



**Public Power Corporation S.A.**

**Clarifications on the item of the Extraordinary General Meeting  
of shareholders on 29.3.2013**

**“Approval for materialization of the investment for the  
construction of the Plant Ptolemais V and the pertinent contract”**

- 1. Project Rationale**
- 2. Planning**
- 3. Bidding procedure – Milestones**
- 4. Project description and evaluation**
- 5. Funding Plan of the Project**
- 6. Summary of the Contract for the construction of the Project**

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# Unit decommissioning

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- **Up to 2015**

- PPC, based on its energy planning, decommissions lignite units of total capacity of approximately 910 MW up to the end of 2015, mainly due to ageing but also for environmental reasons.
- Three (3) lignite units of total capacity of 320 MW (Ptolemais I, Megalopolis I and II) have already been decommissioned.
- The decommissioning of additional units of total capacity of 590 MW is following.
- Additionally, up to the end of 2015, old oil and gas units of total capacity of approximately 1,280 MW will be decommissioned.
- In total, up to the end of 2015, old units of total capacity of approximately 2,200 MW (out of which 910 MW is lignite capacity) will be decommissioned for ageing and environmental reasons.

# Unit decommissioning (cont.)

- **From 1-1-2016 onwards**

- The Directive for the Industrial Emissions (2010/75/EC) revises the existing Directives, making them stricter, with significant impact on the lignite-fired units after 2015.
- Indicatively, the emission limits for new solid fuel units after 2015 become as follows:
  - $\text{SO}_2 \leq 150 \text{ mg/Nm}^3$
  - $\text{NO}_x \leq 200 \text{ mg/Nm}^3$
  - $\text{Particles} \leq 10 \text{ mg/Nm}^3$

whereas, for the existing units, the limits are slightly higher than the ones mentioned above, but still especially restrictive for old units.

- In conclusion, for compliance reasons, a significant number of lignite units will be put out of operation near the end of the decade, on top of the lignite capacity of 910 MW that will have been put out of operation by the end of 2015, limiting significantly today's total lignite capacity.

# Regulatory framework – Market liberalisation

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- The developments concerning further liberalisation of the electricity market, may result in additional decrease of the lignite portfolio of the Company.
- Consequently, based on the above, PPC's available lignite capacity near the end of the decade will bear a significant decrease and, as far as it is not counterbalanced with the addition of new capacity with state of the art technology and adapted to the new environmental requirements, this will have significant financial impact on the Company.
- For the above reasons, the construction of a new lignite-fired state of the art unit is a critical strategic choice for the Company.

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# Planning of the new lignite Unit

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- **In order to define the basic technical features of the new unit, i.e. capacity, technology, efficiency, emissions etc., the following issues have been taken into account:**
  - The quality and quantity of the available, proven and exploitable lignite reserves in the W. Macedonia region, within the perspective of their best exploitation, in order to estimate the size of the necessary capacity.
  - The available technologies for burning lignite in the above capacity range, with satisfactory references.
  - The necessity to comply with the new environmental terms of the European legislation for the new industrial installations, in relation to the new stricter emission limits.
  - The necessity to comply with the Best Available Techniques (BAT) for the new power units and more specifically in relation to their environmental performance and their efficiency.
  - The capabilities and the characteristics of the Greek Interconnected System.



# Planning: Basic parameters of the Project

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- **Based on the previous, the following basic parameters have been defined:**
  - Capacity range: 550 to 660 MWe<sub>el</sub> plus 140 MW<sub>th</sub> for District Heating
  - Technology : Pulverized lignite
  - Net electric efficiency greater than 40.5% (“Ultra-super critical” steam conditions are supposed).
  - Compliance with environmental requirements (Greek and EU legislation)
    - $\text{NO}_x \leq 200 \text{ mg/Nm}^3$ ,
    - $\text{SO}_2 \leq 150 \text{ mg/Nm}^3$  and Desulfurisation degree  $\geq 97\%$
    - Particles  $\leq 10 \text{ mg/Nm}^3$
  - The new unit will be installed at a depleted lignite area of Komanos lignite mine
  - The cost of the project was budgeted at 1,320,000,000 € (for a capacity of 660 MW)

