Renewable Energy Auctions in Pakistan: Thinking beyond Cost

White Paper

May 2022

RENEWABLES FIRST

EXECUTIVE SUMMARY

Capacity Expansion Through Auctions	• After the announcement of ARE Policy 2019, RE procurement will primarily be done through auctions. • The mode of procurement will be steady/yearly instead of large and sudden additions. • These planned additions are a major opportunity for Pakistan to boost local market, attract foreign investment and ensure maximum socio-economic dispersion of benefits.
Mechanism of & Global Trends in RE Auctions	• Auctions provide a flexible and goal-based method of energy capacity procurement however until effectively designed and implemented there is no guarantee that an auction regime will inherently stimulate desired outcomes. • Benefits and fallouts from of auctions are highly dependent on the specific design of auction with regards to the local geographic, social and industrial context. • Auctions will be the primary mode of procurement for over 1,000 GW of planned wind and solar capacity additions globally. • Decreasing technology cost is not the only reason for cost reduction. In fact, auctions drive down costs due to multiple other factors including true price discovery, increased competition & long-term market growth through anticipation and higher certainty for investors & developers.
Market Developments & National Electricity Policy Objectives in Pak	• 78% reduction in wind and solar LCOE in less than a decade signifies the need for looking beyond costs. • While least cost power generation is an important part of the national energy objectives of Pakistan, they also include social and economic advancement, social equity, local manufacturing, market development and enabling participation from the private sector. • A well-designed set of RE auctions will need to incorporate all of the above.
Global Practices	• Several countries apply inclusive design elements to increase level of competition and foster social acceptability. • Experience in Latin American countries shows smaller project size does not necessarily mean higher levelized tariffs. • Local contents requirements result in mixed outcomes.
The Case of South Africa	• REIPPPP was launched by the government of South Africa in 2013 with its fifth renewable energy bid round floated in March of 2021. • REIPPPP supports broader development objectives in terms of equitable ownership and job creation. • REIPPPP has effectively captured price downward trends while achieving socio-economic benefits.
Way Forward for Pakistan	• Moving for an auction design beyond cost, would imply prioritizing other non-cost related energy policy objectives and global best practices. • This entails allowing domestic markets to grow, streamlining the bidding process to ensure maximum participation and competition, reducing barriers to entry, fostering social acceptability, avoiding concentration of projects and above all inclusive and participatory development.

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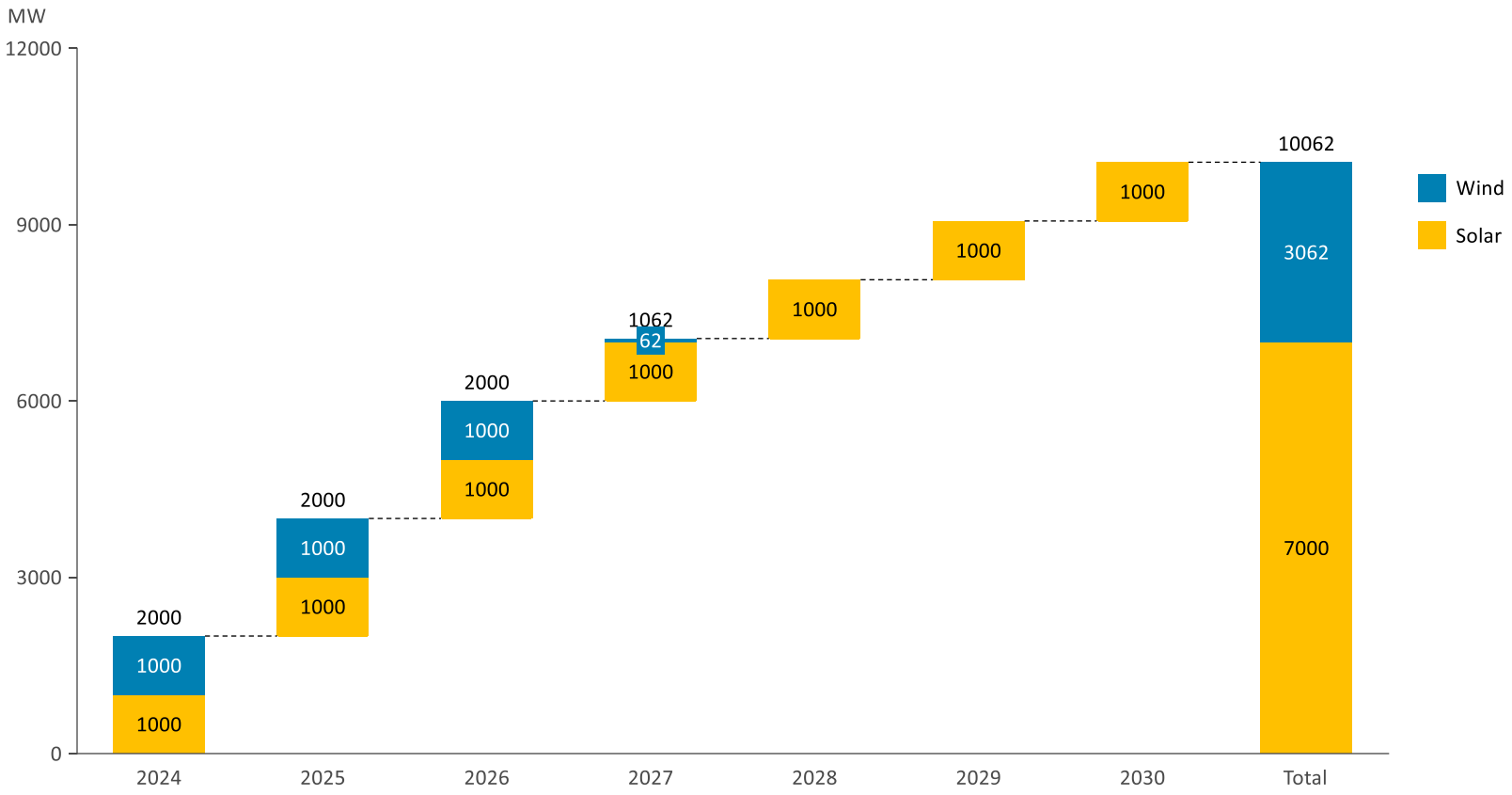
FUTURE RE INDUCTION IS PLANNED THROUGH AUCTIONS WITH CAPACITY EXPANSION PLAN IN PLACE



Planned Renewable Generation Capacity Additions (MW) - IGCEP 2021-30

ARE Policy 2019

- Alternative and Renewable Energy Policy (ARE) 2019 envisages procurement of RE primarily through auctions with at least 20% on-grid RE generation by capacity by the year 2025 and at least 30% by 2030.

IGCEP

- Indicative Generation Capacity Expansion Plan (IGCEP) 2021-30, optimizes addition of 10,062 MW of renewables (wind and solar) by the year 2030 thereby reducing the share of RE to 21% by the same year.

