

# Financing the Energy Transition in Turkey

12th World Renewable Energy Technology Congress  
Virtual Forum

Plenary Session-1 Global Investment in Financing New  
Renewable Energy Efficient Projects

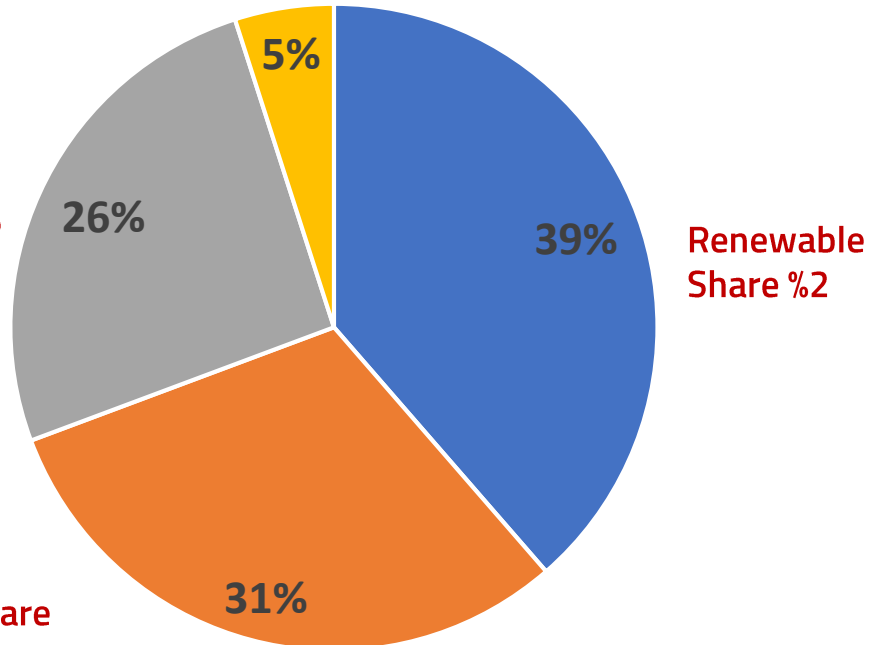
August 21, 2021

- A **transparent** platform working for Turkey's energy transition, with Turkey's priorities
- stimulating discussion on Turkey's energy sector
- **among all interested stakeholders**
- providing fact-based, unbiased and independent research and analysis,
- covering technology, economics and policies
- contributing to the debate on Turkey's energy transition

# End Use Energy Consumption and Outlook for Energy Transition in Turkey

Turkey's Primary Energy Consumption  
(109 Mtoe, 2019)

