Conditioning Behaviour

Webinar presenting insights on use of air-conditioners in five Indian cities

Prayas (Energy Group)

Thursday, 18th June 2020 | 3 pm

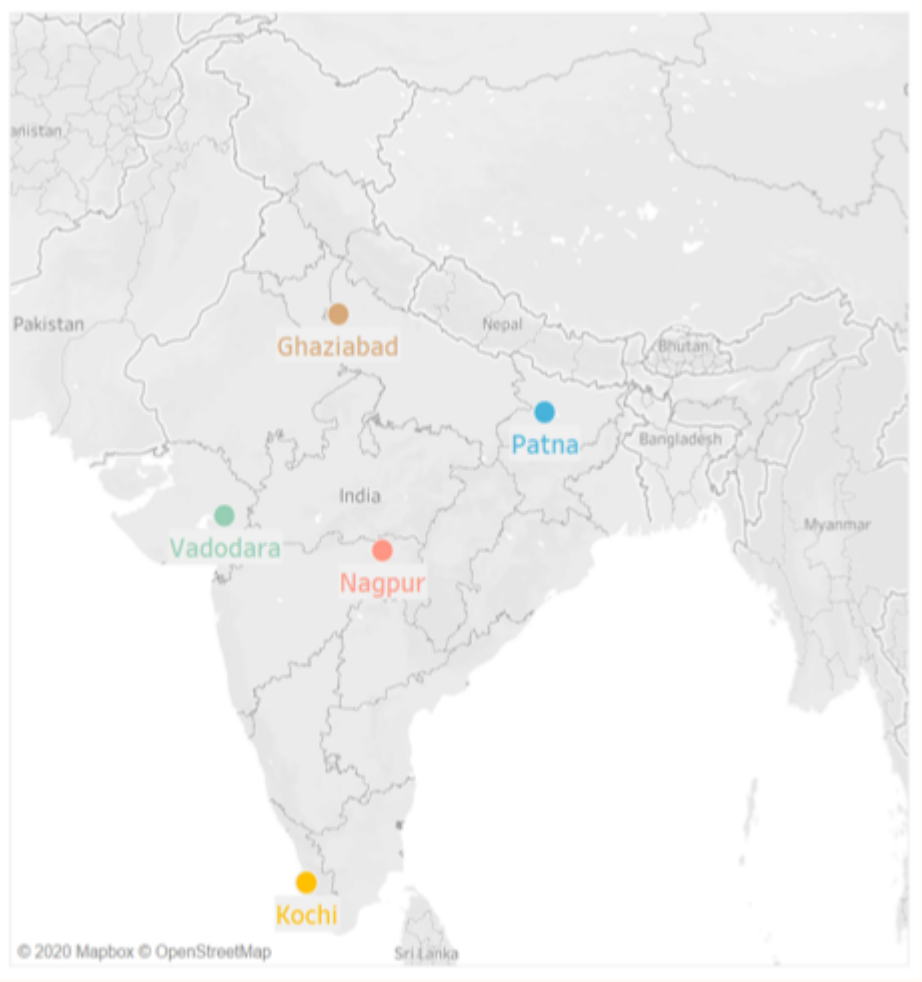
Introduction

Introduction

- IEA predicts a 15 fold increase in India's cooling related electricity consumption from 2016 to 2050
- ICAP predicts a four fold increase in space cooling related energy requirement in 2037-38
- Existing programmes such as Energy Conservation Building Codes and mandatory Standards and Labeling (S&L) programme
- However limited understanding of usage and purchase behaviour which could inform future policies and programs

Sampling, methodology, questionnaire

- Five tier-2 cities chosen on basis of multiple criteria
- 1500 households (HH) were surveyed in total
- Survey conducted between December 2019 and February 2020
- Questions asked on:
  - Demographic features,
  - AC ownership attributes,
  - AC buying behaviour and
  - AC usage features

