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INSTITUTE OF ENERGY
FOR SOUTH-EAST EUROPE

The Crucial Role of Energy in the National Recovery and Resilience Plan and the Need for Investments in Production

Special Report

Athens, September 2021

IENE REPORT (M65)

SEPTEMBER 2021

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Summary

This report has a dual purpose: on the one hand to present the Recovery and Resilience Fund, and on the other hand to focus on investments in the energy sector, as presented in the Greek Recovery and Resilience Plan, pointing out weaknesses and lack of investment strategy.

Pursuant to the Recovery and Resilience Fund and in order for Greece to receive support from this Fund, the Greek Recovery and Resilience Plan "Greece 2.0" was compiled, which aspires to facilitate a paradigm shift in the Greek economy and institutions towards a more extrovert, competitive and green economic model. It is estimated that this funding will play a key role so that Greece can emerge stronger from the COVID-19 pandemic.

In particular, in the energy sector, significant funds will be directed to the development and modernization of electricity networks, to energy storage, to rehabilitation of lignite mines in Western Macedonia and Megalopolis, to the improvement of energy efficiency and to electrification.

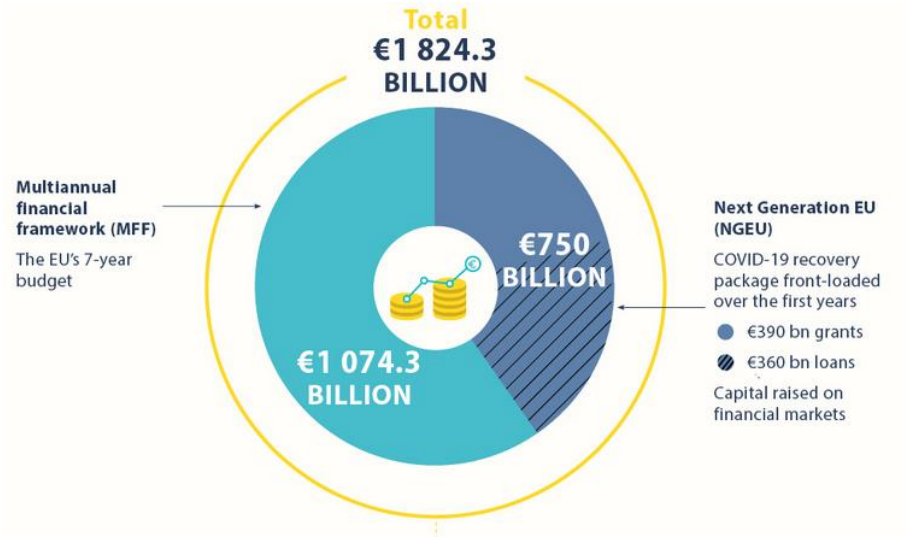
A key element of concern highlighted in this report is the resounding absence from the subsidized investments of "Greece 2.0", the Greek industry for the production of components /systems for RES and infrastructure projects, which could play a supporting role in the construction of RES projects and to act as a catalyst in the creation of domestic know-how, employment and domestic added value, resulting in the reduction of imports of RES products /systems and at the same time the strengthening of exports.

1. How it resulted

On 23 April 2020, EU leaders decided to work towards establishing a EU recovery fund aimed at mitigating the effects of the SARS-CoV-2 crisis. The proposal, a recovery plan for Europe, was presented by the European Commission on 27 May 2020. On 21 July, EU leaders agreed on a **€750 billion recovery effort**, **Next Generation EU**, to help the EU tackle the crisis caused by the pandemic [1].

Alongside the recovery package, the Council adopted on 17 December 2020, following the European Parliament's consent, the regulation laying down the EU's **Multiannual Financial Framework (MFF) for 2021-2027**. The regulation provides for a long-term EU budget of €1 074.3 billion for the EU27 in 2018 prices, including the integration of the European Development Fund. Together with the Next Generation EU recovery instrument of €750 billion, it will allow the EU to provide an unprecedented €1.8 trillion of funding over the coming years to support recovery from the COVID-19 pandemic and the EU's long-term priorities across different policy areas [2].

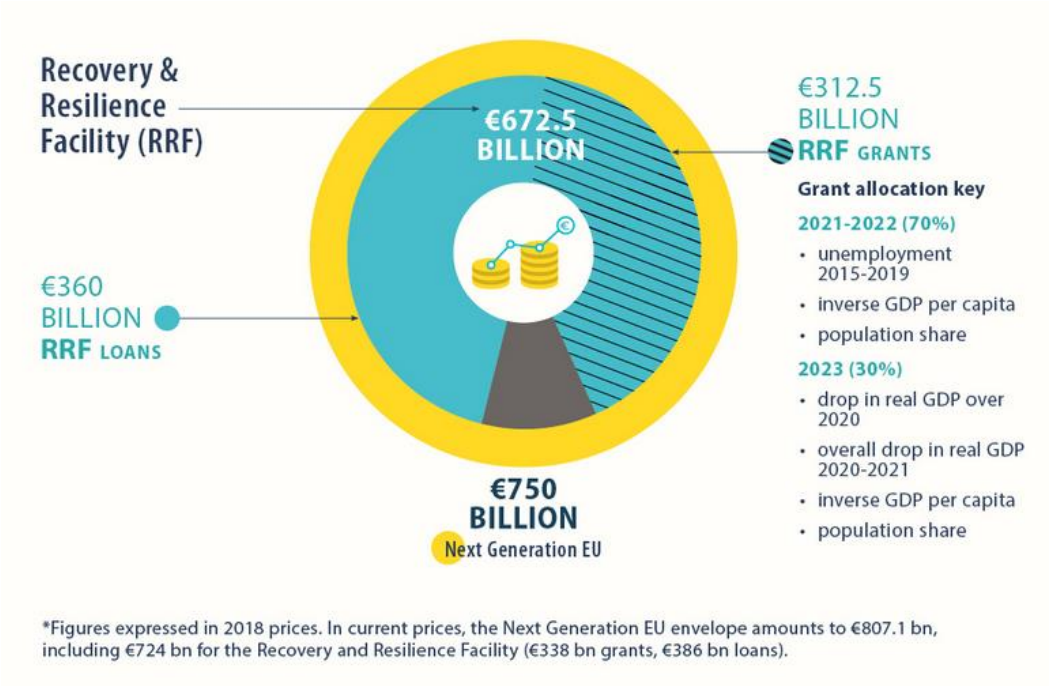
Figure 1: EU Expenditure 2021-2027



Source: European Council [3]

The European Council subsequently adopted, on 11 February 2021, the **Regulation 2021/241 establishing the Recovery and Resilience Facility (RRF)**. The €672.5 billion Facility is at the heart of the EU's extraordinary recovery effort, Next Generation EU (NGEU): the €750 billion plan agreed by EU leaders in July 2020.

