



Financing the Energy Transition in Turkey

About SHURA Energy Transition Center

SHURA Energy Transition Center, founded by the European Climate Foundation (ECF), Agora Energiewende and Istanbul Policy Center (IPC) at Sabancı University, contributes to decarbonisation of the energy sector via an innovative energy transition platform. It caters to the need for a sustainable and broadly recognized platform for discussions on technological, economic, and policy aspects of Turkey's energy sector. SHURA supports the debate on the transition to a low-carbon energy system through energy efficiency and renewable energy by using fact-based analysis and the best available data. Taking into account all relevant perspectives by a multitude of stakeholders, it contributes to an enhanced understanding of the economic potential, technical feasibility, and the relevant policy tools for this transition.

Authors

Yael Taranto (SHURA Energy Transition Center) and Gülay Dinçel (Economist/Senior Consultant). Doğa Can Oruçoğlu and Engin Kiral contributed to the report as consultant.

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For further information or to provide feedback, please contact the SHURA team at info@shura.org.tr

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Energy Transition and Financing in the World

The pressing need to limit the adverse effects of climate change and ensure sustainable growth calls for accelerating global energy transition. The key developments that support energy transition for a sustainable future are the ongoing decline in renewable energy costs, improvements in energy efficiency, widespread electrification powered with renewables, the spread of “smart” technologies, the continuous nature of technological innovation, and inclusive policies that provide direction to all of these developments.

The share of energy investments in the total global fixed capital investments in 2018 was around 10% while the share of energy investments in the gross world product (GWP) was just above 2%. In the medium to long term, including in scenarios where current energy policies are maintained, it is estimated that annual energy investments will exceed the average investment amounts of the last two decades. This will create a need for significant additional finance. Within this context, it is of paramount importance to understand the investment and financing needs for enabling a transition to a low-carbon energy system.

Global investments in the energy sector reached US\$ 1.8 trillion by the end of 2018. Around half of this amount was spent for investments in energy transition. Factors contributing to this are the continuing reduction in the costs of solar and wind energy, policies that support renewable energy resources, transition to market-based policy mechanisms, such as auctions, and technology innovation. In addition, as renewable energy technologies are becoming more mature, financial institutions are more comfortable in financing projects. Sources used for financing the global investments in renewable energy were public funding (10%), equity (39%), loans (50%), and grants and other forms of funding (1%). The development of new financing models and of innovative financial instruments is gaining importance in the energy transition debate.

Globally, general access to finance and financial deepening¹ have gained importance over the past thirty years. Nevertheless, medium- to long-term assets directed to infrastructure investments, including energy, have been limited. The savings of the private sector increased substantially over the same period, but were not directed to medium- to long-term investments at the same rate. More private savings allocated to energy transition investments will play a significant role in securing the necessary financing. Private companies and various funds control an amount of assets equivalent to those held by banks and bond markets, harnessing significant potential. In addition, private funds and financial instruments focusing on sustainability, climate financing, and low-carbon economy are growing and diversifying.

Investments in Turkey’s energy sector to meet the growing demand between 2002 and 2018

Turkey achieved a fast pace of growth in its economy at an annual average of 5.6% between 2002 and 2018. During the same period, total financing volume increased

¹ Financial deepening is defined as an increase and diversification in financial services and the development of capital market instruments in addition to traditional financial instruments, such as bank loans.

by tenfold, reaching US\$563 billion. Bank loans were used to finance 40% of all fixed capital investments, which include energy sector investments.

While total energy demand increased by more than 90% from 2002 to 2018, both energy investments and energy imports have also increased to meet the rising demand. The share of the private sector in electricity generation rose from 32% in 2002 to 75% by the end of 2018. Investors and financial institutions have developed their capacity in project feasibility with the support of stakeholders including public institutions, international financial institutions and technology companies while policymakers enabled a great transformation in the implementation of an efficient market mechanism from design to operation. As of June 2019, the total installed electricity generation capacity reached 90.4 gigawatts (GW). Renewables account for slightly less than half of this total. Support mechanisms, especially the Renewable Energy Sources Support Mechanism (YEKDEM), were effective in increasing the total installed renewable energy capacity. According to the data from the Ministry of Energy and Natural Resources, primary energy intensity decreased by 23.1% between 2000 and 2015, corresponding to an average annual improvement of 1.65%.

