscaping work will be limited since most of the study area is flat.

2.2.5.2 Securing electricity transmission line

Line transfer works will be carried out on the plot via the access road. The plot under study is located at a distance of approximately 50 m from the medium voltage and low voltage EAC Pylons. In the auxiliary facilities a room for electricity meters will be constructed (≈10 m^2).

2.2.5.3 Road access

For the access to the plot there is available public road thus any improvements of the existing access are not necessary.

2.2.5.4 Transport of the equipment and personnel

The transport of the materials will be done by trucks which are not expected to encounter or cause particular problems on the road network or traffic in the area. The equipment will be transferred from Limassol Port to the plot area. For the transport of the materials, 5 routes are expected to be carried out by trucks (or light and heavy-duty vehicles) and another 2 routes for the transport of the concrete and 2 routes for excavator. For the transportation of personnel, 20 routes might be required.

2.2.5.5 Installation of green hydrogen

Responsible for the Installation at Site of the production plant and the filling station will be one (1) Neuman & Esser Supervisor, three (3) Mechanical Supporters and one (1) Electrical Supporter. Once the equipment will be received on site the assembly will start that will take approximately 3 weeks based on information received from the manufacturer. Also, parking spaces, offices, and the refueling station will be constructed. All that are indicated in Section 2.2.3.

2.2.5.6 Fence and security cameras

As indicated in previous section, the area will be protected by installing fence around the plot (185 m) and four (4) security cameras in each corner of the plot. Fence poles are driven deep enough into the ground so that they can stand on their own. The material used in a fence is then incorporated into the poles, forming a barrier protects the property. Metal stakes are particularly popular and durable, while the metal used for their construction is aluminum, steel and iron. 70 Fencing stakes per 2.50m and 9 Rolls Mesh of 20m is estimated that will be needed.

2.2.6 Construction phase of the project

2.2.6.1 Gaseous waste - Air pollution

The emission of gaseous pollutants during the construction phase will come from:

- the heavy vehicles that will be used to transport construction materials and excavation products
- the earthworks.
- from the transportation and unloading of construction materials
- from the use of the necessary machinery for construction
- from open sources (eg storage piles) by wind action.

Air pollutants are mainly particles and of course CO, HC, SO_2 and NO_X from vehicles and machinery.

2.2.6.2 Liquid waste – water pollution

The liquid waste that will come from the construction of the project will be:

- municipal sewage from the workers who will be working,
- waste from the machines that will be used for the construction of the project,
- water from washing construction site machinery,
- waters from wetting the excavation surfaces to avoid dust,
- rainwater that will fall on the construction site High concentrations of suspended solids are expected in the waters of the last three cases due to the construction works.

The quantification of these liquid wastes is rather impossible. Surface runoff is generally expected to be loaded with suspended inorganic particles (dust) and small amounts of oils, greases and hydrocarbons from vehicle traffic and work machinery.

Water contamination is not expected given the nature of the installation works. However, both in the construction phase and in the maintenance of the facilities (operation), the possibility of occasional spills of oil, grease and fuel must be considered from machines and motors. To avoid this and minimize possible effects on the means, the preventive and/or corrective measures established in this regard will be applied, thus avoiding contamination of the soil and surface or groundwater. The location of the machinery and the rest of the actions of the construction phase will be aimed at avoiding contamination and/or disturbance of the existing channels in the surroundings, applying the necessary preventive measures.

2.2.6.3 Solid waste

During the construction of the projects, the main sources of solid waste are the operation of the construction site and the earthworks and excavations that will take place. The produced quantities of soil and building materials from demolitions will be collected by trucks for

disposal in an appropriate place. From the operation of the construction site, the solid waste generated is mainly packaging materials such as oil cans and paper packaging, as well as waste generated by the work personnel. The waste produced by the construction site workers concerns very small quantities, which will be collected on the construction site and collected using the waste management method

The estimate of waste to be generated is shown in the following tables. These residues correspond with those derived from the specific process of the planned work without considering other waste derived from shipping systems, material packaging, etc. This estimate has been codified in accordance with the provisions of Κ.Δ.Π. 545/2020 (List European waste). Regarding the hazardous waste generated in the construction phase, these will be mainly those derived from the maintenance of the machinery used to carry out the work. The aforementioned waste will be used oils, remains of rags impregnated with oils and/or solvents, containers that have contained dangerous substances, etc.

In the construction phase, the non-hazardous waste that will be generated will be of the metal type, plastics, cable remains, concrete remains and organic remains, etc. Due to the work of concreting the channel, etc. concrete remains will be generated from the washing of concrete mixers. Because of the work personnel on site, a series of waste similar to urban, such as food scraps, wrappers, cans, etc. will be generated. The following tables specify, as a summary, the waste generated:

Table 10: Non-hazardous waste generated during the construction phase

Waste generated during construction phase NON-HAZARDOUS WASTE			
Waste code (6 digits) Κ.Δ.Π. 545/2020	**Type of waste**	**origin**	**management**
17 05 04	soil and stones other than those mentioned in 17 05 03	operations involving earthworks such as foundation opening	Reuse as much as possible. The rest will be removed and transferred to a licensed management site.
17 01 01	concrete	foundation concreting operations	Collaboration with authorized manager who prioritizes its valorization
17 02 01	wood	realization of foundations. Assembly of structures	Collaboration with authorized manager who prioritizes its valorization
17 02 03	plastics	Component	Collaboration with

		wrapping, material transport protection	authorized manager who prioritizes its valorization
17 04 05	Iron and steel	Realization of foundation assembly of structures	Collaboration with authorized manager who prioritizes its valorization
17 04 07	Mixed metals	Realization of installations	Collaboration with authorized manager who prioritizes its valorization
17 04 11	cables other than those mentioned in 17 04 10	Realization of electrical installations	Collaboration with authorized manager who prioritizes its valorization

Table 11: Hazardous waste generated during the construction phase

Waste generated during construction phase HAZARDOUS WASTE			
Waste code (6 digits) Κ.Δ.Π. 545/2020	**Type of waste**	**origin**	**management**
15 05 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	Maintenance operations of construction machinery	Collaboration with licensed hazardous waste manager
17 05 03*	soil and stones containing dangerous substances	Possible accidental spills from machinery and handling of dangerous substances such as solvent oils, etc	Collaboration with licensed hazardous waste manager
13 02 05*	mineral-based non-chlorinated engine, gear and lubricating oils	Maintenance operations of construction machinery	Collaboration with licensed hazardous waste manager

13 01 10*	mineral-based non-chlorinated hydraulic oils	Maintenance operations of construction machinery	Collaboration with licensed hazardous waste manager

2.2.6.4 Waste generation prevention measures

To prevent the generation of waste, the installation of a booth or container for storage of reusable materials, so that that they be used later by the builder or to be supplied to an authorized person.

As far as earthmoving operations are concerned, the lowest layer will be removed first, consisting of topsoil that can be reused for recovery work of the area. The surplus land generated due to the excavations will preferably be reused in filling work, whenever possible, trying to minimize the excess land that must be withdrawn. As for the excavation land, since it is not contaminated, it will be used for activities conditioning or fillers whenever possible.

2.2.6.5 Waste separation measures

Through the separation of waste, its reuse, recovery, and subsequent disposal is facilitated. The following measures are envisaged for proper separation measures:

- For the separation of the hazardous waste that is generated, a container will be available suitable next to the work. The collection and treatment will be done by authorized person.
- In relation to the remaining expected waste, the quantities do not exceed those established in regulations to require separate treatment.
- To separate the waste, specific containers will be available. To place these containers an area has been reserved with access from the public road on the site of the work which will be conveniently marked.
- For all waste collection there will be the participation of a licensed Waste Manager in accordance with legislation.

2.2.6.6 Reuse, recovery, or disposal

The possibility of carrying out any of the reuse operations on site is not foreseen, recovery or disposal due to the low amount of waste generated. Therefore, collaboration with Authorized Waste Collectors & Managers will be made for corresponding withdrawal and subsequent treatment of waste. The number of specific Waste Managers required will be at least that corresponding to the categories mentioned in the Waste Separation section, which are: Plastic, Wood Bricks, Concrete etc. In general, the waste will be generated sporadically and spaced out over time, except for those coming from the excavations that

are generated in a more punctual way. However, the frequency of deliveries will be established based on the rhythm of planned works.

2.2.6.7 Noise

During the construction phase there will be an increase in the sound level due to the works - earthworks and construction, but it is judged to be low. Special measures will be taken to limit construction site noise, such as the use of sound-insulating frames and the use of low-noise machines.

2.2.7 Operational phase of the project

2.2.7.1 Final Product

The hydrogen production plant output is: As mentioned above, the plant it is expected to produce 150 tonnes of Hydrogen per year. Additional expansion of the system and H2 production increase will be assessed in a later stage.

The project's product users: For the first step, the final product will be used in the mobility sector and more specifically for light and heavy trucks. It is destined to replace diesel-fuelled vehicles. This fuel switch will result into GHG emissions reduction as quantified in a following Chapter.

2.2.7.2 Energy requirements

The power requirements, expressed in kWh/kg of H2, are approximately 54. Based on the production level of 150 tonnes of hydrogen, that corresponds to 8,100,000 kWh of renewable electricity per year. The energy will be supplied by local renewable energy supplier with the use of guarantees of origin to justify the use of only renewable energy sources, so that the final product can be classified as green.

2.2.7.3 Water use

Based on manufacturer's information the specific process water specific consumption, expressed in litres of water per kilos of hydrogen produced, is 10. Based on the production level of 150 tonnes of hydrogen per year, that results into a water consumption of 1,500,000 litres of water per year.

The water to be used will be derived from secondary treatment of wastewater from the Water Development Department of Larnaca, thus it will be contributing into circular economy actions within it and use water which could be otherwise be lost and not used. The point of collection is ΔΡΟΜ-ΑΠ 04, where a water tanker will collect the water and transfer it to the location of the hydrogen production plant.

Refer to Annex for corresponding communication with the Water Development Department of Larnaca on the request to use wastewater from secondary treatment and main points of agreement.

The water use for the employees and other uses will come from Larnaca Water Board. Based on the data for the employed staff (2 persons) and the Specific staff water consumption of 40 lt/day, the water requirements estimated to be 80 lt/day.

2.2.7.4 Estimation of waste to be generated

- Series of waste like urban, such as food scraps, wrappers, cans, etc. from personnel and the users of the refueling station.
- Accidental leakage from the water tanker responsible from providing of 1,500,000 litres of water per year.
- Deionizing resin and water filtration cartridges from maintenance, harmless for human contact and/or regular disposal.
- UV-lamps, from process water treatment and polishing.
- Reverse-osmosis membrane without harmful waste (**replaced in a 1-2 year interval)**

Table 12: Non-hazardous waste generated during the operation phase

Waste generated during operation phase NON-HAZARDOUS WASTE			
Waste code (6 digits) Κ.Δ.Π. 545/2020	**Type of waste**	**origin**	**management**
20 03 01	mixed municipal waste	From personnel and visitors	Separate as much as possible. The rest will be placed in the municipality bins.
20 01 01	Paper and cardboard	Office operations	Separation. Collaboration with authorized collector & manager
20 01 02	Glass	Office operations	Separation. Collaboration with authorized collector & manager
20 01 39	plastics	Office operations	Separation. Collaboration with authorized collector & manager
20 01 40	metals	Office operations	Separation. Collaboration with authorized collector

			& manager
19 09 99	wastes not otherwise specified	Reverse osmosis membranes	Collaboration with authorized manager who prioritizes its valorization

Table 13: Hazardous waste generated during the operation phase

Waste generated during operation phase HAZARDOUS WASTE			
Waste code (6 digits) Κ.Δ.Π. 545/2020	**Type of waste**	**origin**	**management**
20 01 21*	fluorescent tubes and other mercury-containing wast	Reverse osmosis UV lambs	Collaboration with licensed hazardous waste manager

2.2.7.5 Liquid waste

The sources of liquid waste in the area during its operation are mainly the urban sewage from the workers and passers-by, for each worker it was considered that 30 lt/day of liquid waste.

3 Description and analysis of the current environment

The current scope of this EIA is the environmentally sustainable operation of the project.

3.1 Microclimate

Microclimate is the climate found in small areas independently of their surrounding climate, and by climate it includes temperature, air quality, wind speed, sun radiation, rainfall. It is important to know the microclimate of the wider area as it can be impacted by the actions happening within the area, which can contribute to temperature increase or atmospheric pollution in that area.

The meteorological stations which measure the microclimate conditions and are recording data are coordinated by the Department of Meteorology of the Ministry of Agriculture, Rural Development and Environment. The nearest stations to the plot area are the following and are also shown in the Map 5, LCLK - Larnaca Airport, Achna and Athienou.

Map 5: Meteorological stations locations, Source: https://www.dom.org.cy/AWS/ALL_STATIONS_MAP.html

Cyprus is surrounded by the Mediterranean Sea which influences its Mediterranean climate. The main characteristics of this climate are the hot and dry summer for the duration of May – September and the rainy mild winter for the duration of November-March, and the transition seasons of autumn and spring.

3.1.1 Rain

During the summertime the rain in Cyprus does not exceed the 5% of the yearly average rain. Whereas most of the rain falls during the three winter months of December, January, and February, corresponding to 60% of the rainfall of the year.

As described in the Figure 20 below, the yearly average rain in Cyprus is around 480mm (for the year 1951-1980). As it can be seen from the map most of the rain occurs on the Troodos mountains where the yearly average rain can reach 1100mm.

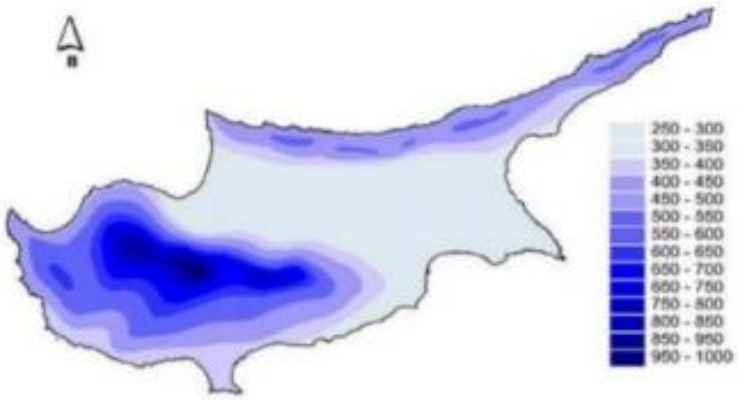


Figure 20: Rainfall intensity

As seen in the figure, the average rainfall in the wider area of the project is low. The monthly rainfall in the wider area for the year 2021 is shown in the table below. For 2021 the lowest amount of rainfall to be recorded was during the months of august and September with the amount of 0.0 mm, and the highest was in December with a rainfall amount of 203.4 mm.

Table 14: Rainfall

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
TOTAL	64.4	12.8	14.2	2.2	1	0.8	0.6	0.0	0.0	15.2	30.6	203.4
MAX	16.4	8.2	3.6	0.8	0.2	0.2	0.2	0.0	0.0	0.3	15.0	66.2
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

3.1.2 Wind

The following figures illustrate information regarding wind speed for whole Cyprus.

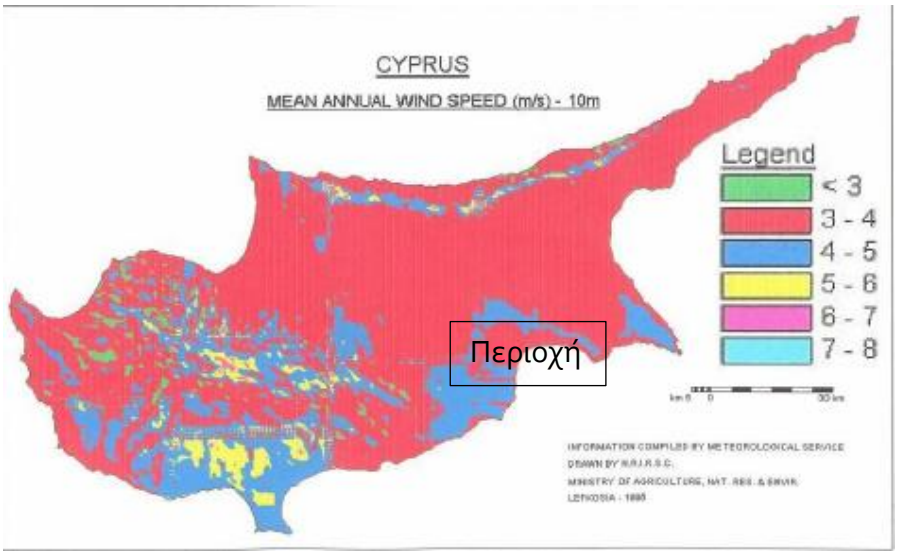


Figure 21: wind speed in Cyprus

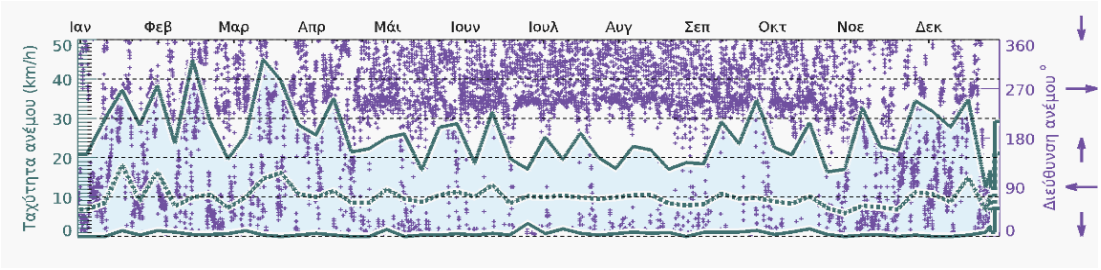


Figure 22: wind speed and direction
https://www.meteoblue.com/el/%CE%BA%CE%B1%CE%B9%CF%81%CF%8C%CF%82/historyclimate/weatherarchive/k%C3%BDpros_%CE%9A%CF%8D%CF%80%CF%81%CE%BF%CF%82_146670

Retrieving information from a near-by station of LCLK - Larnaca Airport, the mean wind speed in the wider area of the project is around 4 m/s.

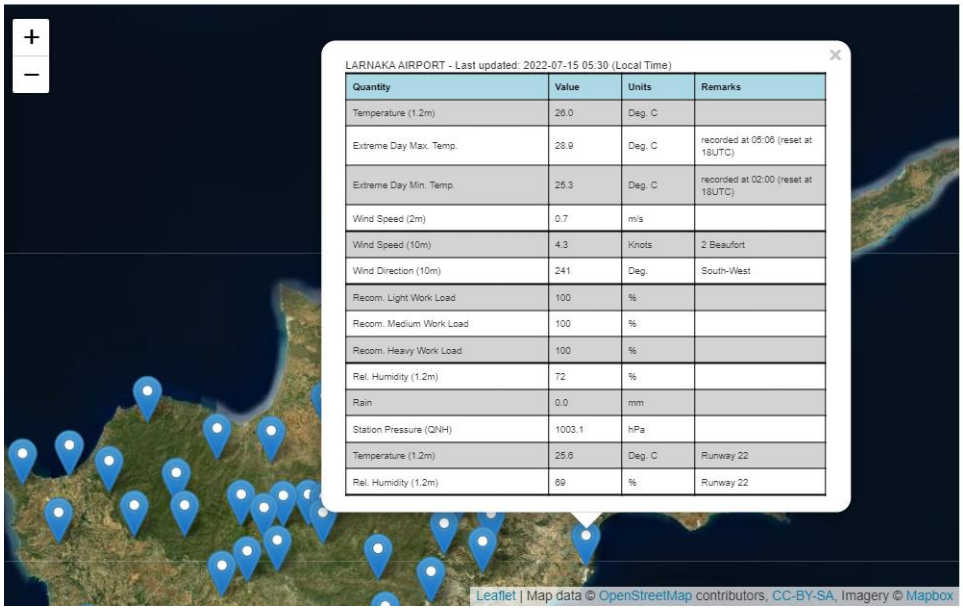


Figure 23: Data from Larnaca Airport station, Source: Cyprus Department of Meteorology

Station Name	Longitude	Latitude	k	c	VFmax (m/s) *	VEmax (m/s) *	ED (kW/m2) *	EI (kWh/m2) per year *
Paphos	32.29 E	34.45 N	2.87	4.43	3.82	5.33	0.0545	477.72
Larnaca	33.38 E	34.53 N	2.87	3.67	3.16	4.41	0.0310	271.62
Paralimni	33.59 E	35.03 N	2.16	4.86	3.64	6.58	0.0871	762.77
Limassol	33.42 E	34.42 N	1.94	3.64	2.51	5.24	0.0408	357.1
Akrotiri	32.58 E	34.37 N	2.11	4.18	3.08	5.73	0.0566	495.89
Athalassa	33.24 E	35.08 N	2.91	4.68	4.05	5.6	0.0639	559.64
Ercan	33.30 E	35.09 N	2.91	4.65	4.02	5.57	0.0627	548.94
Polis	32.26 E	35.02 N	1.92	3.76	2.56	5.45	0.0455	398.25

*Figure 24: Data representing various cities and their wind potential in Cyprus, *VFmax: the most frequent wind velocity *VEmax: the velocity contributing the maximum energy to the regime* [9]

3.1.3 Temperature and solar radiation

Cyprus has a Mediterranean Climate and thus a Mediterranean temperature as well. The Table below demonstrates the data for the temperature of the wider area of the project which have been taken from the data record of the closes meteorological station in the Area, the LCLK. The temperature of the WAoP, has mild temperatures during the winter months of December – February with particularly lower temperatures during the month of February of 8.85 °C. During the summer months, the temperature is higher, where during August the maximum temperature can be 37.2°C.

Table 15: Average, minimum and maximum temperatures for 2021

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
AVERAGE (°C)	21.5	15.7	17.4	21.55	26.1	28.1	32.35	33.25	29.7	26.45	22.1	15.7
MAX (°C)	19.7	19.55	21.25	29.65	30.9	34	36.4	37.2	33.5	33	27.4	21.4
MIN (°C)	9.2	8.85	13.15	27.7	24.2	25.55	29.1	30.35	26.45	21.6	16.75	22.1

Cyprus' location provides the country with long lasting sunshine throughout the year. In the central and eastern lowlands, the sun is above the horizon providing average hours sunshine which amounts to 75% yearly. The average daily solar radiation in the Area accounts for 5.8 kWh/m² and the yearly solar radiation in the wider area of the plot is 2081 – 2154 kWh/m².

