

A clean Covid-19 recovery: Turkey

238 projects for a green recovery and resilience plan for Turkey

May 2021

Prepared by EY-Parthenon,
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Turkey has a unique opportunity to make a step-change on economic growth, job creation and climate change mitigation through a green, post-COVID-19 recovery

- 1 A green recovery focused on renewable energy could deliver large-scale job creation in the near term whilst supporting sustainable employment in the long term**
 - ▶ An ambitious green recovery could have a major positive impact on job creation, laying the foundation for economic renewal and new industries in the wake of the pandemic.
 - ▶ Deploying the current pipeline could create up to 110,000 jobs. If Turkey continues to strengthen local supply chain and manufacturing capabilities for renewable energy, a green recovery could create many more jobs in renewable energy than exist currently in the coal industry.
 - ▶ Turkey has an opportunity to establish a global renewable energy supply chain, with potential to create industrial clusters that could further support wide scale-job creation and 'level up' specific regions.
- 2 A green recovery can deliver a step-change on decarbonisation and climate change**
 - ▶ The existing pipeline of investable projects can enable a green recovery to begin immediately. If fulfilled, it could contribute to the surplus that already exists against Turkey's intended nationally determined contribution (INDC) target.
 - ▶ Beyond the direct impact of decarbonising a highly coal-dependent power sector, a green recovery focused on renewable energy also lays the foundation for decarbonising the broader Turkish economy.
- 3 The pipeline of renewable energy projects identified is large enough to realise an ambitious green recovery, providing an opportunity for economic renewal and sustainable growth**
 - ▶ The visible pipeline of renewable energy represents a US\$19.4bn investment opportunity, which may contribute substantially to kick-starting accelerated growth in Turkey's economy.
 - ▶ The pipeline will also better enable Turkey to take advantage of the potential opportunities presented by the European Green Deal, as well as mitigating the potential challenges related to policy instruments such as carbon border adjustments.

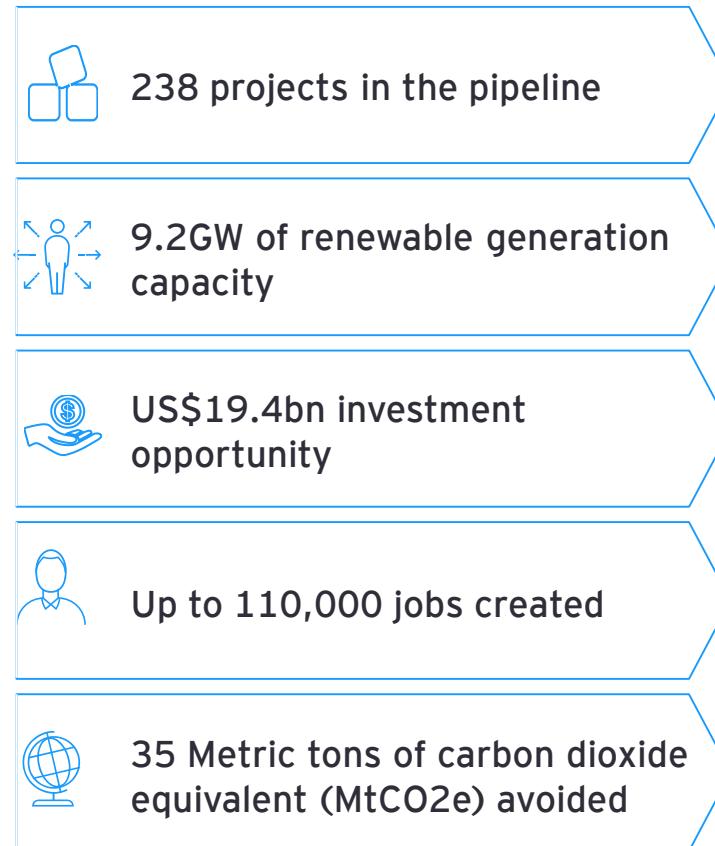


We have identified a 9.2GW pipeline of 238 'shovel ready' projects that could support Turkey in achieving its renewable energy and climate ambitions whilst presenting a green recovery opportunity

Turkey has several policy levers that can be pulled to unlock the potential in the visible renewable energy project pipeline and accelerate broader renewables investment

- 1 Ambitious, but achievable targets for renewable energy and climate goals should be established as a matter of urgency to drive a stronger national renewable energy agenda, and better prepare Turkey to benefit from the opportunities presented by the European Green Deal.
- 2 Continued effort should be made to establish Turkey as a regional manufacturing hub for renewable energy in order to create jobs, support economic growth and help mitigate currency risk for domestic renewable energy investments.
- 3 Turkey should continue to strengthen its cooperation with international finance institutions (e.g., the World Bank, the European Bank for Reconstruction and Development (EBRD), the International Finance Corporation (IFC), export credit agencies) to provide a supportive financial framework, and help mitigate exchange rate and interest rate risks, for non-lira-denominated investments within upcoming Renewable Energy Resource Areas (YEKA) renewable energy zone tenders and the Renewable Energy Resources Support Mechanism (YEKDEM) feed-in-tariff scheme.
- 4 The Appropriation Law which enables the growth of rooftop solar penetration within Turkey, should be expanded with further supporting legislations to promote widespread investment in utility-scale solar within organised industrial zones (OIZs) and help Turkey fulfil its vast distributed solar generation capacity.
- 5 Opportunities for cross-border energy offtake arrangements should be explored to help mitigate the existing currency risk and create a more supportive investment environment. This should be supported by development activity to strengthen transmission infrastructure (both domestically and internationally) and storage-based infrastructure.
- 6 Existing ad hoc capacity payments allocated to coal and natural gas plants should be replaced with a more transparent auction-based pricing system that provides an appropriate level of opportunity and support to both the renewable energy sector and traditional non-renewable energy sectors in need of financial support.

There is a sufficient project pipeline to significantly support the Turkish economy, whilst contributing to the wider renewable energy and climate agenda



The visible pipeline of projects represents a US\$19.4bn investment opportunity and has the potential to support more than 110,000 jobs

- ▶ With a higher job-intensity ratio than in most other traditional and fossil-based industries, the low-carbon projects we have identified may make a major contribution to a green economic recovery in Turkey.

The projects identified have the potential to unlock positive environmental value and contribute significantly to Turkey's renewable energy and climate targets

- ▶ The deployment of the identified projects could contribute positively to progress towards the achievement of Turkey's renewable energy and climate change ambitions by 2030.
- ▶ The project pipeline is estimated to potentially contribute a reduction in CO₂ emission of 35 MtCO₂e per year, reducing total emissions by ca. 7%.
- ▶ Other potential benefits include improved health and well-being (e.g., through cleaner air quality), reduced noise pollution, increased energy independence and greater support for gender equality.

