

LNG Truck Loading Station

Revithoussa LNG Terminal

October 2022



Co-financed by Greece and the European Union

Ferry boat: emergency procedures

The ferry boat has **3 distinctive alarm systems**:

- **General emergency signal:** 7 short blasts and 1 long blast
- **Fire alarm:** continuous ringing
- **Leak signal:** group of 3 rings

In any alarm we wear the **life jackets which are under the seats** in accordance with the instructions of the crew.

We gather at the **assembly station** located at the place where we are and we are following the instructions of the crew.

The **emergency signals does not mean order to leave the ship.**

The order to leave the ship is given only by the captain.



Revithoussa island map: emergency procedures

The Terminal has 3 distinctive alarm systems:

→ FIRE ALARM

Unmodulated - Continuously



→ GAS LEAKAGE ALARM

Modulated 5 sec on, 5 sec off

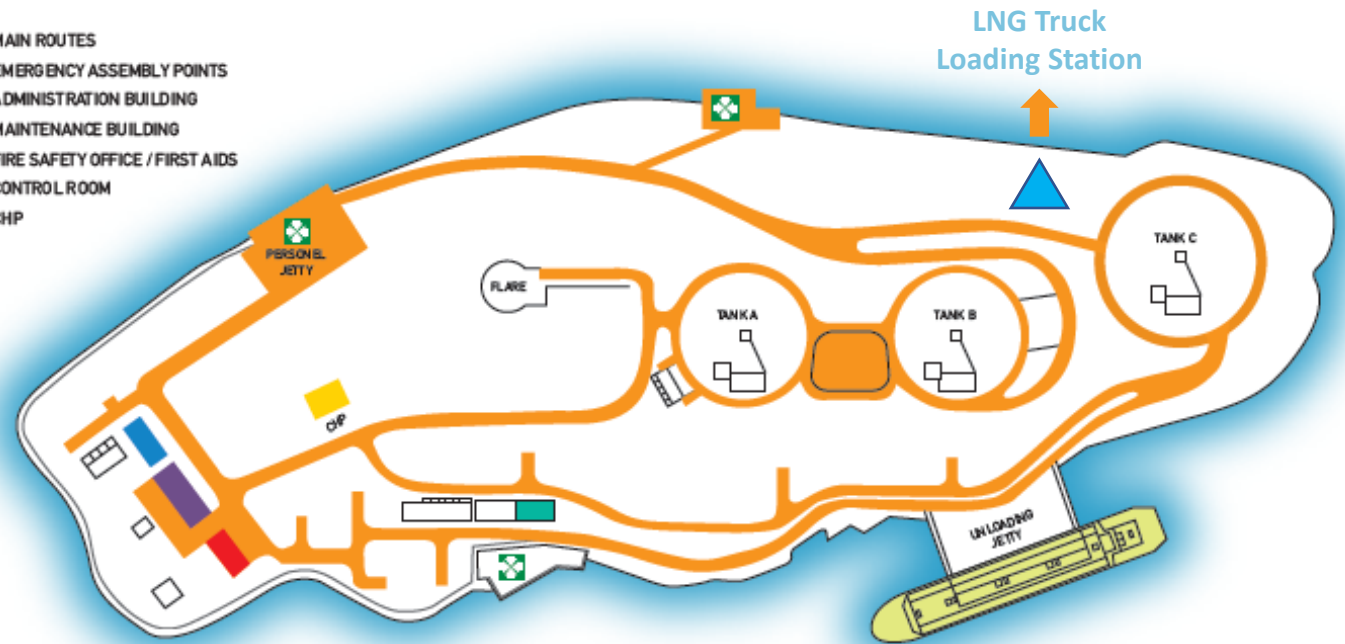


→ LIQUID SPILLAGE ALARM

Modulated 5 sec on, 10 sec off



- MAIN ROUTES
- EMERGENCY ASSEMBLY POINTS
- ADMINISTRATION BUILDING
- MAINTENANCE BUILDING
- FIRE SAFETY OFFICE / FIRST AIDS
- CONTROL ROOM
- CHP





desfa

The concept of Small-Scale LNG The Truck Loading Service

Sotirios Bravos

Commercial Services Division Director, DESFA

The concept & benefits of Small-Scale LNG

Small-Scale LNG consists of a set of logistics activities used to handle small/medium quantities of liquefied natural gas (LNG). It refers to the transportation of small/medium quantities of LNG directly to the facilities of final consumers or distribution networks.

