Draft NATIONAL NATURAL GAS SYSTEM's DEVELOPMENT PLAN 2022-2031

July 2022

Contents

ABBREVIATIONS

BMS: Border Metering Station
CCTV: Closed Circuit Television
CHP: Combined Heat and Power unit
CNG: Compressed Natural Gas
DESFA: TSO of the Greek Natural Gas System
EIB: European Investment Bank
HP: High Pressure
IGB: Interconnector Greece Bulgaria
IISNG: Integrated IT System for Natural Gas
L/V: Linevalve
LNG: Liquefied Natural Gas
M/R: Metering/Regulating
NNGS: National Natural Gas System
NNGTS: National Natural Gas Transmission System
NSRF or PA: National Strategic Reference Framework or Partnership Agreement 7-year E.U. program for the support of the Greek economy
O&M Centers: Centers of Operation and Maintenance
PLC: Programmable Logic Controller
RAB: Regulated Asset Base
RAE: Regulatory Authority of Energy
RRF: E.U. Recovery and Resilience Facility
SCADA: Supervisory Control and Data Acquisition
TAP: Trans Adriatic Pipeline
TSO: Transmission System Operator
Nm^3: Normal Cubic meter
UGS: Underground Storage

Executive Summary

According to the current provisions of the Network Code, DESFA as the TSO of the National Natural Gas System (NNGS) prepares on a yearly basis, and puts in public consultation to all relevant stakeholders, the Draft Ten Year Development Plan (TYDP). Aim of this document is to inform the market participants on the infrastructure- new and planned-that DESFA is currently materializing.

The new proposed Development Plan 2022-2031 includes projects with a ***forecasted budget of approximately € 856 million, from which an amount of €126,7 million corresponds to new projects***, while the rest correspond to the ones already approved in the TYDP 2021-2030, as updated in terms of timeline and budget[1].

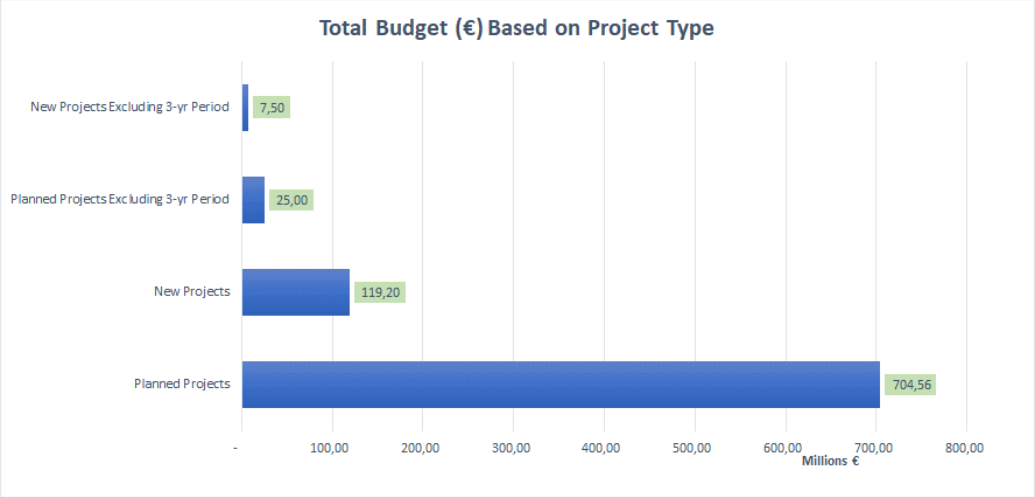
From these new projects, €92 million correspond to expansions to new areas, with the main one being the expansion of the gas infrastructure to Ioannina, and 27,2 million € to improvements, modernization, and maintenance of NNGS. From those, 5,5 million € refer to IT projects aiming at the digitalization of DESFA and its IT transformation in five key areas :1) managing business, 2) managing assets, 3) managing data and continuity, 4) facilitating customer relationships & communication & 5) supporting enterprise intelligence.

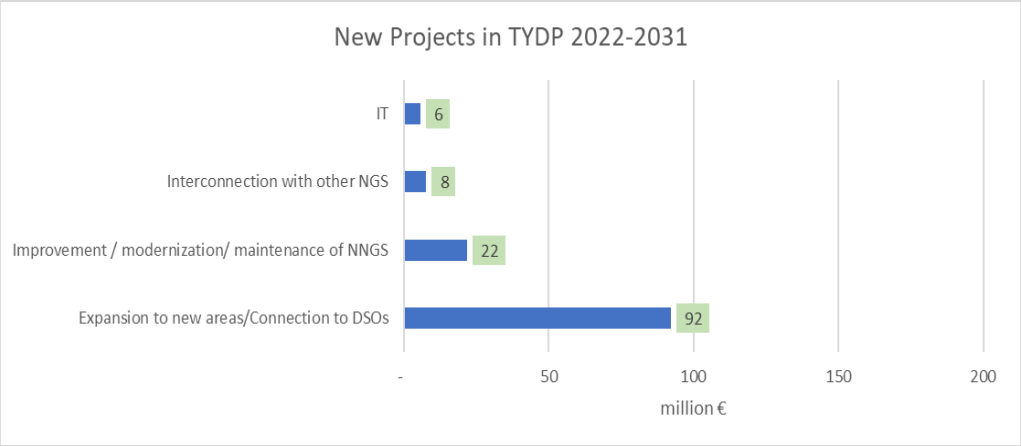
The present Development Plan does not include yet any major project related to the energy transition of the Greek energy sector and the decarbonization process, however, relevant work of DESFA is under development and will be further deployed in the immediate future, as necessary, revising the DESFA's TYDP. In addition, following the Repower EU initiative of the European Commission, DESFA has already proposed three major projects to be included in the relevant initiative, the further upgrade of the CS Komotini, the procurement of an FSU for the permanent upgrade of the storage capacity in Revithoussa, as well as the overall upgrade of the NNGS, with a H2-ready set of pipelines and other required components, with the view to accommodate the increased flows of natural and renewable gases through Greece, also for the neighboring countries and the corresponding new infrastructure connections to the NGTS. The results of the corresponding assessment will be incorporated in the TYDP in the future.

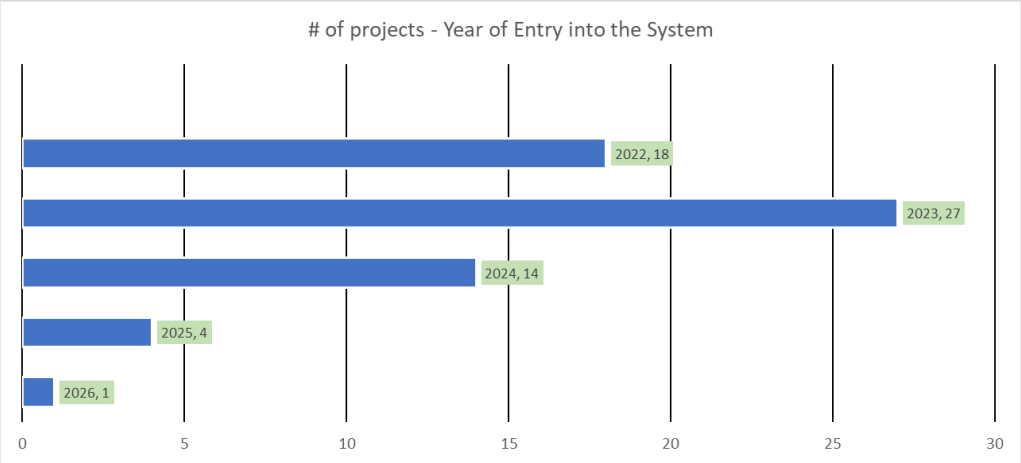
The following graphs include in summary the analysis of the total budget of this draft TYDP, in relation to:

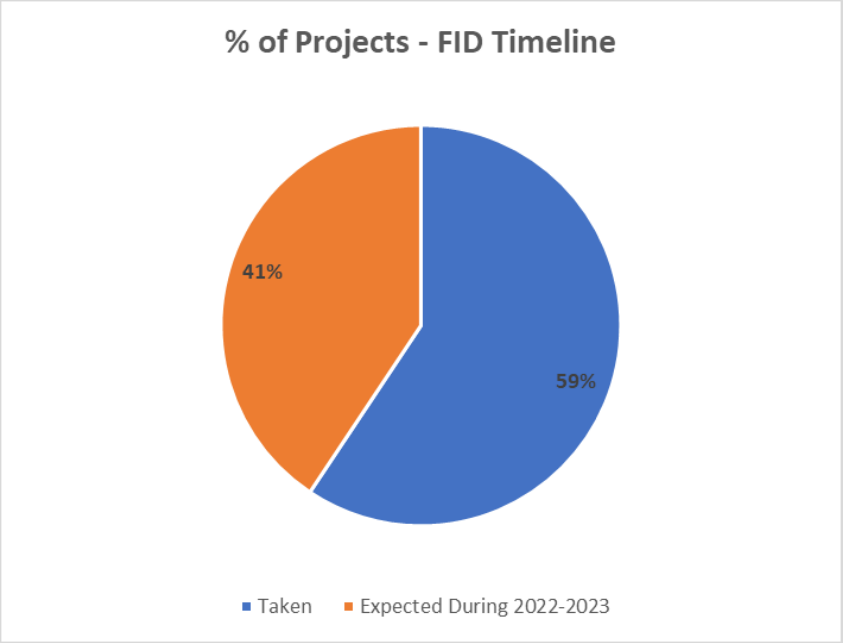
1. The project types
2. The FID date
3. The expected commissioning year

[1] As far as the updated budget is concerned, a total increase of appr. 196 million € is observed, compared to the already approved TYDP, reflecting the most recent update in steel prices and the more detailed estimation of CAPEX as projects mature.


Total Budget (€) Based on Project Type
New Projects Excluding 3-yr Period
7,50
Planned Projects Excluding 3-yr Period
25,00
New Projects
119,20
Planned Projects
704,56
-
100,00
200,00
300,00
400,00
500,00
600,00
700,00
800,00
Millions €


New Projects in TYDP 2022-2031
IT
6
Interconnection with other NGS
8
Improvement / modernization/ maintenance of NNGS
22
Expansion to new areas/Connection to DSOs
92
-
50
100
150
200
million €


# of projects - Year of Entry into the System
2022, 18
2023, 27
2024, 14
2025, 4
2026, 1
0
5
10
15
20
25
30



Chapter I. Introduction

The Development Plan 2022-2031 is conducted in accordance with applicable legislation namely article 14 of L. 4001/2011 and applicable provisions of the NNGS Network code.
As per the provisions of the legislation, for the preparation of the Development Plan, following parameters are taken into account:

a) data of the current and the estimated supply and demand of natural gas
b) the fulfillment of obligations to provide public utility services and gas supply security, aiming at the continuity of supply and prevention of congestions and of refusal of access for new users, in a reliable and economically efficient manner
c) the continuous improvement of the NNGS safety, reliability and efficiency, aiming at the prevention of incidents, failures and emergencies, in a reliable and economically efficient manner
d) the supply of new areas with natural gas and the ensuring of new Users' potential access
e) the protection of the environment, also by expanding the use of natural gas as an alternative, cleaner and more sustainable fuel, among others, in maritime and road transportation
f) the European development plan and the regional investment programs in accordance with the provisions of part (b) of paragraph 3 of Article 8 and of paragraph 1 of Article 12 of Regulation 715/2009
g) the viability of projects that are included in the Plan and their potential financing
h) the ongoing developments regarding the system's readiness to accept H_2 and other renewable gases volumes, in compliance with EU Green Deal requirements.

The Development Plan includes projects whose construction is scheduled to begin within the timeframe of the Plan (i.e., for the period 2022-2031) as well as the Planned Projects whose construction has not been completed yet.
The TSO substantiates the rationale of the inclusion of the new projects in the Development Plan and includes information about the construction method, the estimated budget, the time schedule of the implementation, the way of financing the relevant investments as well as the cost recovery method.
In the following paragraphs the projects of the Development Plan 2022-2031 are presented, including for each project all the necessary elements arising from the Network Code for the regulation of NNGS.
The Development Plan is structured as follows:
Chapter I : Introduction
Chapter II. Projects included in the three years Development Period (namely 2022-2024)
A. New Projects

1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)
2. Projects for the connection of Users
3. Development Projects: Expansion of NNGTS to new areas connected to distribution network
4. Development Projects: Expansion of NNGS to new markets
5. Development Projects: Increase of capacity & security of supply of NNGS
6. Development Projects: Improvement / modernization/ maintenance of NNGS
7. Incremental Capacity Projects according to CAM NC

B. Planned Projects[2]

1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)
2. Projects for the connection of Users
3. Development Projects: Expansion of NNGS to new areas connected to distribution network
4. Development Projects: Expansion of NNGS to new markets
5. Development Projects: Increase of capacity & security of supply of NNGS
6. Development Projects: Improvement / modernization/ maintenance of NNGS

Chapter III. Projects outside the three years Development Period
A. New Projects

1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)
2. Projects for the connection of Users
3. Development Projects

[2] Planned Projects are the projects already included in any of the previous TYDPs or to the List of Small Projects but are not yet concluded

B. Planned Projects

1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)
2. Projects for the connection of Users
3. Development Projects

Chapter IV. Projects that have been removed from the Development Plan 2022-2031

DESFA also provides justification and reasons for deviations or exclusion from the proposed draft Development Plan of any Planned Project.
It is mentioned at this point that according to Article 5A par. 8 of the Tariff Regulation (RAE Decision 1434/2020), the Development Projects that are defined as Projects of Major Importance are eligible for an increased return.

For each project a Table similar to the template below, summarizes the main elements of the project, as presented below:

- the type of project (Planned or New/ Development or Connection)
- the type of investment (pipeline, compressor station, metering station, LNG and small-scale LNG facilities, CNG facilities, including all related plants, machineries, devices, equipment and systems for process monitoring/supervision/control/management and ancillary facilities such as consolidation/protection works, service roads, buildings, offices, IT systems, etc.)
- the expected benefit (according to the criteria of art. 92 par. 2 of NNGS Network Code)
- the current status:
  - under preliminary study, which includes preliminary market analysis, dimensioning and cost estimation that will allow the definition of the project for approval by RAE
  - under maturity, which includes basic design study, environmental authorization, that is all the actions from approval by RAE up to the Final Investment Decision (i.e. Resolution to Construct) according to the definition of the NNGS Administration Code
  - under construction, which includes the detailed design, procurement of materials and construction of the project as well as any tests following mechanical completion, that are all the actions from the Final Investment Decision (i.e. Resolution to Construct) and up to inclusion of the project in the system
- the project milestone dates:
  - the start date, which is the first inclusion of the project to the Development Plan or List of Small Projects
  - the date of Final Investment Decision, as this term described in the NNGS Network Code, i.e. "*the approval decision for the implementation of the project by the Operator without technical, commercial or financial conditions*. *The FID is taken after (a) the approval of the Development Plan or the publication of the Small Projects List, in which it is included, (b) the execution of Connection Agreement for the Connection Projects, (c) the financing decisions, at least in relation to own capital and grants and (d) the approval of Environmental Terms. Contracts for procurement of materials and*

construction of projects are executed by the Operator after the taking of the FID" (art. 1 par. 78 of the Network Code).

- the estimated Operation Date, as described in the NNGS Network Code, which is the starting date of operation (for testing if necessary) after the mechanical completion of the project
- the scheduled day for Entry into System, which is the start of normal operation (or Commercial Operation Date). Entry of a project into the system is performed after the issuance of operation license, where relevant.

