Ενέργεια & Ανάπτυξη 2017

«Μακροχρόνιος Ενεργειακός Σχεδιασμός και Ενεργειακή Ασφάλεια»

Δημήτριος Σαρρής
Διευθυντής Διαχείρισης Ροής Αερίου

23-24 Νοεμβρίου 2017, Αθήνα

DESFA
Hellenic Gas Transmission System Operator S.A.

MINISTRY OF ENVIRONMENT & ENERGY

The role of DESFA in the Gas Market

1 DESFA operates, maintains and develops the National Natural Gas System in a safe, reliable and economically efficient way

2 DESFA offers regulated Third Party Access services in a transparent and non-discriminatory way

3 DESFA already offers and further develops a range of non-regulated services to a number of clients

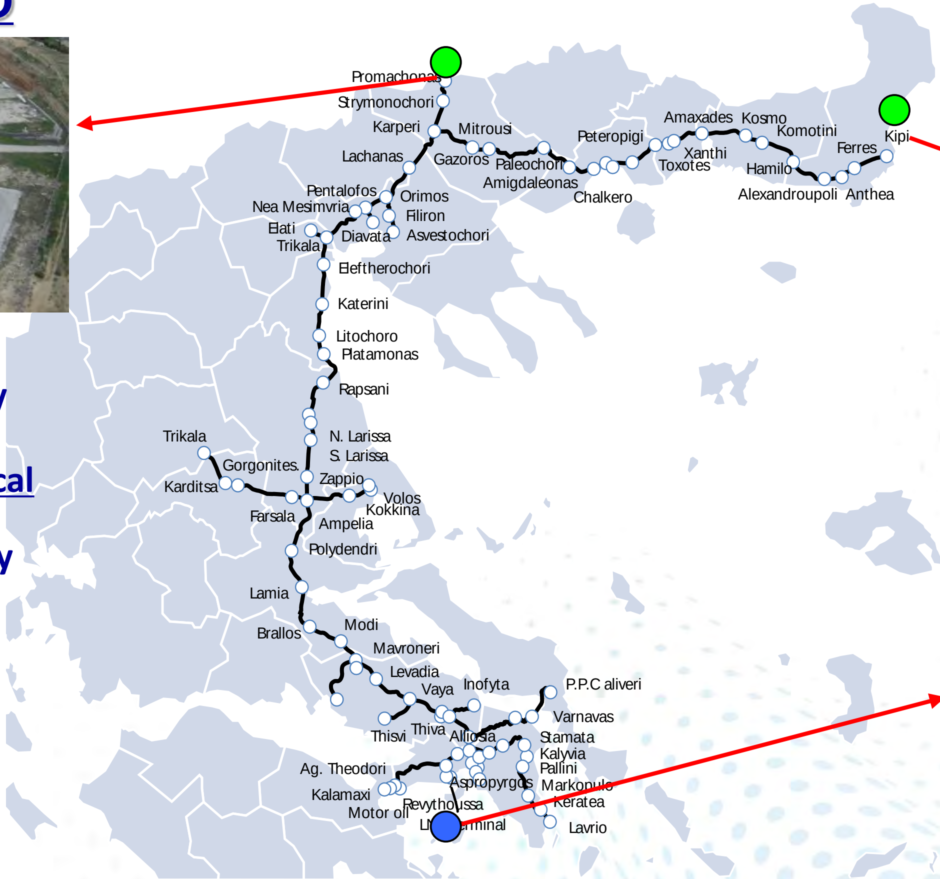
4 DESFA cooperates with neighboring TSOs for making integration at regional level a reality

Entry Points and Technical Capacities

SIDIROKASTRO

Technical Capacity:
10,800,000 Nm³/Day

Reverse Flow Technical Capacity:
1,000,000 Nm³/Day



KIPI

Technical Capacity:
4,300,000 Nm³/Day

AG. TRIADA (LNG)

Technical Capacity:
12,470,000 Nm³/Day

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MINISTRY OF ENVIRONMENT & ENERGY

