SUMMARY FOR POLICY MAKERS

November 2015

Transforming the greek building sector with the help of the sun

How Greece can leave the shadows and turn to the sun by implementing an ambitious energy saving program for buildings

GREENPEACE

GREENPEACE

SUMMARY FOR POLICY MAKERS

This report addresses ways of fighting energy waste and energy poverty currently faced by a large part of the population, by proposing specific policies and economic measures to be taken for one **(1) million households** and businesses over the next decade.

The proposed measures involve energy retrofits of buildings (mainly households) as well as the use of renewable energy sources for covering energy needs (mainly those of poorer households). The aim is twofold. First, to boost economic competitiveness by **improving energy efficiency**, **reducing energy costs** and **attracting new investments**. Second, to have a socially fair growth by **combating energy poverty**, **protecting poorer households**, **creating new jobs** across the country, **supporting small and medium-sized enterprises** as well as **protecting the environment** and **public health**.

The report **takes the current financial situation fully into consideration**, as well as the limited resources and the agreement between Greece and its lenders. The proposed measures are ready to implement and the report in the shorter term utilizes existing and available resources. These measures can be divided into three time periods:

[a] The period **2016-2018**, during which the Memorandum is in force in Greece and there are specific restrictions for the use of certain financing tools.

[b] The period **2019-2020**, during which the Greek economy is expected to improve, specifically in respect to measures already set out in the NEEAPs.

[c] The period **2021-2025**, during which additional financing tools can be used and measures can be quickly implemented.

All Greece needs to do is leave the shadows behind and turn to the sun.

Energy retrofits to 700.000 buildings

The report relies on the useful experience drawn by the implementation of energy saving programs so far, as well as on the National Energy Efficiency Action Plans and Annual Reports (NEEAPs) presented by the Ministry of Environment and Energy in consultation with the Center for Renewable Energy Sources (CRES) in December of 2014, thereby extending the implementation period for the proposed measures until 2025.

The table below sums up the proposed measures for saving energy and for promoting the use of solar energy among poorer households for the time period 2016-2025.

Houses and buildings where energy saving methods are implemented

Year	Continuation of the "Energy Efficiency at Household Buildings" program	Energy upgrade of households	Energy upgrade of unauthorized buildings	Energy upgrade of public buildings	Energy upgrade of tertiary sector	Sum
2016	15.000	20.000	10.000	1.000	1.000	47.000
2017	15.000	30.000	20.000	1.000	2.000	68.000
2018		40.000	20.000	1.000	3.000	64.000
2019		50.000	20.000	1.000	4.000	75.000
2020		60.000	20.000	1.000	5.000	86.000
2021		60.000			5.000	65.000
2022		60.000			5.000	65.000
2023		70.000			5.000	75.000
2024		70.000			5.000	75.000
2025		75.000			5.000	80.000
2016-2025	**30.000**	**535.000**	**90.000**	**5.000**	**40.000**	**700.000**
	Free provision of solar energy to poorer households					**300.000**
	TOTAL SUM					**1.000.000**

The proposed program aims at successfully completing the existing programs included in the NEEAPs (i.e. 'Energy Efficiency at Household Buildings', unauthorized buildings, tertiary sector, public buildings) and at extending this initiative to households by utilizing new available resources. 700.000 buildings can be retrofitted by 2025, the vast majority of which (more than 565.000) are households.

Free electricity to 300.000 low-income households

from solar energy

Furthermore, the proposed program is supported by two scenarios concerning the free provision of electricity to 300.000 low-income households by having the **Public Power Corporation** (PPC) install photovoltaic (solar) systems. Both options aim at supporting vulnerable social groups by having the PPC utilize Greece's immense and inexhaustible solar potential.

Option 1: Free installation of solar cells by the PPC for poorer households

The first option involves the free installation of small photovoltaic systems (2kWp) by the PPC between 2016 and 2020 for 300.000 poor households so that they can self-produce their own solar power, using the new **net-metering** legislation. This option is practically self-financed by the PPC which is already paying for carbon emissions rights (resources raised through carbon credits are considered public funds, which the government has to redirect towards energy saving investments and investments for the development of renewable energy sources). The government can redirect these funds through the PPC to cover at least 80% of the project's capital. The remaining 20% can be raised from the new Juncker Plan.

