Proposed pilot study of solar energy in Greece: a way for European Union institutions to help

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Introduction

This document outlines a proposed project, to show how renewable energy can help Greece thrive. There has been much discussion of the European Union's 'Energy Union', currently being developed (associated with EU Commissioner Marianne Thyssen); this is a very welcome development, but will take years to complete. People may not realise Greece already has electricity connections to other countries, such as Italy; it is already possible to build solar power facilities in Greece, to sell electricity in rich countries such as Germany (which intends to end reliance on nuclear power in the next few years). Greeks can increase solar power generation.

This is an appropriate time for EU institutions to be proactive. "Europe currently has to import over half of its energy because it has few energy reserves. And it has to accept the price decided by world markets" (European Commission, 2014a: 5). This can be improved: "public finance institutions play an important role in catalysing and mobilising investment in renewable energy. There are numerous instruments which are used by these institutions which are typically either state-owned or mandated by their national government. The instruments range from providing subsidies/grants, equity to classic concessional lending (loans with favourable conditions) or guarantees" (EurObserv'ER, 2014c: 172).

Europe needs to invest in renewable energy, to reduce damage to the global ecosystem caused by more carbon dioxide production. But recent progress in Europe has been very disappointing: the latest edition of EurObserv'ER (2014c: 153) states "Major decreases in new investment in solar PV plants could be observed in Italy, Spain, and Greece". EurObserver'ER (2014a: 7-8) describe the dramatic fall in European investment in solar power since 2011; they estimate that (in April 2014) only 2.4% of European electricity was generated by solar power. EurObserver'ER (2014b: 1) claim "The European solar thermal market for heat and hot water production and space heating, is shrinking all the time. EurObserve'ER reports that the market is in its fifth successive year of contraction in the European Union". In the EU as a whole, "EU-wide investment in new utility-scale PV capacity totalled almost € 7.6 billion in 2012; the investments in 2013 only amounted to € 3.1 billion. This corresponds to a decrease of 60%" (EurObserv'ER, 2014c: 150). There was no investment in 'Concentrated Solar Power' in 2013, according to EurObserv'ER (2014c: 173). "Under the current macro-economic trends in the EU it is difficult for public budgets to secure funds for the further support of renewables" (EurObserv'ER, 2014c: 187).

This paper suggests some ways in which renewable energy can be encouraged, focusing on a proposed pilot study of solar power generation in Greece. This project would require support from an EU institution, due to the current financial problems in Greece.

Is solar power appropriate for Greece?

Borenstein (2012: 74) suggested solar power is more appropriate than wind power, in hot countries such as Greece: "Solar power is produced only during daylight hours and tends to peak in the middle of the day. In many areas, this is close to coincident with the highest electricity demand, which usually occurs on summer afternoons". Air conditioning systems tend to consume large amounts of electricity around mid-day, in hot countries.

In Europe (and the world in general), the cost of generating electricity from solar panels has fallen in recent decades; but it is still generally not quite competitive with other methods of electricity generation such as gas (Borenstein, 2012: 86; Grossmann et al., 2012: 167). EurObserver'ER (2012: 131) predicted that the cost of generating solar electricity will have fallen to 'grid parity' (i.e. as cheap as non-renewable sources) by 2016, for the residential sector. But Pew Charitable Trusts (2012: 6) claimed the private sector will not invest much in solar power, unless further research makes it more efficient (or if there are higher subsidies).

Compared to other European countries, Greece is a cost-effective location for solar power (SolarGIS, 2014; Simister et al., 2014: 169). "Electricity prices for both industrial and domestic consumers increased significantly in 2012 […] they remained below the EU average" (European Commission, 2014b: 101). Solar power could be exported from Greece, generating useful export revenue, although the electrical connection between Greece and Italy is sometimes congested (Brancucci Martínez-Anido et al., 2013: 217).

More electricity generation in southern Greece would reduce the need to transport electricity: "Most of the power plants in Greece are located in the North, whereas most of the load is located in the South, primarily in the metropolitan city of Athens. Due to this geographical energy imbalance, electric power flows from North to South" (Andrianesis, Biskas & Liberopoulos, 2011: 1632). Hence, increased renewable energy generation could reduce the cost of transmitting electricity (Brancucci Martínez-Anido et al., 2013: 207).