[9] CASE STUDY OF CYPRUS: WIND ENERGY OR SOLAR POWER?, 2010, DOI:10.13140/2.1.5044.3849 Conference: EPE 2010Volume: Proceedings of the 11th International Scientific Conference Electric Power Engineering 2010. Brno Univ Techol, pp. 283-290

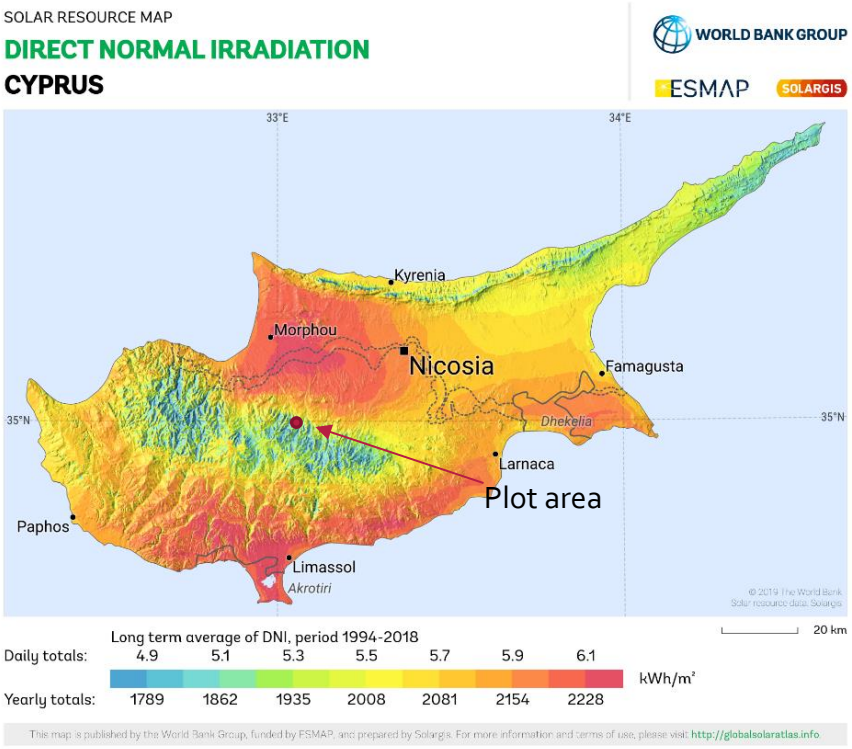
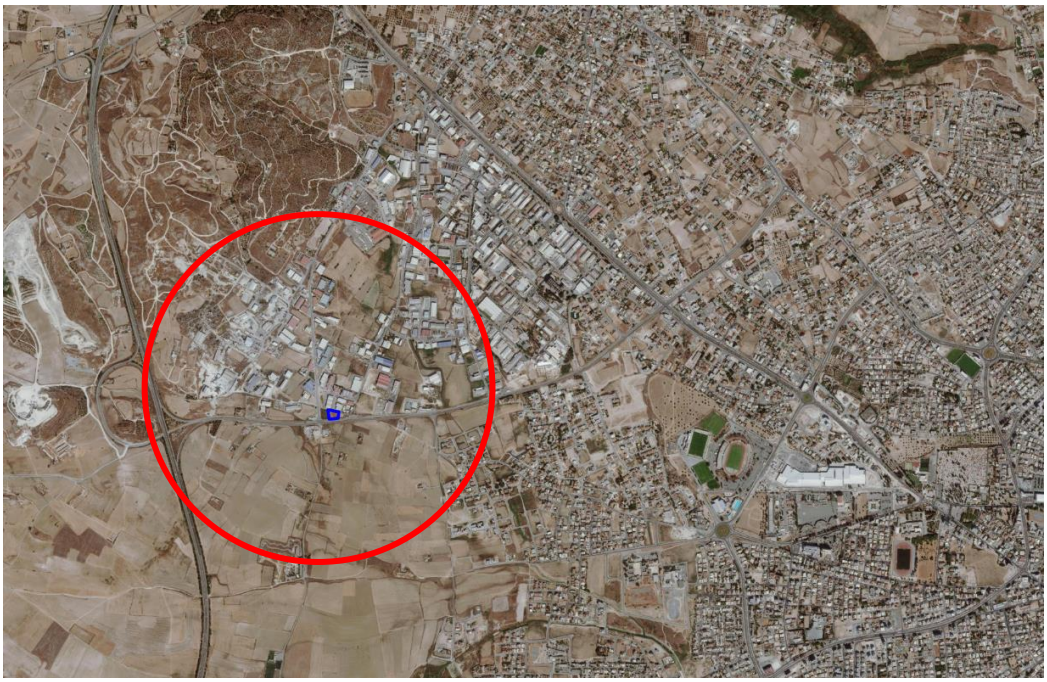


Figure 25: Solar radiation in Cyprus - https://solargis.com/maps-and-gis-data/download/cyprus

3.2 Physical environment

In this paragraph, the analysis of the land area of the existing environmental condition of the plot area (PA) of the project and the wider study area around the land segment with a radius of 1km is described. For the specific analysis, a series of actions were followed including the following: on-site visits to the PA and WSA during the period April-June 2022, as well as photographing of characteristic environmental aspects as well as their mapping. These actions have been followed to assist in the identification of the potential environmental risks that the construction and the operation of the project might impose on the PA and WSA.

The Map 6 shows the plot area and represents the PA which is defined as the area where the factory will be located and the WSA within a radius of 1km.



Map 6: Plot area and wider area

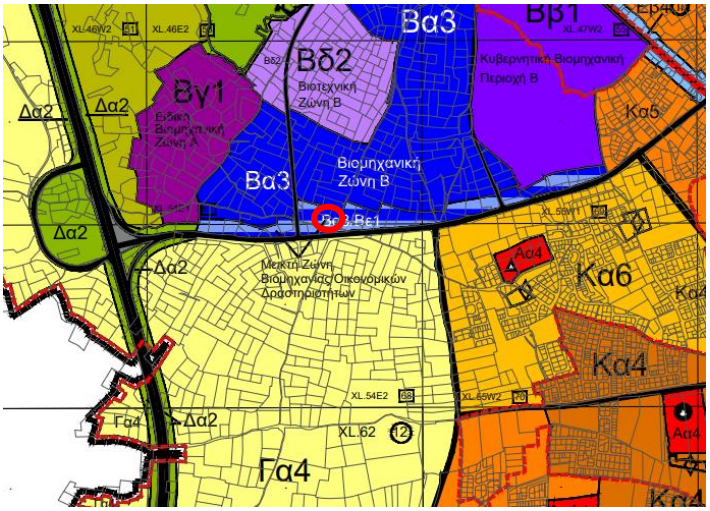
3.2.1 Land area

The PA is located 100% in the planning zone of Bα3/Bε1. In the town planning report of Larnaca, the Bα3 is described as an industrial zone and Bε1 represents the economic activity zone. Thus, the zone Bα3/Bε1 is a mixed zone of those two as it is also being described in the town planning report. The characteristics of the zone are the following:

Table 16: Characteristics of the zone

CHARACTERISTICS OF THE ZONE	
CONSTRUCTION	100%
COVERAGE	60%
FLOORS	2
HEIGHT	nullμ

The PA is bound by the administrative boundaries of the Municipality of Aradippou area, in the Larnaca District. The land segment where the project will be located is a private owned land with the number 371 (Φ/Σ – 55/25) and it has a registered road according to the department of land and surveys.



Map 7: planning zones

The land segment has an area of 2,077 m². The geographical coordinates of the plot are Latitude 34.927726 and Longitude 33.576525. The PA is neighbouring with the municipality of Larnaca, the Municipality of Livadia, the Dromolaxia Meneou Municipality and the vilage of Kalo Chorio and Kochi as it can be seen on the Map 8.

Map 8: Administrative boundaries map

3.2.2 General description and morphology of the plot

The plot under study is characterized as a lowland with an altitude of approximately 30-35 m above sea level. The soil surface of the plot under study is flat and therefore the construction processes to be followed are raising some concerns about the decontamination of the flora.

3.2.3 Geology and geomorphology

Cyprus island is divided into 4 separate geological zones- Troodos, Mamonia, Pentadaktylos and the Circum Troodos Sedimentary Succession or otherwise Autochthonous sedimentary rocks which give rise to four major geomorphologic regions which are the Troodos Mountain Range, The Mesaoria plain, the Pentadaktylos mountain range and the mamonia terrane as they can also be seen on the Figure 26. Municipality of Aradippou is found on the geological zone of the Circum Troodos Sedimentary Succession which is the geomorphologic region of the Mesaoria plain.

Figure 26: Geological zones

The Mesaoria plain is located on the intermediate vicinity between the mountains of Pentadaktylos and the Troodos Mountains. The constituent sediments found on the plain have never been moved from their initial position since their formation. Thus, the particular geological zone consists of the following constituent sediments: thebentonite clays, chalks, marls, sandstones and calcite sandstones, Gravels, sands and silts, Calcitic sandstones, sands and gravels[10]. Both the area of the plot as well as the wider area around the plot are located on the Mesaoria plain. The following Figure 27 shows how each of the geology zones is split into different lithology and formation characteristics.

[10] https://www.carbonlab.eu/2016/08/14/the-geology-of-cyprus/

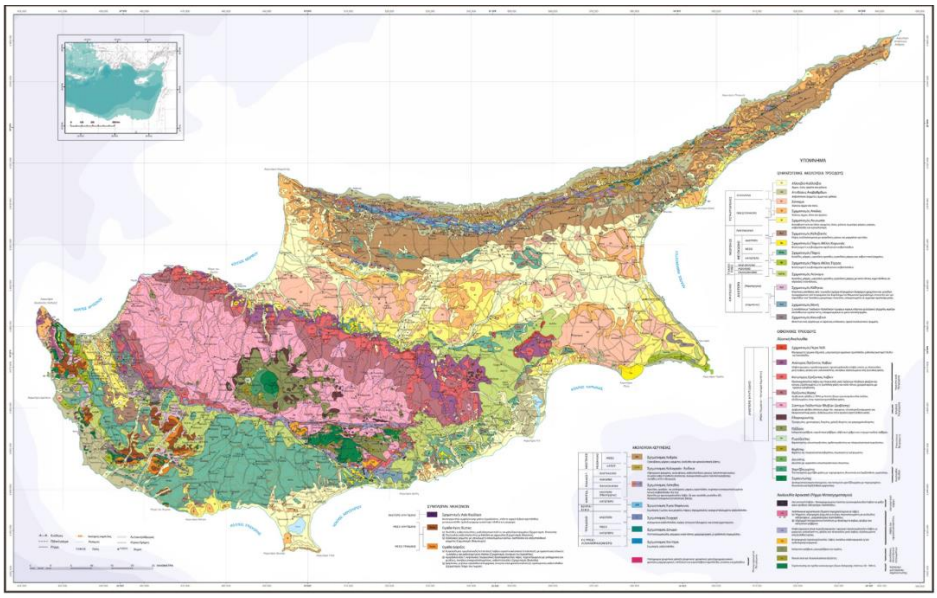


Figure 27: Geology Zones

More specifically, the Figure 28 shows the study area where the plot area is located in the geological formation of Lefkara which consists of pelagic marls and white chalks and has the oldest sedimentary rocks that have been deposited on the geology zones of Cyprus as mentioned.

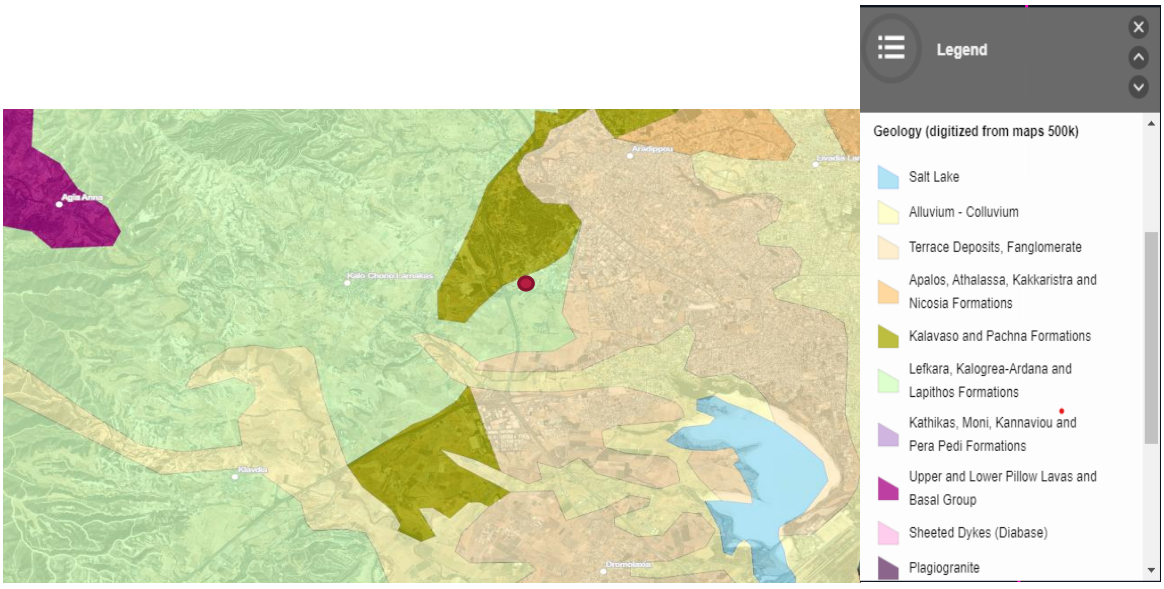


Figure 28: Red dot shows the location of the plot, found on the Lefkara geology zone

3.2.4 Seismicity

Cyprus is located in the seismogenic zone of the Alps-Himalayas in which 15% of the worldwide earthquakes occur. Most of the earthquakes in Cyprus are occurring in the southwestern area of Cyprus. This is because in this location the "Cyprus Arc" is located

which is the main reason for the seismicity in Cyprus. There the African plate moves north towards the Eurasian plate resulting in the subsidence of the African plate under the Anatolian plate (Part of the Eurasian plate). The "Cyprus Arc" starts from the Akama's Peninsula and it expands to the Gulf of Antalya, which describes the tectonic boundary of the two plates. Thus, the tectonic boundary is aligned with the increasing activity in the land rifts located in Paphos, Limassol and Larnaca as also shown in the seismic activity in the Figure 29.

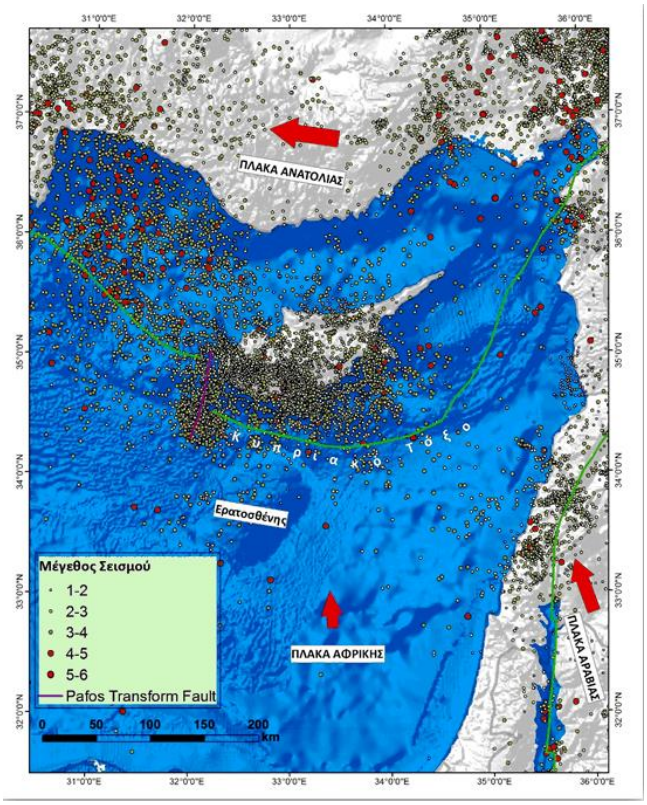


Figure 29: Seismic activity

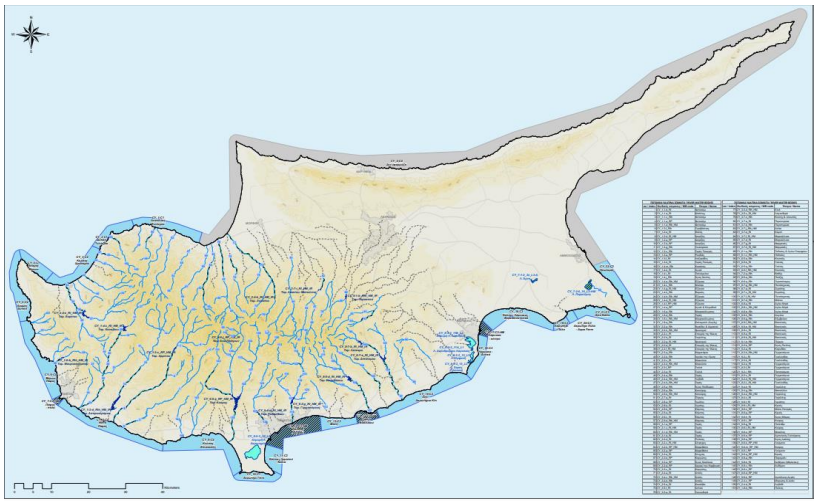
According to the Geological Survey Department and the figure demonstrating the seismic zones of Cyprus, the wider area of the plot is located in an area with possible strong seismic vibrations as it is located in the seismic category 3 where the seismic acceleration factor of the ground is equal to 25% of the acceleration of the gravity.

Figure 30: Seismic categories of Cyprus

3.2.5 Hydrology

3.2.5.1 Surface water

As seen in the hydrographic Map 9 of Cyprus, Cyprus is subdivided into 9 hydrological areas which consist of 70 main catchments and 387 sub-catchments. As an island country, the water bodies of the country depend exclusively on rainfall. Cyprus mainly consists of seasonal rivers and two salt lakes which are large. The main rivers of Cyprus originate from the Troodos Mountain range. Most of the rivers and streams flow for 3-4 months a year with the exception of the Rivers of Diarizos, Kargotis, Kouris, Germasogeia and Marathousa which flow all year round.



Map 9: Hydrographic map - http://www.moa.gov.cy/moa/wdd/wfd.nsf/All/F198F2E9765084CEC22583C5004560B2/$file/Map3-SWB_Categories.pdf?OpenElement

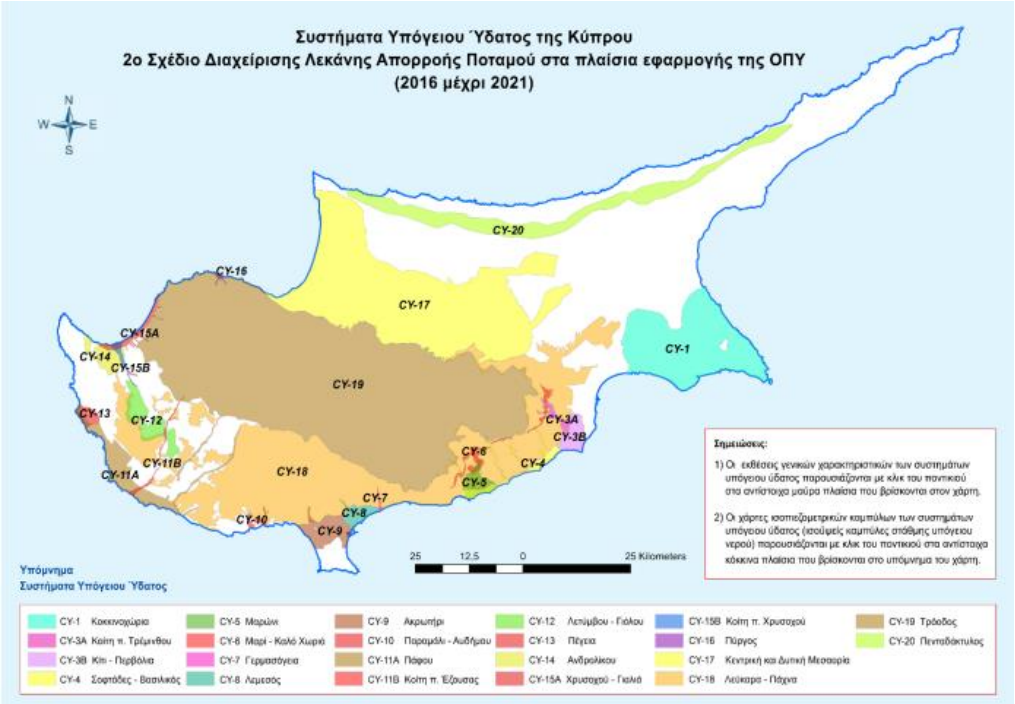
The plot area is near the ephemeral rivers which are near to the water body CY_17-C2-HM Larnaca-City Centre. It is noted that the fence of the park will be at a safe distance from the edges of the ephemeral river.

Hence, even if the plot area is located near the ephemeral rivers the area is not impacted by high-risk flooding areas. As seen in the Map 10, the areas with red are indicating the area where the is a chance of high-risk flooding and the plot which is represented with yellow colour is shown to be in a distance from this area.

Map 10: Potential flooding area
https://wdd.maps.arcgis.com/apps/webappviewer/index.html?id=479ed86d25ed4e0aaa5887511e3397f.

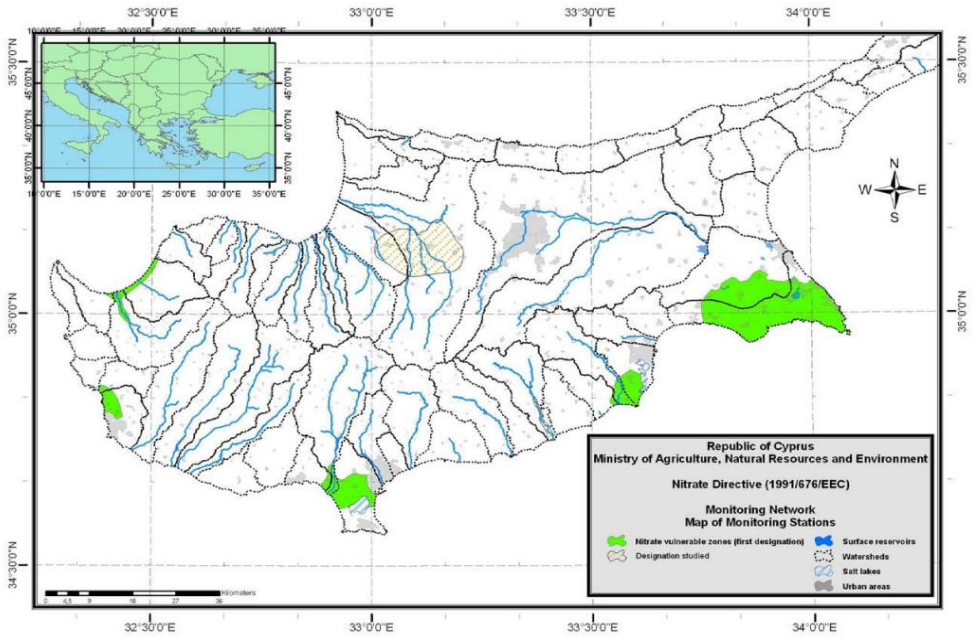
3.2.5.2 Groundwaters

Cyprus groundwater is divided into 3 categories of aquifers. The first aquifers is mainly developed in river and deltaic deposits as well as in marine terraces, the second one belongs to the Karstic and pseudo karstic aquifers which encompasses carbonated rocks such as limestones, dolomites and marbles and sometimes gypsum. The third aquifer represents the third category of aquifers in which the water fills up the space created by the fracturing of the sound bedrock mass – the fractured zones - and it depends on the lithology and the tectonic fracturing, and it is mainly consists of clay minerals. Good hydrological conditions are observed in cracked diabase rocks as well as in tectonically ruptured and crushed gabbro. The underground system that is found in the plot area is the CY_18: Lefkara-Pachna which is a chalky aquifer part of the fracture aquifers which are mainly developed in the Troodos ophiolites.



Map 11: Underground water systems

The system CY _18: Lefkara – Pachna does not fall in a vulnerable to the nitrate pollution area, as the groundwater of the plot area is not pressured onto intensive nitrate pollution.



Map 12: Nitrate pollution

3.2.5.3 Public water works

The Southern Pipeline Project is the largest water development project ever undertaken by the Cyprus Government.

The second phase includes the Diarizos River diversion works with a 14.5 km long tunnel, the Hapotami River diversion works, the Water Refineries in Limassol and Tersefanou, the Tersefanou - Nicosia pipeline, 36.5 km long, the regional water supply plan 9 communities west of Limassol, as well as the irrigation networks in the areas of Akrotiri, Pareklisia, Mazotos, Kiti and Aradippou covering a total area of 4 159 hectares. From these projects, the construction of the Limassol and Tersefanos Refinery, the regional water supply plan for the villages west of Limassol, the installation of the irrigation networks in Akrotiri, Pareklisia and Kiti, the construction of the project to divert the waters of the Diarizos River to Kouri, have been completed.

