Water Heaters in Pakistan

A presentation to Stakeholders
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CLASP
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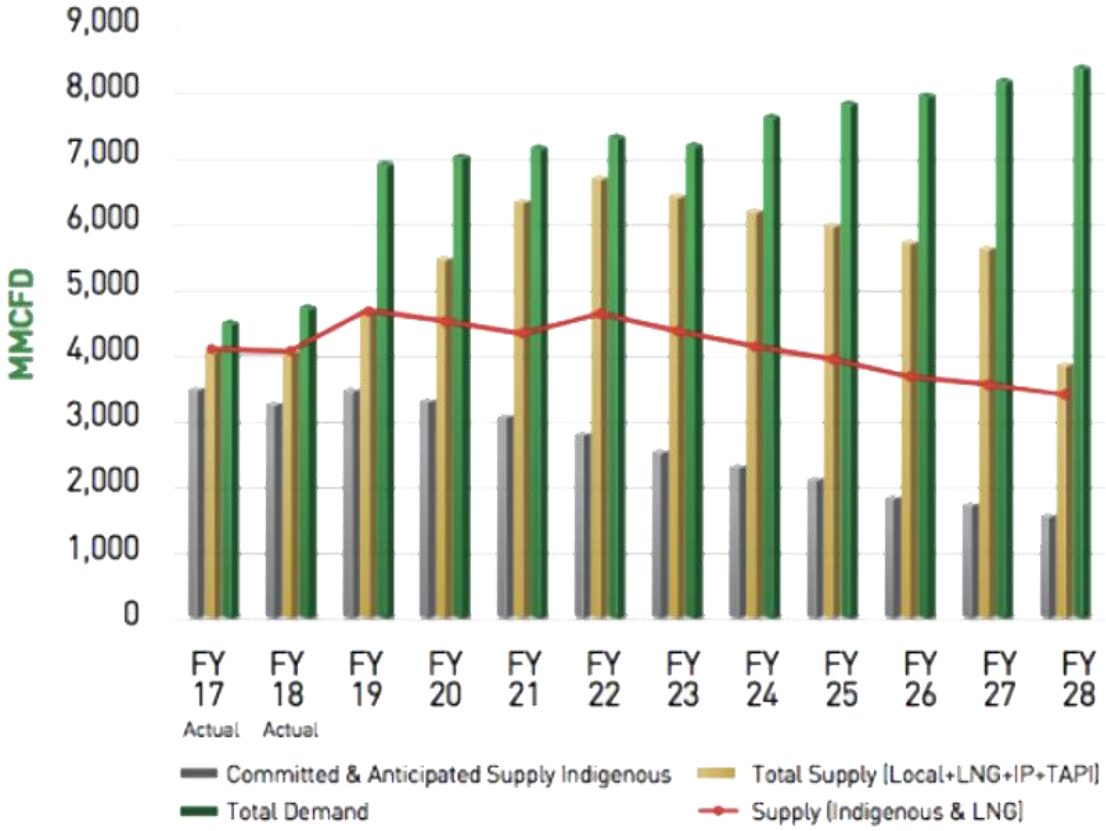
National Gas Consumption

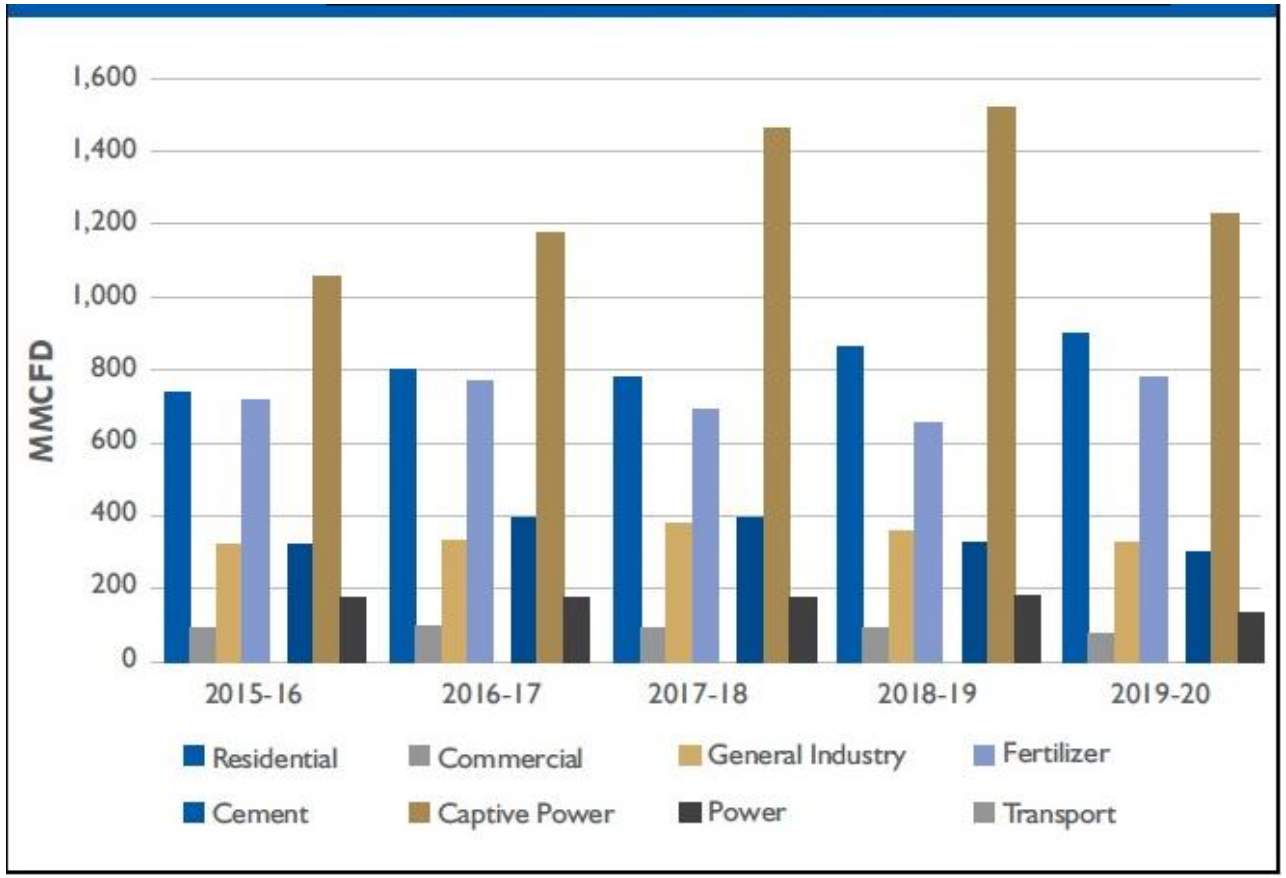
- Pakistan consumed **4,084** MMCFD(million cubic feet per day) of natural gas in year 2019.
- By 2028, Pakistan's demand for natural gas is projected to be above **8000** MMCFD, while supply projected to be below **4000** MMCFD natural gas.[1]
- Supply Distribution in 2028:
  - Indigenous
  - LNG
  - Turkmenistan – Afghanistan – Pakistan – India Gas Pipeline (TAPI) - *planned*
  - Iran – Pakistan Gas Pipeline (IP) - *planned*
- Indigenous supply is on the decline, and the gap is planned to be filled by imported RLNG, IP, TAPI
- International Gas Prices are increasing.