Comments

- The mode of procurement will be steady/yearly instead of large and sudden additions.
- These planned renewable energy (RE) additions are a major opportunity for Pakistan to boost local market, attract foreign investment and ensure maximum socio-economic dispersion of benefits.

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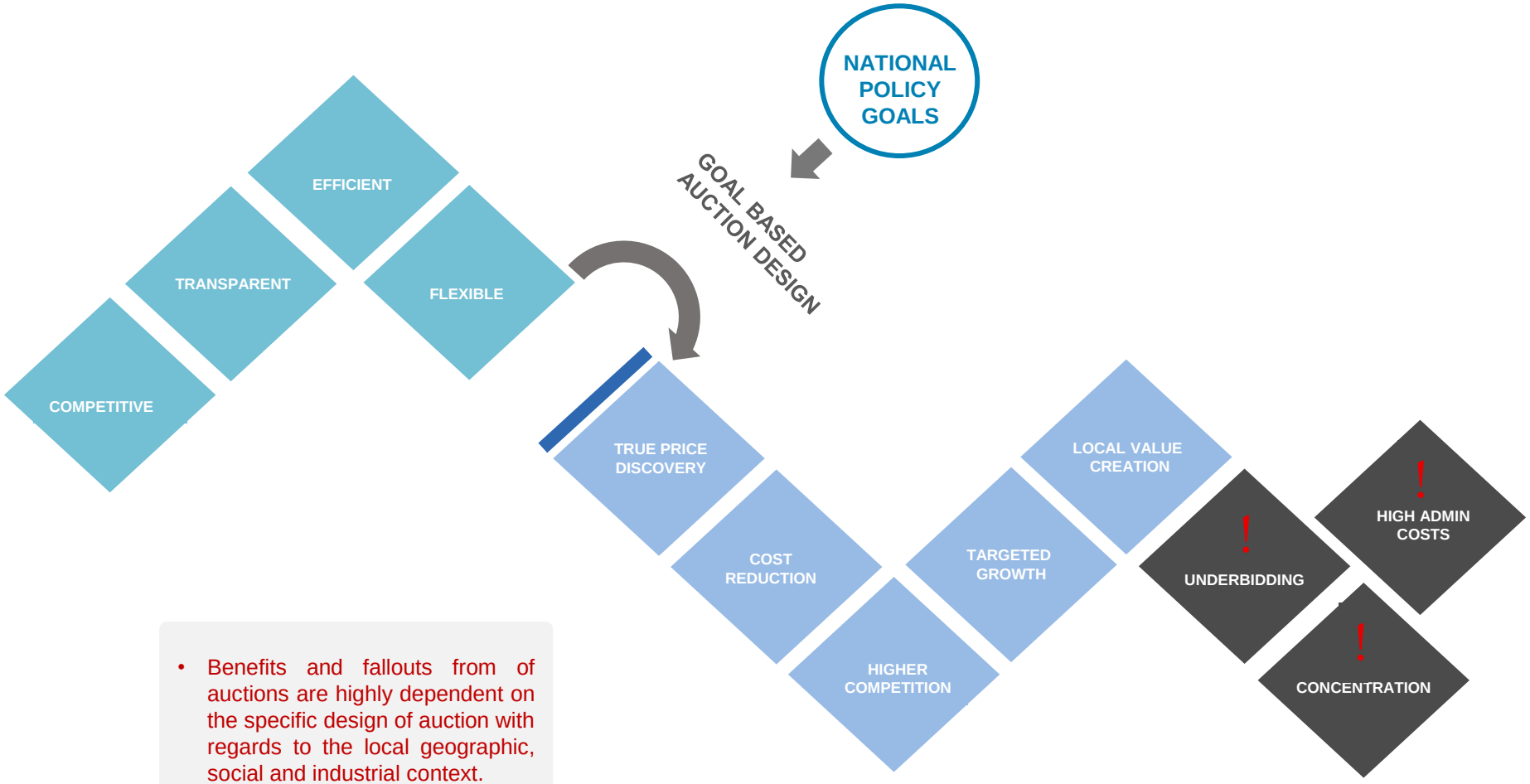
VARYING POTENTIAL OPPORTUNITIES AND RISKS MAKE AUCTIONS A TRICKY MECHANISM



- Benefits and fallouts from of auctions are highly dependent on the specific design of auction with regards to the local geographic, social and industrial context.

Higher Competition

- Auctions send reliable demand signals for the future years into the market, resulting in increased interest and confidence of investors.

Local Value Creation

- LVC is not limited to jobs but includes all economic activities resulting from auctions which use locally available input flows and generate output flows for the local communities.

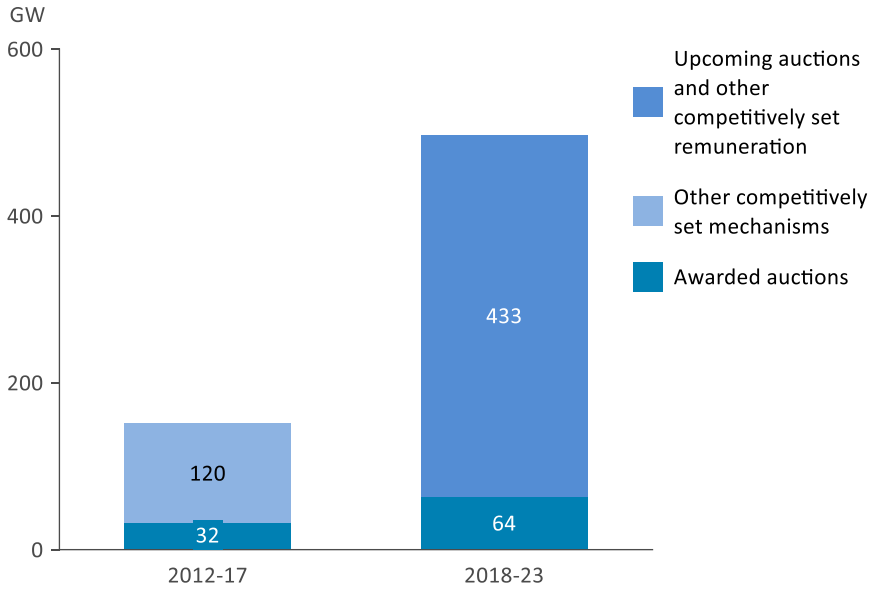
Concentration

- One or few winners take all in which single or few developers dominate the market by procuring too much volume, outbidding small developers due to economies of scale, thereby monopolizing and preventing market growth in the long term.

