RENEWABLES FIRST

Consumer Owned Renewables (CORE) Finance Mapping

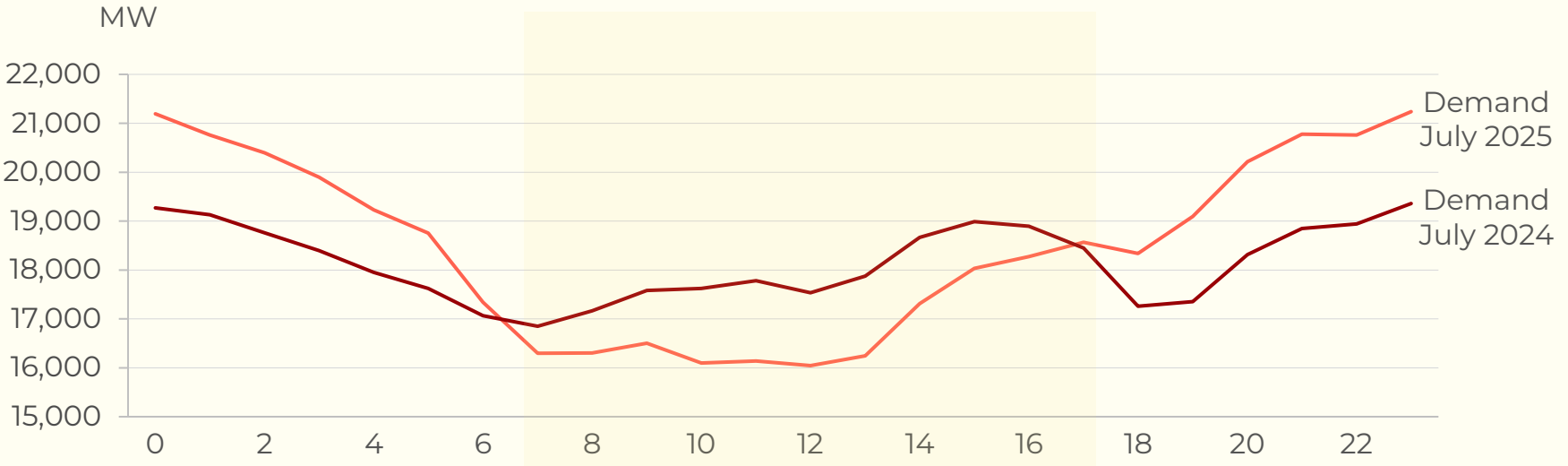
Bridging information asymmetry to accelerate clean energy finance

Solar is now Pakistan's most effective hedge against energy price shocks and geopolitical risk

1. Pakistan's Solar Rush

2. Burning our way out of the Peak

Hourly electricity demand profile – July 2025 vs 2024



From affordability to energy security, a new paradigm in Pakistan's clean energy debate

"BTN" Behind the Numbers	- Less than 1 in 5 households are solar yet are reshaping Pakistan's landscape. - Limited to higher socio-economic class. - Unexplored potential if the other 80% are included.
The affordability gap	- The average Pakistani household earns roughly USD 3,500 a year. - A 10 kW system costs about the same, with a battery adding another 30–40%. - Going solar means handing over a full year's income, a cheque most families cannot write.

Average annual household income, 2024–25, at 1 USD = 280 PKR.

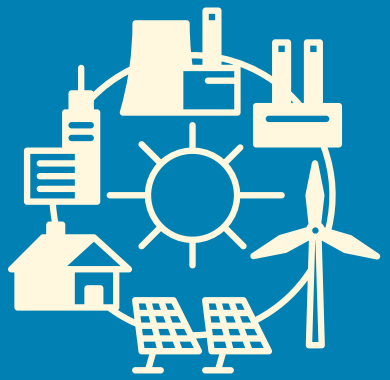
Quintile	*Urban (USD/yr)*	*Rural (USD/yr)*	*Total (USD/yr)*
1st	1,818	1,788	1,794
2nd	2,394	2,341	2,363
3rd	2,780	2,824	2,817
4th	3,472	3,394	3,445
5th	6,297	5,550	5,971
Total	**4,147**	**3,092**	**3,522**