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# Bidding procedure – Milestones

- **20.4.2010      Announcement of an international open tender**

Engineering, Procurement, Transportation, Installation and putting in operation the steam unit “Ptolemais V” of gross power 660 MWel, burning pulverized lignite and with the capacity to supply 140 MWth thermal power for district heating. The Project will be contracted as a turn-key Project, a standard practice of the Company in such projects.

Criterion of assignment of the Contract is the weighted average cost for the generation of one net KWh, calculated at the time of commencement of Commercial Operation and for a period of 30 years.

- **Issuing of Supplements to the Tender Documents, after submission of remarks and comments of possible candidates and within the goal to secure the maximum possible participation**

- **28.6.2011      Submission of Offers**

Participation of the two largest constructors of lignite-fired units having references in state of the art lignite units, environmentally compliant with the requirements of the European and national legislation

- TERNA S.A. with HITACHI POWER EUROPE GmbH as main Subcontractor

- Consortium

- Alstom Power Systems S.A.
- Alstom Power Systems GmbH
- Alstom Hellas A.E.
- METKA A.E.
- DAMCO Energy A.E.

# Bidding procedure – Milestones (cont.)

## – Offer of TEPNA S.A.

- Gross electric Capacity output: **660.0 MW**
- Net electric power output : **615.7 MW**
- Net efficiency : **41.5%**
- The Subsupplier/Subcontractor of the boiler is Hitachi Power Europe GmbH
- The Subsupplier of the steam turbine and the generator is Hitachi Ltd Japan
- The Subsupplier of the Electrostatic Precipitators (ESPs) is Hamon Environmental GmbH
- The Subsupplier of the Desulphurisation system (FGD) is Hitachi Power Europe GmbH

## – Offer of Consortium

- Gross electric Capacity output: **598.9 MW**
- Net electric power output : **527.1 MW**
- Net efficiency : **40.5%**
- The manufacturer of the boiler is Alstom Power Systems GmbH
- The Subsupplier of the steam turbine and the generator is Alstom Power Steam Turbines
- The Subsupplier of the Electrostatic Precipitators (ESPs) is Alstom Power India
- The Subsupplier of the Desulphurisation system (FGD) is Alstom Power Italia

# Bidding procedure – Milestones (cont.)

- **24.10.11 Opening of Financial Offers**

- **Financial offers**

- TERNA S.A. : **€1,394,634,137.82**
- CONSORTIUM : **€1,557,786,200.00**

- **Economic evaluation based on the weighted average cost for the production of electricity**

- TERNA S.A. : **0.06987 €/kWh**
- CONSORTIUM : **0.08026 €/kWh**

- **Bidder with the lowest Offer:**

- TERNA S.A.
- The offered weighted average cost of generation is by 13% lower than the corresponding one of the CONSORTIUM
- The offered weighted average cost of generation is by 0.55% lower than the one resulting from the Tender (budget, efficiency)

