

Uluslararası Sosyal Siyasal ve Mali Araştırmalar Dergisi**International Journal of Social, Political and Financial Researches**<https://dergipark.org.tr/tr/pub/ussmad>*Araştırma Makalesi/ Research Article***Türkiye's Potentials and Challenges in the Implementation of Green Industrial Policies***Türkiye'de Yeşil Sanayi Politikalarının Uygulanmasındaki Potansiyeller ve Zorluklar***Abdullah Önal^a**^aDr. Öğr. Üyesi, Kırklareli University, abduallah.onal@klu.edu.tr, 0000-0002-6659-9285**ARTICLE INFO****Article Received:** 17.08.2025**Article Accepted:** 06.10.2025**Keywords:** Green Industrial Policies, GIP, Green Jobs, Renewable Energy**JEL Codes:** J0, J2, O3, Q3**ABSTRACT**

Among many environmental issues, carbon emissions from fossil fuels can be a major concern, and this study will assess this in the context of renewable energy, although not in all its aspects due to the limitations of this article. The Green Industrial Policy (GIP) is emerging as a solution. In this context, Türkiye, a developing country, will be used as an example, and the advantages and strengths of implementing green policies will be discussed. This is due to the lack of a comprehensive national document covering all programs, incentives, and legal regulations that could address the problems and opportunities in this sector; instead, there are scattered documents from various government institutions. It will be argued that the main challenges for Türkiye are the bureaucratic structure, legal framework, and oversight in terms of capacity and stability. Furthermore, the most significant potential areas are renewable energy, green jobs, electric vehicles, and market opportunities for capturing international competition. While there are other challenges and benefits, the main ones are discussed in the article.

MAKALE BİLGİSİ**Makale Gönderim Tarihi:** 17.08.2025**Makale Kabul Tarihi:** 06.10.2025**Anahtar Kelimeler:** Yeşil Endüstriyel Politikalar, GIP, Yeşil İşler, Yenilenebilir Enerji**JEL Kodları:** J0, J2, O3, Q3

Dünyadaki kirlilik, küresel ısınma, ozon tabakasının incilmesi, karbon emisyonu vb. çevre ve iklim krizleri, ülkeleri çözüm arayışına itmiştir. Türkiye için fosil yakıtlara dayalı karbon emisyonları başlıca önemli sorun olabilir ve bu çalışmada, bir makalenin sınırları nedeniyle tüm yönleriyle olmasa da yenilenebilir enerji bağlamında ele alınacaktır. Yeşil Endüstri Politikası (GIP) bunlara bir çözüm olarak ortaya çıkmaktadır. Bu bağlamda, gelişmekte olan bir ülke olarak Türkiye bir örnek olarak ele alınacak ve yeşil politikaların uygulanması durumunda avantaj ve güçlü yönleri tartışılacaktır. Çünkü bu sektördeki sorunları ve olanakları değerlendirebilecek tüm programları, teşvikleri ve yasal düzenlemeleri kapsayan bütüncül bir ulusal belge yoktur, bunun yerine çeşitli devlet kurumlarından dağınık belgeler bulunmaktadır. Türkiye için başlıca zorlukların bürokratik yapı, yasal zemin ve kapasite ve istikrar açısından denetim olduğu ileri sürülecektir. Ayrıca, ön plana çıkan potansiyeller yenilenebilir enerji, yeşil işler, elektrikli araçlar ve uluslararası rekabeti yakalamak için pazar fırsatlarıdır. Bu bağlamda başka zorluklar ve faydalar da bulunmakla birlikte, makalede başlıcaları ele alınmaktadır.

Introduction

As environmental problems increasingly shape economic development, a move towards the green industry is required (Altenburg&Assmann, 2017, p. 11). Policies based on green growth are financially good for countries, provide a start in the context of new technological developments, the opportunity to adapt to global economic competition, generate certain employment areas, and many developing countries participate in a "green race" in this sense (Steer, 2013 cited in Rodrik, 2014, p. 473). In this regard, GIP, which puts green growth requiring green technologies on its agenda, can be considered as a multi-faceted new growth perspective that aims to reduce climate change effects and - in the long term, stop and reverse it-sustainability of resources, reduce greenhouse gas emissions, and reduce costs in this way, and so put the responsibility on governments to prepare suitable conditions for green-based investments (Rodrik, 2014, p. 469).