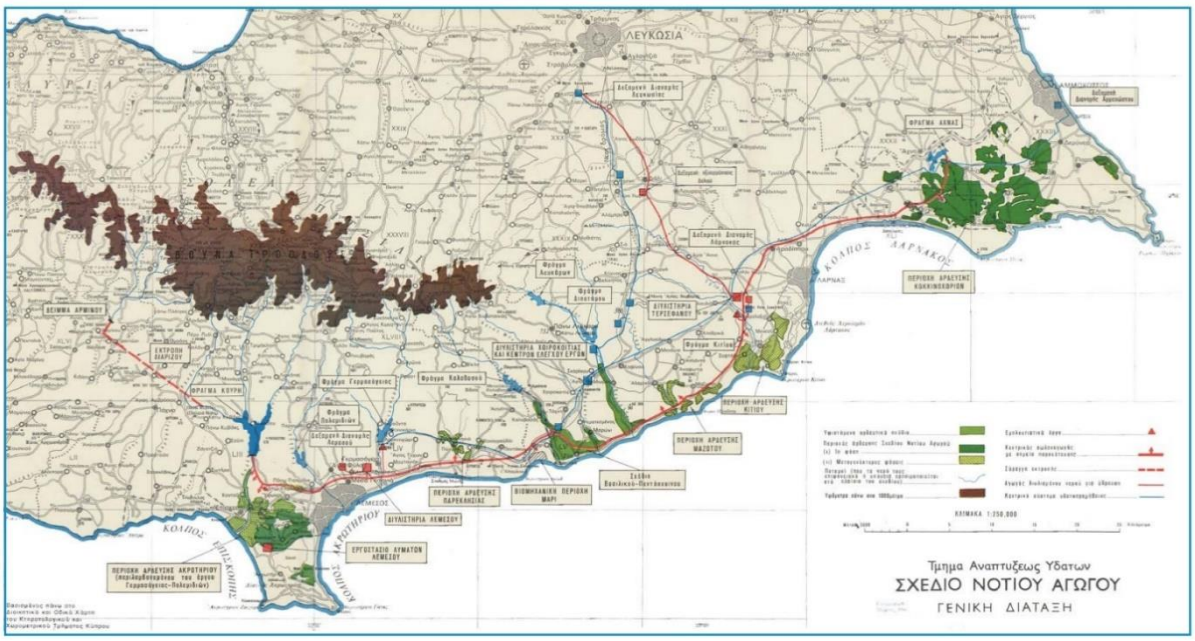


Figure 31: Southern Conveyor project, Source: Water Development Department

3.2.6 Plot aesthetics

The plot area is located within the administrative boundaries of the Municipality of Aradippou in the Larnaca District. The location is surrounded by industrial and economic activities land area; thus, the presence of the plant will not cause any visual alteration of the surrounding area as the wider area of the project does not include any elements of special aesthetic either.

Figure 32: Plot area

Figure 33: Industrial activities in the area

Based on data retrieved from the Service of Industry and Technology of the Ministry of Energy, Commerce, and Industry, there are 39 industries established within Aradippou Industrial Area; types of the corresponding industries are included in the following Table.

Table 17: Industries found in Aradippou Industrial Area, Source: Service of Industry and Technology of the Ministry of Energy, Commerce, and Industry

Type of Industries in Aradippou Industrial Area
Conversion of imported cars, assembly of cars and hydraulic lifts
Maintenance and repair of rental cars

Type of Industries in Aradippou Industrial Area
Carpet dyeing
Fish processing and packaging
Production of salads, sauces, and ready meals
Food preparation for sale to airlines & hotels
Meat packaging and cold cuts making
Rental vehicles maintenance
Production of vitamin and mineral premixes for animal feeds
Car services and MOT
Packaging of frozen products
Production of animal feed
Production of bakery items
Packaged food distribution centre
Processing/packaging of foods
Footwear warehouse and distribution
Manufacturing of household and toilet paper
Furniture assembly and storage
Production of dairy products
Manufacture of metallic frameworks
Chocolate warehouse
Cosmetics warehouse and distribution
Manufacturing of confectionery and bakery packaging and decorations
Copy centre
Manufacturing of candles
Storage of lubricants

Figure 34: Industrial Area of Aradippou, (Source: Service of Industry and Technology of the Ministry of Energy, Commerce, and Industry)

The construction and operation of the plant and the refuelling station will cause no harm to the surrounding neither to the geomorphology and geology nor to any water dam and water reserves.

3.2.7 Current infrastructure

3.2.7.1 Electricity Grid

The Transmission System (TS) is the connection between the main electricity generation points and the distribution network of the electricity system of Cyprus. The TS equipment includes overhead transmission lines, underground high voltage cables, step-down transformers, switchgear, and other high voltage equipment in the Transmission Substations (T/S).

The high voltage network of the TS connects the main power generation points to the T/S, which are placed in places where there is a concentration of load demand. Each T/S includes several step-down transformers to convert the electrical power into an average voltage of 11 kV or 22 kV, which is channelled into the distribution network to electrify the consumer load. The focal points of power generation in the TS include the three conventional EAC Power Stations and the large Wind Farms.

The following Figure displays the existing grid of Cyprus for the year 2021. For the pilot project, there are available electricity substations in the area.

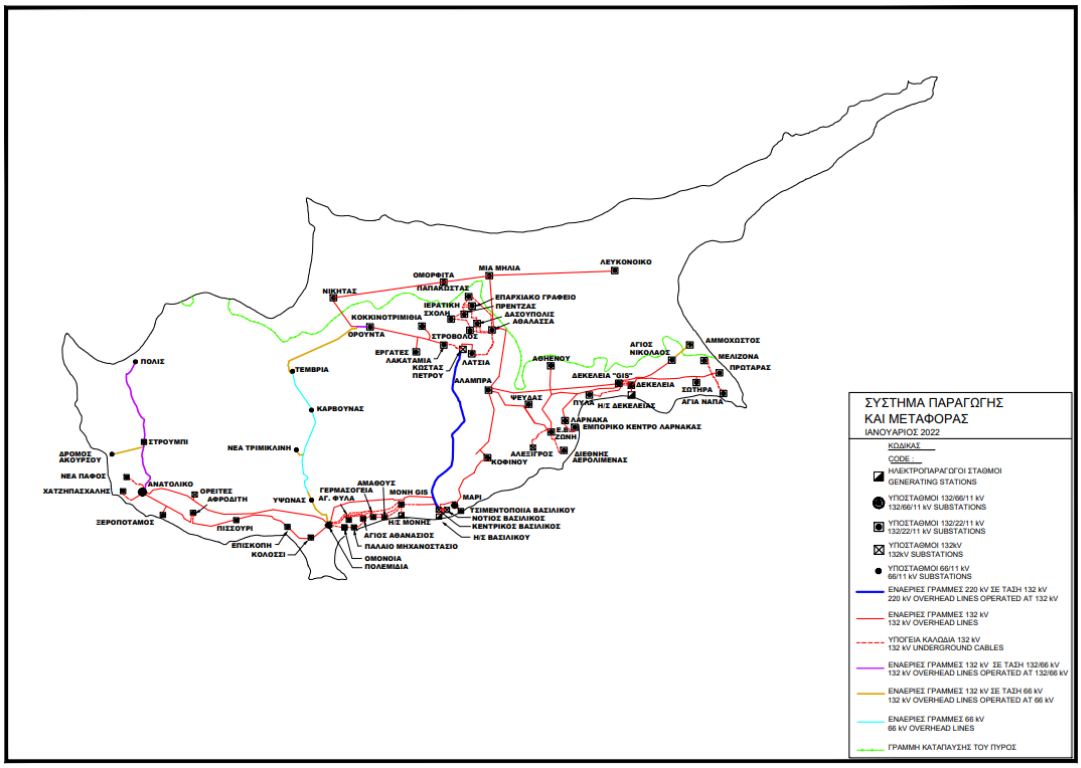


Figure 35: Current Electricity Transmission System Cyprus, Source: TSO Cyprus, 2021

3.2.7.2 Electricity system

The figure below indicates for near-by Transmission Substations the capacity for additional RES. The data are retrieved from Cyprus Transmission System Operator[11].

Figure 36: Capacity from additional RES in electricity system for near-by Transmission Substations

[11] https://www.arcgis.com/apps/dashboards/134fdd8988d44ade8dd33b5c1c26ca65

3.2.7.3 Ports

The construction of the projects is affected by the existence of suitable ports nearby. Cyprus has three ports in Pafos, Larnaca and Limassol. The following Figure shows the main characteristics of the two main ports of Larnaca and Limassol. The location of these two main ports is optimal since they are located close to the centre of the available coastline of Cyprus, which decreases the transport.

	Lemesos Port	Larnaka Port
► Infrastructure Details		
▪ Number of quays	5	2
▪ Total length of quays (m)	2110m	666m
▪ Port sea depth (m)	Varies from 11 to 17m	Varies from 11 to 17m
▪ Turning circle & approach channel depth (m)	600m / 17m	300m / 12m
▪ East quay length / depth (m)	480 / 11m	-
▪ North quay length / depth (m)	430 / 11m	326 / 10m
▪ West quay length / depth (m)	450 / 11-16m	-
▪ South quay length / depth (m)	290 / 16m	340 / 12m
▪ Ro-Ro ramp length (m) / depth	50 / 16m	25 / 12m
▪ Expanse of water (ha)	~ 105ha	~ 25ha
► Technical Details		
▪ Port opening times	24 hours	24 hours
▪ Maximum Ship Dimensions for berth		
- Length	no limit	250m
- Width	no limit	no limit
- Drought	10-13m	11.4
▪ Anchorage		
- Available	yes	yes
- Compulsory	no	no
- Pilotage Compulsory	yes	yes
- Tugs Available	yes	yes
- Tidal movement / range	yes	yes
▪ Clearance		
- Clearance Time	10 min.	10 min.
- Clearance Procedures	Routine control	Routine control
► Services		
- Ship repair	Yes	Yes (small repairs)
- Bunkering	Yes	Yes
- Waste and garbage disposal	Yes	Yes
- Water supply	Yes	Yes
- Provisions	Yes	Yes
- Banking	Yes	Yes
- Electricity Supply	no	Yes
- VTS Services	yes	Yes (from Lemesos Port)

Figure 37: Cyprus Port (Limassol, Larnaca) facilities and infrastructure (CPA, 2018)

However, for the needs of this pilot project the Limassol Port will be used, to transfer the technology and equipment to the site.

The following goods will be transported:

- **Electrolyzer:**
  - 2 x 40΄Container
- **Refuelling station:**
  - 1 x 30΄ Container with Diaphragm Compressor

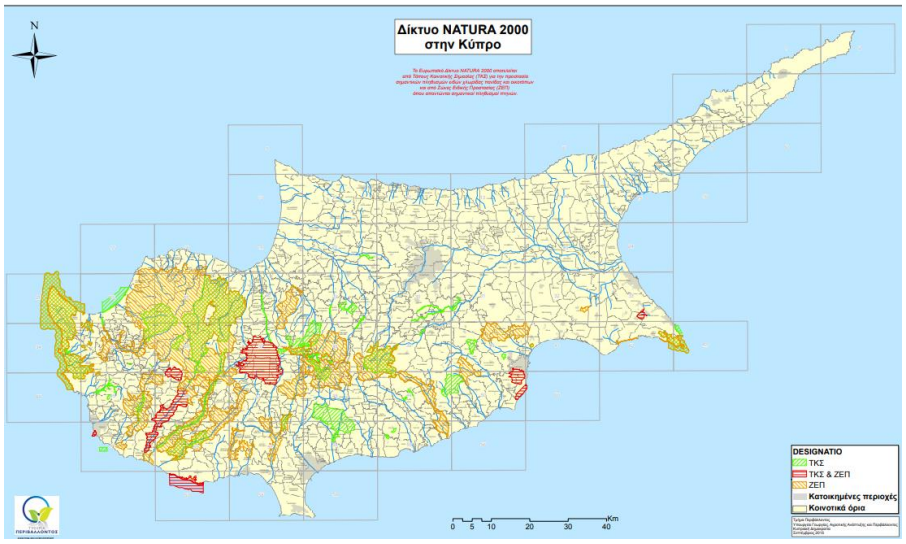
- 2 x 20΄ Container – Medium Storage
- 1 x 10΄ Container – Chiller Unit
- 1 x 10΄ Container – Valve Container
- 1 x 20΄Container – Pipe Material

3.3 Ecology

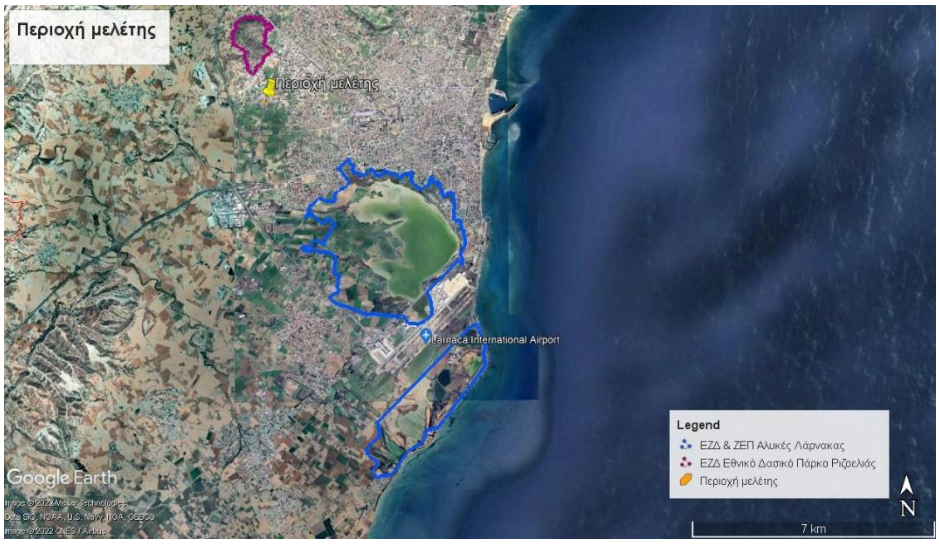
3.3.1 Protected sites

The location of the plot area is not encompassed by the Natura 2000 network thus it does not fall under the Special protection Areas for the bird's fauna, as defined in the directive 2009/147/EC "on the conservation of wild birds" or in the Sites of Community Importance as defined by the Directive 92/43/EEC.

The proposed project is located at a distance of 726 m from the area Natura 2000 Special Conservation Area (SAC) Rizoelia National Forest Park (CY6000006) and 2.48 Km from the SAC and Special Protection Areas (SPA) "Alykes Larnakas" (CY6000002). The SAC Rizoelias National Forest Park is also state forest land governed by the Legislation of the Department of Forestry.



Map 13: Natura 2000 Network



Map 14: Project study area and Natura 2000 areas

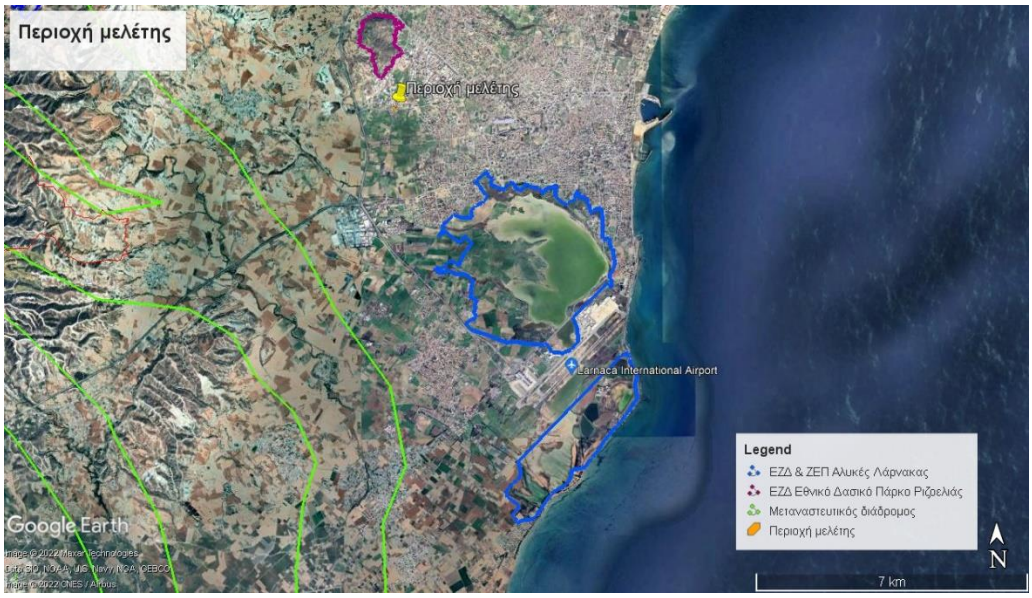
The National Forest Park of Rizoelia (Figure 38) is found in an area with small hills with a maximum altitude of 150 m, and gentle slopes. The geology of the area consists of gypsum with alterations of Cretaceous marls.

As seen, most of the plants in the forest are pines (pinus brutia), cypresses (Cupressus sempervirens), pines (Pinus pinea) and acacias (acacia salihna). The park also encompasses 4 natural habitats which are mixed with each other and are encompassed by the Annex I of the Habitats Directive (92/43/EEC). *5220 - Shrubs with Ziziphus,*1520 - Gypsum Steppes (Gypsophiletalia) which consists of endangered and endemic species, *6220 – Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea and last 5420 – Shrubs with Sarcopoterium spinosum. There is an effort of reforestation in the area which is not being successful yet due to the shrub species like the 5420 to be thriving in the area and successfully occupying the forest ecosystem.

Figure 38: Rizoelia National Forest Park

Due to its significant biodiversity, the Rizoelia National Forest Park (CY6000006) has been included in the European Network of Natura 2000 sites, and it includes endangered habitats (those with *) which are in need of immediate measures to avoid their extinction and support their preservation.

The study area does not fall within corridors and passages of migratory birds according to the corridors established by the Game and Fauna Service (see Map 15: Corridors and passages of migratory birds, Game and Fauna Service).

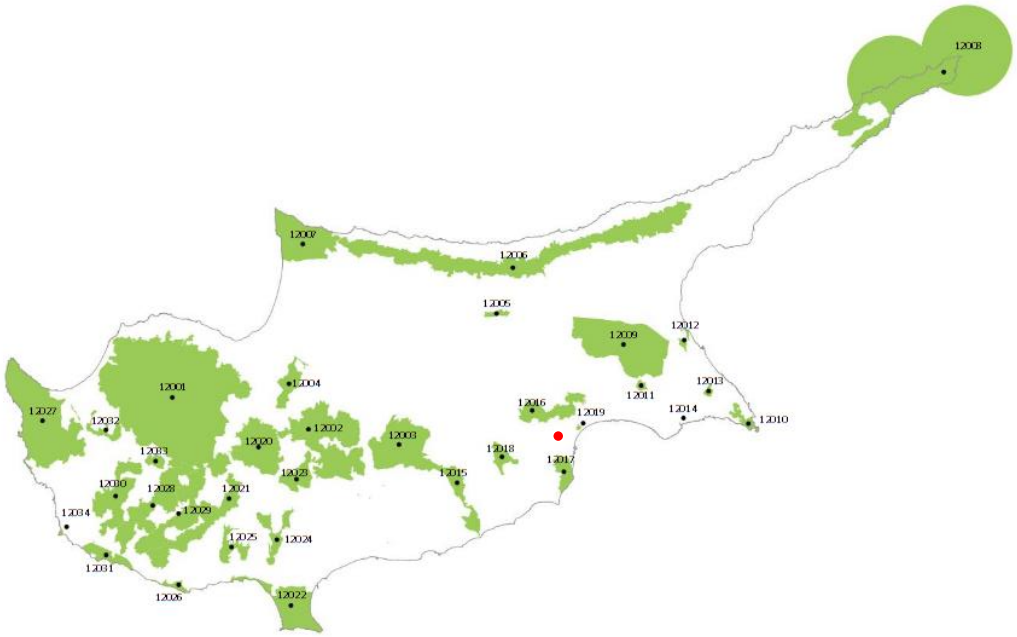


Map 15: Corridors and passages of migratory birds, Game and Fauna Service

Based on EU Birds Directive (2009/147/EC) and the Cyprus legislation transposing it (152(I)/2003), the Game and Fauna Service determines the permitted hunting areas every year as well as the prohibited areas. The study area is included in the prohibited hunting areas as you can see from the Map below.

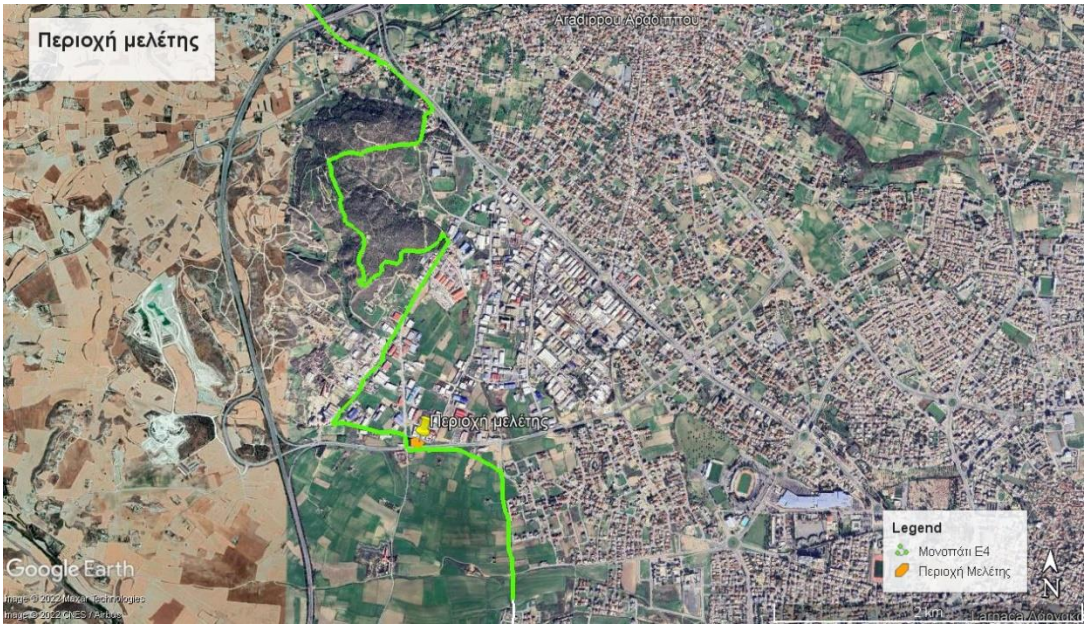
Map 16: Prohibited hunting areas, Game and Fauna Service

Additionally, the area that the project will be developed does not fall under Important Bird Area (IBA) according to Birdlife International and Cyprus Ornithological Society[12].



Map 17: IBA areas of Cyprus, Source: Cyprus Ornithological Society

The southern part of the study area adjoins the European path E4, as the following map indicates.