# Bidding procedure – Milestones (cont.)

- **25.11.2011**      **Award of the Contract to the Bidder with lowest Offer**  
                          **(BoD Decision No 235)**
  - Taking into account the general economic conditions in the country, the signing of the Contract was connected with the funding perspectives of the Project
- **Dec. 2011 – Mar. 2012**    **Actions relating to Project Funding**
  - In the offer of Terna, an indicative, non binding financing proposal was included, for part of the Project's cost relating to the equipment from the subcontractor Hitachi, which could be financed from an international bank under the cover from an Export Credit Agency (ECA).
  - Within this framework, a relevant application was submitted for an insurance cover to the German ECA and a series of meetings took place in order to present the project and PPC to the competent approving German authorities, with an initial positive feedback with respect to the Project.
  - Credit Agricole Corporate and Investement Bank was appointed as financial advisor.
  - Also, KfW IPEX-Bank was appointed financial advisor to support PPC in relation to the ECA cover process and as lead arranger for the respective syndicated loan.
- **12.3.2012**            **BoD Decision No 62**
  - Based on the developments regarding the funding of the Project and the general economic conditions, PPC's BoD decided the briefing of the competent Committee of the Parliament and authorised the Chairman and CEO of the Company to sign the Contract.
- **21.3.2012**            **Briefing of the Parliamentary Committee on Production and Trade by the**  
                                  **Chairman and CEO of the Company**

# Bidding procedure – Milestones (cont.)

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- **11.12.2012 Decision for the signing of the Contract (BoD Decision No 247)**

**The Board of Directors decided the signing of the contract taking also into account the following:**

- that the implementation of the Project remains a major strategic choice for PPC,
- that the delay in the implementation of the Project will have significant financial impact on the Company in the long run, given that the said unit will have to counterweight the impact from the expected loss of lignite generation,
- the positive impact of the Project on PPC, as this has also been identified in the financial analysis of the investment by the financial advisor of PPC SA, Credit Agricole Corporate and Investment Bank, within the framework of exploring funding possibilities,
- that the main expenses for the Project are expected to take place after the end of the first phase, once the studies will have been completed and the building permit will have been issued, and that it is the only major new thermal project for the period, thus enabling PPC to fund the project to a great extent through own funds, within the framework of its Business Plan,
- the recent positive developments and outlook with respect to the economic environment in the country, especially based on the results of the Eurogroup held in December 2012.