The role of governments in developing countries will be decisive. Mainly, GIP includes a reference to the government (Karp & Stevenson, 2012, p. 1). Since, Government initiatives to change the shape of an economy are referred to as industrial policies (Altenburg & Assmann, 2017, s. 2). Governments may help eliminate market failures, provide incentives to the private sector, and make investments in sectors where profitability is uncertain (Karp & Steveson, 2012, p. 1-3), and green budgeting (Kete, 2022). So, governments can generate very lucrative opportunities (Schmitz et al, 2015). Again, public subsidies based on the green industry, taking into account market failures, are about the mispricing of carbon and a gap in investment in technologies (Rodrik, 2014, s. 470). Governments may also see this as an opportunity to gain competitive power on a global scale and prefer to bear the costs. Legal regulation, subsidies and grants, tax reductions, public investment, Feed-In Tariff, standard-setting, and compulsory biofuels are some examples of government implementation in GIP (Aydogdu, 2021, p. 61).

There are some key principles that can be put on the agenda of governments for achieving their goals. Embeddedness, including the coordination and cooperation of the government with the stakeholders, discipline, including the visibility of the actions with specific goals and roadmap, and accountability, including the awareness of being responsible to everyone rather than the interests of narrow groups, are seen as success criteria (Rodrik, 2014, p. 483-9). For the GIP, the fundamental approach is that national green growth strategies may benefit both the environment and the economy (Herman, 2021). In this regard, "catch-up, renewable energy innovation, technological and national innovation systems, green industrial policy" is the foreground for developing countries (Herman, 2021, p. 10).

1. GIP in Türkiye: A Historical Background

Firstly, the issue has been on the table in Türkiye, particularly between 1985 and 1989 (Türkiye's Fifth Development Plan) (Kusat, 2013, p. 4897). Although this emphasis was maintained in the seventh and sixth development plans (1990-94), it was not fully covered in the eighth development plan (Kusat, 2013, p. 4909). Türkiye has established a goal in the ninth plan (2007-2013) to implement environmentally friendly techniques in the industry and private sector participation in environmental investments (DPT, 2006).

The phrase "green growth" is used for the first time in the tenth development plan and expresses one of the main focuses of transformation in the manufacturing industry is green technology and production; the green production capacity should be increased, and environmental standards in production should ensure competitiveness and environment-friendly (DM, 2013, p. 89-138). Since governments need to strike a balance between environmental requirements and the reality of competitiveness (Altenburg & Assmann, 2017, p. 17). In the eleventh, the green growth trend continues, and the emission rise tendency is restricted, and it is aimed that assistance and incentives will be offered to 'Green Port Practices' to boost energy and efficiency in ports (SBDB, 2019). The goals for the green industry are more dominant in the eleventh development plan.

Although not a holistic GIP, in particular, a general framework can be drawn despite the lack of studies measuring how well the targets set in the last-term plans have been implemented; in the plans of five-to-eight: preparing the legal ground for harmonisation with international standards and in the nine-to-eleven plans: smart technologies and renewable energy are at the forefront (Celikyay, 2021, p. 202). The primary policy papers that emerge based on this background are as follows: Development Plans, National Environmental Strategy, Turkish Industrial Policy, Türkiye Industrial Strategy Document, and Turkish Machinery Sector Strategy Document are available in this area and give a scattered appearance (Ustunisik, 2014). And the legislation: Environment Law, the Turkish Penal Code, the Energy Efficiency Law, and the Use of Renewable Energy Resources for Electricity Generation (Ustunisik, 2014). Based on these documents, some incentives and applications have also been started.

Incentives such as tax exemption, income tax reduction (40% investment contribution rate), insurance premium support (for 7 years), interest or profit share support (5 points for Turkish Lira, 2 points for foreign currency), and investment location-allocation are applied (Aydogdu, 2021, p. 68). Again, grants from development

agencies for this area have particular budgets (Aydogdu, 2021, p. 70). In light of the GIP, the government has begun creating laws, a grading scale, and identifying the areas' potential to construct Green Organized Industrial Zones (Duru, 2020). The establishment of the first started 2 months ago (Dunya, 2022). In addition, the Renewable Energy Resource Areas procedure was started, and tenders for location determination and production facility establishment were completed (Aydogdu, 2021, p. 62). Although it is not possible to talk about a holistic GIP in general, advantages such as Türkiye's renewable energy potential and problems such as the disorganisation of the institutional structure and the fragmentation of the legal basis come to the fore.