Provides a versatile solution for the supply of users and areas off-the-grid

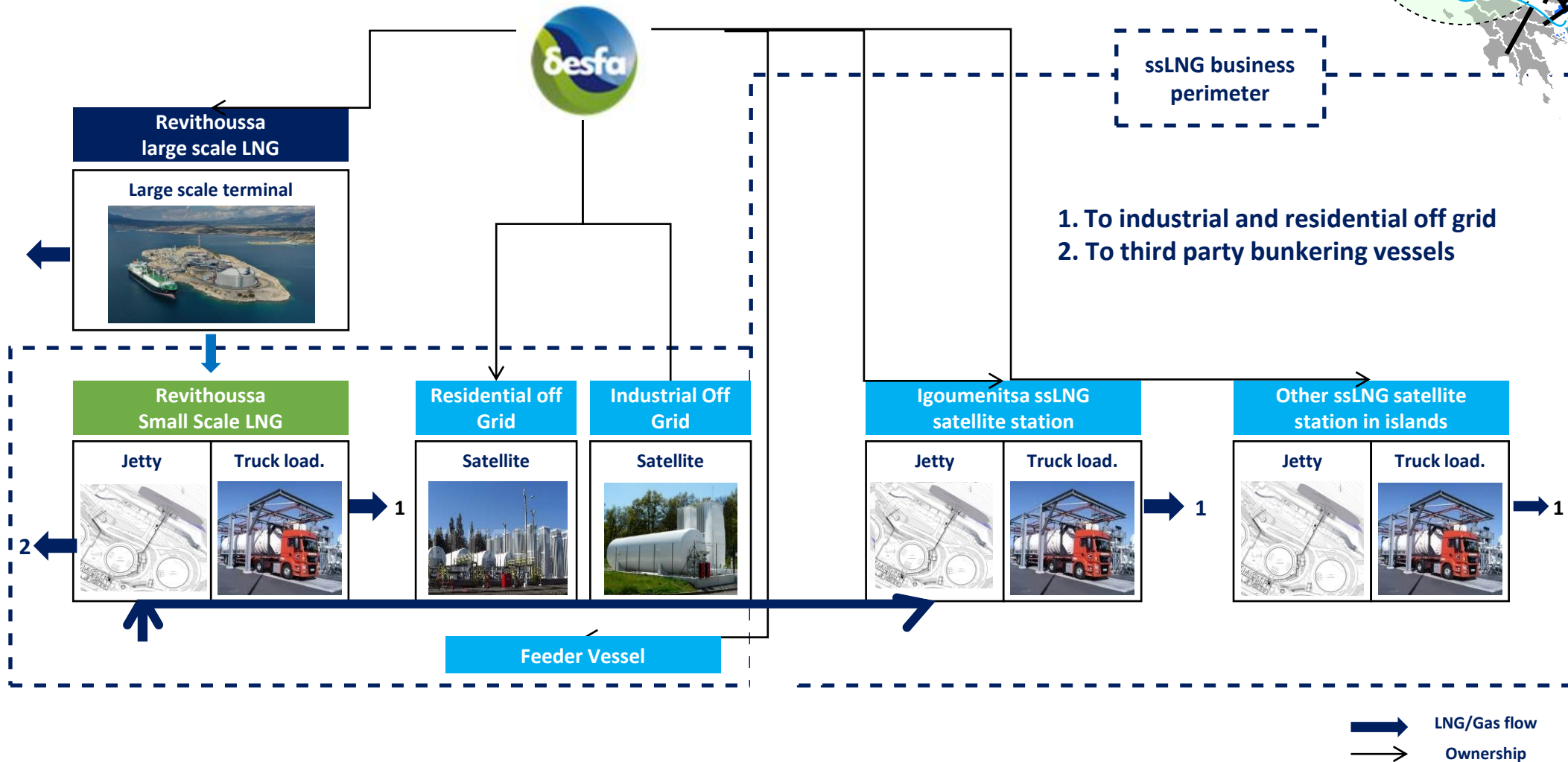
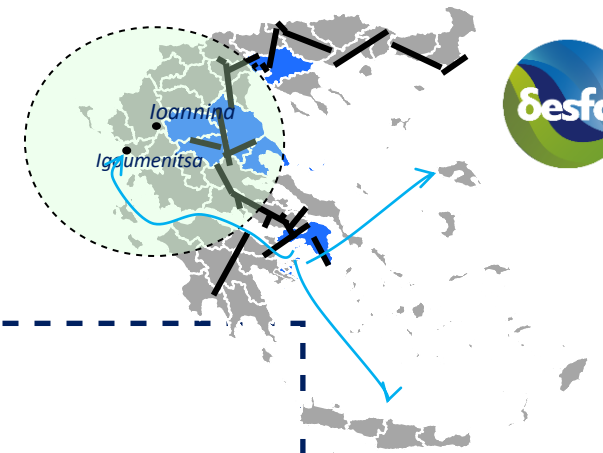
Offers an alternative fuel for industries