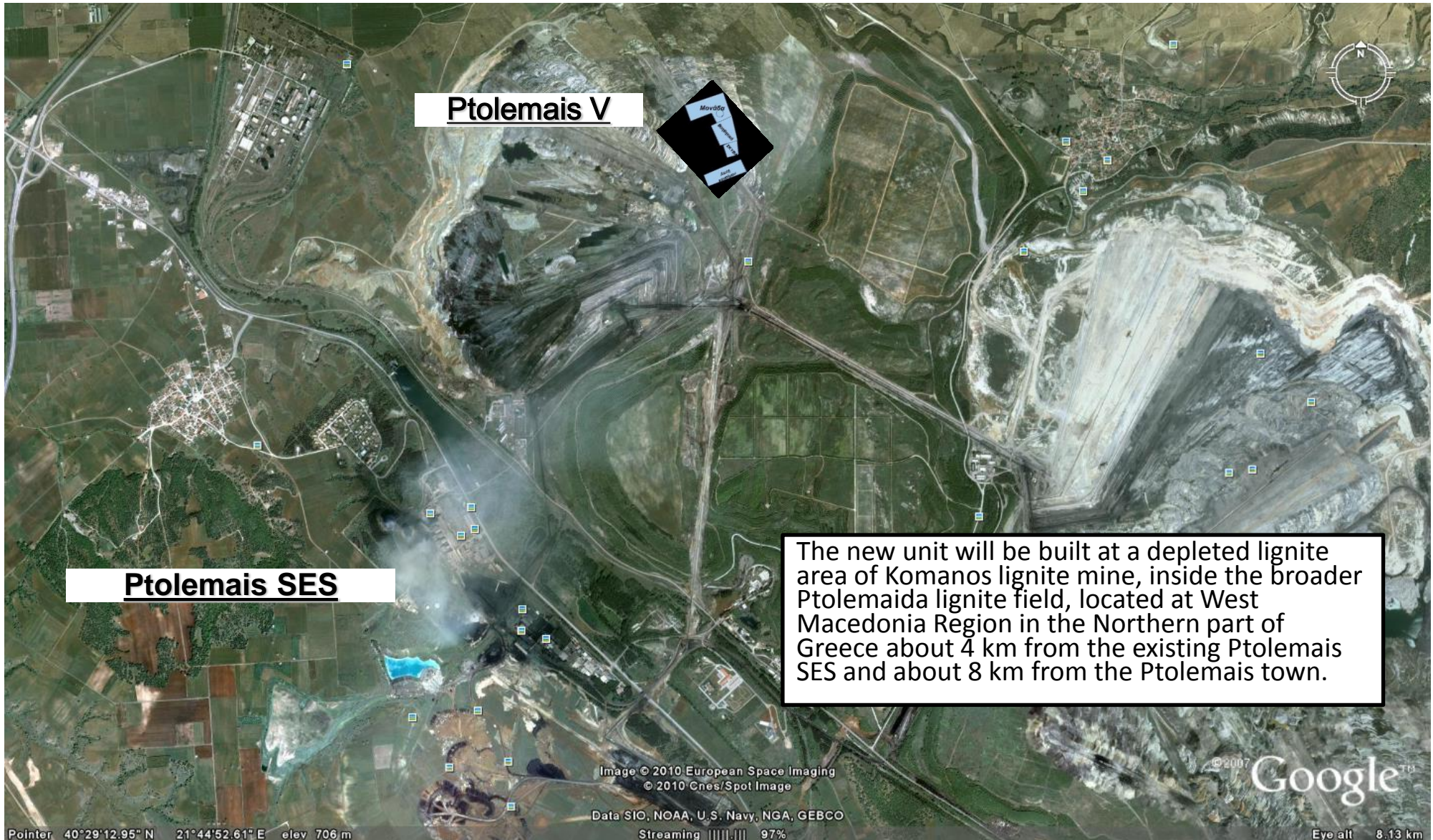
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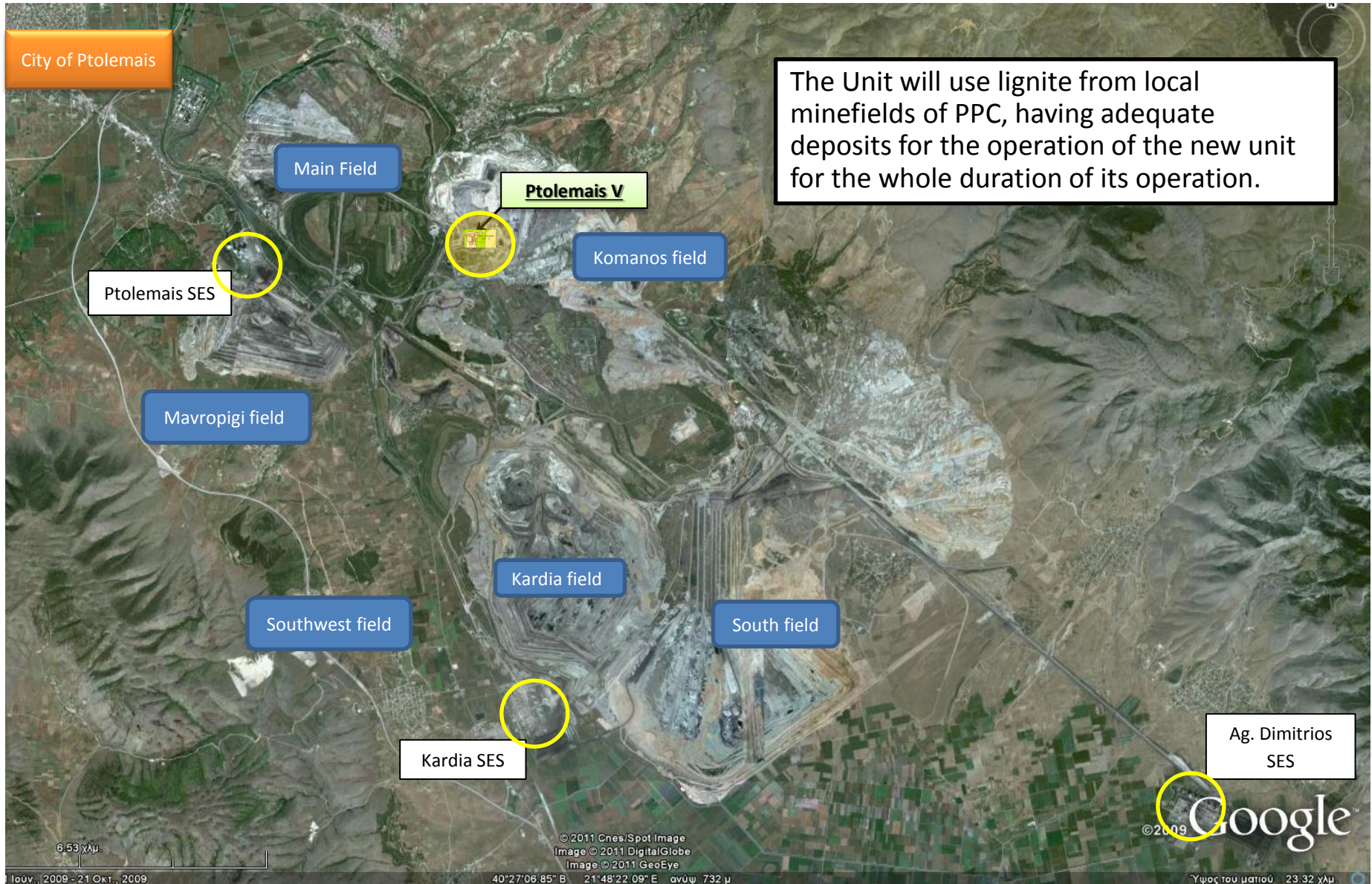
# The Project: Ptolemais V

