Heat Pump Regional Learnings

Factors affecting heat pump viability

Electricity & fuel prices	The ratio between electricity and fuel price is one of the most influential factors in determining the financial viability of a heat pump. In most regions, electricity prices are higher than fuel, but the delta is what makes or breaks the case.
Grid stability	Electrification requires a reliable and consistent electricity supply. In certain geographies, this is not the case. Additionally, even in stable grids, modernization is needed to enable increased renewable electricity to flow through it.
Need for increased transformer capacity	Many textile manufacturers need to increase their transformer capacity to receive the electricity needed to power a heat pump. This requires approvals, often from local government or industrial parks. Additionally, these upgrades are costly and add at least one year to project payback.
Availability of renewable electricity (RE)	In some regions, renewable electricity is harder to procure due to a single utility market or price and availability. This impacts a heat pump's emission reduction potential and its economics.
Local vendor availability	Not all production countries have local vendors, which can add equipment import duties to the overall project cost.
Availability of local contractors	Since heat pump technology is still relatively new, few contractors have experience supporting installation.
Financial incentives	In certain geographies, industrial electrification is a national priority and incentives are available for implementation. This can greatly impact the project's financial viability.

Heat pump viability factors by region

Abbreviations:

DPPA: Direct Power Purchase Agreement

IREC: International Renewable Energy Certificate

PPA - Power Purchase Agreement

Region	Electricity vs. fuel costs(to date)	Renewable energy access	Grid stability	Capacity for transformer upgrades	Local heat pump vendors	Local engineering expertise	Government financial incentives
Bangladesh	Electricity is cheaper than gas in many areas.	Very limited. Rooftop solar capacity is negligible, no c-PPAs exist, and iRECs have limited availability. availability	Grid connections are limited and face frequent reliability challenges.	Likely difficult due to pre-existing grid stability challenges.	None	Available with limited experience.	None
China	While the exact ratio varies by region, electricity is more expensive	Emerging availability via tariff & PPAs.	Very reliable	Easy, but requires approval from the local grid bureau.	Large market	Available with limited experience.	There are no heat pump-specific subsidies, but energy

	than natural gas and steam.						conservation subsidies are available, and government focus exists.
India	Industrial energy costs vary by region and tariff, with electricity generally costing more than coal and being comparable to natural gas. Seasonal biomass can be highly competitive with fossil fuels in some regions.	Emerging availability via tariffs & PPAs.	Reliable	Determined by state; prohibited in some states	Large market	Contractors with strong engineering backgrounds are available; however, they may lack knowledge of textile processes.	None
Italy	Electricity is more expensive than natural gas, but relatively	Widely available	Very reliable but suffered during the repetitive	Easy	Medium-sized market	Available with experience	Largely available (e.g., >50%)

	affordable when compared with other regions. Natural gas prices are increasing.		summer heat waves.				
Pakistan	Electricity is generally more expensive than natural gas; however, natural gas prices are rising.	Only one utility, no green tariff, and no PPAs. IRECs only.	Mostly reliable, but faces regional challenges due to imported fuel shortages.	Likely challenging, due to already existing grid stability challenges	Limited local vendors	Available with limited experience	None
Türkiye	Electricity is more expensive than natural gas, but relatively affordable when compared with other regions. Natural gas prices are increasing.	Available	Very reliable	Determined by local authorities. Should be easier in Industrial zones.	Limited	Limited	Available

Vietnam	Biomass in the north (wood chips) is more expensive than the south (rice husks). National prices are rising due to increased demand from industry and grid-scale co-firing.	iRECs are cheap and plentiful, and rooftop solar has been widely adopted. However, a delay in DPPA legislation (especially for smaller offtakers like the textile sector) means there are still no corporate PPAs.	Reliable in the south all year. In some areas of the north, extended droughts can impact hydroelectric production.	Determined by the industrial zone and provincial authorities. To date, we are unaware of any rejected applications.	None	Available with limited experience	None

While this analysis is based on a limited data set, it provides a better understanding of what is realistically possible in different national contexts, highlights opportunities to move faster in regions such as India and China, and identifies geographies where greater focus is needed. These insights inform the work of Aii and its partners.