Strengthens security of supply/energy storage

Proven & safe technology

Significant environmental benefits (less NO_x, SO, PM emissions)

Introducing LNG in new regions of the country



LNG/Gas flow
 Ownership



HELLENIC REPUBLIC
 MINISTRY OF
 DEVELOPMENT AND INVESTMENTS
 SPECIAL SECRETARIAT FOR
 ERDF & CF PROGRAMMES
 MANAGING AUTHORITY OF EPANEK

EPANEK 2014-2020
 OPERATIONAL PROGRAMME
 COMPETITIVENESS
 ENTREPRENEURSHIP
 INNOVATION

ΕΣΠΑ
2014-2020
 ανάπτυξη - εργασία - αλληλεγγύη
 Partnership Agreement
 2014 - 2020

Co-financed by Greece and the European Union

Regulatory Framework

- ✓ The **Truck Loading Service (TLS)** offered by DESFA, is a **new regulated service**.
- ✓ The rules that describe the access of the Users in the TLS are found in a new Chapter in the NNGS Network Code (Chapter 11A).
- ✓ **All natural and legal entities that are members of RAE's NNGS Registry** are eligible for becoming TLS Users, by signing a **TLS Framework Agreement** with DESFA in order to use the Service.
- ✓ The **Truck Loading Service** is offered under a **standard tariff, approved by RAE (650 € / slot)**
- ✓ Each TLS User must also submit a **Guarantee of 20.000€**, regardless of its activity.



Timeslot Reservation / Assignment

- ✓ The TLS is offered through **Standard Truck Loading Timeslots**.
- ✓ Until **November 20th of each year**, DESFA announces the **list of all available timeslots for the following Year**.
- ✓ Any available timeslot of Year Y can be reserved by interested TLS Users, on a FCFS basis, during the **interval** starting from **November 21st of Y-1, and up until 13:00 of Day D-1 (D: delivery day)**.
- ✓ The TLS User must have an **active TLS Framework Agreement** and the **respective Guarantee in place**, at the **time of the reservation request**.
- ✓ **Timeslots reserves by a TLS user can be assigned to another TLS User**.
- ✓ **Under a Timeslot agreement, the assigned-User transfers all rights and obligations associated with the Timeslot to the assignee-User**.



Truck Loading Station in Revithoussa Technical Overview & Construction Process

Ioannis Chomatas
Asset Development Division Director, DESFA

LNG Truck Loading Station: The Project



The LNG Truck Loading Station (TLS) IN Revithoussa Terminal, is the station of filling specially designed trucks or trailers, in order to transport LNG.

LNG trucks can carry significant amounts of energy by road, simulating a **virtual pipeline**, and providing **high versatility in natural gas supply**.

LNG TL offers a versatile solution for **transporting LNG quantities inland**, that can serve **industrial consumers**,

- ✓ truck to ship bunkering,
- ✓ truck to vehicle fueling, or
- ✓ supply off-the-grid areas or
- ✓ remote distribution points, acting as **virtual pipelines**.

Furthermore, TL Services (TLS) can be **combined with other SSLNG Services** by creating a **relatively flexible network of larger and smaller LNG distribution hubs**.



European Pioneers in the design & implementation of the project



The project has been designed and constructed by European pioneers in LNG technology under the Project Management by DESFA's high experienced technical expertise personnel.

Basic Design

- **TRACTEBEL ENGINEERING S.p.A.**

Duration: 12 months

Detailed Engineering, Procurement & Construction Services

- **TERNA S.A.**

- Award procedure: International Open Tender
- Main Subcontractors: MAN Energy Solutions , TCB , YOKOGAWA, ERGOTERM, SOFMAN, etc.