- **Lignite-fired Unit**
  - Gross Capacity  $660 \text{ MW}_{\text{elec}} + 140 \text{ MW}_{\text{thermal}}$  Thermal Capacity for District Heating
  - Pulverized lignite combustion technology
  - Minimum guaranteed net efficiency is 41.5%
  - With ultra-supercritical steam parameters: 250 bar/600°C/609°C
  - Compliance with BAT
  - Environmental performance
    - $\text{CO}_2$  1.05 tn/MWh
    - $\text{NO}_x$   $\leq 200 \text{ mg/Nm}^3$ ,
    - particles  $\leq 10 \text{ mg/Nm}^3$
    - $\text{SO}_2$   $\leq 150 \text{ mg/Nm}^3$
  - Compliance with the emission limits, as per 1.1.2016
  - CCS ready when commercially available
- **The Unit shall be a base-load Unit, which:**
  - shall replace old lignite-fired Units with low efficiency and high pollutant emissions ,
  - shall secure the thermal power supply to the District Heating system of Ptolemais town
- **Final Price**
  - The Final Contractual Price amounts to **€1,388,634,137.82**
- **The execution of the Project comprises of two stages:**
  - 1<sup>st</sup> stage, of 20-24 months duration: for the issuance of the building permit
  - 2<sup>nd</sup> stage, of 50 months duration : for the construction and the Commercial Operation of the Unit

# Location of the new Unit



# Lignite supply



# Importance of the project for PPC

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- **Renewal of the Generation fleet of the Company**
  - 72% of PPC's electric power Units are above 20 years old, while 46% are above 30 years old
- **Competitive electricity production cost**
  - The new Unit shall be a base load Unit with the lowest variable generation cost
  - Significantly lower lignite consumption due to high efficiency
  - Reduced CO2 emission expenses due to the lower CO2 emissions (kg/kWh)
- **Significant improvement of the environmental footprint**
  - Very significant reduction of pollutant emissions
  - Ensuring 140MWth thermal power supply to the Ptolemais district heating system
- **There are also significant benefits for the Greek economy:**
  - Low cost electricity generation, necessary for the international competitiveness and economic growth.
  - Enhancement of the reliability and of the security of supply of the electric system
  - Significant reduction of CO2 emissions