For the EU as a whole, the average cost of generating new photovoltaic solar power in 2013 was € 1.37 million per MegaWatt (EurObserv'ER, 2014c: 150). This paper does not estimate costs of installing solar panels, adding electrical equipment, or providing undersea cables to connect a new facility to mainland Greece; but focusing on the cost of solar panels only, Solarwatt (2014: 1) reports the price as € 0.65 million per MegaWatt. Commercial returns on investment could be high, but it would be risky for a commercial investor to be the first to try out such a project.

The European Commission seeks to encourage investment, with money earmarked for projects to help end the energy isolation of some EU countries, and clear energy bottlenecks; funding can be sought up to September 2015 (European Commission, 2015a). Miguel Arias Cañete (EU Commissioner for Climate Action and Energy) said "we have to make European public money support targeted and meaningful investments" (European Commission, 2015a).

Greece has had financial problems in recent years (resulting largely from the 2008 global financial crisis which began in USA), so investment would help to reduce Greek unemployment. Hence, it seems appropriate for the EU to encourage investment in solar panels in Greece – investment in a pilot project could lead to commercial investment, once the idea has been established.

Floating solar panels

It would be possible to place solar panels on a Greek island: there are over a thousand islands, some of which are uninhabited. But this would be very controversial, because it may harm the appearance of these islands. If the reader is unfamiliar with Greece, photographs on websites such as Greek Tourist Board (2015) make clear that Greek

islands deserve their reputation as one of the world's best holiday locations; and Greek residents deserve to have the attractiveness of their environment retained for current and future generations. We should not make Greece less attractive – care is needed.

The idea of *floating* solar panels is a relatively new way to generate electricity; but it is becoming increasingly popular. Picture 1 shows part of a 2.3 MegaWatt floating power station in Japan. This might allow seas near Greek islands to generate electricity, helping the Greek economy, without harming the appearance of islands.

Picture 1: floating solar panels

Source: Getty Images (2015).

The idea of floating solar panels must be acceptable to Greek citizens, for this project to be appropriate; this is especially important because Greece is a famous tourist destination, and hence a source of local jobs. But it could be argued that fish farms have become acceptable, adjacent to many Greek islands; Picture 2 shows an example. If fish farms are acceptable to most Greek people, then why can we not experiment with floating solar panels near Greek islands?

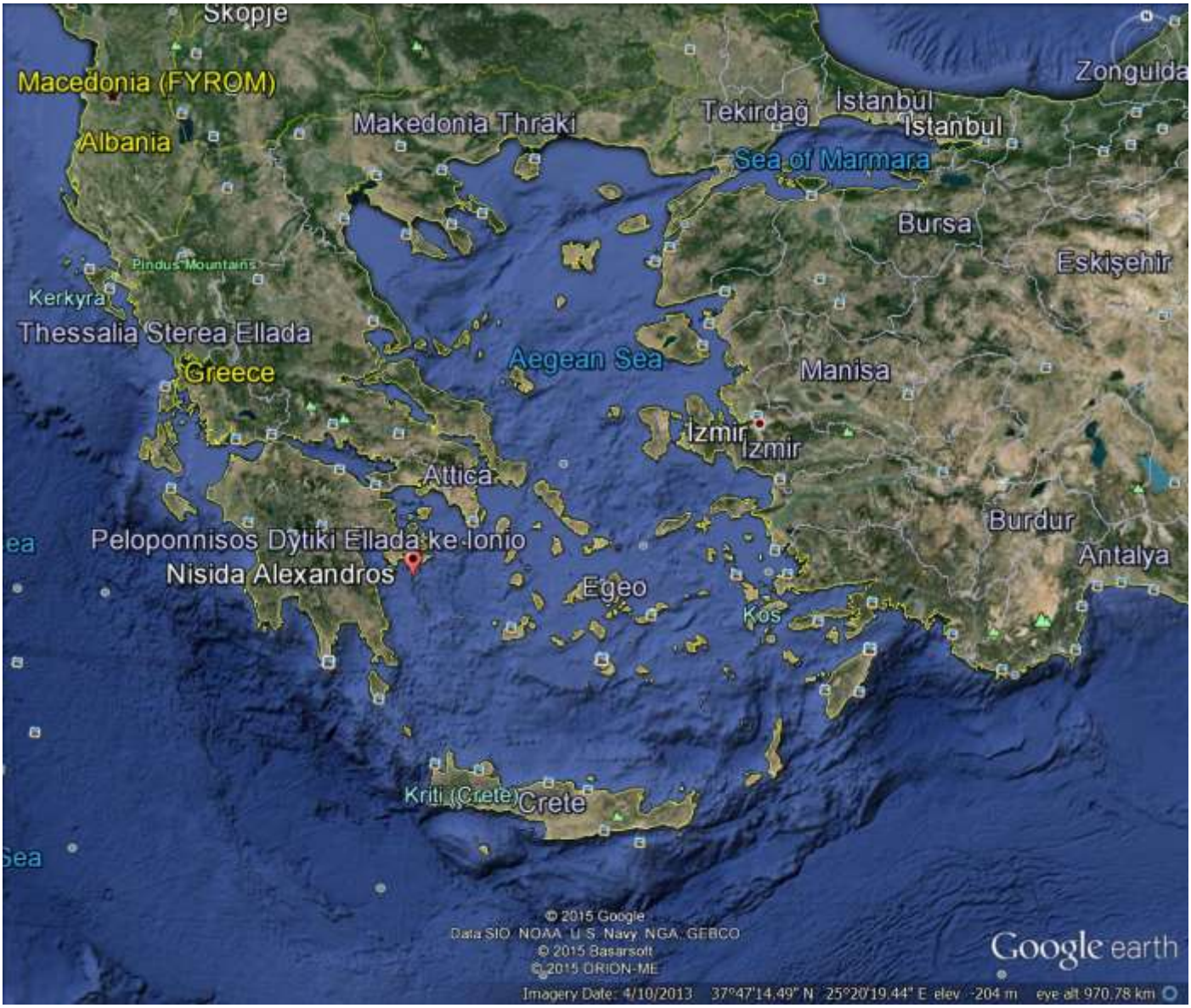
Picture 2: fish farm near a Greek island