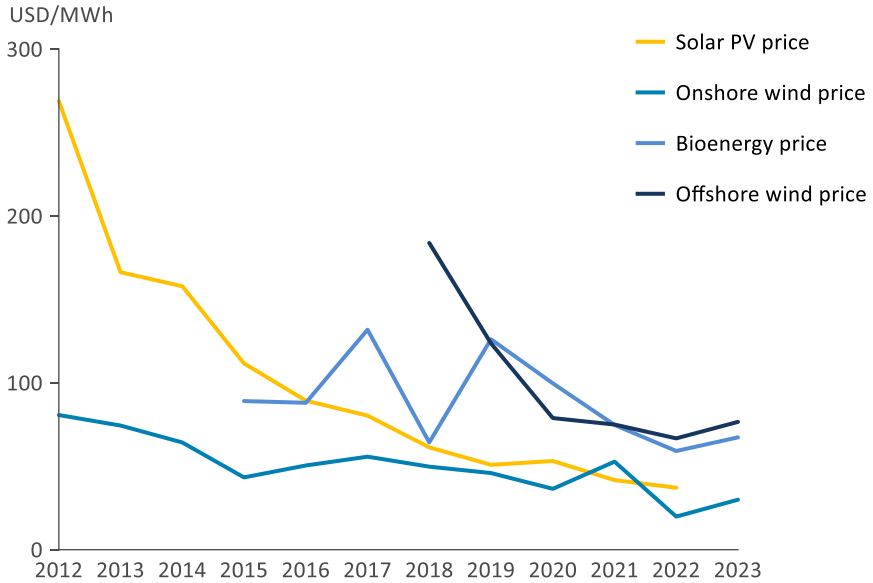
Comments

- Auctions provide a flexible and goal-based method of energy capacity procurement however until effectively designed and implemented there is no guarantee that an auction regime will inherently stimulate desired outcomes.

RE AUCTIONS ARE WIDELY USED TO ADD NEW GENERATION CAPACITY



Awarded utility-scale, competitively renumerated renewable capacity, 2012-2023
Source: IEA



Average auction price by project commissioning date, 2012-2022
Source: IEA

Wind

- According to GWEC, over 469 GW of new onshore and offshore wind capacity will be added globally in the next five years i.e. 2021-2025

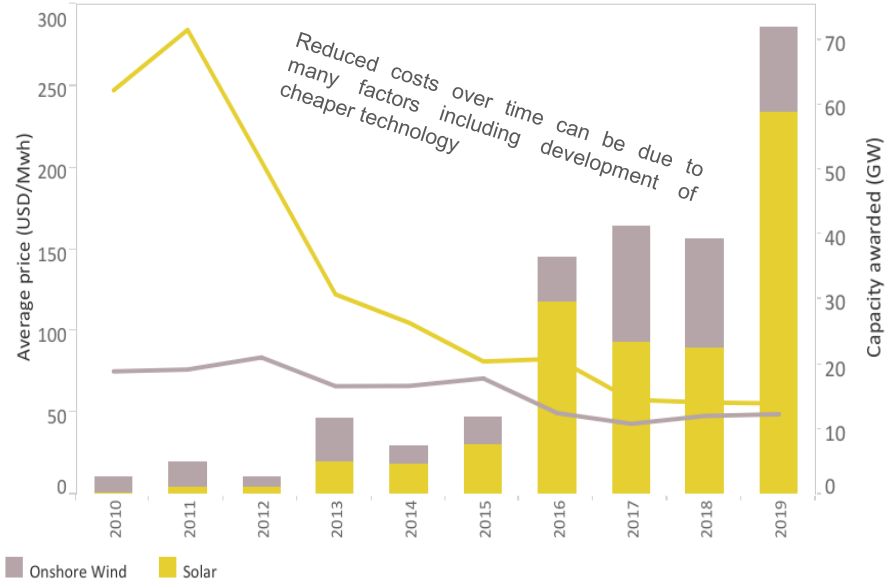
Solar

- IEA estimates almost 600 GW of solar capacity may be added globally during 2020-2024

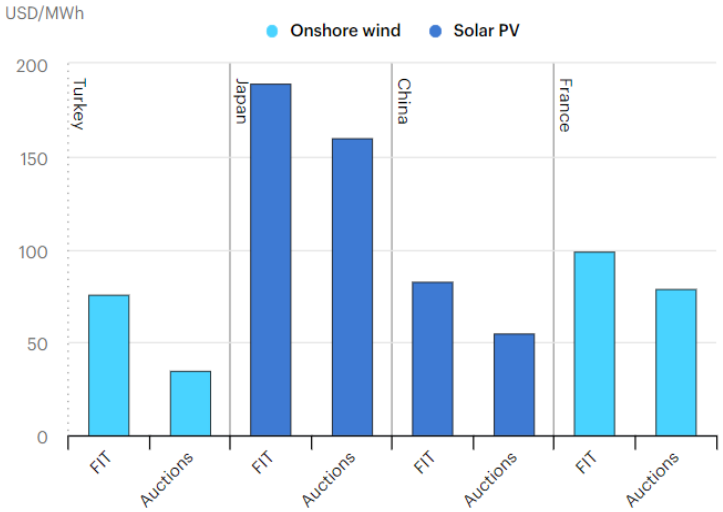
Comments

- Auctions will be the primary mode of procurement for these capacity additions as they provide a wholesale method of adding new energy to the grid
- Data from auctions across the globe indicates that renewable energy auctions, when well designed, have led to significant cost reductions over time

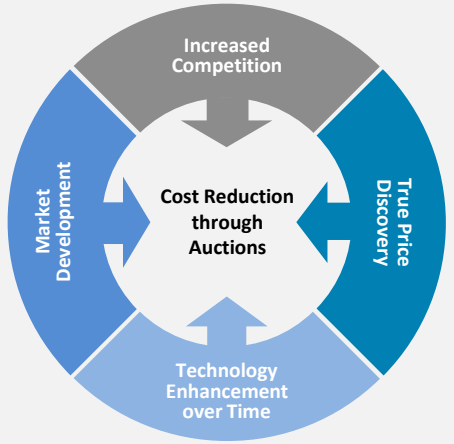
WHETHER AUCTIONS WILL REDUCE COSTS DEPENDS ON THE CHOICE OF DESIGN ELEMENTS IN PARTICULAR SETTING



Global Trends in Renewable Energy Auctions
Source: IRENA Database, n.d., based on BNEF, 2019a and PSR, n.d.



FITs versus auction prices for selected countries, 2017
Source: IEA



Comments

- When compared side by side with Feed-in Tariffs (FITs), which have historically been the traditional method of RE payments, it is seen that enhancement of RE technology over time is not the only reason for cost reduction. In fact, auctions drive down costs due to multiple other factors including true price discovery, increased competition & long-term market growth through anticipation and higher certainty for investors & developers.