Answer to the affordability question is three syllables long, “Financing”

Results of Residential Use Case Simulations by IEEFA

System Size	*Battery Size*	*LCOE (PKR/kWh)*	*Payback Period*
10 kW	0	0.049	1.5
10 kW	5 kWh	0.052	2.7
10 kW	10 kWh	0.064	3.3

- Solar loan a major hurdle for most customers
- **The answer lies in the asset itself:** solar generates monthly savings that beat the hurdle rate of nearly every available financing option.
- The loan, in effect, pays itself off, funded by the very bill reductions the system was installed to deliver.



Mapping Distributed Solar Assets

A Practical Framework based on Primary and Secondary sources

CORE Finance Mapping

Primary Data Collection → **Data Integration & Triangulation** → **Final Estimates**

1. Primary Data Collection

- ✓ Geospatial Mapping
- ✓ Surveys with 393 solar retailers
- ✓ Industry Consultations
  - ✓ 07 EPCs & Pakistan Solar Association (PSA)
  - ✓ 13 Financial Institutions (Banks & MFBs)
  - ✓ Other stakeholders; world bank consultant, PMIC consultant, government advisors

2. Secondary Data Integration

- ✓ *National Datasets:*
  - NEPRA Reports & Hearings
  - PBS HIES Reports 2024-25
  - PBS Agricultural Census 2024-25
- ✓ *Other Reports & Estimates:*
  - PRIED Report 2025
  - TransitionZero Report 2025
  - Govt. Advisor estimates 2024-25

3. Data Triangulation

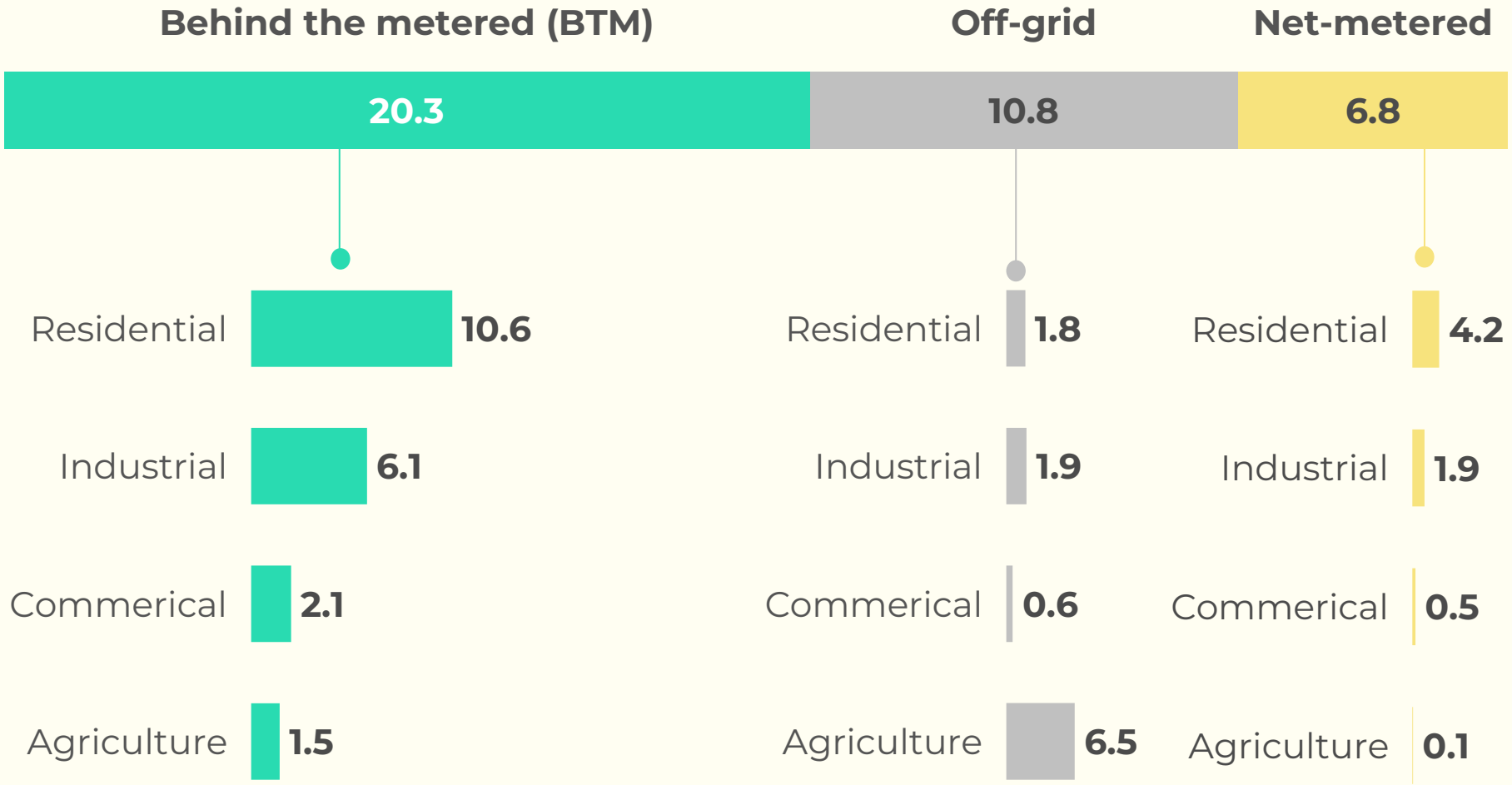
- ✓ Derivation of final estimates using primary data and national datasets
- ✓ Cross-validation of final estimates with other reports & estimates
- ✓ Ensuring consistency across system sizes, pricing, deployment, and financing patterns