The period between 2002 and 2018 saw many critical changes in energy markets, a strong improvement in gross domestic product, and a resulting boost in energy demand, which led to a significant increase in energy investments during the same period. The gross investment in “electricity, gas, steam and air conditioning production and distribution” in the same period was nearly US\$110 billion. In addition, US\$10 billion was invested for improving energy efficiency.

Investments in renewable energy, including hydropower, accounted for 53% of the US\$75 billion invested in power generation capacity between 2002 and 2018. The share of borrowing in renewable energy investments is estimated to be between 65% and 70%, slightly above the average of 60%-65% in the energy sector in general. While the share of renewables in the total power generation investments was 40% from 2002 to 2009, it has increased to 58% during the 2010-2018 period. Hydropower had the highest share in renewable energy investments from 2002 to 2009. Starting from 2010, the share of wind and solar energy has increased.

Investment and financing landscape in the Turkish energy sector

Between 2007 and 2018, the share of the energy sector investments in all fixed capital investments was 2.3% in Turkey. Against this background, the energy sector's share in total bank loans was 7%. The share in medium- to long-term loans was higher at 10%. The higher share in financing, compared to investments, indicates that the rate of borrowing in the energy sector is higher than in other sectors. Local and international financial institutions were the primary source of financing in energy investments between 2004 and 2018. By the end of 2018, the financing provided by local banks to the energy sector reached US\$45.4 billion, including non-cash loans, while international financial institutions provided US\$12 billion in loans to private energy investments. The total outstanding loans of the energy sector are currently around US\$57.4 billion. Of this total, US\$45 billion consists of medium- to long-term loans.

The ratio of loans to total investments in the energy sector is estimated to be around 60%, compared to an average of around 40% for fixed investments in all sectors. The ratio of loans to total energy transition investments is between 60% and 65%. The

share of loans in renewable energy investments is between 67% and 72% while their share in energy efficiency investments is between 43% and 55%.

Multilateral development finance institutions and international export finance institutions have played a leading part in financing Turkey's energy transition in the past years. Multilateral development finance institutions have critically contributed to the policy framework at the beginning of the transition process, and have guided domestic financial institutions in developing project appraisal capacity. Multilateral development finance institutions have not only directly financed the investments of energy companies and public enterprises, but also provided funds through Turkey's local banks.

The second largest source of financing was country loans provided by international export finance institutions collaborating with technology suppliers in their respective countries. The financing provided by these institutions under the guarantorship of local banks or by joint financing started to increase once renewable energy incentives were initiated and the institutional capacity of local banks was improved.

Besides utilizing their own untied funds, local financial institutions, especially development banks and public and private commercial banks, have obtained funds from international financial markets through syndicated loans and bond issues, in addition to those obtained from international development finance institutions and export credit agencies. In addition, leasing institutions are beginning to emerge as an alternative to banks for unlicensed solar energy projects, while/as participation banks, which have access to alternative funding sources, began to play a more active part.

A critical change, led by the market mechanism, occurred in the structure of the energy sector in Turkey in the period between 2002 and 2018. Based on the prevailing needs and priorities, a significant wealth of experience was accumulated on both national and international levels regarding volume, source diversity and financing models in the financing of energy sector investments. However, with the value of the Turkish Lira starting to decrease more rapidly since the middle of 2018, the uncertainty in Turkey's economy has increased.

Although the circumstantial regression led to a temporary interruption in the long-term planning of the energy sector, new needs and priorities have arisen from the energy transition perspective. In order to overcome the difficulties inherited from the previous period and make headway in the energy transition, financing options must be thoroughly evaluated; financing sources must be diversified alongside the opportunities offered by new technologies; and innovative financing models must be developed.

The objective and scope of this study

The objective of the SHURA Energy Transition Center's new study, titled "Financing the Energy Transition in Turkey", is to evaluate the need for financing renewable energy and energy efficiency investments in Turkey, and to develop recommendations for financial institutions, investors and the public sector in enabling a more sustainable investment environment. Specifically, the study focuses on:

- Presenting global trends in financing the energy transition by identifying opportunities, challenges and successful examples;

- Determining the investment and financing needs for Turkey's energy transition, and identifying financing options;
- Developing action areas for diversifying and expanding financial resources suitable for energy transition investments;
- Developing action areas for the public sector, financial institutions and investors on how effective models for energy transition financing can be developed and implemented.