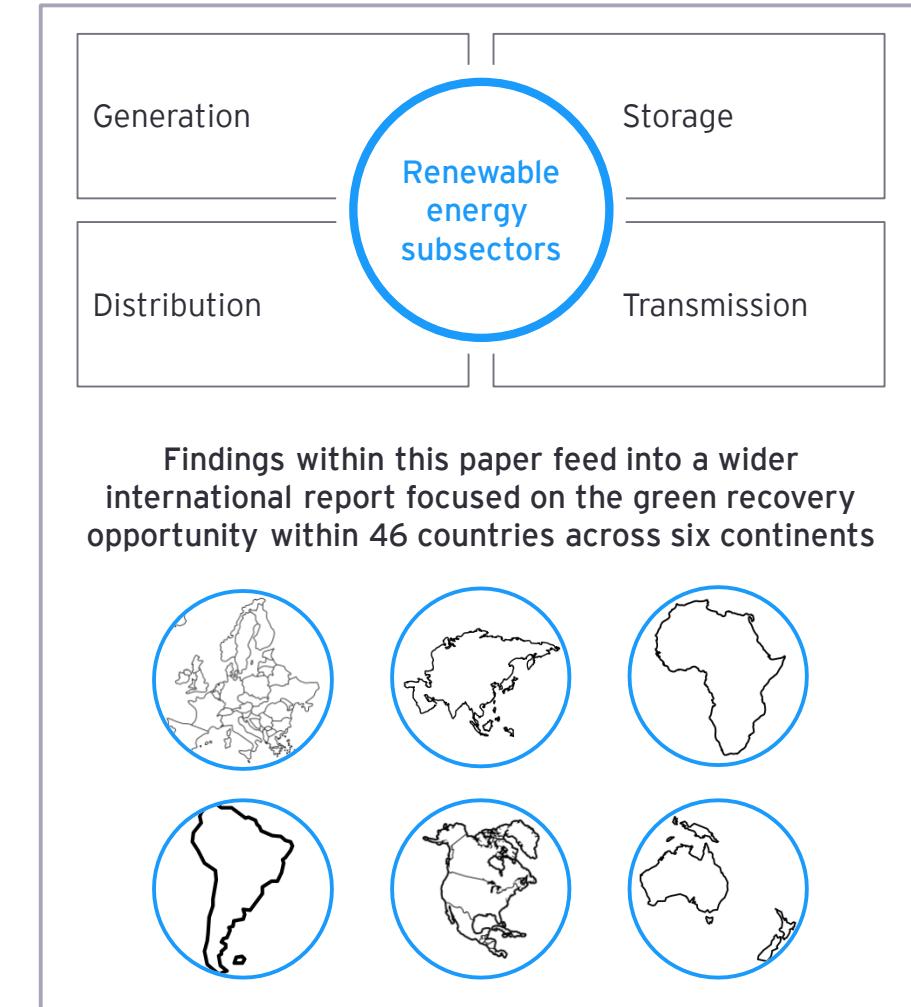
This report is focused on shovel-ready renewable energy projects within Turkey, and the key enablers and policy recommendations that will help fulfil the pipeline

The objective of this report is to support the development of green recovery plans by providing an overview of 'shovel-ready' investment opportunities

- ▶ EY teams have identified projects that can support jobs in the short term, and contribute to Turkey's renewable energy and climate objectives. Projects were researched within four subsectors of renewable energy (generation, storage, transmission and distribution) primarily using secondary research (e.g., databases), and supplemented by a survey completed by local stakeholders (including project developers).
- ▶ The 238 shovel-ready opportunities all have the potential to create economic, environmental and social value in the coming years. These opportunities are real, requiring some stimulus in order to be realised (which could be additional financing or overcoming other barriers).

The projects identified represent a subset of the green projects under development in Turkey

- ▶ This list of projects uncovered has been collated over a short timeframe. It illustrates an initial view of the size of the project pipeline that exists within Turkey to underpin a green and resilient recovery from the COVID-19 economic crisis.
- ▶ The list can only be seen as a subset of all projects with economic and climate benefits under development in Turkey at various levels of maturity, as we have primarily focused on short-term opportunities, i.e., projects that will reach financial close in the next 24 months.
- ▶ Furthermore, we have also only focused on renewable energy rather than other forms of green projects such as electric vehicles or energy efficiency solutions.