Engineering Review & Supervision Services

- **C&M Engineering S.A.**

Third Party Inspection Services

- **TUV Hellas S.A.**

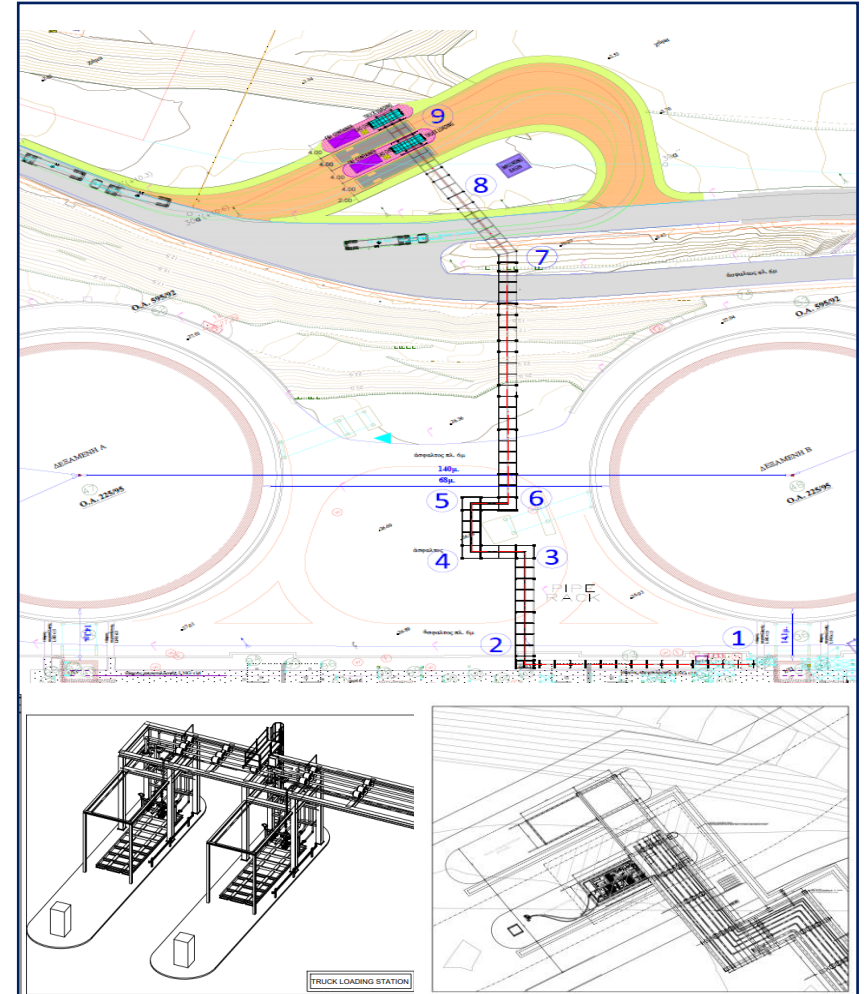
Greece's 1st LNG Truck Loading Station in Revithoussa



- **Status:** Completion of Construction
- **Project Budget:** 7,50 million €
- **EPC Contract Price:** 4,23 million €



- **Co-funded by:**
 - ✓ **NSRF 2014-2020** (Construction phase)
 - ✓ **Poseidon Med II** (Maturity phase)



LNG Truck Loading Station Conditions

- One loading bay station for truck – Road tankers/ ISO containers
- Maximum capacity of 50 m3 (42tn) per truck.
- LNG Send-out flowrate 100 m3/h.
- Construction of a **second loading bay (with the same capacity) for future expansion**, according to the needs of the market.

Loading bays	1 semi – automated
Max flow rate	100 m3/hour
Operational flow rate	0-100 m3/hour
Maximum working pressure	10 bar
Operational pressure	3-5 bar
Weighbridge	1 weighbridge on semi-automated bay
Gas chromatograph	Upstream TLS
Couplings	One (1) 3" hose for LNG supply to trailer One (1) 2" hose for BOG return from trailer



LNG Trucks: General Characteristics



Max. Load of LNG:

49 m³ (84% of the volume = ~23 tonnes)

Max. length:

16 meters

Design pressure:

9.1 barg

Max. weight:

42 tons

Max. width:

2.55 meters

Design temperature:

-198°C

- The **cryogenic tank of Truck** (the inner one) is in **stainless steel with breakwater baffles**, the diameter is around **2.33 m**.
- The Tank is **thermally insulated** with **polyurethane foam** and covered by the **second carbon steel shell**.
- For **security reason**, the cabinet shall be equipped with a **safety switch** in order to cut the battery power of the truck while the cabinet is open. This is to ensure that the **truck engine cannot run while the truck is still connected**.
- For **LNG loading**, the trucks are linked to the flexible hoses by **quick union couplings**.
- This connection must be **safe, free of leaks** but **easy to handle and to plug**.