# Key benefits of the Project

## Comparing the new Unit with the old ones of the Ptolemais SES:

	Ptolemais SES	Ptolemais V	Comparison
Capacity (MW)	663	660	<ul style="list-style-type: none"> <li>Replacement of equal nominal capacity.</li> </ul>
Generated energy (GWh, average annual estimate)	3,000	4,300	<ul style="list-style-type: none"> <li>Increase of the annual generated energy due to increased reliability and availability of the new Unit.</li> </ul>
Efficiency (% , net)	28.0	41.5	<ul style="list-style-type: none"> <li>Significant increase of thermal output/efficiency of the new Unit which results to the optimal use of lignite reserves and to the improvement of environmental footprint.</li> </ul>
Lignite consumption (tn, average annual estimate)	7,000,000	6,500,000	<ul style="list-style-type: none"> <li>Reduction of lignite consumption while at the same time increase of the generated energy which results to a significant reduction of the specific consumption of lignite.</li> </ul>
CO <sub>2</sub> emissions (tn/MWh)	1.50	1.05	<ul style="list-style-type: none"> <li>The new Unit has significantly lower specific CO<sub>2</sub> emissions compared to the old ones and its operation will finally result to the reduction of total CO<sub>2</sub> emissions and of the relevant cost.</li> </ul>
Pollutant emissions (kg/MWh):			<ul style="list-style-type: none"> <li>The environmental characteristics of the new Unit, having particularly low pollutant emissions (significantly lower compared to the old units) and its environmental design will contribute to a significant improvement of the environmental footprint of the Company in the region.</li> </ul>
▪ Particles	2.36	0.04	
▪ SO <sub>2</sub>	2.14	0.57	
▪ NO <sub>x</sub>	1.87	0.75	

# Licensing Procedure

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- **Generation License**
  - Issued in September 2010
- **Environmental Permit for the relevant lignite mines operation**
  - Issued in November 2011
- **Environmental Permit of the Unit**
  - issued in May 2012

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# Funding Plan of the Project

- **According to the Company's standard practice, the funding plan of its investment program, and thus of the specific project as well, throughout the development phases of the Project, is based on a combination of own funds and debt.**
- **Regarding debt, and for the partial funding of the project, the Company aims to revert to funding mechanisms such as:**
  1. Syndicated loan, which will be covered by an international Export Credit Agency (ECA) and/or
  2. Bilateral loan contracts with commercial banks and/or international organisations
  3. In addition, the Company can be financed through the issuance of bonds in the national or international markets and it is in the general planning of the Company to access these markets, when appropriate conditions prevail.
- **KfW IPEX-Bank has been mandated as financial advisor and lead arranger for an ECA-covered syndicated loan. In this respect, the Bank has submitted an application to the German Export Credit Agency, Euler-Hermes, for the approval of the insurance cover for the said loan.**
- **Following the developments in December 2012 regarding the Economic Adjustment Program for Greece, the approval procedure was restarted by Euler –Hermes and is currently at an advanced stage. The said approval for the insurance cover is a prerequisite for the arrangement of the syndicated loan.**



## **Funding Plan of the Project (cont.)**

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- **Regarding debt issuance from commercial banks (excluding ECA covered loans or project finance), as well as bond issuance, it is noted that these are related with the funding of the Company's growth in general, as they are debt products of general corporate purpose.**
- **With respect to own funds, and also due to the importance of the project (BoD Decision 247/12), the Company believes that, it can finance to a large extent the project from own funds, by managing appropriately its investment plan and cash flow generation, without excluding the possibility to approach the capital markets during the implementation of the project.**

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# Summary of the Contract for the construction of the Project

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For the summary of the Contract please click [here](#).