A Panhellenic Social Survey (2018-9) regarding the Quality of Life, Energy Needs and People’s Attitudes towards R.E.S.

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Abstract: This Pan-Hellenic Social Survey (2018-2019) covers the attitudes of the people regarding Climate Change, Energy Needs, the Quality of Life of the people, and also their recent attitudes towards the Renewable Energy Sources. It is a well known fact that Hellas is suffering from an economic crisis during the last ten years. As expected, this crisis, has not only immediately affected the economics of each household, but also the quality of life, the comfort conditions and, in consequence, the everyday life of the citizens. It is also very interesting to see how people’s attitudes towards the application of small and large-scale devices of Renewable Energy Sources, i.e. Photovoltaic and Wind generators, change over time.
It is at least an intriguing subject to see how people cope with the above mentioned circumstances. Among other research projects our Laboratory, every two years, conducts a similar social research with printed questionnaires regarding the attitudes of Hellenic people towards R.E.S.
This specific research presented here is of special interest. It aims at the investigation of how peoples’ attitudes and views towards the Environmental subjects and the use of RES. are affected by the Economic Crisis, and a rather dystopian general future. How serious and important are the environmental issues considered to be when people feel that their everyday life is threatened? This subject is approached through this Pan-Hellenic survey analyzing the data gathered by questionnaires.
After an extremely heavy winter, (January 2019), It is very interesting to see how environmental matters are faced in general, regarding energy sources, fuels and related costs during this critical period. But parallel to the above, Hellenic people have to face their household economics, their traditional attitudes towards their environment (both built and natural) and their dependence from imported fuels (oil and gas).
The conclusions of this research are important, describing the hellenic people’s attitudes towards quality of life, energy needs, energy poverty, and their attitudes towards R.E.S. and the environment. A large number of areas and cities have been covered, offering a satisfactory image of the subject.

1. Introduction
The Panhellenic social research presented here examines the energy consumption, energy needs, comfort conditions of the people of Greece today, and their attitudes towards RES.
After an extremely heavy winter, less than 0 °C for twenty days (very rare in Greece), in 2016/17 and the recent very cold January 2019, energy poverty is a widely known fact [1], [2], [3], [4], [5], [6]. But at the same time, according to EU directives, Greece must comply with regulations on the implementation and use of Renewable Energy Sources [7].
It is also interesting to see how environmental issues are faced in general, about the energy sources, fuel and the related costs, during this transitory period.
The sensitivity of the Greek people towards environmental issues is well known diachronically: the traditional architecture, antiquities, natural environment and the relevant protective legislation have
created a particular culture, which is more or less reconsidered. It is obvious that a new environmental aesthetic culture should be shaped. But in addition to the above, the Greek people have to deal with the economics of the household, the traditional attitude towards the environment (both built and natural) and its dependence on imported fuels (oil and gas). Among other surveys, from 2002 until today and every two years, we conduct a social survey that concerns the attitude of the Greek people to the RES [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20]. This study comes in addition to the existing literature on recent opinions and attitudes of the participants towards the poor comfort conditions, economic crisis and the environmental aspects of RES.

2. The research project
The survey has been planned and carried out by members of the K-ecoprojects co. and a large number of students, postgraduates, and PhDs that have attended our lectures. A large number of areas and cities have been covered, offering a satisfactory image of the subject. As for the subjects among the citizens, there has been a random selection covering the whole area of each city and its suburbs, all age groups, and several occupation and educational level groups. Regarding the sample, the 46,7% was female and 53,3 male, their age was from 26 to 65, their occupation was mainly civil servant (32,31%), employee (27,7%) and self-employees (17,4%). Most of the people had higher education (38,1%) and post-secondary vocational education (29.23%). The questionnaires gathered, have been processed by the staff and the collaborators of K-ecoprojects. The task has been to extract easily understandable data, in order to help the authorities that might be interested to use the results of our survey. The questionnaire is based upon the Guttman scale (Canter, 1988) but it has been adapted to the well approved and generally accepted 5 point Likert scale, in order to be comparable to all previous relative studies (see Kosmopoulos 2002 / 2004 / 2006 / 2008 / 2011 / 2013 / 2015 / 2017).

