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EU Climate Law, Recovery and Resilience Policy: Outcomes for Greece First Energy Transition Steps.

Boulogiorgou D.[1], Kaldellis J.K.[1*]

[1]Soft Energy Applications and Environmental Protection Laboratory, University of West Attica, Greece

*corresponding author:
e-mail: jkald@uniwa.gr

Abstract In view of the fast energy transition implementation, communities depending on fossil fuel exploitation activities are facing structural economic disruptions. This is the case for West Macedonia (W.M.) and Megalopolis (central Peloponnese) regions in Greece, which are severely affected by the rapid decommissioning of lignite-based power stations. Also, the North and South Aegean (N&S A) Non-Interconnected Islands (NIIs), traditionally relied on Autonomous Power Stations (APS) for covering their electricity needs, operating on oil products, are going to face also the consequences of the implementation of zero-carbon energy policy. This study supports the argument that financial and regulatory boosts build resilience only if they are providing reliable and solid prospects for the post-carbon local economy, while the gradual (and not violent) abandonment of fossil fuels utilization, serving as bridge towards a low-carbon economy, may be a realistic option for the near future.

Keywords: Regulatory Framework, Decarbonization, Energy Policy, Electricity Generation, Vulnerable Area.

1. Introduction

On account of amplified climate crisis and the Russia invasion in Ukraine, EU adopted the Fit for 55 and REPower EU strategies, attempting to remove entirely the carbon containing fuels from the electricity generation mix of the country members and improve its energy autonomy. However, communities strongly depending on fossil fuel exploitation activities are facing structural economic disruptions due to this fast and not well-organized energy transition implementation. This is the case for the W.M. and the Megalopolis (central Peloponnese) regions in Greece. These two areas hosted eight lignite power plants of almost 5000 MW_e that provided up to 60% of the entire country electricity for the last 50 years (Kaldellis et al., 2009). Another different case that will face however similar threats in the near future is the N&S A NIIs prefectures. All these NIIs, covering until now their electricity needs with APS operating on oil products, are set to face also the consequences of the implementation of zero-carbon energy policy. More precisely, by 2029, the vast majority of NIIs should retire all their APS and be connected to the mainland electrical system in order to cover their electrical needs, according to the Territorial Just Transition Plan (TJTP) (eydam.gr). Actually, the TJTPs are the most important legislative tools / local strategic plans that attempt to guarante the just implementation of the energy transition policies in vulnerable areas. Since these policies are quite challenging, indicators such as emigration and unemployment rate, GDP per capita, installed generating capacity, local energy consumption, public and EU investments, energy sector related R&D expenditure, may be used for assessing the performance of the attempted energy transition policy.

Local societies, on the other hand, face the energy policy results in their everyday life. In this context, it is important that the local community is involved in the planning and implementation of energy transition projects (Kaldellis et al., 2023).

2. The Decarbonization of Vulnerable Areas

The main consequences of this violent energy transition of Greece vulnerable areas have been scheduled to be healed by the support of EU Just Transition Development Program (JTDP) 2021-2027. Unfortunately, despite the hasty retirement of the existing thermal power stations there is a significant delay in the utilization of the JTDP as demonstrated in Table 1 for almost all priorities included.

Table 1. *Just Transition Development Plan (11/2024)*

Priorities	Million € / per priority	Program Integration Million €
Entrepreneurship	831	155
Climate Neutrality	251	26
Circular Economy	62	0
Just Energy Transition	332	119
Integrated Intervention	89	0
Technical Assistance	65	43
Total	1630	343

According to the official data of Table 1, only 20% of the JTDP financial support is assigned, although the decarbonization in W.M. and Megalopolis is almost completed (officially by 2025). Note that the allocation of

JTDP per vulnerable area is 63% for W.M., 24% for Megalopolis, 13% for N&S A NIIs & Crete.