Map 18: Study area and E4 path

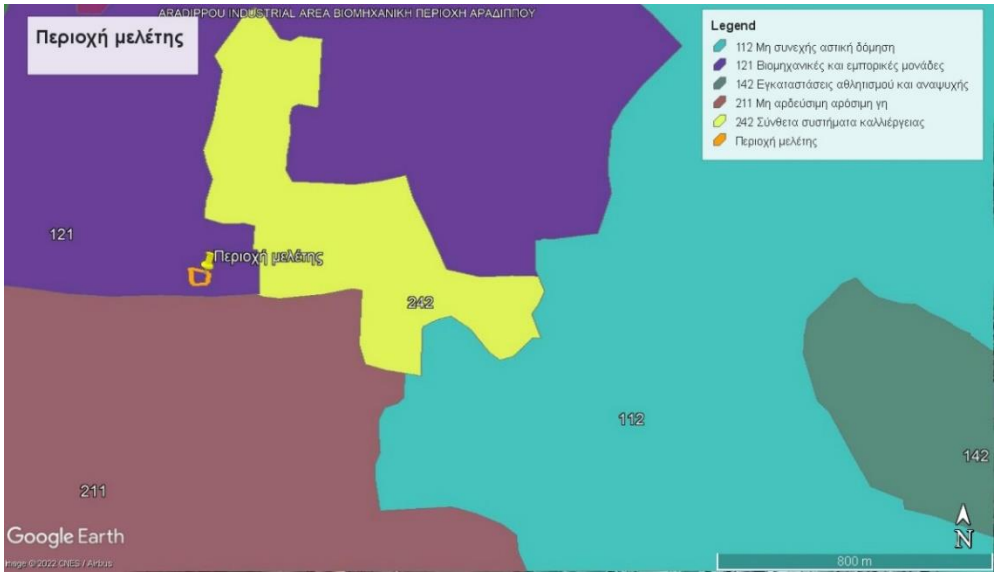
At 3.31 Km and 5.87 Km the natural wetland Alykes of Larnaca and the artificial wetland of Kiti Dam are located respectively.

[12] Hellicar et al. 2014. Important Bird Areas of Cyprus. Birdlife Cyprus, Nicosia, Cyprus.

Map 19: Wetlands in the wider study area

3.3.2 Land uses

The existing land uses in the study area are depicted on the following map. The main feature of the area is the presence of synanthropic vegetation which indicates increased human activity in the area. Around the perimeter of the study area are industrial units, recreational facilities, dry crops, a small olive grove that adjoins the plot of the study area to the west, as well as an existing road.



Map 20: Land uses CORINE 2018

Figure 39: General view of the area

3.3.3 Flora

The study of the flora of the area was carried out with on-site visits and recordings of the species in the field. The samplings were done in July 2022, which is not a sufficiently satisfactory period to record the flora. However, a complete sampling should be repeated at regular intervals during a year, so that the flowering period of the plants coincides with the sampling period.

The study area in which the project will be carried out includes synanthropic vegetation with mainly low herbaceous and sclerophyllous vegetation with dominant species Prosopis farcta, Heliotropium hirsutissimum and Avena sterilis. No species of the Red Book of the Flora of Cyprus (RBC)[13] or species included in Annexes II and IV of the Directive 92/43/EEC were identified.

In the study area, 27 plants were recorded (see Table below). The identification of the species was done to the best possible extent, at least at the genus level, due to the specific time period when the flowering of most species has already been completed.

[13] Τσιντίδης Τ., Χριστοδούλου Χ. Σ., Δεληπέτρου και Γεωργίου Κ., 2007. Το Κόκκινο Βιβλίο της Χλωρίδας της Κύπρου. Φιλοδασικός Σύνδεσμος Κύπρου. Λευκωσία.

Table 18: List of flora found in the study area[14, 15, 16, 17,18,,19,20]

A/A	TAXA	ENDEMIC	DIRECTIVE 92/43/EEC	KBXK
1	*Acacia saligna*			
2	*Aegilops* sp.			
3	*Amaranthus* sp.			
4	*Avena* sterilis			
5	*Centaurium erythraea* subsp. *rhodense*			
6	*Convolvulus arvensis*			
7	*Chondrilla juncea*			
8	*Chrozophora obliqua*			
9	*Dittrichia viscosa* subsp. *angustifolia*			
10	*Ecballium elaterium*			
11	*Echinops spinosissimus*			
12	*Echium angustifolium* subsp. *angustifolium*			
13	*Erigeron bonariensis*			
14	*Euphorbia helioscopia* subsp. *helioscopia*			
15	*Ferula communis* subsp. *communis*			
16	*Glebionis coronaria*			
17	*Heliotropium hirsutissimum*			
18	*Hyparrhenia hirta*			
19	*Lactuca serriola*			
20	*Malva* sp.			
21	*Mandragora officinarum*			
22	*Olea europaea*			
23	*Polygonum equisetiforme*			
24	*Reseda minorca*			
25	*Prosopis farcta*			
26	*Scolymus hispanicus*			
27	*Verbascum sinuatum*			

[14] Christofides Y., 2001. The Orchids of Cyprus – A guide to the Cyprus orchids.
[15] Meikle R.D., 1977. Flora of Cyprus. Vol. 1. The Bentham - Moxon Trust Royal Botanic Gardens, Kew.
[16] Meikle R.D., 1985. Flora of Cyprus. Vol. 2. The Bentham - Moxon Trust Royal Botanic Gardens, Kew.
[17] Viney D.E., 1996. An Illustrated Flora of North Cyprus, Volume 2. Gantner Verlag.
[18] Viney D.E., 2011. An Illustrated Flora of North Cyprus, Volume 1. Koeltz Scientific Books.
[19] Τσιντίδης Τ., 1995. Τα ενδημικά φυτά της Κύπρου. Συγκρότημα Τράπεζας Κύπρου, Παγκύπρια Ένωση Δασολόγων. Λευκωσία, Κύπρος.
[20] Τσιντίδης Τ., Χατζηκυριάκου Γ. και Χριστοδούλου Χ. Σ., 2002. Δέντρα και Θάμνοι στην Κύπρος. Ίδρυμα Α. Γ. Λεβέντη, Φιλοδασικός Σύνδεσμος Κύπρου. Λευκωσία

3.3.4 Avifauna

For the recording of the avifauna, observations were made from a fixed point, in a predetermined radius (50 m) and for a specific period of time (10 minutes). The observation was done in three places within July 2022 (two spots inside and one spot outside the development plot). During the field recordings, it was not possible to detect any of the species of Annex I of the European Directive 2009/147/EC. A total of 11 species were recorded in the study area (see Table below).

Table 19: List of avifauna reported in the study area[21]

A/A	TYPE	IN THE PLOT	OUTSIDE THE PLOT	DIRECTIVE 2009/147/EK	STATUS
1	*Carduelis chloris*	2	1	X	Resident
2	*Cisticola juncidis*	-	3	X	Resident
3	*Corvus cornix*	-	4	X	Resident
4	*Galerida cristata*	2	1	X	Resident
5	*Hirundo rustica*	9	18	X	Migratory
6	*Oenanthe melanoleuca*	1	-	X	Resident
7	*Parus major aphrodite*	-	6	X	Resident
8	*Passer domesticus*	16	60	X	Resident
9	*Pica pica*	-	2	X	Resident
10	*Streptopelia decaocto*	2	5	X	Resident
11	*Spilopelia senegalensis*	-	1	X	Resident

3.3.5 Fauna

To record the fauna in the study area, field work was carried out in the month of July 2022. The data is based on both bibliographic and primary field data, which were collected for the needs of the present study.

Mammals

Mammals likely to be found in the immediate and wider area are presented in the following table:

[21] Svensson et al., 2007. Τα Πουλιά της Ελλάδας της Κύπρου και της Ευρώπης. Ελληνική Ορνιθολογική Εταιρεία, Αθήνα, Ελλάδα

Table 20: List of mammals in the study area

Scientific Name	Common Name	Endemic
Hemiechinus auritus dorotheae	Asian hedgehog	Endemic subspecies
Rattus rattus	Rat	
Mus musculus	Mouse	

Reptiles

Reptiles likely to be found in the immediate and wider study area are presented in the following table:

Table 21: List of reptiles in the study area[22]

Scientific Name	Common Name	Protected through:
Lizards		
Hemidactylus turcicus	Μισιαρός	Annex III Bern Convention
Ophisops elegans	Αλιζαύρα	Annex IV 92/43/EOK[23] Annex III Bern Convention
Mediodactylus kotschyi	Μισιαρός	Annex IV 92/43/EOK Annex II Bern Convention
Snakes		
Dolichophis jugularis	Μαύρο Φίδι	Annex IV 92/43/EOK Annex III Bern Convention
Telescopus fallax	Ξυλόδροπης	Annex IV 92/43/EOK
Hemorrhois nummifer	Δρόπης	Annex IV 92/43/EOK

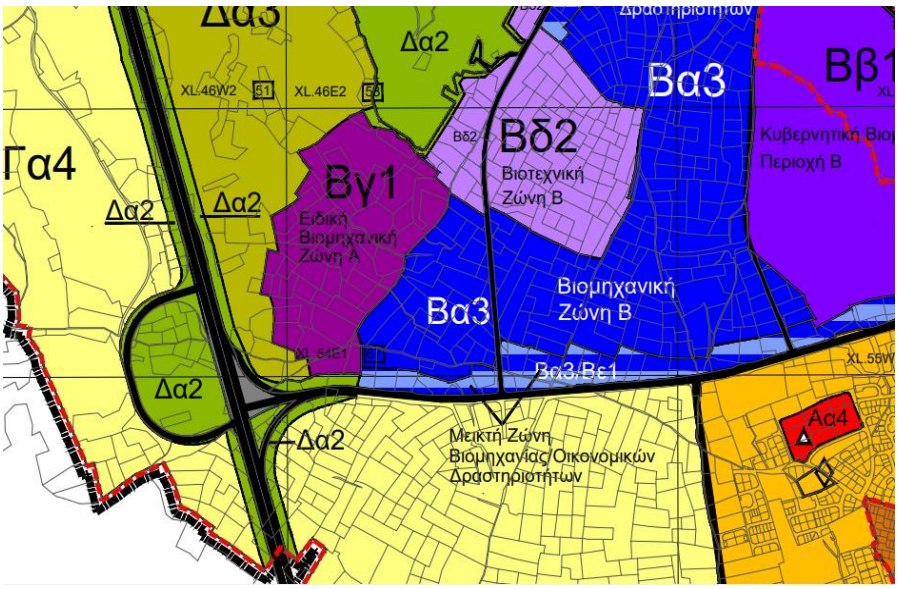
3.4 Human environment

The plot area is located in the administrative boundaries of the Municipality of Aradippou within the Larnaca District, and it is governed by the regulations and provisions by the planning zones strategy of Larnaca. The scope of the strategy is to create an integrated framework which will regulate the development in specific regions and will ensure the utilization of areas with potential for development while at the same time it tries to protect the environment of those regions. Within the strategy, specific basic needs are stated which are controlled and developed by the department of Town Planning and Housing.

[22] Νικολάου Χ., Παφίλης Π. Λυμπεράκης Π., 2014. Τα ερπετά και τα αμφίβια της Κύπρου. Ερπετολογικός Σύνδεσμος Κύπρου, Λευκωσία, Κύπρος.
[23] Council of Europe, 1992. Convention on the Conservation of European Wildlife and Natural Habitats, European Topic Centre on Biological Diversity. http://bd.eionet.europa.eu/article17.

3.4.1 Planning zones

The production plant will be constructed in the plot with the number 371 (Φ/Σχ 40/54E2), in the section 29 found in the area of Agios Fanourios within the Administrative boundaries of the municipality of Aradippou. The specific plot has an area of 2,077 m². As the plot area is encompassed by the regulations and provisions of the Larnaca planning zone strategy, it is stated that the plot area is located within the planning zone Bα3/Bε1, as shown in the Map 21: Planning zones.



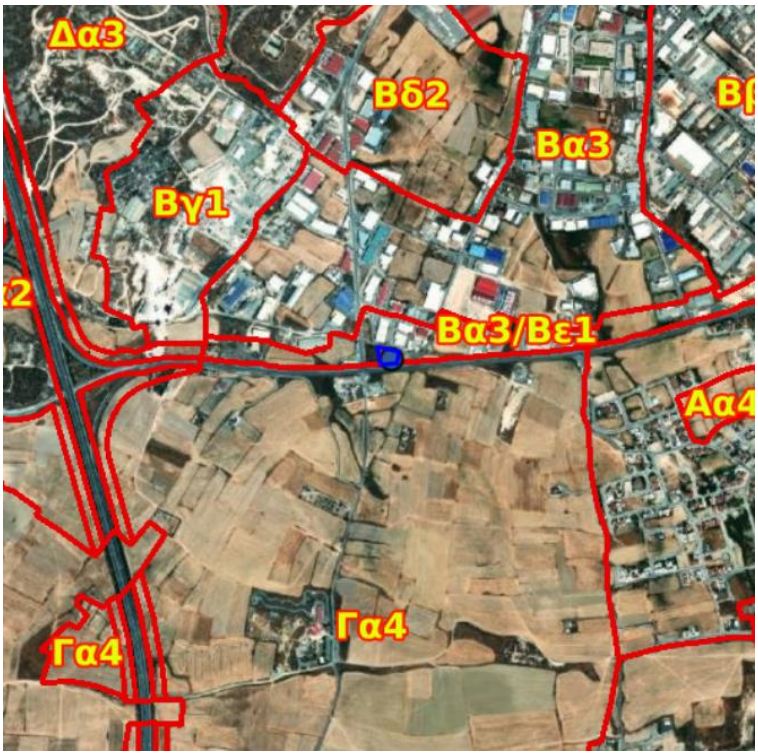
Map 21: Planning zones

The planning in the plot area and its wider area is governed by the provisions of the Larnaca Strategy for planning zones of 2019. The characteristics of the zone are found in the following table:

Table 22: characteristics of planning zone

CHARACTERISTICS OF THE ZONE	
CONSTRUCTION	100%
COVERAGE	60%
FLOORS	2
HEIGHT	nullμ

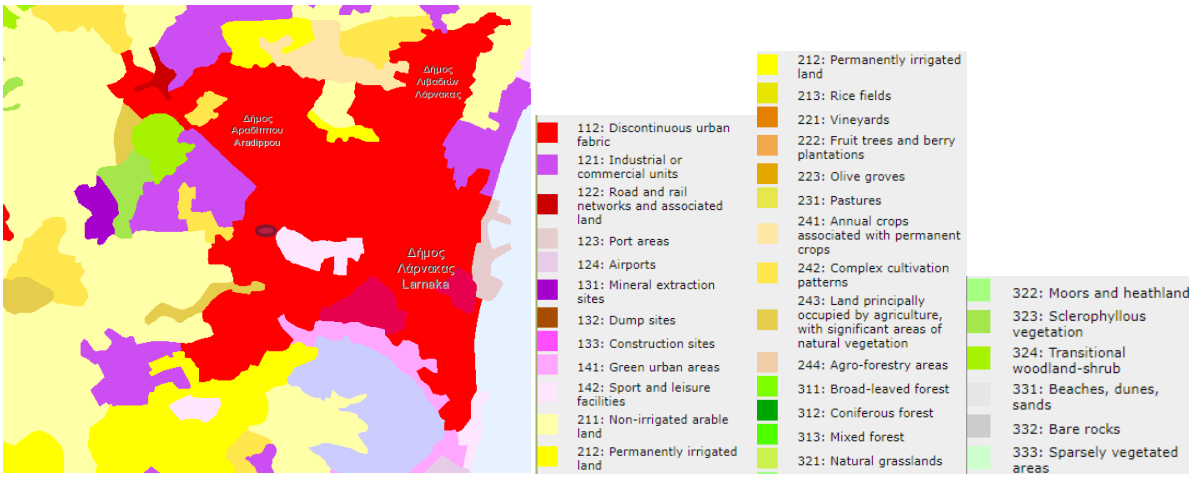
According to the strategy, there is no more specific characteristics about the construction of the area within that planning zone other than the ones shown in the Table 16: Characteristics of the zone. The following map shows the planning zone within the wider area of 1 km from the plot area and the plot area with the colour blue.



Map 22: Planning zones, plot in blue
https://maps.palsurveying.com/?@=x%253D3737590%252Cy%253D4154092%252Cz%253D16%252Cba%253D0340151920

According to the Corine Land Cover map 2018 (Map 23), the plot area is found in the red zone, the category 112, which is considered to be a discontinuous urban fabric in the region of Agios Fanourios. In the wider area of the plot, the land cover is described with the following:

- Category 142 represents sport and leisure facilities
- Category 121 represents industrial or commercial units
- Category 242 represents complex cultivation patterns
- Category 323 represents sclerophyllous vegetation
- Category 324 represents transitional woodland-shrub



Map 23: Corine Land Cover map 2018

The following table presents the number of entities in the municipalities of Aradippou, Livadia, Dromolaxia-Meneou by economic sector (NACE codes).

Table 23 Economic activities in near-by municipalities, Source: CYSTAT 2011

	ECONOMIC ACTIVITIES	ARADIPPOU	LIVADIA	DROMOLAXIA-MENEOU	TOTAL
A	Agriculture, forestry, and fishing	78	12	44	134
B	Mines and Quarries	0	0	0	0
C	Processing	194	44	40	278
D	Electricity Supply, natural gas and steam and air conditioning	1	0	0	1
E	Water supply, wastewater, and waste management	6	0	5	11
F	Construction	207	86	87	380
G	Wholesale and retail trade, vehicle repair	374	91	100	565
H	Transport and storage	49	17	32	98
I	Activities in the service, accommodation and catering industry	56	30	26	112
J	Media	14	4	2	20
K	Financial and insurance activities	25	11	6	42
L	Property management	11	2	1	14
M	Professional, scientific, and technical activities	95	17	9	121
N	Administrative and Supportive Activities	37	13	17	67
O	Public administration and defence and social insurance	3	2	2	7
P	Education	81	16	21	118
Q	Human health and social care activities	44	6	11	61
R	Arts and entertainment	34	9	11	54
S	Service activities	96	37	35	168
T	Household activities concerning the production of	325	127	132	584

	ECONOMIC ACTIVITIES	ARADIPPOU	LIVADIA	DROMOLAXIA-MENEOU	TOTAL
	goods and services				
U	Organizations activities	0	0	0	0

3.4.2 Archaeological sites

There are no archaeological sites near the plot area and the wider area of the plot.

3.4.3 Constructions around the area

Figure 40: Construction near the area

After the site visits, it was taken into consideration that near the plot area there are some construction actions taken place for another project. The construction of the project is in the plot area 1111, near the plot under study with number 371.

Map 24: Project construction near the area

3.4.4 Area population

During the last decades, there have been an indicative increase of development in the residential houses in Cyprus. The plot area is found in the Municipality of Aradippou, within the administrative boundaries of Larnaca District, borders with Larnaca Municipality, northwest of the plot, west from the municipality of Livadia and south with the Municipality of Dromolaxia-Meneou. Also, the administrative boundaries of Aradippou also borders with the following village communities of Kalo Chorio Larnaca, Kochi, Kellia, Avdallero and Troulloi. According to the population Census of the Cystats in 2011, the population of the Larnaca District was 143,192 where the 19,228 people correspond to the residents of Aradippou Municipality. The residential data for Aradippou is 5,665. The population living in the municipality of Larnaca is 51,468, in the municipality of Livadia 7,206 and in the Municipality of Dromolaxia- Meneou is 6,689.

Table 24: Population census, Source: CYSTAT 2011

POPULATION 2021	
MUNICIPALITY OF ARADIPPOU	19,228
MUNICIPALITY OF LARNACA	51,468
MUNICIPALITY OF LIVADIA	7,206
MUNICIPALITY OF DROMOLAXIA – MENEOU	6,689
KALO CHORIO LARNACA	1,518
KOCHI	n/a
KELLIA	387
AVDALLERO	218
TROULLOI	1,175

Map 25: Administrative boundaries

The total population living in the Municipality of Aradippou accounts for the 13.43% of the total population of the Larnaca District. However, 11 years late, the Statistical Service of Cyprus has contacted a Population census 2021, but the results for each municipality specifically are not available yet. Still, the population consensus identified the total population of the Larnaca District, which by 1/10/2021 was 154,200. [24]

3.5 Air pollution

Air pollution is the result of the emission of gases, dust particles and smoke in the atmosphere, which have negative impacts on the health of humans, the environment as well as the infrastructure of the cities. According to the World Health Organization, atmospheric pollution is considered one of the most serious environmental risks to health in Europe.[25]

In Cyprus, the Cypriot Law on the Quality of Atmospheric Air Κ.Δ.Π 574/2002, places the limits Table 25, which represent the acceptable quality of air which does not disturb the health of the surrounding environment and people. The air quality in Cyprus data is monitored by the Department of Labour inspection and its Section on Air quality and Strategic Planning.

[24] https://www.cystat.gov.cy/el/PressRelease?id=66207
[25] World Health Organization, "Ambient Air Pollution: A global assessment of exposure and burden of disease", 2016.

Table 25: Acceptable quantities for air quality

Type of pollutant	Units [Limit in µg/m3 in 20°C and 101,3 kPA]	
Nitrogen Dioxide	Annual average value	50
	1-h average value	250
Ozone	8-h average value	120
	1-h average value (limit for alarming population)	240
Carbon Monoxide	8-h average value	1000
Sulphur Dioxide	24-h average value	125
	1-h average value	350
Total Suspended particulate	24-h average value	250
Particulate Matter (PM10)	24-h average value	50
Lead (Pb)	Annual average value	0.5

The plot area and the wider area around the plot are found near the air quality traffic monitoring station, which is located south-east from the area plot. The station operates in accordance with the specifications under the Cypriot Legislation and is equipped with modern instruments with high standards from European networks.

The station has recorded the following results for the year 2021:

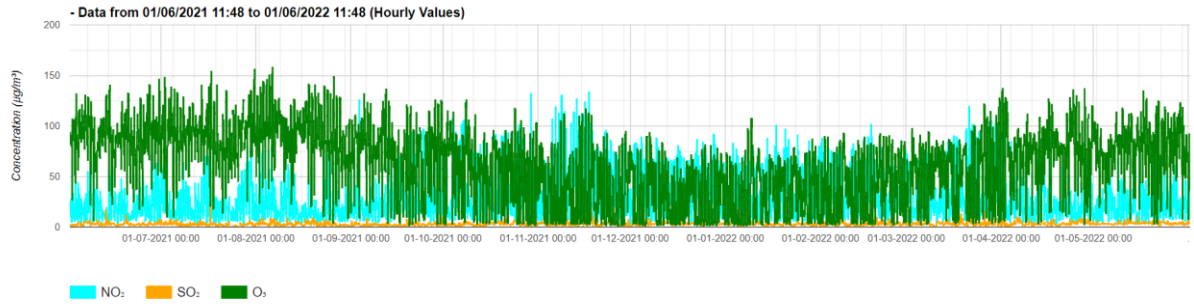


Figure 41: NO2, SO2 and O3 emissions during the year 2021 in Cyprus

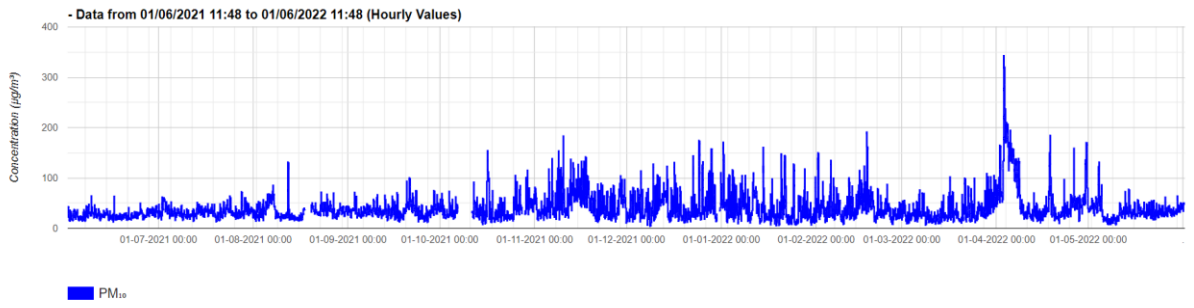


Figure 42: PM10 during the year 2021 in Cyprus

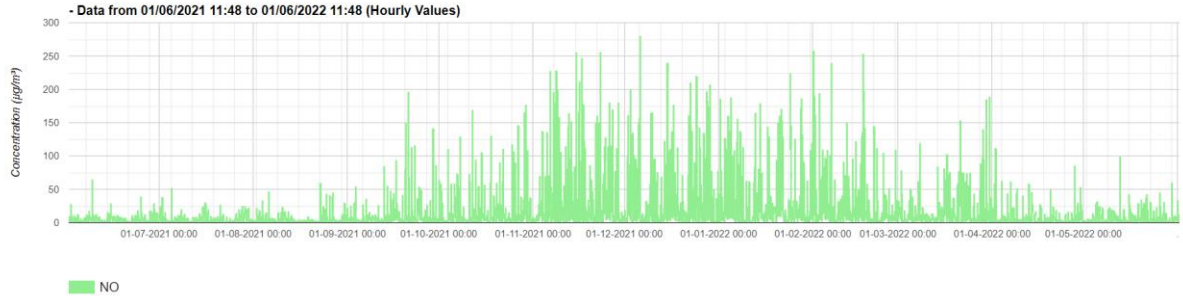


Figure 43: NO emissions during 2021 in Cyprus (source: https://www.airquality.dli.mlsi.gov.cy/el/graphs)

These are the collected data for the duration of June 2021 – June 2022. As seen (Figure 43) NO emissions near the area were higher in 2021 rather than 2022. It can also be seen that there are some sparks related to the PM10. The PM10 emissions are mainly due to emissions from vehicles, central heating, various industrial sources as well as air dust from the agricultural areas from the North Africa (Sahara) and Asia, from the streets and uncovered cities during periods of drought as well as from sea salt.