3. The survey
The research project, regarding the social attitudes towards the environmental subjects during this critical period, has lasted from September 2018 to March 2019, all over Hellas (and Cyprus) through the collection of printed questionnaires distributed by our team, and has covered the respective number of 1287 valid questionnaires.

3.1 The social survey results:
In the diagrams below, the results from the survey are presented. The answers to the questions raised, define a reference level on the economic situation and the general conditions on climate change and extreme phenomena.

1. Has the economic crisis affected the quality of life of your household?

2. Climate change, with extreme weather phenomena that often occur recently, do you think that affects the comfort conditions (heating-cooling) and potential hazards (floods / drought / fire / landslides) for your residence?
3. IN YOUR HOME/RESIDENCE
Heating system, Perceived thermal comfort.

3.1.1. For heating you use:

3.1.2. What percentage of your income you spent for heating during winter eg ten years ago and how much this year?

3.1.3. Do you think that heating costs you:

4. Do you know what Renewable Energy Sources are?

5. How well do you know about the following:

5.1. Solar Heater

5.2. Photovoltaics in buildings:
5.3. Photovoltaics in land properties:

| Level | Percentage |
|-------|------------|
| Not at all | 5.15% |
| A little | 9.29% |
| So and so | 22.16% |
| Well enough | 40.72% |
| Very well | 22.68% |

5.4. Photovoltaic Parks:

| Level | Percentage |
|-------|------------|
| Not at all | 7.17% |
| A little | 12.82% |
| So and so | 28.21% |
| Well enough | 31.31% |
| Very well | 19.49% |

5.5. Wind Generators:

| Level | Percentage |
|-------|------------|
| Not at all | 28.23% |
| A little | 21.07% |
| So and so | 18.36% |
| Well enough | 15.95% |
| Very well | 14.41% |

5.6. Wind Generators Parks:

| Level | Percentage |
|-------|------------|
| Not at all | 7.73% |
| A little | 13.40% |
| So and so | 29.38% |
| Well enough | 31.96% |
| Very well | 17.53% |

5.7. Geothermy for buildings:

| Level | Percentage |
|-------|------------|
| Not at all | 21.54% |
| A little | 19.49% |
| So and so | 30.25% |
| Well enough | 17.44% |
| Very well | 11.28% |

5.8. Teleheating for settlements:

| Level | Percentage |
|-------|------------|
| Not at all | 28.21% |
| A little | 21.08% |
| So and so | 28.15% |
| Well enough | 12.82% |
| Very well | 9.74% |

5.9. Heating with Biomass (firewood - pellets - coal)

| Level | Percentage |
|-------|------------|
| Not at all | 21.16% |
| A little | 7.56% |
| So and so | 21.16% |
| Well enough | 32.12% |
| Very well | 37.83% |

5.10. Double Glazing:

| Level | Percentage |
|-------|------------|
| Not at all | 2.05% |
| A little | 2.05% |
| So and so | 9.74% |
| Well enough | 48.21% |
| Very well | 37.95% |

5.11. Insulation in walls:

| Level | Percentage |
|-------|------------|
| Not at all | 2.05% |
| A little | 4.11% |
| So and so | 9.74% |
| Well enough | 48.72% |
| Very well | 35.38% |

5.12. Windbreak / Solar patio (windows / plexyglass / transparent plastic sheet in contact with the building or on the balcony)

| Level | Percentage |
|-------|------------|
| Not at all | 20.51% |
| A little | 20.51% |
| So and so | 23.13% |
| Well enough | 19.49% |
| Very well | 14.36% |

5.13. Fan

| Level | Percentage |
|-------|------------|
| Not at all | 1.54% |
| A little | 3.59% |
| So and so | 4.36% |
| Well enough | 26.79% |
| Very well | 63.72% |

5.14. Do you already use any of the above?

| Level | Percentage |
|-------|------------|
| No | 34.20% |
| Yes | 65.80% |

5.15. If yes, which one:
6. Do you know that all of the above can help:  
- 1. Yourself to save money: 23.95%  
- 2. In reducing pollution: 19.73%  
- 3. In reducing the impact of greenhouse effect: 28.38%  
- 4. In reducing climate change: 27.94%

7. Do you know that all of the above can help our national economy become independent from imported oil and natural gas?  
- 1. Yes: 87.69%  
- 2. No: 12.31%

8. Do you know that all of the above can help in reducing environmental pollution?  
- 1. Yes: 92.31%  
- 2. No: 7.69%

9. Would you wish to install Photovoltaics:  
- 1. At home (roof, facade, yard): 36.84%  
- 2. At land property: 13.88%  
- 3. To the building where I work: 6.69%  
- 4. At our office or manufacturing installations: 3.83%  
- 5. I would like to, but...