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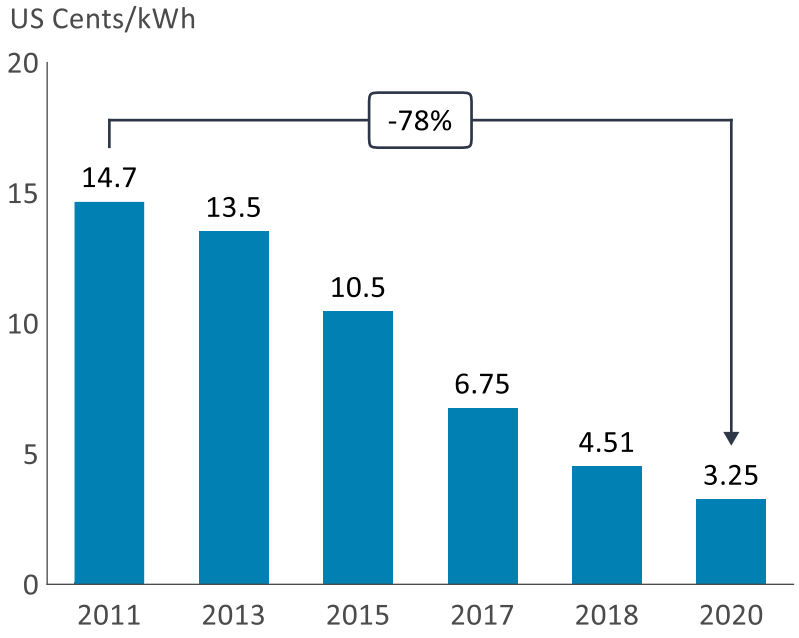
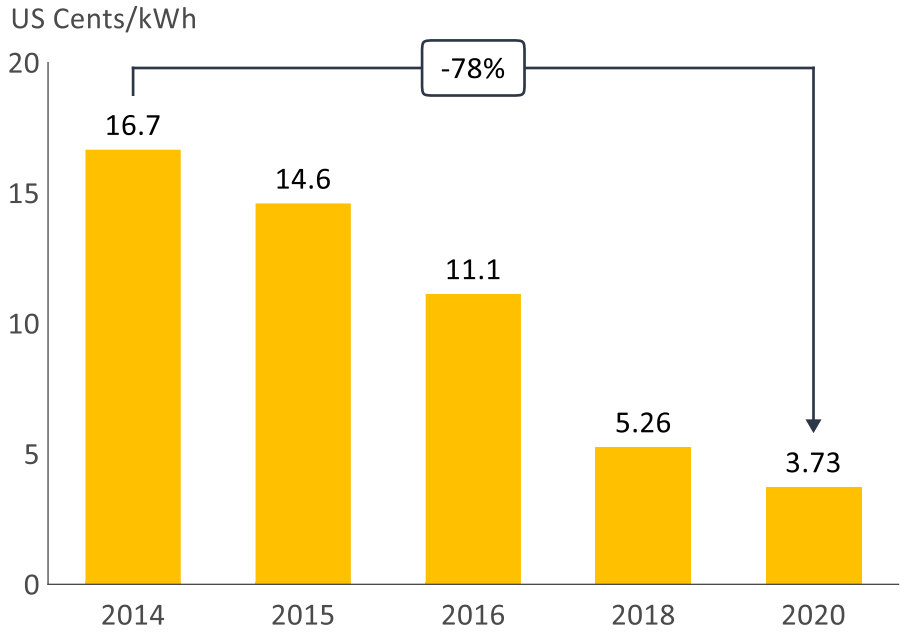
PAKISTAN HAS EXPERIENCED 78% COST REDUCTION IN RE IN LESS THAN A DECADE: FOCUS MUST MOVE BEYOND COST

Levelized Tariff Trend for Wind Energy



Source: NEPRA

Levelized Tariff Trend for Solar Energy



Source: NEPRA

Wind

- 78% reduction in levelized tariff for wind power projects in less than a decade
- 60% contraction in EPC costs over the same period
- The difference in levelized tariff and EPC costs reductions may be attributed to declining cost of finance, market maturity and lower return on investment

Solar

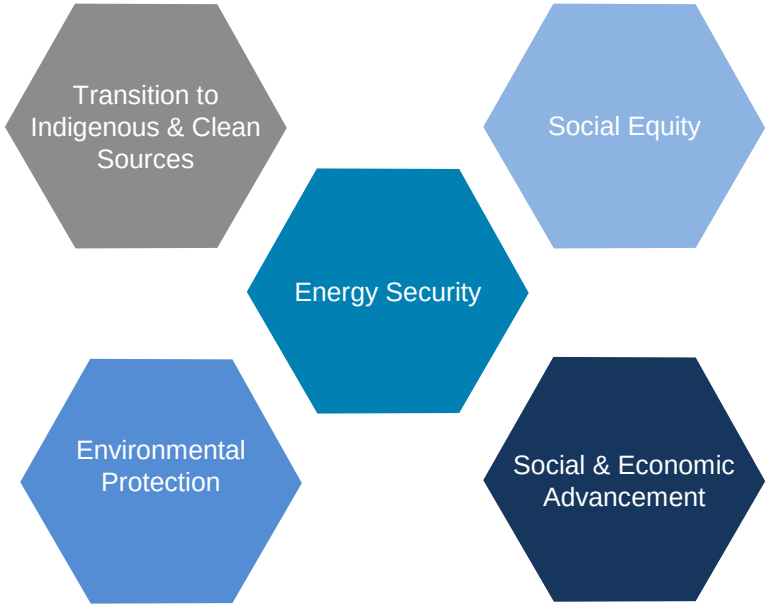
- 78% reduction in levelized tariff for solar PV projects between 2014 to 2020

Comments

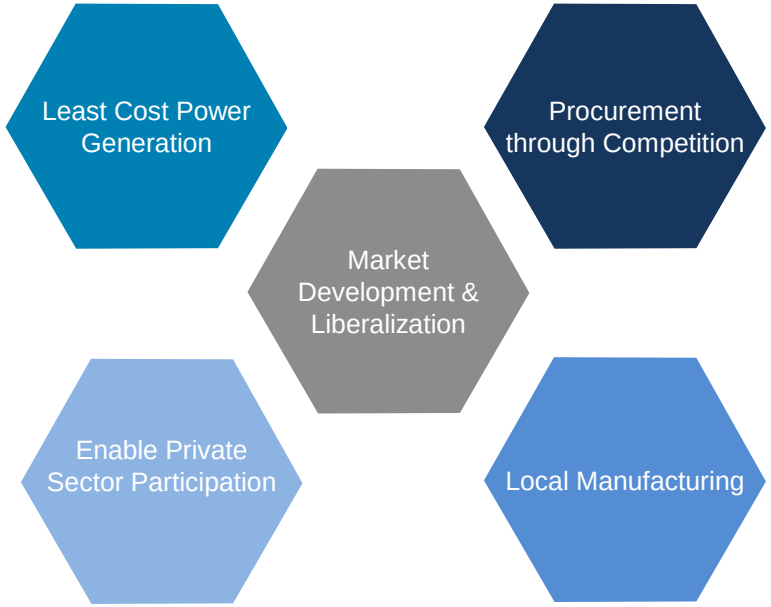
- Tariffs of both solar and wind have already seen drastic reduction under FiT/Cost-plus regimes. Pushing for further cost reduction without giving due diligence to other parameters can be unrealistic and can even be detrimental for growth of local and indigenous RE market