Source: Shutterstock (Image ID: 26955910; Copyright: Konstantin Karchevskiy)

Perhaps the fish-farm structures in Greece, such as those shown in Picture 2, are harmful to Greece's tourist industry because they do not blend in with their environment. There is a risk that a particular firm (running a fish farm, or solar power generation) could raise their own profit at the expense of the environment – and hence tourism. If floating solar panels are implemented in Greece, it might be appropriate to locate them some distance from the nearest island – and, of course, away from busy shipping lanes. They should not be placed in the most attractive parts of Greece (many tourists and locals would say <u>all</u> of Greece is attractive, so the Tsipras government should only act with care).

It seems plausible that solar power may be popular in Greece. Most European citizens support renewable energy: in a 2012 Eurobarometer survey, 58% of respondents support "increasing the share of renewable energy in the EU by 20% by 2020" (European Commission, 2012: 22). 73% of Europeans interviewed consider it important "to support an economy that uses fewer natural resources and emits less greenhouse gas" (European Commission, 2012: 21).

Map 1: where would Greek solar panels be most appropriate?

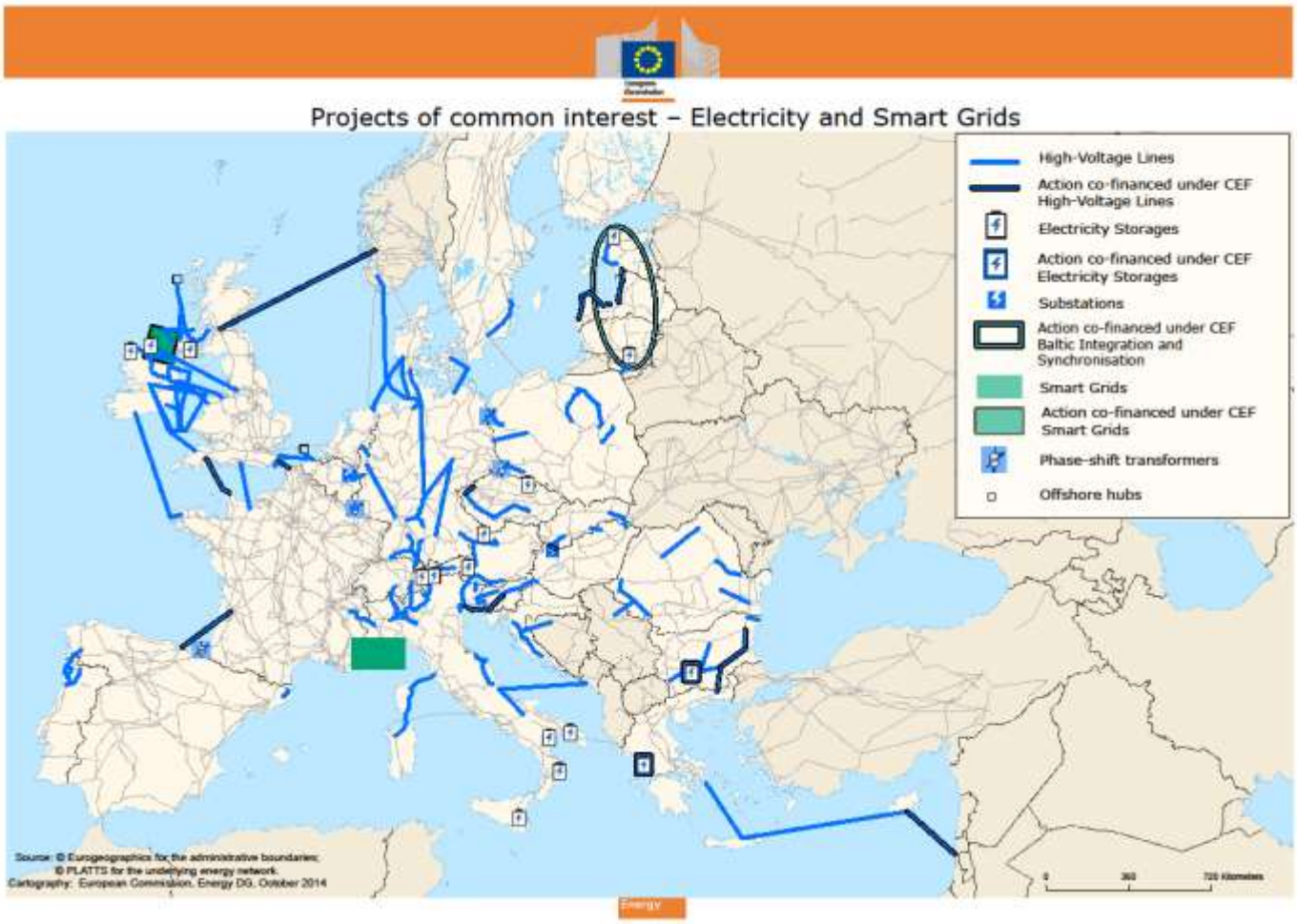


Source: Google Earth.

There is often a trade-off between generating jobs, and harming the environment; but in Greece, an added complication is that more jobs in solar power plants could reduce jobs in tourism. This issue should be monitored carefully by future Greek governments. It is not clear where, in Map 1, solar panels would be most appropriate. There are many locations which are popular with tourists, and (more importantly) are precious to local Greek residents.