The produced power per photovoltaic system (2.700kWh) can cover the needs of an average household for up to 70%, thereby delivering an annual benefit of €380. The realization of this project by the PPC will create on average more than 5.500 jobs annually across Greece between 2016 and 2020.

It is worth noting that **a similar program is already beginning in California. Solar cells are being installed for free in poorer households using funds from carbon credits auctions, which is exactly what Greenpeace proposed for Greece as well**. The initiative will be undertaken by an NGO which will be aiming at allowing a rather excluded social group (poor households) to enjoy the free benefits of solar power. As far as Greece is concerned, the PPC itself can take over the planning and the execution of the initiative, improving at the same time its environmental and social image.

Option 2: Direct and free solar energy by the PPC to SRT households

The **second option** involves lignite divestment as well as a shift towards mass investments in solar parks. This could be implemented gradually between 2017 and 2025. In the longer term, the added profit derived by investing on low-cost solar energy, as opposed to lignite, would **allow the PPC earnings to be partly reimbursed as free power provisions to hundreds of thousands of households qualified for the Social Residential Tariff (KOT).**

This option involves the PPC gradually developing solar power plants reaching a total of 1.900MWp (e.g. 95 plants of 20MWp each). This would cost around €1,45 billion and would replace the Ptolemaida-5 lignite power plant currently under development (660 MW, €1,4 billion). This PPC project would help create an average of 9.500 jobs annually throughout the country between 2017 and 2025.

The total economic benefit for the PPC for choosing solar over lignite in this case would be **€729 million** over 25 years. Indeed, the PPC has publicly announced the average levelized cost of energy (LCOE) of Ptolemaida 5 to be **€69,87/MWh**. On the other hand, the expected LCOE for the proposed solar parks is estimated **€58,7/MWh**. If the savings from avoiding to buy carbon credits are taken into consideration, the total benefit would amount to around **€3 billion between 2021 and 2045**!

The PPC would in this case return part of its profit as free provision of electricity to 300.000 (or more) beneficiaries of the Social-Rate Tariff (KOT), who would gain around 1.000 kilowatt hours annually, thereby getting a benefit of **€95 annually**.

The first two options are realistic proposals relating to two different scenarios, with which the **PPC** and the **Greek State** could utilize Greece's biggest resource, the sun, by combining social and development policies in the interest of lower-income households. However, in between there are many other options.

For instance, the PPC could utilize funds from the emissions trading system or from the 'Services of General Interest' charge that is included in electricity bills (currently it raises around 800 million euros annually, most of which is used to subsidize oil-power generation in the Greek Islands) in order to build a solar plant. The vast majority of the power produced by the park would be directed towards the beneficiaries of the SRT. The remaining power could be used by the PPC in the wholesale electricity market in order to have a reasonable profit and cover the maintenance costs for the park.

How feasible is the implementation of the proposed program?

(Sources of finance)

The table below shows the annual budget for the proposed programs (both options for the development of photovoltaic systems are represented).

Budget (million €)

Year	Continuation of the "Energy Efficiency at Household Buildings" program	Energy upgrade of households	Energy upgrade of unauthorized buildings	Energy upgrade of public buildings	Energy upgrade of tertiary sector	Photovoltaics option 1	SUM option 1	Photovoltaics option 2	SUM option 2
2016	155,3	207	103,5	49,5	80	140	735,3		595,3
2017	155,3	310,5	207	49,5	160	165	1047,3	95	977,3
2018		414	207	49,5	240	192	1102,5	90	1.000,50
2019		517,5	207	49,5	320	217	1311	127,5	1.221,50
2020		621	207	49,5	400	240	1517,5	164	1.441,50
2021		621			400		1021	154	1.175,00
2022		621			400		1021	185	1.206,00
2023		724,5			400		1124,5	180	1.304,50
2024		724,5			400		1124,5	210	1.334,50
2025		776,3			400		1176,3	241,5	1.417,80
Σύνολο	310,5	5.537,30	931,5	247,5	3.200	954	11.180,90	1.447	11.673,80

The proposed **€11,18 – 11,67 billion** investments between 2016-2025 represent around 1,5% of what the European Commission has identified as needed in energy efficiency investments in Europe until 2020, **thus there is a correlation between the size of the proposed program and Greece's contribution to EU's GDP**.