■ Manufacturing Industry ■ Buildings  
■ Transport ■ Agriculture and Others



Renewable Share  
0%

Renewable  
Share %2

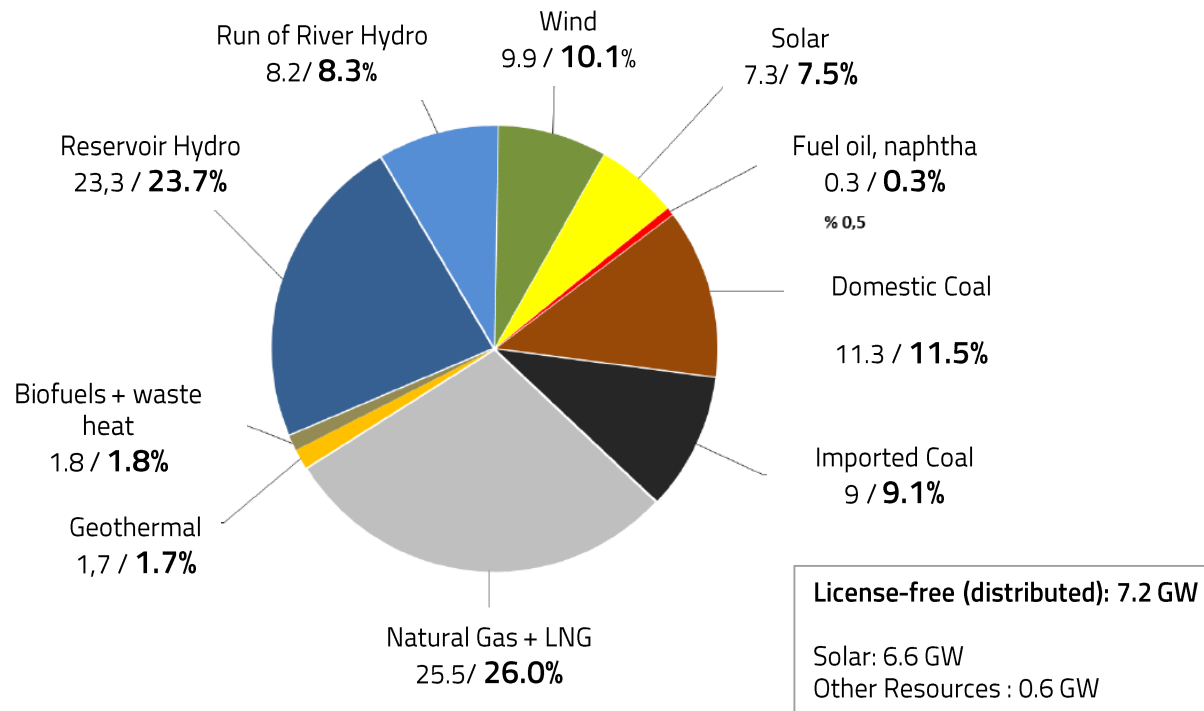
Renewable Share  
10%

**Imported fossil fuels constitute 78% of primary energy supply**

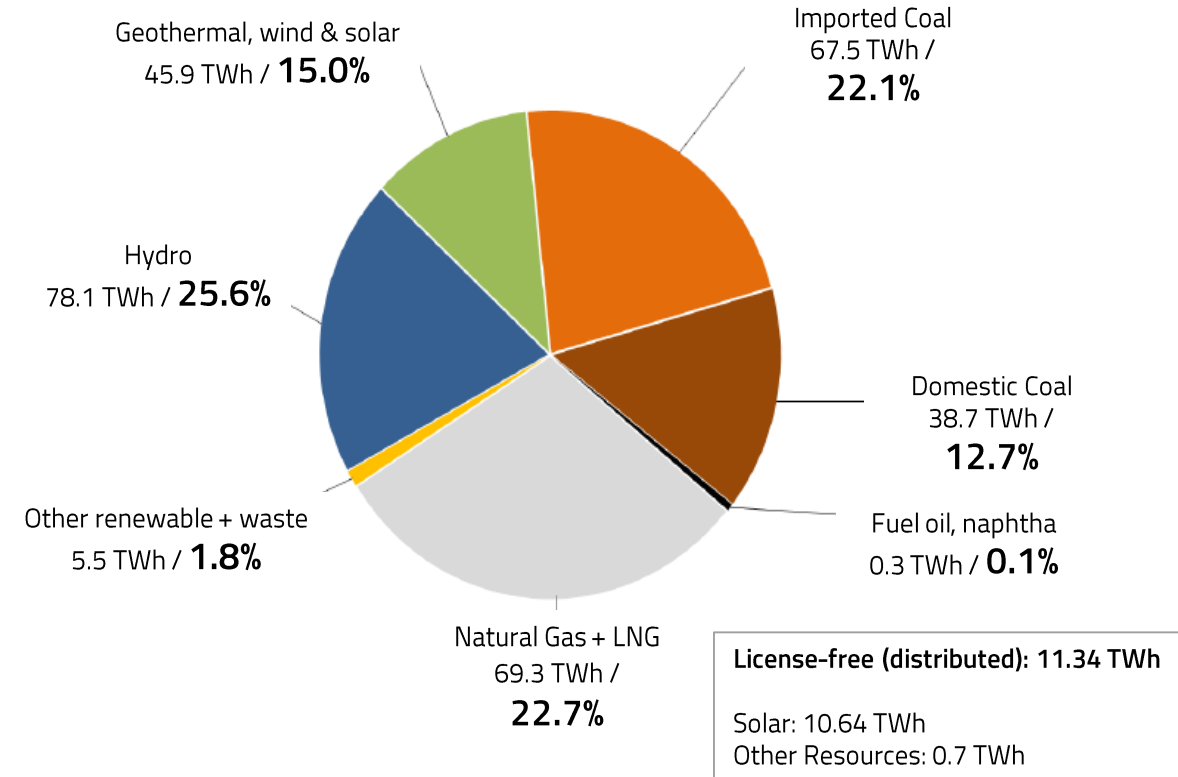
- **Power sector transformation underway**
  - ✓ Over 40% renewable share in power generation
  - ✓ Wind + solar share approaching 15%
  - ✓ Renewables constitute most of new generation capacity
- **Manufacturing sector- largest energy user**
  - ✓ Well-developed industrial sector- iron & steel, cement/glass/ceramics, textiles and chemicals/petrochemicals major energy consumers.
  - ✓ Low carbon energy use becoming a major factor for export competitiveness.
- **Buildings- rapidly growing energy consumption**
  - ✓ 9.1 million building stock, over 65% of population active natural gas users
  - ✓ 4 climate zones differing significantly in demand for space heating and cooling
- **Transport- transformative solutions required**
  - ✓ Largest user of oil products, 13 million passenger vehicles and growing
  - ✓ 2030 government vision: 1 million electric vehicles

# Turkey Power Sector Snapshot (2021/2020)

Installed Capacity (July 2021) (98.3 GW)



Total Generation (2020) (305.4 TWh/year)



Renewable resources represent about half of total generation.  
Share of solar + wind is around 12 percent.

# Key Messages

- **Renewable energy is becoming the most competitive option** for energy generation and the low carbon energy transition will be the key driver.
- **Climate financing sources** will retain their importance in financing renewable energy and the energy transition.
- Conventional resources such as bank loans and own-equity will be insufficient to meet increasing investment requirements; **equity financing and blended finance needs to play a larger role.**
- **Sustainability financing and green financial instruments will continue to grow.**
- **As small scale distributed renewable energy grows** new business models and new modes of finance will be required.
- **Post-Covid green recovery and the Green Deal is becoming the main paradigm for investments and financing.**

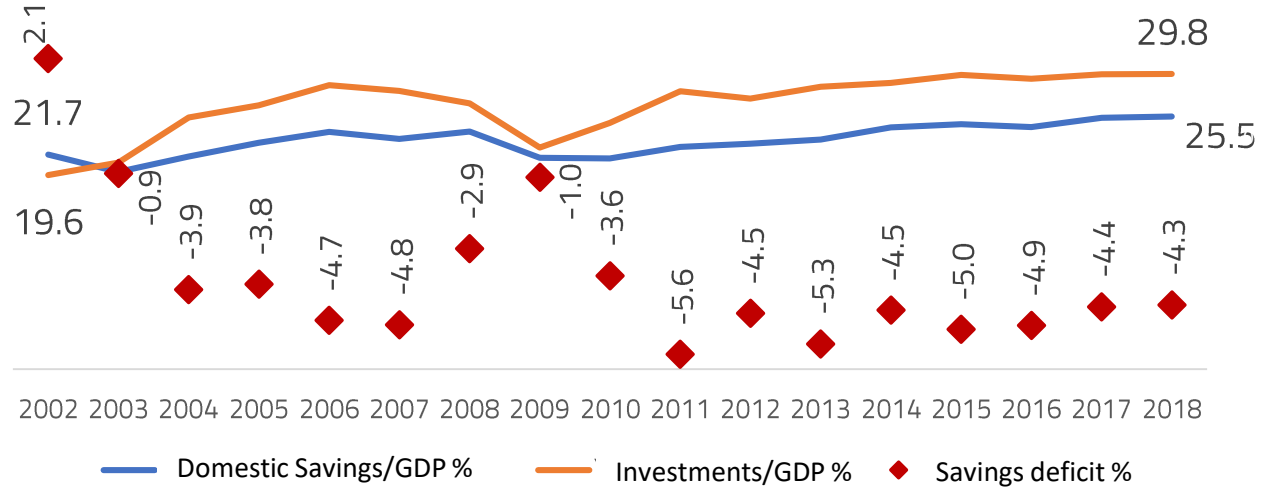
# Global Financing Environment for Energy Transition