4. Output

- ✓ Segment-wise deployment patterns (costs, sizes, capacity)
- ✓ Total financing flows
- ✓ Debt vs equity financing structure

Develop the first bottom-up estimate of Pakistan's distributed solar market by mapping deployment and financing flows across segments. A robust, bottom-up evidence base built through triangulation of field data, market consultations, and national statistics.

Solar deployed 38 GW



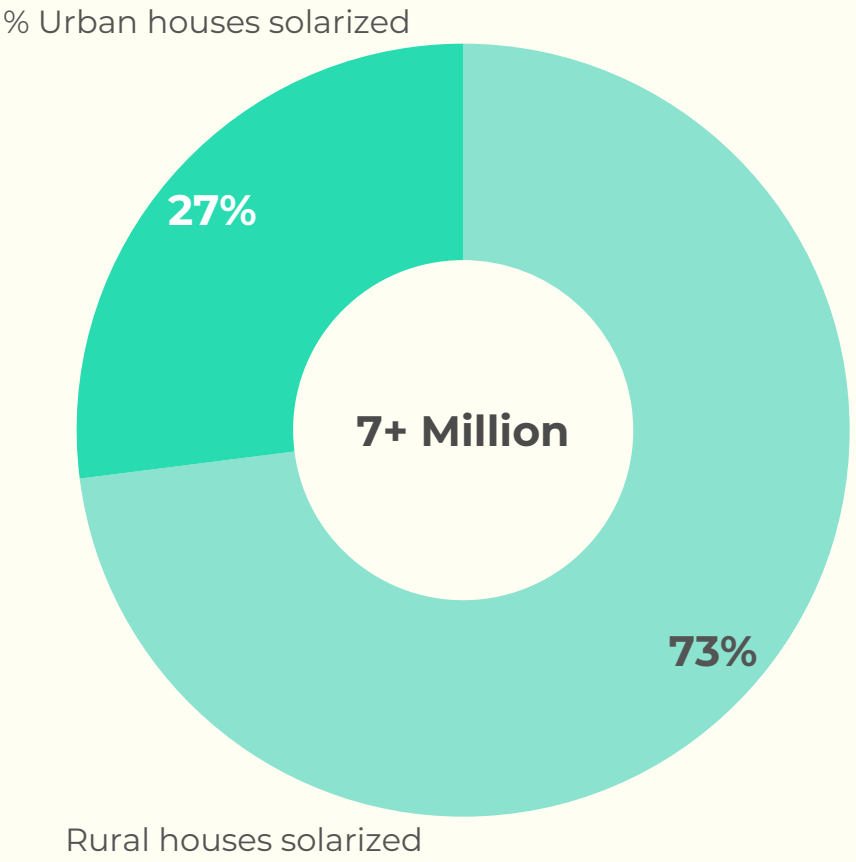
Residential Segment