The resources available today for funding are:

- **National Strategic Reference Framework** (NSRF)[1] resources for private buildings: €286,6 million
- NSRF resources for public buildings: €247,5 million
- Resources from clearing the fines for unauthorized buildings: €931,5 million

1 NSRF is Greece's reference document that manages European Structural and Investment Funds, http://www.espa.gr/EN/Pages/default.aspx

These resources add up to **€1,46 billion** for the time period until 2020, which is equal to either **26%** or **28%** of the proposed program budget (depending on the option chosen).

However, resources from the so-called "**Juncker Plan**" have to be added to this. Overall, about €1 billion will be allocated to banks between 2016 and 2018 in order to finance projects (at low interest rates), the majority of which will be used for investments in renewable energy sources and/or energy saving projects for the time period 2016-2020. This report suggests that **€167 million** be used, which is a reasonable amount, given the proposed program's importance to social welfare and sustainable economic growth.

Moreover, Greece can utilize crucial resources through the European Emissions Trading System (ETS) in order to promote investments in energy efficiency and renewable sources, as required by EU law. Taking into account recent measures by Europe to strengthen the ETS, this report estimates that the total sum which could be available over 2016-2025 would be between **€0,7 and €1,9 billion**.

International practices have so far shown that a percentage from **property taxes** could be used in a reciprocative manner, thereby strengthening energy efficiency policies in buildings. In Greece, around €2,65 billion are raised from the property tax (called ENFIA); an amount that is currently 'lost' in the national budget, without fueling any real economic activity. Even if a very small percentage between 3% and 5% was to be used for promoting energy efficiency investments, resources of around €80-130 million would be made available annually, or **€0,8-1,3 billion** in total for the time period between 2016 and 2025.

Finally, even if we consider a market boost through tax incentives is currently impossible while under the Memorandum, **this measure can be implemented after 2019** and further strengthen the proposed program's implementation.

Adding up all the above resources would result in **€3,67-5,83 billion** available for the time period 2016-2025. Taking into account that there will be an average of 40% in bank loans for these projects, we are left with a very reasonable contribution from building owners of around 10%-30%.

Potential resources for implementing the proposed measures

(million € for the time period 2016-2025)

NSRF	534,1
Fine-clearing for unauthorized buildings	931,5
Juncker Plan	167
ETS	740-1.900
Property tax	800-1.300
Tax incentives*	500-1.000
Sum 2016-2025	**3,67-5,83 δις €**

*Depending on the size of the incentives. This report estimates €0,5 and €1 billion, considering a €1.000-2000 economic benefit per household from 2019 onwards in the form of tax-returns.

GREENPEACE

Changing the course of the building sector

important benefits from implementing the program

Implementing the proposed program would have unparalleled benefits for Greece: it would boost the income for many poor households, help eradicate energy poverty, create jobs and reduce the building sector's environmental footprint.

From the proposed interventions on 700.000 buildings there is an estimated energy saving **of 1.533,9 ktoe (17,84 TWh)**, which translates to an **average annual economic benefit of around €1.000 per household** and around €10.000 per business (about 45.000 buildings of the tertiary sector).

Moreover, the two proposed PPC solar options deliver an average annual benefit of **€380** and **€95** respectively for 300.000 households.

Overall, **the cumulative benefit from energy savings in both households and the tertiary sector would amount to €5,7-6 billion upon completion of the 10-year program**.

It is also worth noting that the **Greek economy** would profit by reducing oil imports by about **10,5 million barrels annually, which translates to an estimated annual benefit of €460 million**.

Equally important are the positive effects to employment. The proposed program would help create **an annual average of 29.500-35.000 jobs** (depending on the chosen solar option) between 2016 and 2025.

Jobs (direct, indirect and consequent) arising from the implementation of the proposed projects

Year	Continuation of the "Energy Efficiency at Household Buildings" program	Energy upgrade of households	Energy upgrade of unauthorized buildings	Energy upgrade of public buildings	Energy upgrade of tertiary sector	Photovoltaics option 1	SUM option 1	Photovoltaics option 2	SUM option 2
2016	4.037	4.037	2.691	1.287	2.080	3.740	**17.872**		**14.131**
2017	4.037	8.073	5.382	1.287	4.160	4.660	**27.599**	4.620	**27.559**
2018		10.764	5.382	1.287	6.240	5.590	**29.263**	4.620	**28.293**
2019		13.455	5.382	1.287	8.320	6.470	**34.914**	6.860	**35.304**
2020		16.146	5.382	1.287	10.400	7.350	**40.565**	9.060	**42.275**
2021		16.146			10.400	400	**26.946**	9.060	**35.606**
2022		16.146			10.400	400	**26.946**	11.200	**37.746**
2023		18.837			10.400	400	**29.637**	11.200	**40.437**
2024		18.837			10.400	400	**29.637**	13.270	**42.507**
2025		20.183			10.400	400	**30.983**	15.290	**45.873**

The following table shows the environmental benefits from the implementation of the proposed energy efficiency interventions to 700.000 buildings (i.e. without the two proposed PPC solar scenarios).