- the current budget of the project, as well as the part of which is considered maintenance capex. *Maintenance capex is considered to be any addition to or replacement of existing NNGS assets in order the latter to be maintained in their initial operational capability as long as possible.*
- for new projects their impact on the Average NNGS Tariff is calculated, as described and provided for in the Tariff Regulation
- the financing plan and the recovery method of the investment
- whether a commitment with a User has been made for booking of Transmission Capacity for a certain period of time
- whether the project is part of the three-year Development Period provided for in the respective NNGS Network Code. This period includes projects for which the final Investment Decision (i) has been taken, or (ii) is considered possible to be taken within three (3) years from the publication of the draft Development Plan in DESFA's website (i.e. up to October 2024). For projects not included in the 3-year Development Period, no planning is given.

Project Summary	
Type of project	
Type of investment	
Current Budget	
of which Maintenance Capex	
Expected benefit	
Start date	
Final Investment Decision	
Operation Date	
Entry in the system	
Current Status of Project	
Financing plan	
Recovery method	

Connection Agreement with User	
Impact on the Average Tariff for the use of NNGS (for "New" projects only)	
Inclusion in the 3 years Development Period	
First approval from RAE (for Planned Projects)	

Following the project summary of each project, a short description of the scope of it and any other necessary relevant information is given.

Chapter II. Projects included in the three years' Development Period

A. New Projects

A1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)

This chapter presents projects (could be either Development or Connection projects) that aim to interconnect the NNGTS with other natural gas systems (UGS facilities, LNG or FSRU, high pressure pipelines etc.) promoted by others. Currently there are no such projects included in the TYDP 2022-2031.

A2. Projects for the connection of Users

This chapter presents projects that are a result of the acceptance by DESFA of an Application for Advanced Reservation Capacity Allocation submitted by a User according to the procedure described in Article 95B of the Network Code. No new connection projects are proposed in this TYDP.

A3. Development Projects: Expansion of NNGS to new areas connected to distribution network

This chapter presents projects that aim to expand the transmission system to new areas and interconnect with the distribution network promoted by the relevant DSO in the area. Three (3) projects are proposed with a total budget of 92 million €.

1. Supply of Ioannina via SSLNG

Project Summary	
Type of project	New Project
Type of investment	ssLNG infrastructure
Current Budget	85 million €
Expected benefit	The supply of new areas with natural gas ensuring potential access to new Users
Start date	July 2022
Final Investment Decision	July 2023
Operation Date	June 2026
Entry into the system	September 2026
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Additional Services
Impact on the Average Tariff for the use of NNGS	2,95%[3]
Inclusion in the 3 years Development Period	Yes

The main aim of the project is to introduce gas to the city of Ioannina, but also, in the future, other major cities, industrial and agricultural premises in the area of Epirus, West Macedonia, as well as the neighboring countries, which have no gas at the moment. Following a comparative analysis between supply of natural gas with a pipeline - - and that through ssLNG, as also requested by RAE, DESFA proposes to proceed with the a small scale LNG (SSLNG) solution.

Epirus (capital: Ioannina), with a total area of 9,203 km2 and a population of 333,696 inhabitants in 2019 (Eurostat, 2020), is positioned at the north-western part of Greece and it is mostly an alpine region. However, recent infrastructure projects -e.g., Egnatia Odos, Ionia Odos and the forthcoming privatization of the port of Igoumenitsa, which is one of the major transit ports to Europe- a growing tourism, services and agricultural sectors, a dynamic academic environment (University of Ioannina and Technological Educational Institute of Epirus) and the strengthening of traditional industries are gradually transforming the region. The City of Ioannina is located at almost 60 km from Igoumenitsa port. The area is not served yet by natural gas infrastructure. In addition to Ioannina, also other major cities (Arta and

[3] For the calculation of the impact on the average tariff only the consumption of the city of Ioannina has been taken into account and not the surrounding areas, which might be substantial.

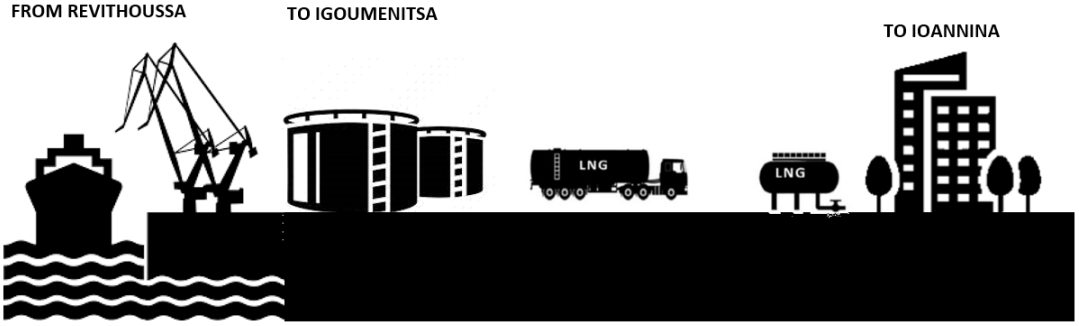
Preveza) would see the evolution of their economy requiring developing the natural gas infrastructure.

In addition to the development of a high-pressure pipeline stemming from the corresponding pipeline of West Macedonia, DESFA has assessed the alternative of supplying the region of Epirus through a virtual pipeline based on a SSLNG supply chain. Based on a comparative analysis of the corresponding costs it is proven that the option for the supply of Ioannina through SSLNG is the most cost efficient one.

To develop the LNG / NG infrastructure in the region DESFA has identified that the most technically, economically and timely efficient solution, is the supply through ssLNG installations, leveraging on its experience in managing the LNG terminal in Revithoussa island from which the LNG will be supplied to the Epirus region.

In order to satisfy the Ioannina consumption, it has been foreseen to supply LNG to the north of Greece via LNG carrier, it follows that a dock or a jetty will be needed as well as a small installation with LNG unloading and storage facility at Igoumenitsa area. The supply of LNG to Ioannina and eventually surrounding cities will be then organized via truck. A modular installation strategy will be applied as construction approach to stagger the project phases following the natural gas consumption increase.

Figure 1: Supply chain of LNG to Ioannina



Igoumenitsa Area: The LNG will be transferred to the port of Igoumenitsa via a small scale LNG vessel where it will be unloaded to specific storage facilities.

A jetty will also be required to accommodate the carrier and unload LNG from the LNG carrier to the storage facilities. The jetty will be adjacent to the Igoumenitsa port area.

In order to proceed from Storage tank to the supply of Ioannina, a truck loading skid is required to meet the maximum consumption per day capacity.

Ioannina Area: A Truck unloading skid is required to receive LNG at the Ioannina Storage and regassification hub. No spare Truck loading skid has been considered as the LNG Storage has been sized to accommodate approximately 2 days of additional peak volume for the Ioannina city consumption. Apart from a storage facility in Ioannina a regasifier and a metering equipment is also required.

The aforementioned design is preliminary and will be finalized at the time of basic engineering design.

2. M/R Station to Veroia

Project Summary	
Type of project	New Project
Type of investment	M/R Station
Current Budget	3,5 million €
Expected benefit	the supply of new areas with natural gas and the ensuring of new Users' potential access
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	June 2024
Entry into the system	Sep 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	-0,02%
Inclusion in the 3 years Development Period	Yes

The purpose of the project is the installation of a Metering/Regulating Station (along with the necessary building facilities and supporting equipment) at the extended area of Veroia for the supply with natural gas. The M/R station will be connected to the 10'' branch Arsenio-Veroia which is part of theHPP to West Macedonia (already planned project) upstream and downstream with the expected distribution network of DEDA.

The M/R Station will be designed with an initial capacity of 8.000 Nm^3/h and outlet pressure of 16,7 barg, (8.000 Nm^3/h, configuration 1+1 – one metering/regulating stream in operation and one stand-by), with future provision for expansion to max capacity of 16.000 Nm^3/h, when this will be justified demand-wise by the downstream connected system. The project is designed to be 100% H2 ready.

3. M/R Station to Naousa

Project Summary	
Type of project	New Project

Type of investment	Metering & Regulating Station
Current Budget	3,5 million €
Expected benefit	the supply of new areas with natural gas and the ensuring of new Users' potential access
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	June 2024
Entry in the system	September 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,05%
Inclusion in the 3 years Development Period	Yes

This new M/R Station U-9130 concerns the installation of a Metering/Regulating Station at the Kopanos area of Naousa for the supply with natural gas.

The M/R station will be fed through LVS U-9120 of the 10"branch Arsenio-Veria, which is part of the 30'' HHP to West Macedonia.

The M/R Station will be designed with a total capacity of 6.000Nm^3/h and outlet pressure of 16,7 barg, (6.000 Nm^3/h, configuration 1+1 – one metering/regulating stream in operation and one stand-by), including as well as skid shelter, Control Room and RCC building Station and supporting equipment. The project is designed to be 100% H2 ready.

A4. Development Projects: Expansion of NNGS to new markets

This chapter presents projects that aim to expand the transmission system to new markets related to regulated opportunities such as the expansion to new areas through virtual pipelines etc. Currently, there are no projects in this section.

A5. Development Projects: Increase of capacity & security of supply of NNGS

This chapter includes projects that aim to increase capacity and enhance the security of supply of NNGS. Currently, there are no projects in this section.

A6. Development Projects: Improvement / modernization/ maintenance of NNGS

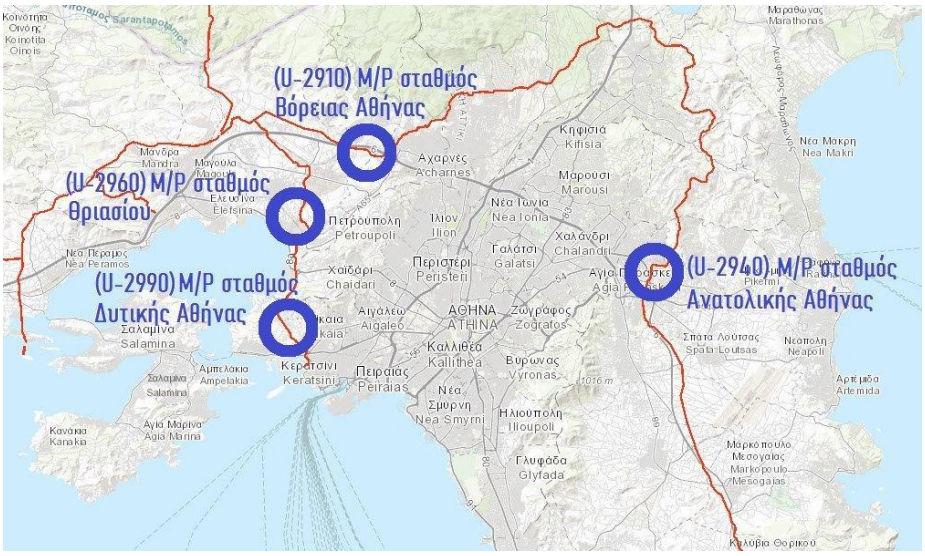
This chapter presents projects –mainly small capital ones- that aim to the continuous improvement of the NNGS, its modernization and maintenance to ensure safety, reliability and efficiency. Seventeen (17) projects are proposed with a total budget of 27,2 million €.

1. Expansion and Upgrade of M/R Stations of Exit Point to Distribution Network 'Athens'

Project Summary	
Type of project	New Project
Type of investment	M/R equipment
Current Budget	3,0 million €
Expected benefit	Improvements to the efficiency and effectiveness of the NNGS
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	December 2023
Entry into the system	March 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,03%
Inclusion in the 3 years Development Period	Yes

The Exit Point to Distribution Network 'ATHENS' is served by the Metering/Regulating Stations 'ATHENS NORTH', 'ATHENS EAST', 'ATHENS WEST') and 'THRIASSIO' as shown on the map below.

Figure 2 : Overview of exit point to Athens



The first three (3) Metering/Regulating Stations were designed to be installed in two phases. The first phase, which has been implemented, includes the installation of two (2) metering/regulating lines (one in operation and one in standby mode), while the second phase provides for the installation of additional metering/regulating lines in such a way that one line will be in standby mode.

Since the maximum capacity of the first phase in the Metering/Regulating Stations 'ATHENS NORTH' and 'ATHENS EAST' has already been used in peak loads during the last winter seasons and considering the expected increase in Natural Gas consumption in the domestic sector, in the coming years (appr. 40% between 2022 and 2031), due to the new connections that are planned to be made by the Distribution Network Operator, it is deemed necessary to upgrade the four Metering/Regulating Stations that serve the Exit Point to Distribution Network 'ATHENS', as follows:

1. Detailed engineering, procurement and construction of additional Metering/Regulating lines at the M/R stations 'ATHENS NORTH' and ATHENS EAST' to the existing stub outs, including all the attached electrical and electronic equipment, with the aim of securing the supply of Natural Gas in the greater Athens area. Stations' existing capacity of 110.219 Nm^3/h will be upgraded to 269.862 Nm^3/h in order to ensure the supply to the Exit Point to Distribution Network 'Athens' in peak hourly loads in the next winter periods.

2. Installation of flow control valves at the four (4) Metering/Regulating Stations at the Exit Point to Distribution Network 'ATHENS' with the aim of optimizing the control of allocation of Natural Gas flow among them – especially in periods of high demand for Natural Gas – by the Control & Dispatching Center of DESFA.

The Project aims to improve the smooth operation of the NNGTS in servicing an Exit Point connected to the Distribution Network and at the same time servicing the expected increase in Natural Gas consumption in the domestic sector.

The project is designed to allow for a specific percentage of blends; the allowable blend of H2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

2. Keratsini branch rerouting (Mavri Ora stream)

Project Summary	
Type of project	New Project
Type of investment	Construction works for branch rerouting
Current Budget	0,425 million €
Expected benefit	Protection of the environment
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	June 2024
Entry into the system	June 2024
Current Status of Project	Under maturity
Financing plan	The project will be reimbursed by the Region of Attica
Recovery method	
Impact on the Average Tariff for the use of NNGS	0%
Inclusion in the 3 years Development Period	Yes

The Scope of this Project is to perform all the necessary actions for rerouting part of Keratsini branch 24'' at Aspropyrgos Attica to enable construction works for channel improvement of Mavri Ora stream. The Project is undertaken for compliance with a request raised by the Region of Attica due to necessary flood-defense works.

The Project aims to facilitate a public service requirement (construction works for channel improvement of Mavri Ora stream).

3. Construction of a new Metering & Regulating Station in Markopoulo Site to replace the existing temporary M/R

Project Summary	
Type of project	New Project
Type of investment	M/R Station
Current Budget	2,2 million €
Expected benefit	Improvements to the efficiency and effectiveness of the NNGS
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	December 2023
Entry into the system	March 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,03%
Inclusion in the 3 years Development Period	Yes

The Exit Point "SPATA" is supplied by Metering / Regulating Station "MARKOPOULO", which is served by the temporary station TM2. Since the Metering / Regulating Station TM2 is a temporary and portable installation (compact), it does not support all the functions and redundancies provisioned for the Metering Regulating Stations of NNGTS. Therefore, it is deemed necessary to build a new fully operational Metering / Regulating Station based on the applicable specifications of the company. The new station can be installed on the SE side of the available plot considering the requirements of the legislation in force and any modifications required. The station's final capacity will be 28.800 Nm^3/h in a configuration of (2+1) - two metering/regulating streams in operation and one stand-by, with each stream's capacity of 14.400 Nm^3/h.

The Project aims to improve the smooth operation of the NNGTS in servicing an Exit Point connected to the Distribution Network.