Methodology for estimating installed residential solar capacity 2025

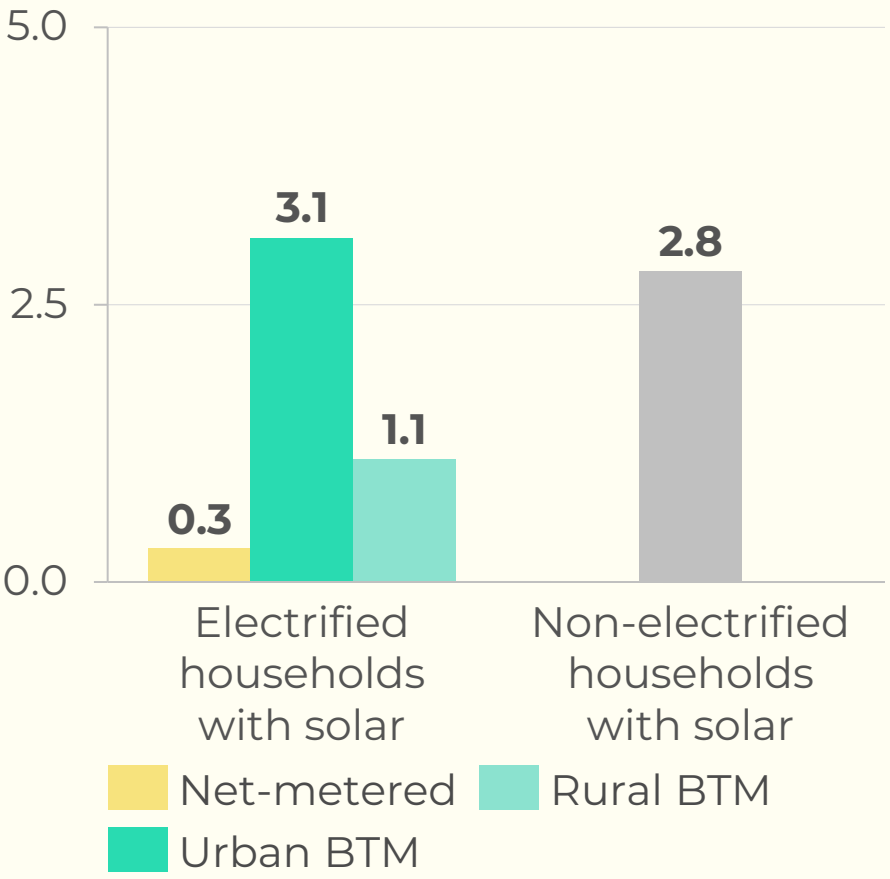
Data collection	**Estimate total households 2025**	**Energy access split in rural & urban** Grid, Grid + Solar, Off-grid
Method	**Assign system sizes**	**Source**
Adjust	**Oversizing in net-metering installations**	✓ PBS Census 2023,2025, population & household growth rates & NEPRA reports. ✓ using geospatial, surveys and EPC insights. ✓ EPC insights.
Output	**Final residential capacity**	