Decrease in CO_2 emissions (tons/year) from the implementation of energy saving projects

Year	Continuation of the "Energy Efficiency at Household Buildings" program	Energy upgrade of households	Energy upgrade of unauthorized buildings	Energy upgrade of public buildings	Energy upgrade of tertiary sector	Cumulative sum per year
2016	40.800	40.800	27.200	53.300	108.673	270.773
2017	40.800	81.600	54.400	53.300	217.345	718.218
2018		108.800	54.400	53.300	326.018	1.260.735
2019		136.000	54.400	53.300	434.690	1.939.125
2020		163.200	54.400	53.300	543.363	2.753.388
2021		163.200			543.363	3.459.950
2022		163.200			543.363	4.166.513
2023		190.400			543.363	4.900.275
2024		190.400			543.363	5.634.038
2025		204.000			543.363	6.381.400

A further decrease in CO_2 emissions should also be taken into account from the development of the two proposed solar options for the PPC. This decrease would amount to 24 and 70,25 million tons CO_2 respectively between 2017 and 2045. By adding up all the emissions savings, and taking into account the gradual development of the photovoltaic systems over a ten-year period, the proposed program results in an **average annual decrease in CO_2 emissions of 7-8,8 million tons – equal to 7,9-9,7% of the total annual CO_2 emissions in Greece!**

GREENPEACE

Conclusion

Policy recommendations

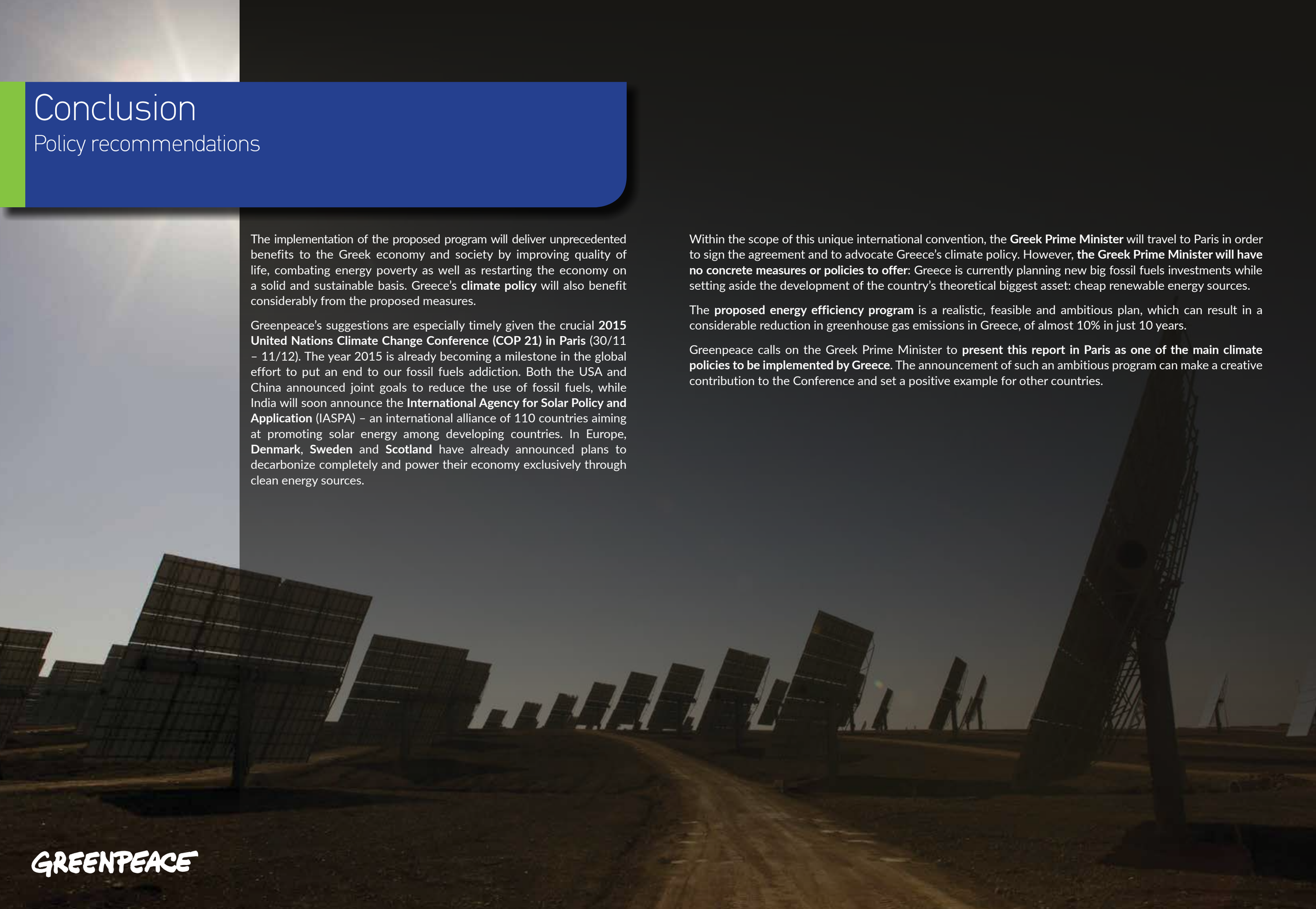
The implementation of the proposed program will deliver unprecedented benefits to the Greek economy and society by improving quality of life, combating energy poverty as well as restarting the economy on a solid and sustainable basis. Greece's **climate policy** will also benefit considerably from the proposed measures.