1. Pakistan Industry Report, 2018-2

National Gas Consumption by Sector

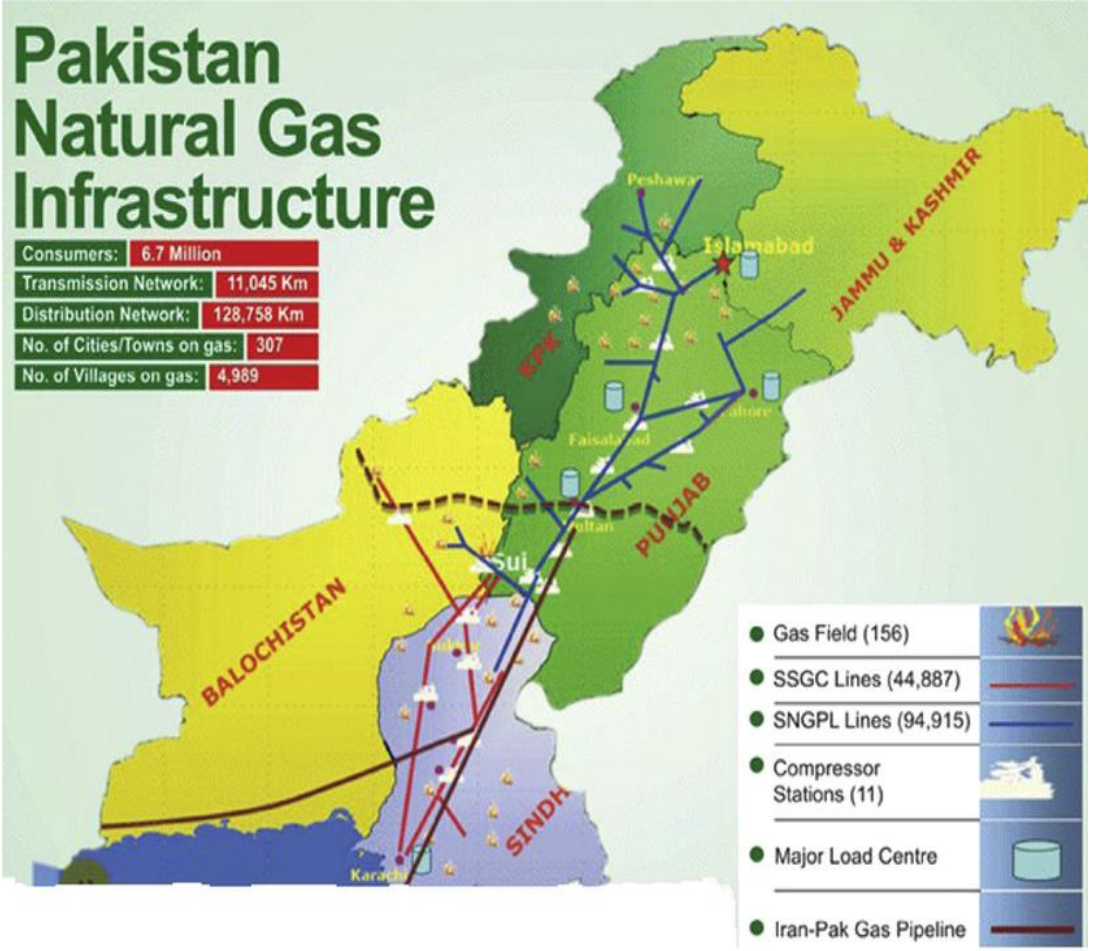
- Residential sector was 2nd highest consumer in 2019-20. **(24%)** [1]
- Residential sector consumed ~ **888** MMCFD of natural gas. [1]
- Primary usage of natural gas in a typical household:
  - Space heating
  - Cooking
  - Water heating