10. If you have already attempted to do so, what is your comment on the necessary bureaucracy?  
- 1. Definitely yes: 31.52%  
- 2. Rather yes: 32.07%  
- 3. Maybe: 25.00%  
- 4. Rather no: 5.43%  
- 5. No: 5.98%

11. If you are reassured from the authorities that you will have definite economic gain, and a simple bureaucratic procedure, would you proceed to install Photovoltaics?  
- 1. Definitely yes: 73.10%  
- 2. Rather yes: 7.77%  
- 3. Maybe: 8.81%  
- 4. Rather no: 7.73%  
- 5. No: 2.59%

12. Do you think that the installation of Photovoltaics and Wind Generators insult/destroy the aesthetics/natural beauty of buildings and/or the natural environment?  
- 1. Definitely yes: 6.21%  
- 2. Rather yes: 15.67%  
- 3. Maybe: 21.33%  
- 4. Rather no: 31.08%  
- 5. No: 25.71%

13. Would you accept a nuclear plant in our country?  
- 1. Definitely yes: 2.59%  
- 2. Rather yes: 7.77%  
- 3. Maybe: 8.81%  
- 4. Rather no: 7.73%  
- 5. No: 73.10%
14. Do you think that switching to renewable energy sources (solar, wind, etc.) and the independence from oil, gas and wood / pellets will reduce extreme / extraordinary phenomena connected to climate change?

| Option     | Percentage |
|------------|------------|
| Yes        | 33.33%     |
| Rather yes | 31.77%     |
| Maybe      | 22.92%     |
| Rather no  | 5.73%      |
| No         | 6.25%      |

15. We hear that there are fossil fuels in our country. Do you think that their exploitation:

| Option                                | Percentage |
|---------------------------------------|------------|
| Would help the energy/economy of our country | 39.88%     |
| Would offer profit to the oil companies | 25.15%     |
| Would harm the natural environment    | 18.40%     |
| Would help the Greek citizens financially | 16.57%     |

16. Finally, would you wish to see a wide use of R.E.S. for the following reasons:

| Reason                                                        | Percentage |
|--------------------------------------------------------------|------------|
| For a clean environment                                      | 31.05%     |
| For the independence from foreign countries/companies (imported oil and gas) | 32.59%     |
| To improve the national economy                              | 20.03%     |
| For the household economy                                    | 16.33%     |

17. What do you recommend for the issues we have asked you?

| Recommendation                                                                 | Percentage |
|-----------------------------------------------------------------------------|------------|
| Increased financial programs for "green house" ("Έξοχοκομισία")           | 12.59%     |
| Prevention by the state to deal with extreme phenomena                       | 13.42%     |
| Photovoltaics installation at public buildings and public places            | 9.73%      |
| Easier and cheaper process installation for solar heaters, solar panels, photovoltaics, wind generators | 11.91%     |
| Cheaper Electricity                                                         | 19.02%     |
| Cheaper Gas                                                                 | 10.23%     |
| Cheaper oil                                                                 | 23.04%     |

Also recommended:
- Actions by the state and the municipalities for “green” planning, and energy saving interventions.
- Financial measures including tax reduction and grants for “green” houses and buildings
- Cheaper electricity produced by R.E.S.
- Citizens’ awareness of environmental benefits

3.2. Analysis of the Survey Results

Regarding comfort conditions, on heating, it has been confirmed the increased use of solid fuels, following the gas and oil (with moderate use), and also emphasized the limited duration of use of
electric power (auxiliary devices). It is obvious that heating is expensive, while there hasn’t been noticed satisfactory "heat" in the spaces for the majority. During summer, about 50% have unsatisfactory coolness, and rather resort to "natural ventilation". Accordingly, the money spent on cooling, is much less than e.g. a decade ago.