PAKISTAN MUST ALIGN AUCTIONS WITH NATIONAL ENERGY POLICY OBJECTIVES

SOCIETY & ENVIRONMENT



POWER MARKET



Comments

- A well-designed set of RE auctions in Pakistan will need to incorporate all the goals set in national electricity policy and plan while maintaining “least cost” main evaluation criteria as per ARE Policy 2019

FROM COST TO VALUE: SUCCESS OF RE AUCTION

1. **Adapt Auctions to the Specific Market Conditions**
2. **Foster Social Acceptability**
3. **Strengthen Domestic Supply Chains**
4. **Prevent Domination of Market by a Few Players**
5. **Reduce Barriers to Entry**
6. **Promote Domestic Research & Development**

Comments

- While least cost power generation is included in Pakistan's national energy policy objectives, trends indicate that costs have already reduced drastically over the past years. As the technologies of wind and solar are already mature, a further substantial reduction cannot be expected.
- Keeping design of auctions limited to price can start a race to zero, destroying the domestic and indigenous renewables market which is already under stress due to post Covid global supply chain disruptions, removal of sales tax exemptions and imposition of additional advance tax on renewable energy equipment import.
- Moving beyond costs means that domestic market is allowed to grow, the process is streamlined to ensure maximum participation and competition, barriers to entry are reduced, social acceptability is fostered, and concentration/domination of few players is avoided.

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ACTOR DIVERSITY: SEVERAL COUNTRIES APPLY INCLUSIVE DESIGN ELEMENTS TO INCREASE LEVEL OF COMPETITION AND FOSTER SOCIAL ACCEPTABILITY

Uruguay

In Uruguay project sizes were limited to 10 MW (2006), 20 MW (2007), 30-50 MW (2009) with only one award per bidder, 50 MW (2011) with up to 100 MW per bidder. Limitations were imposed for intake at geographic nodes, both because of grid limitations and to disperse the socioeconomic benefits of projects.

In 2010, only one project could be awarded per bidder and in 2011 this was changed to more than one, for up to 100 MW per bidder. All projects were subject to a 20% local content requirement and companies that exceeded that quota were granted a higher price.

Spain

In the upcoming third auctions of Régimen Económico de Energías Renovables (REER) 2022, for CSP projects, Spain has set a limit of maximum 100 MW per bid and 180 MW per bidder. Moreover, Spain plans on reserving an additional 140 MW in 2022 auctions for local photovoltaic installations of less than or equal to 5 MW, indicating a truly inclusive design. Bids are also required to submit a local content plan describing the effect of project on local employment and the supply chain.

Argentina

Project sizes were limited to between 1 to 100 MW for both solar PV and wind in first and second rounds of RenovAr program, 2016 & 2017. Hydro projects were limited to 20 MW. Due to limitations of the transmission system, region specific RE quotas were also made. In round 3 (2018) and round 4 (2019) of RenovAr, this limit was further reduced to 10 MW per project and 20 MW per province (except in populous Buenos Ares).

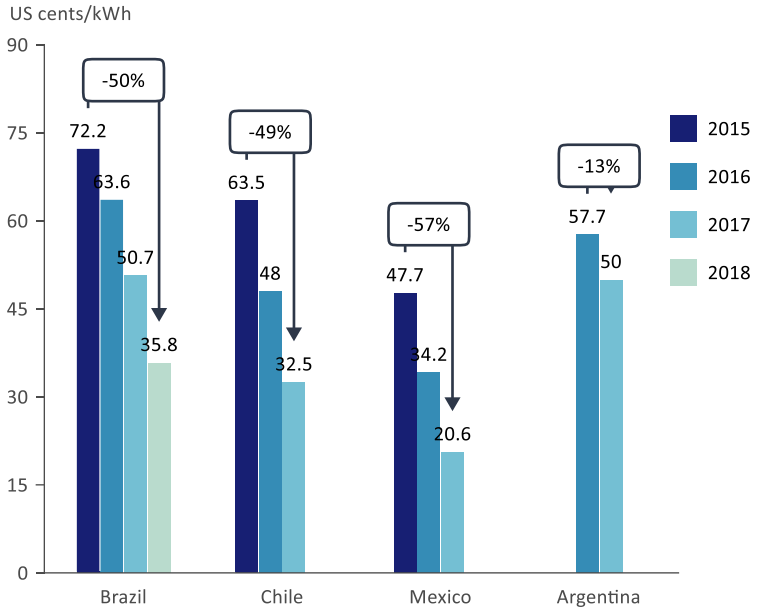
Germany

Solar PV projects were limited to 10 MW. Geographical distribution of RE was also carried out. Tariffs were adjusted (upwards or downwards) to encourage participation in areas far from grid. “Citizen projects” were introduced and incentivized through lower bid bonds (around 20 USD per kW), with less qualification requirements, longer realization periods (54 months) and preferential tariffs.

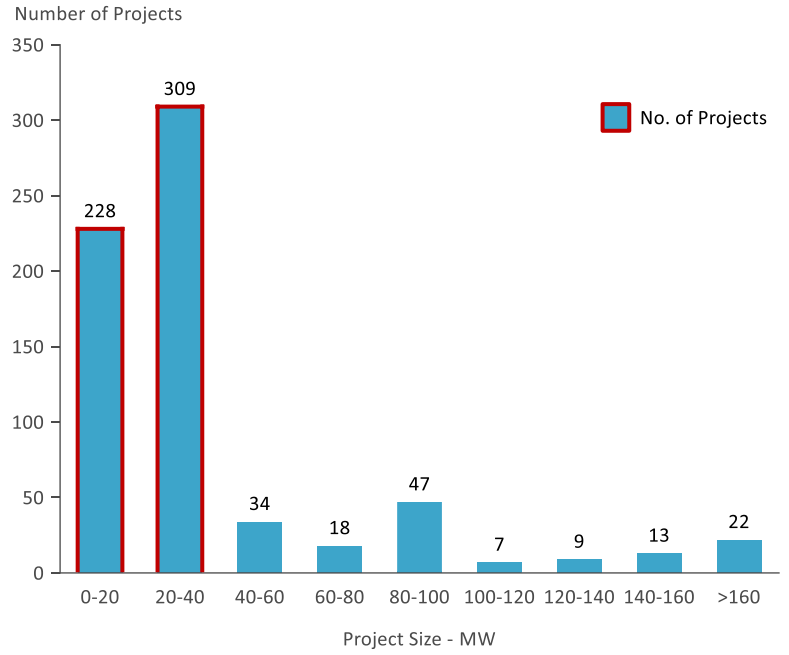
Comments

- Limiting project size is an important way of reducing the risk of concentration and spreading benefits across a large range of developers. Setting quotas for bidders protects against risks of monopolization/concentration and ensures that that one winner does not take all or most of the volume available.
- Preventing monopolization of market and dispersing socioeconomic benefits is vital for enabling market growth and regional/national socioeconomic advancement.