1. Petroleum Industry Report, 2019-20

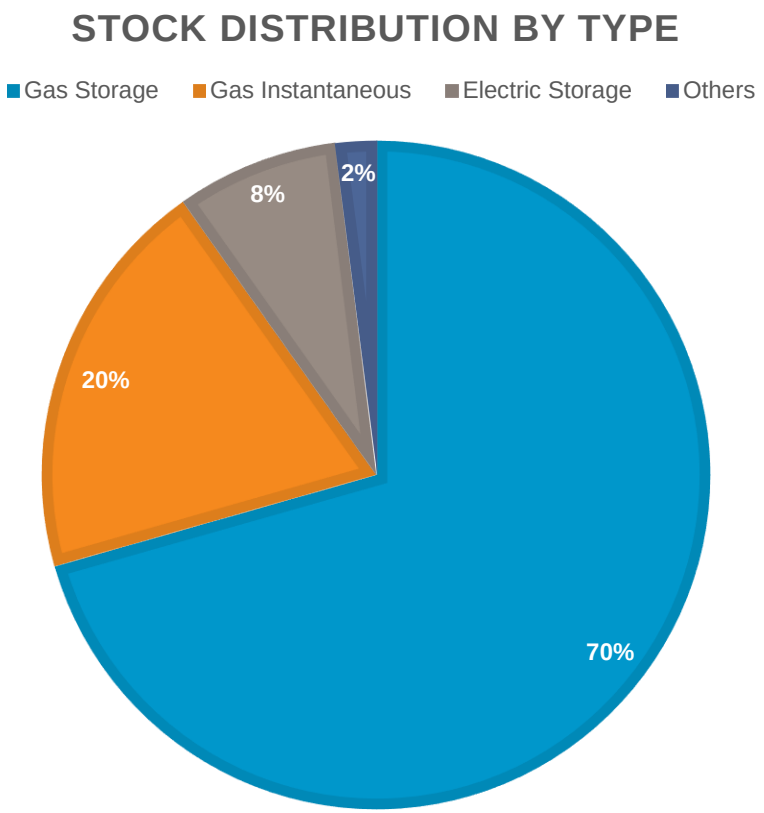
Gas Supply Utilities

- There are two utility companies in operation with a total of **10.12 million** consumers:
  - SNGPL
  - SSGC
- SNGPL operates in the northern half of the country and has the larger share, serving **7 million** consumers.
- SSGCL has the remaining **3.12 million** consumers.



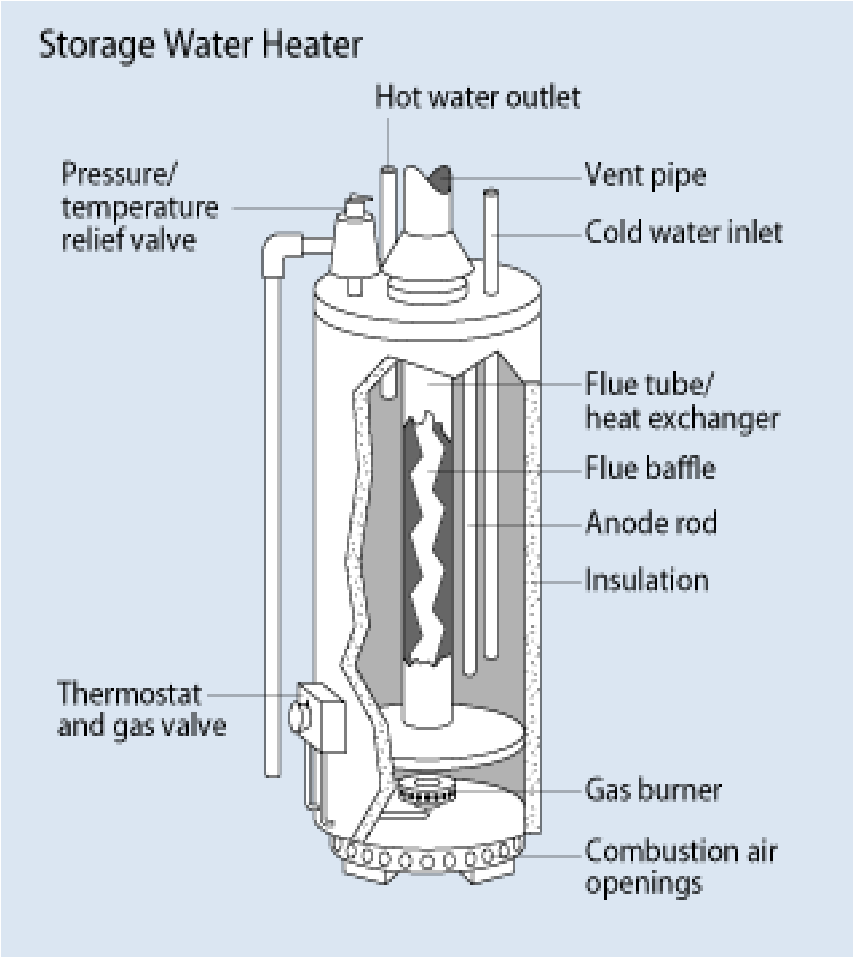
Water Heater Types and Estimated Stock

- 3 types of water heaters currently in use:
  - Gas Storage Water Heaters
  - Instantaneous Water Heaters
  - Electric Water Heaters
- ADB Report of 2009 estimates total water heater stock to be **2.27 million** units.
- SNGPL estimates 40% of gas consumers have a water-heater. Assuming there are 1.5 water heaters per consumer, total stock in 2020 is approximately **6 million** water heaters.