The project is designed to allow for a specific percentage of blends; the allowable blend of H2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

4. Electronic Information System (EIS)- functionalities upgrade

Project Summary	
Type of project	New Project
Type of investment	IT System
Current Budget	0,35 million €
Expected benefit	Ensure high quality offered services
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	December 2022
Entry into the system	December 2022
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services
Impact on the Average Tariff for the use of NNGS	0%
Inclusion in the 3 years Development Period	Yes

DESFA is required to update the existing commercial IT system (EIS) to be able to provide new services and products and to comply with regulatory changes triggered either by the market or internally by DESFA to improve the level of services already offered. Most notable examples for 2022 are:

- Introduction of Small-Scale LNG Truck Loading Services
- Interconnection with IGB and offering of new relevant capacity products at said Interconnection Point
- Balancing Regime overhaul with the introduction of Commercial Balancing
- Expansion of secondary market flexibility by redesigning the regime in force and integrating such transactions with PRISMA Platform (requires new interfaces between EIS and PRISMA).
- 7th Code revision

The project concerns the upgrade of DESFA EIS to ensure high quality of offered services through an integrated electronic environment, as provided for in the Network Code, as in force.

5. Development of an Information System for DESFA to undertake the role of forecasting party for the NNGTS Balancing Zone

Project Summary	
Type of project	New Project
Type of investment	IT System
Current Budget	0,50 million €
Expected benefit	Necessary for the balancing forecasting /Enhance the role of Network Users in the NGTS balancing activity and enable them to manage their balancing portfolio more efficiently
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	October 2022
Entry into the system	October 2022
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0%
Inclusion in the 3 years Development Period	Yes

According to Decision 70/2020 of the Regulatory Authority for Energy (Government Gazette B' 473/08.02.2021) DESFA is assigned the role of the Forecasting Party for the Balancing Zone of Greece, according to paragraph 5 of Article 39 of the COMMISSION REGULATION (EU) No 312/2014. This role foresees that DESFA is to calculate and publish daily forecasts of the Network User's inputs and outputs (entry & exit allocated quantities), particularly for Network Points where there is no hourly or daily measurement of the end customers' consumption (non-daily metered flows). To this end, DESFA must develop an information system that will collect all required data for a) DESFA' s other IT systems (Commercial Electronic Information System & Asset Management Gas Demand Forecast system) and b) Distribution System Operators (DSOs), which will be used in conjunction with advanced predictive models to produce the required forecasts, which will be afterwards published to inform the Network Users. The project will enable DESFA to fully comply with the Regulator's mandate, which stems from the provision of EU legislation (BAL NC). Also, it will greatly enhance the role of Network Users in the NGTS balancing activity and enable them to manage their balancing portfolio more efficiently. This fact is also expected to decrease DESFA's overall balancing, also

increasing the use of the trading platform. Finally, there will be incentives tied with the forecasting accuracy which will enable DESFA to potentially gain value out of the project.

6. New electronic information system for natural gas

Project Summary	
Type of project	New Project
Type of investment	IT System
Current Budget	3,50 million €
Expected benefit	Ensure high quality offered services
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	December 2023
Entry into the system	December 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services
Impact on the Average Tariff for the use of NNGS	0,05%
Inclusion in the 3 years Development Period	Yes

DESFA is required to migrate to a new commercial IT system (EIS) to:

i. secure the smooth operation and the business continuity of such an important system provided that the existing system is a transitional solution, built to satisfy the imminent need to implement the (mandatory) EU legislation provisions in 2016 (indicatively, CAM Capacity Auctions, Interconnection Agreement with Bulgarian TSO, renominations, etc.). Furthermore, it is fully custom developed and supported by a very small company. On top of structural issues, lack of expandability and low responsiveness increase the Operational Risks at the highest levels

ii. be able to provide new services and products and to comply with regulatory changes triggered either by the market or internally by DESFA to improve the level of services already offered. Most notable examples for 2022 are:
   - Introduction of Small-Scale LNG Truck Loading Services and Small-Scale LNG Jetty
   - Balancing Regime overhaul with the introduction of Commercial Balancing

- Expansion of secondary market flexibility by redesigning the regime in force and integrating such transactions with PRISMA Platform (requires new interfaces with PRISMA)

Although there is some overlap of the items mentioned in ii. above with the project "Electronic Information System - functionalities upgrade", the reason is that, as at least some aspects of these new services will start to be offered in 2022, where the new system will not be ready, some upgrades are required to the existing one to be able to support them. The upgrade project is meant as bridge solution, until the time of completion of the new system, which will cover all new and existing services.

7. New project management system

Project Summary	
Type of project	New Project
Type of investment	IT System
Current Budget	1,20 million €
Expected benefit	Ensure high quality offered services
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	December 2022
Entry into the system	December 2022
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission & LNG Services
Impact on the Average Tariff for the use of NNGS	0,01%
Inclusion in the 3 years Development Period	Yes

DESFA has a leading project management environment, which has been operating smoothly for the last 15 years. This environment, which was designed and implemented according to the global standard PMBOK 7.0 of PMI, allowed the successful implementation of DESFA's complex projects. The Project Management Integrated Information system plays a vital role in this environment.

Desfa requested for the Project Management Integrated Information system's operating system to change how it worked to be fully compatible with the central ERP system SAP4HANA. An advanced dynamic data exchange process was also developed.

As new needs derived by DESFA next decade's TYDP program, DESFA wants to

- Re-evaluate the state of the environment created.

- Consider complementary technological solutions offered by the international industry that could improve it, through a process of obtaining well-defined consulting services and searching for the relevant market.
- Implement any necessary steps concerning new complementary IT solutions. These solutions should be fully integrated with the current PM information systems, compatible with DESFA Projects Management Environment and able to provide further services for CAPEX Monitoring of all the categories of Projects (IT, Maintenance, Development, etc.)

The implementation of the final solution should, in any case, ensure

- that DESFA will continue to have a top project management environment,
- the smooth operation and the business continuity without the slightest interruption of its operation.

8. Upgrade of Fire Fighting System & replacement of the pressure relief valves at BMS Sidirokastro

Project Summary	
Type of project	New Project
Type of investment	Equipment for NNGTS
Current Budget	0,8 million €
Expected benefit	Improvements to the efficiency and effectiveness of the NNGS
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	November 2022
Entry into the system	December 2022
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0%
Inclusion in the 3 years Development Period	Yes

The project consists of the following:

1. Upgrade of the Fire Fighting system so as to operate remotely and to support the unmanned operation of the station (BMS Sidirokastro operates remotely since September 2019). It consists of the Upgrade of the Fire Fighting system (Fire Detection System, CO2 system, etc.) of the Diesel Tank room, the EDG room, the Fuel Gas room,

the Gas Analyzer room, the Administration room and the Control room of BMS Sidirokastro (0,55 million €).

2. The replacement of eight Pressure Relief Valves of the Filters, of the condensate vessel, of the Gas Heaters and of the Fuel Gas skids, including piping and new Vent lines, so as to be in compliance with relative legislation (0,25 million €).

The project aims to improve the safety, security of gas supply at entry point Sidirokastro and the smooth operation of the NNGTS.

9. Nitrogen Injection System

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	2,53 million €
Expected benefit	Effective operation
Start date	October 2021
Final Investment Decision	July 2022
Operation Date	June 2024
Entry in the system	June 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,04%
Inclusion in the 3 years Development Period	Yes

The Nitrogen Injection System is required in order to support the Booster Compression Station in Nea Messimvria.

Due to the difference between the upper limit of the Wobbe Index between the gas transmitted in NNGTS and the one transmitted in the TAP pipeline, a Nitrogen Injection System shall be installed so as to treat the gas prior to its injection in the TAP pipeline.

The Nitrogen injection System is composed of the following equipment:

- Liquid Nitrogen Storage Tanks with PBU (Three (3) tanks with 57,3m^3 capacity each)
- Liquid Nitrogen HP Pumps
- Nitrogen Ambient Air vaporizers
- Nitrogen Trim Heaters
- Nitrogen Injection Mixing Tree

Based on the Booster Station Capacity, the maximum permissible flow N_2 in the gas injected to the TAP pipeline is 4.190 kg/h.

10. Overhaul maintenance of the two (2) BOG Compressors V-3101 A & V-3101 B

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	0,64 million €
Expected benefit	Effective operation
Start date	May 2022
Final Investment Decision	December 2022
Operation Date	April 2023
Entry in the system	April 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of LNG services
Impact on the Average Tariff for the use of NNGS	0,01%
Inclusion in the 3 years Development Period	Yes

LNG BOG (Boil off gas) compressor's main role is to keep the pressure of the LNG tank within required range. Boil off gas enters into the suction line of the compressor, is compressed and sent either to a condenser for re-liquefaction, fed into a gas turbine as fuel in a power generation plant, or is directed into a pipeline for gas usage. Therefore, special considerations for its proper maintenance are required.

The overhaul maintenance of the BOG compressor units aims to extend their uninterrupted operation and consequently of the LNG Terminal Station, which is crucial for satisfying DESFA's obligations as the LNG Operator, in the most cost–effective, transparent and direct way.

The overall maintenance of the two (2) BOGs is performed every 8.000 operating hours, following the technical procedures of the manufacturer and includes:

- Disassembling of crank case & cross guide, crank Shaft, connecting rods, crosshead, pistons, cylinder, valves, oil pump, water coolers and safety valves.
- Visual, dimentional inspection, penetrant and magnetic tests (non-destructive testing)
- Replacement of consumable spare parts (cylinder valves, rod packing, inner parts, etc)
- Assembling of all parts
- Commissioning

- Test run – performance test

11. Overhaul maintenance of GE 1 Unit of CHP Plant

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	0,5 million €
Expected benefit	Effective operation
Start date	May 2022
Final Investment Decision	September 2022
Operation Date	November 2022
Entry in the system	November 2022
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of LNG services
Impact on the Average Tariff for the use of NNGS	0,01%
Inclusion in the 3 years Development Period	Yes

The CHP Plant provides for the electricity and thermal needs of the LNG Terminal. Following a damage and a subsequent inspection in February 2021 to one of the two CHP units, the company decided to put out of operation this machine and proceed to an overhaul maintenance as the working hours were quite close to the planned technical intervention.
Having completed with the overhaul maintenance of the one generator, there is a need to conclude with the overhaul maintenance of the second (GE1) for the full functionality of the CHP Plant.
The overhaul maintenance of the GE1 unit aims to extend their uninterrupted operation of the CHP Plant and consequently of the LNG Terminal Station, which is crucial for satisfying DESFA's obligations as the LNG Operator, in the most cost–effective, transparent and direct way.
Said overhaul maintenance includes the provision of the spare parts required and the supervision by 1 engineer for overhaul preventive maintenance – upgrade of the CHP Gas Engine GE1, as well as the following services:

- Disassembling of cylinder heads, crank case & cross guide, crank Shaft, connecting rods, crosshead, pistons, cylinder valves, oil pump, turbochargers, water coolers and safety valves.
- Visual, dimentional inspection, penetrant and magnetic tests (non-destructive

testing)
- Replacement of consumable spare parts (cylinder valves – guides - seats, main bearings, connecting rod bearings, piston rings, inner parts, e.t.c)
- Repair or replace of connecting rods
- Assembling of all parts
- Commissioning
- Test run – performance test

12. LNG Upgrade Projects 2022

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	0,65 million €
Expected benefit	Effective operation
Start date	May 2022
Final Investment Decision	July 2022
Operation Date	July 2023
Entry in the system	July 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of LNG Services
Impact on the Average Tariff for the use of NNGS	0,01%
Inclusion in the 3 years Development Period	Yes

The project refers to a set of LNG Maintenance works or upgrades on the LNG Terminal of Revithoussa. In particular, the Project includes the following subprojects:

i. Supply and installation of new online CL / PH analyser system in sea water chanel ORV-D (€ 20.000)
ii. Supply and installation of new battery of UPS chargers in tanks A/B (€110.000)
iii. Recertification of inergen vessels for fire equipment units (€180.000)
iv. Supply of equipment for upgrading of FMC unloading arm C (€250.000)
v. Re-thermal Coating of Panels in ORVs M3101 A & B (€89.920,00)

The project is important for maintaining or extending the useful life of the LNG Terminal asset and its components, which is crucial for satisfying its obligations as the LNG Operator, in the most cost–effective, transparent and direct way.

13. Transmission Upgrade Projects

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	0.5 million €
Expected benefit	Effective operation
Start date	May 2022
Final Investment Decision	July 2022
Operation Date	June 2023
Entry in the system	June 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,01%
Inclusion in the 3 years Development Period	Yes

The project refers to a set of necessary upgrades of the Transmission Network System, namely:

i. Replacement of Fan Coils at 5 O&M Centers (€200.000)
ii. Replacement of Split type Air Conditioning Units in NGTS Installations (€30.000)
iii. Procurement of New Portable Air compressors (€150.000)
iv. Procurement of Pressure Relief Test Bench and accessories for Ampelia and Vistonida O&M Centers (€80.000)
v. Procurement of a lift clark with a lifting capacity of 3,5 tonnes (€47.750)

The project is important for maintaining or extending the useful life and integrity of the Transmission Network System assets and its components, which is crucial for satisfying its obligations as Operator, in the most cost–effective, transparent and direct way.

14. Replacement of Telecommunication and Network Equipment in NNGS Fixed Telecommunication System

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	0,95 million €
Expected benefit	Effective operation
Start date	May 2022
Final Investment Decision	July 2022
Operation Date	July 2023
Entry in the system	July 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,01%
Inclusion in the 3 years Development Period	Yes

The Project aims at replacing a large part of the installed telecommunication electronic equipment due to the announced end-of-support date by manufacturer CISCO. After the expiration of the end-of-support period, the equipment will be maintainable by means of a Support Agreement Contract which ends on 31.07.2023. After this date, no new spare parts will be available for replacing failed hardware and no software will be maintainable for such equipment.

The following telecommunications equipment should be installed:

i. One hundred (100) CISCO layer 3 switches ME3600X installed at almost all gas metering stations and Operation & Maintenance buildings.
ii. Seventy-nine (79) of the installed CISCO layer 3 switches ME3600X.
iii. Twenty-one (21) of the installed CISCO layer 3 switches ME3600X.
iv. Three (3) CISCO voice gateways connecting DESFA's telephony system with the external public telephone network.
v. One (1) CISCO router installed at Kula station interfacing with Bulgartransgaz network.

The configuration software of the existing installed equipment will be migrated to the new equipment respectively.

15. Nea Messimvria M/R Station modifications for Reverse Flow Operation

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NNGTS
Current Budget	2 million €
Expected benefit	Effective operation
Start date	July 2022
Final Investment Decision	October 2022
Operation Date	March 2024
Entry in the system	June 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,03%
Inclusion in the 3 years Development Period	Yes

The project concerns the modifications of Nea Messimvria M/R station in order to supply the compressed natural gas quantities from National Natural Gas System to Trans Adriatic Pipeline system, with delivery pressure significantly higher than the NNGS operating pressure.
This investment enables the full bi-directional flow in the interconnection point with the implementation of new pipework connections and equipment changes at the existing area of Nea Messimvria M/R station. The changes will accommodate the transportation of compressed Natural Gas quantities from the new Booster compressor station to the TAP pipeline.

16. Relocation of Ampelia – Karditsa – Trikala Pipeline

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NNGTS
Current Budget	4,95 million €
Expected benefit	Effective operation
Start date	July 2022

Final Investment Decision	July 2022
Operation Date	January 2023
Entry in the system	March 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Impact on the Average Tariff for the use of NNGS	0,07%
Inclusion in the 3 years Development Period	Yes

The need of relocation for a section of the Ampelia-Karditsa-Trikala Pipeline occurs due to the final location of the new project of Ampelia Compressor Station. A number of installations have to be based on the land that HPPL passes through. The Ampelia-Karditsa-Trikala Pipeline will be relocated for a length of about 300 meters using the Line Stop Hot-Tapping method, and the construction of a new bypass in order to provide continuous operation of the Pipeline without any interruption during the relocation period.