“If the truck does not fulfill specific requirements, access to site shall be denied”

LNG Truck Loading Station: Main Equipment

Truck Loading skid
(The place of the Loading)



Electrical & Instrument Container
(The Control Room)



Gas Chromatograph cabinet
(The place where gas is analysed)



Implementation in line with the best practices and specifications for Project Management and Construction with the use of highest safety standards



Delivery a state-of-the-art, fully-engineered infrastructure for the supply of LNG via trucks to any place in Greece



A photograph of a truck loading station at a DESFA facility. The station features a large blue and green structure with the 'desfa' logo. In the background, there is an industrial complex with various pipes and structures under a clear blue sky with some clouds. A green semi-transparent banner is overlaid on the image, containing the title and speaker information.

Truck Loading Station in Revithoussa Operational Overview

Nikos Katsis

Asset Management Division Director, DESFA

LNG Truck Loading station: Operational Overview



Elements of the Service



- Inspection of the necessary documents of the TLS User, the LNG Truck and its driver at the Transit Port.



- Sea Transportation of the LNG Truck and driver from the Transit Port to the LNG Facility.



- Inspection of the LNG Truck, entrance to the TL Facility and loading of the LNG Truck.



- Sea Transportation of the LNG Truck from the LNG Facility back to the Transit Port.



- Conducting all necessary measurements and procedures required for the effective, safe and cost efficient operation of the facility according to the regulatory framework and the technical manuals.



LNG Truck Loading station: Operational Overview

Technical Description

The TL Facility will be integrated to the Revithoussa LNG terminal. LNG from the LNG storage tanks shall be supplied to the TL Facility.