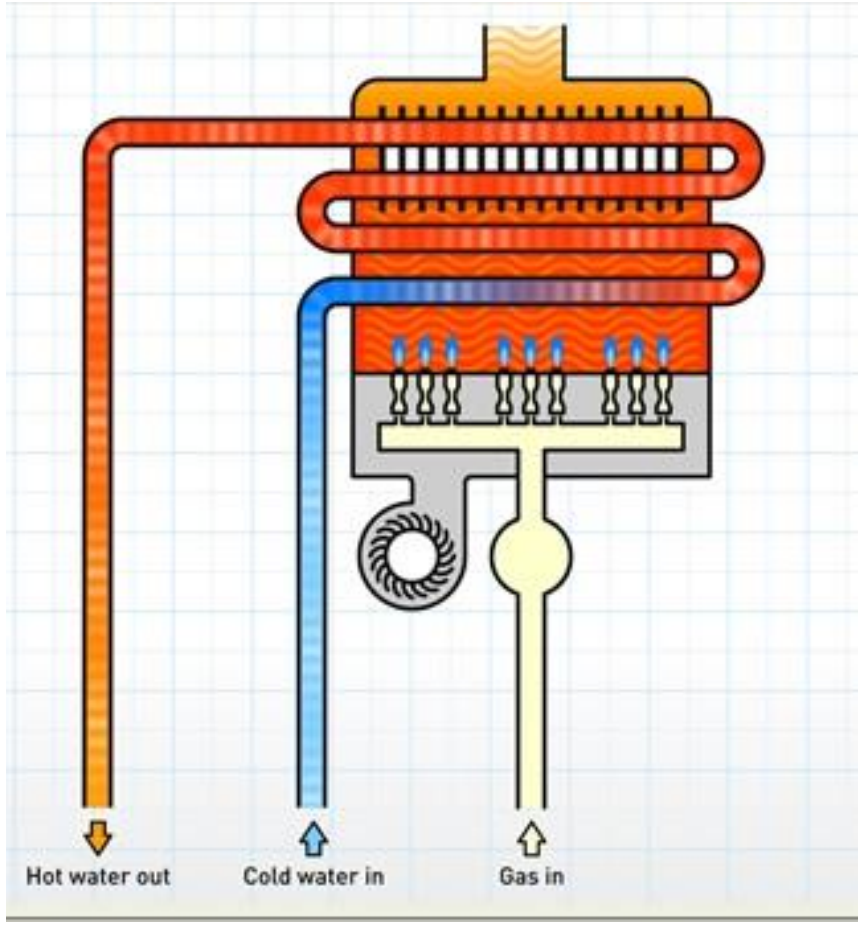
Water Heater Types – Gas Storage

- Manufactured in capacity ranging from 20 to 55 gallons. Most prevalent is capacity between 35-50 gallons.
- A gas burner is placed beneath a water tank to heat water.
- A vent placed on top allows for hot flue gases to escape.
- Can provide stored hot water instantly.
- Has a simple construction. A number is produced by artisan manufacturers and simple repair jobs can extend usage.
- Lifetime of a storage unit is between 15-20 years.
- PSQCA limits the thermal efficiency to a minimum of 65% and permissible heat loss per hour is 10%



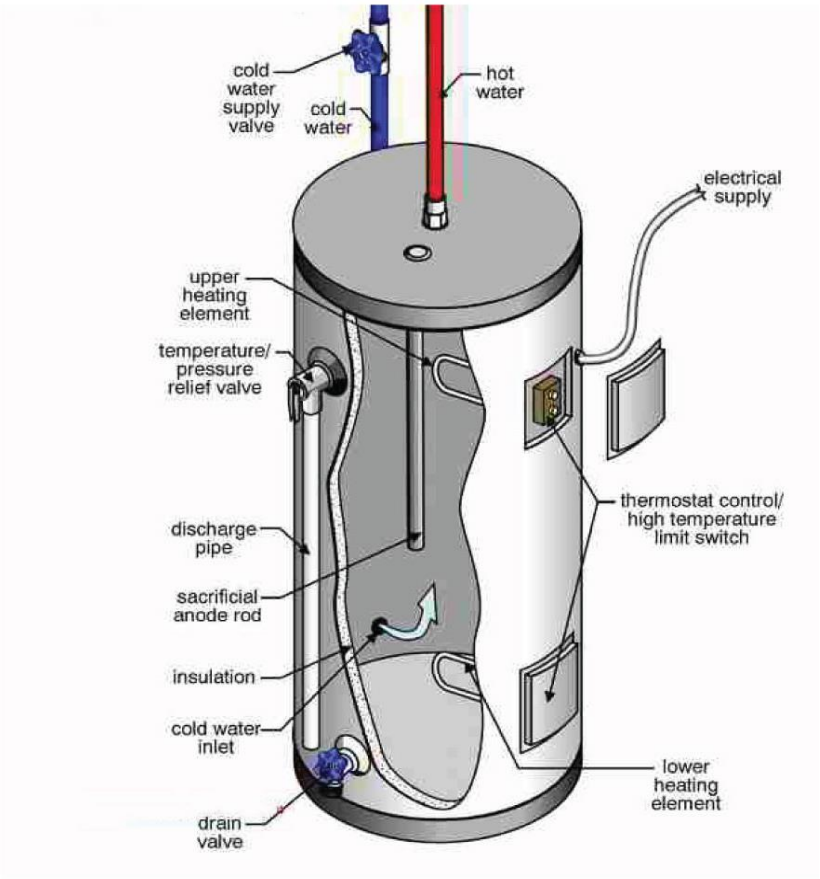
Water Heater Types – Gas Instantaneous

- Instantaneous types have flow rate ranging from 8L/min to 20L/min.
- Do not have storage.
- A gas burner is placed beneath pipes to serve as a heat exchanger.
- Requires a small heat up time to provide hot water at a desired temperature.
- Is placed at point of use and burner is only switched on when there is demand.
- Parts are commonly imported from China and assembled locally.
- Lifetime of a gas instant unit is between 3-5 years
- PSQCA limits thermal efficiency to a minimum to 65%.



Water Heater Types – Electric Storage

- Have capacities similar capacities to storage water heaters.
- An electric heating element of 1.5 KW placed on the bottom and top of the tank heats water.
- Have lesser standby losses as compared to gas storage water heaters as a flue vent is not required
- Due to higher electricity tariff, electric storage water heaters are usually only employed when a gas connection is not available.
- Lifetime of electric heaters is approximately 10 years which can be extended by replacing the heating element.
- PSQCA does not have standards for electric storage water heaters.