1.1. Green in Türkiye's Current Agenda

When it comes to today, it is seen that many ministries have published different policy documents due to the increase in interest in the green industry.

'Green Organized Industrial Zones' that meet their energy and have high resource efficiency will be implemented, a national economy action plan will be prepared, and electric vehicles will be manufactured (MTF, 2021). Similarly, Türkiye emphasises in its International Direct Investment Strategy (2021-2023) that supplier infrastructure should be aligned with the Sustainable Development Goals and the European Green Consensus (IO, 2021). Again, in the New Economy Program (2021-2023), Public-Private Sector-Universities cooperation is set as a target (MTF, 2020). In the Green Deal Action Plan, carbon-related regulations, cheap and secure energy supply, and smart transportation occur in the plan (MC, 2021). Despite the different reports and objectives, there have been several general developments in GIP.

2. Challenges and Potentials in Türkiye

Natural and human resource efficiency, the creation of new business lines and opportunities, and the development of new products and markets are common advantages for Türkiye (Ates&Ates, 2015:91). In this context, targeting activities of public support; determining the incentives and measuring whether they are successful; the capability of the policy administrator the bureaucratic structure; the relationship between the institution maintaining the incentive and the private sector explain how the policies will be implemented are important (Rodrik, 2006, p. 114-6).

2.1. Challenges

In general, the challenges are the fragmented bureaucratic structure, and the lack of legal regulation, audit, and stability.

2.1.1. Capacity: Laws, Bureaucratic Structure

Making legal regulations and applying them after they are made constitutes a critical pillar of the GIP. For example, with the Integrated Pollution Prevention and Control Law in the Textile Sector in 2011, a legal regulation was made in the textile sector in the context of the green industry approach (ON, 2011). Furthermore, Türkiye has not made much progress regarding laws on industrial pollution (Apak&Atay, 2013, p. 250). So, due to the lack of legal supervision, there were shortcomings in its implementation, and amendments to this law were planned (Ministry of Commerce, 2021).

Effective use of all public intervention tools in all sectors is essential for developing countries such as Türkiye. It has always been more than the market mechanism can achieve with the intervention of the bureaucracy and the price mechanism (Erdogmus, 2016, p. 12). Here, it can refer to the competence of the bureaucratic structure (Rodrik, 2007). However, Türkiye has also made no substantial development in terms of "administrative capacity" (Apak & Atay, 2013, p. 250). Due to the system's complexity, the legislation under the control of the administration cannot function (Saygin & Yamak, 2018). So, "administrative and law capability is vital for the regulation formulation, application, and compliance (Pegels & Becker, 2014, p. 42). However, although there are some legal regulations in Türkiye, it is possible to go beyond the law because of inadequacies in inspections and populist practices (Kete, 2021, p. 106).

2.1.2. Audit and State-Market Relations

The deficit of public scrutiny in applying and oversight of environmental laws, rules, and standards also allows firms to conduct arbitrary actions in Türkiye (Ates & Ates, 2015, p. 89). The fragmentation of the bureaucratic system is one of the fundamental causes behind this. For example, even each of the policy documents mentioned in the previous section has been published by different ministries. Nevertheless, these classic bureaucratic problems can be overcome with "appropriate institutional design" (Rodrik, 2008). Relatedly, there can be a high level of coordination and a platform between institutions, NGOs and Private Sector stakeholders, as in South