2.1 The situation in West Macedonia

Currently, in the last 5 years, lignite units in the W.M. with a total capacity of approximately 3000 MW_e have been retired, while no new thermal units (e.g. Natural Gas based ones) have been installed. The added/existing capacity of RES is 1000 MW (PV and Wind Farms), with an equivalent annual energy production approximately equal to that of Melitis Power Station (330 MW_e) before 2020 (Kaldellis and Ktenidis, 2024). Local economy faces very serious unemployment problems, causing brain drain of young scientists, while the local community's quality of life has declined. Since 2011, there is 20% population reduction (i.e. almost 36,000 people), 20% decrease of GDP per capita, and almost 14% drop in electricity consumption, mainly as results of the decarbonization policy fast implementation. Moreover, the unemployment rate of the region is one of the highest in Europe and the highest in Greece reaching almost 25%.

2.2 The situation in Peloponnese

In the Megalopolis region 13% of the nation's installed thermal power capacity has been located. Currently, there is only one lignite-based unit in the area, Megalopolis 4, which has a 300 MW capacity. Delignitization will directly result in almost 1300 fewer jobs in the area. These projections are based on 2019 data. More precisely, the direct effect of delignitization on employment in Megalopolis' power generation industry are projected to be 481 jobs by 2029 (compared to 2019) and 782 jobs (in full-time equivalent terms) lost in the lignite mining sector, according to the TJTP (eydam.gr).

2.3 Aegean Sea Islands Status

The restructuring of the NIIs local electricity market will substantial affect the local economy, hence substantial investments are required, owing mostly to the challenges of insularity. The islanders cannot carry the entire expense, thus without EU investments, their energy transition would be incomplete, with significant environmental and socioeconomic consequences. According to HEDNO (deddie.gr), for 2024 the capacity of APS in NII was 1000 MW along with 162 MW of RES power. For comparison reasons, in 2010 the APS capacity was 1700 MW on top of 108 MW of RES. The existing APS employ approximately 735 Full Time Equivalent (FTE) positions in NIIs, i.e. 369 in the Dodecanese, 236 in the North Aegean and 130 in the South East Cyclades.

2.4 Local Society Opinion

In modern societies, citizens are aware of the climate crisis and are in favor of protecting their environment. In some cases, however, the policies designed to address the climate crisis and the measures implemented have serious impact on local communities' life quality. This fact has influenced public opinion over the years. Studies from 2013 (Kaldellis et al., 2013) and 2018 (Bouloigiorgou et al., 2018) show the initial positive attitude of local societies towards RES applications in most areas examined. However, a contemporary study in progress in the W.M. (by the same research team) shows the local attitude change due to the undesirable consequences of the attempted implementation of delignitization policy (Figure 1).

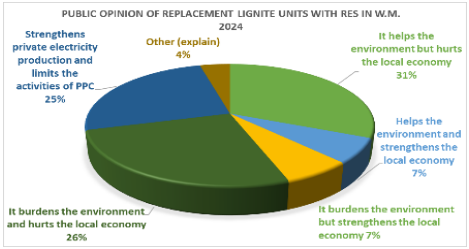

Figure 1 *Public opinion towards RES projects replacing lignite units*

3. Conclusions

The analysis of key indicators for the regions under study shows that the energy sector plays a crucial role in their economic development strongly affected by the energy transition attempted. This energy sector not only supports job creation and the emergence of new local industries, but its positive impact is undermined when policies and compensatory measures are poorly implemented. Such shortcomings can hinder economic growth and strain the social fabric. Additionally, a comparison of these indicators over time with each region's energy dependency relative to GDP highlights the need for more effective implementation of energy transition policies. These policies are essential to strengthen local economies, unlock regional potential and improve the financial well-being of residents. To support this transition, existing studies on citizens' awareness of energy issues and the Green Transition should be leveraged. Informing the public about the challenges and opportunities associated with the energy transition is vital. Well-informed and engaged citizens can play an active role in ensuring just and successful transition while safeguarding their interests.

To this end, it is important that the local community is involved in the planning and implementation of energy transition projects. This is necessary so that citizens fully understand the challenges that arise throughout the transition process, while the citizens' participation facilitates the success of the energy transition protecting at the same time the local society interests.

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