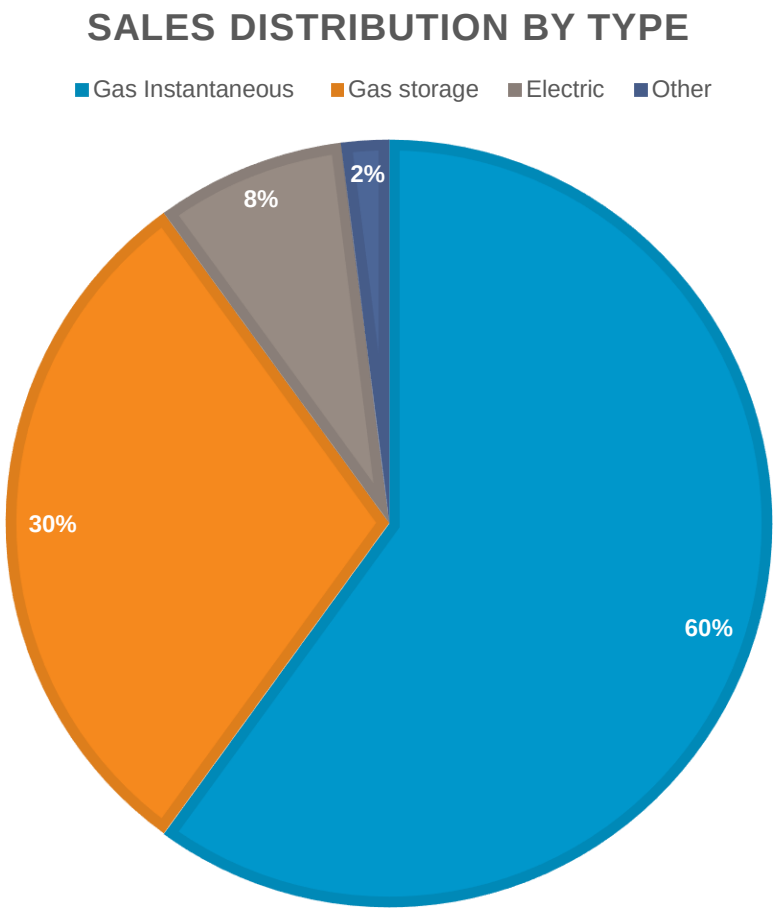
Water Heater Manufacturers

- There are several manufacturers of water heaters in Pakistan with the main ones being:
  - Canon
  - Nas Gas
  - Golden Fuji
  - Super Asia
  - Singer
  - Intec Pakistan / InstaGas [Importers]

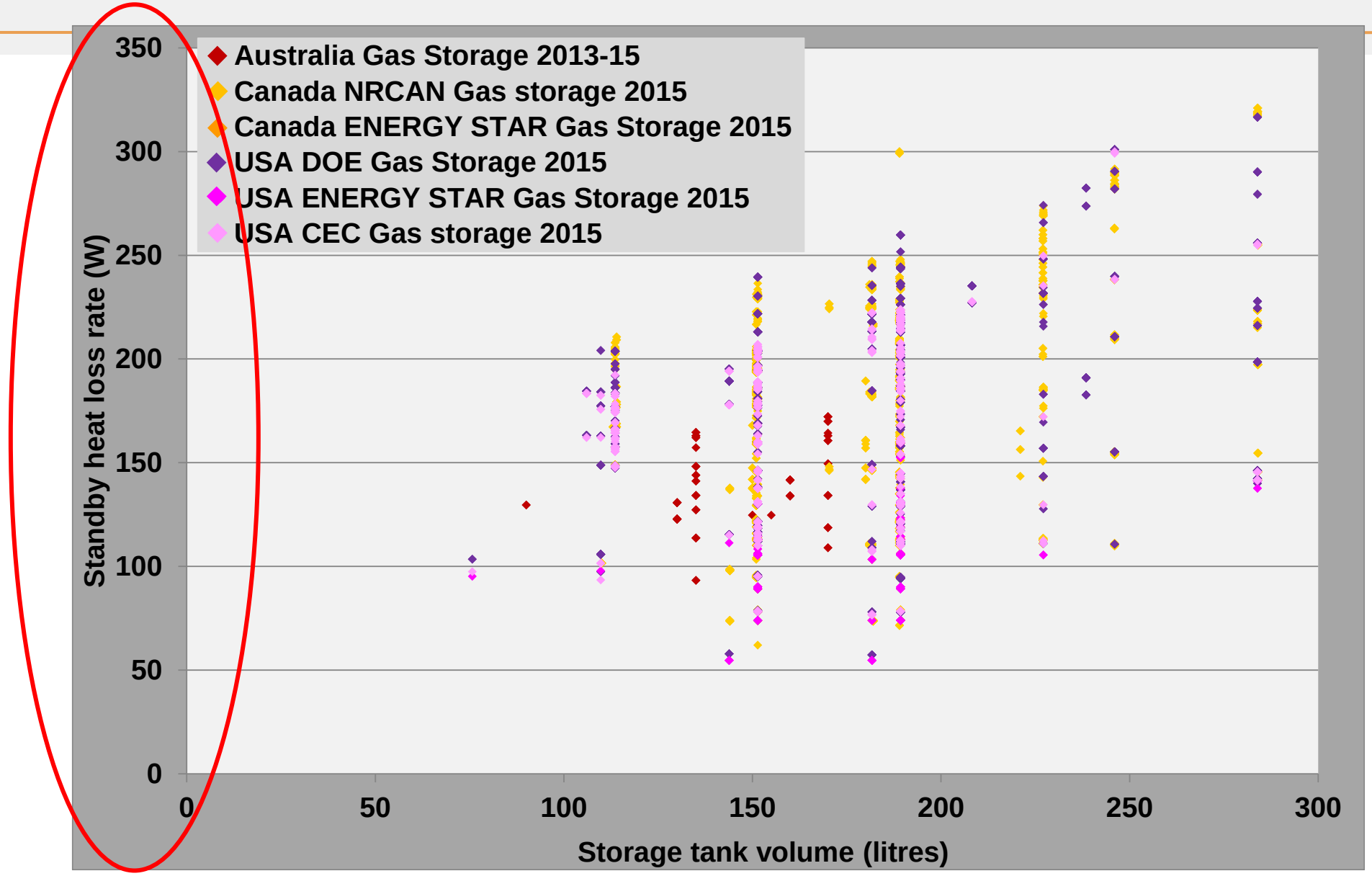
- We understand that the large companies mentioned above account for more than 75% of the market and the rest is comprised of several small manufacturers & importers.