The role of the LNG Terminal

The Revithoussa LNG Terminal plays a key role in the everyday operation of the National Natural Gas System. Additionally it has played a key role in the opening up of the Greek Gas Market in 2010, but also in successfully dealing with the security of supply crises of 2009, 2012 and 2016-17 in the region

The role of the Revithoussa LNG Terminal is expected to be enhanced in the near future, as a gateway for diversified supply sources in the whole South-Eastern Europe region

Revithoussa LNG Terminal (after the 2nd Upgrade)

New Storage Capacity:	225,000 m^3 LNG storage volume
New Send Out Capacity:	1,400 m^3LNG/hour (Sustained Maximum Send out Rate)
Approach and berth of LNG carriers:	Up to 260,000 m^3

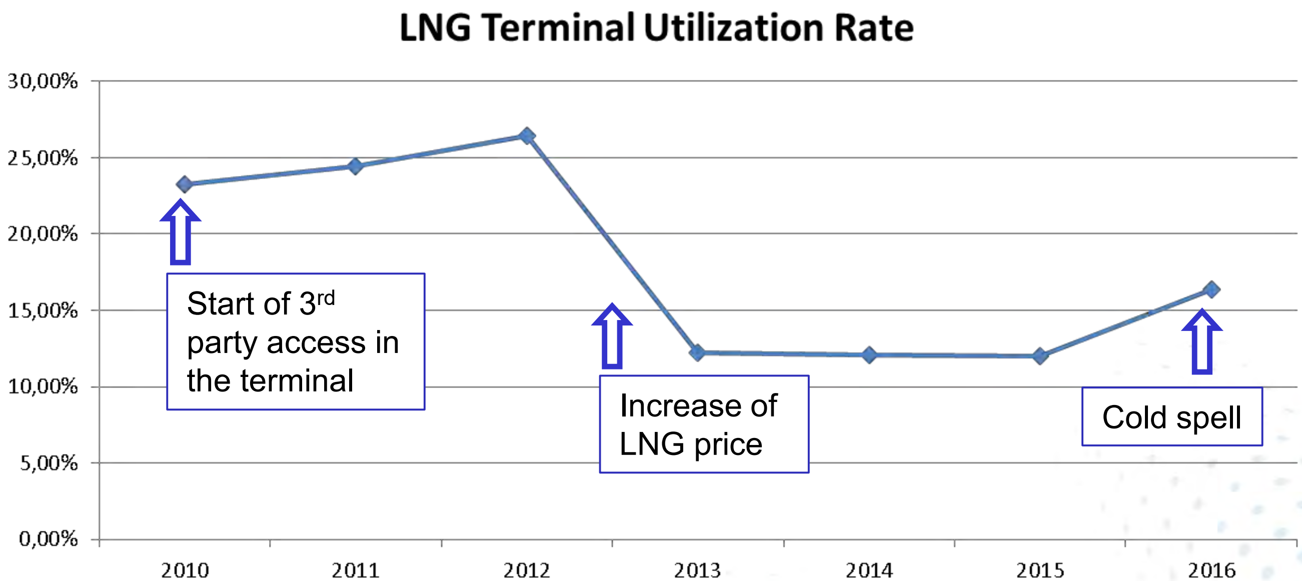
Significant benefits anticipated

- Enhancement of security of supply level in case of cut-off of the northern entry points
- Ability to accommodate almost all LNG vessels
- Key role in establishing Greece as a regional gas hub in conjunction with interconnection projects
- Flexibility in the operation of the LNG Terminal Station

LNG Terminal Expansion Project 2nd Upgrade phase

The commercial operation is expected in September 2018 (the LNG Terminal Station will shut down in the period 26.03-10.06.2018 for increasing the gasification capacity)

Revithoussa terminal average use rate



Utilisation rate = actual yearly throughput / maximum throughput with LF=1

- Only 17,6% of the terminal's capacity is reserved on a long-term basis and this will be may decreased to 11,4% after the commissioning of the 2nd upgrade
- Conclusion: Important amount of free capacity

