

Keynote speech: “Energy efficiency – the constant challenge”

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Energy is the sector on which Greece can depend in the coming years; it can serve as a lever for development, a pole attracting investment and a vehicle to create numerous jobs.

I never miss a chance to stress that energy saving, especially in the construction sector, is the most important energy resource for our country; sadly, despite progress made in recent years, it still remains untapped. It is a known fact that the “greenest” kWh is the one we have never consumed.

Clearly, energy saving in the construction sector must be considered as a national energy resource similar to lignite, the geothermal, the sun and the wind, which can provide in the future a comparative advantage for the country’s economy and development.

At international level, the construction sector is one of the most important sectors of economic activity, with a turnover of nearly \$3 trillion that represents approximately 10% of the global economy.

Buildings consume 40% of the world’s energy and 16% of the world’s drinking water supply, while producing 50% of carbon dioxide emissions.

Given that each job in the construction sector leads to the creation of 2 new jobs, it can be argued that buildings, either directly or indirectly, are responsible for creating 20% of global labour.

Construction is also an exceptionally important sector for the Greek economy. In Greece, the construction sector is responsible for 9% of the GDP, while residential construction alone, 2 to 3 years ago, used to be equivalent to 23% of the country’s investments. Total domestic employment in the construction sector came to approximately 300 thousand workers, while the construction sector is responsible for 7% of total employment.

Annual energy expenses of public buildings alone reach 450 million Euros! Overall, the building sector is responsible for 36% of total energy consumption. Additionally, almost 20% of electric power consumption of a typical Greek household is used for water heating. Despite these facts, the percentage of solar collectors used in residences in Greece is low – approximately 30% – as compared to approximately 60% in Israel and over 90% in Cyprus.

This fact dramatically increases the percentage of the population that belongs to the energy poverty group.

Construction in Greece, responding to post-war needs for housing and development, followed an anarchic, arbitrary rationale, which reflected the qualitative level of the country and led to unliveable urban centres.

Athens is a characteristic example of environmental and energy waste. It is indicative that the air-conditioning load in the central districts of Athens is almost double that of corresponding suburban areas. The doubling of this indicative load is exclusively due to the temperature increase in central urban areas caused by the heat island effect. The rapid penetration of air-conditioning in the country is one of the main causes of the significant increase in peak electrical load. However, we should also be aware that the cost of the peak load is approximately three times higher than the average cost of electric power generation and approximately 4-5 times higher than the cost of applying energy-saving technologies.

Sustainable management of cities is the challenge of current practices throughout the developed world. It is a holistic approach that combines physical planning, urban planning and architectural design so as to meet the developmental model needs.

Proper architectural, bioclimatic and energy design provides a great opportunity for the revitalization and salvation of cities, in ways such as:

- creation of large, medium and small-size green air-ducts that will guide air turbulence through the city with suitable tree planting along streets, open spaces, main road arteries and squares;
- use of modern cold materials in spaces, streets, pavements and building façades;
- installation of energy systems using renewable energy sources in buildings;
- creation of buildings that incorporate innovative building materials, systems and technologies that do not absorb energy.

The immediate implementation of these interventions in buildings is imperative considering the harmonization of Greek Legislation (Law 3851/2010) with European Directive 2002/91/EC (EPBD), according to which all new buildings from 1.1.2020 onwards must meet all their primary energy consumption needs using RES, CHP, remote heating or high efficiency heat pumps. For new public buildings, this obligation applies as of 1.1.2015.

Over the last three years, the Ministry of Environment, Energy & Climate Change has, for the first time, formulated a cohesive energy policy with a view to highlighting growth prospects for the country's energy sector, and developed a framework of regulations aiming at further RES utilization and implementation of energy-saving actions in the public and private sectors.

The **'Energy saving at Home'** Programme has been adjusted to respond to current conditions. We have improved incentives for citizens while maximizing benefits for the country, as we have secured a €400 million increase in the Programme budget instead of the initial forecast of €200 million by re-using capital that concerns loans (rollover capital). To date, 10,000 citizens have joined the programme, undertaking energy upgrades on their residences and saving significant amounts in regard to energy consumption (mainly in the heating – cooling sector).

The **'Energy saving at Local Authorities'** Action concerns the improvement of energy efficiency conditions at 106 municipalities (83 million € budget), the promotion of 'demonstration' actions with direct, applicable results and awareness-raising of citizens and Local Authority officials in regard to energy saving issues, urban environment protection and sustainable management. These goals will be realized through projects for the improvement of the energy efficiency of municipal buildings and other infrastructure (pump stations, biological waste treatment), interventions in public use areas (streets, squares, parks) and urban transport (improvement of the energy efficiency of Local Authority vehicles, development of urban mobility plans and implementation of transport studies).