Even if the area is found in an industrial area, there is no monitoring of sources of high air environmental pollution due to the result of the industrial activity.

3.6 Noise pollution

The World Health Organization has set the Night Noise Guidelines for Europe which state the European target noise limit during night-time for the minimum impact on the population which has annual average level of 40 dB. According to the guidelines, the night noise Lnight, is considered as the most indicative for the protection of human health from noise pollution. The guidelines suggested by WHO are shown in the Table 26: Noise guidelines by WHO below:

Table 26: Noise guidelines by WHO

NIGHT NOISE GUIDELINES FOR EUROPE 2009	L_{NIGHT}, OUTSIDE
NIGHT NOISE GOAL	40dB
INTERMEDIATE TARGET	55dB

According to action plans on noise in Larnaca area, there has been a record of the Lnight in Larnaca shown in Figure 44.

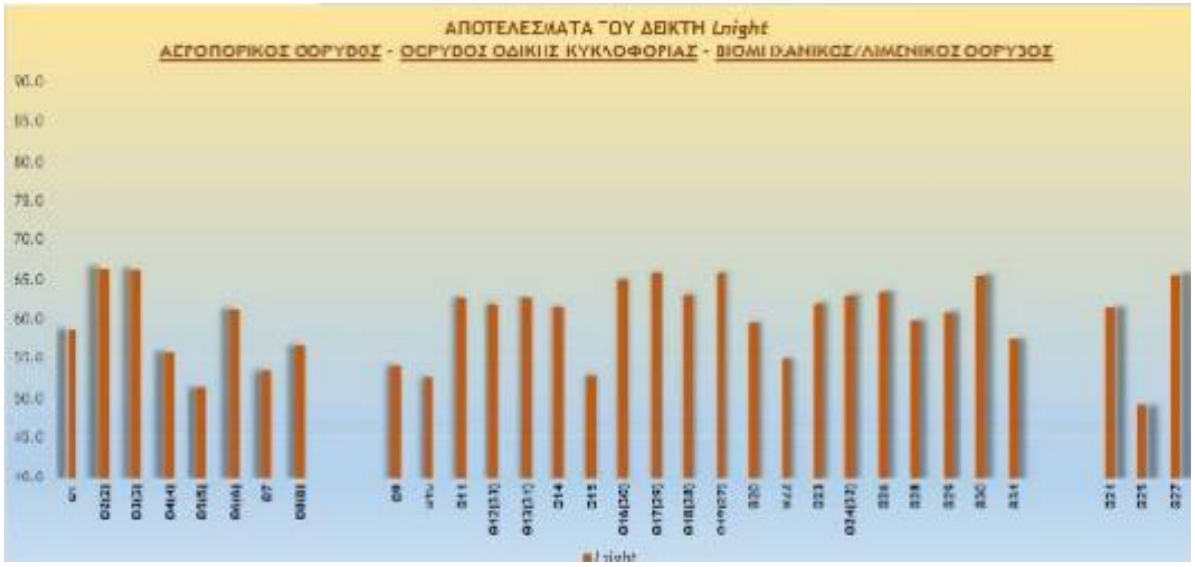


Figure 44: Night, noise during the night in Larnaca
http://www.moa.gov.cy/moa/environment/environmentnew.nsf/All/53B677098OCD5AF3C22582D30022D933/$file/20180719-%CE%A0%CE%B1%CF%81%CE%BF%CF%85%CF%83%CE%AF%CE%B1%CF%83%CE%B7%20%CE%91%CE%BD%CE%B1%CE%B4%CF%8C%CF%87%CE%BF%CF%85.pdf

The plot area is located 5 km northwest to the Municipality of Larnaca which is the city centre of the Larnaca District, and it is located around 7km away from the Larnaca International Airport. The plot is also located on a main road which also adds up to the noise pollution impacting the plot area. Thus, the noise pollution in the plot area and the wider area around the plot, has been recorded as 35-55dB, having always in mind the effect the highway found west to the plot, has on the noise pollution of the area.

4 Methodology EIA

4.1 Introduction

The EIA examines the environmental impacts that may result from the construction and operation of the plant and suggests measures to minimise the possible negative impacts on the environment. As mentioned, for the appropriate identification of the above, it was decided that-the following actions were necessary:

- site visits,
- communication with the appropriate Departments and Services,
- evaluation of the environmental parameters directly related to the aspects of the construction and operation of the plant,
- Consultations with Aradippou Municipality.

The EIA process followed is shown in the Figure 45: EIA process Diagram.

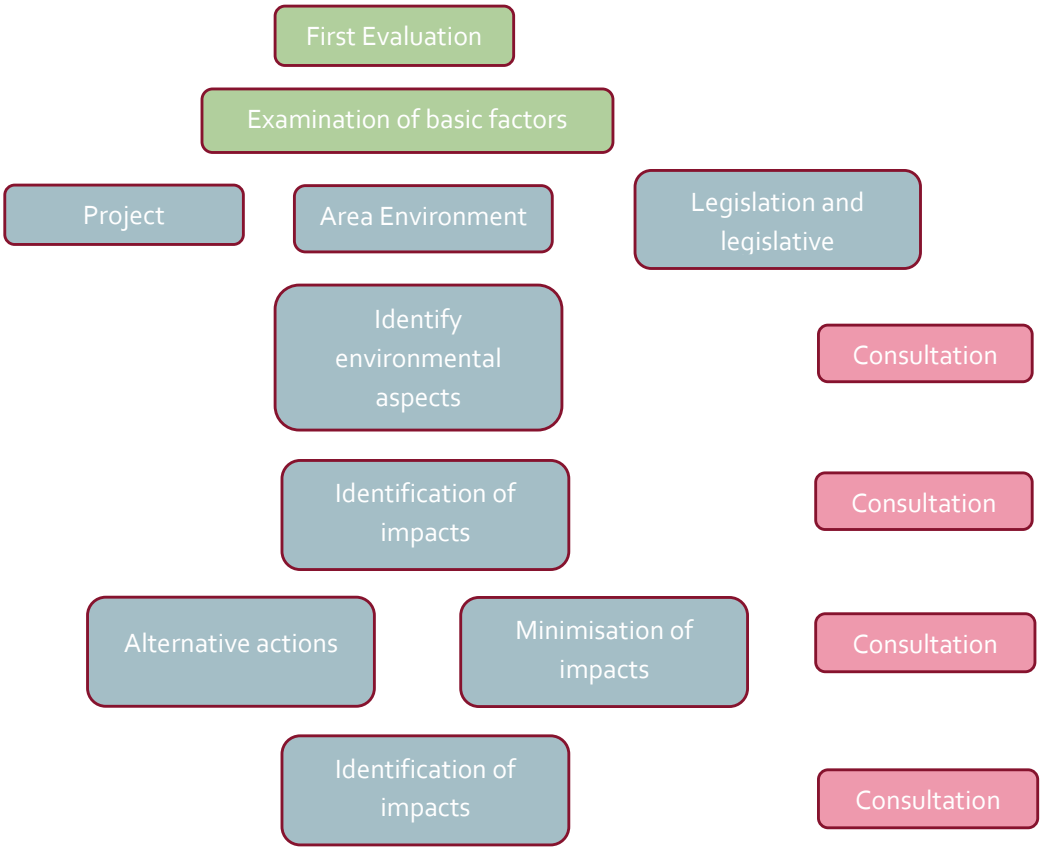


Figure 45: EIA process Diagram

Before the conduction of an EIA for the plot area of the project, the team conducted a first evaluation on the plot area of the project in order to identify the areas of interest for EIA. During this evaluation, data collection from available studies related to the project is followed in order to determine the areas which need the collection of primary data from the source, like the data needed for describing the existing environmental situation of the plot area. More importantly, the aim of the study is to identify and analyse the environmental related issues which arise from the construction and operation of the project and analyse their impacts.

The most important parameters of the Figure 45: EIA process Diagram, are the minimisation of impacts and the alternative actions to minimise the impacts on the environment arising from the construction and operation of the green hydrogen production plant and refuelling station. This assessment evaluates the environmental and socioeconomic issues which may arise from the project implementation through analysis and collection of data.

4.2 Collection of information

An extensive literature review was conducted first to identify as much data as possible related to the plot area and the wider area of the project location. It was found that some information was available online yet some of those data were insufficient as they were outdated (census of population living in specific areas data). The most important environmental and socioeconomic issues were determined as issues of concern after the collection of the following data:

- Available information related to the actions of the project.
- Legislative framework and legislation for the context of the EIA.
- Good practices applied in other countries.
- Data collection from site visits (July 2022) from the plot area.
- Consultations.

To identify possible environmental and socioeconomic impacts it is important to have a detailed understanding of the existing conditions of the plot area and the wider area before the start of the program activities. This expresses the need to describe the existing environmental and socio-economic conditions, which are described below (as also described in Chapter 3). The impacts on the environment from the project are assessed for both phases of the project, the construction (phase 1) and the operation (phase 2) of the plant and the refuelling station.

4.2.1 Outline of environmental impacts

4.2.1.1 Morphology and geomorphology

An assessment of the impacts on the morphological characteristics of the plot area occurs, having in mind current and future land uses of the area. Then an evaluation of the impacts of the project on the aesthetics of the plot area and the analysis of the possibility of breaking down the fine lines of the landscape and the image of the plot area from different parts within the plot area.

4.2.1.2 Hydrology

An assessment and evaluation of the effects on the quality of the water and the neighbouring aquifers is carried out based on the information and the data available related to the liquid waste production of the project and the available data on the quality of the recipient's water and considering the basic water flow characteristics.

4.2.1.3 Air quality

Identification of the impacts on air quality in the plot and the wider area of the plot during the construction phase of the project by the use of the construction machinery (dust from the construction site, gaseous emissions from material transport trucks, excavators, loaders, etc.). The analysis includes the estimation of the expected pollution or dust, concentration based on emission estimates from the project under study and impact assessment.

4.2.1.4 Environmental noise

A preliminary assessment of the expected nuisances to humans and animal is taken for the effects on the acoustic environment of the area from the construction phase (operations, operation of machinery, movement of vehicles, etc.) and during the operation of the project.

4.2.1.5 Flora-Fauna

An assessment and evaluation of the impacts of the project (as qualitative changes "is affected- not affected") is undertaken on the biological diversity of the flora and fauna in the plot and the wider area, to the climate of the area as well as to the limiting factors for each type of natural habitat which their existence determines the existence of specific plant and animal species in each type of natural habitat.

4.2.1.6 Waste

Determining the main and secondary streams of solid waste and liquid waste during the construction and the operation of the production plant and the refuelling station. The possibility of uncontrolled leakage is estimated and accordingly, mitigation measures are proposed.

4.2.1.7 Consumption of Natural Resources

The consumption of Natural resources is mainly focus on the energy requirements for the construction and operation of the project mainly for the use of the machinery.

4.2.1.8 Climate Change

The assessment of any positive or negative impacts on the GHG emissions.

4.2.2 Outline of socioeconomic impacts

4.2.2.1 Land use

An evaluation of the land use changes in the plot and the wider area of the project occurs. These changes are commented and evaluated in comparison with the current situation of the area and the future situation which is expected to be formed during the project development period.

4.2.2.2 Spatial planning

Check of the compatibility of the project with the provisions of the zoning planning provided by the provisions and regulations of the administrative location.

4.2.2.3 Road Transport

Assess the changes in traffic conditions in the plot area during the construction and operation of the project. The analysis includes the assessment of changes in traffic conditions based on the number of additional vehicle-kilometres on the existing value of the vehicles on the particular area, as a result of the construction and the operation of the plant and the station.

4.2.3 Protection areas

4.2.3.1 Aesthetics

An assessment is made for the construction of the project and the expected changes in the landscape aesthetics of the wider area of the project. In this context, an investigation of the image of the project from selected observation positions within the boundaries of the project is also undertaken (e.g., obstructing the view of the horizon or creating an aesthetically unacceptable landscape).

4.2.3.2 Protected areas

An assessment of the impacts on any protected areas included in the project area is undertaken. In these contexts, the provisions for the planning and administrative zones of the area and around the plot area is considered essential to follow the proposed provisions applicable for the protection of different protected regions.

4.3 Analysis

For the analysis of the impacts, the process given by the legislation of Law 127(I)/2018 was followed. However, there are different laws which contribute to the protection of the physical and socio-economic environment which are also considered in this assessment. The EIA assesses different aspect of the project including activities, products, or services of the company, which may interact with the natural and socioeconomic environment.

The analysis of the activities that would take place during the construction and operation of the project is essential to determine its impacts on the above aspects. The impacts of the activities were analysed to have a direct or indirect impact through the violation of relevant legislative and administrative framework (planning strategy), through the interaction with the existing physical, social, and socio-economic environment, the complexity and frequency/duration of an impact, cumulative impacts from other projects in the wider area and possibility of prevention or minimization of the impact.

Once all environmental and socio-economic aspects of the project have been identified, the degree of impact is assessed as a result of the various interactions between activities and those impacted by them. The degree of impact is assessed assuming they are implemented all appropriate mitigation measures, which are inherent with the construction work and the operation of the project.

4.3.1 Magnitude of impact

The magnitude of the impact is expressed as the sum of the severity and the probability of incident to occur during an activity, and it is expressed as seen in the following Table. The sign (+ or -) indicates the nature of the impact, it will be + when the impact is beneficial and – when the impact is detrimental.

Table 27: How to measure probability and magnitude of impact

		Probability				
		1	**2**	**3**	**4**	**5**
Severity	**-5**	NI	MINI	MODI	SI	SI
	-4	NI	MINI	MODI	SI	SI
	- 3	NI	MINI	MINI	MODI	SI
	-2	NI	NI	MINI	MINI	MODI
	-1	NI	NI	MINI	MINI	MINI
	0	NI	NI	NI	NI	NI

	+1	NI	NI	MINI	MINI	MINI
	+2	NI	NI	MINI	MINI	MODI
	+3	NI	MINI	MINI	MODI	SI
	+4	NI	MINI	MODI	SI	SI
	+5	NI	MINI	MODI	SI	SI

Find in the following Table the explanation of the four (4) types of impact: no impact, minimum impact, moderate impact and severe impact.

Table 28: Ddefinition of levels of impact

IMPACT	SEVERITY	PROBABILITY	EXPLANATION
NO IMPACT (NI)	(-) or (+) 1-5	1 – Rare	Impact can happen under extreme circumstances, and if the impact happens it might be negligible.
	(-) or (+) 1-2	2 – Sporadic	Impact can happen under extreme circumstances, and if the impact happens it might be negligible.
MINIMUM IMPACT (MINI)	(-) or (+) 3-5	2 – Sporadic	Impact can happen in some cases, yet it will still be regulated under legislation.
	(-) or (+) 1-3	3 – Sporadic	Impact can happen in some cases, yet it will still be regulated under legislation.
MODERATE IMPACT (MODI)	(-) or (+) 4-5	3 – Sporadic	Impact can happen under different circumstances and the magnitude might be higher than the threshold.
	(-) or (+) 3	4 – Frequent	Impact can happen under different circumstances and the magnitude might be higher than the threshold.
	(-) or (+) 2	5 – Specific	Impact can happen under different circumstances and the magnitude might be higher than the threshold.
SEVERE	(-) or (+) 4-5	4 – Frequent	Impact most probable to happen more times and have a magnitude higher in

IMPACT	SEVERITY	PROBABILITY	EXPLANATION
IMPACT (SI)			threshold than the one regulated, or the duration of the impact might be known.
	(-) or (+) 3-5	5 – Specific	Impact most probable to happen more times and have a magnitude higher in threshold than the one regulated, or the duration of the impact might be known.

5 Environmental Impacts from the construction of the project

This chapter assesses and evaluates the potential impacts of the plot area on the area's environment and the wider area environment of the plot of the plant construction. The significant impacts the plot has on the environment are examined along with the characteristics of the location of the plant construction. The analysis of the possible impacts is done for each environmental parameter including hydrology, geology, flora and fauna, air, aesthetics, and noise.

5.1 Introduction - Description of the construction works

The impacts imposed on the environment of the plot area during the construction phase of the project which might have duration of 5-7 months. The possible effects of each environmental aspect were also descripted in Chapter 2 and mitigation measures are proposed for their implementation during the construction phase by the construction company and their employer in this Chapter.

As mentioned in Chapter 2, the work concerns the construction of the 3MW hydrogen production plant, 1.000 kg hydrogen storage and a refuelling station. Regarding the footprint of the production plant, storage, and filling station the following information is available:

- Process: 12,19 m x 2,44 x 2,59 m (L x W x H)
- Rectification: 12.20 m x 2.44 x 2.59 m (L x W x H)
- Storage: 6.1 x 2.44 x 2.8 m (L x W x H)
- Storage: 6.1 x 2.44 x 2.8 m (L x W x H)
- Dispenser: 2.2 x 0.7 x 2.2 (L x W x H)
- Compressor: 9152 x 4.1 x 2.90 m (L x W x H)
- Valves: 3.0 x 2.44 x 2.59 m (L x W x H)
- Chiller: 3.0 x 2.44 x 2.59 m (L x W x H)
- Water tanks: 2 x 2 m diameter

Furthermore, the pilot project involves the following:

- Office/store/storage: 12.90 x 6.65 m (L x W)
- Parking spaces: 7.2 x 4.8 m (L x W)
- Filling station roof: 10 x 3.5 m (L x W)
- Fence: 185 m
- Cameras: 4 security cameras will be installed

The construction phase involving the above, will generated waste and emissions as descripted in detail in Chapter 2. In general, in the construction phase, the non-hazardous waste that will be generated will be of the metal type, plastics, cable remains, concrete remains and organic remains, etc. Due to the work of concreting the channel, etc. concrete remains will be generated from the washing of concrete mixers. Because of the work personnel on site, a series of waste like urban, such as food scraps, wrappers, cans, etc. will be generated. Regarding the hazardous waste generated in the construction phase, these will be mainly those derived from the maintenance of the machinery used to carry out the work.

5.2 Impacts on hydrology environment

5.2.1 Possible impacts

The hydrology of the plot area has been examined in previous Section. As analysed through the Water Development Department data given, there are no surface water, water systems and aquifers on the plot area, yet they are found on the wider area around the plot.

However, during the construction of the project there will be no production of any liquid waste to put in danger the water system environment of the wider area. However, during the construction there might be production of uncontrolled disposal of liquid chemical waste from used motor oils and fuel from the operation and maintenance of vehicles and construction site equipment. Even in the case of the production of liquid waste, the water systems are far from the plot area, and most importantly the constructing company knows well how to deal with those situations.

According to the analysis, the maximum amount of fuel that can escape in the event of an accident it will never exceed the 30 litres. Furthermore, hydrocarbon and heavy metals in general leak to the underground water through the surface from possible leaks of petroleum products, lubricants, or other chemical substances. Such a leak is considered as a minor leak with a negligible effect on the surrounding environment and it is simple to be controlled especially by the constructing company employees. However, in case of contamination of the soil of the plot area, it should be collected and disposed in licensed installation as it is considered as hazardous.

Moreover, the construction actions can lead to high concentration of soils on the surface waters due to the mix up and the disturbance of the soil. This action can change the colour of the surface water to cloudy, which will reduce the clarity of the water and consequently affect the aquatic ecosystem of the water.

Thus, as discussed above, the possible impact degree seems to be negligible.

Table 29: Impacts on hydrology environment by the construction of the project

Severity	-1

Probability	2
Impact	No Impact

5.2.2 Mitigation measures

As the impacts have been identified, the team proposes some mitigation measures to minimise the possibility of the impacts on the surface of the waters of the area.

- It is important to follow the construction of the plant during the months with minimal rainfall to avoid run off of substances.
- Collaboration with licensed hazardous waste manager for leakages from maintenance operations of construction machinery
- Monitoring the contractor's work to avoid the generation of soil particles into the water and the surface runoff due to placing the materials on an unstable area.
- Cover of the soil/dust surface on the construction site as well as the one carried by the construction vehicles.

5.3 Impacts on the geology

5.3.1 Possible impacts

The topography of an area is affected by the soil dredging and groundwork carried out during the construction stage of the plant. For the construction of the plant, the groundwork needed will be of small scale as the plot area has a gentle slope, thus the topography of the area will not be disturbed.

The possible impacts of the construction include the soil compaction due to the use of heavy vehicles or equipment, the soil pollution due to toxic substances leaking the construction equipment and vehicles, soil erosion due to the construction materials on the area and the extraction of soil for changing the geology of the plot area, removal of the surface layer of the soil, the cover of soil with concrete which will also disrupt the vegetation on the soil of the plot area. For the purposes of the construction of the plant and the refuelling station, the placement of concrete will happen for around 1000m^2 of the area. Thus, the groundwork that will happen during the construction phase at the plot area, will create permanent change to that area.

Additionally, hazardous, and non-hazardous waste will be generated as explained detailed in Chapter 2.

Table 30: Impacts on the geology by the construction of the project

Severity	-5
Probability	5
Impact	Severe Impact

5.3.2 Mitigation measures

As far as earthmoving operations are concerned, the lowest layer will be removed first, consisting of topsoil that can be reused for recovery work of the area. The surplus land generated due to the excavations will preferably be reused in filling work, whenever possible, trying to minimize the excess land that must be withdrawn. As for the excavation land, since it is not contaminated, it will be used for activities or fillers whenever possible.

In the event that the mining waste should be disposed on the ground, the contractor should choose the appropriate location for the disposal with the approval of the local authorities and the competent governmental agencies including the Geological Survey Department, the Water Development Department as well as the Environment Department. Also, the contractor is eligible to dispose the liquid and hazardous waste to avoid soil pollution.

The management of the hazardous waste shall be managed in accordance with the provisions of the Solid and Hazardous Waste Law (No. 215(I)/2002) and the relevant regulations for the management of the hazardous materials. Hence, as mentioned, the topography will not be disturbed, the impact is considered negligible.

Through the separation of waste, its reuse, recovery, and subsequent disposal is facilitated. The following measures are proposed:

- For the separation of the hazardous waste that is generated, a container will be available suitable next to the work. The collection and treatment will be the object of the Waste Management Plan.
- In relation to the remaining expected waste, the quantities do not exceed those established in regulations to require separate treatment of the same.
- To separate the waste, specific containers will be available whose collection will be provided for in the specific Waste Management Plan. To place these containers an area has been reserved with access from the public road on the site of the work which will be conveniently marked.
- For all waste collection there will be the participation of a Waste Manager authorized in accordance with what is established in the Waste Management Plan.