Water Heater Sales and Shift in the Market

- A GIZ report estimated national water heater sales of **312,000** units in 2010
- Discussions with manufacturers estimate a national sales of **450,000-500,000** units in 2020.
- However, since 2015 sales have drastically shifted from storage type towards gas instantaneous type of water heaters.
- Approximate sales distribution show over **60**% are of instantaneous type.
- However, a replacement of 1 storage type translate to approximately 3 instantaneous units.

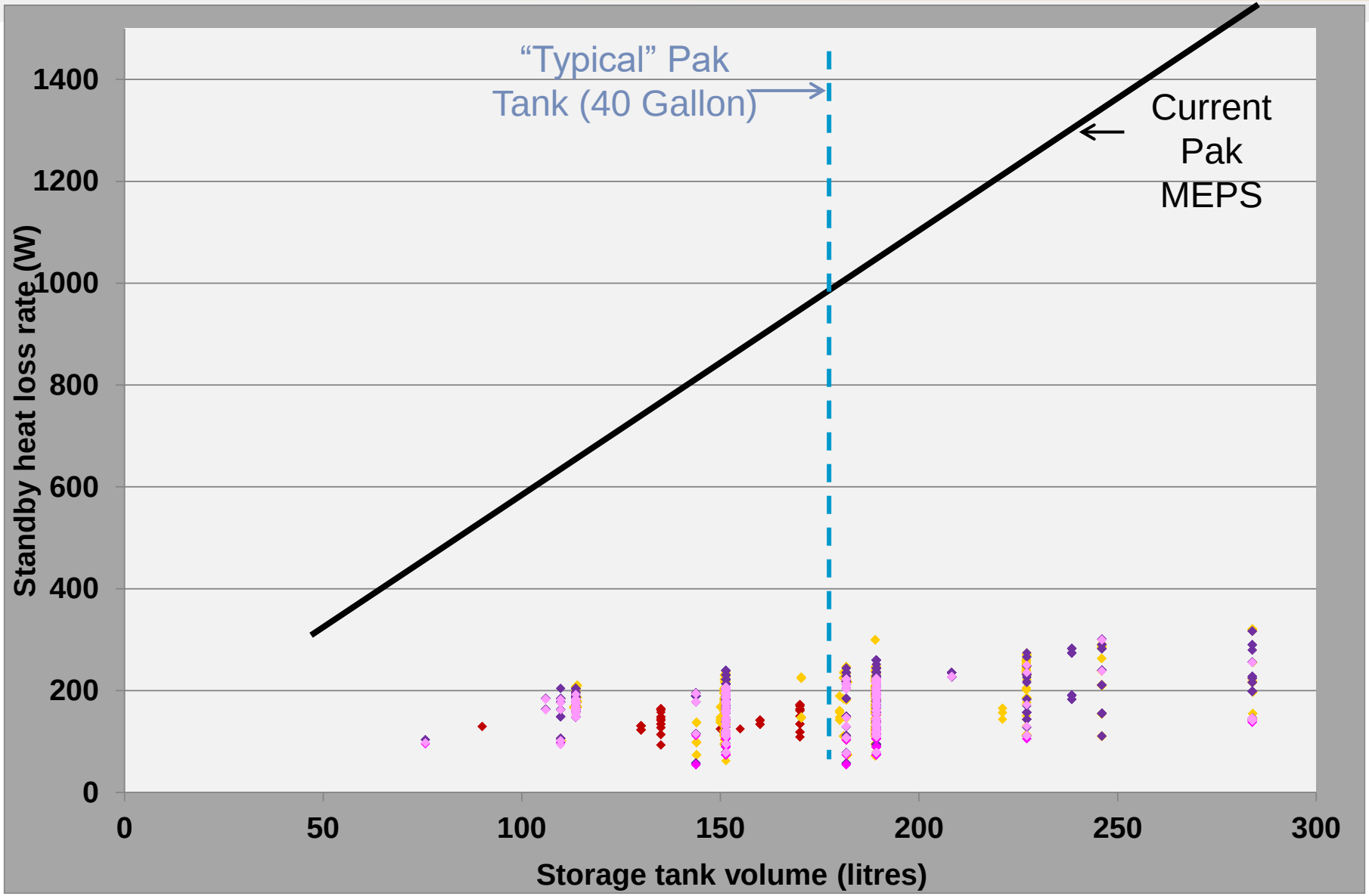