It is estimated that approximately 920 jobs are to be created during the implementation of related operations.

Another Programme of the Ministry of Environment, Energy & Climate Change aiming at energy saving in the construction sector has been 'Building the Future', which concerns the creation of a comprehensive framework for the energy upgrade of the national building stock. The project is to last until 2020. During this period, over 3,000,000 energy interventions will be carried out on buildings; the benefit for citizens due to related energy saving is €9 billion.

Initial programme actions are distinguished at three levels:

1. Actions incorporating advanced and mature technology, for interventions planned on residential and commercial buildings
2. Demonstration and pilot actions on large-scale projects of products and technologies of high energy and environmental efficiency (Green neighbourhoods, Energy Service Companies, 40 Green schools, 100 Green roofs, Green island, Green military camps). The demonstration and pilot interventions are to be financed with approximately €80 million from co-financed programmes and will also be based on voluntary agreements with private citizens.
3. Coordinated industrial and academic research actions, aiming at designing and developing innovative industrial products of high energy and environmental efficiency and quality, to be made available in both the domestic and international markets.

Additionally, measures have been taken for the energy upgrade of public buildings, aiming at reducing state expenses for heating, cooling, lighting and warm water. A total of €45 million will be used to co-finance projects that include the incorporation of RES exploitation systems, the replacement of window & door frames, sun protection and ventilation systems, rooftop planting and so on.

In cooperation with the Ministry of Education, a €25 million call for proposals has been announced for financing bioclimatic school building projects with a dual benefit: 1) bioclimatic improvement of buildings and their surrounding areas, and 2) development of environmental awareness among pupils, combined with educational actions concerning new technologies.

Recent legislation concerning 'Third Party Financing (TPF)' provides for external financing of energy-saving investments in major building complexes, such as hotels.

'Smart Cities', an innovative European initiative, aims at creating conditions for adopting, at a massive scale, energy efficiency technologies, renewable energy sources combined with smart networks, energy storage networks and actions for developing "green transport". The total public and private European investment expenditure required for this activity over the next decade amounts to €11 billion.

At the same time, the submission of tenders for the call titled 'Green Island and Agricultural Communities' of a total budget of €50 million was recently completed. A total of 42 Municipalities submitted proposals for the conversion of island or mountain villages into zero net energy buildings or zero net CO₂ emission communities.

Specifically, the project for the design and implementation of green mountain villages aims at creating energy-autonomous villages, where the local economy will grow and new jobs will be created through green actions.

The design and construction of green islands aims at creating zero net energy or zero net CO₂ emission islands that will serve as a global example of green management of energy, the environment and the overall economy of the area. It provides for the implementation of actions similar to those of green mountain villages, but, in the case of islands with weak electrical networks, the application of innovative smart network technologies combined with energy reservoirs will play a key role in achieving a high rate of Renewable Energy Source penetration.

The 'Green Museums' project, with a budget of €20 million, will feature the use of intelligent techniques for managing energy and environmental parameters through the use of renewable energy sources and energy saving techniques, as well as smart networks and online management systems, in order to achieve zero energy consumption in buildings, an optimal internal environment and communication of all relevant information to visitors in an

intelligent and interactive way. This is the first major application of intelligent energy solutions in the country's museums.

The green roof project ('Green Terraces on Public Buildings') aims at installing a high number of green roofs in public buildings. The project budget comes to €20 million and the tender has already been announced. Green roofs diminish the heat consumption of buildings and reduce the intensity of the urban heat island effect, while significantly improving the local micro-climate.

The strategy used to design and apply the new green energy policy takes into account and maximizes the comparative advantages of the Greek energy industry and the sector of energy services developed in our country.

These policies and activities, as well as the markets created, are new in Greece and were virtually non-existent for decades.

It is noted that the investments required for the energy and environmental upgrading of the country's public and private buildings (excluding residences) to attain modern technological levels are conservatively estimated at approximately €150 billion. At the same time, if part of the existing building stock will have to be gradually converted to zero consumption buildings, at least €70 billion more will be required by 2050.

During this peak crisis period, solutions cannot only be austerity policies, but must also include policies for development and job creation. Energy saving in buildings can and must serve as the central pillar for turning all construction activity towards actions that are sustainable, sound in terms of urban planning and socially fair. Energy saving actions in buildings constitute a significant, progressive and innovative initiative that increases national added value, creates new national wealth and reduces social inequalities.

Our vision is for Greece to be a new country when it finally exits the crisis: an energy-self-sufficient country that is competitive, modern, and attractive to domestic and international investors – but, above all else, a country that respects its citizens.