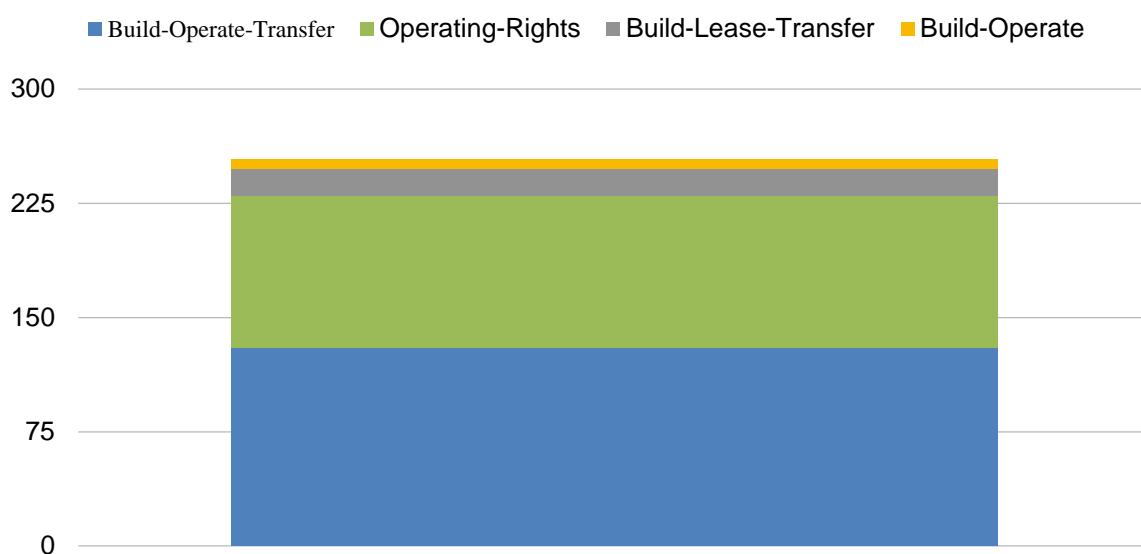
Korea and Mexico (Ates & Ates, 2015, p. 88). Here, "institutions" are needed for the healthy communication of bureaucrats with the private sector (Rodrik, 2008, p. 28).

2.1.3. Public-Private Partnership and Serving Narrow Interests of the Groups

Investments based on public-private cooperation in Türkiye are frequently used by the government (DM, 2018) and have reached approximately 156 billion dollars so far (PPPKG, 2022). These projects are realised according to the distribution shown in the table below. It can be stated that the legal regulations in this area have not been finalised and the studies on this issue are continuing (SBDB, 2019).

Among these projects, by far the most significant part belongs to the energy sector (Chart 1) (SBDB, 2021). The established industries can establish better relations due to the established order of the governments (Baldwin & Robert-Nicoud, 2007 cited in). Moreover, in specific contexts, governments may exchange information with the private sector to effectively use public investments without any privileged group (Warwick, 2013, p. 22). However, incentives should not serve the interests of narrow groups (Rodrik, 2014). It is more like that the usability of industrial policies as a method of transferring income to those who are politically close (Rodrik, 2008, p. 31).

Chart 1: Energy Sectors



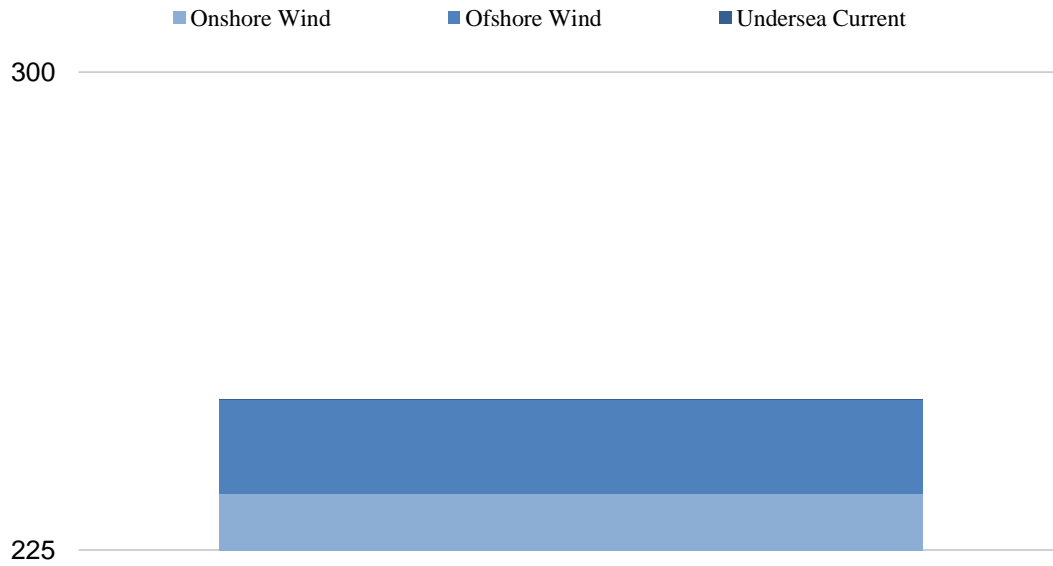
Source: (SBDB, 2021)

The policies in this area can be suggested to be the state's policy rather than government policy (Kusat, 2013, p. 4913). The fact that the state rather than the government owns projects may also prohibit only certain people from benefiting from incentives in the context of the green industry policies. Structuring rules and regulations and removing bureaucratic barriers are other requirements in this industry (Kayisoglu & Diken, 2019, p. 65). So, it is possible to say that cooperation is essential, and the government acts in cooperation with the private sector.