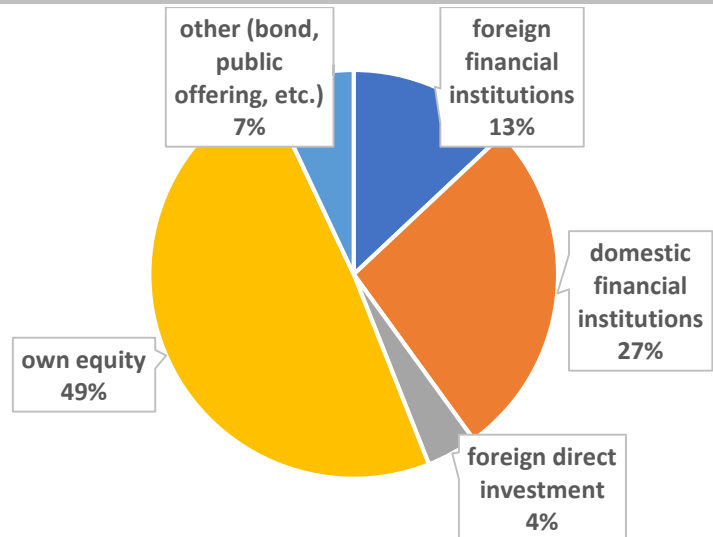
- **Over the past 30 years** with rapid growth in developing countries, increased globalization, enhanced role of the private sector and growth in private sector savings, access to financing and **financial deepening** increased.
- **Medium-long term financing available for infrastructure investment** needs unable to keep pace and **falling behind required levels**.
- Significant potential represented by about **80 trillion US\$ worth of assets held by institutional investors, private sector corporations and various funds**, comparable to those held by commercial banks and international bond markets
- Annual energy investments totaling **1.7-1.8 trillion dollars** constitute about 10 percent of global investments. **Renewable energy constitutes about half of all energy investments.**
- Achieving net zero emissions will require investment volume to increase by 2.5-3 fold.
- **Green financial instruments related to sustainability, climate finance, low-carbon economy are growing and diversifying.**

# Investments and Financing in Turkey

## Investment-Savings Balance



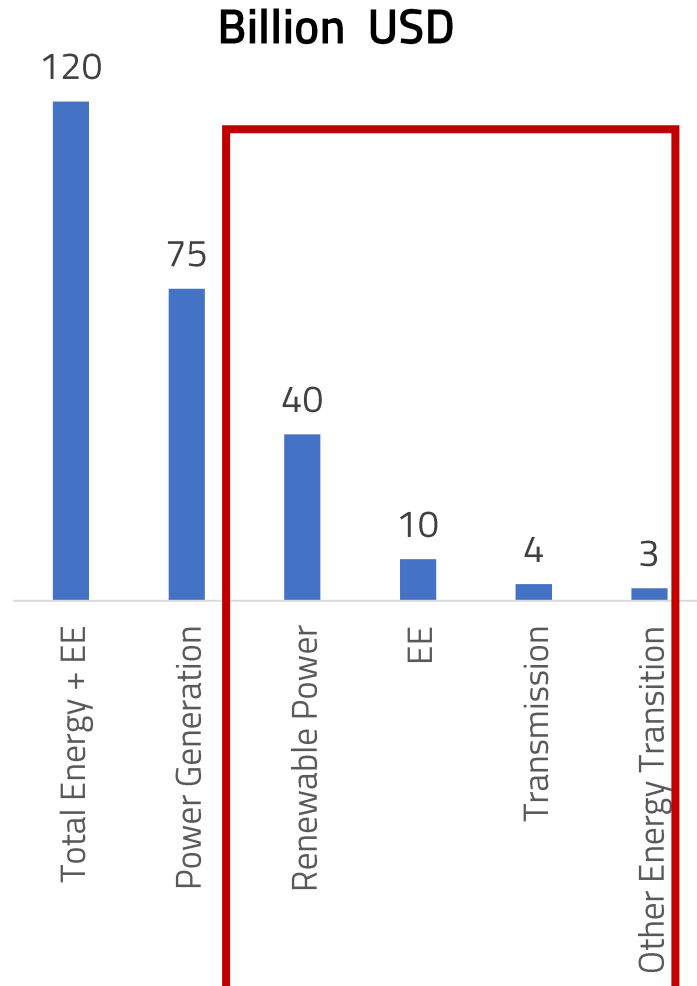
## Financing of Investments (2007-2018 Annual Average)



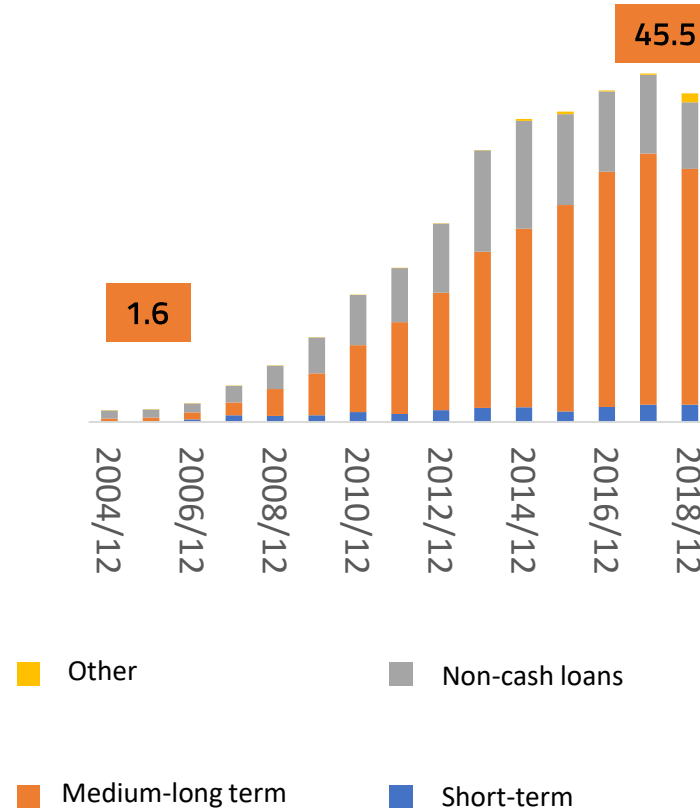
- Turkey has a domestic savings deficit, making it partially **reliant on foreign sources for financing of investments**.
- During 2007-2018 **the share of loans from banks for financing fixed investments totalling 225 billion USD is around 40%**.
- **The banking sector** plays a **dominant** role in financing investments.
- **Total financing volume increased ten-fold, reaching 563 billion USD, up from 56 billion USD.**
- Since 2018, macroeconomic difficulties posed by high private sector debt, economic slowdown, currency depreciation, and the Covid crisis .