Figure 2: How much money



Source: European Council [4]

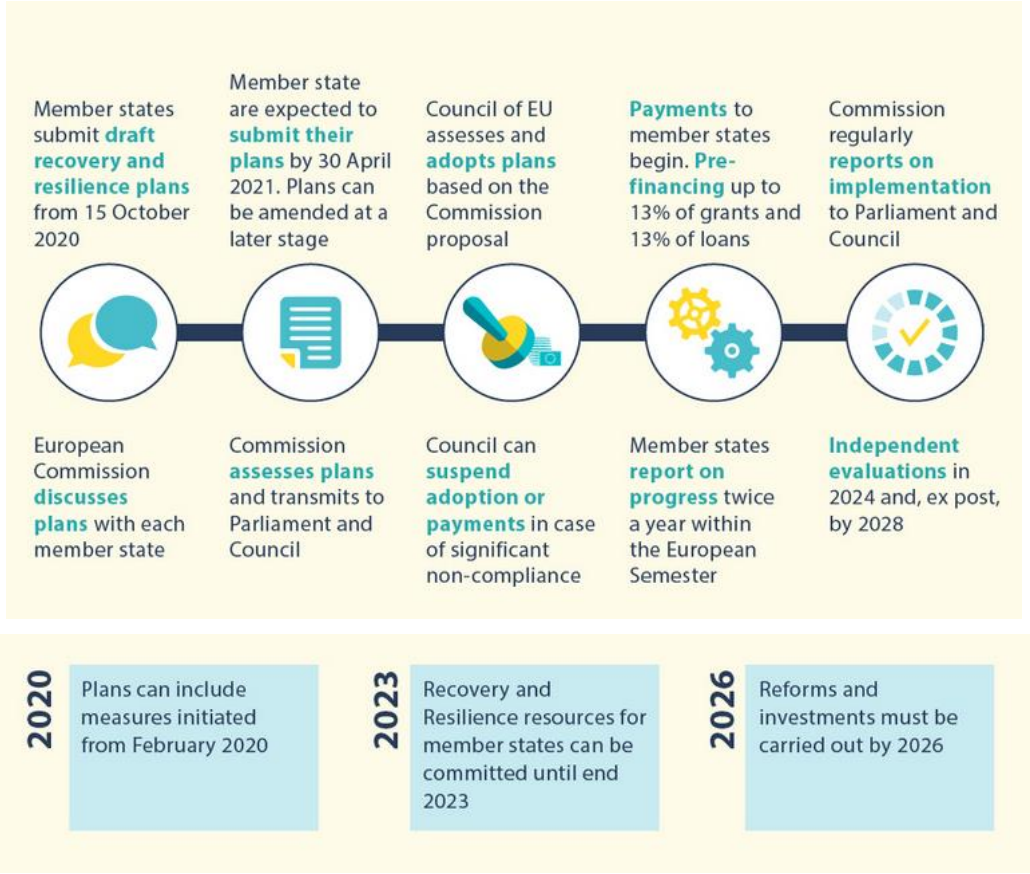
Under the Recovery and Sustainability Fund, Member States will be able to cope with the economic and social impact of the COVID-19 pandemic, while at the same time their economies will experience a green and digital transformation so as to become more sustainable and resilient.

In order to receive support from the Recovery and Resilience Facility, EU countries are asked to set out a coherent package of projects, reforms and investments- **National Recovery and Resilience Plans (NRRPs)**- in six policy areas [5]:

- the green transition
- digital transformation
- smart, sustainable and inclusive growth and jobs
- social and territorial cohesion
- health and resilience
- policies for the next generation, including education and skills

EU countries had until 30 April 2021, as a rule, to submit their National Recovery and Resilience Plans setting out their reform and investment agendas until 2026.

Figure 3: How does it work?



Source: European Council [4]

Plans must [4]:

- Align with EU priorities: boost growth, job creation and economic and social resilience
- Reflect country specific challenges, in line with European Semester country-specific recommendations.
- Support the green transition, at least 37% of resources contribute climate action and environmental sustainability
- Foster digital transformation, at least 20% of resources contribute to the EU's digital transition.

The European Commission published on September 17, 2020, the **Annual Sustainable Growth Strategy 2021** [6], which provides countries with guidelines for drafting NRRPs based on in the use of the Recovery Fund. All NRRP should focus particularly on reforms and investments that support the green transition. In order to meet the European Council 's commitment to meeting the 30% target for integrating the climate dimension into both the Multiannual Financial Framework and the Next Generation EU, at least 37% of the spending on each Recovery and Sustainability Plan should be related to with the climate.

Most national governments submitted their plans for investments and reforms in April and May 2021, with clear milestones and targets to access recovery funding. The European Commission started approving the first batch of plans in mid-June in line with its deadline of two months following receipt of the plans. The Council then has four weeks to adopt each plan by means of an implementing decision.

After the approval of the plans, member states will receive pre-financing of 13% of the total amount allocated to kick-start the recovery [5].

Regarding Greece, the Deputy Minister of Finance submitted on April 28 to the offices of the European Commission in Athens, a copy of the Greek Recovery and Sustainability Plan, which was sent the day before and posted on the system of the European Union. The Greek Recovery and Resilience Plan was prepared in time, was submitted 2nd among the 27 countries and Greece is in the first group of countries that received on June 17, 2021 the positive evaluation of the European Commission [7]. The final step for the start of the pre-financing disbursement was the approval of the Greek Recovery and Sustainability Plan "Greece 2.0" by Ecofin on July 13, 2021.

2. The Greek Recovery and Resilience Plan

The Greek National Recovery and Resilience Plan (NRRP), aspires to facilitate a paradigm shift in the Greek economy and institutions towards a more extrovert, competitive and green economic model, with a more efficient, less bureaucratic digitalised state, a much reduced «grey sector», a more growth friendly tax system and a more resilient social safety network [8].

"Greece 2.0" is fully in line with EU objectives. for faster transition of the Greek economy towards a green and digital growth model, exceeding the European targets, achieving 38% and 22% share in the respective actions.

The Greek NRRP comprises of four pillars: (1) Green, (2) Digital, (3) Employment, skills, and social cohesion and (4) Private investment and economic & institutional transformation.

In economic terms, the primary consideration of the Plan is to cover the large investment, output and employment gap endemic to the performance of the Greek economy over the last decade which deteriorated due to the current pandemic. In this context, the National Recovery and Sustainability Plan also aims to mobilize significant forces from the private

sector by boosting private investment and using Public-Private Partnerships and Energy Service Companies to make significant public investments in order to raise significant additional private funds. By using these funds and utilizing the loans of the Recovery Fund for the promotion of private investments, "Greece 2.0" seeks to mobilize total investment resources of 57 billion euros [8].

Greece will receive about 31 billion euros from the European Union's 672.5 billion euro Recovery and Resilience Facility. This amounts to € 18.2 billion in grants and € 12.7 billion in loans. For Pillar 1: Green Transition the corresponding amount is € 6.0 billion (Table 1).

Table 1: Budget

Pillars	RRF budget (in million €)	Mobilised Investment Resources (in million €)
1. Green Transition	6.026	10.395
2. Digital Transformation	2.136	2.236
3. Employment, Skills and Social Cohesion	5.208	5.310
4. Private investment and transformation of the economy	4.821	7.806
Sum of Grants	18.191	25.748
Loans	12.728	31.819
Total investment resources	**30.919**	**57.567**

Source: Hellenic Republic

According to the regulation of the Recovery Fund, Greece is expected to receive an advance payment of 13% of the total amount of grants and loans in 2021. According to Bank of Greece estimates, the disbursements of the remaining grants and loans are evenly distributed over the remaining years until 2026, as shown in Table 2 [9].

Table 2: Expected NRRP Disbursements per year (bn €)

	2021	2022	2023	2024	2025	2026	Total 2021-2026
Resources RRP	3,97	5,31	5,31	5,31	5,31	5,31	30,50
of which							
Grants	2,35	3,15	3,15	3,15	3,15	3,15	18,08
Loans	1,61	2,16	2,16	2,16	2,16	2,16	12,42

Source: Bank of Greece estimates based on information from the Ministry of Finance

The disbursement of funds depends on the satisfactory fulfillment of the relevant milestones and targets, as set out in the "ANNEX to the Proposal for a Council Implementing Decision on the approval of the assessment of the recovery and resilience plan for Greece" [9]. The milestones are the qualitative measures and the targets are the quantitative measures of the progress of the reforms and investments, which must be clear, precise and realistic. If, after the evaluation, the Commission finds that the projects have not been satisfactorily completed, the payment of all or part of the financial contribution and, where appropriate, the loan shall be suspended.