2.1.4. External Dependency

The fact that the technology required for green production is not homegrown is an issue (Yilmaz, 2014, p. 128). In both equipment and energy, reducing reliance on foreign sources is a priority stressed in growth plans (Yilmaz, 2014, p. 93). Foreign dependency in this area is also a severe burden on the economy (Cevikalp, 2019, p. 68).

Chart 2: Total Hydrogen Potential with Wind Power (Mt)



Source: (Karayel et al., 2021a)

2.2. Potentials

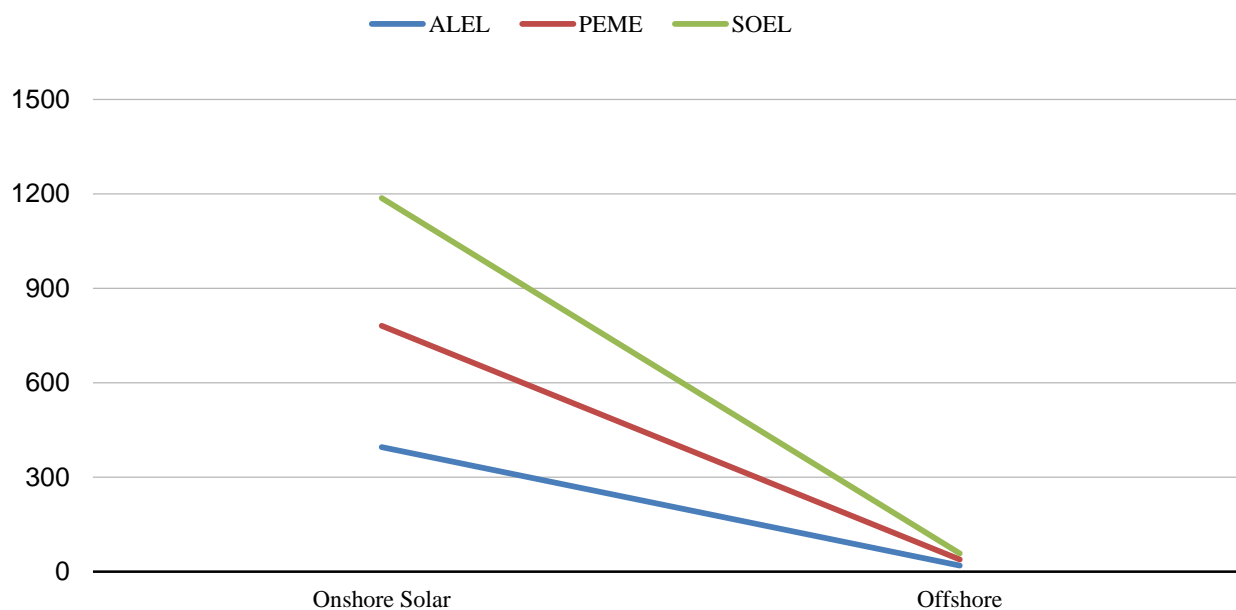
Green growth strategies can help developing nations catch up to the technological and policy frontier by increasing competitiveness in climatic and environmental innovations (Walz and Köhler 2014 cited in Herman, 2021, p. 16-7). Considering Türkiye's young population and dynamic economic structure, the steps to be taken within the "green growth" concept framework will contribute positively to the long-term course and competitive structure of the economy (Ates & Ates, 2015, p. 86).

In this regard, Türkiye's new electric vehicle project, TOGG can be an example of a chance for a developing nation that has missed previous technological revolutions to protect the environment while also participating in global competitiveness. Also, green jobs for the youth unemployed can be an opportunity.