EXPERIENCE IN LATIN AMERICAN COUNTRIES SHOWS SMALLER PROJECT SIZE DOES NOT NECESSARILY MEAN HIGHER LEVELIZED TARIFFS



Source: Inter-American Development Bank



Source: Inter-American Development Bank
**The above graphic includes auction data from Brazil, Chile, Mexico, Argentina, Peru & Jamaica from 2015 to 2019.*

Latin America

- The majority of the projects in Latin America were smaller than 40 MW as indicated in the upper figure, yet the prices continued to go down. Between 2015 and 2018, Brazil saw a 50% reduction in price while from 2015 to 2017, Chile saw a 59% reduction and Mexico saw a 57% reduction in price. Between RenovAr 1 and RenovAr 2.5, Argentina saw a 22% reduction in price.

Japan

- In Japan size limits did not decrease market interest but in fact led to higher participation. In the 4th round of 2019 RE auctions, size limits were decreased from 2 MW to 500 kW. This resulted in a three-fold increase in the number of bids, moreover, did not prevent prices from falling as compared to previous rounds.

Comments

- Auction results indicate that limiting project size is not a deterrent to price reduction or volume procurement

STREAMLINING PROCEDURES AND SETTING UP DEDICATED ENTITIES AT NATIONAL AND REGIONAL LEVELS LEAD TO SUCCESSFUL IMPLEMENTATION OF AUCTIONS

Morocco

Moroccan electricity sector is vertically integrated under the National Agency for Electricity and Water (ONEE). In order to carry out solar auctions, a separate agency titled Moroccan Agency for Solar Energy (MASEN) was created in 2010 which signed a PPA with ONEE. In 2016, MASEN was extended to include wind and hydro as well and subsequently renamed the Moroccan Agency for Sustainable Energy (MASE). MASE acts as both procurer and off-taker of RE power from auctions, provides debt financing, and works with selection and preparation of sites, among other activities.

Argentina

RenovAr acted as both the procuring agency and the off-taker on behalf of distribution companies, thus providing a single channel for auction related exchanges. The country offered guaranteed and structured loans through FODER which is a national trust fund for RE. It ensured long-term loans, interest rate subsidies etc.

As a result, RE auctions led to an overwhelming investor interest in Argentina which led to more capacity being awarded than what was initially requested.

South Africa

The government of South Africa launched the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in March of 2021 with a goal to procure 2.6 GW of renewable energy. By the end of 2021, it had successfully allocated 2.58 GW divided across 25 wind and solar projects.

India

Multiple states in India such as Gujarat, Telangana, Rajasthan and Tamil Nadu have taken initiative to promote renewables in their region by devising customized policies. These policies are set up with the aim to create a facilitative environment and enable prospective local developers to harness these sources. As a result, almost half of the staggering 30 GW of renewable energy (mostly solar PV) procured in India has been done through the efforts of state (provincial) governments.

Comments

- Setting up a centralized, transparent and dedicated agency has been crucial for implementing successful auctions.
- In India, regional/provincial RE policies have spurred the growth of renewable energy capacity

LOCAL CONTENTS REQUIREMENTS RESULT IN MIXED OUTCOMES

South Africa

Competitive bidding process launched in 2011 requires 49% of involved entities to be South African and at least 30% of shareholders to be Black. 5% of ownership must be by black women. It also mandates that 25% of workers on RE projects must be black and at least 40% of construction content must come from local sources.

Brazil

Initially a requirement of 60% local content was set in place for wind. This requirement was later removed and only kept as a loan requirement.

India

The local content requirement in India has been controversial. The govt. initially set a 50% local content requirement. US launched a formal complaint with WTO which resulted in a ruling against India. After 2 rounds, local content requirements were lowered or removed altogether. Since then, govt. has been considering levying import duties on solar components.

Denmark

Denmark is unique in requiring developers to include local actors as minimum 20% owners of projects.

Comments

- Local Value Creation (LVC) includes a wide range of economic activities which use locally available input flows and generate output flows for the local community. All types of RE Auctions promote LVC, however, they can be fine tuned to bring maximum benefit to the local society and regional economy

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CASE IN PERSPECTIVE: REIPPPP IN SOUTH AFRICA

The Renewable Energy Independent Power Producer Procurement Programme was launched by the government of South Africa in 2013 with its fifth renewable energy bid-window floated in March of 2021, procuring 2.58 GW of Solar and Wind, a total investment of $3.25 billion. The entire REIPPP has resulted in procurement of around 6.4 GW of RE and a total investment of $13.7 billion.

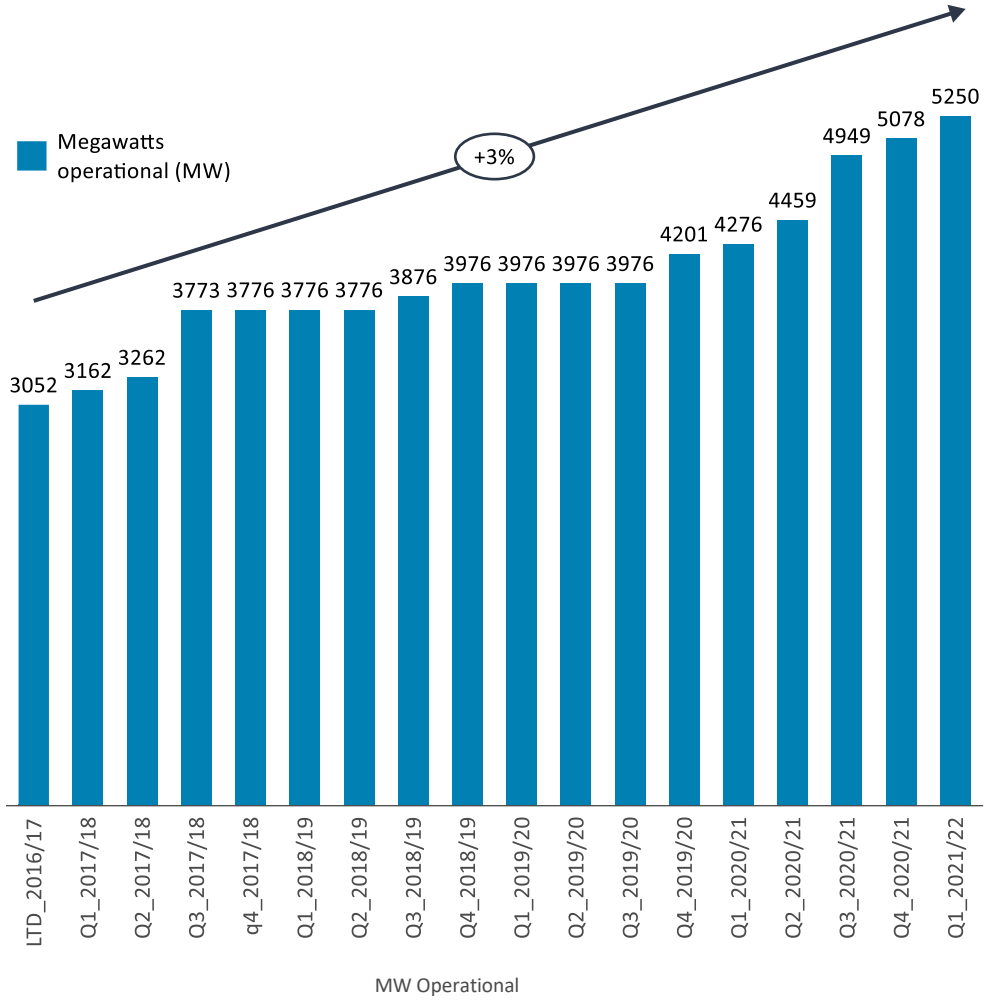
A Design Beyond Cost: The IPPP was designed not only to procure energy but also to cater for the national development objectives of job creation, social upliftment, local industry development, and the broadening of economic ownership.