Interconnection with TAP

- Putting in operation of an additional source of supply with technical capacity 4,800,000 Nm^3/Day
- Enhancement of security of supply
- Expected commercial operation: 2019

Revithoussa to BG via IP Kulata/Sidirokastro

Year	Capacity in bcm/y (LF = 1)		Conditions
	Firm	**Backhaul ***	
2017 - mid 2018	0,36	3,5	-
from mid 2018	1,8	3,5	Commissioning of Revithoussa upgrade
future phase	4	3,5	C/S at Ambelia (Central Greece) C/S at Kipi (GR/TR border) or no flow from Turkey

* equal to forward flow (BG -> GR).
Can be added to the firm capacity.

TAP to Bulgaria via IP Kulata / Sidirokasto

<table>
<tr><th rowspan="2">Year</th><th colspan="2">Capacity in bcm/y (LF = 1)</th><th rowspan="2">Conditions</th></tr>
<tr><th>Firm</th><th>Backhaul *</th></tr>
<tr><td>from operation of TAP</td><td>1,8</td><td>3,5</td><td>Commissioning of Nea Messimvria M/R station **</td></tr>
<tr><td>future phase</td><td>4</td><td>3,5</td><td>C/S at Kipi (GR/TR border) or no flow from Turkey</td></tr>
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* equal to forward flow (BG -> GR).
Can be added to the firm capacity.
** Currently under design

South Kavala UGS

Possible participation in South Kavala UGS

- Important synergies anticipated between UGS and the LNG Terminal as well as between UGS and the Gas Hub

Review of regulatory developments (1/2)

- **Transposition of 3rd energy package (Directive 2009/73/EC):**
  - ✓ Law 4001/2011 (August 2011)
  - ✓ Unbundling model for DESFA: Independent Transmission Operator (ITO)
  - ✓ Certification of DESFA as ITO: September 2014

- **Additional/structural reforms:**
  - ✓ Opening of the retail gas market: (Law 4336/2015)
    - Legal unbundling of integrated supply/distribution companies: 01.01.2017
    - Eligibility of all gas customers: 01.01.2018