2.2.2. Renewable Energy

Energy is a priority for the green industry, both for the environment and because it is the highest foreign dependency of Türkiye. Türkiye, with hydrogen production, can be the leader in the region, with 248.56 million tons with the wind (Chart 2) (Karayel et al., 2021a). Additionally, Türkiye is estimated to have 415.48-427.22 million tons of "hydrogen production potential with solar energy" depending on top of "depending on the type of electrolyser" (ALEL, PEME, SOLEL) (Chart 3) (Karayel et al., 2021b).

According to studies, "hydroelectric energy" has a significant role in pushing nations into leading in the industry of "green hydrogen" generation (Karayel et al., 2022).

Chart 3: Hydrogen Production Potential With Solar Energy Depending On Top Of "Depending On The Type Of Electrolyser

Source: (Kareyel et. al., 2021b)

In this context, "Türkiye's hydro-based green hydrogen production potential is estimated to be 2.26 megatons" (Karayel et al., 2022, p. 1). So, Wind energy is advantageous in terms of total installation cost and operating, and maintenance costs, and the most prominent investments in Türkiye are in the field of wind and solar energy generation (Kete, 2021, p. 116). According to an analysis, investing in renewable energy in Türkiye in order of wind, hydraulic, solar, geothermal and biomass; will give the optimum result in terms of technical, economic, environmental and social aspects (Kete, 2021, p. 123). When it comes to incentives, in addition to public-private sector investments in renewable energy, the government has provided an 85 per cent discount incentive for all land fees for the first ten years for private enterprises investing as of 2020 (Kete, 2021, p. 101).

The results show that investments in renewable energy, especially wind and solar energy, have advanced significantly, and by 2023, the proportion of renewable energy in overall electricity generation had increased to 41.73% (Karakus, 2024). In addition, it should be emphasized that green technological innovations have an important role in reducing Türkiye's ecological footprint and promoting sustainable economic growth (Ozkan et al., 2023). The potential of the carbon price to lessen environmental effects is its most important function, in addition to its ability to generate cash. According to a modelling research, incentives to use fewer fossil fuels will result in a 17% reduction in total CO₂ emissions by 2030, reaching 722.6 million tonnes (Kolsuz & Yeldan, 2017, p. 1247).

2.2.3. Türkiye's Automobile Joint Venture Group (TOGG): A Chance To Compete With The Global Market

As a developing country, Türkiye has not been able to catch up with its previous technological revolutions. In this context, it is not among the countries of the fourth period, namely the "Age of Oil, the Automobile and Mass Production" (Tevez, 2009, p. 190). Lewis (2014) recognised industrial policy rivalry as a new component in international green development models, particularly in the context of electric car incentives (Herman, 2021, p. 14). In this context, Türkiye launched the TOGG initiative in 2018 to produce electric vehicles.

The cars will be produced by a joint venture between the public and private sectors, and it is expected to contribute \$50 billion to the budget and provide 20,000 jobs (Invest, 2020, s. 3). It is possible to say that general coordination problem are not seen in the case of TOGG. It will also reduce Türkiye's energy engines and emission rates (Dailysabah, 2020). Since most of Türkiye's energy demand and gas emissions are from the transportation sector (Kete, 2020, p. 68).

Additionally, the study comes to the conclusion that although the growth rate of BEV ownership is substantially faster than that of ICEV ownership, TBEVs will drastically change how long it takes for the Turkish market to reach saturation, exhibit a faster adoption rate than conventional vehicles, and give policymakers crucial information for strategic planning (Alatawneh & Ghunaim, 2024).

Therefore, TOGG can be considered as a development in line with the idea of transition to a green industry, which Türkiye has announced in its policy and strategy documents. The government from this initiative expects that it will be the pioneer in the green industry in Türkiye (TRT, 2022). Additionally, this case is an excellent example of embeddedness. Again, it is evident that the developments in this field will produce new employment areas that can be evaluated within the scope of green jobs.