17. Anti-Flood works and Damage Restoration in the Ampelia Station

Project Summary	
Type of project	New Project
Type of investment	Equipment for the NGTS
Current Budget	2,5 million €
Expected benefit	Effective operation
Start date	July 2022
Final Investment Decision	September 2022
Operation Date	September 2023
Entry in the system	December 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services

Impact on the Average Tariff for the use of NNGS	0,04%
Inclusion in the 3 years Development Period	Yes

The proposed project concerns the restoration of damages caused in the area of Ampelia before the construction of the planned Compressor Station, due to extensive floods that occurred last year and the installation of an anti-flood network that will mitigate any future flood damages.
Thus, with the present project, flood works of existing structures that have been affected by the occurrence of severe weather phenomena will be executed, with indicative but not restrictive works such as topographic survey, hydraulic study, restoration or maintenance of existing flood defenses and the design of new slopes and water channels which will protect the area from future damages.
The works will result in a uniform slope and uniform flow, in order to avoid as much as possible, the stagnant waters and the local deposition of sediments.

A7. Incremental Capacity Projects according to CAM NC

Following the launch of the Incremental Capacity Process on July 2021, DESFA received non-binding demand indications for Nea Messimvria Interconnection Point (IP) and Komotni (IP).
In October 2021 DESFA published the respective Demand Assessment Reports (DARs), with the conclusion that there was sufficient indicative demand to initiate an Incremental Capacity Project. DESFA did not receive any demand indications for other IPs so a zero demand DAR was also published jointly with Bulgartansgaz.
In January 2022, DESFA, TAP and SRG in accordance with the provisions set out in article 27 (3) of CAM NC, jointly launched a public consultation on a draft Project Proposal for incremental capacity. The comments received during the public consultation are considered to the extent possible in the final Project Proposal that will be submitted for approval to the Greek, Italian and Albanian NRAs in July 2022. The Binding Phase will be launched in September 2022 after the approval of the Project Proposal by the NRA's.
In parallel, in January 2022 DESFA also launched a public consultation on a draft Project Proposal for incremental capacity for Komotini IP. The respective final Project Proposal will be sent to the competent Regulatory Authorities for Energy by the end of October 2022, while the launch of the Binding Phase is expected in May 2023.

A8. Impact of the Development projects in the Average Tariff for the Use of the system of NNGS

It is estimated that the inclusion in the RAB of the above new projects increases the Average Tariff for the usage of NNGS by **3,97%** considering no grants and according to DESFA's latest demand forecast study. Nevertheless, the benefits achieved from the above-mentioned projects would be important and decisive for the economy, the environment and the quality of life for the new regions concerned.

For information and transparency purposes the total capex of the present TYDP 2022 -2031 (new and planned projects already approved in previous TYDPs), excluding the projects that have no effect in the tariff, increases the Average Tariff for the usage of NNGS by **11%** taking into consideration potential increased gas volumes for exports.

B. Planned Projects

B1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)

1. Pipeline Nea Messimvria – Evzoni/ Gevgelija and Metering Station

Project Summary	
Type of project	Planned Project
Type of investment	Pipeline & M Station
Current Budget	67 million €
Expected benefit	Development SEE market, increase of usage of NNGS
Start date	June 2017
Final Investment Decision	November 2022
Operation Date	June 2025
Entry in the system	July 2025
Current Status of Project	Under maturity
Financing plan	EIB loan[4], DESFA's own equity or other loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

The project aims at the interconnection of natural gas transmission systems of Greece and North Macedonia which will enhance the diversification of supply sources for North Macedonia. The latter one is currently solely dependent on the supply of gas from its congested interconnection with Bulgaria.

[4] Application submitted for up to a maximum of 25 million €.

DESFA and NER have signed a Memorandum of Understanding for the project in October 2016 but also have concluded, on 10 September 2021, a Cooperation Agreement for the construction of the pipeline on both parts of the border.

Access to NNGS, and especially to the LNG terminal of Revithoussa and to natural gas through TAP pipeline, can benefit market competition thus leading to lower prices for the supply of natural gas in the neighboring country. Meanwhile the project enhances the regional development of natural gas market and the involvement of more market players thus enhancing the role of Greece as a hub. Furthermore, it will lead to the increased usage of the NGTS and will thus lead to a reduction of the tariffs for the usage of the transmission system in the long term.

The Greek Part of the project comprises of:

- Approx. 55 km pipeline of 30'' in with 80 barg design pressure and 66.4 barg maximum operating pressure starting from Nea Messimvria (downstream of the current compressor station) an ending to the Border Station U-7550 which belongs to the administrative limits of the Community of Evzoni, eastern of river Axios.
- A Border Metering Station (BMS) in the interconnection area (estimated capacity 430.000 Nm^3/h), with a central bypass arrangement of the station at 50% of the final capacity.

  The new Border Metering Station design philosophy is a configuration of separate section, as follows:

  a. filtering section (1+1), one filtering stream in operation and one stand-by - each stream's capacity of 430.000 Nm^3/h,
  b. metering section (2+1), two metering streams in operation and one stand-by - each stream's capacity of 215.000 Nm^3/h,
  c. flow control section (2+1), two flow control streams in operation and one stand-by - each stream's capacity of 215.000 Nm^3/h,
- A Scraper Station (Launcher) installed in the connection with NNGTS in Nea Messimvria
- A Launcher and a Receiver Scraper Station installed in the Border Station area

The basic design of the project has been completed and the environmental terms have been approved since February 2020. Currently, the basic design is under update to incorporate requirements for H2 compatibility. The project will be implemented after the completion of the market test, which is expected to be launched within July 2022.

Figure 3: Routing of the pipeline from Nea Messimvria to the border with North Macedonia

2. Connection with the FSRU of Alexandroupolis

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating station
Current Budget	26 million €
Expected benefit	Enabling access to new Users
Start date	June 2018[5]
Final Investment Decision	Taken
Operation Date	October 2023
Entry in the system	October 2023
Current Status of Project	Under Construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee / Additional Connection Fee
Connection Agreement with User	Not yet
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

[5] The Start date refers to the day of the Advanced Reservation of Capacity Application.

The Connection Project concerns the construction of a Border Metering / Regulating Station for the receipt, control of the flow and the invoicing of the transferred quantities of natural gas from the point of entry, downstream of the scraper station of the Connected System.
The new Border M/R Amphitrite Station will have a total capacity of 865.000 Nm^3 /h, design pressure 110 barg, with arrangements of valves station of inlet and outlet E.S.D. (with bypass arrangement) and central bypass arrangement of the M / R station at 50% of the final capacity.
The new M/R Amphitrite Station design philosophy is a configuration of separate section, as follows:

1. filtering section (1+1), one filtering stream in operation and one stand-by - each stream's capacity of 865.000 Nm^3/h,
2. metering section (2+1), two metering streams in operation and one stand-by - each stream's capacity of 432.500 Nm^3/h,
3. gas heating section (1+1), one gas heating stream in operation and one stand-by - each stream's capacity of 865.000 Nm^3/h,
4. regulating section (2+1), two regulating streams in operation and one stand-by - each stream's capacity of 432.500 Nm^3/h,
5. flow control section (2+1), two flow control streams in operation and one stand-by - each stream's capacity of 432.500 Nm^3/h,

The connection with the NNGS will be made downstream of the Amphitrite M / R station by the HOT TAPPING method.
The project is designed to allow for a specific percentage of blends; the allowable blend of H2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

3. Metering and Regulating Station for connecting with Dioryga Gas FSRU

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating Station
Current Budget	15 million €
Expected benefit	Enabling access to new Users
Start date	March 2021
Final Investment Decision	October 2022
Operation Date	December 2024
Entry in the system	March 2025
Current Status of Project	Under maturity
Financing plan	DESFA's own equity
Recovery method	Connection Fee/Additional Connection Fee

Connection Agreement with User	Not yet
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The Connection Project includes a new Metering/Regulating (M/R) Station where the natural gas pipeline that Dioryga Gas plans to construct, will end up. This new M/R Station will be located near the existing M/R Stations for the supply of MOTOR OIL HELLAS (MOH) refinery and the Korinthos Power S.A. Power Plant, in the area of Agioi Theodoroi in Corinthia. This new M/R station will have a capacity of 490.000 Nm^3/h and a central bypass arrangement of the M / R station at 50% of the final capacity.
Upon the completion of the project, a new Entry Point "DIORYGA GAS" will be created, which will satisfy Dioryga Gas' request for a total natural gas delivery of 11,76 million Nm^3/d. The M/R station's maximum output pressure will be equal to 66,4 barg.
The new M/R Dioryga Gas Station design philosophy is a configuration of separate section, as follows:

1. filtering section (1+1), one filtering stream in operation and one stand-by - each stream's capacity of 490.000 Nm^3/h,
2. metering section (2+1), two metering streams in operation and one stand-by - each stream's capacity of 245.000 Nm^3/h,
3. gas heating section (1+1), one gas heating stream in operation and one stand-by - each stream's capacity of 490.000 Nm^3/h,
4. regulating section (2+1), two regulating streams in operation and one stand-by - each stream's capacity of 245.000 Nm^3/h,
5. flow control section (2+1), two flow control streams in operation and one stand-by - each stream's capacity of 245.000 Nm^3/h,

The project is designed to allow for a specific percentage of blends; the allowable blend of H2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

B2. Projects for the connection of Users

1. M station at SALFA A. Liossia

Project Summary	
Type of project	Planned Project
Type of investment	Metering station
Current Budget	0,72 million €
Expected benefit	Enabling access to new Users
Start date	June 2017
Final Investment Decision	Taken

Operation Date	January 2023
Entry in the system	February 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee
Connection Agreement with User	Yes
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

The project is developed according to the provisions of the Tariff Regulation as well as the relevant request and agreement with the "DEPA Commercial SA.
The new Metering Station will be designed with a total capacity of 5.000Nm^3/h in a configuration of (1+1) – one metering stream in operation and one stand-by.

2. M/R station AdG III

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating station
Current Budget	2 million €
Expected benefit	Enabling access to new Users
Start date	April 2011[6]
Final Investment Decision	Taken
Operation Date	March 2023
Entry in the system	April 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee
Connection Agreement with User	Yes
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

[6] The Start date refers to the day of the signing of the Connection Agreement.

The construction of the new ADG III (U-2840) Measuring / Regulating Station (U-2840) in the area of Distomo Viotia includes the dismantling of the existing ADG III station (TM1 / TM5), the installation of the building infrastructure (RCC and Station Building), the construction of the M/R Station with a capacity of 23.500 Nm^3/h in a configuration of (1+1) – one metering/regulating stream in operation and one stand-by, with auxiliary installations (gas actuation systems) metal housing for the protection of the Metering skids (Skid Shelter) and connections to the existing ESD L/V (Emergency Shut Down) to supply the industry.

3. Connection of Energean Oil & Gas S.A. plant with NNGTS

Project Summary	
Type of project	Planned Project
Type of investment	Pipeline/Metering station
Current Budget	3,9 million €
Expected benefit	Enabling access to new Users
Start date	November 2018[7]
Final Investment Decision	May 2023
Operation Date	February 2025
Entry in the system	May 2025
Current Status of Project	Under maturity
Financing plan	DESFA's own equity
Recovery method	Connection Fee
Connection Agreement with User	Not yet
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The project will be implemented for natural gas supply of the Energean Oil & Gas S.A. plant. For this project a high pressure 6" pipeline, 3 km length approximately, including needed facilities (valve station, scraper station, hot tapping) and a Metering Station for the connection of Energean Oil & Gas S.A. plant with NNGTS will be constructed. The project also includes land purchase for the valve station and scraper station.
Construction of the project will be awarded after the signing of Connection Agreement with the applicant User.

[7] The Start date refers to the day of submission of the application for Advanced Reservation of Capacity.

4. Metering station at Agios Nikolaos Viotia (AdG IV)

Project Summary	
Type of project	Planned Project
Type of investment	Metering station
Current Budget	1,87 million €
Expected benefit	Enabling access to new Users
Start date	April 2018[8]
Final Investment Decision	Taken
Operation Date	March 2023
Entry in the system	April 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee
Connection Agreement with User	Yes
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The aim of this project is to install Metering Station in the greater area "Aluminium of Greece-ADG" industry, in order to supply with natural gas, the new installations of "New C.C.G.T. Agios Nikolaos II". Project includes construction of Metering skids, construction of auxiliary installations (gas actuation systems), construction of steel shelter for the protection of Metering skids (Skid Shelter), extension of the existing communication building (R.C.C.), as well as construction of new inlet and outlet Emergency Shut Down valve stations. The new Metering Station will be designed with a total capacity of 142.500Nm^3/h in a configuration of (1+1) – one metering stream in operation and one stand-by.

5. Connection of ELVAL plant to the NNGTS in Inofyta

Project Summary	
Type of project	Planned Project
Type of investment	Pipeline/Metering station
Current Budget	4,95 million €

[8] The Start date refers to the day of submission of the application for Advanced Reservation of Capacity.

Expected benefit	Enabling access to new Users
Start date	December 2015[9]
Final Investment Decision	Taken
Operation Date	December 2023
Entry in the system	March 2024
Current Status of Project	Under construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee
Connection Agreement with User	Yes
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The project will be implemented for natural gas supply of the ELVAL SA plant in Inofyta, Viotia, for various thermal uses. A new pipeline (extending the NNGTS), two scraper stations (launcher/ receiver) and a M / R station will be constructed for the supply of ELVAL plant.
The new M/R Station is designed with an initial capacity of 11.500Nm^3/h and outlet pressure of 16,7 barg, in a configuration of (1+1) – one metering/regulating stream in operation and one stand-by), with future provision for expansion to max capacity of 23.000 Nm^3/h, when this will be justified by demand-wise by the downstream connected system.

6. Connection with TERNA Power Plant to the NNGTS

Project Summary	
Type of project	Planned project[10]
Type of investment	Pipeline / Metering station
Current Budget	6,26 million €
Expected benefit	Enabling access to new Users
Start date	June 2020
Final Investment Decision	Taken
Operation Date	December 2023
Entry in the system	March 2024

[9] The Start date refers to the day of submission of the application for Advanced Reservation of Capacity.

[10] Transferred from the Small Projects' List.

Current Status of Project	Under construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee/ Additional Connection Fee
Connection Agreement with User	Yes
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The project comprises construction of a new 1,5km pipeline that will be connected to the branch of ''Komotini-Alexandroupoli'' with the method of hot-tapping and construction of one-line valve station, construction of one Metering station with two metering skid, 1 working + 1 stand by, with capacity of 142.000 Nm^3/h, construction of central inlet and outlet Emergency Shut Down valve stations, and construction of one-line valve station as NNGTS exit point.

7. Connection with ELPEDISON Power Plant to the NNTGS

Project Summary	
Type of project	Planned project[11]
Type of investment	Pipeline/ Metering station
Current Budget	3,46 million €
Expected benefit	Enabling access to new Users
Start date	June 2020
Final Investment Decision	Taken
Operation Date	September 2023
Entry in the system	December 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity
Recovery method	Connection Fee
Connection Agreement with User	Yes
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

[11] Transferred from the Small Projects' List.

The aim of this project is to install one Metering Station at the west area of Thessaloniki in order to supply with natural gas the new Power Plant of ELPEDISON. The project comprises construction of a new 0,3km pipeline that will be connected to the branch of 'Pentalofos - Diavata'' with the method of hot-tapping, construction of one-line valve station, construction of one Metering station with two metering skid, 1 working + 1 stand by, with capacity of 130.000 Nm^3/h and construction of central inlet and outlet Emergency Shut Down valve stations inside DESFA's property.