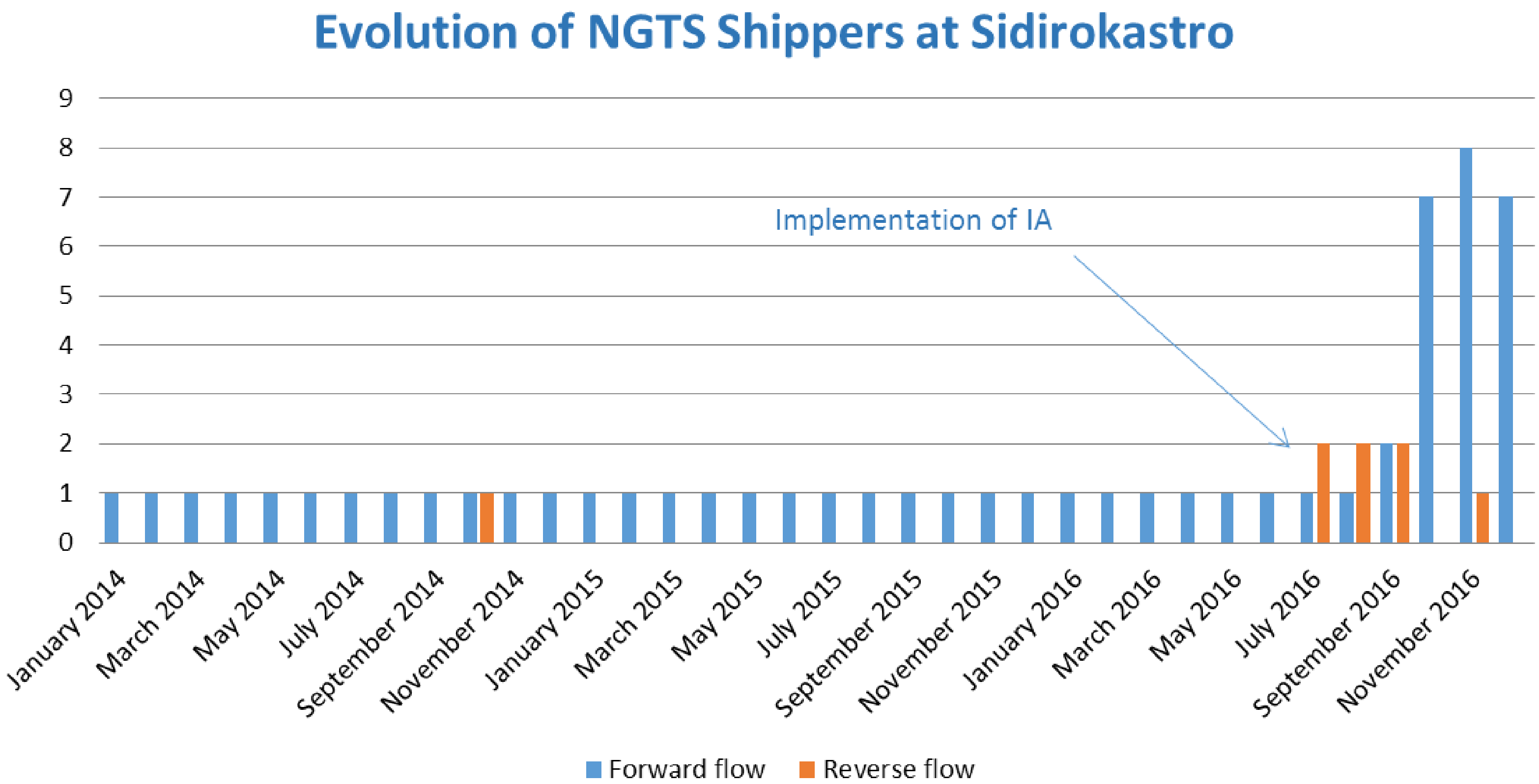
- **Security of Supply:**
  - ✓ Risk Assessment (2011, 2017) and Preventive Action Plan (2013), reviewed March 2015
  - ✓ Emergency Plan approved March 2013, reviewed December 2015
  - ✓ Establishment of market response, back-up fuel and SoS levy schemes: 2014-2016

Review of regulatory developments (2/2)

- **TPA arrangements: Establishment of an entry/exit system**
  - ✓ Entry/exit capacity booking regime with a virtual point:
    - o Established in 2014 (2nd revision of the Greek Network Code)
    - o Reviewed in 2016 (3rd revision of the Network Code), entry into force: June 2017
  - ✓ Full application of CMP provisions at IPs & interruptible capacity offered at all points

- **Market Integration:**
  - ✓ Interconnection Agreement (IA) between DESFA (GR) and Bulgartransgaz (BG) entered into force 1st July 2016, amended 1st June 207
    - o Full TPA in both sides of the Kulata(BG) - Sidirokastron(GR) Inteconnection Point (IP) for the first time
    - o Physical flows in the direction Greece-Bulgaria
  - ✓ Since December 2016: capacity allocation auctions at both sides of the Kulata(BG) - Sidirokastron(GR) IP, according to the CAM NC

Evolution of
NGTS Shippers at Entry Point Sidirokastro



Next steps

- **Market Integration:**

  Initiation of a new round of talks with Turkish TSO for an Interconnection Agreement at the GR-TR Interconnection Point “Kipi” in March 2017

- **Review of LNG TPA arrangements (2018):**

  In light of the forthcoming upgrade of the LNG Terminal storage and gasification capacity

- **Establishment of a wholesale gas market (gas hub):**
  - ✓ DESFA feasibility study completed September 2016
    - o Module I: Review of existing TPA arrangements – general hub design
    - o Module II: Sequence of work packages established
  - ✓ Project closely related to the reform of the gas balancing regime, according to the European Network Code on Gas Balancing
  - ✓ Implementation work is underway

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Thank you!