As part of the planning process for a pilot project, it may be appropriate to consider the predicted electricity grids in Map 2: location near an undersea cable (e.g. between Crete and Cyprus) might make the proposed floating power station more profitable, due to reduced cost of installing cables to a new floating solar power station. More details of EU plans to improve our energy system are available from European Commission (2015b). But Map 2 adds another level of complexity, to the already difficult task of increasing Greek solar power production.

Map 2: planned electricity grids



Source: European Commission (2015b).

Private ownership of Greek islands is another complication, when deciding where to locate a pilot project to generate electricity from a floating solar power plant. But there seems no reason to allow a millionaire (who owns a Greek island) to prevent economic development for the majority of Greeks; we should consider the welfare of all Greeks, including unemployed Greek people, who would prefer to earn their own food rather than relying on a food bank.

Conclusion

This working paper suggests a possible way for EU institutions to support Greece. It is possible that this proposal will be unwelcome among Greek people who live nearby – such a project should only be implemented with the full support of the Greek government, and the government would need to take responsibility for decisions such as where the new solar power generating facility would be located.

It seems plausible that if the team led by European Commissioner Thyssen discusses this issue with the Greek government, an arrangement can be found which will provide jobs and export revenue to the Greek economy. A

pilot project, funded by the EU Energy Union, would clarify the profitability and acceptability of this approach; and could lead to a considerable amount of new commercial investment in Greece.

Planning this pilot project may be complicated. Europeans are creative (Greeks invented democracy, for example); and when Marianne Thyssen was given the task of Commissioner, President Juncker asked her to be proactive in seeking solutions to Europe's problems (Simister, 2015: 2). Investing in solar power, in Greece, seems an appropriate challenge.

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