3. The Energy Sector -the Epicenter of the NRRP

The NRRP is going to contribute to the "green" transition of Greece by dedicating 38% of the estimated budget to achieving the climate targets. At the same time, all the reforms and investments included in the Plan comply with the principle of "no significant harm" within the meaning of Article 17 of Regulation (EU) 2020/852, contributing significantly to the achievement of the EU Green Agreement on achieving climate neutrality by 2050. The Plan also reflects the strategic priorities and specific climate objectives of the National Energy and Climate Plan (ESEC). It also incorporates the recommendations of the European Commission in the context of the recent evaluation of the Greek ESEK by the Commission services on the use of the Recovery and Resilience Fund to achieve the energy and climate targets in 2030 and beyond. Together with Greece's National Plans for the Just Transition of Lignite Areas, Reforestation, the Circular Economy and Biodiversity are the strategy that supports the Plan's

contribution to the green transition, while also contributing significantly to tackling energy poverty.

Table 3 presents the basic distribution of investment resources based on the selected pillars.

Table 3: Total investment resources mobilized by RRF for Pillar 1

Pillar 1 and Components	RRF budget	Mobilised investment resources
1. Green Transition	**(mil. €)**	**(mil. €)**
1.1 Power up	1.200	2.574
1.2 Renovate	2.544	4.279
1.3 Recharge and refuel	520	1.197
1.4 Sustainable use of resources, climate resilience and environmental protection	1.762	2.345
Total resources Pillar 1	**6.026**	**10.395**

Source: Hellenic Republic

Component 1.1: Power up

This component promotes the green transition, aiming to increase the share of RES in gross final energy consumption, improve energy efficiency and reduce GHG emissions. It is consistent with the phase-out of lignite and petrol in power generation and contributes to the climate change mitigation and pollution prevention and control objectives of the "EU Taxonomy Regulation". Moreover, the proposed reforms and investments, contribute to the energy security of Greece and the broader region, by diversifying its energy supply sources and limiting the vulnerabilities of the country's interconnection infrastructures, and creating new jobs.

Moreover, the component will promote Greece's national target of total lignite phase-out by 2028 and phase out from fossil fuels, while introducing integrated support measures, including socio-economic and environmental rehabilitation measures, for the redevelopment of affected areas, ensuring Just Transition.

The investments and reforms included in this component are:

(a) **Support of the installation of storage systems to enhance RES penetration.** The action intends to support the installation of up to 1400 MW capacity of energy storage in the electricity system. These investments will allow the system integration of new RES capacity which is required for the achievement of NECP targets. In addition, this action will also alleviate network congestion, increase the flexibility of the electricity system and liquidity of balancing market, enhance system adequacy, enable energy efficiency, and promote transparent electricity price formation. **Cost: 450 mil €. Date of completion: till 31.12.2025.**

(b) **Revitalisation actions of the most affected territories (Just Transition territories)**. Land restoration in the areas of former lignite mines in Western Macedonia and Megalopolis. Restoring land is a significant challenge for the just transition, both in environmental (soil remediation, redevelopment and implementation of interventions regarding landscape and environment restoration) and economic terms (readjustments in land uses, the creation of organized receptors of activities). **Cost: 242 mil €. Date of completion: till 31.12.2025.**

(c) **Interventions for the electricity interconnection of islands and the upgrading of the electricity network.** Interconnection of the Cyclades Islands (Phase D), an overhead line connecting Extra High Voltage Center (EHVC) Corinth and E HVC Koumoundouros and accompanying projects. The projects boost energy security, while also increasing the potential for electricity generation from RES in the islands and the Peloponnese. They also reduce energy costs, leading to new investments and jobs in the energy intensive sectors of the economy. **Cost: 195 mil €. Date of completion: till 31.12.2025.**

(d) **HEDNO network upgrades aiming at enhancing resilience and protecting the environment.** Undergrounding and rerouting of the electricity distribution network in settlements of special importance from a cultural or touristic point of view and city centres, with priority given to areas where the infrastructure is vulnerable to extreme weather. The aim is to improve the resilience of the network and contribute to the protection of the environment. **Cost: 60 mil €. Date of completion: till 31.12.2025**

(e) **HEDNO overhead network upgrading in forest areas.** Replacement of bare conductors in the overhead electricity distribution network (with covered ones or twisted cable), installation of insulating covers, and undergrounding or relocation of the electricity distribution network passing through forest areas. The project aims to

improve the resilience and reliability of the network (energy quality indicators SAIDI, SAIFI) and better protect the environment (forests, wildlife). **Cost: 40 mil €. Date of completion: till 31.12.2025**

(f) **Installed capacity increase in Hellenic Electricity Distribution Network Operator (HEDNO) HV/MV substations for new RES connection.** Increase of the installed capacity in existing substations of the network. The aim is to address the congestion of the distribution grid that prevents further growth of RES plants, thus, enabling the increased penetration of RES in the energy mix. **Cost: 12 mil €. Date of completion: till 31.12.2025**

(g) **Restructuring and enhancement of the RES-CHP account revenues.** The proposed reform includes: (a) measures that ensure the financial viability of the existing RES-CHP Account (ELAPE), in light of the effects of the pandemic. (b) the creation of a new RES-CHP Account, exclusively for the new RES units (commissioned after 1.1.2021), with new mechanisms that guarantee its financial viability. The reform aims to increase investor confidence and facilitate the financing of new projects in RES. **Cost: 202 mil €. Date of completion: till 30.6.2025**

(h) **Streamline the efficient operation of the new electricity market model and the development of new res plants to reach NECP targets through the implementation of the monitoring mechanism, the participation in demand response and an extensive reform of the licensing procedure for new RES.** The first aspect of the reform entails the establishment of a market monitoring system for the National Regulatory Authority (RAE) and the participation of demand-side response (DSR) in the balancing market. The second part of the reform refers to the streamlining of the licensing framework for RES, including simplification and digitalisation of procedures, short and binding administrative response times and accountability procedures for unnecessary delays, reduction of the necessary documentation and procedures. The aim is to accelerate the doubling of the installed capacity of RES in view of the lignite phase-out in Greece. The third and final part pertains to the development of a new regulatory framework for one of the most promising RES technologies, offshore wind. The reform, combined with the forthcoming revision of the RES special spatial planning framework, plans to create a comprehensive and streamlined framework for the implementation of new investments in the RES sector.

Component 1.2 Renovate

The reforms and investments of the component are linked to the reduction of CO_2 emissions and the climate "neutrality" of urban areas as well as to the climate adaptation objectives related to the cities' and their building stock's climate resilience. The component provides incentives for building renovations and energy upgrades, resulting in the regeneration of urban areas, the attraction of private investments and energy poverty mitigation. Finally, the reform and investments of the component promote the economic recovery, prosperity and resilience of the Greek economy by promoting investments in the construction sector, industry and urban environment. The component will result in the creation of new jobs, including jobs for young and/ or unskilled labour and contribute positively to the country's GDP.

The component includes reforms and investments that promote both the renovation and energy upgrade of buildings and the implementation of urban planning. Regarding buildings, the component includes investments aiming at the renovation of the existing stock of buildings, including residential, commercial, industrial and public buildings as well as social infrastructure. Regarding urban planning, reforms and investments are included promoting the improvement of the urban ecosystem through the reform of the urban policy framework and the promotion of sustainable growth projects.