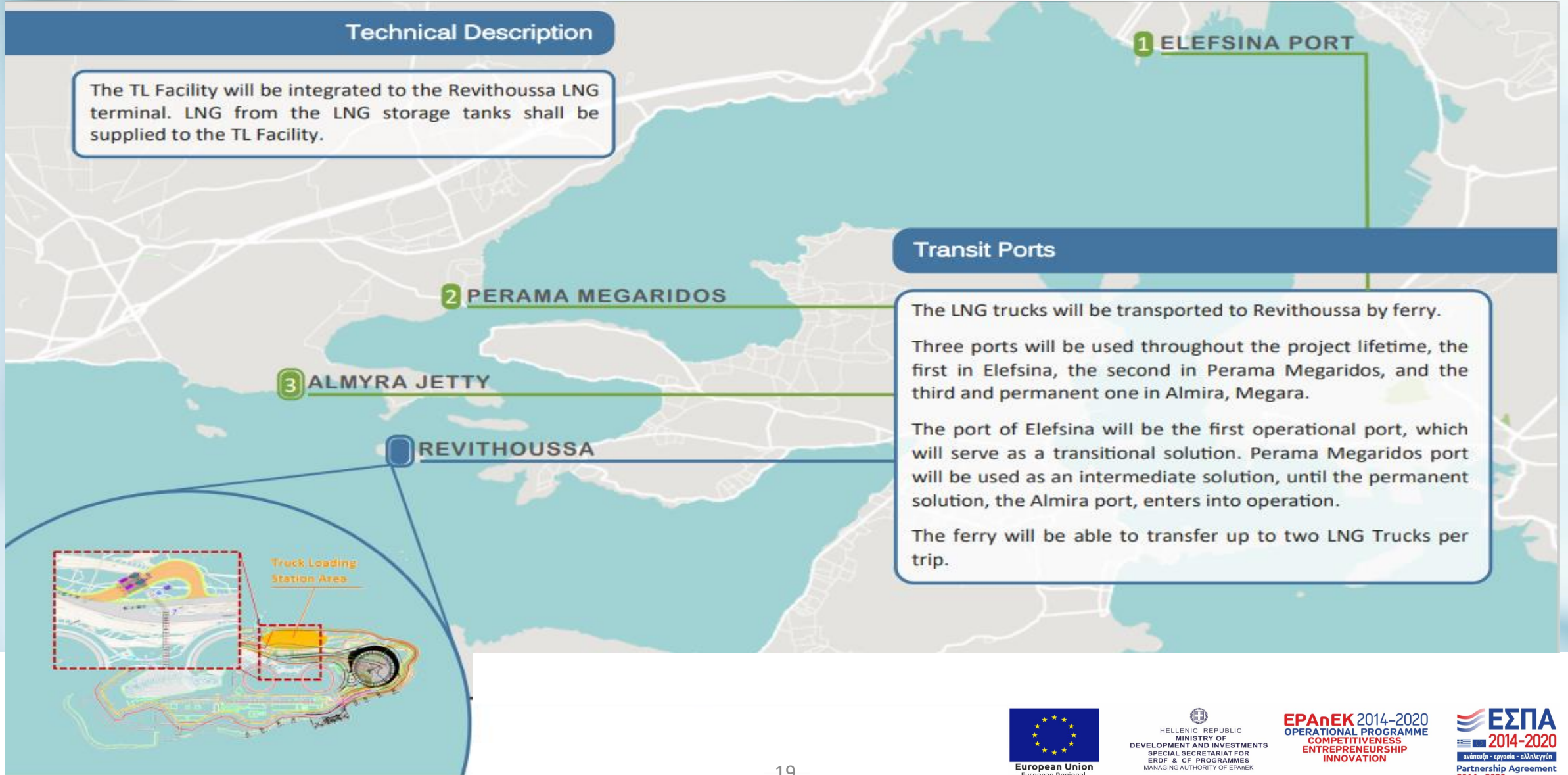
Transit Ports

The LNG trucks will be transported to Revithoussa by ferry.

Three ports will be used throughout the project lifetime, the first in Elefsina, the second in Perama Megaridos, and the third and permanent one in Almira, Megara.

The port of Elefsina will be the first operational port, which will serve as a transitional solution. Perama Megaridos port will be used as an intermediate solution, until the permanent solution, the Almira port, enters into operation.

The ferry will be able to transfer up to two LNG Trucks per trip.



LNG Truck Loading station: Operational Overview

Timeslots

Operation & Logistics

Max number of trucks onboard per transfer	2
Anticipated TLS – Timeslots per day*	10
Timeslot duration (for Elefsina port)*, **	4 hours
One-way trip duration (Elefsina– Revithoussa)	60'
One-way trip duration (Perama Megaridos – Revithoussa)	20'
One-way trip duration (Almyra jetty – Revithoussa)	10'
Truck loading duration (including preparatory activities)*	~60' per truck

Truck Loading Facility

Operational days per week	7
Anticipated operational window	08:00 – 20:00
Peak loading capacity	100m ³ _{LNG} /hr
Number of loading bays	1
Maximum estimated TLs annually	3,550

*Only for the first year of operation (2022) the truck loading duration time might be over 60' for technical reasons, leading to timeslots larger than 4 hours. Anticipated daily number of TLS-timeslots may be reduced accordingly.

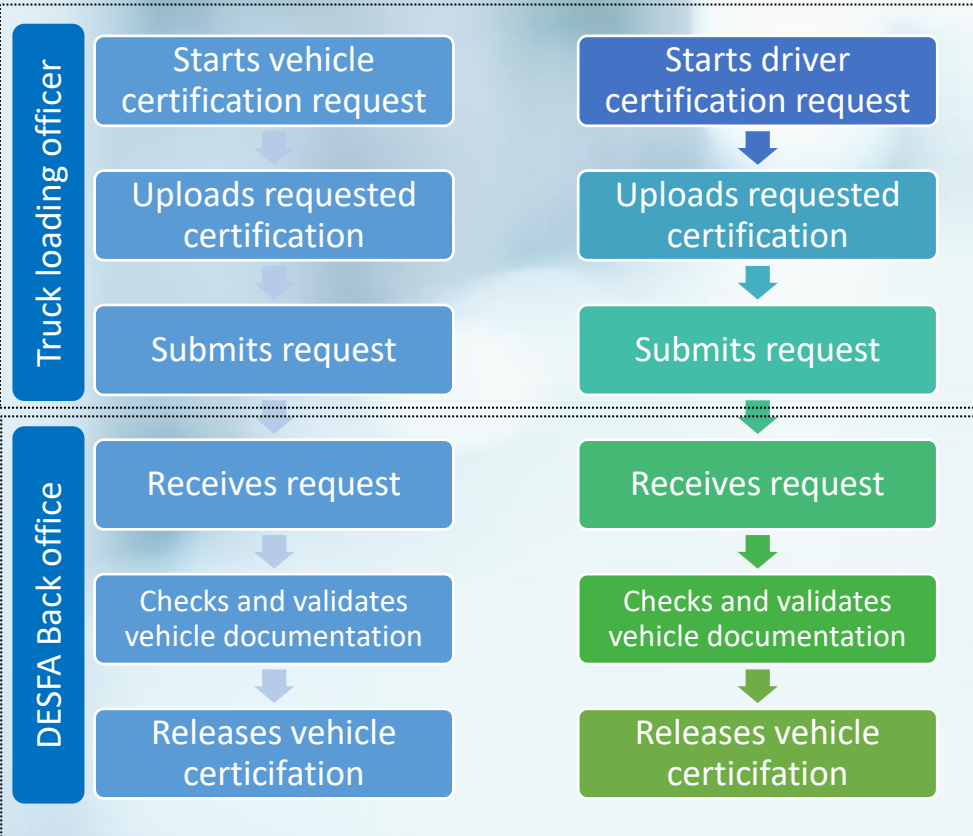
**The Timeslot's duration depends on the actual Transit Port. Timeslot duration will be reduced for Perama Megaridos and Almyra ports.