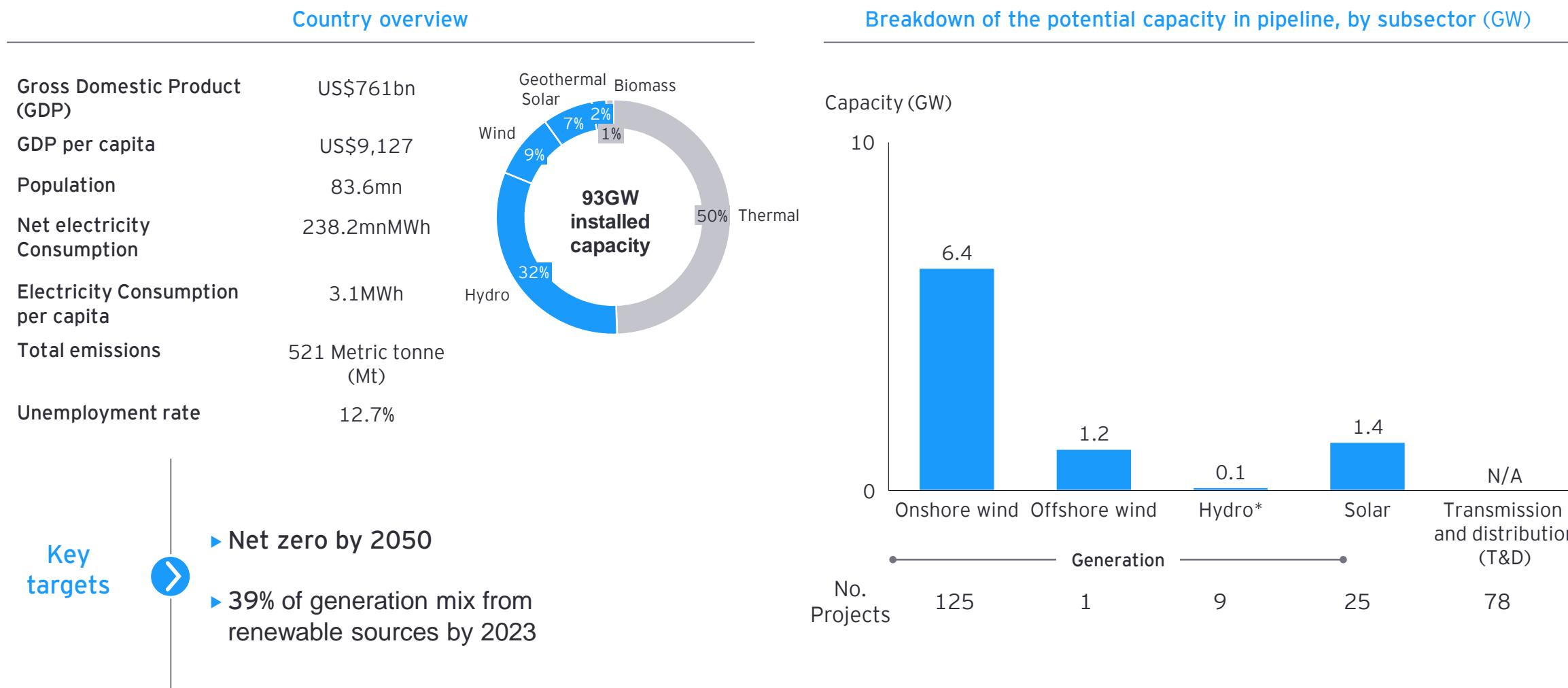


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The visible pipeline of renewable energy projects in Turkey contains 238 projects

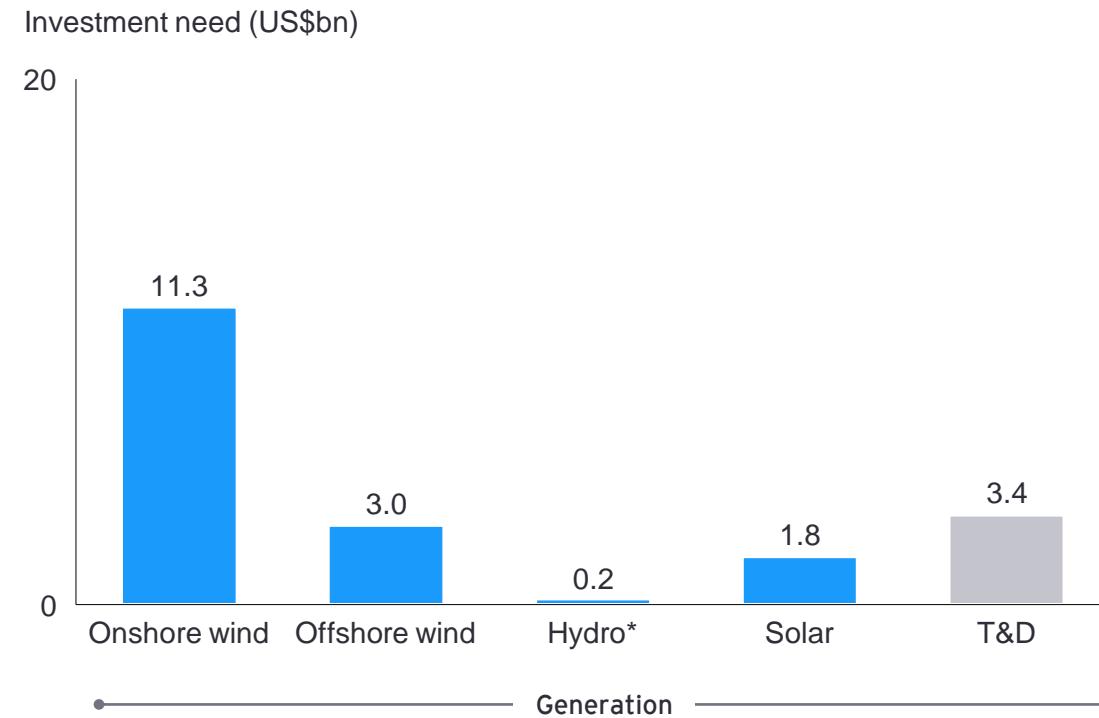


Note: only includes hydropower projects below 25MW capacity.

Source: World Bank, Moody's, BMI, Climate Action Tracker, TurkStat, EY-Parthenon analysis.

The 238 projects in the visible pipeline offers US\$19.4bn of investment opportunities, spanning all regions of Turkey

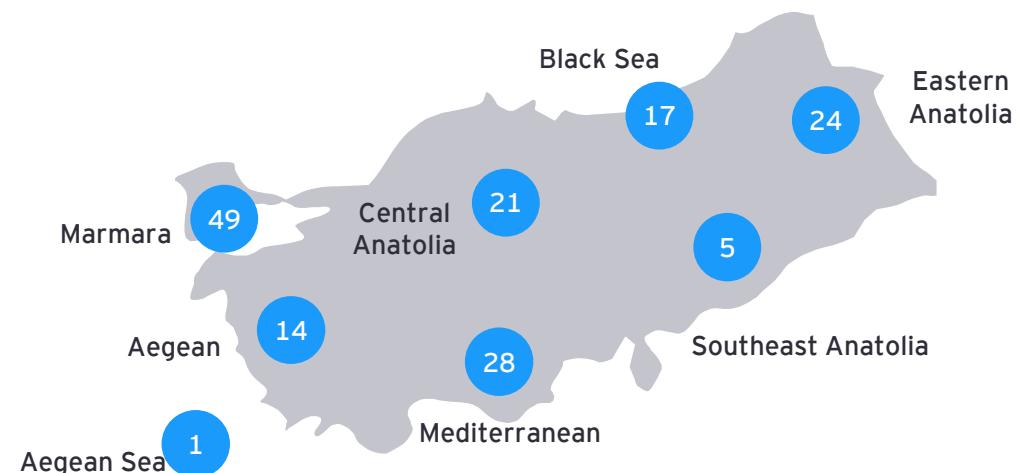
Potential investment opportunity in the visible pipeline (\$bn)



No. Projects	125	1	28	25	78
Avg. Invest. Amount	US\$90mn	US\$3,000mn	US\$22mn	US\$71mn	US\$44mn