- Notwithstanding the foregoing, the Waste Management Plan must provide for the possibility of that more containers are necessary depending on the conditions of supply, packaging, and execution of works.

5.4 Impacts on flora and fauna

5.4.1 Possible impacts

The flora and fauna ecosystems of the plot area are the most important when assessing the impacts of the construction of the plant on the area within the plot. As the construction of the plant will be permanent, there will be an effect on the flora and fauna ecosystems. The coverage of the land area will impact the ecosystems found there. The biological environment of the area is mainly degraded due to the high anthropogenic activities in the area, with isolated species of flora and fauna being found in the plot area. In the neighbouring plot, there is an area with olive trees where birds are also found there, however there will be no impact on the plot as most of the species will be able to return to their location after the end of the construction actions.

It is important to evaluate the impacts on the biological diversity and the terrestrial food chain impacts on the ecosystem of the plot area. Through bibliography research and the site studies, it was decided that there is not any disturbance with the food chain and the passage of migratory birds.

Additionally, the area is found in an industrial/economic activities zone which is characterized as of low importance for its flora and fauna. The plot and the wider area do not belong into any Special Protection Area or Natura 2000 Network thus it demonstrates that there are no specific impacts to endangered and important species.

Table 31: Impacts on flora and Fauna by the construction of the project

Severity	-3
Probability	4
Impact	Moderate Impact

5.4.2 Mitigation measures

As mentioned, by the completion of the construction the species will be able to return to neighbouring plots as the noise and the disturbance will decrease. However, during the construction, the surrounding fence should be placed a few cm above the ground to provide passage for reptiles and small mammals. It is clear that the construction of the plant will not create any significant disturbance to the flora and fauna ecosystems.

5.5 Impacts on the surrounding air

5.5.1 Possible impacts

Air pollution is an important parameter when assessing the environmental impacts. The use of machinery during the construction is the main emitter of polluting air particles into the atmosphere disturbing the quality of the atmosphere surrounding the plot and the wider area. The emissions during the construction can be either from the machinery (dust levels) or the energy used for the construction (mainly fuel combustion).

Construction equipment and vehicles emit gases as a result of burning liquid fuels, including GHG emissions (carbon monoxide and HC, etc.). During the construction period of the project site (plot configuration and concrete work) the atmosphere will be burdened locally with an increase in dust levels. The construction works are expected to generate dust in the atmosphere due to the execution of land works, transport, loading and unloading of materials and the movement of machinery in the plot area. In addition, the use of cement and sand can also contribute to the pollution of the atmosphere.

The main polluting factors are:

Ozone (O_3) and Nitrogen oxide and Nitrogen dioxide

Ozone is created in the environment by the photolytic breakdown of O_2 into $2O^*$ and then the compound $O_2 + O^* = O_3$. Under normal conditions and without other oxidizing compounds (NO, NO_2), ozone reaches its maximum concentration during periods of maximum sunshine. The presence of NO accelerates the destruction of ozone, while NO_2 accelerates its creation.

Nitric oxide and nitrogen dioxide (NO, NO_2) are created mainly from road traffic. Thus, their concentration near roads follows traffic variation. The NO generated is converted shortly to NO_2 (life cycle = 2 min). Near the source of NO are presented reduced ozone levels. As NO as transported by wind, it is converted to NO_2 and thus at some distance from the source they start to appear increased ozone levels.

Sulphur Dioxide

The main source of sulphur dioxide is mainly from industrial units while burning coal. However, as there will be no such action during the construction of the plant, the only thing to take into consideration is the sulfur content of the fuel from the cars. However, the sulfur content from the road traffic is low, thus it will not be impacting the atmosphere.

Carbon monoxide and Carbon dioxide

Carbon monoxide is produced during combustion, with the biggest emitter being the vehicles and the central heating. However, it does not stay in the atmosphere for long as it converts to carbon dioxide, so its impacts are mainly locally. Thus, near busy road traffic the levels of CO can be significantly high especially in road of low-speed traffic.

Even if carbon dioxide is not included within the environmental dimensions, it is still one of the biggest contributors to the GHG emissions. Thus, the carbon dioxide emissions in the area are important as they contribute towards the greenhouse gas effect and accordingly to climate change.

Suspended particles

These particles are mainly sourced from wind dust, which can be either in solid, liquid, or mixed form in the atmosphere. Their main anthropogenic emission sources are processing industries minerals, power plants, diesel vehicles as well as the driving on dirt roads. However, emissions from vehicles on road are not producing much dust in the atmosphere.

The suspended particles mainly impact the health workers of the project as well as the residents around the area and the people working in the wider area. Moreover, the displacement of dust can also impact the vegetation of the wider area.

Indicatively, for the construction of the project the following routes will be performed:

- around 5 routes are expected to be carried out by trucks (or light and heavy-duty vehicles) to transport the containers from Limassol port (75 km from plot)
- around 2 routes for the transport of the concrete
- around 20 routes for transportation of personnel
- around 2 routes of excavator.

Table 32: Fuel consumption and emission factors for different vehicles and fuels

Type of vehicle	Fuel consumption	CO2	CO	PM
Trucks	35 l/100 km	954 gr/km	0.24 gr/km	0.09 gr/km
Light and heavy-duty vehicles	30 l/100 km	817 gr/km	0.20 gr/km	0.09 gr/km
Private cars	7 l/100 km	250 gr/km	0.08 gr/km	0.04 gr/km
Excavator	25 l/100 km	712 gr/km	0.18 gr/km	0.06 gr/km

Table 33: Emissions generated from the routes associated with the construction of the project

Type of vehicle	Distance travelled	CO2	CO	PM
Trucks	500 km	477 kg	120 gr	45 gr

Private cars	1000 km	250 kg	80 gr	40 gr
Excavator	100 km	71 kg	18 gr	6 gr

Table 34: Impacts on the surrounding air by the construction of the project

Severity	-2
Probability	4
Impact	Minimum Impact

5.5.2 Mitigation measures

The emissions from fuel combustion of vehicles from the transportation of material and personnel will be relative negligible, thus there is no need for mitigation measures for this action. Yet, for their minimisation, better quality fuels can be used, routine checks of the machinery and the vehicles should be updated, and limitation of the use of machinery and vehicles is necessary.

However, the dust levels that will be impacting the atmosphere can be reduced during the construction process, with special attention during the summer months. Selected human resources to work on the construction of the site should be appropriately trained to know how to correctly use the machinery and vehicles to limit operating revolutions of their engines as well as minimising the speed of the vehicles within the construction site. This will result in the reduction of emitted pollutants. Moreover, the facilities to be used by the workers of the site should be configured appropriately to avoid dust concentration. Keeping the land wet during the summer months is essential in a construction site to avoid dust.

Thus, the implementation of an air pollution management plan is necessary to incorporate all of the above and make is easier for the employees to follow them. Moreover, the threshold of the impact is minimum, as there are minimal emissions by the machinery and vehicles at the construction site, however the dust should be managed appropriately.

5.6 Impacting the aesthetics

Changing the fauna, flora and morphology of an area can have vast impact on the aesthetics of that particular area if the appropriate measures are not taken. Thus, aesthetics impacts can lead to environmental pollution.

5.6.1 Possible impacts

The possible impacts on the aesthetics include the actions taken on the construction site, the construction materials left on site as well as the transportation of those materials through the roads it will be impacting the aesthetics of the drivers. The most important aesthetics is the visual pollution the people will have while watching the construction site and the storage areas with various materials.

Table 35: Impacting the aesthetics by the construction of the project

Severity	-2
Probability	5
Impact	Moderate impact

5.6.2 Mitigation measures

Planning of the construction duration is the most important mitigation measure during the construction of the site as it will minimise the time completion of the construction time and will reduce the visual aesthetics impacts of the construction site faster. Thus, the creation of a specified timetable within which the contractors will complete their work is essential.

5.7 Impacts on human environment

5.7.1 Noise

5.7.1.1 Possible impacts

The construction of the plant will lead to increased noise levels. Those levels will be impacting people in the surrounding areas (mainly industrial and economic area (offices) as well as people driving by the road. The noise can also affect birdlife, however as the duration of the construction is limited, the noise pollution can be isolated and transient.

In the plot and the wider area, the noise levels are quite hight due to the plot being located on a main road, thus the fauna species, mainly the birds, have been adapted to these high levels of noise pollution and might be able to adapt to higher noise levels.

The main processes expected to contribute to increasing noise levels in the wider area are the following:

- Traffic of heavy vehicles carrying construction materials
- Operation of machinery and vehicles in the area
- The land works occurring for the plant construction

The machine to be used during the construction of the plant will create some noise pollution. The levels of noise pollution are demonstrated in the Table below.

Table 36: noise levels to occur from the vehicles during the construction

MACHINE TYPE	NOISE POLLUTION (DBA)		
	Max	Min	Average
TRUCK	109	95	106
LOADER	102	98	100
CONCRETE PAVING VIBRATION MACHINE	115	100	106
EXCAVATOR	110	110	110
TRUCK FOR POLE PLACEMENT	117	117	117
GENERATOR	-	-	70-80
CONCRETE PREPARATION AND PLACEMENT	60	80	70
MATERIAL HANDLING	60	80	70

Table 37: Impacts on human environment by the construction of the project

Severity	-4
Probability	5
Impact	Severe Impact

5.7.1.2 Mitigation measures

The legislation on Environmental assessment and Noise management law of 2004 (224(I)/2004) measures on noise legislation should be followed by the Project Manager. The noise level pollution cannot be controlled during the construction but limiting the noise pollution can be successfully occur by limiting the direction of the construction works. Moreover, setting daily time periods for the construction works is essential, as using the high levels of noise pollution instruments only during 9:00 – 14:00 when most of the people work during these hours and avoid working on Saturday, Sunday, and public holidays.

It is important to keep the machinery updated and maintained to minimise their noise pollution generation due to their proper operation. Additionally, minimising the duration of noisy tasks, by doing them simultaneously with other tasks can be a way to minimise the noise pollution duration.

5.7.2 Health and Safety during the construction

To protect the staff, it should be created around the premises, where work will be carried out that produce noise levels above the permissible limit, a restriction zone circulation to which entry is prohibited to those who are not related with this particular task and are not wearing the appropriate equipment. Those who will be within this zone must wear protective equipment against noise. The use of a protective helmet, gloves and work safety shoes should be mandatory for all staff. The staff must be qualified in the field to be employed.

There should be a pharmacy on the construction site and at least on the employees to know first aid in case of any accident. Fire safety is also essential within the construction site and not only.

Monitoring system is essential, and it will be helpful if it could be added on site for additional safety measures, in case of something happening during the times the employees are not on site working and also in times when an accident happens, and the employers and employees need the footage for their own purposes.

The speed limit within the plot area should be limited below 20 km/hour for the safety of the employees and the people in the surrounding areas.

Table 38: Health and Safety during the construction

Severity	-5
Probability	2
Impact	Minimum Impact

5.8 Summary

The following table summarises the impacts during the construction of the hydrogen production plan and the refuelling station, as presented in the above sections of Chapter 5.

Table 39: Summary of impacts during the construction of the project

Possible impacts	Impact severity before mitigation measures				Impact Severity after mitigation measures			
	Severity	Probability	Impact	Nature of Impact	Severity	Probability	Impact	Nature of Impact
Hydrology	-1	2	No impact		-1	1	No impact	
Geology	-5	5	Severe impact	Negative	-5	2	Minimum Impact	Negative
Flora and fauna	-3	4	Moderate impact	Negative	-3	3	Minimum Impact	Negative
Atmosphere	-2	4	Minimum Impact	Negative	-2	3	Minimum Impact	Negative
Aesthetics	-2	5	Moderate Impact	Negative	-2	4	Minimum Impact	Negative
Noise pollution	-4	5	Severe Impact	Negative	-3	4	Moderate Impact	Negative
Safety	-5	2	Minimum Impact	Negative	-5	1	No impact	

6 Environmental Impacts by the operation of the project

6.1 Introduction - Description of the operational work

As mentioned in Chapter 2, the plant is expected to produce 150 tonnes of Hydrogen per year. Additional expansion of the system and hydrogen production increase will be assessed in a later stage. For the first step, the final product will be used in the mobility sector and more specifically for light and heavy trucks. It is destined to replaced diesel-fuelled vehicles. **The fuel switch that will result into GHG emissions reduction is quantified in a following section.**

The power requirements, expressed in kWh/kg of H_2, are approximately 54. Based on the annual production level of 150 tonnes of hydrogen, that corresponds to 8,100,000 kWh of renewable electricity per year. The energy will be supplied by **local renewable energy supplier** with the use of guarantees of origin to justify the use of only renewable energy sources, so that the final product can be classified as green.

Based on manufacturer's information the specific process water specific consumption, expressed in litres of water per kilos of hydrogen produced, is 10. Based on the production level of 150 tonnes of hydrogen per year, that results into a water consumption of 1,500,000 litres of water per year. The water to be used will be derived from **secondary treatment of wastewater from the Water Development Department of Larnaca, thus it will be contributing into circular economy actions** within it and use water which could be otherwise be lost and not used. The point of collection is ΔΡΟΜ-ΑΠ 04, where a water tanker will collect the water and transfer it to the location of the hydrogen production plant. Refer to Annex for corresponding communication with the Water Development Department of Larnaca on the request to use wastewater from secondary treatment and main points of agreement.

The waste due to the operation of the pilot project are the following:

- Series of waste like urban, such as food scraps, wrappers, cans, etc. from personnel and the users of the refueling station.
- Accidental leakage from the water tanker responsible from providing of 1,500,000 litres of water per year.
- Deionizing resin and water filtration cartridges from maintenance, harmless for human contact and/or regular disposal.
- UV-lamps, from process water treatment and polishing.
- Reverse-osmosis membrane without harmful waste.

6.2 Impacts on hydrology environment

6.2.1 Possible impacts

The hydrology of the wider area and the plot area will not be impacted as there will be no liquid waste. There is a probability of oil and fuel leakage from the water tanker responsible from providing of 1,500,000 litres of water per year.

Table 40: Impacts on hydrology environment by the operation of the project

Severity	-2
Probability	2
Impact	No Impact

6.2.2 Mitigation measures

However, in case of oil and fuel leakage from the tanker that will fill the water tanks, the employees of the station will have to be fully trained in order to deal with the situation appropriately and avoid any leakage into the water systems around the plot area.

6.3 Impacts on geology

6.3.1 Possible impacts

The operation of the plant and refuelling station is not expected to impose any impacts on the geology of the plot area as the plot is already flat and the construction activities have already altered a bit the area. However, the following waste is expected to be generated:

- Series of waste like urban, such as food scraps, wrappers, cans, etc. from personnel and the users of the refueling station.
- Deionizing resin and water filtration cartridges from maintenance, harmless for human contact and/or regular disposal.
- UV-lamps, from process water treatment and polishing.
- Reverse-osmosis membrane without harmful waste.

Table 41: Impacts on geology by the operation of the project

Severity	-3
Probability	3
Impact	Minimum Impact

6.3.2 Mitigation measures

In order to minimise general waste generation from the users of the filling station, appropriate waste disposal containers must be installed in visible places. During the operation and maintenance of the pilot project, deionizing resin and water filtration cartridges, UV-lamps and reverse-osmosis membrane will be produced. However, the Future Fuels operator will be cooperating with a licensed company which can disposed and/or treat the waste in the proper manner.

6.4 Impacts on flora and fauna

As mentioned previously, the area is found in an industrial/economic activities zone which is characterized as of low importance for its flora and fauna. The plot and the wider area do not belong into any Special Protection Area or Natura 2000 Network thus it demonstrates that there are no specific impacts to endangered and important species.

Table 42: Impacts on flora and fauna by the operation of the project

Severity	-2
Probability	2
Impact	No Impact

6.5 Impacts on the surrounding air

6.5.1 Possible impacts

During the production of hydrogen by the plant, there will be no emissions of any gases into the atmosphere. Moreover, the storage of hydrogen will also not emit any particles and gases into the atmosphere. Additionally, the surrounding road at the plot area is already paved, which means there will be minimal dust emissions in the surrounding air.

Hydrogen particles from the hydrogen production might leak into the atmosphere. The leakage of hydrogen and the breathing in by people can cause asphyxia, however, as the hydrogen production will be occurring outside, the hydrogen particles dissolve fast into the atmosphere, which will not have an impact on the surrounding atmosphere of the plot area.

The refuelling station will attract vehicles which can be filled with hydrogen. Thus, the refuelling of these cars and their trip towards and away from the station, or their waiting in traffic will not produce any emitting gases as the burning of hydrogen gas only disposes water. The hydrogen production plan is expected to produce 150 tonnes of hydrogen fuel per year. That is equivalent into 500,000 litres of diesel fuel per year, if we considered that the fuel switch will take place between diesel-fuelled vehicles and hydrogen-fuelled

vehicles. **The corresponding fuel switch will result into GHG emissions reduction of 1,335 tonnes of carbon dioxide per year. This is considered as a positive impact, and it is related only to the reduction of GHG emissions from the replacement of the fleet.**

Table 43: Parameters used for the calculations of GHG emissions reduction due to fuel switch

PARAMETER	UNITS	VALUE	SOURCE
ENERGY CONTENT OF DIESEL BY VOLUME	MJ/lt	36	Renewable Energy Directive 2018/2001/EU (REDII)
CO_2 EMISSIONS FACTOR OF DIESEL	kg CO_2/TJ	74,100	2006 IPCC Guidelines for National Greenhouse Gas Inventories
CO_2 EMISSIONS FACTOR OF DIESEL	kg CO_2/lt	2.67	Calculated

Thus, there will be no negative impact on the surrounding air from the operation of the plant. **On the contrary, the project will have a positive impact in GHG emissions levels and therefore in air quality, and in a broader sense to climate change mitigation.**

The only source of GHG emissions comes from the transportation of water from the point of collection of the Water Development Department of Larnaca and the hydrogen production plant. The transportation will occur with a water tanker with the following characteristics:

Table 44: Fuel consumption and emission factors of water tanker

Type of vehicle	Fuel consumption	CO_2	CO	PM
Water tanker	30 l/100 km	817 gr/km	0.20 gr/km	0.09 gr/km

Table 45: Emissions generated from the routes associated with the provision of water to the production plant

Type of vehicle	Distance travelled	CO_2	CO	PM
Water tanker	600 km	490 kg	120 gr	54 gr

As we can see from the table above, the impact from the use of conventional fuel for the water tanker is negligible.

Table 46: Impacts on the surrounding air by the operation of the project

Severity	+3
Probability	5
Impact	Severe Impact

6.6 Impacts on the aesthetics

6.6.1 Possible impacts

The wider area around the plot is already an industrial and economic activity area. This means that the aesthetics of the area are already impacted and dedicated for industrial use. Thus, the production plant and the refuelling station on site will not be impacting and interfering with the aesthetics of the plot and the wider area.

Table 47: Impacts on the aesthetics by the operation of the project

Severity	-1
Probability	5
Impact	Minimum Impact

6.7 Impacts on natural resources

6.7.1 Possible impacts

The most important natural resource for the operation of the project is water. Based on manufacturer's information the specific process water specific consumption, expressed in litres of water per kilos of hydrogen produced, is 10. Based on the production level of 150 tonnes of hydrogen per year, that results into a water consumption of 1,500,000 litres of water per year and 4,225 litres of water per day, if we consider 355 days of operation per year.

Table 48: Impacts on the natural resources by the operation of the project

Severity	-3
Probability	5
Impact	Severe Impact

6.7.2 Mitigation measures

However, the water to be used will be derived from secondary treatment of wastewater from the Water Development Department of Larnaca, thus it will be contributing into circular economy actions within it and use water which could be otherwise be lost and not used. Refer to Annex for corresponding communication with the Water Development Department of Larnaca on the request to use wastewater from secondary treatment and main points of agreement.

6.8 Impacts on human environment

6.8.1 Noise

6.8.1.1 Possible impacts

Based on information provided by the manufacturer of the hydrogen production plant and the refuelling station, there are three (3) main sources of noise during the operation:

- Electrolyser (Air Cooler)
- Diaphragm Compressor in Container
- Chiller Unit (Air Cooler) for Hydrogen Refuelling Station

The three (3) sources mentioned above have a sound pressure level, measured in 1 meter of distance of lower than 80 dB(A) (≤ 80 dB(A)).

Furthermore, there will be an increase in the noise level by 17 vehicles as they will refuelling from the station on the plot. However, the wider area of the station has already a lot of traffic as it is an industrial area and there is also main road, which is an exit from main highway. Thus, the noise from the 17 vehicles will be contributing to the noise pollution in the wider area which related to the traffic of the area will not have a great impact on the noise.

Regarding the comparison of noise levels between diesel and hydrogen fuelled vehicles, a study[26] was uses that aimed to analyse the influence of the type of fuel (gasoline or hydrogen) on the sound levels produced by a vehicle with an internal combustion engine. Using a commercial vehicle with an internal combustion engine adapted to run on both gasoline and hydrogen, an experimental setup has been designed and used to compare the sound levels produced when using those fuels. Within the study scope, tests were carried out with the vehicle when stationary to eliminate rolling and aerodynamic noise and acoustics and psychoacoustics levels were measured both inside and outside the vehicle. A slight increase in the noise level has only been found outside when using hydrogen as fuel, compared to gasoline. The increase can be quantified between 1.1 and 1.7 dBA and is mainly due to an intensification of the 500 Hz band. As the study concluded, slightly higher noise levels produced by hydrogen can be attributed to its higher reactivity compared to gasoline in an adapted Volkswagen (VW) Polo 1.4.

However, even the negligible higher noise levels identified in the study **are not associated to the specific project as the user of the produced hydrogen will be fuel cells vehicles (busses/coaches and trucks). As a result, no negative impact is been identified regarding the noise.**

[26] Arana, M., San Martín, R., Urroz, J. C., Diéguez, P. M., & Gandía, L. M. (2022). Acoustic and psychoacoustic levels from an internal combustion engine fueled by hydrogen vs. gasoline. Fuel, 317, 123505.

Table 49: Impacts on the human environment by the operation of the project

Severity	0
Probability	5
Impact	No Impact

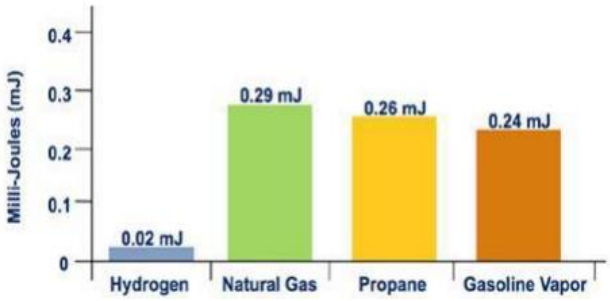
6.8.2 Health and Safety during the operation

By nature, the production of hydrogen fuels has some dangers. The safe use of any fuel focuses on preventing situations where the three combustion factors – ignition source (spark or heat), oxidant (air) and fuel are present. Several hydrogen's properties make it safer to handle. For example, hydrogen is not toxic as it dissolves into the atmosphere due to its light weight.

However, the minimum ignition energy of hydrogen is lower than that of natural gas or gasoline vapor. Thus, the lower the ignition energy the higher the risk of explosion. Consequently, adequate ventilation and leak detection are important elements in the design of safe hydrogen systems. Because hydrogen burns with a nearly invisible flame, special flame detectors are required.

In addition to designing safety features into hydrogen systems, training in safe hydrogen handling practices is a key element for ensuring the safe use of hydrogen. In addition, testing of hydrogen systems—tank leak tests, garage leak simulations, and hydrogen tank drop tests—shows that hydrogen can be produced, stored, and dispensed safely. Regular inspection and leak testing of pressure systems according to Written Scheme of Examination / maintenance schedule are essential.

Monthly testing for the detection equipment to be used as well as personnel training is important to keep the site safe from any leakages and explosions. The use of appropriate and updated leak detection machinery is essential to avoid leakages and potential threats. Additionally, reserve parking can be a policy measure for easier exit of employers from the plot in case of an accident.