Example International Benchmarking: Gas storage heat losses

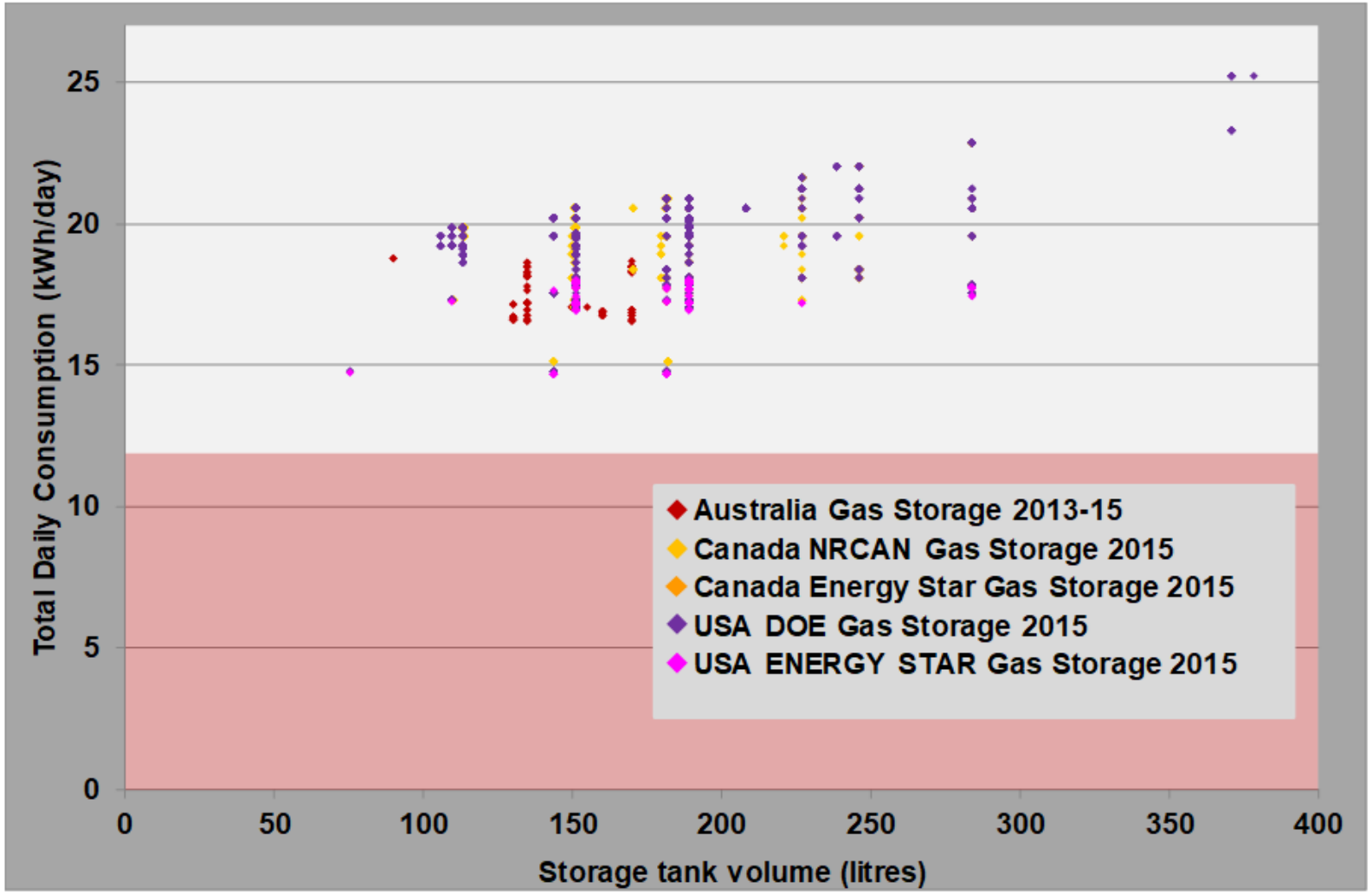


Rescaling the graphic to accommodate current Pakistani MEPS heat loss

Example International Benchmarking: Gas storage heat losses



Comparison with International Norms: **Gas Storage**



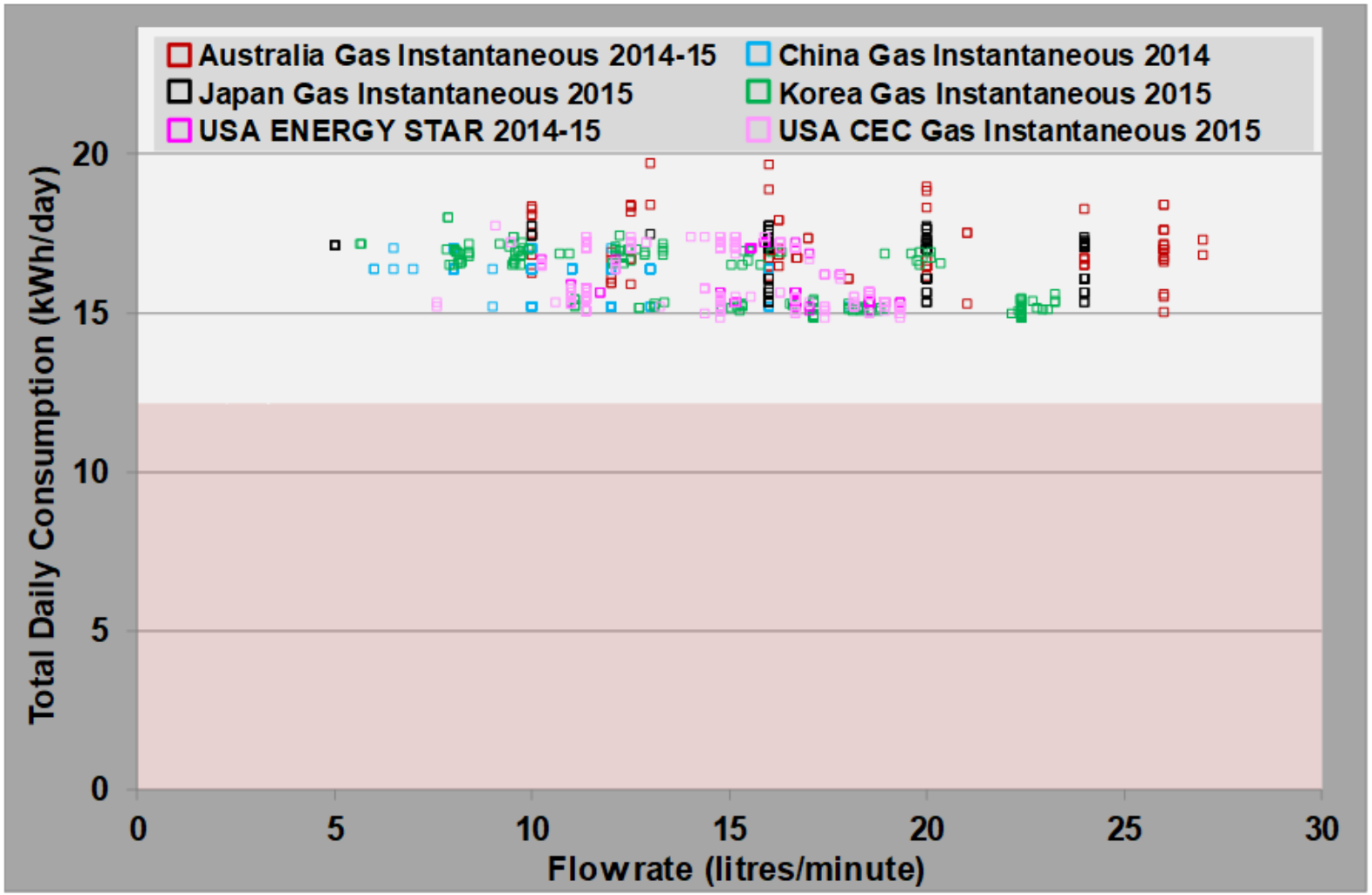
International Average ~ 20 kWh

Pakistan ~ 52 kWh

Potential Saving ~ 61 %

Red area actual embodied energy of hot water used

Comparison with International Norms: Gas Instantaneous



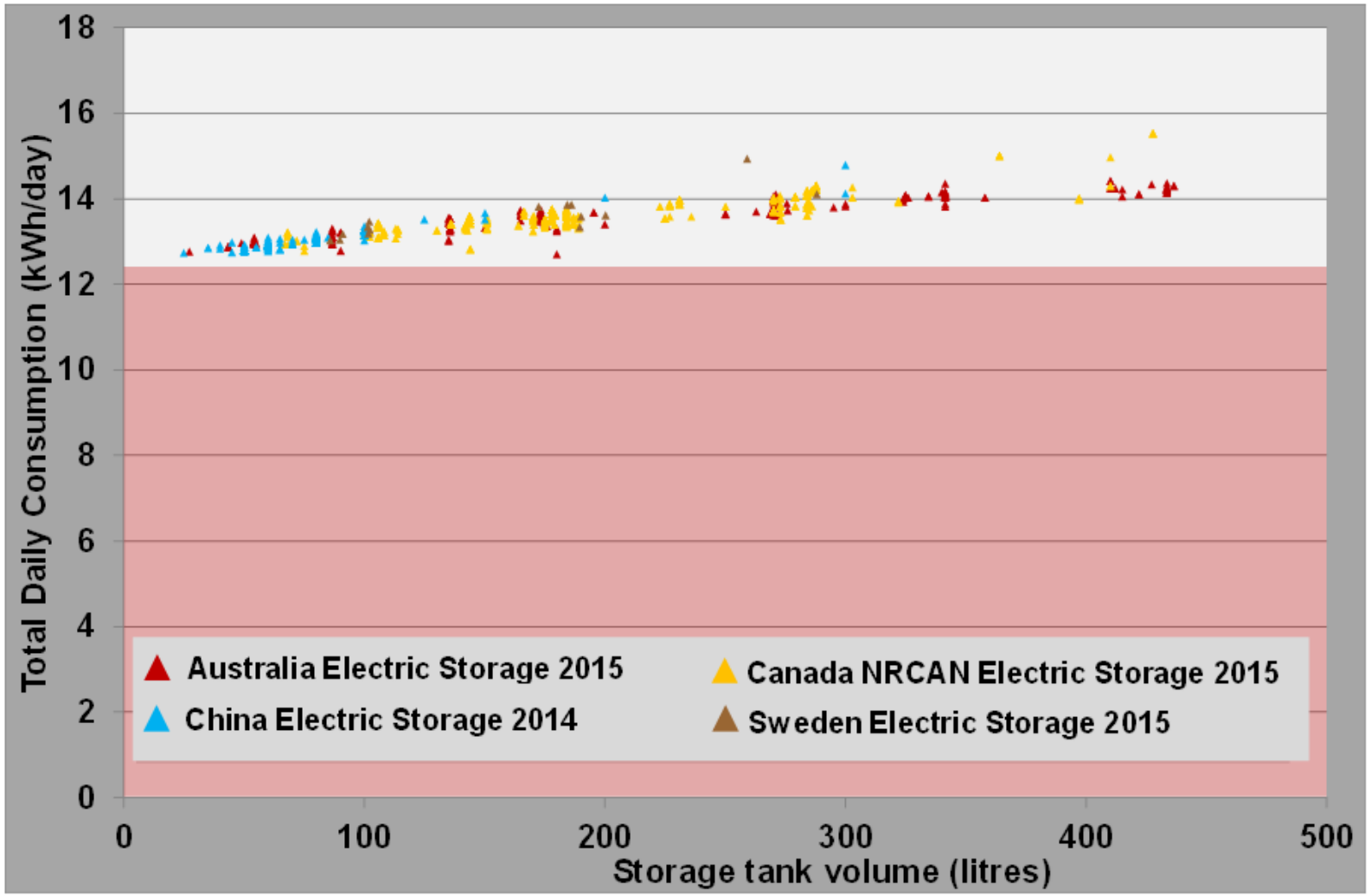
International Average ~ 17.5 kWh

Pakistan ~ 18.6 kWh

Potential Saving ~ 6%

Red area actual embodied energy of hot water used

Comparison with International Norms:
Electric Storage



International Average ~ 14 kWh

Pakistan ~ 34 kWh

Potential Saving ~ 59%

Red area actual embodied energy of hot water used

The Way Forward

- Update MEPS for gas storage and gas instant…?
- Develop MEPS for Electric Storage…?

We will present a draft policy or set of suggestions in the next workshop on the 4th of October (Serena Hotel, Islamabad)

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