# Energy Investments and Financing in Turkey

## Energy Investments (2002-2018)

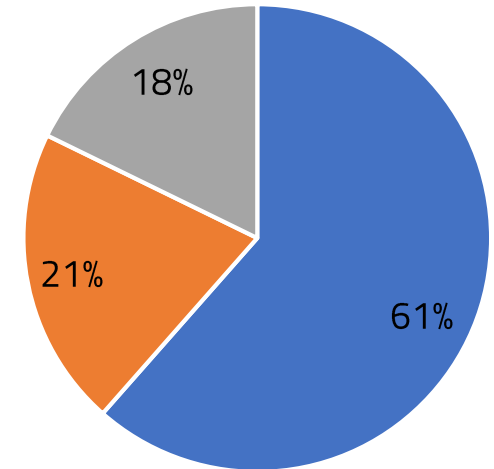


## Energy Sector Loans (2018)



## Sources of Loans

Loans by international development finance institutions and export credit agencies, disbursed by local banks (indirect foreign borrowing), played a pioneering role in financing the energy transition.



EE: Energy efficiency



# Energy Transition Finance: Renewable Energy



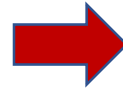
## Renewable Energy Financing by Provider %

International Development Finance Institutions	16
Export Credit Agencies	18
Other International Financial Institutions	13
Local Banks	48
Leasing Companies	3
Risk Capital	2

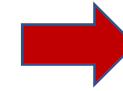
- Renewable energy constitutes one-third of total energy investments and **about 70% of energy transition investments.**
- **About 60% of energy financing is renewable energy.**
- Investments concentrated in hydro during 2002-2009 while **during 2010-2018, share of variable renewable energy like wind and solar increased.**

# Energy Transition Finance: Energy Efficiency

Energy Efficiency  
Investments  
(2002-2018)  
10.5 billion USD



Energy Efficiency  
Financing  
(2002-2018)  
4.5-5.5 billion USD



Debt /  
Investment  
% 43-% 55

## Energy Efficiency Financing by Provider%

International Development Finance Institutions	65
Other International Financial Institutions	10
Local Banks	20
Other	5

- Energy efficiency constitutes 9% of total energy investments and **18% energy transition investments**.
- **The ratio of energy efficiency financing to total energy financing is around 8-10%**
- **Energy efficiency finance is generally not recognized as a separate area,** investments may be part of other projects.

# Renewable Energy: Achievements and Areas for Improvement

## Investment Effectiveness

- **Achievements:** security of supply, institutional development of stakeholders, private sector development, rapid development and diversity of scale in renewable energy.
- **Areas for improvement:** reducing import dependency in energy resources, market based mechanisms, long-term strategy development in renewable energy.

## Policy/Legislation Effectiveness

- **Achievements:** extensive experience and capacity development in policy and regulation design, ability to develop new policy mechanisms (e.g. YEKDEM, YEKA).
- **Areas for improvement:** further policy development, especially with respect to integrating finance.

## Financing Conditions

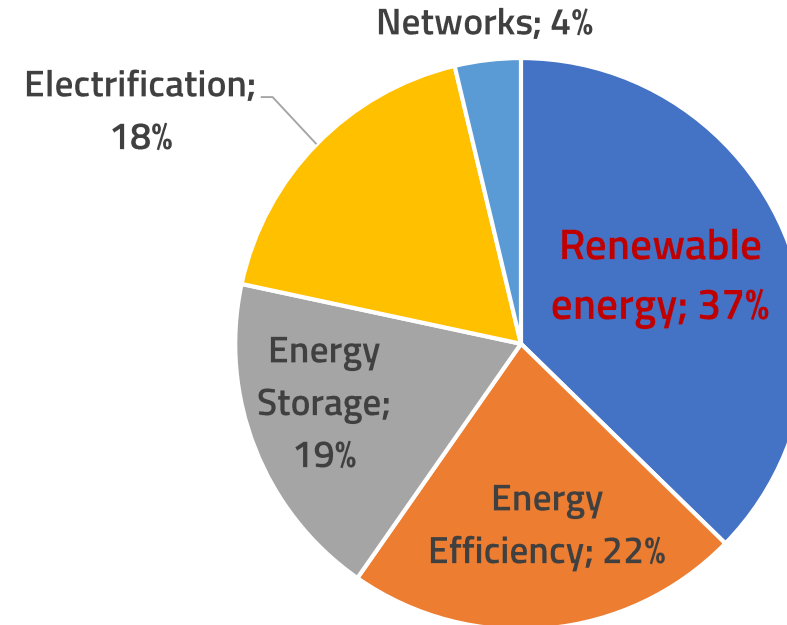
- **Achievements:** access to long-term international finance, policy enhancing role of international development finance institutions, effective collaboration between technology providers and ECAs, increased effectiveness of local banks.
- **Areas for improvement:** developing alternative financial resources and models and tools, developing specific financial tools for distributed renewable energy.