The investments and reforms included in this component are:

(a) **Energy poverty action plan**. The drawing-up a coherent strategy to address the challenge of energy poverty. Indicatively, about 17.9% of the total population are reportedly unable to heat their homes, while this percentage was 34.1% in 2019 among the economically vulnerable population. The plan will feed into targeted policy measures that will prioritise upgrading the energy efficiency of residential buildings among vulnerable households. **Cost: 0 €. Date of completion: till 30.9.2021**

(b) **Energy renovation on residential buildings.** The investment aims to improve the energy efficiency of residential buildings through renovations, thus, contributing to significant energy savings and the associated NECP targets. In parallel, it will contribute to the digitalisation and electrification of final energy consumption (energy management systems, RES and storage systems), while also promoting the deployment of e-mobility infrastructure (charging stations). **Cost: 1,231€. Date of completion: till 31.12.2025**

(c) **Interventions in residential areas and in the building stock.** This investment concerns a number of interventions in different urban areas. 1) Interventions - in 16 urban and

coastal areas - that contribute to climate change adaptation and mitigation, including the protection of urban landmarks of significant importance, and the promotion of the climate neutrality of cities. 2) The regeneration of the ex-industrial area of Votanikos / Elaionas in the heart of Athens. 3) The upgrade of a connected and accessible seafront along the coast of Athens (Athenian Riviera). 4) Other strategic interventions. **Cost: 475€. Date of completion: till 31.12.2025**

(d) **Energy and entrepreneurship.** The investment provides financial support to private companies for energy-efficient renovations of their buildings. It includes two (2) sub-programs: (a) one for energy efficiency in the tertiary and secondary sectors, for medium, large and very large enterprises and (b) another for the installation of energy efficient equipment in very small enterprises. Through the installation of such energy efficient equipment and systems for energy conservation in production, storage, distribution of products and the operation of the companies, this measure contributes to increasing the energy efficiency of buildings in line with the targets set out in the NECP. **Cost: 450 €. Date of completion: till 31.12.2025.**

(e) **Energy upgrade of public sector buildings.** This is an investment in the renovation of public sector buildings with a view to increasing their energy efficiency, through the involvement of energy savings companies (ESCOs). The investment also contains the energy upgrade of street lighting infrastructures. As with the energy-efficient renovation programs for residential and private company buildings, this investment also contributes to meeting the energy efficiency targets adopted in the NECP. **Cost: 200 €. Date of completion: till 31.12.2025.**

(f) **Restoration and redevelopment of former royal estate TATOI.** The project covers the renovation of 42 historic buildings as well as the creation of walking and cycling routes, in the estate found in the forest of Tatoi, north of Athens. The project will deliver a green, renovated and freely accessible area for recreation to the inhabitants of Attica, as well as a new landmark for tourists to visit. **Cost:40 €. Date of completion: till 31.12.2025.**

(g) **Olympic Athletic Centre of Athens.** This investment in the Olympic sports complex of Athens aims to extend its useful life, restore its image, reduce its running costs and ensure its financial sustainability by turning it into a modern and lively urban athletics and leisure destination. **Cost:43 €. Date of completion: till 31.12.2025.**

(h) **Preparation of urban plans in implementation of the urban policy reform**. A key reform pertaining to urban development that addresses weaknesses and gaps in zoning and land use. The objective is dual: protecting the environment and promoting sustainable

economic activity. This is a comprehensive reform consisting of 5 actions: (a) Local Urban Plans (along administrative boundaries), (b) Special Urban Plans (overriding administrative boundaries), (c) the definition of the Development Rights Transfer Zones (ΖΥΣ), (d) completing the delimitation of settlements, (5) addressing land use issues related to recognition of (municipal) road access. **Cost:250 €. Date of completion: till 31.12.2025.**

(i) **Establishment of a new marine spatial planning.** The reform covers the creation of a) the national spatial strategy for the marine environment and b) maritime spatial plans. The reform seeks to promote sustainable development in the maritime areas and coastal zones, while protecting the marine environment and biodiversity. **Cost:0 €. Date of completion: till 31.12.2025**

(j) **Establishment of a new special spatial planning for RES, industry, tourism and aquaculture.** The reform involves the establishment of new special spatial frameworks for RES, industry, tourism and aquaculture to promote climate mitigation and adaptation, protection of biodiversity, economic growth and job creation. **Cost:0 €. Date of completion: till 31.12.2025**

Component 1.3 Recharge and Refuel

The main objective of the component is to promote the green transition, aiming to structure and coordinate efforts to make urban mobility cleaner, smarter, safer and fairer. This objective is in line with, and forms part of the local Sustainable Urban Mobility Plans and the nationwide strategy of sustainable mobility (as depicted in the National Energy and Climate Plan-NECP). The related investments, which feature the improvement of the transport sector through transport electrification, are anticipated to significantly contribute to the reduction of GHG emissions. Moreover, the component contributes to the recovery, prosperity and resilience of the Greek economy through the reinforcement of new technologies in the design, construction, project management, products and services sectors, thus alleviating youth unemployment by creating employment opportunities for highly qualified human resources.

The investments and reforms included in this component are:

(a) **Produc-E green**. This is a multi-pronged investment. 1) The first component targets the supply-side of e-mobility, supporting the development of 20 industrial production units with R&D departments for innovative products or services, such as the recycling of electric car batteries through re-use of raw materials like lithium and cobalt or the

production of electric vehicles and regular or high power charge points. 2) The second component, which will significantly contribute to emissions' reduction, is the development of the first CO_2 storage facility in Greece. **Cost: 300 mil. €. Date of completion: till 31.12.2025.**

(b) **Framework for installation & operation of EV charging infrastructure.** The reform institutes a holistic and complete regulatory framework that will put Greece well on its path to meet the NECP 30% share of electric vehicles in the domestic market by 2030. Upon its completion, local authorities will have issued plans for 330 publicly accessible charge points. **Cost: 0 €. Date of completion: till 31.12.2022.**

(c) **Electromobility.** The investment promotes e mobility in line with the objectives of the NECP and encompasses: 1) support for the installation of 8,656 publicly accessible charge points in key urban and suburban locations and points of interest (i.e. airports, motorways, ports and in parking areas); 2) the replacement of older buses with 220 new electric ones; and 3/ incentives for the replacement of older taxis with battery electric vehicles (BEV). **Cost: 220 €. Date of completion: till 31.12.2025.**

The Greek NRRP is linked to the European flagship initiatives and describes the investments and reforms needed to be implemented to promote the achievement of these flagships (Table 4).

Table 4: Connection of Greek NRRP with European Flagships of Pillar 1

Flagship	National baseline	Investments	Reforms
Power Up *(Contribution by Component 1.1.)*	1.Grid congested areas where no new RES-e plant can be installed 2. Limited on site RES power generation at the building sector 3. Coal-fired district heating systems and households exposed to energy poverty (regions in energy transition)	1.Upgrade electricity infrastructures to allow higher RES share and connection of new RES-e plants both at the transmission and distribution systems as well as through the interconnection of islands. 2. Deploy electricity smart meters for the consumers in order to allow and enhance their role in the new electricity markets and to foster installation of on-site small-scale RES systems 3. Enhance and improve the energy efficiency of district heating systems in the energy transition regions 4. Allow the green transition by substituting fossil fuel products in energy consumption through the expansion of natural gas grids	Ensure the sustainability of the national RES account for the operating aid support of RES generation through structural reforms and by addressing the covid-19 pandemic impact on the account's balance (Also linked to ongoing national reforms non presented under NRRP that improve the RES licensing process, the RES auto-consumption scheme, the operation of RES in the electricity market as well as the regulatory adoption of grid development plans)
Renovate	<8000 energy renovations of	Integrated investment activity that concerns the provision of incentives	

(Contribution by Component 1.2.)	residential buildings per year if no financing program in place (no foreseen national program for the period 2021-2022)	(grant and interest-free loan if the latter is chosen by the beneficiary households) for the energy efficient upgrade of the residential building stock. (also linked with the power up initiative as it foresees promoting the role of the active consumers, through the support for the installation of on-site RES power generation systems (PV), electricity storage infrastructure (batteries) and charging stations for electric vehicles, as well as the upgrade to a smart home, via the installation of smart energy management systems and devices. Dedicated measure with mix financial instruments also for companies in the secondary and tertiary sector, including the tourism sector, regardless of size, in order to improve their energy efficiency, to promote the use of Renewable Energy Sources and in general to upgrade their competitive position by investing in "green" development. Dedicated sub-measure for the energy renovation of public buildings through the mobilisation of Energy Service Companies.	(Linked to ongoing national reforms non presented under NRRP, like the recently adopted Long Term Renovation Strategy and the operation of ESCOs in the public sector via energy efficiency contracts)
Recharge and Refuel (Contribution by Component 1.3.)	Zero charging stations for EVs in specific public areas	Support the roll-out of publicly accessible electric vehicles charging network, both at areas Local Authorities are responsible for, and at points of interest on urban and suburban environment. Aid provided to new production lines and R&D units being developed, related to e-mobility sector, that create products or offer services	(Linked to ongoing national reforms non presented under NRRP, like the recently adopted JMD for the installation of charging stations)

4. Focus on Energy Investments

The energy sector is at the heart of the NRRP, whose investments will accelerate the rapid recovery from the Covid-19 pandemic crisis and at the same time lay the foundations for Greece to move rapidly towards the energy transition.