About Renewable Energy, the public cognitive level has risen over all our previous investigations. There are solar water heaters in widespread use, several solar panels, and parallel visual stimuli but also opinion for larger scale R.E.S. parks. In exception there is little experience of district heating for settlements (except for Western Macedonia), and geothermal energy for buildings and settlements (except for Eastern Macedonia). Of course especially popular in large scale has been the use of biomass (wood, pellets, etc.), in particular in small towns and villages in northern Greece, where we very often meet balconies with glass protection from air (in wide use and also to ground-floor shops) as additional protection from the cold - creating improvising greenhouses. The small wind turbine for buildings remains still unknown.

More generally on energy issues, the use of RES climate change and the economy, the following have been expressed:

- The public knows that R.E.S. help minimize environmental pollution and simultaneously provide the opportunity to reduce dependence on oil and gas.
- Reducing environmental pollution is considered to help reduce the greenhouse effect, and maybe reduce climate change.
- They also hope that R.E.S. will help financially both the country and the household economy.
- In particular photovoltaics, for which, in previous years, a major campaign has been run for their placement at houses, but has been followed by a downward pricing policy, the public shows disappointed, and says that only large companies are being benefited for photovoltaic and wind turbines application. Nevertheless if they have the reassurance of satisfactory financial payback and simple paperwork they are willing to proceed with the installation.
- Another interesting issue is the changing attitude toward aesthetics of the environment on the installation of renewable energy parks across the country. During two earlier surveys (e.g., 2007, 2009), the elder people seemed to be firmly against large-scale installations, for the protection of the natural environment as the main argument. Nowadays, most people seem to be more interested in installing R.E.S.. Both photovoltaics in buildings and fields, and wind generators on saddles of mountains, are more acceptable - or perhaps not so important - in relation to our respective previous researches.
- The negative attitude towards nuclear power plant installation in our country, has been intensified, and more over because of the seismicity.
- The Oil and gas deposits exploitation in our country is both an economic hope, but also a fear of the large scale interests.
- About turning to applications of Renewable Energy the following remarks have been expressed:
  - That they will reduce the extreme / extraordinary phenomena attributed to climate change
  - That we will have a cleaner environment (rather than electricity produced from fossil fuels)
  - That we will have independence from imported fuels (gas - oil), and that the national economy and household finances will improve.

Additional proposals of the respondents on the issues mentioned are: demands for cheaper oil, natural gas, electricity, simple procedures for photovoltaics, state prevention to address extreme events, production of energy from RES, and increased financial programs for "green house".

With regard to whether they feel safe in their living area, there is always, to some degree, fear of fire, earthquake, flood, storm, landslides, for which the reference rate is directly related a) to the area where the building is, b) to the age of the building, and c) to the surroundings.

4. Remarks

a) Concerning natural gas, over the last 15 years in many large cities, it has been distributed and installed in many households. But since the average income has decreased and prices have increased, even gas, seems to be an expensive mean of heating.
b) Electricity prices tend to put air conditioners and electric heaters disused or as a final solution for a short time...
c) Regarding burning wood there are the following categories:
i. Legally purchased firewood and pellets
ii. Illegally cut wood from the forests
iii. Parts of wood waste (containing toxic chemicals)
iv. We should also mention the newspapers, card boxes, and paper products with toxic chemicals.
It certainly is a fact that all the above objects that generate heat, are much cheaper than oil and gas, not to mention the non-organic waste (even if it is recyclable or toxic), which is quite inexpensive. As to energy poverty, climate change, intense and extreme events, and the combination of economic crisis and recession have caused in our country a "shock" situation. The average Greek household, from an upward or even an illusion of a stable economic situation, suddenly found itself becoming poor, and the inability to face everyday needs (first stage before redemption?)
In our surveys of 2010, 2011 and 2012, as it has been shown in our respective papers, the forced adaptation of households to new conditions has been observed. And naturally the situation deteriorated in the following years. This situation of the households in Athens, after eight years of economic crisis is shown on a recent research carried out on behalf of the Region of Attica and the Athens Labor Center [4]. In 2018, they announced the results of research in which, inter alia, states that "... one in two households at the area faces economic problem so it cannot pay on time its bills (electricity, telephone, water, communal, or the rent) and 43% say they cannot ensure adequate heating in their home.