B3. Development Projects: Expansion of NNGS to new areas connected to distribution network

B.3.1. Supply of West Macedonia

1. SSLNG infrastructure to supply the regions of Poria, Aspros & Perdikas

Project Summary	
Type of project	Planned Project
Type of investment	SSLNG infrastructure
Current Budget	11,03 million €, including leasing of semi-trailers for 15 years
Expected benefit	Supply of new areas
Start date	July 2022
Final Investment Decision	November 2022
Operation Date	October 2023
Entry in the system	October 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in the RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The inclusion of the expansion of the NGTS to the regions of Western Macedonia has been approved by RAE already with their 755/2020 (TYDP 2020-2029). The initial approach was that the regions of Perdikkas and Aspros will be initially connected with TAP, while the region of Poria will be permanently connected to TAP. DESFA would enter into all necessary commercial

arrangements with TAP to implement the appropriate interface which would safeguard that the gas supply chain to the consumers of those regions connected to TAP would be equivalent to their supply through the NGTS, while the resulting cost would be incorporated into the required revenue of the NGTS and be covered by the use of the system tariffs.

However, following RAE's request, DESFA has assessed the alternative of supplying of the corresponding regions through a virtual pipeline based on a small scale LNG (SSLNG) supply chain. Based on a comparative analysis of the corresponding costs, which proves that the option for the temporary supply of Perdikkas and Aspros through SSLNG until the pipeline to West Macedonia is put in operation, and the permanent supply through SSLNG of the region of Poria is the most cost efficient one, DESFA includes in the TYDP 2022-2031 the solution of the SSLNG virtual pipeline for the supply of these areas.

The project consists of the necessary ssLNG installations for the supply of the regions Poria, Aspros and Perdikas in West Macedonia. It should be highlighted that the areas of Aspros and Perdikas will be supplied though the HP Pipeline in West Macedonia upon its completion, therefore the proposed ssLNG infrastructures in these areas will serve only the supply of the regions on a temporarily basis. To this end, the most efficient solution is to proceed with modular small size tanks and gasifiers, which are easy to be relocated, thus maximizing possible synergies and minimizing relevant cost. Those installations will then be relocated to Poria and other possible regions, following the commercial operation of the high-pressure pipeline.

The supply chain till the area of West Macedonia, refers to the loading of LNG in semi-trailers from the truck loading station in Revithousa and its transportation and unloading in tanks in the aforementioned regions. As per the preliminary design the necessary equipment consists of:

Table 1- Necessary Installations for the supply of the regions Aspros, Perdikas & Poria with natural gas

	Aspros	Perdikas	Poria
Trailers 43-48 m^3 net LNG capacity[12]	3	2	2
Storage Tanks of 108 m^3 net LNG capacity	4	2	2
Vaporization rate	2.200 -2.400 Nm^3/h	1.100 -1.200 Nm^3/h	1.100 -1.200 Nm^3/h

For Aspros and Perdikas the aforementioned infrastructure are considered sufficient to cover the emerging demand for the first year of the introduction of natural gas in the area, since, after that, both regions will be supplied through the HP Pipeline to West Macedonia. From that point onwards the ssLNG equipment could be relocated either to Poria or other cities depending on the evolution of the market.

Finally, regarding the semi-trailers, the proposed solution includes the option for leasing them for 15 years, depending on the case, however relevant optimization will take place upon basic design of the project.

[12] Including 2 extra semi-trailers for contingency purposes

2. High Pressure pipeline to West Macedonia

Project Summary	
Type of project	Planned Project
Type of investment	Pipeline & M station
Current Budget	167 million €
Expected benefit	the supply of new areas with natural gas ensuring new Users' potential access/ decarbonization of Greek System
Start date	July 2020
Final Investment Decision	Taken
Operation Date	June 2024
Entry into the system	September 2024
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan, possible NSRF 2021-2027 grant[13]
Recovery method	Inclusion in the RAB of Transmission System (w/o possible grants)
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The project is included to support the decarbonization policy introduced by the Hellenic Republic and it concerns the extension of the existing NGTS via a new pipeline branch up to the region of West Macedonia. According to the basic design study the Project consists of 157 km Natural Gas High Pressure pipeline, out of which:

- **93,4 Km/30" HPP** starting from the existing LVS at Trikala Imathias and ending north of Ptolemaida (Komnina new LVS)
- **29,8 Km/ 14" HPP** branch for connection to Kardia M Station
- **3,4 Km/10'' HPP** branch for connection to Aspros M/R station
- **9,1 Km/10'' HPP** branch for connection to Perdikkas M/R station
- **21,3Km/ 10" HPP** branch for the supply of Veria/Naoussa district and

including all the necessary auxiliary facilities and line valve stations for the operation of the project as well as provisions for future extensions.

The project also includes Kardia Metering Station to supply the district heating installations for the cities of Kozani, Ptolemaida and Amyntaio, as well as line valves to supply other consumption in the region. The Metering Station is designed with a total capacity of 50.000Nm^3/h,

[13] DESFA has applied for inclusion in the NSRF 2021-2027 for apprx. 30% of the capex.

in a configuration of (1+1) – one metering stream in operation and one stand-by. The timeline of the project is aligned with the teleheating installations project time schedule.

The project's design has been aligned with the company's strategy for energy transition and more specifically it will be constructed to be compatible for H_2 transportation up to 100%. Therefore, and in combination with the White Dragon project for hydrogen production in the area, it will initiate actions for hydrogen adaptation in the market.

3. M/R Station in the region of Aspros

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating Station
Current Budget	3,5 million €
Expected benefit	Supply of new areas
Start date	December 2019
Final Investment Decision	Taken
Operation Date	June 2024
Entry in the system	September 2024
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

Aspros M/R Station will be fed with natural gas from West Macedonia Pipeline, and it will supply the cities of Edessa, Skidra and Gianitsa.

The new M/R Station is designed with an initial capacity of 15.000Nm^3/h and outlet pressure of 16,7 barg, (in a configuration of (1+1) – one metering/regulating stream in operation and one stand-by), with future provision for expansion to max capacity of 30.000 Nm^3/h, when this will be justified by demand-wise by the downstream connected system.

The project is designed to be 100% H_2 ready.

The M/R Station of Perdikas Eordeas will be fed with natural gas from West Macedonia Pipeline, and it will supply local cities gas distribution network.

4. M/R Station in the region of Perdikas Eordeas

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating Station
Current Budget	4,2 million €
Expected benefit	Supply of new areas
Start date	December 2019
Final Investment Decision	Taken
Operation Date	June 2024
Entry in the system	September 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The new M/R Station is designed with an initial capacity of 5.000Nm^3/h and outlet pressure of 16,7 barg, (in a configuration of (1+1) – one metering/regulating stream in operation and one stand-by), with future provision for expansion to max capacity of 10.000 Nm^3/h, when this will be justified by demand-wise by the downstream connected system. The project is designed to be 100% H_2 ready.

B.3.2. Supply of Western Greece & Peloponnese

1. High Pressure Pipeline to Patras

Project Summary	
Type of project	Planned Project
Type of investment	Pipeline & M/R Station
Current Budget	98 million €
Expected benefit	the supply of new areas with natural gas and the ensuring of new Users' potential access

Start date	July 2020
Final Investment Decision	May 2023
Operation Date	June 2025
Entry in the system	September 2025
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

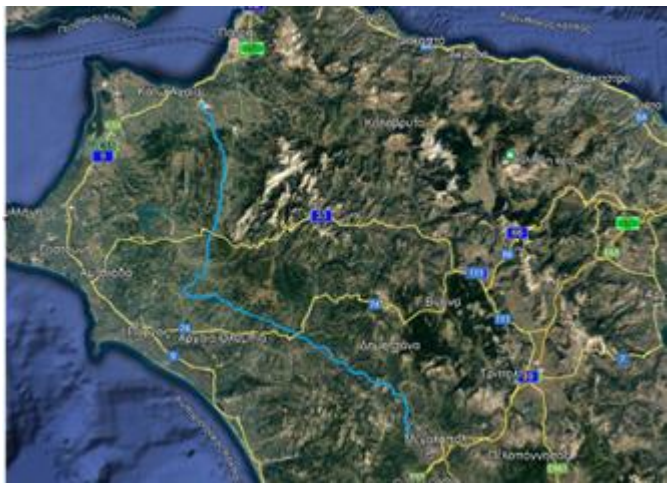
In line with relative request of the Western Greece Region, the project concerns the connection of the city of Patra and the Industrial Area (VIPE) of Patras with the NNGS, with provision for future extensions to other cities of the Western Greece Region.

According to the preliminary routing, the project consists of a high-pressure pipeline, of approximately 130 km and 20" diameter, starting from a suitable point on the HPP branch of Megalopolis. The project also includes all necessary infrastructure and a Metering/ Regulating station. The M/R Station will be designed with an initial capacity of 27.500Nm^3/h with configuration of (1+1) – one metering/regulating stream in operation and one stand-by, with future provision for expansion to max capacity of 55.000 Nm^3/h, when this will be justified demand-wise by the downstream connected system.

DESFA will coordinate with the Distribution System Operator who will undertake the development of the distribution network in the region.

The project is designed to be 100% H_2 ready.

Figure 4: Pipeline Routing



2. Korinthos M/R city gate station

Project Summary	
Type of project	Planned Project
Type of investment	M/R Station
Current Budget	2,7 million €
Expected benefit	Enabling access to new Users
Start date	July 2020
Final Investment Decision	Taken
Operation Date	September 2023
Entry in the system	December 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The investment consists of one Metering Regulating city gate station at the area of Korinthos including construction of Metering and Regulating skid, construction of auxiliary installations, construction of steel shelter for the protection of M/R skid (Skid Shelter), as well as connection with the existing NNGTS pipeline. The capacity of the of the station has been estimated at 20.000 Nm^3/h with a (1+1) configuration.

Construction of the project will be awarded following coordination with the Distribution System Operator who will undertake the development of the distribution network in the city of Korinthos.

The project is designed to allow for a specific percentage of blends; the allowable blend of H2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

3. Argos/Nafplio M/R city gate station

Project Summary	
Type of project	Planned Project
Type of investment	M/R Station
Current Budget	2,9 million €
Expected benefit	Enabling access to new Users

Start date	July 2020
Final Investment Decision	Taken
Operation Date	September 2023
Entry in the system	December 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The investment consists of one Metering Regulating city gate station including construction of Metering and Regulating skid, construction of auxiliary installations, construction of steel shelter for the protection of M/R skid (Skid Shelter), as well as connection with the existing NNGTS pipeline.
The new M/R Station is designed with an initial capacity of 10.000Nm^3/h and outlet pressure of 16,7 barg, in a configuration of (1+1) – one metering/regulating stream in operation and one stand-by, with future provision for expansion to max capacity of 20.000 Nm^3/h, when this will be justified demand-wise by the downstream connected system.
Construction of the project will be awarded following coordination with the Distribution System Operator who will undertake the development of the distribution network in the cities of Argos and Nafplio.
The project is designed to allow for a specific percentage of blends; the allowable blend of H_2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

4. Tripoli M/R city gate station

Project Summary	
Type of project	Planned Project
Type of investment	M/R Station
Current Budget	2,3 million €
Expected benefit	Enabling access to new Users
Start date	July 2020
Final Investment Decision	Taken
Operation Date	October 2022

Entry in the system	October 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The investment consists of one Metering Regulating city gate station at the area of Tripolis. The capacity of the station is estimated 20.000 Nm^3/h, in a configuration of (1+1) one metering/regulating stream in operation and one stand-by. Construction of the project will be awarded following coordination with the Distribution System Operator who will undertake the development of the distribution network in the city of Tripolis.
The project includes construction of Metering and Regulating skid, construction of Emergency Shut Down inlet and outlet valves stations both with 4'' by-pass arrangement, construction of steel shelter for the protection of M/R skid (Skid Shelter), M/R Control system as well as connection with the existing NNGTS pipeline.
The project is designed to allow for a specific percentage of blends; the allowable blend of H_2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

B.3.3. Supply of Central Macedonia

1. Drymos/Liti M/R city gate station

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating station
Current Budget	3,8 million €
Expected benefit	Enabling access to new Users
Start date	July 2020
Final Investment Decision	Taken
Operation Date	August 2023
Entry in the system	September 2023
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan

Recovery method	Inclusion in the RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

Drymos Metering / Regulating Station will be fed from the National Natural Gas Transmission System (NNGTS) through the existing main pipeline with Hot-Tapping Method. New M/R station's maximum capacity will be 18.000Nm^3/h and it will be constructed in two phases: Phase 1: 9.000 Nm^3/h, Phase 2: 18.000 Nm^3/h.

In the first phase, two (2) gas metering and regulating streams shall be installed in a (1+1) configuration – one in operation and one stand-by – with each stream's capacity of 9.000 Nm^3/h, an interconnecting pipeline of 100m estimated length, Hot-Tapping configuration with all relevant equipment and installations, as well as Control Room's and RCC's equipment that will be installed at M/R station's Cabinet.

The project is designed to allow for a specific percentage of blends; the allowable blend of H_2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

B.3.4. Supply of other areas

1. Metering / Regulating Station Livadia U-2710

Project Summary	
Type of project	Planned Project
Type of investment	M/R Station
Current Budget	2,3 million €
Expected benefit	Enabling access to new Users
Start date	July 2018
Final Investment Decision	Taken
Operation Date	July 2022
Entry in the system	September 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes

First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The aim of this project is to install one M/R City Gate Station in the greater area of Livadia, in order to supply the distribution networks (19 barg MP) of Livadia city with natural gas.
The project includes the construction and installation of a Metering and Regulating skid with capacity of 11.500 Nm^3/h and outlet pressure of 16,7 barg, (5.750 Nm^3/h with 1 working + 1 stand by , with future provision for expansion to 2 working + 1 stand by, adding 5.750 Nm^3/h capacity), when justified by demand, the construction of Emergency Shut Down inlet and outlet valves stations both with 4'' by pass arrangement, construction of steel shelter for the protection of M/R skid (Skid Shelter), M/R Control system as well as connection with the NNGTS pipeline, for gas supply of final consumers.
The project is designed to allow for a specific percentage of blends; the allowable blend of H_2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

B4. Development Projects: Expansion of NNGS to new markets

1. Truck Loading Pilot (first) Station

Project Summary	
Type of project	Planned Project
Type of investment	Small scale LNG facility
Current Budget	7,5 million €
Expected benefit	Supply of new areas/markets/ decarbonization of the Greek energy system
Start date	April 2016
Final Investment Decision	Taken
Operation Date	June 2022
Entry in the system	July 2022
Current Status of Project	Under construction
Financing plan	Poseidon Med II Grants (for studies), PA 2014-2020 grants[14], DESFA's own equity or loan
Recovery method	Inclusion in RAB of Additional LNG Services

[14] Approved with 57,42% of eligible budget.

Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 64/2017 (TYDP 2016-2025)

The construction of a pilot truck loading station (the characterization of the station as pilot refers to the fact that will be the first station) will give the possibility for the use of natural gas in off grid areas, where the transmission system is not developed yet (e.g., islands and west Greece), along with its use in shipping for the fueling of vessels (for vessels using LNG as marine fuel). The result will be an increased gas consumption and a more efficient use of Revithoussa Terminal.

The market has already expressed interest for the said application both for the supply of off-grid consumers and for bunkering purposes. The station will have one loading bay for 50 m^3 trucks with a loading capacity of 100 m^3/h. It will also include provision for a future second bay.

The project also includes:

- Measurement of LNG loaded via weighbridge
- Control of the truck loading station from the LNG Terminal Control Room and DESFA EIS and SAP system as required
- The early activities for the future construction of the 2nd truck loading bay
- Expansion of the existing pier at Perama Megaridas port (3.1 miles from Revithoussa) for back up use
- Upgrade of Almyra jetty (1.1 miles from Revithoussa) so as to be the permanent transfer port. As intermediate solution Kronos pier in Elefsina port (10 miles from Revithoussa) will be used.