Among the projects that will receive funds from the NRRF are those for the development and modernization of electricity networks (307 million euros), which in combination with energy storage (450 million) will lead to a resilient system that can support the development of RES.

In the field of renewable sources, the inclusion in the NRRP of the new marine spatial planning as well as the spatial planning of RES is important, in order to develop new technologies, such as marine wind farms, which will utilize the huge wind potential of the Greek offshore territory. Also crucial is the support with 202 million euros of the viability of the Special RES Account (ELAPE), in order to increase the confidence of investors and to be able to plan their projects in the long run. In this direction, the reform of the licensing process of RES projects will contribute to the doubling of the installed capacity of RES, in view of the decarbonization of the country.

The funds of 242 million euros for the restoration of the old lignite mines in West Macedonia and Megalopolis are also of great importance, in order to utilize the areas by adjusting the land uses and the creation of organized receptors for activities. Funds are also provided for the capture and storage of CO_2, as it is a promising technology mainly for the decarbonization areas of the country.

Significant NRRP funds are available for energy savings, as € 1.731 billion are earmarked for energy renovation on residential buildings, in companies and the public sector.

Finally, it is worth mentioning the sector of electrification and the development of the charging network, where the NRRP provides 220 million euros for transport (electric city buses, electric taxis) and chargers, at a time when Ministry of Environment and Energy has targeted to have 10,291 electric vehicle charging points located throughout the country till 2021 [11].

5. Recovery and Resilience Plan (RRP) Loan Facility

The Ministry of Finance is introducing the “RRP Loan Facility”, an investment related to the provision of financial incentives to the private sector, aiming to promote private investments for the green transition, digitalization, extroversion, economies of scale facilitation through mergers & acquisitions and innovation (R&D), through, in essence, a state aid reform [12].

The objective entails the use of the maximum allowed RRF loans to provide financial incentives to private investment, close the large investment gap and foster economic recovery. For Greece, this maximum stands at approximately 13 billion euros in 2018 values, i.e. approximately 8% of projected GDP for 2020.

RRF loans will be the funds of the RRP Loan Facility. RRP Loan Facility loans will respect the following guiding principles:

- The RRP Loan Facility will provide loans directed to long-term (6 - 12 years) investment projects, addressing the following policy objectives:
  - the green transition,
  - digitalization,
  - extroversion,
  - economies of scale through mergers & acquisitions,
  - innovation (R&D).
- The decisions will be taken using exclusively economic criteria, with no intervention from the State.
- A reasonable grace period (e.g., 2-3 years) before the commencement of loan repayment shall be provided
- The low interest rates of the RRF loans will be channeled to the private sector investments in accordance with the EU state aid rules which will be thoroughly implemented, to incentivize investments.
- RRF loans will be leveraged with third party financing at a minimum level of 50%, including own equity and CBs loans.
- Loan Facility's portfolio shall be rated by a credit rating agency that will be managed by Public Debt Management Agency ("ΟΔΔΗΧ").
- Three levels of audit on eligibility. (a) Assessment by the financial institution providing the financing; (b) assessment by Independent certified auditor -prior to the financing; and (c) ex-post assessment.

The budget of the project is expected to be € 12.728 million for RRF (Table 5).

Table 5: Budget timeline

Loan Facility	2021	2022	2023	2024	2025	2026
Annual RRF Loans disbursements (%)	0%	5%	25%	20%	30%	20%
Aggregate RRF Loans disbursements (%)	0%	5%	30%	50%	80%	100%
Annual RRF Loans disbursements (EUR mil)	**0**	**636,4**	**3182**	**2545,6**	**3818,4**	**2545,6**
Aggregate RRF Loans disbursements (EUR mil)	**0**	**636,4**	**3818,4**	**6364**	**10182,4**	**12728**

Source: Ministry of Finance

6. RRF and Small-Medium Enterprises

According to a study by the National Bank of Greece entitled "Small and Medium Enterprises: The Resilient and Recovery Fund is a great opportunity for Greek SMEs" [13] , it is found that the biggest gap between small and large enterprises is in the industry sector, with industrial SMEs to have 60% lower labor productivity than large companies, while the corresponding gap in the trade-services sectors is in the order of 30-40% (with similar trends in Europe). Recognizing the fact that the industry sector is a representative example of small business backwardness in terms of competitiveness, as well as the significant contribution it is expected to make to the future development of the country, interest in the energy sector, among other things, focuses on the support from the energy components production sector, in order to channel with domestic products the implementation of the major energy infrastructure and energy upgrade projects that are eligible for funds from the NRRP.

In addition, according to the indicators of PVInfoLink [14] for 2021, there was an increase in the fees of freight container transport as well as an increase in the prices of raw materials (eg silicon), with the result that the prices of photovoltaics are still very high. Indicatively, the prices of silicon in July 2021 increased by 300% from July 2020, while the fees of freight containers increased by 350% from April 2020. Covid-19, make it necessary to provide incentives for the development of Greek industrial systems/components for RES projects, using the cash flows from the Recovery and Resilience Fund.

7. Macroeconomic impact of NRRP

As far as economic results are concerned, the NRRP envisages the creation, exclusively by its own activities, of 180,000-200,000 new permanent jobs by 2026 and a permanent increase in the amount of real GDP by 7%. The increase is permanent as it comes mainly from the increase in private investment and the implementation of structural reforms that improve the country's competitiveness and create new production, jobs and exports following their completion. After the completion of the NRRP, these benefits will not decrease but instead will continue to increase, through improved human capital and investment and productivity benefits of digitization and improved public administration.

A study of the Bank of Greece on the qualitative and quantitative evaluation of the effects of the NRRP on the Greek economy, in the context of a Dynamic Stochastic Model of General Balance, concludes that the NRRP will lead to an increase in real GDP of Greece during the

period 2021 -2026 cumulatively equal to about 1/3 of GDP in 2020, and by 7% in 2026 compared to the baseline scenario, which is defined as the state of the economy without the implementation of the Plan. This increase remains in the long run mainly due to structural reforms, with the permanent increase over 20 years being estimated at 6.5 points in GDP each year.