As part of this study, SHURA contacted around 100 stakeholders, including financial institutions, energy companies, technology suppliers, consultancy companies, industrial companies, sector institutions and public institutions, and carried out around 40 one-on-one interviews. Among the interviewed stakeholders, 47% are national and international financial institutions, 19% energy companies, 17% national and international consultancy companies, 11% energy technology suppliers, and 6% energy-intensive industrial companies.

The interviewed financial institutions accounted for 55%-65% of the financing in energy investments in Turkey between 2002 and 2018, representing around three-quarters of the financing of renewable energy investments. The interviewed energy companies accounted for 20%-25% of the total energy investments and 25%-30% of the total renewable energy investments. At the same time, they represented 40%-45% of all investments in Turkey's electricity distribution system. The leading energy technology suppliers that were interviewed for this study are also among the largest global players and have a share of more than 60% in Turkey's total energy investments.

The current status of energy transition financing in Turkey

A summary of the consultations with the international financial institutions, local banks, energy companies, and technology and consultancy companies are provided in the following table:

Taking into account stakeholder evaluations, the current situation in financing renewable energy investments between 2002 and 2018 is reviewed and analysed with respect to the effectiveness of investments, policies and legislations, as well as the financing conditions. In terms of the effectiveness of investments, improvements in the security of energy supply, the liberalization of energy markets, the share of renewables, and the level of institutionalization achieved by the private sector in the energy industry show that the transition process is successful overall. However, there are opportunities to improve in continuing to reduce import dependency, and thereby alleviate the current account deficit caused by energy imports, to build long-term strategies and improve predictability in generation from renewables, and to develop more market-based mechanisms for renewables.

In terms of the effectiveness of the regulatory framework, an extensive experience and capacity have been built through the design and implementation of the YEKDEM, Renewable Energy Resource Areas (YEKA), and pre-license auctions. As a result, the level of Turkey's competency in the renewable energy regulatory framework can be considered consistent with international practices as the framework has fulfilled Turkey's needs in the energy sector so far. Mechanisms offering long-term purchase and price guarantees, especially the YEKDEM, have facilitated the availability of long-term financing. However, areas for improvement exist, such as in the market

effectiveness and feasibility of pre-license auctions, and in designing more effective policies concerning local content requirements.

International Financial Institutions	Local Banks	Energy Companies	Technology and Consultancy Companies
Renewable energy			
<ul style="list-style-type: none"> • Development of energy markets • Capacity development of energy companies and domestic financial institutions in project appraisal skills • Effective policy mechanisms • Need for more weight to be given to financing options when considering policy design • Need for ensuring full liberalization of the market 	<ul style="list-style-type: none"> • More access to foreign/ international sources in financing energy investments • Diversification of financing sources for loan-based financing and longer maturities • Institutional capacity development in the energy sector • Policy mechanisms that provide predictability • Fewer problems faced in financing renewable energy investments • Risks created by macroeconomic volatility 	<ul style="list-style-type: none"> • Market development and opportunities for private players in the energy industry • Ensuring security of energy supply • Effective policy mechanisms • Increased financing availability • Increased generation from renewables • Macroeconomic uncertainties • Need for full liberalization of the market • Need for eliminating policy mechanism gaps and lack of long-term public strategy 	<ul style="list-style-type: none"> • Poor range of borrowing instruments other than loans for renewable energy financing • Need to develop export finance options to encourage domestic production of energy equipment
Energy efficiency			
<ul style="list-style-type: none"> • Large industry-led development in energy efficiency investments • Insufficiency of SMEs and building applications • Lack of energy efficiency focus and capacity in domestic financial institutions 	<ul style="list-style-type: none"> • Energy efficiency investments do not have a financing category of their own • Lack of focus; inadequacy of separately specialized products • Lack of specific and segregated data and difficulty in assessing current financing portfolio • Due to lack of specific focus, few studies performed regarding risks, guarantee structures and other issues 	<ul style="list-style-type: none"> • Focus on electricity generation; improvement of power plants • Low interest except for limited distribution network improvement investments 	<ul style="list-style-type: none"> • Energy efficiency consultancy dominated by Efficiency Enhancement Projects and energy surveys provided by strong technology and engineering companies for the investments of large industrial companies • Inadequate energy efficiency data segregated by segment and type of investment; slow progress in measurement and verification standards and institutional development