2. New jetty for small-scale LNG in Revithoussa

Project Summary	
Type of project	Planned Project
Type of investment	Small Scale LNG facility
Current Budget	28,8 million €
Expected benefit	Supply of new areas/markets/opening of a new gas market sector for Greece (bunkering)/ decarbonization of the Greek energy system
Start date	June 2017
Final Investment Decision	Taken
Operation Date	September 2023
Entry in the system	December 2023
Current Status of Project	Under Construction

Financing plan	Poseidon Med II Grants (for studies), NSRF 2014-2020 grants[15], DESFA's own equity or loan
Recovery method	Inclusion in RAB of Additional LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The new jetty will be realized in the northeastern part of Revithoussa and will serve the loading of LNG to small scale ships (1.000 m^3 and up to 30.000 m^3 of LNG).
The smallest ships will primarily be used to supply vessels powered by LNG (cruisers, containerships, Ro-Pax), in the port of Piraeus primarily and possibly other ports in the vicinity of Revythoussa.
The larger ships will transport LNG to satellite LNG storages and distribution stations in other coastal locations in in Greece, either to ports (such as Patras, as foreseen in the Poseidon Med II program), or off-grid installations where gas consumption will be regarded as feasible, including islands, through virtual pipeline schemes.
Following the completion of the feasibility studies, geological prospections, and analysis of the best available technologies on the internal markets, the project includes the construction of a new QUAYWALL (berth structure parallel to the shore), all the necessary cryogenic piping and equipment (marine arms, valves, instruments, controls, etc.).
The project is an implementation of the studies under POSEIDON MED II[16].

B5. Development Projects: Increase of capacity & security of supply of NNGS

1. Compression Station in Komotini and Regulating Station

Project Summary	
Type of project	Planned Project
Type of investment	Compressor station, Regulating station
Current Budget	50 million €
Expected benefit	Technical adequacy of NNGS, increase of capacity of NNGS

[15] Approved with apprx. 50% of the eligible budget.

[16] POSEIDON MED II, under the auspices of the INEA (Innovation and Network Executive Agency), is part of the necessary steps towards adopting liquefied natural gas as a marine fuel in the Eastern Mediterranean, making Greece the focal point for supplying and distributing liquefied natural gas in Southeast Europe, implementing Directive 94/2014 / EU and Law 4439/2016 incorporating the above Directive into Greek law. In this action 26 partners from shipping and gas industry from three EU Member States are involved (Cyprus, Greece, Italy)

Start date	July 2007[17]
Final Investment Decision	November 2022
Operation Date	October 2024
Entry in the system	October 2024
Current Status of Project	Under maturity
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of the Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 64/2017 (TYDP 2016-2025)

This project has been originally included in the TYDP as the Compressor Station in Kipi. However, following the latest developments in the Greek Market and the corresponding assessment of possible capacity configurations:

- request from IGB for minimum delivery pressure of 60 barg, to be increased to 70 barg for the second phase of expansion of the IGB pipeline
- increased import capacities from new entry point TAP,
- increasingly reduced import quantities and related commercial interest from entry point Kipi
- potential future export requests to IGB,
- new entry point of Alexandroupolis,
- economies of scale in order to achieve future needs with a single CS instead of two CSs in Kipi and Komotini

and taking into consideration uncertainties associated with the electricity grid in Kipi vs. decision to have an electrical compressor, it is proposed to proceed with the relocation of the CS Kipi in the area of Komotini.

The project aims at increasing the pressure of the gas in the branch eastern of Komotini and is required in order to address the changing dynamics of the Greek and the regional gas market due to the forthcoming entry into operation of IGB and the new FSRU Terminal in Alexandroupolis, as well as the increased interest for LNG flows from the Greek NGTS to the SEE region. It will also enhance the flexibility of operation of the whole NNGTS and ensure the capacity of transportation of gas in the direction North to South and vice versa.

The project is included in the 5th PCI list that was issued by EC in 2021.

The total capacity of the compressor is preliminarily estimated at 12,5 MW with provisions for future extension of additional compressor power till 17 MW.

The Regulating Station in Komotini is necessary for safety reasons because the Maximum Allowable Operating Pressure (MAOP) of the pipeline west of Komotini is lower.

[17] Approval time of basic design

Regarding H_2 readiness of the asset it is noted that the Compressor will be Electric Motor Driven and will be able to operate with up to 20% hydrogen. As far as the Regulating Station in Komotini is concerned, the project is designed to allow for a specific percentage of NG/ H_2 blends; the allowable blend of H_2 and natural gas is under evaluation, according to the specifications of the existing infrastructures.

2. Compressor Station in Ambelia

Project Summary	
Type of project	Planned Project
Type of investment	Compressor Station
Current Budget	73 million €
Expected benefit	Efficiency of NNGS, effective operation in respect to prevent congestion
Start date	June 2017
Final Investment Decision	Taken
Operation Date	October 2023
Entry in the system	December 2023
Current Status of Project	Under Construction
Financing plan	NSRF 2014-2020 grants[18], DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

The project is necessary on the basis of the hydraulic simulation studies carried out by DESFA and increases the transported quantities of natural gas from north to south. The project accommodates the additional daily flow from the TAP pipeline through its interconnection with NNGTS in Nea Messimvria.

In order to ensure the hydraulic stability and efficiency of the system, irrelevant of the entry point in the northern section of the NNGTS the Users will select, it is necessary to increase the technical capacity of the said NNGS entry points with the installation of a compressor station at the southern part of Greece, which concentrates the larger part of the demand.

According to the Basic Design, the compressor station will include two compressor units plus one spare with size (2+1) x 10 MW. Furthermore, the station will be designed to provide also

[18] Approved with 50,84% of eligible budget.

the possibility of compression in reverse flow. The Compressor is Gas Turbine Driven and will be able to operate with up to 10% hydrogen.

3. Upgrade of Nea Messimvria compressor station

Project Summary	
Type of project	Planned Project
Type of investment	Compressor station
Current Budget	18,2 million €
Expected benefit	Efficiency of NNGS, effective operation in respect to prevent congestion
Start date	March 2018
Final Investment Decision	Taken
Operation Date	December 2022
Entry in the system	March 2023
Current Status of Project	Under construction
Financing plan	NSRF 2014-2020 grants[19], DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

The project is considered necessary since TAP pipeline is scheduled to be connected to NNGTS upstream as well as downstream the existing compressor station in Nea Messimvria. For the cases that TAP gas is injected upstream the existing compressor station, in order to ensure the hydraulic stability of the transmission system, in combination with Ambelia compressor station, it is necessary to install a 3rd compressor unit at Nea Messimvria with similar characteristics to the existing ones.

In general, the installation of the 3rd compressor unit at Nea Messimvria, in combination with the planned compressor station at Ampelia, increases the total entry capacity of the entry points in the northern section of the NNGTS.

The Compressor is Gas Turbine Driven. The new unit is part of the existing Compressor Station and follows the design of the two existing units. The compatibility with gas blends is under evaluation.

[19] DESFA has requested 50,27% of eligible budget.

4. Booster Compressor for TAP in Nea Messimvria

Project Summary	
Type of project	Planned Project
Type of investment	Compressor station
Current Budget	42,7 million €
Expected benefit	Efficiency of NNGS, effective operation enabling transit flows
Start date	December 2019
Final Investment Decision	Taken
Operation Date	March 2024
Entry in the system	June 2024
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The project concerns the installation of a new Compressor Station in order to supply the Trans Adriatic Pipeline with delivery pressure significantly higher than the NNGS operating pressure. According to the provisions of the paragraph 4.7.4 of Joint Decision of Greek, Albanian and Italian Regulators for the exemption of TAP from articles 9, 32, 41(6), (8) and (10) of Directive 2009/73/EC (Decision of RAE 269/2013 Gov. Gaz. 1833/29.07.2013) at least one (1) Tie-In Point between NNGS and TAP pipeline should be realized, with a nominal capacity of 10 mil. Nm^3/ day and bi-directional flow capability. The cost of construction of the above-mentioned investment, based on the exemption decision, will be covered by DESFA and will be recovered through the tariffs of the Users of the National Natural Gas System.

According to the regulatory framework the tie in point must be bidirectional. Flow from NNGTS to TAP due to the difference in the operating pressure (66,4 barg vs 93 barg respectively) requires the installation of a Compressor Station.

This investment enables the full bi-directional flow in the interconnection (2nd phase of the project).

The characteristics of the compressor station were preliminarily identified as follow:

Installation of 2 units of 1,1 MW and 1 unit of 3,3 MW, with no spare capacity. This configuration can cover a widespread range of flows, from very low up to the 10 million Nm^3 per day.

The Compressors will be Electric Motor Driven Variable Speed. The Compressor will be able to operate with up to 20% hydrogen.

B6. Development Projects: Improvement / modernization/ maintenance of NNGS

1. Design, supply and installation of a daily gas flow system design[20]

Project Summary	
Type of project	Planned Project, Maintenance Project
Type of investment	Scada equipment of the NNGTS
Current Budget	0,242 million €
of which maintenance capex	*0.242 million €*
Expected benefit	Efficiency of NNGS, effective operation
Start date	May 2010
Final Investment Decision	Taken
Operation Date	October 2022
Entry in the system	October 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion of cost in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval	Ministerial Decision Δ1/Α/1271

The establishment of a system for forecasting-planning-control of daily gas flow will provide DESFA the ability to:

- estimate the volume of gas that will be transmitted,
- increase the level of accuracy in the prediction of the volume
- embody a regular review of the progress of the daily planning of gas and
- adjust the levels of unexpected consumption or shortages in supply.

The investment will:

- unburden DESFA from operating costs (overtime of field staff, unnecessary start-up/shut-down of LNG terminal, Compressor N. Messimvria, etc.)
- optimize the management of Users' reports and
- provide daily justified gas flow plans.

[20] Former part of the project "Upgrading Projects of NNGS -1st group"

2. LNG Terminal Boil-off Gas Compressor Station

Project Summary	
Type of project	Planned Project
Type of investment	LNG facility compressor station
Current Budget	13,85 million €
Expected benefit	Efficiency of NNGS, effective operation
Start date	April 2016
Final Investment Decision	Taken
Operation Date	May 2023
Entry in the system	July 2023
Current Status of Project	Under construction
Financing plan	NSRF 2014-2020 grants[21], DESFA's own equity or loan
Recovery method	Inclusion in RAB of LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 64/2017 (TYDP 2016-2025)

In order for DESFA to manage with the best possible way the produced boil-off gases (BOG) in the LNG Terminal of Revithoussa from the cryogenic facilities (2nd upgrade) as well as from the unloading/loading phase and mainly to avoid the combustion of the gases in the flair of the facility in the case of no send-out operation, DESFA will install a new compressor station for BOG so as to increase the pressure and inject them to the national natural gas system.
The new project consists of the following parts:

- Compressor station unit of total throughput of 10.000 kg/h and discharge pressure 26÷64 barg
- Knock Out Drum container in the sanction of compressors
- System for water cooling with cooler and re-circulation pumps
- Metal building for the accommodation of the compressor unit of 420 m^2 surface, including the electromechanical infrastructure
- Electrical facility for the power supply to compressors, coolers, pumps and building
- Installation of automation and control of new installations and interconnection with the central control room

[21] It has been re-submitted with a percentage of 60,71% of eligible budget.

- Pipeline networks for the transport of wastewater and extension of the existing auxiliary networks of the station (compressed air, nitrogen, water etc.)
- Extension of the plant's fire protection facilities
- Decommissioning of the existing nitrogen facility and relocation to a new location

This project, apart from saving of LNG significantly for the users of the station is an important environmental benefit by eliminating the carbon dioxide emissions during the period of non-operation of the Terminal.

3. Upgrading Projects of NNGS -3rd group

Project Summary	
Type of project	Planned Project, Maintenance Project
Type of investment	Equipment for the NNGTS and LNG
Current Budget	1,1 million €
Expected benefit	Efficiency of NNGS, effective operation to prevent emergency situations
Start date	June 2017
Final Investment Decision	Taken
Operation Date	December 2022 (project 1 table 2) December 2022 (project 2 table 2)
Entry in the system	December 2022 (project 1 table 2) April 2023 (project 2 table 2)
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

Table 2 – Projects for the upgrade of NNGS operation

No.	Investments	Estimated cost (€)	Final Investment Decision	Start of operation date	Inclusion in the system
1	Upgrade of electrical circuit breakers for medium voltage and internal lighting	1.000.000	Taken	December 2022	December 2022

	in the control room of LNG facility				
2	Upgrade of Geographical Information System (GIS) system	100.000	Taken	December 2022	April 2023
	TOTAL	**1.100.000 €**			

The following paragraphs analyze the feasibility and the technical characteristics of the projects presented in above table.

1. Upgrade of electrical circuit breakers for medium voltage and internal lighting in the control room of LNG facility

It concerns the supply and replacement of medium voltage (6 kV) electrical circuit breakers at the LNG facility (45 pcs.) aiming at the smooth operation of the automation in the distribution of electricity and supply of medium voltage loads (motors and pumps). The upgrade study is in progress.

2. Upgrade of Geographical Information System (GIS) system

The project will further develop DESFA's geographic database in order to fully integrate DESFA's assets and their efficient performance through GIS-web applications to the end users.

4. Upgrade of physical security of DESFA facilities - Physical Security Control Center

Project Summary	
Type of project	Planned Project
Type of investment	Equipment of the NNGTS and LNG facility
Current Budget	1,2 million €
Expected benefit	Efficiency of NNGS, effective operation
Start date	June 2017
Final Investment Decision	Taken
Operation Date	November 2022
Entry in the system	November 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services

Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

NNGS facilities are considered as European critical infrastructure. Possible shutdown or destruction would have a significant impact on the country and Europe-wide.
The aim of the project is to upgrade the physical security of all DESFA infrastructure due to the rapid development of the technological applications in the sector and the establishment of a Physical Security Control Center covering the requirements of the Directive 2008/114/EC concerning critical infrastructure security, which was incorporated into the Greek law with Presidential Decree 39/2011.
The aim is to prevent, mitigate and eliminate risk threats (examples include theft, sabotage, terrorism, accidents, and natural phenomena).
The project includes:

- -Implementing a vulnerability study of all DESFA installations and developing an Infrastructure Safety Management Plan
- Compilation of Technical Specifications of Safety Systems and Physical Security Control Center
- Installation of security systems in DESFA (eg. CCTV systems, tamper detectors, alarms, headlamps, access control etc.)
- Development and operation of a Physical Security Control Center for the management and coordination of the security systems of the infrastructure.

5. Replacement of Metering and Supervision/ Control systems at NNGTS M and M/R stations of NNGTS

Project Summary	
Type of project	Planned Project, Maintenance Project
Type of investment	Equipment for control/management of NNGS
Current Budget	4,5 million €
of which maintenance capex	*4,5 million €*
Expected benefit	Efficiency of NNGS, effective operation
Start date	Jun-17
Final Investment Decision	Taken
Operation Date	December 2023
Entry in the system	December 2023
Current Status of Project	Under construction

Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

The project concerns the replacement of the Measurement Management and Supervision / Control Systems in twenty-four (24) existing Metering (M) and Metering / Regulating (M / R) Stations, to achieve:

- the compatibility with each other as well as with the already upgraded 15 M/R stations and the planned new stations as presented in the planned projects herein, through similar equipment and software as well as similar architecture, achieving on the one hand direct economies of scale, by maintaining a smaller number of required spare parts and consumables and on the other hand by the support services of these systems during their operational phase,
- the separation to the maximum extent of the Measurement Management System from the Supervision /Control System at NNGTS Stations, achieving (a) the stations' measurement data to be collected in the SCADA of the Control and Load Distribution Centers (KEKF) of DESFA directly - without intermediate processing - by the certified Multi-Stream Flow Computers which will be installed in the framework of this project at the NNGTS stations and (b) by extension the optimization of the services provided by DESFA under the requirements of European and national regulatory framework (e.g. publication of data, validation of measured quantities etc), and
- to ensure the operation of the Measurement Management and Supervision / Control Systems of the Stations for the next decade as the equipment and software at these Stations operate on average for a decade and is expected not to be supported by the manufacturers in the coming period.