# Investment and Financing Needs for Energy Transition

## SHURA Transition Scenario 2030

- 50% share **renewable energy** share in power generation with 30% of the total from wind + solar
- Through **energy efficiency**, 10% savings in power consumption compared to the government baseline
- Increased **electrification** of transportation (mainly 2.5 million electric vehicles) and heating (mainly 2 million heat pumps for buildings)

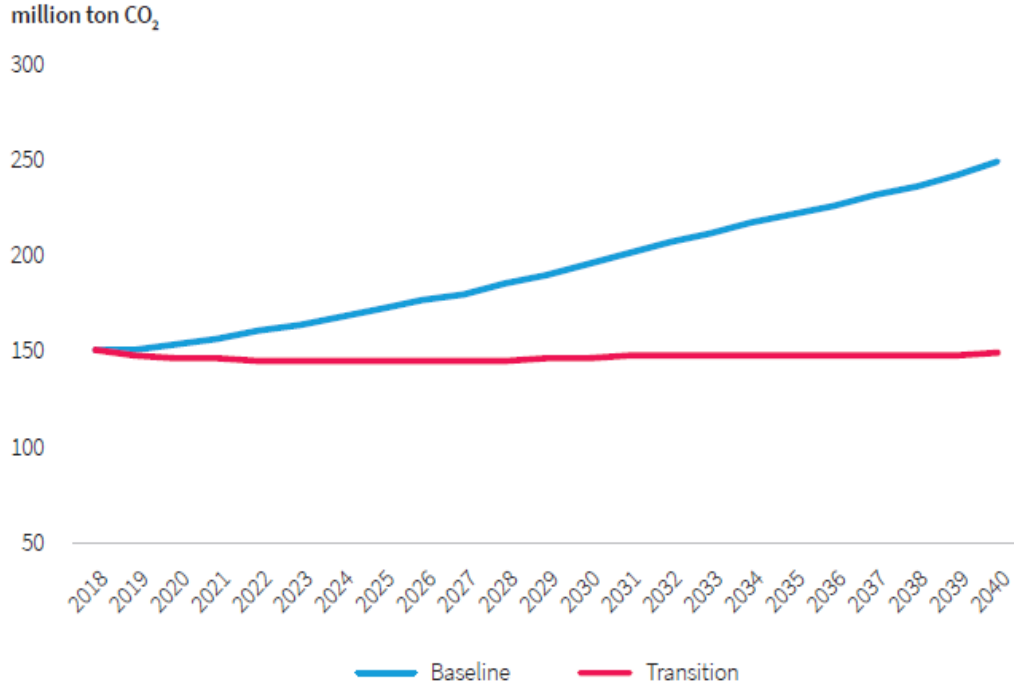
**Average Annual Investment required by 2030:  
12.3 billion US\$**



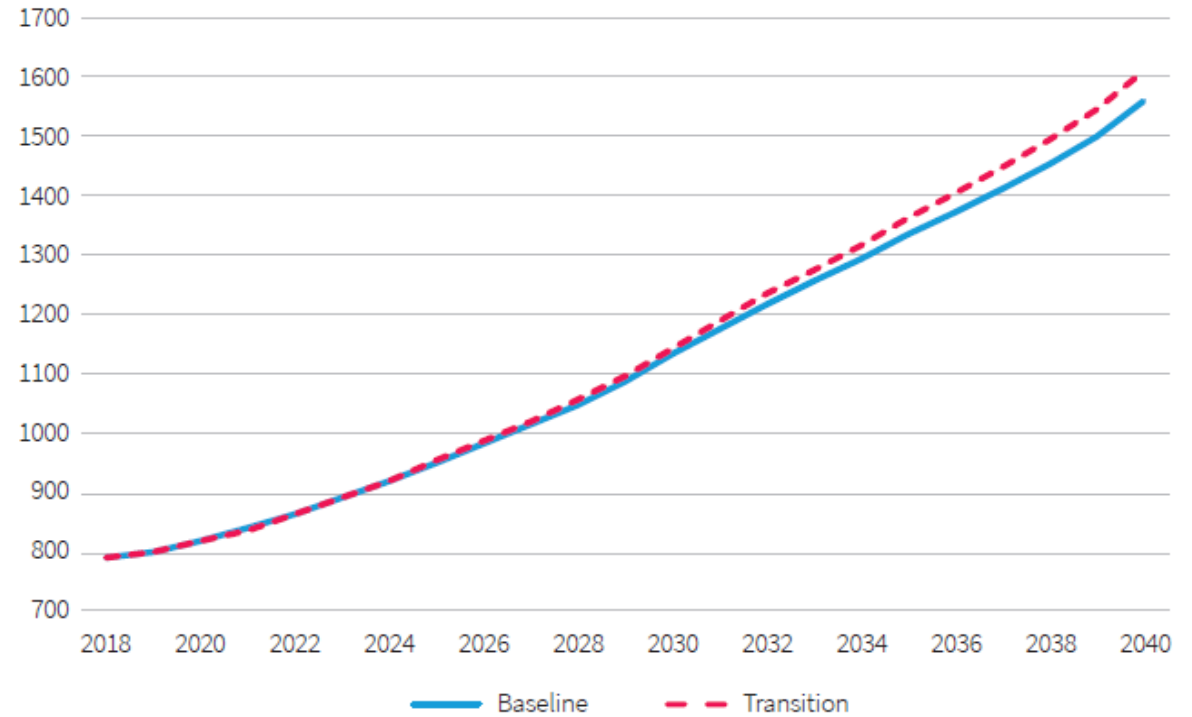
Average investment and financing needs are expected to double compared to the previous period.  
New sources of financing will need to be created to meet the increased requirement.