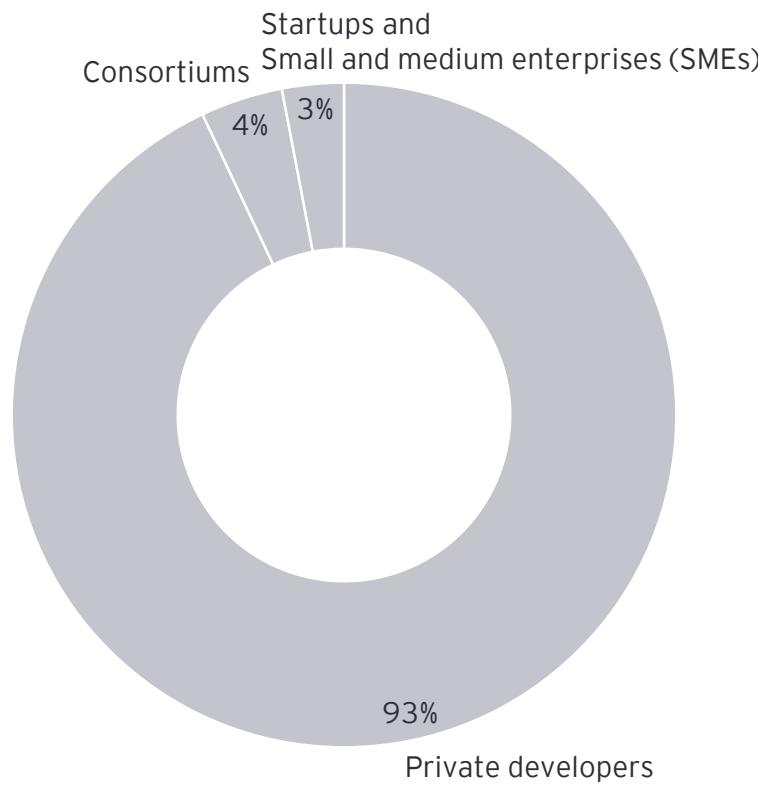
Breakdown of generation projects by geography (number of projects)

Note: one additional generation project and 78 T&D projects cross multiple regions and are therefore not included in the map

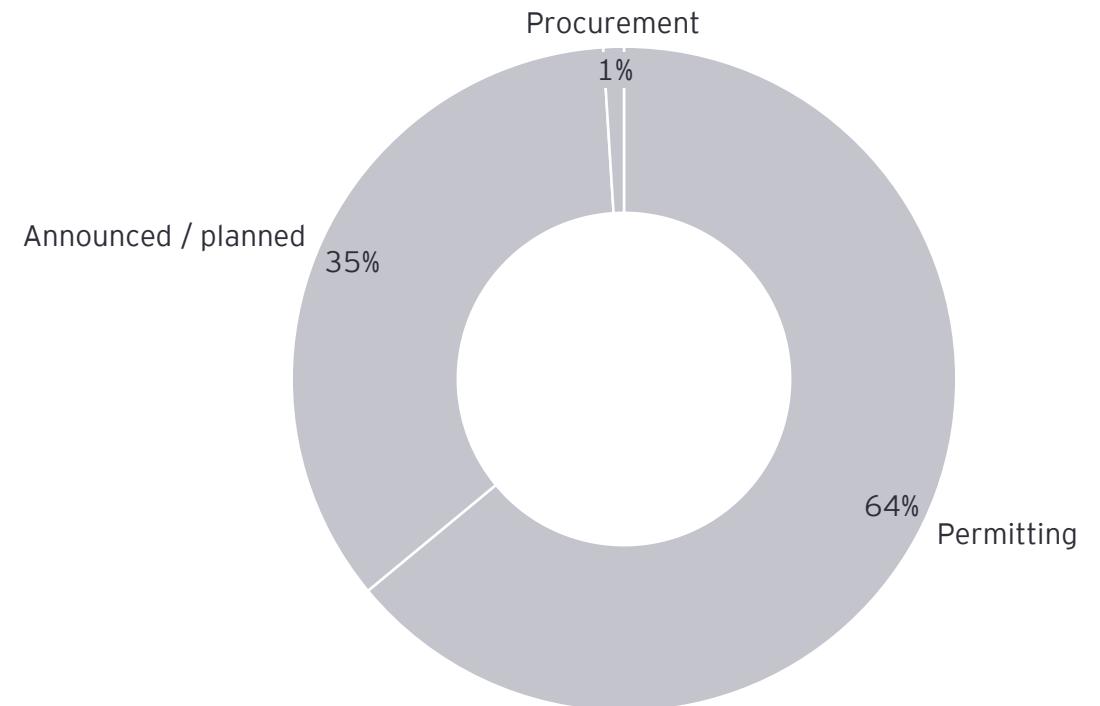


Private organisations are the primary driver behind the size of the project pipeline, with the majority of projects remaining in the early stages of maturity

Breakdown of the developer type for 238 projects (%)

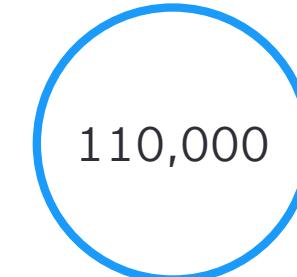


Breakdown of the maturity level for 238 projects (%)



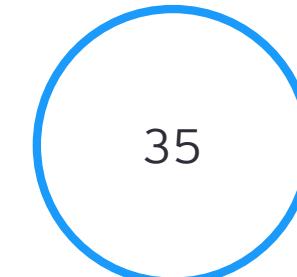
A green post-COVID-19 economic recovery in Turkey could have a massive positive impact on the people, the planet and economic prosperity