The replacement of the Measurement Management and Supervision / Control Systems in the Stations of DESFA refers to the following elements:

- SCADA & Telecom
- programmable Logic Controller – PLC
- flow computer
- gas chromatograph, and
- equipment of local stations network.

6. New building for DESFA's headquarters

Project Summary	
Type of project	Planned Project

Type of investment	Project for the control/management of the NNGS
Current Budget	18,8 million €
Expected benefit	Efficiency of NNGS
Start date	Jun-17
Final Investment Decision	Taken
Operation Date	June 2023
Entry in the system	June 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services [22]
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 236/2019 (TYDP 2017-2026)

DESFA headquarters are now housed in a rented building. It is considered cost efficient for DESFA to acquire a privately-owned headquarters building, which will constitute a company's fixed asset, contribute to the saving of operating expenses and ensure improved health and safety of work, while it will in parallel promote and represent the vision and the values of the company.

The goal is to avoid burdening the NNGS users due to the savings that will be achieved, mainly by the rental cost. It is also estimated that there will be energy savings due to stricter energy specifications of the new building.

7. Technical Training Centre in Nea Messimvria

Project Summary	
Type of project	Planned Project
Type of investment	Equipment of the NNGS
Current Budget	1,74 million €
Expected benefit	Enhanced training for DESFA personnel/Efficiency of NNGS, effective operation/increase safety in the operations of the NNGTS

[22] Under the provision that, with regulatory depreciation of 40 years, there will be a negative impact on the Average Tariff for the use of NNGS.

Start date	June 2017
Final Investment Decision	Taken
Operation Date	October 2022
Entry in the system	October 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The project concerns the construction of a Training Center for the theoretical and practical practice of natural gas technicians. The development of such infrastructure will be the first in the Balkan region. It will be used primarily for the needs of the DESFA staff, but it creates an opportunity of additional services for the training of personnel of other TSOs and DSOs, contributing to the reduction of costs for the Greek network users.
In particular, the Training Center will consist of a central building, which will house the administration and operation areas for theoretical education, as well as a separate installation in which the necessary equipment for natural gas networks will be installed for practical training.

8. NNGS Modernization projects – 4th compilation

Project Summary	
Type of project	Planned Project, Maintenance Project
Type of investment	Equipment for the NNGTS
Current Budget	0,17 million €
of which maintenance capex	0,17 million €
Expected benefit	Increased efficiency of the system
Start date	June 2019
Final Investment Decision	Taken
Operation Date	December 2022
Entry in the system	December 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan

Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The project refers to the upgrade of three (4) odorant units in Metering Stations and more specifically the procurement and installation of three (3) odorant units in Metering Stations in Alexandroupolis, Komotini, Petropigi and Farsala with the aim of upgrading the odorant services of NNGTS. The budget is estimated at 170.000 €.

9. Upgrade of LNG and O&M Facilities for energy saving

Project Summary	
Type of project	Planned Project, Maintenance Project
Type of investment	Equipment for NNGTS & LNG Facility
Current Budget	2 million €
of which maintenance capex	*2 million €*
Expected benefit	Increased efficiency of the system
Start date	December 2019
Final Investment Decision	Taken
Operation Date	June 2023
Entry in the system	June 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

1. Upgrade of LNG Facilities

This project includes interventions in heating/cooling systems and external lighting in order to achieve energy savings. The budget is estimated at 100.000 €.

2. Upgrade of O&M Facilities

The aim of the project is the energy upgrading of the Building and Electrical / Mechanical Facilities of the Operation and Maintenance Centers in order to achieve energy savings in accordance with the Energy Performance Regulation of buildings "KENAK" (Government

Gazette B 2367/12.07.2017). This upgrade includes interventions at buildings' shells, heating/cooling systems, lighting, installation of photovoltaic etc. The budget is estimated at 1.900.000 €.

10. Cathodic Corrosion Protection System Upgrading

Project Summary	
Type of project	Planned Project
Type of investment	Equipment for NNGTS
Current Budget	2 million €
Expected benefit	Increased efficiency of the system
Start date	July 2019
Final Investment Decision	Taken
Operation Date	November 2023
Entry in the system	November 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of the Transmission Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

A continuous monitoring of Cathodic Protection System (CPS) can be used as a pipeline integrity diagnostics tool complementary to In-Line Inspection (ILI), enriching also with valuable data the Pipeline Integrity Management System (PIMS).
The upgrading of the CPS, involves three main components:

1. **Equipment for remote monitoring and control of CPS:**
   a) Remote monitoring and control of CPS Rectifiers and test posts
   b) Recording of corrosion rates and other CP data at special coupons (ER probes)

   The project will also include the replacement of Transformers / Rectifiers with low-cost DC modules.

2. **Revision - Updating of proximity effects (electromagnetic interference) studies:**
   In order to propose the improvement or extension of the pipeline earthing system, including lightning protection of insulating joints, risk assessment of pipeline damage by lightning and a corrosion risk assessment.

3. **Replacement of DC decoupling devices in the existing pipeline earthing system**

11. IT Transformation

Project Summary	
Type of project	Planned Project
Type of investment	IT System
Current Budget	7,7 Million €
of which Maintenance Capex	7,7 Million €
Expected benefit	Digitalize and automate DESFA's core processes Enhance data-driven insights and decision-making Enable seamless collaboration and communication across departments and 3rd Parties Achieve Asset Lifecycle Management excellence by shortening maintenance work cycles Leverage Innovation Technologies for Gas Transmission Network Monitoring, Inspection and Defects Detection Gain a holistic view of the organization's risks and compliance with the Regulatory Framework
Start date	Sep-2019
Final Investment Decision	Taken
Operation Date	January 2023
Entry in the system	January 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission and LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

With the strategic goal of digital transformation and in response to market challenges and requirements, DESFA has developed a five-year transformation roadmap for the transition to the new IT/OT Operating model. In this context, the "IT/OT Transformation Programme" constitutes the full implementation of the five-year roadmap, which includes the establishment of a Data Governance and Security Framework and the further development of

existing and implementation of new IT services. This project consists of two main workstreams:

1. **Workstream 1**: Including actions aiming at further improving the IT Governance Model and achieving optimal level of Information Security. Amongst others, the stream includes the design of an Information Security Framework based on best practices and international standards, the implementation of security mechanisms / controls to achieve optimum level of security as well as the development of appropriate procedures for the optimal provision of IT services internally and externally. In addition, this stream includes Digital Transformation activities in Cloud environments and the implementation of periodic security risk assessments on IT services and critical transmission network infrastructure of the National Natural Gas System.
2. **Workstream 2**: Including actions related to further improving and replacing part of existing applications as well as introducing new technologies. Specifically, the upgrade of core applications to cover DESFA's financial services and procurement activities is included as well as the design and implementation of necessary applications to optimize the complaints and customer care management and the achievement of optimal asset lifecycle management of the National Natural Gas System.

The purpose of this project is to meet the objectives of the corporate strategy; DESFA intends to replace part of the existing IT services that support its core business operations and introduce new technologies aiming at a continuous process for: the modernization of the IT Landscape, the automation and digitalization of business processes, the optimization of the operational activities, the increase of reliability and compliance with the regulatory framework, the reduction of operational costs.

Main pillars of this project are the new ERP SAP system, the implementation of the disaster recovery center, the creation of a document management system, the upgrade of the human capital management system, the introduction of modeling tools, an upgrade of the Integrated Project Management System, that will allow a faster, more reliable and efficient operation of the company.

12. Upgrade of LNG Facilities

Project Summary	
Type of project	Planned Project
Type of investment	Equipment for the LNG Facility
Current Budget	0,36 million €
Expected benefit	Increased efficiency of the system
Start date	June 2020
Final Investment Decision	Taken

Operation Date	October 2022
Entry in the system	October 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in the RAB of LNG Services
Inclusion in the 3 years Development Period	Yes
First approval from RAE	Decision 116/2021 (TYDP 2021-2030)

The project consists of an:

1) Upgrade of equipment of LNG Facilities: This project includes a) Engineering, supply and installation of new PLC control system for Marin – Gangway, b) Engineering, supply and installation new PLC & HMI control system for SCV A/B and c) Replacement of Dry Powder system in LNG tanks A/B (supply and installation).

2) Upgrade of air supply system of LNG Facilities: This project includes design & supply of equipment for upgrading the air supply system (plant & instrument Air).

3) Engineering supply and installation of condensate treatment system for Combined Heat & Power Plant: Including engineering, supply and installation of condensate treatment system for Combined Heat & Power Plant.

13. LNG Maintenance Projects

Project Summary	
Type of project	Planned Project [23]
Type of investment	Equipment for the LNG Facility
Current Budget	0,822 million €
Expected benefit	Increased efficiency of the system
Start date	May 2021
Final Investment Decision	Taken
Operation Date	October 2022
Entry into the system	October 2022
Current Status of Project	Under Construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in the RAB of LNG Facility

[23] Transferred from the Small Projects' List ver .19

Inclusion in the 3 years Development Period	Yes

The project refers to a set of LNG Maintenance works or upgrades on the LNG Terminal of Revithoussa for maintaining or extending the useful life asset and its components, which is crucial for satisfying its obligations as the LNG Operator, in the most cost–effective, transparent and direct way.

In particular, the project includes the following subprojects:

i. Fire-fighting vehicle
ii. Study Interior Lighting Upgrade Control Room
iii. Maintenance of Compressors BOG A.B.C
iv. Maintenance of bridge cranes of Tanks A & B
v. Upgrade existing ones & purchase of a new chromatograph at CHP Unit
vi. Maintenance of GE 1&2 CHP (50,000h)
vii. Replacing air conditioners with new type INVERTER-2nd Phase

14. Upgrade of Control and Dispatching Center in Patima

Project Summary	
Type of project	Planned Project [24]
Type of investment	Equipment for control/management of transmission system
Current Budget	0,716 million €
Expected benefit	Increased efficiency of the system
Start date	May 2021
Final Investment Decision	Taken
Operation Date	September 2022
Entry into the system	September 2022
Current Status of Project	Under Construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in the RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes

[24] Transferred from the Small Projects' List ver.19

The project refers to Full SCADA replacement at Patima Dispatching Center. Existing data based, historical data, displays and reports will be migrated to have modern hardware, faster speed, higher capacity, better security, virtualization of New Application for Gas Measurement Data Management with additional functionalities for validation and editing of metering data and storage of all metering data in single data base.
In particular, the project includes the following subprojects:

i. Architectural and Electromechanical upgrade of Control and Load Distribution Center in Patima- Procurement of long-term materials Study Interior Lighting Upgrade Control Room

ii. Architectural and Electromechanical upgrade of Control and Load Distribution Center in Patima- Construction

15. Asset management IT & OT Equipment

Project Summary	
Type of project	Planned Project[25]
Type of investment	Equipment for the NGTS
Current Budget	0,075 million €
Expected benefit	Increased efficiency of the system
Start date	April 2022
Final Investment Decision	Taken
Operation Date	SP1: December 2022 SP 2: June 2023
Entry in the system	SP1: December 2022 SP 2: June 2023
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan
Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes

The project consists of two sub-projects (SP):

Subproject 1: Operations Technology Hardware and Software
The Project refers to i) the supply of one (1) Schneider Electric license package of M580 PLC programming software "EcoStruxure Control Expert, extra-large (XL), group (3 users)", ii) the

[25] Transferred from the Small Projects' List ver.23.

supply and installation of two (2) permanent licenses of SCADA system software Genesis 32 V9 of ICONICS, Inc. in the supervisory computers of Thessaloniki North and Thessaloniki East M/R stations, iii) the supply of one (1) storage server RS1221RP+ of Synology Inc. with five (5) Western Digital Gold Hard Disks of 8TB each, iv) the supply of one (1) portable Hart Communicator instrument with hazardous area enclosure (ATEX) and v) the supply of one (1) GAMS (Base Module and CPLEX) license to be used by the Gas Demand Forecast system. It is deemed necessary to procure the software licenses and equipment in order to i) maintain the installed PLCs at Kipi Border Metering Station, ii) to make the licenses of SCADA software of Thessaloniki North and Thessaloniki East M/R stations transferrable to other supervisory computers, iii) to store diverse SCADA and Telecommunications software in a central storage server and to support restoration activities required by security procedures, iv) to support and facilitate the main activity of the accredited calibration laboratory of DESFA, and v) to facilitate the short-term gas demand forecast of the gas-fired power plants.

Subproject 2. GIS software upgrade

The Scope of Services pertain to the provision of services for upgrading the existing status of ArcGIS server to expand the capabilities of DESFA GIS.

In particular, the Scope of Services shall include, the following:

i. Upgrade of existing ArcGIS Enterprise workgroup Standard to ArcGIS Enterprise Standard version

ii. Upgrade of existing ArcGIS Geoevent Workgroup server to ArcGIS Enterprise Geoevent server

iii. Technical services for the implementation of the above

16. Required O&M Equipment for 2022

Project Summary	
Type of project	Planned Project[26]
Type of investment	Equipment for the NGTS
Current Budget	0,2 million €
Expected benefit	Increased efficiency of the system
Start date	April 2022
Final Investment Decision	Taken
Operation Date	December 2022
Entry in the system	December 2022
Current Status of Project	Under construction
Financing plan	DESFA's own equity or loan

[26] Transferred from the Small Projects' List ver.23.

Recovery method	Inclusion in RAB of Transmission Services
Inclusion in the 3 years Development Period	Yes

The project refers to a basket of capital expenses related to acquisition of machinery (tools) and small equipment necessary for the operation and maintenance of DESFA's O&M centers across the NNGTS. The range of tools and equipment varies according to the needs of the O&M centers, including but not limited: Pressure test pumps, portable generators, calibration instruments, electrician tools and measuring instruments, replacements, etc.

Chapter III. Projects outside the three years Development Period

A. New Projects

A1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)

1. Metering and Regulating Station for the connection to East Med Pipeline

Project Summary	
Type of project	New Project
Type of investment	Metering & Regulating Station
Current Budget	7,5 million €
Expected benefit	Interconnection to a n.g. system
Start date	-
Final Investment Decision	-
Operation Date	-
Entry in the system	-
Current Status of Project	-
Financing plan	DESFA's own equity
Recovery method	-
Inclusion in the 3 years Development Period	No

The project consists of the implementation of one Metering & Regulating station at Megalopoli, in the Peloponnese, for the potential interconnection of the Greek gas transmission system with the East-Med pipeline.

The realization of the project strongly depends on the advancement and the FID of the East Med Pipeline.

A2. Projects for the connection of Users

There are no projects in this section.

A3. Development Projects

There are no projects in this section.

B. Planned Projects

B1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)

1. Metering and Regulating Station for connecting South Kavala underground storage

Project Summary	
Type of project	Planned Project
Type of investment	Metering & Regulating Station
Current Budget	7,5 million €
Expected benefit	Security of Supply
Start date	-
Final Investment Decision	-
Operation Date	-
Entry in the system	-
Current Status of Project	-
Financing plan	DESFA's own equity
Recovery method	-
Connection Agreement with User	Not yet
Inclusion in the 3 years Development Period	No
First approval from RAE	Decision 755/2020 (TYDP 2020-2029)

The Metering and Regulating Station is necessary for the injection and withdrawal of gas to and from the Underground Storage in South Kavala to NNGTS, for which no FID has been taken yet.