Socioeconomic Development: Independent power producers are required to report on initiatives and contributions for socioeconomic improvement of the communities in which they operate.

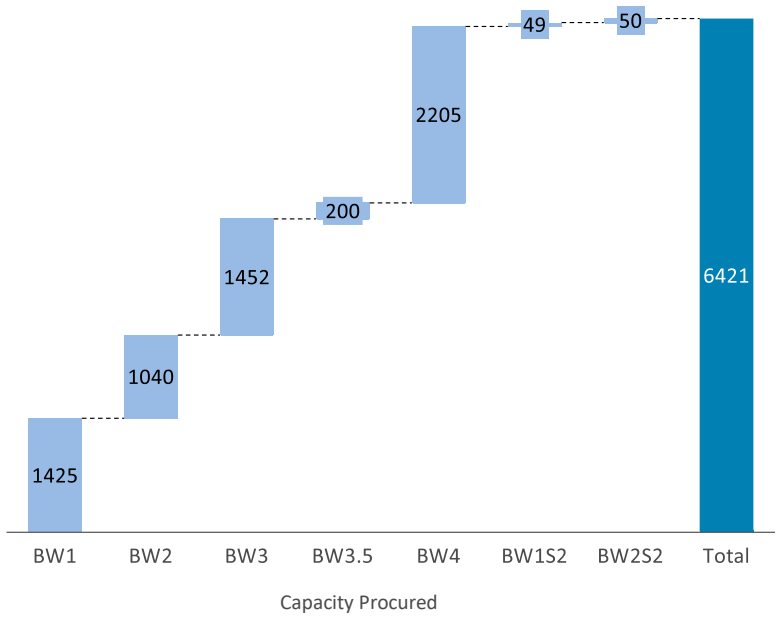
Geographic Distribution: The REIPPPP projects of the first seven bid windows were distributed across all nine provinces of South Africa. This distribution was primarily due to the spread of renewable energy resource potential. However, increasing geographic spread of projects is also an important contributor to dispersing socioeconomic benefits of RE projects.

Domestic Market and Shareholding: To create a balance between foreign investment and domestic ownership, local shareholding is an important component of REIPPPP

PROCURED PORTFOLIO OF RE CAPACITY HIGHLIGHTS SUCCESS OF REIPPPP



Source: IPPPP Overview - June 2021

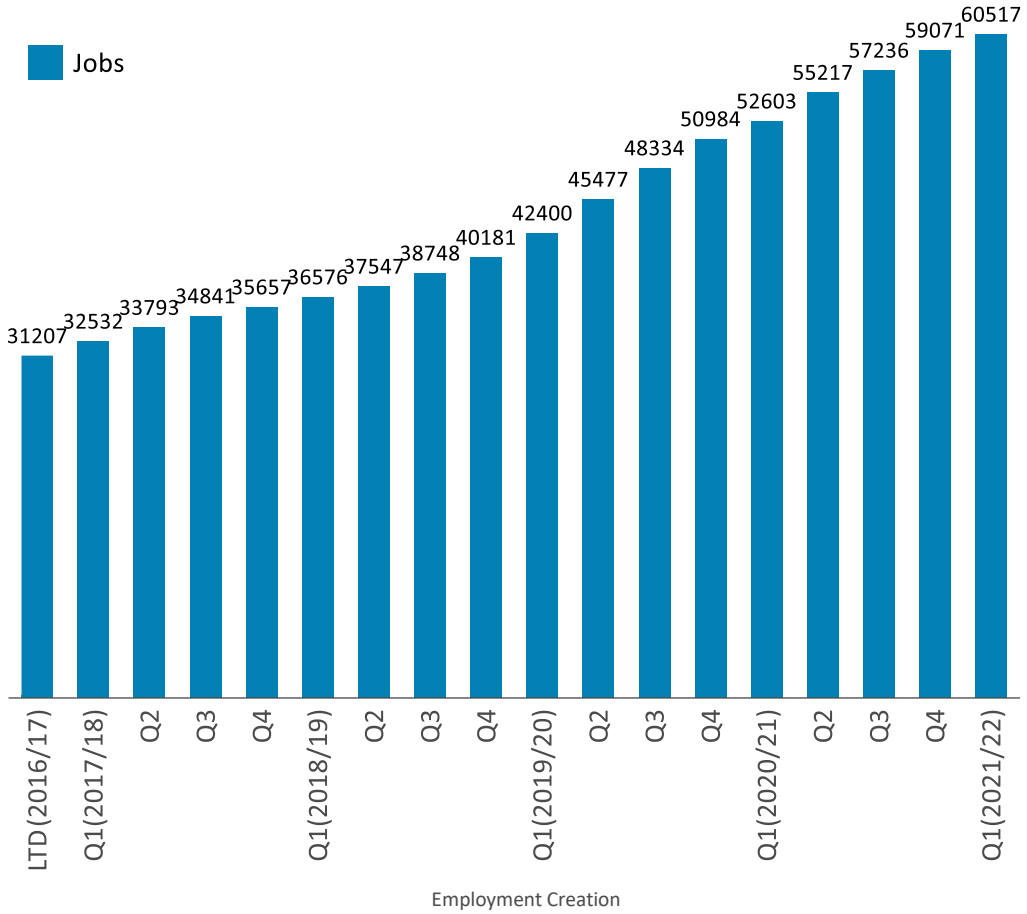


Source: IPPPP Overview - June 2021

Comments

- The seven rounds of REIPPP, starting from November 2013, have seen successful procurement of 6,422 MW of electricity capacity from 112 RE Independent Power Producers (IPPs) out of which 5,250 MW from 81 IPPs has been connected to the national grid
- As of June 2021, 92% of IPPs have started operation according to schedule, indicating a high realization rate
- A total of 62,949 GWh of energy has been generated from renewable energy sources under the REIPPP since its inception, offsetting 63.9 Mton of CO_2 emissions and saving 75.5 million kiloliters of water