People

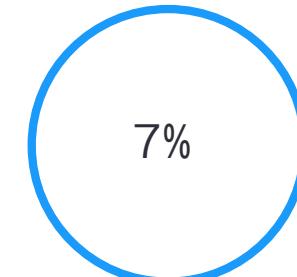


Potential jobs created

Planet



MtCO₂e avoided per annum



Current emissions avoided

Prosperity

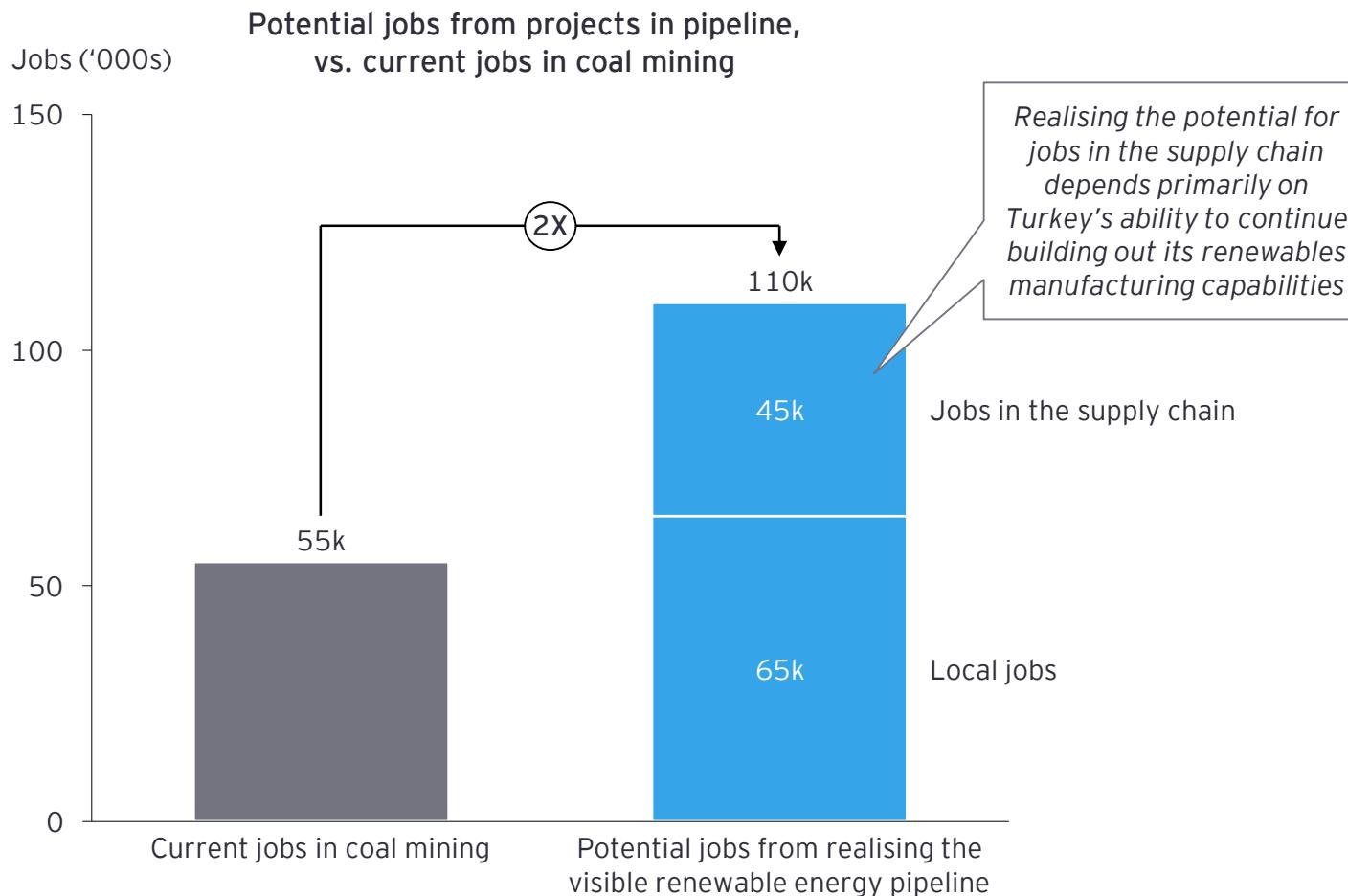


Short-term GDP impact

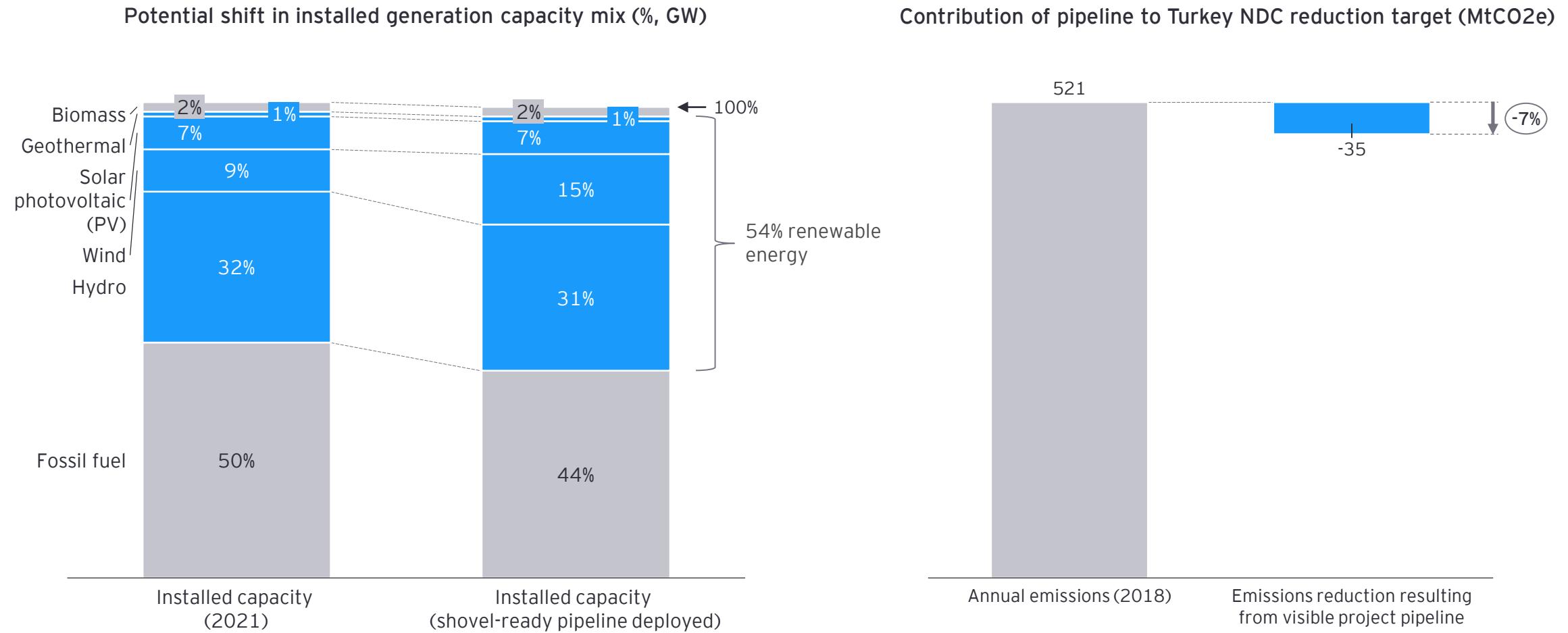


Annual, recurring GDP impact

The visible renewable energy pipeline can create up to 110,000 jobs



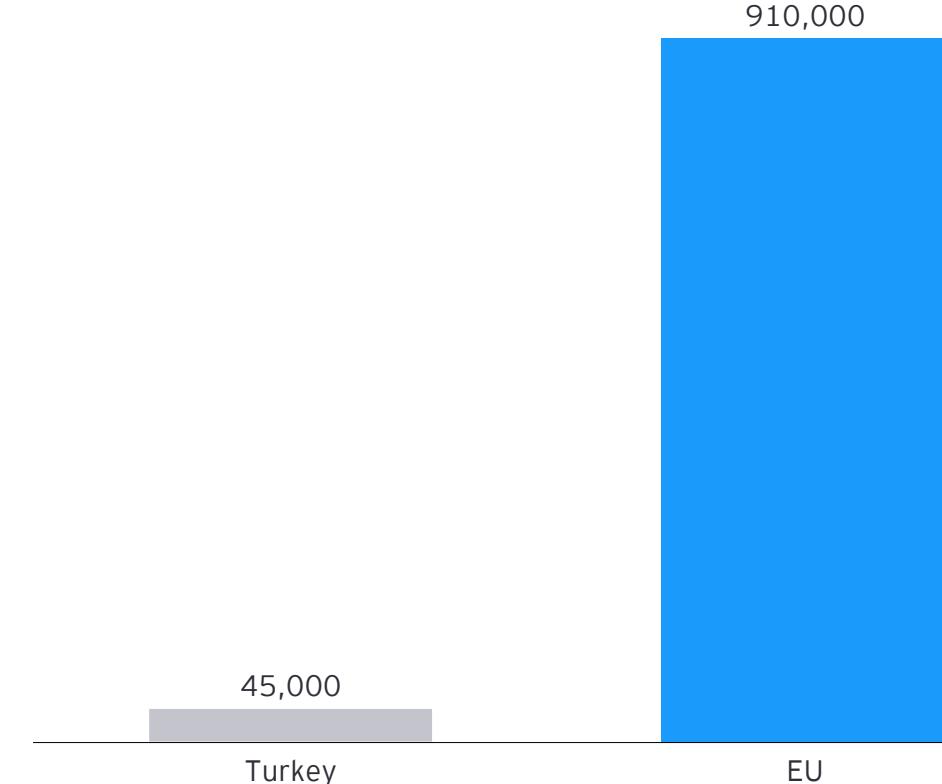
The visible project pipeline could allow Turkey to substantially shift its energy mix towards renewables and reduce its total emissions by ~7%



Exporting of renewable energy equipment manufactured in Turkey could further increase the potential for job creation and economic growth in the sector

Potential jobs in the supply chain from the visible pipeline of renewable projects in Turkey and the European Union (number of jobs)

- ▶ Industrial developments such as the Siemens Gamesa nacelle assembly facility highlight the potential of renewable energy technology manufacturing within Turkey.
- ▶ Beyond Turkey, there is a wider export opportunity in the region that can be exploited if the right investments and support are made available to build strong clusters of competitive manufacturing capability for renewables.
- ▶ Capturing only a 5% share of the EU market for renewables could double the total potential for job creation in Turkish renewables manufacturing.



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There are a number of potential blockers preventing the fulfilment of the extensive project pipeline identified within Turkey

National ambition and targets

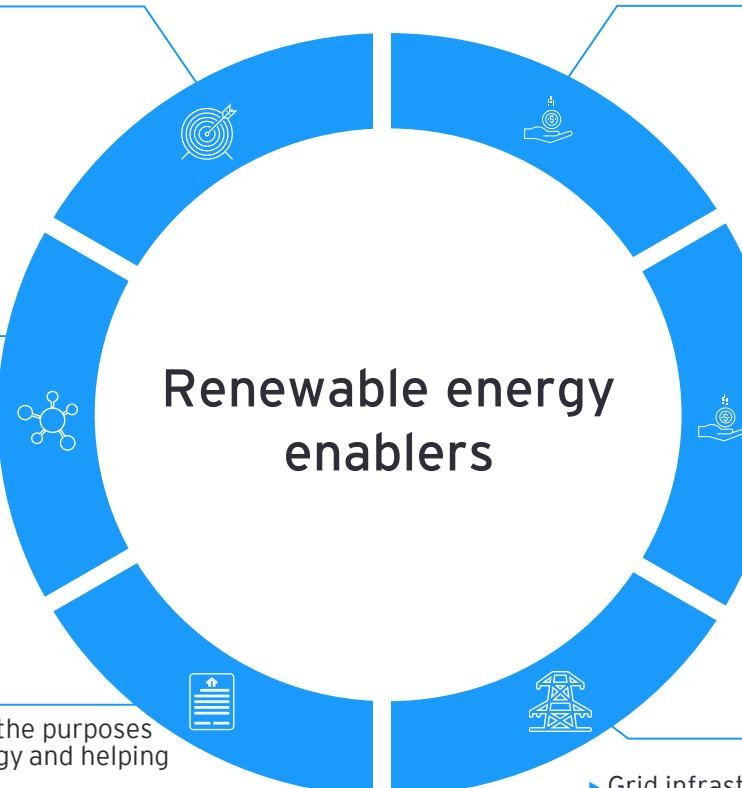
- ▶ The Government is increasingly keen to decrease national dependence on imported energy sources.
- ▶ While short-term targets are in place, longer term targets (beyond 2023) are missing, and existing short-term targets could be far more ambitious.

Supporting policy and market framework