With regard to financing conditions for renewables, positive factors pertaining to this period were the access to substantially large, long-term foreign financing, and the roles played by development finance institutions, international export credit institutions and local banks, whose effectiveness in finance has improved as more experience was gained. However, financing was mostly based on renewable energy support policies (especially the YEKDEM), and imperfections in the operation of energy markets have had a limiting effect. Financing was further limited by the inability to access alternative financing sources and models and by the lack of a policy framework specific to these alternative sources, as well as by the underdevelopment of capital markets. One other shortcoming identified with respect to this period is the lack of development of financing models and policy instruments for creating a distributed generation market.

Energy efficiency investments from 2002 to 2018 were dominated by large industrial companies, especially energy-intensive industries that produce bulk materials, such as primary metals, cement, glass, ceramics, and refinery products. Energy efficiency investments for buildings, or small- and medium-enterprises SMEs were relatively limited. In buildings, thermal insulation, particularly roof and window insulation, accounted for much of the investments. In transport, the commercial vehicle fleet has become younger, most notably due to scrap regulations. A significant portion of investments that resulted in energy efficiency was either a component of larger projects, or mostly financed by equity, as a result of which they were not reported as energy efficiency financing. The market for energy efficiency in general and for the specific case of energy service companies (ESCOs) are underdeveloped in comparison to the global trends.

Development finance institutions have provided considerable resources for energy efficiency projects in Turkey, funding investments by both large industrial companies and the SMEs. In addition to financing, development finance institutions contributed to institutional capacity building both for industrial enterprises and for domestic financial institutions in terms of defining energy efficiency as a concept and practice, performing/undertaking investment appraisal, and establishing a financing framework. In addition, funds have been provided for efforts to shape public policies. National development banks and local banks acted as liaisons to direct resources provided by international development finance institutions to SMEs. Local banks financed energy efficiency mostly by making available the resources provided by development finance institutions, and through consumer loans designed to utilize building insulation incentives.

Current/Key shortcomings include the lack of a separate category for energy efficiency investments and loans, the inadequacy of the regulations for financial institutions in recognizing savings made possible by energy efficiency as a loan guarantee, inadequacies regarding the status of energy efficiency consultancy firms (EEC) and ESCOs, and the low functionality of support mechanisms for energy efficiency. Completion of the legislation for an ESCO model for energy performance contracts (EPCs) is expected to enhance the progress achieved in this area. There is a need for a decisive action plan and a support mechanism to meet energy efficiency targets set for public buildings, which would serve as a pilot implementation case for future efforts in energy efficiency in the buildings sector. With respect to public buildings, information on building inventory needs to be improved, and budget design needs to encourage energy efficiency improvements. Stakeholders also highlighted the need for specific incentives for energy efficiency. Another issue that needs to be resolved to ensure

efficient planning, investment and financing is data restrictions regarding energy efficiency in buildings. Reliable data on the building stock and energy consumption are required to produce accurate assessments of the energy efficiency potential in buildings. In addition, there is a need to prioritize energy efficiency investments by sector (i.e., buildings, industry, etc.) and by region, and conduct socio-economic research and impact analyses for designing an effective support mechanism.

Expectations and prognoses for financing Turkey's energy investments: Stakeholder views