Property	Hydrogen	Methane (NG)
Flammability in air	4 to 75%	5 to 15%
Burning velocity	~3 m/s	0.45 m/s
Detonation energy	1 g TNT	1 kg TNT

Figure 46: Minimum ignition energy of fuels, Source: https://www.fch.europa.eu/sites/default/files/3.%20Joseph%20Morelos%20-%20H2Safety.pdf

The Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances (so-called SEVESO Directive), as mentioned in previous Chapter, it is linked with the production and storage of hydrogen. The Annex I, Part 1 of the Directive establishes Hydrogen as a dangerous substance and lists the quantity of hydrogen for the application of lower-tier requirements (≥ 5 tonnes) and upper-tier requirements (≥ 50 tonnes).

The Seveso Directive covers situations where dangerous substances may be present, for example during processing or storage, in quantities exceeding certain thresholds. It establishes general obligations on the operator and notification of all concerned establishment. Specific obligations included the deployment of a major accident prevention policy, the development of a safety report and internal emergency plans for establishments falling under the upper-tier group. Furthermore, the directive imposes the obligation to conduct public consultations on specific individual projects that may involve risk of major accidents. **Regarding the specific project, the hydrogen production on site will be 150 tonnes per year with a storage of 1,000 kg. As a result, the project does not fall within the Seveso limits.**

Furthermore, all health and safety requirements and conformity assessment procedures must be followed, as envisioned by the Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (recast).The so-called ATEX Equipment Directive defines the essential requirements and procedures to be applied before products are placed on the EU market and is significant for the engineering of hydrogen production plants.

Additionally, the Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (so-called ATEX Workplace) must

be followed. The directive lays down general obligations for the employer by taking measures so that where explosive atmospheres may arise in such quantities as to endanger the health and safety of workers or others, the working environment is such that work can be performed safely and appropriate supervision during the presence of workers is ensured in accordance with the risk assessment using appropriate technical means. Furthermore, From the employer's perspective, the directive requires the employers to classify areas, where hazardous explosive atmospheres may occur, into zones.

The requirements of the Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work, apply where hazardous chemical agents are present or may be present at the workplace. Amongst others, the Directive imposes certain obligation on the employers for the determination and assessment of risk, for the implementation of specific protection and prevention measures and for the training of workers.

Table 50: Health and Safety during the operation

Severity	-5
Probability	3
Impact	Moderate Impact

6.9 Summary

The following table summarises the impacts during the operation of the hydrogen production plan and the refuelling station, as presented in the above sections of Chapter 5.

Table 51: Summary of impacts during the operation of the project

Possible impacts	Impact severity before mitigation measures				Impact Severity after mitigation measures			
	Severity	Probability	Impact	Nature of Impact	Severity	Probability	Impact	Nature of Impact
Hydrology	-2	2	No impact		-2	1	No impact	
Geology	-3	3	Minimum Impact	Negative	-1	2	No impact	
Flora and fauna	-2	2	No impact		-2	2	No impact	
Atmosphere	+3	5	Severe Impact	Positive				
Aesthetics	-1	5	Minimum Impact	Negative	-1	5	Minimum Impact	Negative
Natural Resources	-3	5	Severe Impact	Negative	0	1	No Impact	
Noise pollution	0	5	No Impact		0	5	No Impact	
Safety	-5	3	Moderate Impact	Negative	-5	1	No impact	

7 Existing National (Cyprus) Legislation related with EIA

The existing legislation which this EIA was based and written upon is the legislation on the Environmental Impact assessment (N127(I)/2018) which sets the guidelines for the impacts of specific projects (particularly the project is included in the category of projects in the Appendix 2 of the legislation) on the physical and human environment. Along with the EIA National legislation, the following national legislations were also examined:

- The Urban Planning and Spatial Planning Law (N.90/1972)
- The Environmental Impact Assessment of Certain Projects Law (N127(I)/2018)
- The Environmental Noise Assessment and Management Law of 2004 (N. 224(I)/2004).
- Natura 2000 Network
- Occupational Health and Safety regulations (hazards of large-scale accidents related to hazardous substances)
- The Water Protection and Management Law of 2004 (Law 13(I)/2004)
- The Water Pollution Control (Urban Wastewater Disposal) Regulations of 2003 (Κ.Δ.Π. 772/2003).
- On the Control of Water Pollution (Pollution from Certain Hazardous Substances) Regulations of 2002 (Κ.Δ.Π. 513/2002).
- The Water and Land Pollution Control Law of 2002 (N. 106(I)/2002, Κ.Δ.Π 99/2000 & 45/1996)
- The Ambient Air Quality Law of 2002 (N.188(I)/2002 & Amendment: 53(I)/2004, 161(I)/2005, 54(I)/2004, 17(I)/2007,77(I)/2010)
- The Environmental Noise Assessment and Management Law of 2004 (N. 224(I)/2004).
- The Nature and Wildlife Protection and Management Law of 2003 (N 153(I)/2003)
- The Locational Policy for Renewable Energy Sources Projects

8 Public Consultation

Future Fuels Ltd through a letter to Municipality of Aradippou (see Annex), express it intent to proceed with the installation of the first green hydrogen production pilot plant, with the aim of supplying hydrogen as a fuel in vehicles. With the corresponding letter, preliminary opinions from the Municipality of Aradippou regarding the construction of the above project were requested. Furthermore, Future Fuels proposed the organisation of an event in order to present the project to the relevant Committee of the Municipality and to the general public.

9 Environmental Management and Monitoring

For the right environmental monitoring of the different phases of the project, it is necessary to establish an Environmental Monitoring Program, which guarantees all the recommendations collected within this report, as well as the indications issued by the environmental body within the EIA procedure.

Therefore, it is necessary to propose an environmental monitoring and surveillance program or plan of the expected incidents and of those that may arise, also allowing the detection of the deviations from the expected effects or detect new unforeseen alterations and, consequently, adapt the proposed measures or adopt new ones.

9.1 Monitoring and environmental monitoring during construction

9.1.1 Air quality control

- It will be verified that there is no significant dust lifting. In this case is applied the related risks on the surfaces exposed to the wind or on the areas of transfer of machinery.
- It will be controlled that the vehicles circulate at low speed and, where appropriate, with the elements opportune (covers or others, in trucks for the transport of earth, for example) limiting the lifting and dispersion of dust.
- Dust accumulation on surrounding vegetation will be controlled. In case it is significant accumulation on it, it will be cleaned with water.
- The vehicle engines to be used in the construction works will have all necessary papers e.g., MOT etc.

9.1.2 Control of action areas

- Future Fuels will notify the surrounding communities as well as the neighboring plants of the start of the works.
- During the period of execution of the works, the correct signaling and beaconing will be verified of all areas of action.

- It will be verified that the maximum use has been made of the network of existing public roads.
- The removal and storage of topsoil will be supervised.
- It will be verified that the topsoil removed and stored during the works phase has been extended over potentially improvable areas, especially in restored areas, to favor the invasion of natural vegetation.
- Supervision of the areas affected by the works, to detect all those areas of land with compaction problems and implement the appropriate corrective measures where the works have been completed and are not going to be altered by new steps of machinery, preventing erosive processes.
- During the construction phase, the areas surrounding the work must be monitored, avoiding the affection to the vegetation with unnecessary actions and, where appropriate, they must add the pertinent restorative measures
- During the execution of the works, a monitoring of the clearing will be carried out in coordination with the environmental officers in the area, and it will also be verified, in where appropriate, that the conditions established in the pruning and clearing authorization are met.
- It will be verified that, where appropriate, the exogenous materials used in the work are from areas duly authorized.

9.1.3 Waste and discharge control

- Visual inspections of the general appearance of the works will be carried out in terms of the presence of leftover construction materials, rubbish, waste, and any other type of waste generated so that its storage and management is as planned.
- The corresponding invoices and/or delivery certificates will be kept, where applicable. Any residues delivered to Authorized Waste management Plant that will serve as proof of the adequate treatment of these.
- In the event of accidental and uncontrolled spills of waste materials, they will be immediate withdrawal and the cleaning of the affected land.
- Control the availability of materials suitable for collecting accidental spills.
- It will be verified that the machinery parking, construction material warehouse and installation area to the point of machinery are carried out in the selected places and with the measures foreseen to prevent contamination of water and soil. It will be verified that these areas are perfectly marked and in the knowledge of all the work personnel.
- It will be controlled that stones and inert spills are not thrown on the adjoining land. In case If they are detected, the Contractor must proceed to their immediate withdrawal.

- It will be verified that there are suitable drums and containers for waste collection, in number and conditions required for the storage of the waste generated. It will be controlled that they are replaced when they do not meet the appropriate conditions of tightness or that they are full.
- It will be verified that all personnel are informed about the rules and recommendations for the responsible management of materials and substances potentially contaminants.
- It will be verified that there are adequate areas for the deposit of hazardous waste, these they must be in covered areas and physically separated according to their type.
- The daily amount of waste produced should be systematically measured, both in winter and in summer. In this way, the plant manager will be able to control the specific production per selected person, in order to precisely determine the storage needs in waste bins, as well as the frequency of their collection with the waste truck by the Municipality of Aradippou. The physical composition of the waste should also be monitored, so that if it is found that it contains hazardous substances, it can be managed in accordance with the legislation in force.

9.1.4 Acoustic environment - Noise

Both the scale of the projects and their impact on the environment do not require a noise impact monitoring system either during the construction of the projects or during the continued operation.

9.1.5 Water quality control

- Possible liquid spills from machinery maintenance will be monitored.

9.1.6 Vegetation control and restoration

- Control the traffic and movement of the machinery with respect to the occupation of the same front to the vegetation, especially with elements of importance such as tree specimens of big size.
- It will be controlled that there is no damage to the vegetation due to the uprooting, removal or cutting of branches by machinery in its path. If observed, a correct pruning and application of healing pastes to prevent pest attack.
- The correct execution of the restorations must be controlled, as well as the recommendations of the environmental officers in the region.

9.2 Proposed environmental terms and guidelines

- To plant all surfaces those are amenable to vegetation (slopes, trench levels, etc.).
    - Planting operations to begin in each section of the project where the earth-works have been completed and the final surfaces have been formed.
    - Earthworks should be followed by anti-erosion works to prevent the loss of valuable soil and the creation of gully erosion before sufficient vegetation is established.
    - All plantings should be done while ensuring irrigation for rapid growth and maintenance of the vegetation.
    - Vegetation existing in the project area will be collected and preserved for use during restoration work.
- For any activity or installation, necessary for the construction and operation of the project, all the permits and approvals required by the current legislation must have been previously granted, including the approvals of environmental conditions required for the individual activities or installations (quarries).
- To ensure the unchecked flow of surface water by constructing the necessary works, excluding any damming of streams, streams, etc. with excavated materials unless they are to be permanently covered in accordance with the project design.
- The excavations to be carried out shall be limited to those absolutely necessary, in order to construct the project in accordance with the terms of the present, the regulations in force and the geotechnical characteristics of the project area.
- It is permitted to use material mined in accordance with the above, as long as it is suitable, for the preparation of concrete, construction of embankments and other constructions.
- Excavation beyond what is necessary as described above, in order to secure additional material for embankments, concrete preparation, etc., is not permitted.
- In addition to the above, required materials can be secured from legally operating quarries in the area or from quarries, loan chambers that can be created in accordance with the provisions of relevant Laws
- The depositing of unsuitable surplus excavation products should be done in a suitable and approved place or suitable areas
- It is possible to use surplus excavation products for the construction of other public works in the area.
- During any drilling, use mechanical equipment that will ensure the containment of dust.
- Systematic wetting of construction site roads, materials, etc. in order to limit the dust during the execution of earthworks, with non-potable water. Also, trucks transporting materials (aggregates, excavated materials, etc.) during their movement and if they carry materials of a similar nature must be covered with suitable covers.

- All kinds of waste, useless materials, old spare parts and machinery, oils, all kinds of grouts, etc. They will be collected and removed from the project site, and they will be disposed of in accordance with the applicable regulations.
- It is forbidden to burn materials of any kind (tires, oils, etc.) in the area of the project.
- It is forbidden to pollute surface and underground waters with any kind of oil, fuel, etc. Similarly, it is prohibited to dispose of old oils on the ground.
- Average level of noise during the operation of construction sites is defined as 65 dB (A).
- To take care of fire protection during construction, to deal with any outbreaks of fire from the operation of the machines. The way of organizing the fire protection will be checked and approved by the supervising agency Fire Department before the start of the work.

Consultants

The report was prepared by environmental and energy consultants of ideopsis ltd from June to July of 2022. The team conducted this EIA consists of the following researchers:

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Annex

Technology overview of production plant and filling station

NEUMAN & ESSER Deutschland GmbH & Co. KG	Future Fuels Ltd. Project : 3 MW Electrolyser & HRS for Cyprus NEAD Quotation 18364-01-00 Part 2 (HRS)

Scope :

2 x MP-Storage 500 kg @ 500 bar

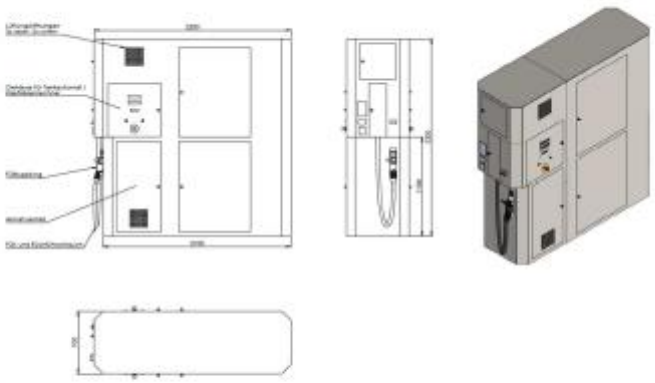
Please note : 1 x MP Storage as a Back Up for One Day if Electrolyzer fails

Type 4 Storage Vessel
Dimensions : ~ 6.0 x 2.5 x 2.8 m
Operating Volume : ~ 518 kg @ 10-500 barg & 15 °C
Volume : ~ 16.8 m³
Total Weight (empty) : ~ 10000 kg
Design : PED / CE

1 x Dispensers for HDVs

Dispenser Connection each (HDV) :	1 x 350 bar, 0° C Cooling
Display :	15,4" Color-Touch-Screen
Dimensions (Casing) :	~ 2.200 x 2.200 x 700 mm (HxWxT)

see typical Sketch & Picture of Dispenser :



NEUMAN & ESSER Deutschland GmbH & Co. KG
Vertrieb und Anlagentechnik – Office Austria
Ernst Heissgasse 3/14, A-1110 Vienna

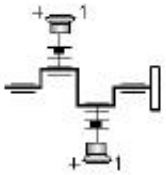
Phone : +43.1.9138506
Cell Phone : +43.664.1800831
Mail : Heinz.Eschner@Neuman-Esser.de
Website : www.neuman-esser.de

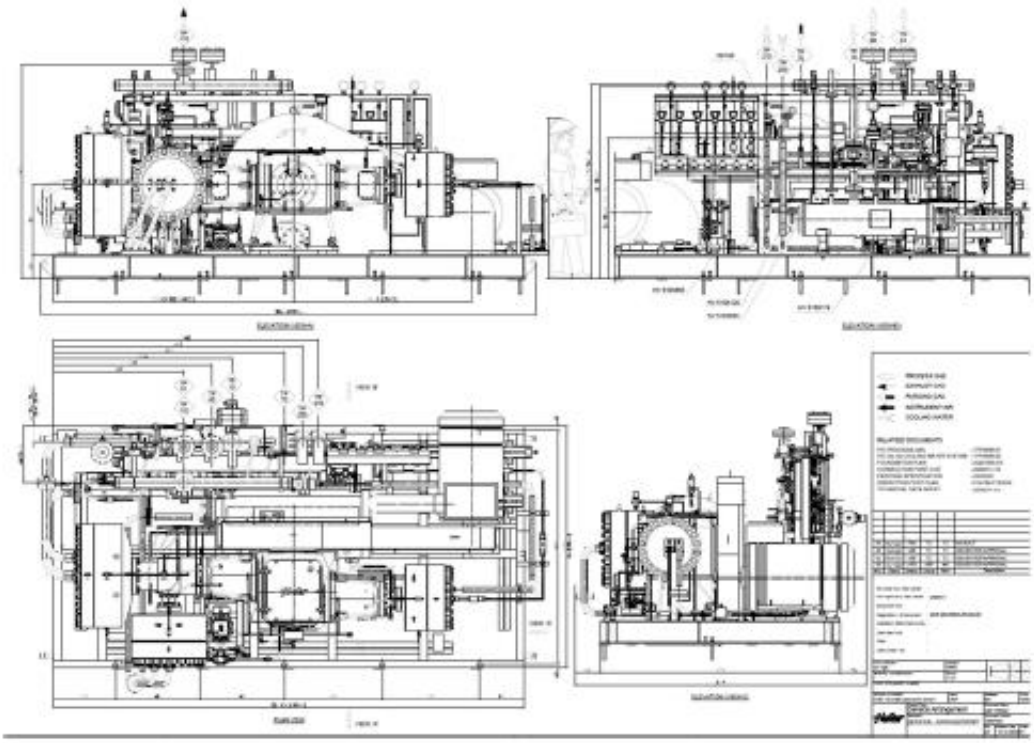
NEUMAN & ESSER Deutschland GmbH & Co. KG	Future Fuels Ltd. Project : 3 MW Electrolyser & HRS for Cyprus NEAD Quotation 18364-01-00 Part 2 (HRS)

1 x Diaphragm Compressor installed in ~30´ Container

Container consists of two Sections : one Ex-Area for Compressor, one Ex-free Area for Control etc.
Dimensions – Container : L x W x H = ~ 9.0 x 3.5 x 2.9 m
Total Weight (Container + Diaphragm Compressor + PLC) : ~ 25000 kg

Diaphragm Compressor (see typical GA attached) :
3-stage, 3-Diaphragm Heads, horizontal Design (oil-free & leakage-free Compression !),
Noinal Power of Main Driver : ≤ 190 kW





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NEUMAN & ESSER Deutschland GmbH & Co. KG	Future Fuels Ltd. Project : 3 MW Electrolyser & HRS for Cyprus NEAD Quotation 18364-01-00 Part 2 (HRS)

1 x Cooling Unit for Dispenser installed in ~10´ Container

aircooled Chiller, suitable for Outdoor Installation (Protection IP 54).
Chiller cools Hydrogen on Inlet Side of Dispenser down to ~ -10 °C.
Rated Power : ≤ 80 kW

1 x Valve Container installed in ~10´ Container

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Mail : Heinz.Eschner@Neuman-Esser.de
Website : www.neuman-esser.de

NEA | HYTRON HyPEM

Modularized Turnkey Solutions

Decarbonization projects, at the pace and scale required, face considerable challenges. Initiatives are taking up momentum. Involving the right partners is key, and a matter of trust. For about a century NEUMAN & ESSER (NEA GROUP) has been supplying H_2, O_2 and other process gas compressor units to the industry. Through the permanent development of its proficiencies NEUMAN & ESSER has become much more in the last decade.

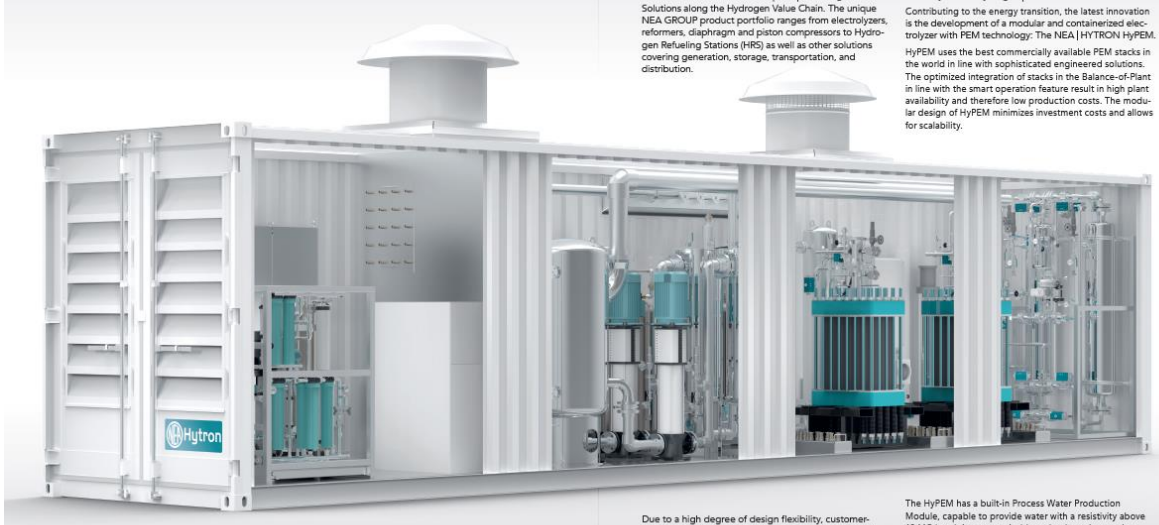
NEA GROUP is now a one-stop shop for Integrated Solutions along the Hydrogen Value Chain. The unique NEA GROUP product portfolio ranges from electrolyzers, reformers, diaphragm and piston compressors to Hydrogen Refueling Stations (HRS) as well as other solutions covering generation, storage, transportation, and distribution.

NEUMAN & ESSER has also developed comprehensive services, starting from feasibility studies, through project engineering and construction management, to digital integration and 360° service during operation.

This ensures a customer-centric approach to upstream and downstream Hydrogen solutions. In this way customers benefit from an OEM expert integrating all elements to an overall optimum and providing support during the full lifecycle of a Hydrogen plant.

Contributing to the energy transition, the latest innovation is the development of a modular and containerized electrolyzer with PEM technology: The NEA | HYTRON HyPEM.

HyPEM uses the best commercially available PEM stacks in the world in line with sophisticated engineered solutions. The optimized integration of stacks in the Balance-of-Plant in line with the smart operation feature result in high plant availability and therefore low production costs. The modular design of HyPEM minimizes investment costs and allows for scalability.



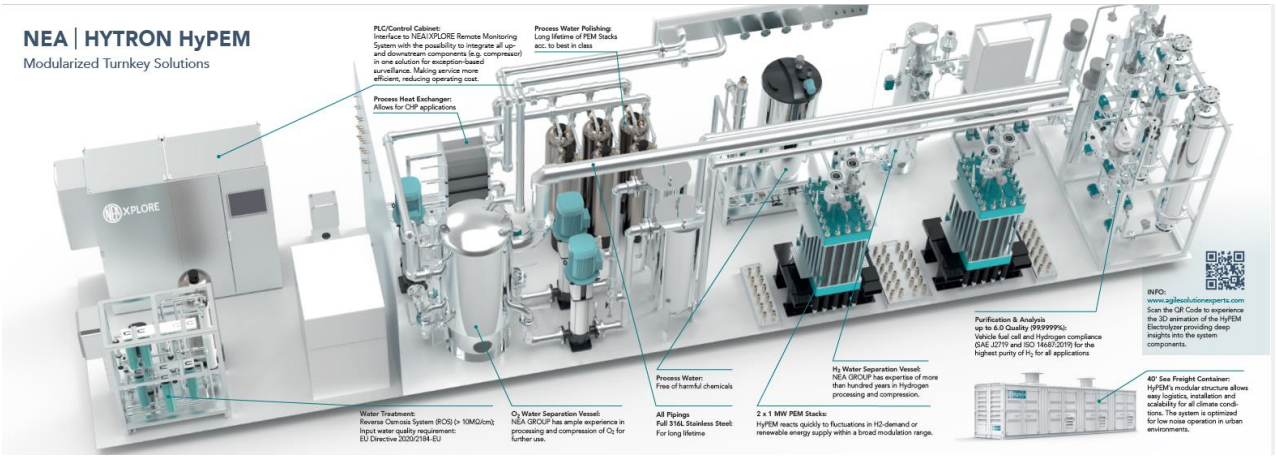
Due to a high degree of design flexibility, customer-specific indoor and outdoor configurations are available in a standardized container solution operating in the ambient temperature range from -20° to 40°C. Kits for challenging conditions are available, e.g. Low Noise Option, High Purity Option.