- ▶ A new YEKDEM has been agreed upon and announced - this is a step in the right direction and can be further expanded upon.
- ▶ A more transparent price setting mechanism is required to encourage renewable energy growth whilst supporting traditional energy sources (e.g., coal and natural gas) to help ensure the grid remains balanced.
- ▶ The number of regulatory changes has been regarded as a blocker to investment .

Land allocation and permitting

- ▶ YEKA have been an effective mechanism to allocate land for the purposes of renewable energy, supporting the growth of new technology and helping to reduce the cost.
- ▶ There is a high potential for solar, pumped hydro (including storage) and hybrid power plants (e.g., PV integrated with wind) across the country yet to be tapped into, which requires support through enabling legislation.



Pipeline impact:
Supportive

Major blocker

Availability of domestic capital

- ▶ The economic climate is complex, with high inflation rates, high amounts of government debt, a high current account deficit, increasing interest rates and increasing commercial loan rates.
- ▶ Delays in financing are leading to further issues with permits expiring, inhibiting the ability to fulfil shovel-ready projects.
- ▶ Local content contribution rates have supported Turkish-based manufacturing, with the potential for future expansion of national manufacturing capability.

Availability of international capital

- ▶ Cooperation with international finance institution such as the World Bank and EBRD on renewables should be extended in scale and scope.
- ▶ Success has been seen through Export Credit Agency backed up loans, however these are not widely used on renewables yet.
- ▶ The cost of renewable energy technology is reducing as a result of increased levels of efficiency, potentially making Turkey a more attractive investment location if capital were to be more readily available.