# The transition scenario provides an opportunity for enhanced economic growth as well as reduced emissions

**Figure 18:** Evolution of Electricity Sector CO<sub>2</sub> emissions across Baseline and Transition scenarios



GDP (Billions US\$, Fixed 2018 Prices)

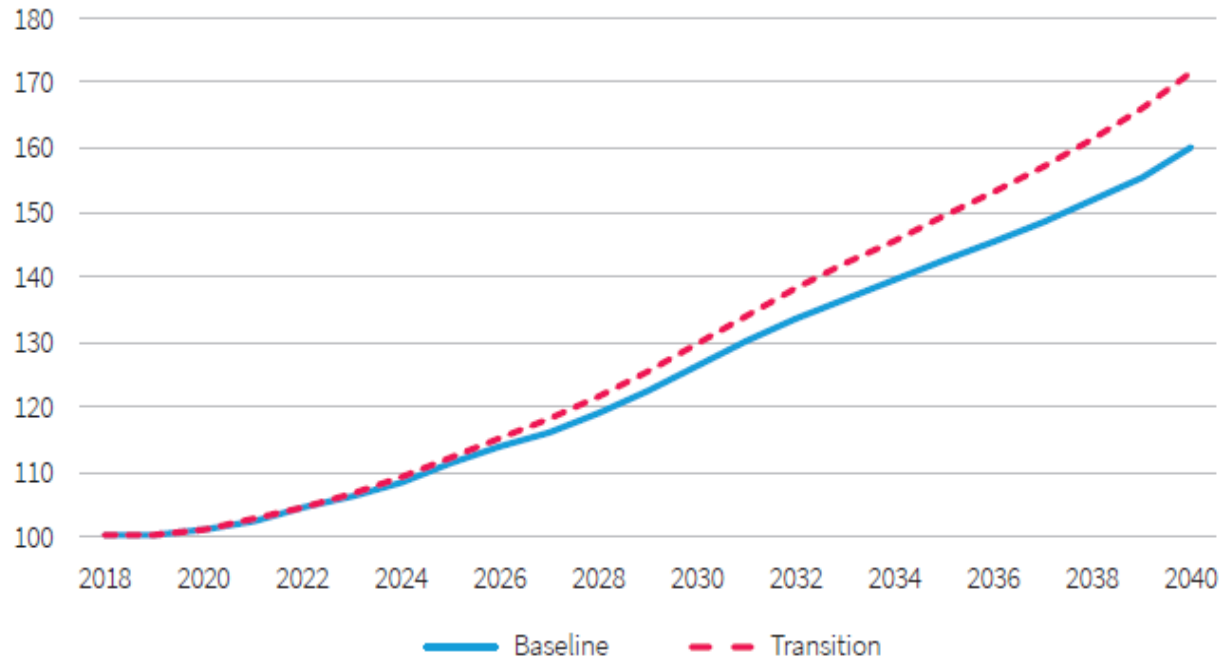


- ✓ **The transition scenario stops the growth in power sector carbon emissions.**
- ✓ To approach net zero carbon, **a new national vision with clear targets for 2030 and 2050** covering all consumption areas **is needed.**
- ✓ Global **green deal and green recovery** will form the basis for the new vision.

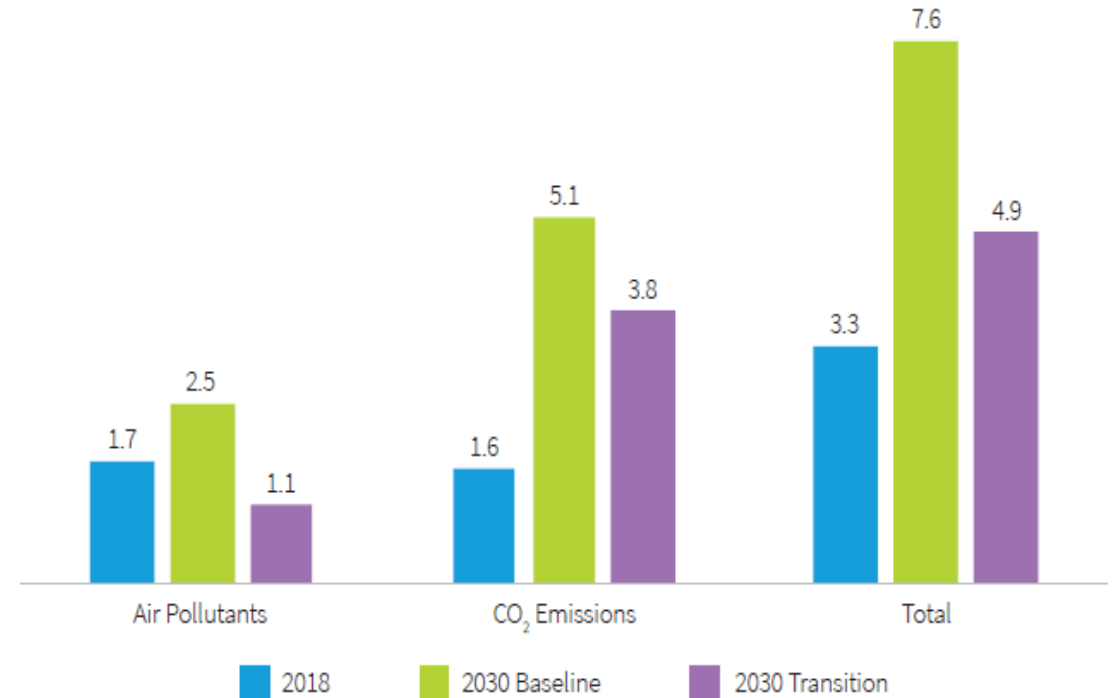
# The transition scenario provides significant economic benefits

**Figure 8:** Real wage Indexes across Baseline and Transition scenarios

(Billions US\$, Fixed 2018 Prices 2018=100)