It is expected that energy transition investments, primarily those concerning renewable energy and energy efficiency, will continue despite the ongoing circumstantial difficulties. Although there are policy uncertainties and shortcomings, the current regulatory framework supports this expectation. Significant dynamics supporting energy transition investments are the declining costs of technologies, the higher predictability in renewable energy and the development potential in energy efficiency investments. The development potential for increased energy efficiency investments will be driven mainly by industrial enterprises seeking to lower costs to enhance their competitiveness and by the encouragement for energy efficiency in public and commercial buildings. Furthermore, as Turkey has a high savings deficit, the need to resort to foreign savings for investments makes foreign financing opportunities a determining factor. The expansion of resources committed to climate financing worldwide and Turkey's attractiveness for climate financing resources due to its scale, as well as the existence of a developed energy market and financial sector, indicate that the supply of financing will help increase energy transition investments. The expectations of stakeholders regarding renewable energy, distributed energy and energy efficiency are summarized in following table. Taking into account these expectations and prognoses will play a crucial role in the transition of Turkey's energy sector. Based on these expectations and the transition needs, an average annual investment of US\$5.3-7.0 billion is estimated for the period between 2019 and 2030, requiring a total average annual financing of US\$3.6-4.5 billion. These investments would put Turkey's energy sector on a pathway to supply half of its total electricity demand from renewables by 2030, as estimated in SHURA's grid integration study, and reach the national energy efficiency targets for 2023 with the annual improvement rates maintained till 2030. By comparison, in the period between 2002 and 2018, the annual average of energy investments was estimated to be US\$5.5-6 billion while more than half of this (US\$3-3.5 billion) was spent for energy transition. The financing needed for all energy sector investments in the same period was US\$3.5-4 billion annually, and US\$2 billion of this amount was for energy transition. As financing needs are estimated to increase significantly, it is predicted that 70% of the need will be met with conventional bank loans, while securities, venture/risk capital and other alternative investment instruments will be needed for the remaining 30%.

	International Financial Institutions	Local Banks	Energy Companies	Technology and Consultancy Companies
Renewable Energy	Continued expansion of climate financing sources linked to increase in commitments	Creating alternative funding sources with favorable terms and costs	Continued investment in solar and wind energy through Renewable Energy Source Areas (YEKA) and new, dynamic policy mechanisms	Development in the distributed system due to public policies and funding options
	High energy transition potential and financeability in Turkey	Expansion of the distributed system primarily in industrial and commercial buildings	Long-term power purchase contracts may be implemented with increased predictability	Revision of the local content requirement may expand financing options
	Continued investments in renewable energy	Personal/retail products may be developed for renewable energy investments if lower currency risk develops along with continued reduction in investment costs.	When stability improves, issuing thematic securities, such as green bonds, may become a key source of funding	
	Regulations that mitigate the problems in the current credit portfolio that are the result of macroeconomic fluctuation and market issues			
	More predictability in the energy industry through market mechanisms and long-term strategies			
	New technologies and innovative business models to improve access to alternative financing sources			
	Improving infrastructure to attract corporate investors			
Distributed Energy	Self-generation funding: High expectation for industry, commercial companies and public buildings (in the focus of banks and leasing companies)			
	Rooftop systems for residential/retail segments: Uncertainties; pilot studies considered			
	Investments based on joint ownership: Industrial Zones as a priority; shopping centers have high potential			
	Need for developing products for mitigating currency risk (capital expenditures in foreign currency, savings in TL)			
	Digitalization and demand side participation, demand management: inadequate perspective			
Reinforcing an integrated approach to renewable energy and energy efficiency				
Energy Efficiency	Availability of more resources for energy efficiency within the scope of climate financing	Improving measurement and verification standards	Developing evaluation as a new business field	Clarifying technical, legal and financial framework to develop a model based on energy service companies for energy efficiency investments; implementing pilot studies led by the public sector
	Development and pilot implementation of business and financing models that will accelerate energy efficiency investments	Specialization and capacity building in local banks for energy efficiency		
	High investment potential in both industry and buildings			
	Development of infrastructure for business and financing models aimed at energy efficiency investments			
	Stronger inclination to save energy based on macroeconomic developments and the increase in energy prices			

Five areas of action for effective energy transition financing

The actions and precautions necessary for securing the investment and financing needed for continuing the transition of Turkey's energy sector were grouped into action areas based on stakeholder consultations. Action areas were identified on the basis of the need to create additional financing sources and develop new financing models. While concentrating on the two main areas of energy transition, namely renewable energy and energy efficiency, the need for an integrated and medium to long term approach to energy transition as a whole is evident.