Truck Loading Verification process

Before truck arrival

1 Vehicle Certification

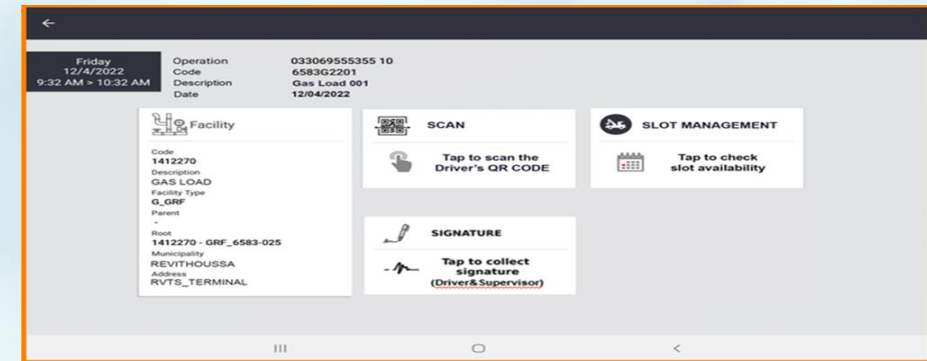
2 Driver Certification



Upon truck arrival

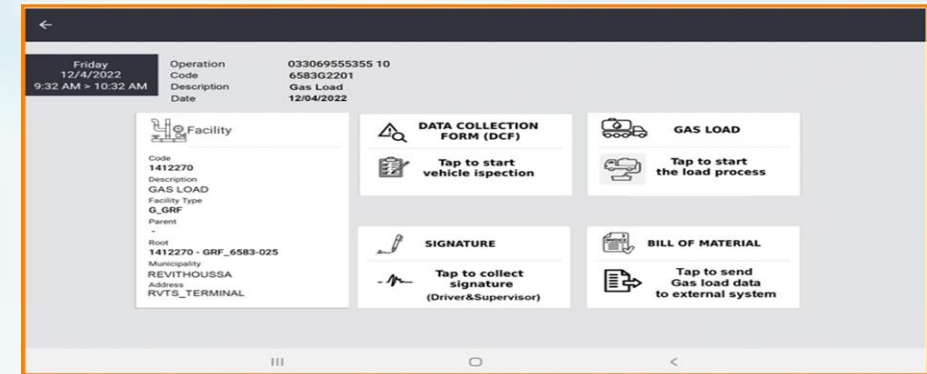
3 Mobile App | QR Scanner & Slot Management

- DESFA can scan the transportation's QR Code to check all the information and permission related to the vehicle and driver.
- In case of **invalid check-in or driver delays**, the Mobile app allows DESFA users to **check for the next available slot and reschedule the load in the same day, if available.**



4 Mobile App | Preload inspections & gas load

- DESFA User, through **Data Collection Form (DCF)**, has a set of features for the information collection related to activities, events or circumstances during the working day.
- The **DCF** is a **system configurable entity**, which allows to trace on the device technical data in a uniform and structured way.





LNG TRUCK LOADING

Η ΕΝΕΡΓΕΙΑ





Thank you!



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