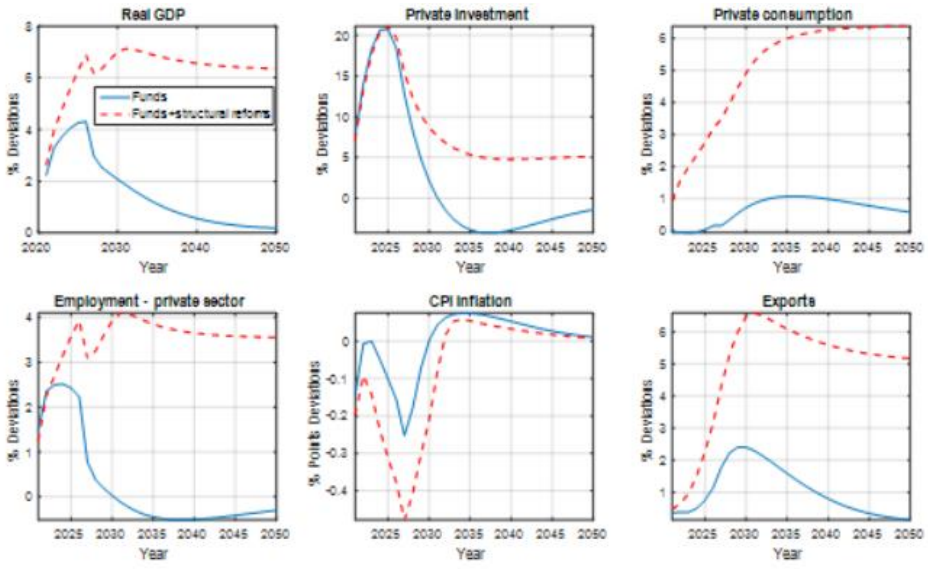
The Bank of Greece study presents the overall projected macroeconomic impact of the NRRP, as evidenced by the combined effect of grants, loans and structural reforms (Table 6).

Table 6: Overall impact of the NRRP

Variable	2021	2022	2023	2024	2025	2026	10 years	20 years
Real GDP	2,61	3,98	4,78	5,55	6,27	6,90	7,00	6,55
Private investments	7,18	13,32	17,70	20,35	21,15	19,75	8,70	4,77
Employment in private sector	1,24	2,26	2,70	3,16	3,58	3,93	3,92	3,65
Tax revenue	1,09	1,74	2,09	2,38	2,62	2,80	2,56	2,80

Source: Bank of Greece estimates

Figure 4: Dynamic impact of NRRP



Source: Bank of Greece estimates

8. Considerations

The Greek Plan "Greece 2.0" intends to utilize all the funds available from the RRF, in order to promote and finance a number of public and private investments. However, in Pillar 1 "Green Transition", the NRRF provides an overview describing some of the investments and focusing on those related to public investment entities (networks, substations, smart meters). In the case of private investment, relating to Pillar 1 of the Green Transition, it appears that the amount corresponding to private investment amounts to approximately 4.3 billion euros, out of the total of 10.4 billion euros mobilized. However, there is minimal reference to the projects that will be funded, while there is no description of the RES projects that will be eligible for implementation by private entities as well as their impact on society.

In the epicenter of our considerations is the absence, in the Greek NRRF, of any reference to those related to the strengthening of the domestic production industry of energy systems and components, in which case the export and production creates much more jobs and know-how compared to simple RES installations. While the promotion of RES projects is considered crucial for the path to climate neutrality, the installation of a photovoltaic park with almost none permanent employment and 75% of the materials to be imported, is not considered a very productive investment.

According to the Hellenic Association of Photovoltaic Companies (HELAPCO) [15] on the direct jobs created per installed MW of Renewable Energy projects for 2020, it is observed that the sector of component manufacturing creates more jobs compared to the direct jobs created by the phase of operation and maintenance of the project. Specifically, referring to the technology of photovoltaics, during the components production 5.9 jobs are created per MW, while the corresponding jobs in the operation and maintenance phase of the project are 0.3 jobs per MW. In the field of wind, the jobs created during the production of components are 46.5 times more than the corresponding ones in the operation and maintenance phase, in the hydroelectric sector the gap is reduced with the production of components creating 0.5 jobs per MW and the phase operation and maintenance to maintain 0.2 jobs per MW. In contrast, in biomass technology, the operation and maintenance of the project holds the lead in job creation with 1.9 jobs per MW, while component production produces 0.4 jobs per MW. Making a projection to 2025 and 2030, always according to data from the Association of Photovoltaic Companies the picture is similar, with the production of components to take the lead in creating jobs in photovoltaics, wind and hydroelectric, while the picture is reversed for the biomass sector.

In the view of the above data, it appears that investments in Renewable Energy projects produce energy, but do not create jobs, while giving boost to imported energy components.

According to an analysis by IENE [16], RES covered 20% of gross final energy consumption and 28% of electricity generation in 2020. In the coming years these percentages will increase significantly since according to the National Plan for Energy and Climate (ESEK), by 2030 RES will have to cover 35% of energy consumption and more than 60% of electricity generation. In addition, given the EU decision to further reduce greenhouse gas emissions by 55% by 2030, the targets for RES penetration in the energy system will have to be revised upwards, reaching 15 GW by 2030, making them RES central pillar of the energy system.

Therefore, based on the revised targets for the penetration of RES, as well as the huge investment interest expressed through the applications for RES projects in Regulatory Authority for Energy (RAE) [17], which reached 45.5 GW in the December 2020 cycle, Greece is going to be green the next 10 years with thousands of small and large RES projects. Cash flows to RES projects, which according to a recent study by IENE [18] by 2030 will reach 10 billion € for RES units and 7.5 billion for the expansion and upgrade of the distribution network, must be combined with the funds available for RES and Energy Efficiency and infrastructure projects from the Recovery and Resilience Facility. Based on the above data, there is a huge opportunity to invest in the creation of a production base in both wind and photovoltaic and related technologies. Today, unlike in the past, there is the right size of applications and the necessary scale, that allows the planning and implementation of investments in the productive part of the chain.

In terms of the percentage of domestic added value from the installation of photovoltaic and wind, this is quite low and ranges at the level of 25%. If we can not significantly increase the percentage of domestic added value in the construction of RES units, this means that most of the money that will flow for investment in the coming years, will go to foreign suppliers, with Greece benefiting only at the stage of installation and operation.

Connection of NRRP with other Financing Mechanism

In addition, it must be noted that there is no evidence of the the link between funding from the NRRP and the other funding mechanisms. We refer to the complementarity of the financing of these investments with the other available resources, such as the new Multiannual Financial Framework 2021-2027, the Just Transition Fund as well as the available

national resources. The issue of the complementarity of the NRRP with the funds provided by Partnership Agreement for the Development Framework (ESPA) and other financial mechanisms (eg ReactEU, Connecting Europe) is raised and a need arises to develop appropriate synergies between the different funds in order for the resources to complement each other. Unfortunately, the necessary roadmap that will allow the interested investors to consider all the available funds is missing.

9. Investing in the Domestic Production of Energy Products & Systems

The energy sector can play a central role in boosting the country's productive activities, as it is the link that allows and facilitates a number of other activities in manufacturing and services. In particular, based on the high goals of ESEK for the participation of RES in electricity generation 65% and the energy balance 35%, new opportunities are created for the expansion and upgrade of the production base in energy sector.

However, there is a discrepancy between the high targets for the penetration of RES in the energy balance and the prospect of productive activities, since apart from the domestic production of solar thermal systems, all other systems and components (eg photovoltaic, wind) are imported almost by 85%.

Given the planned high investments (> 12GW in the current decade, which require about € 14 billion), every effort should be made to increase the domestic added value of RES projects by up to 50%, through the construction by local businesses a significant part of the components/equipments, while creating highly skilled employment.

For the mature economies of northern Europe with advanced industrial infrastructure, RES may be a unique opportunity to revitalize their declining industry through the development of new products and technology, in a focused effort to recover lost ground due to China - after a delay of 15 years - but for our country things are not exactly like that. For the simple reason that the components used for the utilization of RES, except for the small domestic production of solar thermal systems, are all imported and in fact at high cost.