Greenpeace's suggestions are especially timely given the crucial **2015 United Nations Climate Change Conference (COP 21) in Paris** (30/11 – 11/12). The year 2015 is already becoming a milestone in the global effort to put an end to our fossil fuels addiction. Both the USA and China announced joint goals to reduce the use of fossil fuels, while India will soon announce the **International Agency for Solar Policy and Application** (IASPA) – an international alliance of 110 countries aiming at promoting solar energy among developing countries. In Europe, **Denmark**, **Sweden** and **Scotland** have already announced plans to decarbonize completely and power their economy exclusively through clean energy sources.

Within the scope of this unique international convention, the **Greek Prime Minister** will travel to Paris in order to sign the agreement and to advocate Greece's climate policy. However, **the Greek Prime Minister will have no concrete measures or policies to offer**: Greece is currently planning new big fossil fuels investments while setting aside the development of the country's theoretical biggest asset: cheap renewable energy sources.

The **proposed energy efficiency program** is a realistic, feasible and ambitious plan, which can result in a considerable reduction in greenhouse gas emissions in Greece, of almost 10% in just 10 years.

Greenpeace calls on the Greek Prime Minister to **present this report in Paris as one of the main climate policies to be implemented by Greece**. The announcement of such an ambitious program can make a creative contribution to the Conference and set a positive example for other countries.



GREENPEACE

Greenpeace calls on the government to:

- **Recognize energy efficiency and the solarization of the Greek economy as a strategic choice of the highest priority.**
- **Set an ambitious and realistic goal to upgrade 1 million buildings by 2025.**
- **Present ambitious climate policies in Paris aiming at both reducing greenhouse gas emissions and improving quality of life for Greek people.**
- **Start the public debate for an economy without fossil fuels over the next decades**

In this new global era which sees countries start competing with each other over whom will decarbonize their economies first, **Greece** can have an important advantage. Greece has a huge potential to save energy as well as a tremendous renewable energy potential which, if properly used, can help provide households, businesses and industries with low-cost power.

Greenpeace's current proposal is not only essential but also feasible, as long as an ambitious clean energy policy is promoted with the utilization of all financial tools and resources available. Again, it will once again be proven that it's all a matter of priority. With strong political will, priority must be given to pushing forward these policies that will move Greece away from its bad energy past, its energy poverty and its unprecedented unemployment levels.

All Greece needs to do is leave the shadows behind and turn to the sun.

GREENPEACE

Greenpeace Hellas
78 Kolonou Str., GR- 104 37 - Athens-Greece
greenpeace.gr
tel. 210 3840774 & 5
φαξ. 210 3804008