The plant productivity depends on the number of electrolzer stacks with each 1 MW stack generating up to 200 Nm^3/h of Hydrogen at an output pressure of more than 30 bar(g). At the same time half the volume flow of O_2 is produced with a pressure of up to 10 bar(g).

The HyPEM has a built-in Process Water Production Module, capable to provide water with a resistivity above 10 MΩ/cm. It is a customizable technology that can be tailored to the water conditions on site.

Further components belonging to the scope of supply: Thermal management system, a Hydrogen Purification, Dehumidification and Deoxidizer Module, including permanent gas analysis and quality monitoring to ensure the desired gas quality (up to 6.0).

The power cube, consisting of a separate containerized set of transformers and rectifiers, is tailormade to the electric grid conditions on site.


NEA | HYTRON HyPEM
Modularized Turnkey Solutions
PLC/Control Cabinet:
Interface to NEA|XPLORE Remote Monitoring System with the possibility to integrate all up- and downstream components (e.g. compressor) in one solution for exception-based surveillance. Making service more efficient, reducing operating cost.
Process Water Polishing:
Long lifetime of PEM Stacks acc. to best in class
Process Heat Exchanger:
Allows for CHP applications
XPLORE
Water Treatment:
Reverse Osmosis System (ROS) (> 10MΩ/cm);
Input water quality requirement:
EU Directive 2020/2184-EU
O2 Water Separation Vessel:
NEA GROUP has ample experience in processing and compression of O2 for further use.
Process Water:
Free of harmful chemicals
All Pipings
Full 316L Stainless Steel:
For long lifetime
H2 Water Separation Vessel:
NEA GROUP has expertise of more than hundred years in Hydrogen processing and compression.
2 x 1 MW PEM Stacks:
HyPEM reacts quickly to fluctuations in H2-demand or renewable energy supply within a broad modulation range.
Purification & Analysis
up to 6.0 Quality (99.9999%):
Vehicle fuel cell and Hydrogen compliance (SAE J2719 and ISO 14687:2019) for the highest purity of H2 for all applications
INFO:
www.agilesolutionexperts.com
Scan the QR Code to experience the 3D animation of the HyPEM Electrolyzer providing deep insights into the system components.
40' Sea Freight Container:
HyPEM's modular structure allows easy logistics, installation and scalability for all climate conditions. The system is optimized for low noise operation in urban environments.

Letter of Support from Ministry of Energy, Commerce and Industry regarding the application to Innovation Fund

REPUBLIC OF CYPRUS
MINISTRY OF ENERGY, COMMERCE AND INDUSTRY
Permanent Secretary's Office

Ref No: 8.4.1.9

08 June 2022

Future Fuels Ltd,
71, Larnacos Aven., Centre Court, Flat 301
2101 Aglantzia

Attention: Makis Ketonis

Project "Hydrogen to Transport" prepared by the Future Fuels Ltd
Letter of support for Innovation Fund - Small-Scale Projects, European Union Funding Application

I refer to the above subject and further to your Letter dated 15th April 2022, I would like to inform you that, according to the information provided in your letter, the Ministry of Energy, Commerce and Industry (MECI) provides its support to the proposed project.

2. Furthermore, we encourage the "Innovation Fund - Small Scale Projects" to fund this pilot project whose outcomes are expected to contribute to the decarbonization of the energy sector.

3. Please note that this document is not legally binding and the above are without prejudice to the various permits/approvals required to be obtained from all competent authorities according to the legislation in force, which is the project promoter's responsibility. Furthermore, please note that the MECI does not commit itself to provide any capital and/or operational funding or any other form of financial support for the proposed project.

Marios Panayides
Permanent Secretary

MINISTRY OF ENERGY
COMMERCE AND INDUSTRY
Tel.: 22867196 Fax: 22374445
1421 Nicosia CYPRUS, Email: mpanayides@meci.gov.cy

REPUBLIC OF CYPRUS

DEPUTY MINISTRY OF RESEARCH, INNOVATION AND DIGITAL POLICY
Office of the Permanent Secretary

DMRID: 05.24.010.001
Tel: + 357 22691921
Fax: + 357 22691919
Email: epoulli@dmrid.gov.cy

July 8, 2022

Mr. Makis Ketonis
Future Fuels Ltd
71 Larnakos Avenue,
2101 Nicosia, Cyprus

LETTER OF SUPPORT

Future Fuels Hydrogen proposal – Innovation Fund Small-Scale Projects

I am pleased to be informed about the project **Hydrogen to Transport** prepared by the Future Fuels in Cyprus, that will be submitted for funding under the Small-Scale Projects call of the Innovation Fund.

2. The Innovation Fund represents one of the world's largest funding programmes for the demonstration of innovative low-carbon technologies. The Deputy Ministry of Research, Innovation and Digital Policy of Cyprus, considers **this innovative project as an opportunity for a significant contribution to the reduction of greenhouse gas (GHG) emissions by increasing the share of Renewable Energy Sources (RES) to the transport sector in Cyprus.** As a result, we believe that this project will contribute to the delivery of EU's commitments under the Paris Agreement and the EU objective for climate neutrality by 2050.

3. Regarding Cyprus's plans up to 2030, the National Energy and Climate Plan (NECP) submitted to the European Commission in accordance with Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, is formulated to achieve, amongst others, the following quantitative targets: i) 20.9% reduction of the emissions in the sectors outside the Emissions Trading System (ETS) by 2030 compared to 2005, while the national target for non-ETS sectors of 24% reduction will be achieved using flexible mechanisms provided by the Effort Sharing Regulation, and ii) 14% share of RES in the transport sector by 2030. With the new ambitious of the EU under the European Green Deal for climate neutrality by 2050, the NECP will have to be updated in accordance with the 55% reduction target of GHG emissions by 2030.

4. The Long-Term Low Greenhouse Gas emission (GHG) Development Strategy for 2050, which is complementary to the NECP, identifies the part of the country's participation in the collective European goal of a successful and sustainable transition to a climate-neutral economy

by 2050. As it is highlighted in the country's draft Long-Term Low GHG Development Strategy for 2050 (2022 update), the difference in the projected emission reductions between the NECP scenario and the "Ambitious" scenario (AMB) towards carbon neutrality in 2050 is significant even for the years 2022-2030. This justifies the importance those solutions can make to the decarbonization of the economy and the increase of share of RES, with the ultimate goal of climate-neutrality.

Sincerely,

Dr. Stelios D. Himonas
Permanent Secretary

Letter of Support from Ministry of Agriculture, Rural Development, and Environment

REPUBLIC OF CYPRUS
MINISTRY OF AGRICULTURE, RURAL DEVELOPMENT AND ENVIRONMENT
MINISTER

5th July, 2022

Mr. Makis Ketonis
Future Fuels Ltd
71 Larnakos Avenue
2101 Nicosia
Cyprus

LETTER OF SUPPORT

Future Fuels Hydrogen proposal – Innovation Fund Small-Scale Projects

I have been informed about the project **Hydrogen to Transport** prepared by the Future Fuels in Cyprus, that will be submitted for funding under the Small-Scale Projects call of the Innovation Fund.

The Ministry of Agriculture, Rural Development and Environment of Cyprus, considers **this innovative project as an opportunity for a significant contribution to the reduction of greenhouse gas (GHG) emissions by increasing the share of Renewable Energy Sources (RES) to the transport sector in Cyprus.**

The Integrated National Energy and Climate Plan (INECP) submitted to the European Commission in accordance with Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, is formulated to achieve quantitative targets in accordance with the national energy and climate objectives for 2030. Some of these targets are the following: i) 20.9% reduction of the emissions in the sectors outside the Emissions Trading System (ETS) by 2030 compared to 2005, while the national target for non-ETS sectors of 24% reduction will be achieved using flexible mechanisms provided by the Effort Sharing Regulation, and ii) 14% share of RES in the transport sector by 2030.The corresponding document suggests policy measures which are deemed necessary for attaining the related objectives for 2030, with the hydrogen deployment not been explicitly considered for the period from 2021 to 2030. With the new ambitious of the EU under the European Green Deal for climate neutrality by 2050, the NECP will have to be updated in accordance with the 55% reduction target of GHG emissions by 2030.

The Long-Term Low Greenhouse Gas emission (GHG) Development Strategy for 2050, which is complementary to the NECP, identifies the part of the country's participation in the collective European goal of a successful and sustainable transition to a climate-neutral economy by 2050. As it is highlighted in the country's draft Long-Term Low GHG Development Strategy for

Ministry of Agriculture, Rural Development and Environment, 6, Amfipoleos Str., 2025 Strovolos, Nicosia
Tel.: 22408326/27, Fax.: 22780623, Website http://www.moa.gov.cy

2050 (2022 update), the difference in the projected emission reductions between the NECP scenario and the "Ambitious" scenario (AMB) towards carbon neutrality in 2050 is significant even for the years 2022-2030. This justifies the importance those solutions can make to the decarbonization of the economy and the increase of share of RES, with the ultimate goal of climate-neutrality.

Sincerely

Costas Kadis
Minister

Letter from Water Development Department of Larnaca for use of wastewater from secondary treatment

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΓΕΩΡΓΙΑΣ,
ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

ΤΜΗΜΑ ΑΝΑΠΤΥΞΕΩΣ ΥΔΑΤΩΝ
ΕΠΑΡΧΙΑΚΟ ΓΡΑΦΕΙΟ ΛΑΡΝΑΚΑΣ

Αρ. Φακ.: **2.11.023.04.03/2**
Αρ. Τηλ.: **24819223**
Email: wddlca@wdd.moa.gov.cy

14 Ιουλίου 2022

ΜΕ ΗΛΕΚΤΡΟΝΙΚΟ ΤΑΧΥΔΡΟΜΕΙΟ
M.C.K. Future Fuels Ltd
(υπόψην κ. Μάκη Κετώνη)
ketonis@wincono.com

Θέμα: Αίτημα για παραχώρηση ανακυκλωμένου νερού

Αναφέρομαι στο πιο πάνω θέμα και σε συνέχεια του ηλεκτρονικού σας μηνύματος, ημερομηνίας 07/07/2022 σας πληροφορώ τα ακόλουθα:

1. Το αίτημά σας εγκρίνεται και θα σας παραχωρηθεί ανακυκλωμένο νερό από το σημείο ΔΡΟΜ-ΑΠ 04 για τις ανάγκες των βιομηχανικών εργασιών σας.
2. Οι ποσότητες του νερού που θα σας παραχωρηθούν θα είναι της τάξης των 1500 κ.μ. νερού ετησίως.
3. Το νερό που θα σας παραχωρηθεί κατατάσσεται στην Βιομηχανική Χρήση και ως εκ τούτου η τιμή του ανέρχεται στα €0,17/κ.μ.
4. Η μεταφορά του νερού από το σημείο σύνδεσης θα γίνεται με τη χρήση βυτιοφόρων. Η διοχέτευση του νερού από την παροχή στο βυτιοφόρο συστήνεται όπως γίνεται με την χρήση εύκαμπτου λαστίχου τύπου spiral. Η προμήθεια των βυτιοφόρων με νερό θα πρέπει να γίνεται ιδιαίτερα προσεχτικά ώστε να μην διαχέονται τα νερά στο μονοπάτι διέλευσης και να δημιουργούνται προβλήματα στην πρόσβαση άλλων πολιτών προς την ιδιοκτησία τους.
5. Το ΤΑΥ δεν φέρει ευθύνη για την ποιοτική ή την ποσοτική επάρκεια του νερού και η χρήση του θα γίνεται με δική σας ευθύνη.
6. Το τέλος σύνδεσης ανέρχεται στο ποσό των €200,00 + 5% Φ.Π.Α. το οποίο θα πρέπει να καταβληθεί σε ταμείο του ΤΑΥ στην Λάρνακα.
7. Για επίλυση πρακτικών θεμάτων και υπογραφή της συμφωνίας σύνδεσης, παρακαλώ όπως επικοινωνήσετε με τον κον Αντώνη Βύρα στο τηλέφωνο 24819089.

Δρ. ΝΤΙΝΟΣ ΠΟΥΛΛΗΣ
Επαρχιακός Μηχανικός

ΑΚ/ΑΚ

FUTURE FUELS LTD

4 Ιουλίου 2022

Δήμαρχο Αραδίππου
8, Λεωφόρος Σταδίου
7103 Αραδίππου

Φαξ: 24 811080
Email: municipality@aradippou.org.cy

Αξιότιμε κύριε Ευαγγελίδη,

Θέμα: Διαβούλευση για την κατασκευή μονάδας Παραγωγής Πράσινου Υδρογόνου

Η Future Fuels προτίθεται να προχωρήσει στην εγκατάσταση της πρώτης πιλοτικής μονάδας παραγωγής πράσινου υδρογόνου, με στόχο την παραγωγή Υδρογόνου για εφοδιασμό οχημάτων.

Η προτεινόμενη ανάπτυξη χωροθετείται στην Ενορία Άγιος Φανούριος, στο τεμάχιο 371, 40/54E2, στη Ζώνη Ba3/Be1 που είναι μικτή ζώνη βιομηχανίας και οικονομικών δραστηριοτήτων.

Με την παρούσα επιστολή θα θέλαμε τις προκαταρκτικές απόψεις του Δήμου σας σχετικά με την κατασκευή του πιο πάνω έργου. Σύμφωνα με την νομοθεσία, πέραν τον απόψεων σας, θα ήταν καλό να διοργανωθεί μία παρουσίαση στην Σχετική Επιτροπή του Δήμου και να είναι ανοιχτή στο κοινό για συμμετοχή.

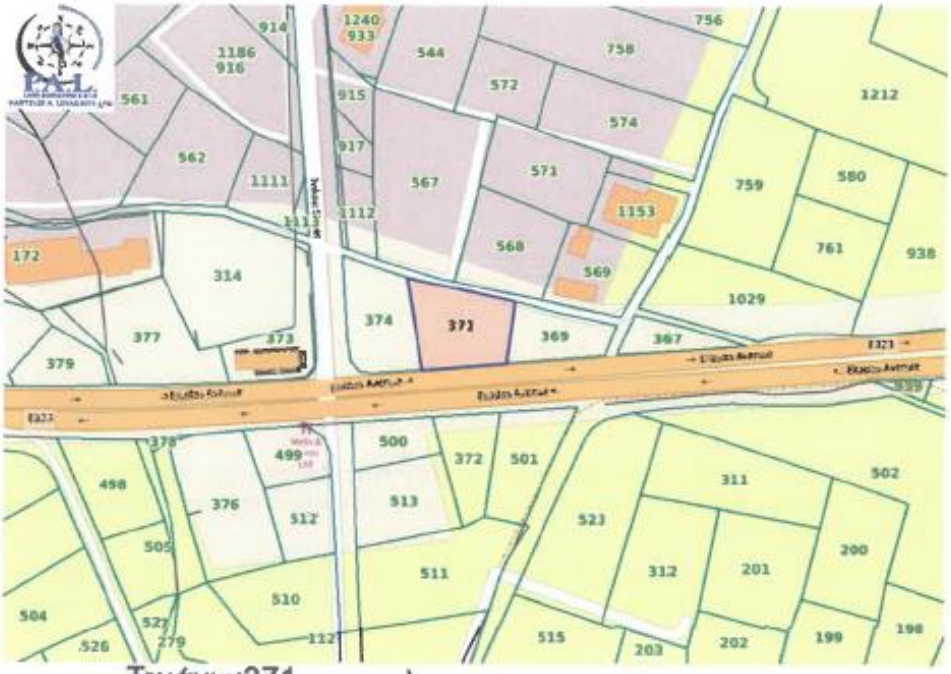
Το σχετικό κτηματικό σχέδιο που αναφέρεται πιο πάνω, επισυνάπτεται

Στη διάθεση σας για διευκρινίσεις.

Με εκτίμηση

Μάκης Κετώνης
Διευθύνων Σύμβουλος

71, Larnacos Aven. | Centre Court | 3rd floor, Office 301 | 2101 Aglantzia Nicosia Cyprus
T **22876699** | F **22876696** | email: **ketonis@wincono.com**



Τεμάχιο:371

Δήμος/Κοινότητα:	ΔΗΜΟΣ ΑΡΑΔΙΠΠΟΥ
Ενορία:	ΑΓΙΟΣ ΦΑΝΟΥΡΙΟΣ
Τμημα:	29
Αρ. Φ/Σχ:	40/54Ε2
Αρ. Εγγρ.:	29/305
Τοποθεσία:	ΚΛΗΜΗΣ
Αξία 2018:	€211,100
Αξία 2021:	€211,100
Εμβαδόν:	2,077μ2
Κατηγορία:	ΧΩΡΑΦΙ
Ζώνη:	Βα3/Βε1
Ζωνη Περιγραφή	ΜΕΙΚΤΗ ΖΩΝΗ ΒΙΟΜΗΧΑΝΙΑΣ & ΟΙΚΟΝ. ΔΡΑΣΤ.
Δόμηση:	100%
Κάλυψη:	60%
Ορόφοι:	2
Υψος:	nullμ

ΟΙ ΠΕΡΙ ΤΗΣ ΕΚΤΙΜΗΣΗΣ ΤΩΝ ΕΠΙΠΤΩΣΕΩΝ ΣΤΟ ΠΕΡΙΒΑΛΛΟΝ ΑΠΟ ΟΡΙΣΜΕΝΑ ΕΡΓΑ ΝΟΜΟΙ ΤΟΥ 2018 ΕΩΣ 2021

Άρθρο 26

ΕΝΤΥΠΟ 13

ΔΗΛΩΣΗ ΟΡΘΟΤΗΤΑΣ ΓΙΑ ΠΛΗΡΟΦΟΡΙΕΣ ΜΕΕΠ

Σύμφωνα με το άρθρο 26 των περί της Εκτίμησης των Επιπτώσεων στο Περιβάλλον από Ορισμένα Έργα Νόμων του 2018 έως 2021, και σε σχέση με τη Μελέτη Εκτίμησης Επιπτώσεων στο Περιβάλλον για την ανέγερση / κατασκευή του Πιλοτικού έργου παραγωγής πράσινου υδρογόνου και σταθμού ανεφοδιασμού,

στην βιομηχανική περιοχή *Αραδίππου*

εγώ η *Ανθή Χαραλάμπους*, ειδικότητας Χημικής Μηχανικής/Περιβαλλοντικής Μηχανικής, με την παρούσα δηλώνω ότι αναλαμβάνω πλήρη ευθύνη για την ορθότητα των στοιχείων και πληροφοριών που παρουσιάζονται στη Μελέτη Εκτίμησης Επιπτώσεων στο Περιβάλλον και που αφορούν θέματα: **Αναλυτική περιγραφή του σχεδιασμού του έργου, Εκτίμηση και αξιολόγηση των επιπτώσεων στο περιβάλλον, περιβαλλοντική διαχείριση και παρακολούθηση, Κωδικοποίηση αποτελεσμάτων και προτάσεων για την έγκριση περιβαλλοντικών όρων.**

Στοιχεία Μελετητή:

Φορέας: ideopsis Ltd

Όνομα: Ανθή Χαραλάμπους

Τηλέφωνο επικοινωνίας: 22667760

Ηλεκτρονική διεύθυνση: a.charalambous@ideopsis.com

Υπογραφή:

ΟΙ ΠΕΡΙ ΤΗΣ ΕΚΤΙΜΗΣΗΣ ΤΩΝ ΕΠΙΠΤΩΣΕΩΝ ΣΤΟ ΠΕΡΙΒΑΛΛΟΝ ΑΠΟ ΟΡΙΣΜΕΝΑ ΕΡΓΑ ΝΟΜΟΙ ΤΟΥ 2018 ΕΩΣ 2021

Άρθρο 26

ΕΝΤΥΠΟ 13

ΔΗΛΩΣΗ ΟΡΘΟΤΗΤΑΣ ΓΙΑ ΠΛΗΡΟΦΟΡΙΕΣ ΜΕΕΠ

Σύμφωνα με το άρθρο 26 των περί της Εκτίμησης των Επιπτώσεων στο Περιβάλλον από Ορισμένα Έργα Νόμων του 2018 έως 2021, και σε σχέση με τη Μελέτη Εκτίμησης Επιπτώσεων στο Περιβάλλον για την ανέγερση / κατασκευή του Πιλοτικού έργου παραγωγής πράσινου υδρογόνου και σταθμού ανεφοδιασμού,

στην βιομηχανική περιοχή *Αραδίππου*

εγώ η *Δρ Χρύσω Σωτηρίου*, ειδικότητας Φυσικός/Climate Change Expert, με την παρούσα δηλώνω ότι αναλαμβάνω πλήρη ευθύνη για την ορθότητα των στοιχείων και πληροφοριών που παρουσιάζονται στη Μελέτη Εκτίμησης Επιπτώσεων στο Περιβάλλον και που αφορούν θέματα: **Συμβατότητα του έργου με τις θεσμοθετημένες χωροταξικές και πολεοδομικές ρυθμίσεις της περιοχής και το θαλάσσιο χωροταξικό σχεδιασμό καθώς επίσης και με Διεθνείς, Ευρωπαϊκές και Εθνικές Στρατηγικές, Υφιστάμενη κατάσταση του περιβάλλοντος, Εκτίμηση και αξιολόγηση των επιπτώσεων στο περιβάλλον, Αντιμετώπιση των επιπτώσεων στο περιβάλλον.**

Στοιχεία Μελετητή:

Φορέας: ideopsis Ltd

Όνομα: Δρ Χρύσω Σωτηρίου

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Υπογραφή:

ΟΙ ΠΕΡΙ ΤΗΣ ΕΚΤΙΜΗΣΗΣ ΤΩΝ ΕΠΙΠΤΩΣΕΩΝ ΣΤΟ ΠΕΡΙΒΑΛΛΟΝ ΑΠΟ ΟΡΙΣΜΕΝΑ ΕΡΓΑ ΝΟΜΟΙ ΤΟΥ 2018 ΕΩΣ 2021

Άρθρο 26

ΕΝΤΥΠΟ 13

ΔΗΛΩΣΗ ΟΡΘΟΤΗΤΑΣ ΓΙΑ ΠΛΗΡΟΦΟΡΙΕΣ ΜΕΕΠ

Σύμφωνα με το άρθρο 26 των περί της Εκτίμησης των Επιπτώσεων στο Περιβάλλον από Ορισμένα Έργα Νόμων του 2018 έως 2021, και σε σχέση με τη Μελέτη Εκτίμησης Επιπτώσεων στο Περιβάλλον για την ανέγερση / κατασκευή του Πιλοτικού έργου παραγωγής πράσινου υδρογόνου και σταθμού ανεφοδιασμού,

στην βιομηχανική περιοχή *Αραδίππου*

εγώ η *Αφροδίτη Μάγου*, ειδικότητας Περιβαλλοντολόγος, με την παρούσα δηλώνω ότι αναλαμβάνω πλήρη ευθύνη για την ορθότητα των στοιχείων και πληροφοριών που παρουσιάζονται στη Μελέτη Εκτίμησης Επιπτώσεων στο Περιβάλλον και που αφορούν θέματα: **Υφιστάμενη κατάσταση του περιβάλλοντος, Εκτίμηση και αξιολόγηση των επιπτώσεων στο περιβάλλον, Αντιμετώπιση των επιπτώσεων στο περιβάλλον.**

Στοιχεία Μελετητή:

Φορέας: ΚΥΚΛΟΙΚΟΔΡΟΜΙΟ

Όνομα: Αφροδίτη Μάγου

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