At a time when more than €6 billion from the RRF is going to be directed to the energy sector, with a significant involvement of RES and electricity grids, it is a reasonable request that some of this money be directed to stimulating domestic production of energy products and systems. Today, in Greece there is limited productive activity, significantly less than in the past, with

production focusing on electrical cables, pipes, metal structures, measuring instruments and devices and solar thermal systems. With this limited activity, the domestic value of RES systems that are installed every year (photovoltaic panels, power conversion systems and wind turbines) cannot be increased. Today, the domestic added value is limited to metal frames, columns and wiring in the case of photovoltaics and to earthworks and foundations in the case of wind farms. Thus, in the best case the domestic added value, in the form of labor costs and infrastructure, usually does not exceed 10% to 15% of the total cost of the project.

In the context of redistribution of the mixture in electricity generation (decarbonization) and based on the goals of ESEK, Greece by 2030 should have installed 10-12 GW of RES units that require approximately € 14.0 - € 15.0 billion in investment. With the lion's portion occupied by wind and photovoltaic parks and household photovoltaics (€ 10.0 billion) and the rest corresponding to geothermal, biomass and biogas units, small and large hydroelectric and solar thermal systems of all types. If we assume that after a coordinated and systematic effort, we achieve 30% domestic value added, this means that in 10 years around € 4.0 billion, ie € 400 million per year will be absorbed by local companies.

We will also accept that the investments by IPTO and HEDNO to support RES projects can be differentiated in some way and considered to be part of RES investments, so that all domestic investments around RES to reach € 600 million a year. However, with such an amount that only corresponds to 0.035% of the annual GDP and that is anything but secured, since its disbursement is in the good mood and financial strength of investors, it can not be argued that the country's economic growth will be based primarily in the green economy and especially in RES.

We must note that the prevailing government optimism about the role of RES as a key growth driver for economic growth is a utopia, at best, not to mention that it can easily be perceived as misleading public opinion. This certainly does not mean that RES and the investments around them should be abandoned to their fate. Every effort should be made to increase domestic added value by as much as 50%, through the construction by local companies of a significant piece of equipment while creating highly skilled employment. Only in this way the development of RES can substantially contribute to the economic and social development of the country. The NRRP is a unique opportunity, through targeted investments in industry to improve the deficit in local value added, especially in the energy sector.

Both the EU's adoption of the Green Deal at the beginning of the year and the € 750 billion support package a few months later, thanks to the coronavirus, have given the false

impression that the European economy, along with that of Greece, is to recover and in fact quickly due to massive investments in Renewable Energy Sources, electricity, the circular economy and everything else that the "green" economy generally entails. And while the need for an "energy transition" through the adoption of clean energy and RES technologies is hard to dispute, the extent to which they can contribute to economic growth is much debated.

A careful reading of the latest IEA Report "Energy Technologies Perspectives 2020-Special Report on Energy Technology Innovation" [19] on the technological innovations that will be needed in the coming years, in order to achieve great penetration of clean energy systems by 2050, leaves no doubt that these will be developed by countries with advanced research structures and where university research is closely linked to industry. This is certainly not going to happen in Greece of today, exhibiting constant university operation disruption, extreme partisanship and organized reaction to excellence, innovation and to funding of academic research by industry.

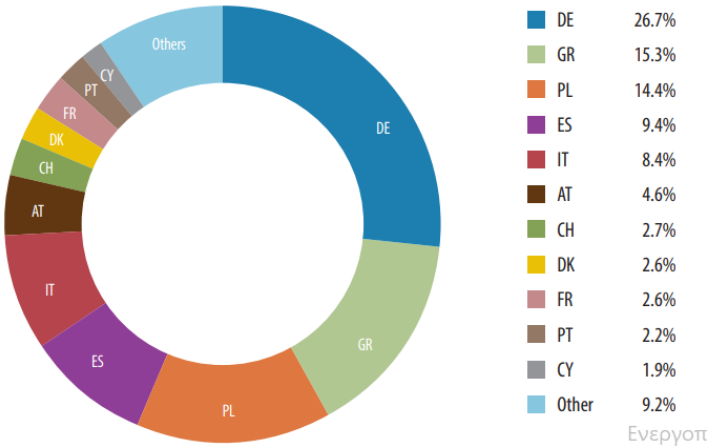
Examples of Companies for the Production of Energy Products & Systems

In order to realise the possibilities that exist for enhancing the domestic added value, we cite selected examples of companies that produce energy products and systems in Greece.

(a) Solar Thermal Systems

A very interesting example of domestic production of RES products, is the Greek industry for the production of solar thermal systems, which is one of the most competitive markets in Europe, demonstrating significant export activity. The Greek solar thermal industry exports more than 60% of its production worldwide, being the second largest market in Europe after Germany, as it holds 15.3% of the European solar thermal market in terms of new installed capacity in 2019 (Figure 5) [19].

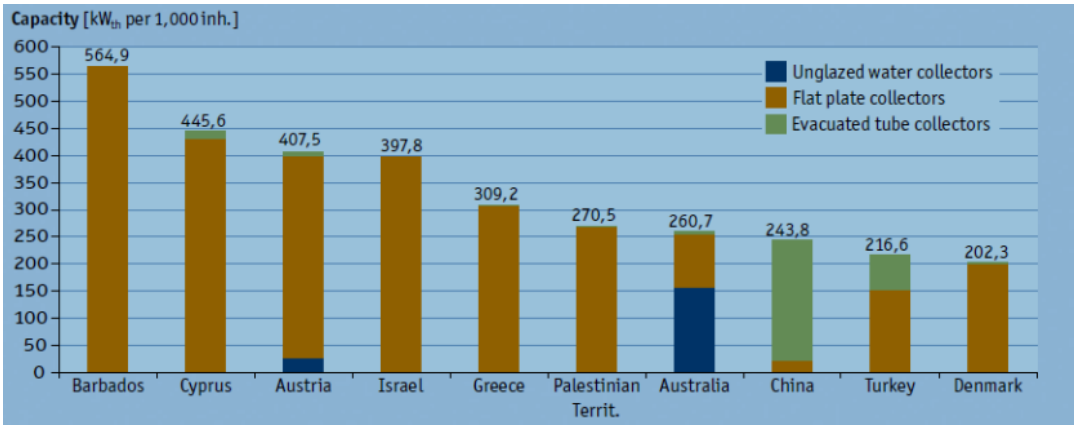
Figure 5: Shares of the European Solar Thermal Market (new installed capacity)



Source: EBIE

Greece was ranked 5th in the world relating to installed capacity of thermal solar panels per 1000 inhabitants in 2018 (Figure 6).

Figure 6: Top 10 countries of cumulated water collector installations per 1,000 inhabitants in 2018 (relative figures in KW_{th})



Source: EBIE

(b) Measuring Instruments

Leading companies are included in the field of production of measuring instruments in the Greek territory, which could dynamically support the projected rapid development of RES projects. Indicatively, the company METRON Energy Applications was founded in Greece in 1997 to offer complete construction solutions in the oil and gas industry. Since then, the company has grown rapidly nationally and internationally, participating in projects in more than 45 countries worldwide [20]. Also, the Greek subsidiary of Landis + Gyr, based in Corinth, produces high-tech industrial and domestic energy meters, which are available in almost 80

countries and its product range includes "smart" meters and related energy management products.

(c) Cables - Pipes

Another example of productive investment is the sector of Greek cables with the pioneering company HELLENIC CABLES SA. To develop great dynamics and be one of the largest cable production units in Europe. It has a strong export orientation and emphasis on the development of high value-added products, such as submarine cables and high and ultra-high voltage cables for offshore wind farms, power cables for onshore wind farms and solar projects, special solar cables for photovoltaic projects and for wind turbines that are resistant to stress [21].

The Greek steel pipe industry is also showing a remarkable course, with the main representative being CORINTH PIPEWORKS, which is one of the most important producers of steel pipes internationally for the transport of liquid and gaseous fuels (oil and natural gas). Its products are also used in energy transmission projects and large construction projects [22].