REIPPPP SUPPORTS BROADER DEVELOPMENT OBJECTIVES IN TERMS OF EQUITABLE OWNERSHIP AND JOB CREATION



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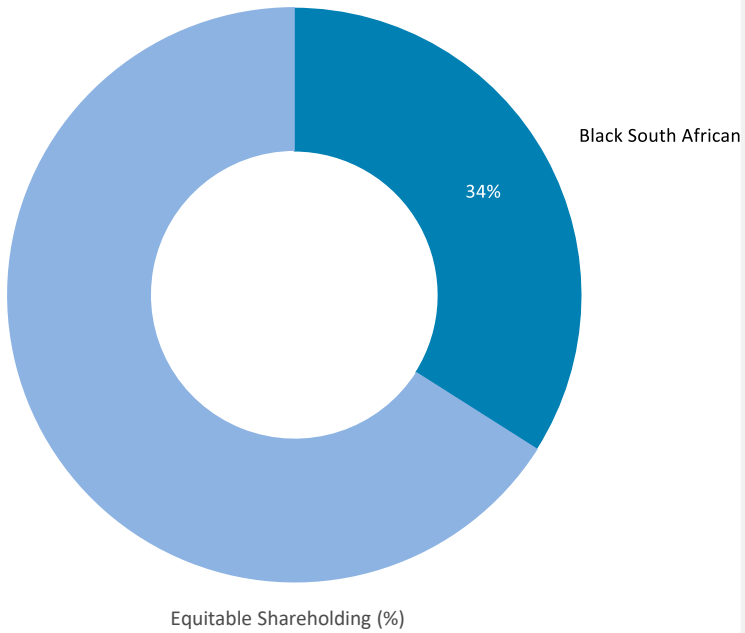
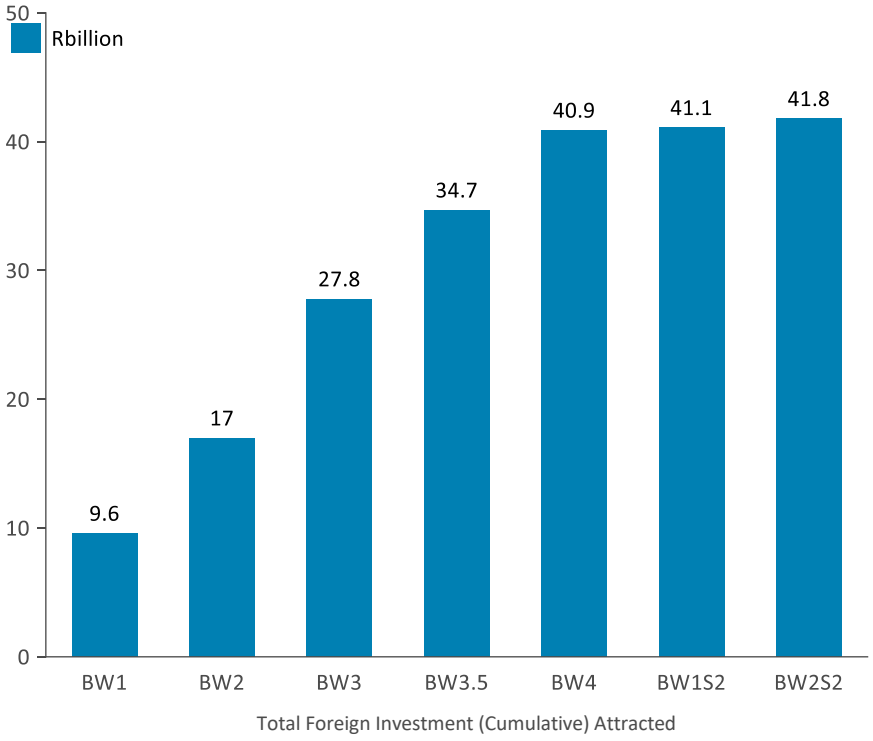


Source: IPPPP Overview - June 2021

Comments

- REIPPPP mandated 49% of involved entities to be South African, and at least 40% of construction content coming from local sources. As a result, 60,517 job years have been created for South African citizens to date.
- The program also mandated least 30% of shareholders to be Black. As a result, black South Africans hold 34% of the shares across the complete supply chain of REIPPPP projects.

REIPPPP HAS EFFECTIVELY CAPTURED PRICE DOWNWARD TRENDS WHILE ACHIEVING SOCIO-ECONOMIC BENEFITS



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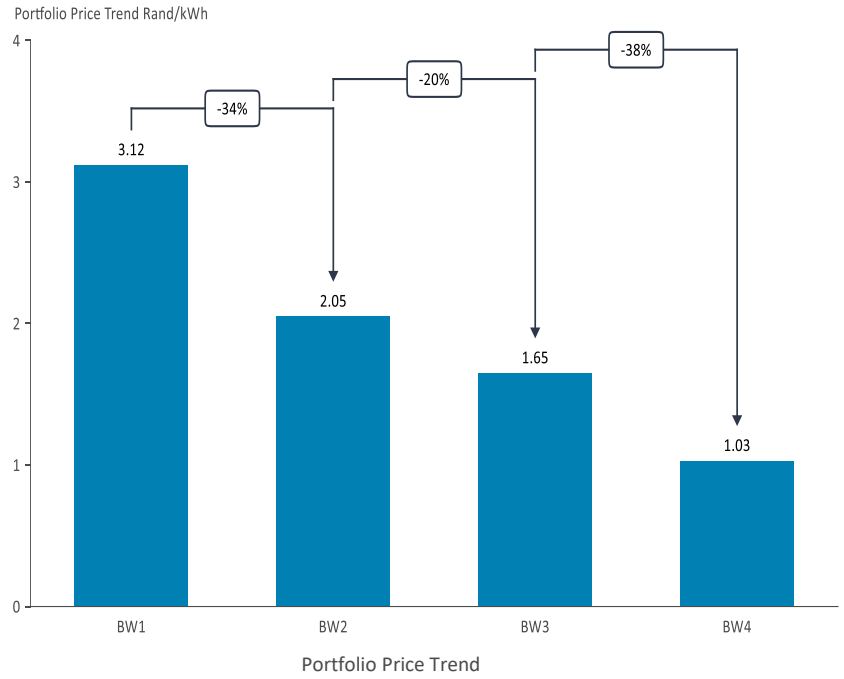

Source: IPPPP Overview - June 2021

Comments

- For the seven REIPPPP rounds (BW1 – BW4 & 1S2 & 2S2) there was a total of R41.8 billion (USD 2.74 billion) in foreign equity and financing
- Bid cycles of the program successively resulted in lower and lower prices, with tariffs in BW4 resulting in an average of R1.03 per kWh (6 US cents per kWh). Tariffs are expected to drop further in future rounds.

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WAY FORWARD FOR PAKISTAN

1. **Inclusive and Participatory Market Development**
2. **Avoid Dominance and Concentration**
3. **Disperse Socioeconomic Benefits**
4. **Prevent Barriers to Entry**

Moving for an auction design beyond cost, would imply prioritizing other non-cost related energy policy objectives and global best practices. This entails allowing domestic markets to grow, streamlining the bidding process to ensure maximum participation and competition, reducing barriers to entry, fostering social acceptability, avoiding concentration of projects and above all inclusive and participatory development.

RENEWABLES FIRST

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