Transmission infrastructure

- ▶ Grid infrastructure is generally good, but it could become a blocker for deployment of the scale of the identified project pipeline (specifically regarding offshore wind).
- ▶ Existing cross-border interconnectors in place, but they may need to be enhanced to help increase cross-border energy off-taker capacity and enable Turkey to become a major renewable energy provider for other nations, especially those to the west.

There are several policy levers that need to be pulled in order to overcome blockers and unlock the vast potential of the identified project pipeline (1/3)

Policy	Recommendations	Enablers impacted
1 Binding renewable energy targets	<ul style="list-style-type: none">▶ Set more ambitious yet achievable binding targets for renewable energy and climate goals should as a matter of urgency to drive a stronger national renewable energy agenda, and better prepare Turkey to benefit from the opportunities presented by the European Green Deal▶ Set more ambitious short- and medium-term targets that align with overarching targets, in order to provide clear signals to citizens, political actors and businesses▶ Develop a clear renewables direction that could help prepare for the potential economic impacts of the proposed Carbon Border Adjustment Mechanism (CBAM) on exportations▶ Better align with the EU accession process and with the expectations of the wider international community (e.g., G20)	
2 Regional industry cluster investment	<ul style="list-style-type: none">▶ Establish Turkey as a global manufacturing hub for renewable energy technology to support the job market and wider economy, whilst helping to mitigate currency risk for domestic projects▶ Use mechanisms such as production purchase guarantees, tax exemptions (e.g., social security payments and land acquisition) and local content subsidies as a means to drive manufacturing demand▶ In the long term, establish industry clusters that can level up Turkish regions, building on the planned Siemens Gamesa nacelle assembly facility as an example▶ Provide support for the development of local supply chains to improve international competitiveness and the proportion of Turkish content on renewable energy projects	

Pipeline Impact:
Supportive Major blocker

There are several policy levers that need to be pulled in order to overcome blockers and unlock the vast potential of the identified project pipeline (2/3)

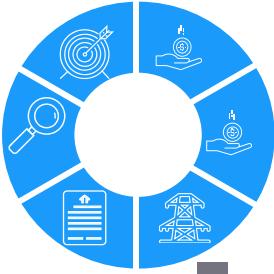
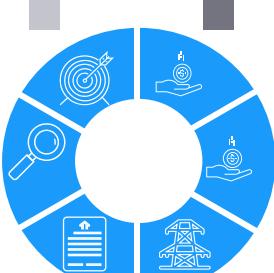
Policy	Recommendations	Enablers impacted
3 Cooperation with international finance institutions	<ul style="list-style-type: none"> ▶ Cooperation with international finance institutions (e.g. the World Bank, the EBRD, the IFC and export credit agencies) to provide a more supportive financial framework, and help mitigate exchange rate and interest rate risks, for non-lira-denominated investments within upcoming YEKA renewable energy zone tenders and the YEKDEM FiT scheme ▶ Use methods such as including green loans, local content subsidies and strong guarantees that have been effective to date ▶ Take advantage of further opportunities to support YEKA, such as reducing the size of tenders and the number of locations that they cover ▶ Take advantage of further opportunities to support YEKDEM, including corporate PPAs (which need to be simple and have a clear framework), spot price-bonded models (e.g., fixed value premiums, fixed % premiums, spot market vacancies) and renewable portfolio standard models (e.g., green energy certificates) 	
4 Appropriation Law	<ul style="list-style-type: none"> ▶ Expand the Appropriation Law, which enables the growth of rooftop solar penetration within Turkey, with further supporting legislations to promote widespread investment in utility-scale solar within residential areas (especially multi-family housing) and OIZs and help Turkey fulfil its vast distributed solar generation capacity ▶ Extend legislation to allow increased penetration in OIZs will help further reduce the impact of increasing energy costs within Turkey by allowing businesses to offset costs 	

Pipeline impact:

Supportive

Major blocker

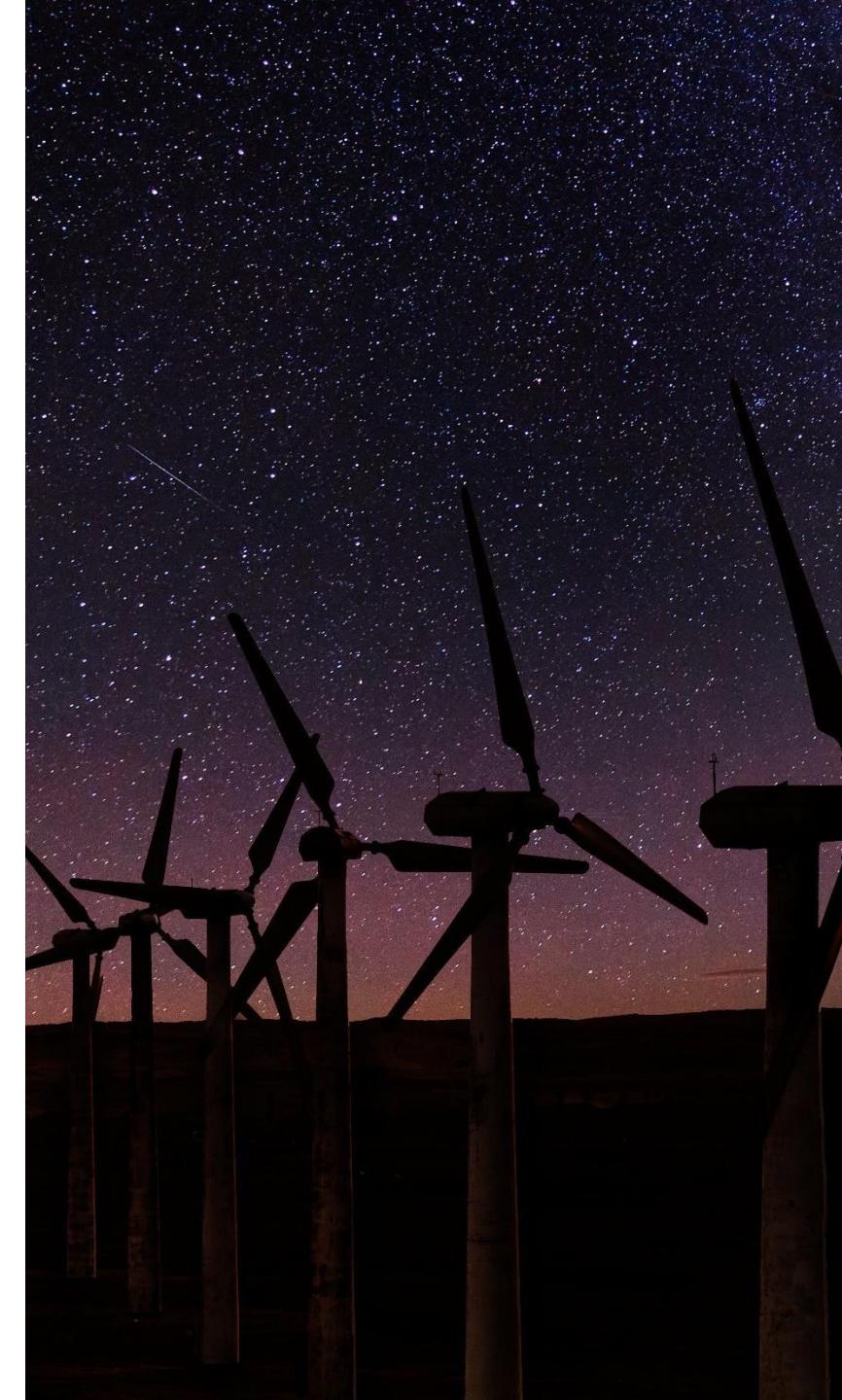
There are several policy levers that need to be pulled in order to overcome blockers and unlock the vast potential of the identified project pipeline (3/3)