2.2.4. Green Jobs

As the green industrial sectors grow, employment opportunities will also increase. Once it is considered that Türkiye is one of the countries which have the high youth unemployment rate in OECD (OECD, 2022), it can be understood better the importance of the new employment possibilities. Especially for developing countries such as Türkiye, there are serious new employment opportunities in new energy and business lines, and it is expected that these opportunities will increasingly continue (Ates & Ates, 2015, p. 86). In this respect, it seems meaningful to invest in renewable energy resources such as a zero-carbon wind power plant, which is expected to significantly increase employment (Kete, 2020, p. 65). Renewable energy, construction, industry and transportation, sustainable agriculture, tourism and forestry, and other environmental services are sectors for potential jobs (Uner, 2017, p. 109). For example, the positive effect of solar energy systems on employment is supported by an additional increase of 50,000 people in 2017 (Guner, 2018, p. 6). In the context of the green industry, it is stated that 2,229,534 jobs can be created by 2030 in Türkiye (Yilmaz, 2014, p. 58). There are government incentives for green jobs as well as environmental reforms, tax credits and subsidies (Uner, 2017, p. 109). Green jobs can be viewed as a significant possibility for a country dealing with an issue such as youth unemployment for Türkiye.

The emphasis on green jobs in Türkiye is increasing. The 11th development plan, in particular, emphasized the importance of green jobs within the context of environmental adaptation. In fact, it's safe to say that this emphasis has been increasing in all development plans as we approach the present day. In parallel with this emphasis, it's worth noting that the share of green jobs in overall employment is steadily increasing (Basol, 2018, p. 82).

2.2.5. Market Opportunities

The share of developing countries in the renewable energy market is growing in parallel with the growth of the market (REN21 2017 cited in Altenburg & Assmann, 2017, p. 8). The EU's Green Deal will impact Europe's competitive manufacturing circumstances; hence Türkiye pursues harmonisation measures (TEA, 2021, p. 24). So, Türkiye has the potential for product standards compliance with the EU, regional advantage (Customs Union agreement with the EU), high port capacity, and excellent logistical services (TEA, 2021, p. 125). For example, It has a significant advantage in the field of safe and sustainable food, with a 4-season climate and fertile agricultural lands (TEA, 2021, p. 113).

Türkiye's sustainable branding is strengthened by TOGG's "local, clean, and digital" image. These byproducts are expected to create new job possibilities as well as new maintenance and charging networks. Additionally, the European Union's Green Deal framework presents chances for innovative battery and sensor technology products. Together, all computers could offer substantial benefits for breaking into the European market after internal combustion engines are outlawed in 2035.

Conclusion

Although Türkiye has some challenges, it also has some advantages. Problems such as the lack of legal basis and the disorganisation of the bureaucratic structure appear as the main problems. In addition, the inability to distribute incentives in this field at the desired level or the lack of equal opportunities in this field is another problem. In addition, renewable energy sources have potential for innovations such as electric vehicle production and green jobs. It is also seen that the developments in this field have a serious potential for Türkiye. In the context of the developments in the green industry in the world, Türkiye has significant advantages in terms of both producing policies that take care of the environment and catching up with the competition in the world.

There will be major effects on the economy and environment from the implementation of Türkiye's Green Industrial Policy. Ecological footprints can be decreased and economic growth can be increased at the same time by implementing sustainable practices and green technologies. Through the creation of jobs and the encouragement of new sectors through increasing investments in renewable energy, green technology advances can boost economic growth. Additionally, carbon taxes might create new streams of funding for the government. Ensuring that the environmental effects of economic expansion are offset is the goal of green industrial policy.

In the light of all these, a holistic legal arrangement and a central institution to maintain all policies are the main recommendations of this study. This institution will be able to combine the separate regulations of each ministry under a single coordination. This institution will also be able to transform the scattered policy documents into a national strategy and assume a supervisory role.

AUTHOR STATEMENT

Research and Publication Ethics Statement: This study was prepared in accordance with the rules of scientific research and publication ethics.

Ethics Committee Approval: This study does not require ethics committee approval as it does not include analyses that require ethics committee approval.

Author Contributions: The contribution of the author is 100%.

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Appendixes

Figures	Reference	Source
Figure 1. Public-Private Projects	TR Strategy and Budget Department	https://koi.sbb.gov.tr/Main_EN.aspx
Figure 2. Total Hydrogen Potential With Wind Power (Mt)	Karayel et al, 2021a	Karayel, G.K., Javani, N. and Dincer, I. (2021a) 'Green hydrogen production potential for Türkiye with solar energy', <i>International journal of hydrogen energy</i> , pp.1-10
Figure 3. Total Hydrogen Production with Solar	Karayel et al, 2021b	Karayel, G.K., Javani, N. and Dincer, I. (2021b) 'Green hydrogen production potential for Türkiye with solar energy', <i>International journal of hydrogen energy</i> , pp.1-11