(d) Batteries - Storage Systems

SUNLIGHT is one of the leading companies in the global production of industrial batteries and energy storage systems, with exports to 100 countries and state-of-the-art facilities and factories in Greece, Italy and the US, heavily investing in R&D. The industrial battery production unit is located in Xanthi, where the emphasis is on lithium technology for the creation of energy storage systems [23].

The above examples of domestic industries in the energy sector are indicative of the important activities that have been developed in Greece in recent years, with the production of high-quality products. Most of these products are exported with great success, having gained a steady share of the international market. Both the extensive productive experience, as well as the accumulated knowledge and know-how in energy systems, make us optimistic that the right investment moves will be made in the context of an inspired national strategy. In the coming years, the energy industry could design and produce a wide range of domestic products and systems for use in wind turbines (e.g. metal tower), photovoltaic systems (e.g. panels, cables, columns), in biogas systems (e.g. tanks, metering stations), in concentrated

solar systems (e.g. mirrors), but also in energy consumption control systems (e.g. energy management systems).

10. The Crucial Role of Infrastructure and Construction in Energy Investments

Apart from the need to support the production of energy products and services through targeted investments, the role of infrastructure and constructions related to energy projects is equally serious.

In the context of the financial flows that will be raised from the RRF for the implementation of energy investments in the period 2021-2027, the role and potential contribution of Infrastructure and Construction is particularly critical.

The construction sector designs and implements a number of projects that contribute significantly to boosting the productivity of the economy. The capacity and efficiency of the sector greatly affect the time and quality of investments and in particular in the energy sector the implementation of civil engineering projects for RES projects and network upgrades.

According to a study by IOBE [24], the share of the construction sector in the total gross value added of the Greek economy was 1.4% in 2019 (EU-27: 5.4%) from 9.4% in 2006. Overall, the infrastructure and construction sector contributed 4.1% of the total gross value added of the Greek economy in 2019, compared to 13.2% in 2006. Taking into account the interconnections of the construction sector with other sectors in the Greek economy and the relative multiplier effects created by the activity of the sector, it is estimated that the total contribution of the Construction sector in terms of GDP amounted to approximately 7% of the country's GDP in 2019.

Given the wide value chain and the low dependence of the construction industry on imports, the strengthening of the construction activity and the implementation of the necessary infrastructure in the energy sector, will have strong multiplier effects in the whole economy and will help in the its rapid recovery. At the same time, the energy projects that will be implemented as required by the NRRP will contribute to the achievement of key policy objectives, e.g. energy savings, increased RES share. Energy projects support adapting to a new growth model, covering part of the country's investment gap and helping to increase the economy's productivity.

Table 7 presents the energy projects included in the NRRP that are related with the activity of the Infrastructure and Construction Industry. In total, for these projects, the funding budget is close to 3.25 billion euros.

Table 7: NRRP projects related to the Infrastructure and Construction Industry.

Projects	Budget (in mil. euro)
Support of the installation of storage systems to enhance RES penetration	450
Revitalisation actions of the most affected territories (Just Transition territories)	242
Interventions for the electricity interconnection of islands and the upgrading of the electricity network	195
HEDNO network upgrades	112
Energy renovation on residential buildings	1081
Energy and entrepreneurship	450
Energy upgrade of public sector buildings	200
Electromobility	220
Produc-E green	300
TOTAL	**3.250**

Source: National Recovery and Resilience Plan

11. Lack of Goals and Strategy

A key element of criticism in the Greek NRRP, in terms of its energy component, is the fact that no specific goals are set, nor is there a Strategic Plan for private investments, especially in the field of RES and energy efficiency. However, with the huge growth potential of the "green economy", we would expect to see ideas and goals aiming to strengthen the Greek production of systems and energy products that could be manufactured in Greece and channeled into the international value chain, creating new jobs and contributing to the acquisition of know-how. Not only is there no Strategic Plan, but there is no mention of this possibility either.

Such a debate is still lacking in the context of institutionalized government bodies (eg ESEK, Economic Policy Council). And yet with such large funds, a Strategic Investment Plan in Greek production is considered absolutely necessary. It is important that the Strategic Plan identifies

specific objectives and at the same time evaluates the economic, social and environmental benefits of private investment, as well as their national added value. It should also be noted that in the submitted NRRP there is no clear reference to job creation per investment category.

And yet, with so much money being invested in energy sector in such a short period of time, boosting the production process is a great opportunity to boost domestic production by creating a range of products, systems and related know-how. For this, NRRP as it has been presented so far, it lags tragically in terms of strategy in the field of productive investments.

Not unrelated to the need to support Greek production in the field of energy products and systems is the sustainability and the possibility of carrying out the desired RES projects. If the government really wants to double or even triple the current RES installed capacity in the country within the next decade - since only then will it be able to achieve its ambitious goals - it has to face a difficult and uphill course, but it does not seem to be prepared. The obstacles are continuous and have to do mainly with land use, demarcation and integration in the suburban fabric and in areas of high natural beauty or natura. Given the growing size of the various RES installations - mainly wind turbines - the relatively large areas now required (e.g. photovoltaic parks of hundreds of acres), the special management regarding the recycling of toxic fluids (e.g. geothermal, biogas) and the special licensing in many cases, will require the establishment of a dedicated staff body at national level that will be able to oversee and coordinate projects where needed.

Above all, however, the design and adoption of a special spatial plan that will cover most areas of the country that are considered suitable for RES facilities is required. Within the framework of this proposed special spatial plan there should be a suitable location for large wind projects and especially for offshore wind farms (open sea areas and rocky islets), large photovoltaic and solar thermal projects (solar tower), solar tower and geothermal installations.

Based on the above, the need for a parallel integrated strategic RES planning at national level is obvious, something that is currently lacking. In addition, we point out that both at ESEK level and within the NRRP, there is no forecast or reference to the need to develop the domestic RES industry, which if not developed will inevitably lead to a rapid increase in imports and give support to foreign industries.

12. Conclusions

Despite the shortcomings identified, the NRRP is an extremely useful, long-term and ambitious development plan. At the same time, it is particularly demanding in its implementation, which requires political will, observance of national and European rules, transparency, determination and commitment to goals. It is necessary to convert the investments and reforms envisaged in the NRPP into real projects, following specific budgets and narrow time milestones. However, if successfully implemented, it can positively affect the course of Greece by contributing to its dynamic reorganization towards an extroverted, competitive and new low-emission economic model, achieving an increase in real GDP (estimated at 7%) and creating 180,000 - 200,000 new jobs by 2026. But without strengthening the domestic productive base, especially in the field of RES and energy efficiency, by creating permanent jobs and acquiring new technical skills in the production, design and installation of integrated systems, there is no way to create the jobs mentioned above.

The main points of IENE regarding the NRRP can be summarized as follows:

- The link between the funding from NRRP and the other funding mechanisms, such as the new Multiannual Financial Framework 2021-2027, the Just Transition Fund and the ESPA 2021-2027, is not clear.
- There is no support for the domestic industry in the production of energy products and systems that could be manufactured in Greece (to tackle the upcoming massive investments in RES, to show export activity, while creating new jobs and contributing to the acquisition of know-how). It is pointed out that according to the Hellenic Association of Photovoltaic Companies, the sector of production of energy products and components exceeds in job creation referring to the direct jobs created, compared to the operation and maintenance phase of RES projects.
- The lack of a Strategic Private Investment Plan is obvious, where specific goals are to be set and a clear reference to the contribution of energy investments to national added value and job creation is to be included.
- The important role of the infrastructure and construction sector in energy investments is recognized.
- The need for a comprehensive strategic RES planning at national level is identified, including specific spatial planning for RES.

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