Energy transition must be considered within the framework of economic and industrial policies, together with climate change mitigation and adaptation policies. Reducing import dependency remains a crucial task in improving Turkey's trade balance. In addition, the energy transition perspective plays a unique role in keeping pace with the latest technology trends in the industry, services and energy sectors, thereby allowing for the utilization of the opportunities offered by energy the transition. Electrification of transport and a wider implementation of smart technologies will increase energy efficiency. This will also enable Turkey to rapidly adapt to the transformation in the global value chains in different sectors, ranging from electrical equipment to automotive vehicles, software and other services. This perspective overlaps with approach adopted in Turkey's 11th Development Plan released in July 2019. When assessing the need for investment and financing for energy transition, it must be kept in mind that energy transition is a capacity improvement that affects the entire economy and entails major changes in the energy infrastructure for decades to come. As a result, extensive studies on the direct and indirect economic and social impact of energy transition are needed. The five areas of action for facilitating energy transition financing, cross cutting finance, energy and related sectors, are summarized below:

- **Reinforcing the energy transition perspective and market mechanism**
 - Building a long-term energy transition strategy
 - Strengthening the regulatory role of the public sector in the energy market
 - Continuing policy development to support market deepening and improve financial predictability
 - Defining the role local governments can play in the energy transition; expanding investment and financing potential
- **Diversifying financing sources**
 - Creating a definition for energy transition, especially for energy efficiency specifically for financing
 - Establishing a public sector-led central fund where climate funds and packages are collected to ensure effective allocation of energy transition resources
 - Building a mechanism that will provide coordination among financial institutions, including the international ones, and facilitate harmonization with public policies
 - Developing policies and legislation from an energy transition perspective for venture capital, “crowdfunding” and other models aimed at securing funds from corporate investors other than financial institutions, and making use of international examples
- **Increasing energy efficiency financing**
 - Completing the efforts for determining the rules for energy efficiency applications
 - Creating a distinct definition for energy efficiency financing

- o Developing support mechanisms for finance suppliers in energy efficiency financing
- o Recognizing energy performance contracts as guarantees in financing
- o Establishing a mechanism similar to the Credit Guarantee Fund for providing guarantees for the financing of energy efficiency applications
- o Including energy efficiency investments for buildings in the scope of mortgages or providing the ground work for developing mortgage-like products
- **Developing renewable energy financing models**
 - o Developing support mechanisms for finance suppliers in renewable energy financing
 - o Defining renewable energy as a separate product
 - o Refinancing the current renewable energy portfolio
 - o Directing funds generated by the current renewable energy portfolio to new investments
- **Developing distributed renewable energy financing models**
 - o Creating a more directed public policy for distributed generation
 - o Creating resources specific to the financing of distributed renewable energy; and developing portfolio measurement capability
 - o Developing risk-mitigating products for rooftop systems; making insurance products more inclusive and including these alongside financing in investment packages
 - o Providing savings from losses in transmission and distribution lines, made possible by distributed generation, as an incentive for a few years.

About Istanbul Policy Center at the Sabanci University

Istanbul Policy Center (IPC) is a global policy research institution that specializes in key social and political issues ranging from democratization to climate change, transatlantic relations to conflict resolution and mediation. IPC organizes and conducts its research under three main clusters: The Istanbul Policy Center–Sabancı University–Stiftung Mercator Initiative, Democratization and Institutional Reform, and Conflict Resolution and Mediation. Since 2001, IPC has provided decision makers, opinion leaders, and other major stakeholders with objective analyses and innovative policy recommendations.

About European Climate Foundation

The European Climate Foundation (ECF) was established as a major philanthropic initiative to help Europe foster the development of a low-carbon society and play an even stronger international leadership role to mitigate climate change. The ECF seeks to address the “how” of the low-carbon transition in a non-ideological manner. In collaboration with its partners, the ECF contributes to the debate by highlighting key path dependencies and the implications of different options in this transition.

About Agora Energiewende

Agora Energiewende develops evidence-based and politically viable strategies for ensuring the success of the clean energy transition in Germany, Europe and the rest of the world. As a think tank and policy laboratory, Agora aims to share knowledge with stakeholders in the worlds of politics, business and academia while enabling a productive exchange of ideas. As a non-profit foundation primarily financed through philanthropic donations, Agora is not beholden to narrow corporate or political interests, but rather to its commitment to confronting climate change.



Evliya Çelebi Mh. Kibelezade
Sk. Eminbey Apt. No:16 K:3 D:4
34430 Beyoğlu / İstanbul
Tel: +90 212 243 21 90
E-mail: info@shura.org.tr
www.shura.org.tr

SHURA is founded by

İPM | IPC İSTANBUL POLİTİKALAR MERKEZİ
SABANCI ÜNİVERSİTESİ KAMPUSU
İSTANBUL POLICY CENTER
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