Residential solar adoption is on the rise, reaching seven million households by 2025

Total houses solarized 2025, rural vs urban



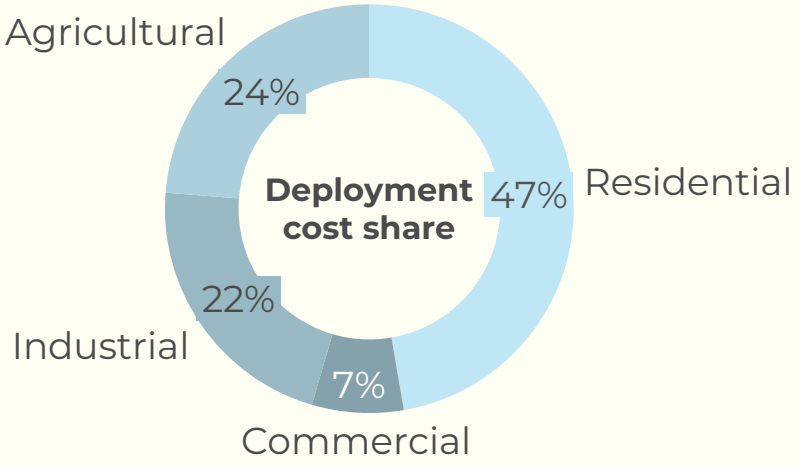
Electrified and non-electrified households, 2025

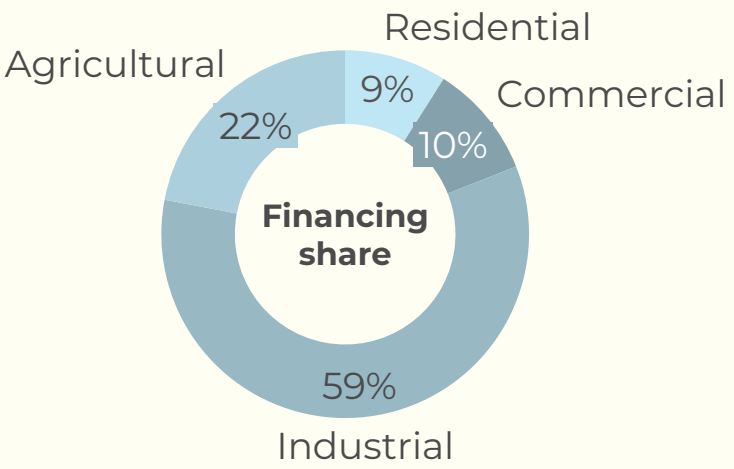


Residential Segment – Core Insights

1. BTM is the largest & fastest-growing segment yet banks are entirely absent.
2. Access beats price where customers accept 3-4x costlier informal credit for speed, flexibility & simplicity.
3. No mid-ticket lender exists for ‘PKR 500k-1Mn’ - the largest BTM portion is unserved by formal lending.
4. Residential is only 9% of total solar lending, massively underserved relative to market value of 47%.
5. Solar + storage is the next frontier.

The landscape changes from Deployment to Financing





16.6 GW

Residential

Total Deployment Cost (USD mil)	**6,436**
Solar Financing Value (USD mil)	**40.4**
Financing Penetration	**0.06%**

3.3 GW

Agricultural

Total Deployment Cost (USD mil)	**986**
Solar Financing Value (USD mil)	**48.2**
Financing Penetration	**4.9%**

9.9 GW

Industrial

Total Deployment Cost (USD mil)	**2,954**
Solar Financing Value (USD mil)	**277.9**
Financing Penetration	**9.4%**

8.1 GW

Commercial

Total Deployment Cost (USD mil)	**3,232**
Solar Financing Value (USD mil)	**101.4**
Financing Penetration	**3.10%**

Renewables First (RF) is a think-and-do-tank for energy and environment. Our work addresses critical energy and natural resource issues with the aim to make energy and climate transitions fair and inclusive.

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