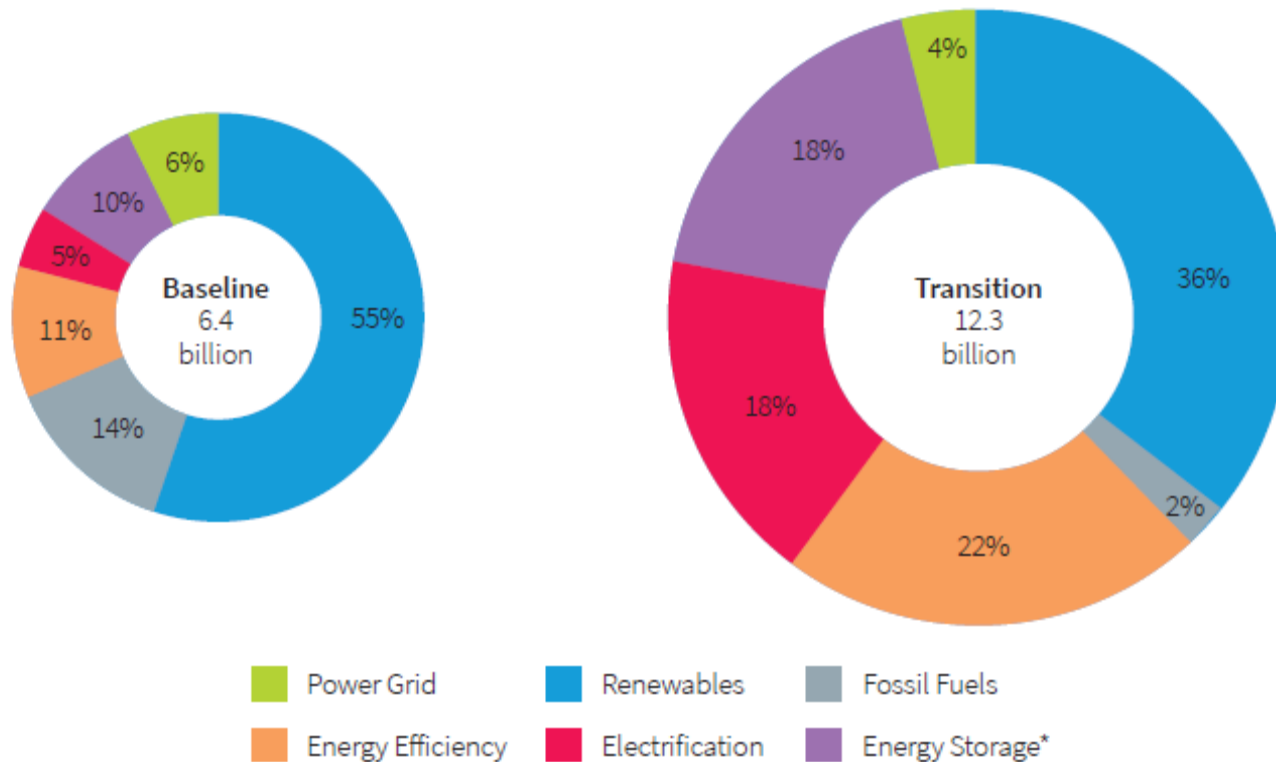
**Figure 17:** Externalities from Power Generation (billion US\$/year)



- ✓ Most pronounced impacts: external trade balance, industrial value added and social welfare.
- ✓ Gains on health and environment as well as higher skilled and better employment opportunities under the transition scenario contribute to social welfare.

# Cost-benefit of the transition; challenges and opportunities

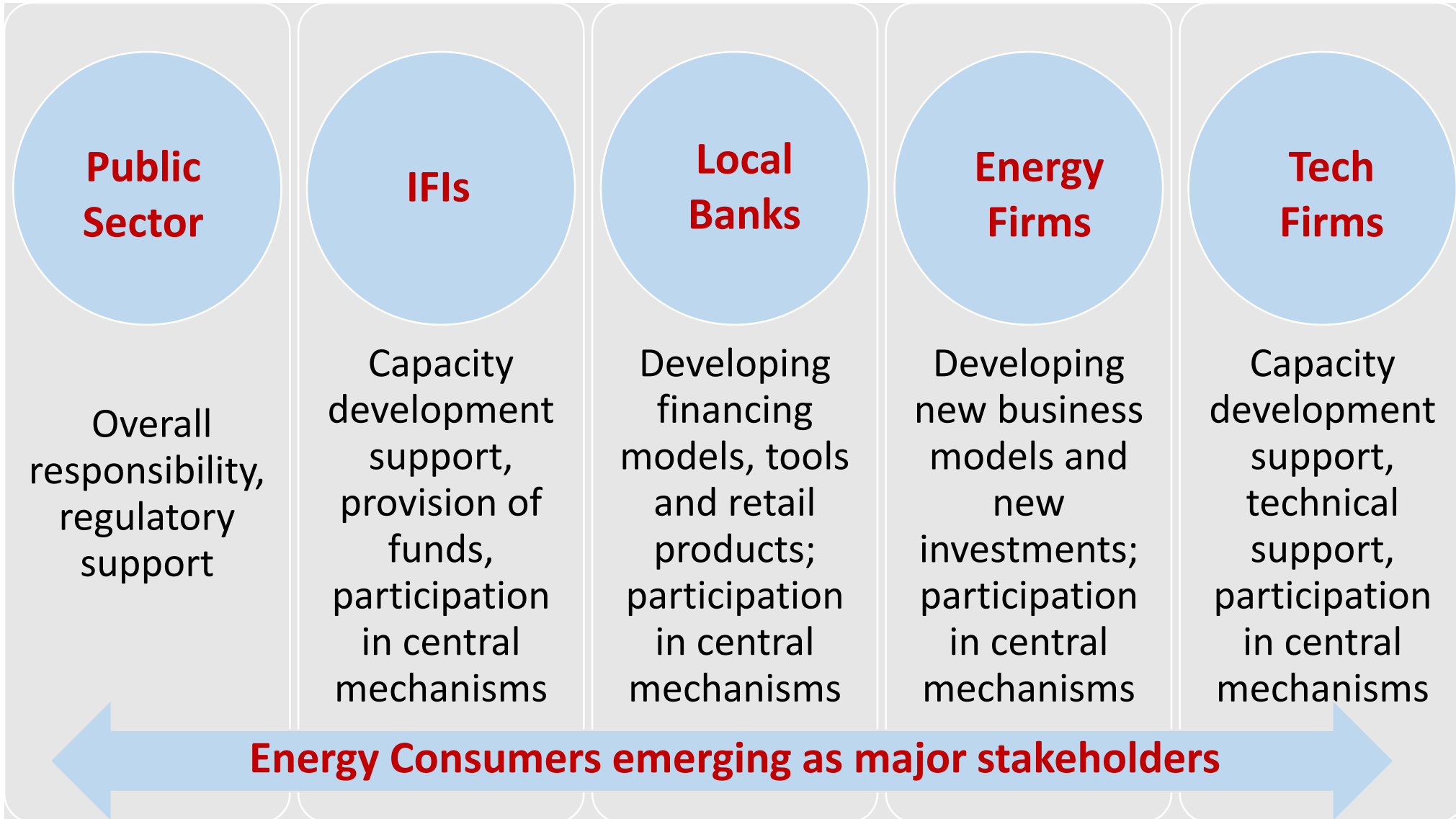
## Average Annual Investment Requirement (US\$)