5. Conclusions
1. People really care about the environment, for the national economy, for the release of imported fuels, and particularly of course, for personal / family financial gain from R.E.S. application, but is also frustrated by the new financial policy applied for R.E.S. and the necessary paperwork.
2. Regarding R.E.S., 12-15 years ago, after optimistic promises by the state, many people had chosen to install PVs in homes, buildings or land, but their reward was disappointing. Despite the enthusiasm and the investment, prices per Kwh have fallen dramatically and it is difficult to see any new interest. New hopes seem to arise with the legislation on "Energy Communities" after the established and successful example of several European countries.
3. It is quite understandable that the reduction of fuel consumption by households is directly related to the reduction of people's income (or lack of) and of course the parallel rise in oil prices, electricity and gas. Recent research shows that especially in big cities (e.g. Athens, Thessaloniki), where the apartments have to share the heating costs due to the inability of some households to pay their bills, the entire building is left without central heating. And in addition, another study (Institute of GSEE 2/2018) indicates that 43% of households in the metropolitan area of Athens is completely without heat [4]!
According to the Oil Distributors Association, a decade ago heating oil costed 0.55 € / lt, and this year it costs 1,1 € / lt, and the consumption has dropped by 60% The money spent for heating has increased, but the amount of fuel consumed has decreased.
It is quite understandable that reduced fuel consumption by the households is directly related to the reduction of people's income (or lack of) and of course the increase in oil prices and natural gas ... The comfort conditions at homes, have diversified. Over the past few years, most people say that in their homes, they use heavier clothes than in the past because of the lack of heating.
4. Regarding energy poverty in our country, the average expenditure per household and the average consumption of different fuels, does not fully represent the reality: the averages produced, derived from 0 to x. Thus, as is understood, there are families without heating during the winter season. This cannot be presented with simple statistics ... Energy poverty in today's Greece is a fact. It is necessary for the state to apply emergency measures, to meet the energy needs of the average household.
In our previous nationwide questionnaire surveys conducted every two years, we had shown rather quite early, the following:
a) The growing difficulty of Greeks to have sufficient comfort conditions in their home as a result of the economic crisis.
b) The expectation of exploitation of the sun and the winds of Greece with photovoltaic and wind turbines and the exploitation of geothermal energy in several areas. The widespread use of solar water heaters in our country is already a fact. During the last two years, with the economic crisis on the one hand, and the arrival on the scene of the deposits in the Greek subsoil and seabed, concerns are growing: what will be the development of the country with the claims and the exploitation of mineral deposits; This field belongs to other scientific fields, as it’s directly linked to political / economic issues, and is not related to the exploitation of Renewable Energy Sources that do not harm the environment. Since the annual measurements at the experimental model house ZED-KIM show that the combination of photovoltaics and (small) wind turbine can meet the average needs of a household in northern Greece (the more so in the southern sunshine) our main interest and hope are the potential applications and the exploitation of the sun and wind.

Finally, I am embarrassed to quote here some statements that recently, support the potential of our country.

Jeremy Rifkin (The Hydrogen Economy). During a recent visit to Greece, he said: "... I do not understand how come your country with such both sun and wind, isn’t independent of fossil fuels ...»

Jeffrey Sacks (Columbia U. and Sustainable Development Network UN). "...Greece has an incredible potential for solar and wind power, and geothermal energy. Greece could become the power plant of Europe from Renewable Energy Sources ...

And also Henrik Stiesdal, the Danish specialist on RES and offshore wind farms, emphasizing of course on the fact that the parks should not affect sensitive landscapes of tourist attraction, says that "Greece has the best resources for the creation of wind and generally green energy, as it has the appropriate climate and appropriate winds"…

In conclusion, we come to the point that "energy poverty" can and must be treated with proper thermal shielding of buildings, with planting and vegetation, with the implementation and use of systems and devices that require the minimum energy for their operation, and therefore lower environmental impact and of course, with the maximum implementation of Renewable Energy Sources. The skills, technologies and tools mentioned in the preceding conclusion and discussion underline the needs and opportunities that exist in our country. It is now absolutely clear that the identification of problems in connection with the awareness of our country’s specific characteristics and possibilities, and decentralized energy production from renewable sources, can directly and fully contribute to the improvement of the "Well-being" of the citizens.

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