B2. Projects for the connection of Users

1. Construction of High Pressure Pipeline Mavromati (Vagia)-Larymna and necessary Metering Station for the Connection of LARCO GMM SA with NNGS

Project Summary	
Type of project	Planned Project
Type of investment	Pipeline, Metering Station
Current Budget	17,5 million €
Expected benefit	Enabling access to new Users
Start date	Jun-13
Final Investment Decision	-
Operation Date	-
Entry in the system	-
Current Status of Project	Under maturity
Financing plan	-
Recovery method	-
Connection Agreement with User	Not yet
Inclusion in the 3 years Development Period	No
First approval from RAE	Decision 525/2013 (TYDP 2013-2022)

The project consists of:

- Pipeline of 36 km and 10inch diameter which will start from the main natural gas pipeline line valve station "Mavromati (Vagia)" and ends up in the facility of LARCO in Larymna.
- Metering station that will be installed in land provided by LARCO

Technical studies as well as licenses procedures for the project are in progress. These studies are carried out under DESFA's contract with LARCO for the "Elaboration of studies for the connection of the installations of LARCO SA with NNGS".
The project is not included in the projects of the three-year period as there is no progress regarding User's commitment from its starting date until now.

B3. Development Projects

There are no projects in this section.

Chapter IV. Planned projects that are not included or were completed in the Development Plan 2022-2031

The following planned projects of TYDP 2021-2030 or List of Small Projects have been **completed** and therefore are not proposed for inclusion in this TYDP

- Upgrade of LNG Loading Arms at Revithoussa LNG Terminal
- Increment of the back-up power availability at the Revithoussa LNG terminal
- Replacement of (2) Regulating Valves 24'' Mokveld
- Replacement of two (2) Chiller systems
- Integrated Information System for Natural Gas Upgrade (year 2020)
- Hydraulic Simulation software of NNGTS upgrade in real time
- Asset Management Division's Equipment (included in the List of Small Projects ver. 19/18.5.2021)
- Replacement of UPS in 9 RCC and 2 M/R at EKO, PLATY plus UPS in O&Ms Patima, Ambelia and Vistonida (included in the List of Small Projects ver. 19 /18.5.2021)
- Upgrade of HMI system of Solar compressor (included in the List of Small Projects ver. 19 /18.5.2021)
- Energy upgrades in O&M centers (included in the List of Small Projects ver. 19/18.5.2021)
- Nea Messimvria Compressor TUCO A Overhaul (included in the List of Small Projects ver. 20 /09.09.2021)
- CHP Corrective Replacement in CHP Unit (included in the List of Small Projects ver. 20/09.09.2021)
- Required O&M Equipment (included in the List of Small Projects ver. 20 /09.09.2021)
- Interconnection of IGB Pipeline with the NNGS in Komotini
- Upgrade of projects 1st group| Upgrade of SCADA in dispatching centers
- Vent Stack System implementation at Nea Messimvria
- Installation of M/R Kavala
- Megalopoli M/R city gate station

The following projects have been **excluded** from TYDP

- "Connection of the Power Production Unit of ELVAL /HALCOR is Thisvi" has been excluded from this TYDP as the relevant ARCA has been rejected in accordance with the provisions of Article 95B, par. 12 (B) of the Code.

- M/R Station in the region of Poria due to changed design philosophy in respect to the supply of West Macedonia & CNG Station in the region of Poria due to changed design philosophy in respect to the supply of West Macedonia [27]
- Connection of "DEPA Commercial SA" CNG Station with the NNGTS in Komotini following DEPAs Commercial letter (PN 80745/31.01.2022) requesting the exclusion of the project from TYDP 2022-2031
- Connection of "DEPA Commercial SA" CNG Station with the NNGTS in Tripoli requesting the exclusion of the project from TYDP 2022-2031

[27] These two projects have been replaced by the project B3.1.1. "SSLNG in Poria, Aspros & Perdikas".

Annex I

Summary Table of the Projects of the NNGS Development Plan 2022-2031

Three Year Development projects [28]			
	INVESTMENT	**COST (€)**	**MILESTONES**
	A. NEW PROJECTS		
A1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)			
A2. Projects for the connection of Users			
A3. Development Projects: Expansion of NNGS to new areas			
1	Supply to Ioannina via SSLNG	85.000.000	Final Investment Decision: 07/2023 Start of Operation: 06/2026 Entry into the system: 09/2026
2	M/R Station to Veroia	3.500.000	Final Investment Decision: 07/2022 Start of operation: 06/2024 Inclusion in the system: 09/2024
3	M/R Station to Naousa	3.500.000	Final Investment Decision: 07/2022 Start of operation: 06/2024 Inclusion in the system: 09/2024
A4. Development Projects: Expansion of NNGS to new markets			
A5. Development Projects: Increase of capacity & security of supply of NNGS			
A6. Development Projects: Improvement / modernization/ maintenance of NNGS			
1	Expansion and Upgrade of M/R Stations of Exit Point to Distribution Network 'Athens'	3.000.000	Final Investment Decision: 07/2022 Start of operation: 12/2023 Inclusion in the system: 03/2024
2	Keratsini branch rerouting (Mavri Ora stream)	425.000	Final Investment Decision: 07/2022

[28] Projects which the Final Investment Decision (i) has been taken, (ii) is considered possible to be taken within three (3) years from the publication of the draft Development Plan in DESFA's website

			Start of operation: 06/2024 Inclusion in the system: 06/2024
3	Construction of a new Metering & Regulating Station in Markopoulo Site to replace the existing temporary M/R	2.200.000	Final Investment Decision: 07/2022 Start of operation: 12/2023 Inclusion in the system: 03/2024
4	Electronic information system - functionalities upgrade	350.000	Final Investment Decision: 7/2022 Start of operation: 12/2022 Inclusion in the system: 12/2022
5	Development of an Information System for DESFA to undertake the role of forecasting party for the NNGTS Balancing Zone	500.000	Final Investment Decision: 7/2022 Start of operation: 10/2022 Inclusion in the system: 10/2022
6	New electronic information system for natural gas	3.500.000	Final Investment Decision: 7/2022 Start of operation: 12/2023 Inclusion in the system: 12/2023
7	New project management system upgrade	1.200.000	Final Investment Decision: 7/2022 Start of operation: 12/2022 Inclusion in the system: 12/2022
8	Upgrade of Fire Fighting System & replacement of the pressure relief valves at BMS Sidirokastro	800.000	Final Investment Decision: 07/2022 Start of operation: 11/2022 Inclusion in the system: 12/2022
9	Nitrogen injection system	2.530.000	Final Investment Decision: 07/2022 Start of operation: 06/2024 Inclusion in the system: 06/2024
10	Overhaul maintenance of the two (2) BOG Compressors V-3101 A & V-3101 B	640.000	Final Investment Decision: 12/2022 Start of operation: 4/2023 Inclusion in the system: 4/2023

11	Overhaul maintenance of GE 1 Unit of CHP Plant	500.000	Final Investment Decision: 9/2022 Start of operation: 11/2022 Inclusion in the system: 11/2022
12	LNG Upgrade Projects 2022	650.000	Final Investment Decision: 7/2022 Start of operation: 7/2023 Inclusion in the system: 7/2023
13	Transmission Upgrade Projects	507.750	Final Investment Decision: 7/2022 Start of operation: 6/2023 Inclusion in the system: 6/2023
14	Replacement of Telecommunication and Network Equipment in NNGS Fixed Telecommunication System	950.000	Final Investment Decision: 7/2022 Start of operation: 7/2023 Inclusion in the system: 7/2023
15	Nea Messimvria M/R Station modifications for Reverse Flow Operation	2.000.000	Final Investment Decision: 10/2022 Start of operation: 03/2024 Inclusion in the system: 06/2024
16	Relocation of Ampelia – Karditsa – Trikala Pipeline	4.950.000	Final Investment Decision: 7/2022 Start of operation: 01/2023 Inclusion in the system: 03/2023
17	Anti-Flood works and Damage Restoration in the Ampelia Station	2.500.000	Final Investment Decision: 09/2022 Start of operation: 09/2023 Inclusion in the system: 12/2023
	B. PLANNED PROJECTS		
B1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)			
1	Pipeline Nea Mesimvria – Evzoni/ Gevgelija and M Station	67.000.000	Final Investment Decision: 11/2022 Start of operation: 06/2025

			Inclusion in the system: 07/2025
2	Connection of the FSRU of Alexandroupolis	26.000.000	Final Investment Decision: Taken Start of operation: 10/2023 Inclusion in the system: 10/2023
3	Metering and Regulating Station for connecting with Dioryga Gas FSRU	15.000.000	Final Investment Decision 10/2022 Start of operation: 10/2024 Inclusion in the System: 03/2025
B2. Projects for the connection of Users			
1	M Station at SALFA Ano Liossia	720.000	Final Investment Decision: Taken Start of operation: 01/2023 Inclusion in the system: 02/2023
2	M/R Station AdG III	2.000.000	Final Investment Decision: Taken Start of operation: 03/2023 Inclusion in the system: 04/2023
3	Connection of Energean Oil & Gas S.A. plant with NNGTS	3.900.000	Final Investment Decision: 05/2023 Start of operation: 02/2025 Inclusion in the system: 05/2025
4	Metering Station at Agios Nikolaos Viotia (AdG IV)	1.870.000	Final Investment Decision: Taken Start of operation: 03/2023 Inclusion in the system: 04/2023
5	Connection of ELVAL plant of NNGTS in Inofyta	4.950.000	Final Investment Decision: Taken Start of operation: 12/2023 Inclusion in the system: 03/2024
6	Connection with TERNA Power Plant to the NNTGS	6.260.000	Final Investment Decision: Taken Start of operation: 12/2023

			Inclusion in the system: 03/2024
7	Connection with ELPEDISON Power Plant to the NNTGS	3.460.000	Final Investment Decision: Taken Start of operation: 09/2023 Inclusion in the system: 12/2023
B3. Development Projects: Expansion of NNGS to new areas or markets			
B.3.1. Supply of West Macedonia			
1	SSLNG infrastructure to supply the regions of Poria, Aspros & Perdikas	11.030.000	Final Investment Decision: 11/2022 Start of operation: 10/2023 Inclusion in the system: 10/2023
2	High Pressure pipeline to West Macedonia	167.000.000	Final Investment Decision: Taken Start of operation: 06/2024 Inclusion in the system:09/2024
3	M/R Station at the prefecture of Aspros	3.500.000	Final Investment Decision: Taken Start of operation: 06/2024 Inclusion in the system: 09/2024
4	M/R Station in the region of Perdikas Eordeas	4.200.000	Final Investment Decision: Taken Start of operation: 06/2024 Inclusion in the system: 09/2024
B.3.2. Supply of Western Greece & Peloponnese			
1	High Pressure Pipeline to Patras	98.000.000	Final Investment Decision: 05/2023 Start of operation: 06/2025 Inclusion in the system:09/2025
2	Korinthos M/R city gate Station	2.700.000	Final Investment Decision: Taken Start of operation: 09/2023 Inclusion in the system: 12/2023
3	Argos/Napflio M/R city gate Station	2.900.000	Final Investment Decision: Taken

			Start of operation: 09/2023 Inclusion in the system:12/2023
4	Tripoli M/R city gate Station	2.300.000	Final Investment Decision: Taken Start of operation: 10/2022 Inclusion in the system:10/2022
B.3.3. Supply of Central Macedonia			
1	Drimos/Liti M/R city gate station	3.800.000	Final Investment Decision: Taken Start of operation: 08/2023 Inclusion in the system: 09/2023
B.3.4. Supply of other areas			
1	M/R Station Livadia	2.300.000	Final Investment Decision: Taken Start of operation: 07/2022 Inclusion in the system: 09/2022
B4. Development Projects: Expansion of NNGS to new markets			
1	Truck Loading Pilot (first) Station	7.500.000	Final Investment Decision: Taken Start of operation: 06/2022 Inclusion in the system: 07/2022
2	New jetty for small scale LNG in Revithoussa	28.800.000	Final Investment Decision: Taken Start of operation: 09/2023 Inclusion in the system: 12/2023
B5. Development Projects: Increase of capacity & security of supply of NNGS			
1	Compression station at Komotini and Regulating station	50.000.000	Final Investment Decision: 11/2022 Start of operation: 10/2024 Inclusion in the system:10/2024

2	Compressor Station in Ampelia	73.000.000	Final Investment Decision: Taken Start of operation: 10/2023 Inclusion in the system: 12/2023
3	Upgrade of Nea Messimvria compression station	18.200.000	Final Investment Decision: Taken Start of operation: 12/2022 Inclusion in the system: 03/2023
4	Booster Compressor for TAP in Nea Mesimvria	42.700.000	Final Investment Decision: Taken Start of operation: 03/2024 Inclusion in the system: 06/2024
B6. Development Projects: Improvement / modernization/ maintenance of NNGS			
1	Design, supply, installation of a system for the daily gas flow	242.000	Final Investment Decision: Taken Start of operation/ Inclusion in the system: 10/2022
2	LNG Terminal Boil-off Gas Compressor Station	13.850.000	Final Investment Decision: Taken Start of operation: 05/2023 Inclusion in the system: 07/2023
3	Upgrade of electrical switches for medium voltage and internal lighting in the control room of LNG facility	1.000.000	Final Investment Decision: Taken Start of operation/ Inclusion in the system: 12/2022
4	Upgrade of Geographical Information System (GIS)	100.000	Final Investment Decision: Taken Start of operation: 12/2022 Inclusion in the system: 04/2023

5	Upgrade of physical security of DESFA facilities - Physical Security Control Center	1.200.000	Final Investment Decision: Taken Start of operation: 11/2022 Inclusion in the system: 11/2022
6	Replacement of Metering and Supervision/ Control systems at NNGTS M and M/R stations of NNGTS	4.500.000	Final Investment Decision: Taken Start of operation: 12/2023 Inclusion in the system: 12/2023
7	New building for DESFA's headquarters	18.800.000	Final Investment Decision: Taken Start of operation: 06/2023 Inclusion in the system: 06/2023
8	Technical Training Centre in Nea Mesimvria	1.740.000	Final Investment Decision: Taken Start of operation: 10/2022 Inclusion in the system: 10/2022
9	NNGS Modernization projects- 4th Compilation	170.000	Final Investment Decision: Taken Start of operation: 12/2022 Inclusion in the system: 12/2022
10	Upgrade of LNG and O &M Facilities for energy saving	2.000.000	Final Investment Decision: Taken Start of operation: 06/2023 Inclusion in the system: 06/2023
11	Cathodic Protection System Upgrading	2.000.000	Final Investment Decision: Taken Start of operation: 11/2023 Inclusion in the system: 11/2023
12	IT Transformation	7.700.000	Final Investment Decision: Taken Start of operation: 1/2023 Inclusion in the system: 1/2023
13	Upgrade of LNG Facilities	360.000	Final Investment Decision: Taken

			Start of operation: 10/2022 Inclusion in the system: 10/2022
14	LNG Maintenance Projects	822.000	Final Investment Decision: Taken Start of operation: 10/2022 Inclusion in the system: 10/2022
15	Upgrade of Control and Dispatching Center in Patima	715.950	Final Investment Decision: Taken Start of operation/ inclusion in the system: 9/2022
16	Asset management IT & OT Equipment	75.000	Final Investment Decision: Taken SP1: Start of operation/ inclusion in the system: 12/2022 SP 2: Start of operation/ inclusion in the system: 06/2023
17	Required O&M Equipment for 2022	200.000	Final Investment Decision: Taken Start of operation: 12/2022 Inclusion in the system: 12/2022
	Subtotal	**823.767.700 €**	

	PROJECTS NOT INCLUDED IN THE 3YR DEVELOPMENT PERIOD	COST(€)
	A. NEW PROJECTS **A1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)**	
1	Metering and Regulating Station for the connection to East Med Pipeline	7.500.000
	B. PLANNED PROJECTS **B1. Projects for the interconnection of NNGS with other interconnected systems (connection/development projects)**	
1	M/R Station for connecting South Kavala UGS	7.500.000
	B2. Projects for the connection of Users	
1	Construction of high pressure pipeline Mavromati (Vagia) - Larymna and the necessary Metering Station for the connection of LARCO GMM SA with NNGS	17.500.000
	Subtotal	**32.500.000 €**

Total	**856.267.700 €**