\* Note: Energy Storage includes both electric vehicles and power grid energy storage.

- ✓ **Investment and financing needed for transition will be twice the level in the baseline.**
- ✓ **Estimated additional annual cost of the transition is 4 billion US\$, compared to 12-13 billion US\$ economic benefit.**
- ✓ **Policy predictability will be key to securing the necessary financing.**

# Roles Stakeholders need to play in Energy Transition Financing





# Challenges and opportunities 2021 and beyond

- **Currency depreciation and high private sector debt levels denominated in foreign currency**
- **Increased role of public sector financial institutions** to counteract the reduced ability or preference of private sector financial institutions in accessing sources of capital
- The **European Green Deal**, which aims to shape economic and social policies toward making the continent **carbon-neutral by 2050**. New paradigm with major economies, such as **China, US, UK, S.Korea, Canada** making carbon neutrality legally required or part of policy documents.
- **EU's Fit for 55 package**, aiming 55% lower greenhouse gas emissions by 2030, the EU budget for 2021-2027 requiring **30% of total expenditure for climate-related projects**.
- As **renewable energy is becoming the most competitive option for power generation** and energy efficiency is becoming a key factor in industrial competitiveness, it will be necessary to encompass **a wider range of stakeholders and actors**, including industrial consumers and technology providers

# Thank you!

## Yael Taranto ([yael.taranto@shura.org.tr](mailto:yael.taranto@shura.org.tr))



Türkiye'de enerji dönüşümü ve özel sektör rolü. Dönüşüm enerjisi tasarrufları artırıyor!



Türkiye'nin Elektrik Sektöründe yenilenebilir kaynakların etkin paylaşım. Çekim Gücü ve Enerji Güvenliği.



"TÜRKİYE'DE YÜKÜK KAPASİTELİ YENİLENEBİLİR GEÇİCİ KAYNAK FİNANSMANIN SÜREKLİLEŞTİRİLMESİNE SAĞLANMASI" PANELLİ ÖZET RAPORU  
12 Eylül 2016, İstanbul



Türkiye'de kullanılan elektrik 1500 den fazla yenilenebilir kaynaktan sağlanabilir. Rüzgâr ve güneş enerjisi sistemleri sistem olarak değerlendirilirse...



Rüzgâr ve güneş Türkiye'de enerji dönüşümüne hızla kullanılabilir. KİREZEL ÖNERİLER  
YÖNETİCİ ÖZETİ



Türkiye'de kullanılan elektrığın 1500 den fazla yenilenebilir kaynaktan sağlanabilir. Enerji dönüşümü destekleyen düzenleyici çerçeveler güçlendirilirse için YÜKÜK KAPASİTELİ yenilenebilir finansur.



Türkiye'de kullanılan elektrığın 1500 den fazla yenilenebilir kaynaktan sağlanıyor. Sistem yenilenebilir enerji için gerekli düzenlemeler hızla ve maliyetli.



Türkiye enerji sektöründe uygulamaya ve piyasaya giriş hızı artıyor.



Birçokları için hızlı güneş enerjisi potansiyeli. Türkiye'de hızlı güneş enerjisi sistemlerinin hızla gelişmesi için finansman modelleri ve politikalar.



Türkiye'de enerji sektöründe dönüşümün hızla ilerliyor. Türkiye'de enerji dönüşümü potansiyeli artıyor.



Türkiye enerji dönüşümünde inovasyon ve patent eğilimleri



Enerji ve Ulaştırma Sektöründe Enerji Dönüşümüne Katkı. Enerji, Finansur ve Yenilik Uygulamaları



Türkiye'de Enerji Dönüşümünün Finansmanı



2030 yılına değin Türkiye'nin optimum elektrik üretimi kapasitesi



Türkiye Elektrik Sistemi için En Güvenli Enerji Enerji Verimliliği ve Yenilik Modelleri



Enerji Verimliliği Çözümü Sistem Tasarımı



Enerji Verimliliği Çözümü Mücadele



Enerji Verimliliği Çözümü Piyasa Tabanlı Politikaları Araştırma



Enerji Verimliliği Çözümü İş Modelleri



Enerji Verimliliği Çözümü Finansman Mekanismaları



Türkiye enerji dönüşümünü hızlandırmak için 2020 yılı sonuna düzenleyici politika mekanizması geliştirilmesi. Şebeke içi güneş enerjisi kapasite kurulumları



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@company/shura



Türkiye'de Yenilenebilir Enerji Tedariki ve Balançosu



Priority Areas for a National Hydrogen Strategy for Turkey



Salgın sonrasında enerji dönüşümü ile sürdürülebilir büyüme



Türkiye enerji dönüşümünü hızlandırmak için 2020 yılı sonuna düzenleyici politika mekanizması geliştirilmesi. Şebeke içi güneş ve rüzgâr enerji kapasite kurulumları



Türkiye'de elektrik üretimi, sistemi ve karayolu taşımacılığında fosil yakıt kullanımının azaltılması