Policy	Recommendations	Enablers impacted
5 Cross-border offtake arrangements	<ul style="list-style-type: none"> ▶ Explore opportunities for cross-border energy offtake arrangements with neighbouring countries to help mitigate existing currency risk and create a more supportive investment environment ▶ Increase the flexibility of the Turkish power system through projects that focus on: <ul style="list-style-type: none"> - Strengthening transmission infrastructure domestically and internationally (e.g., with Bulgaria and the wider Balkan nations, where infrastructure stock is seen to be deteriorating, as well as Georgia and beyond) - Developing storage-based infrastructure (e.g., pumped storage), utilising the vast national potential - Improving smart grid infrastructure 	
6 Renewable energy auctions	<ul style="list-style-type: none"> ▶ Replace existing ad hoc capacity payments allocated to coal and natural gas plants should be replaced with a more transparent auction-based pricing system that provides an appropriate level of opportunity and support to both the renewable energy sector and traditional non-renewable energy sectors in need of financial support ▶ Use the auction-based system to help place more focus on the growth of the renewable energy sector, whilst recognising the need to support existing coal and natural gas plants due to their grid balancing impact ▶ Explore carbon tax subsidisation and long-term PPAs (e.g., 15 years) provided to new coal and natural gas plants with a view to replicating them for new renewable energy projects 	

Pipeline impact:
Supportive Major blocker

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Project pipeline summary – notable projects

Subsector	Technology	Project name	Developer	Capacity / voltage	Investment required (US\$m)
Generation	Offshore wind	Aegean Sea wind farm	Multiple	1,200MW	US\$3,000mn
Generation	Solar PV	Şanlıurfa-Viranşehir solar PV park	Multiple	500MW	US\$604mn
Generation	Onshore wind	Sertavul wind farm	WestWind Enerji	450MW	US\$891mn
T&D	Interconnector	Çanakkale Strait-Zmit Gulf Line	Turkiye Elektrik Iletim A.Ş.	400kV	US\$388mn
T&D	Interconnector	Tirebolu-Altinkaya Line	Turkiye Elektrik Iletim	380kV	US\$370mn

Climate policy overview

Long-term climate action and targets	Major policy and strategy
<ul style="list-style-type: none">▶ Turkey has set out various indicative renewable energy targets; however, they are not binding or fixed in legislation.▶ The key target is to generate at least 38.8% of electricity from renewable sources by 2023. This is an uplift from the initial 30-30-30 target, which aimed for renewables (including hydro), natural gas and coal to each have a 30% share of the generation mix (with nuclear making up the remaining 10%).▶ The renewable energy target for 2023 is broken down across the following sources of installed capacity: hydroelectric - 32GW, Wind - 11.9GW, Solar - 10GW, geothermal and biomass - 2.9GW. Note: Targets beyond 2023 are yet to be established.	<ul style="list-style-type: none">▶ A number of policy documents have been driving renewable energy activity within Turkey in recent years, including the National Renewable Energy Action Plan (2014), the National Climate Change Action Plan (2011–2023) and various development plans.▶ Underpinning policy is the renewable energy law (enacted in 2005), which introduced ideas to support the growth of renewables, such as floor prices and priority of dispatch.▶ This law was subsequently updated in 2011 when FiTs were introduced through the renewable energy support mechanism, enabling supplier obligations to purchase renewable electricity (as a PPA) at a preferential price (up to 10 years in US dollars), have priority connection to transmission/distribution systems, exemptions from licence obligations for small generators (0.5MW), and pay reduced fees for both land acquisition and project preparation.▶ Renewable energy zones (REZs) were established in 2016, providing access to land either via direct designation by the Energy Market Regulation Authority (EMRA) or via a public tender for capacity allocation. The main purpose of REZs is to allow for more structured investments in renewable power projects whilst promoting fast growth of new technologies.▶ Feed-in premiums were also introduced in 2016, meaning participants in the support mechanism receive a premium in addition to the market price for their electricity, provided they accurately determine the electricity they give to the system from the power plants.▶ A new FiT scheme (YEKDEM) was recently introduced, taking over from the previous scheme.

Covid-19 recovery plan and industry impact

Covid-19 recovery plan	Covid-19 Industry Impact		
	Generation	Transmission	Distribution and retail
<ul style="list-style-type: none">▶ Turkey launched several highly substantial stimulus packages to support the COVID-19 recovery.▶ A series of recovery measures relate to fiscal policy, comprising tax breaks and deferrals, credit guarantees and delays in loan repayments.▶ In addition to supporting the workforce, the plan also focuses on reviving export and production-orientated growth; however, no specific information relating to the energy sector (including renewables) has been provided.	<ul style="list-style-type: none">▶ Energy demand has reduced between 20% and 30%, mainly due to commercial and industrial shutdowns.▶ Gas generators lost out due to the renewables baseload capturing more of the small market.▶ Peak demand loads reduced, negatively impacting gas peaking plants and other standby peaking plants.	<ul style="list-style-type: none">▶ The COVID-19 crisis had a limited financial impact on the transmission network, which is largely insulated by regulation.▶ Manpower and travel issues affected operations and reduced new connections, increased costs, deferred maintenance and reduced capital expenditure.▶ High renewable capacity and low demand created challenges for balancing the system.	<ul style="list-style-type: none">▶ Energy retail companies faced an increase in unpaid bills, which may have been deferred (or never paid).▶ Retailers with more industrial and commercial customers were impacted more negatively than those with a large residential customer base.

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