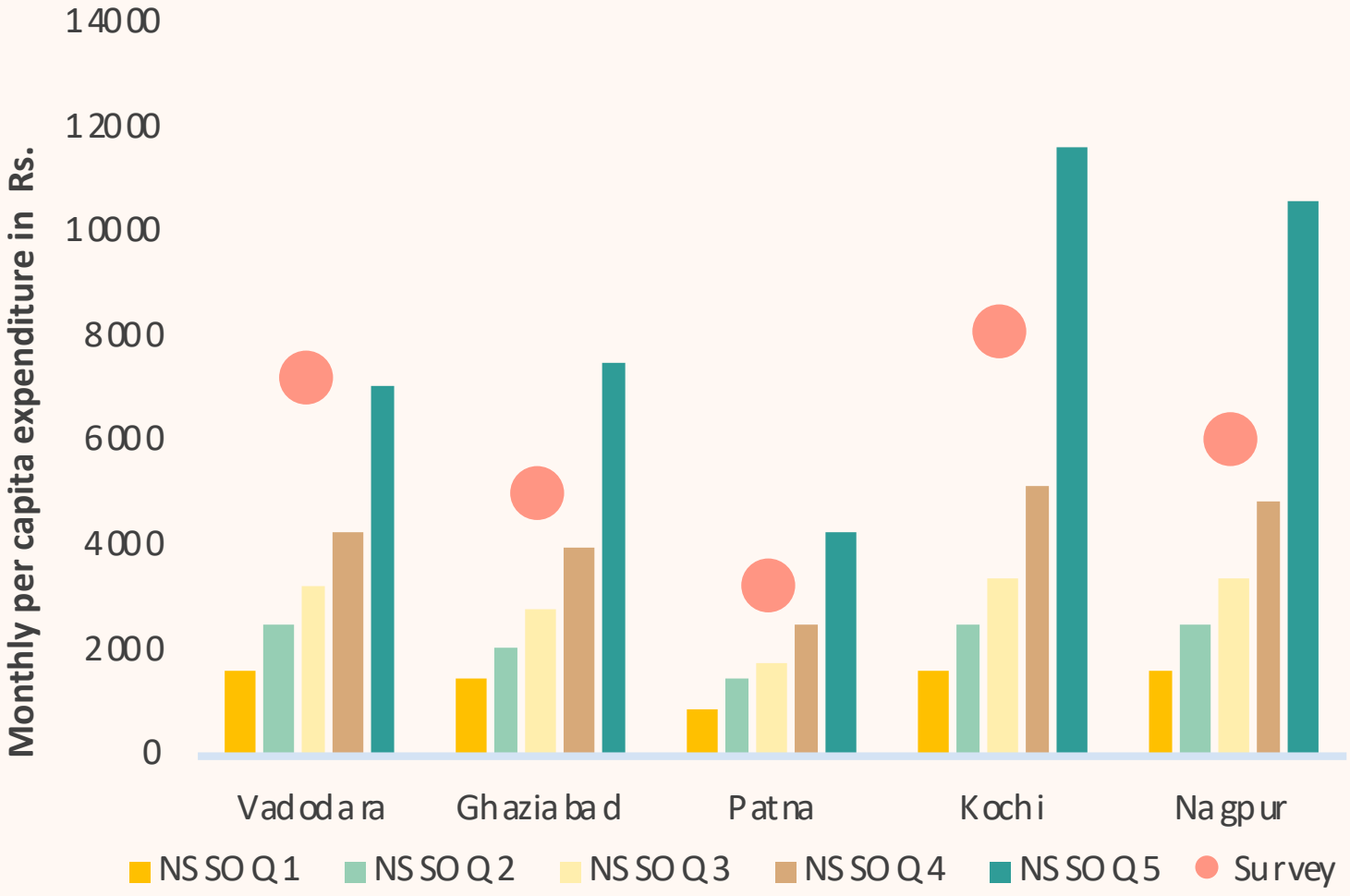


Demographics

- Average household (HH) size varies from 4 to 6 people
- 82% respondents reside in bungalows/independent houses, remaining live in apartments
- As a proxy for income, HH were asked about their monthly expenditure on food, fuel, electricity and other miscellaneous goods and services
- Average monthly per capita expenditure is ₹5900 across sample
- 37% of the households in the sample own more than one AC

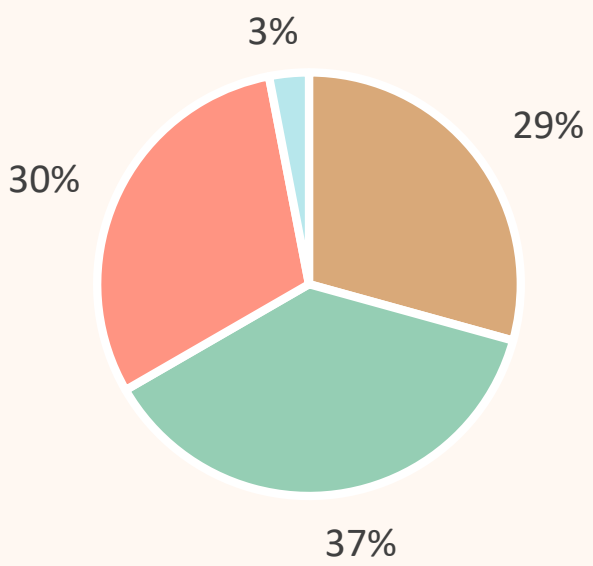
Key Insights

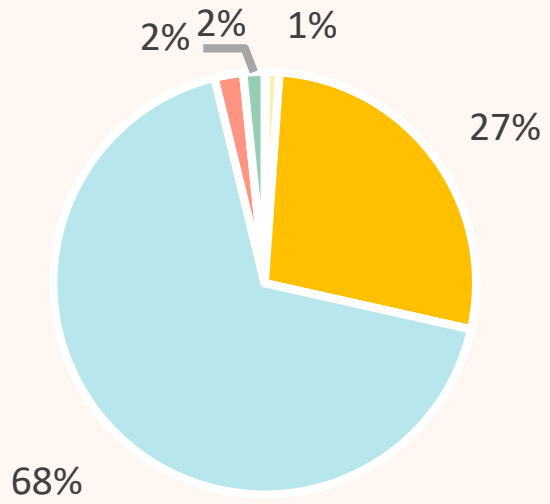
More middle income urban households may buy ACs in future



AC stock features

- Most common features: Split type, 1.5 ton and under 5 years in age



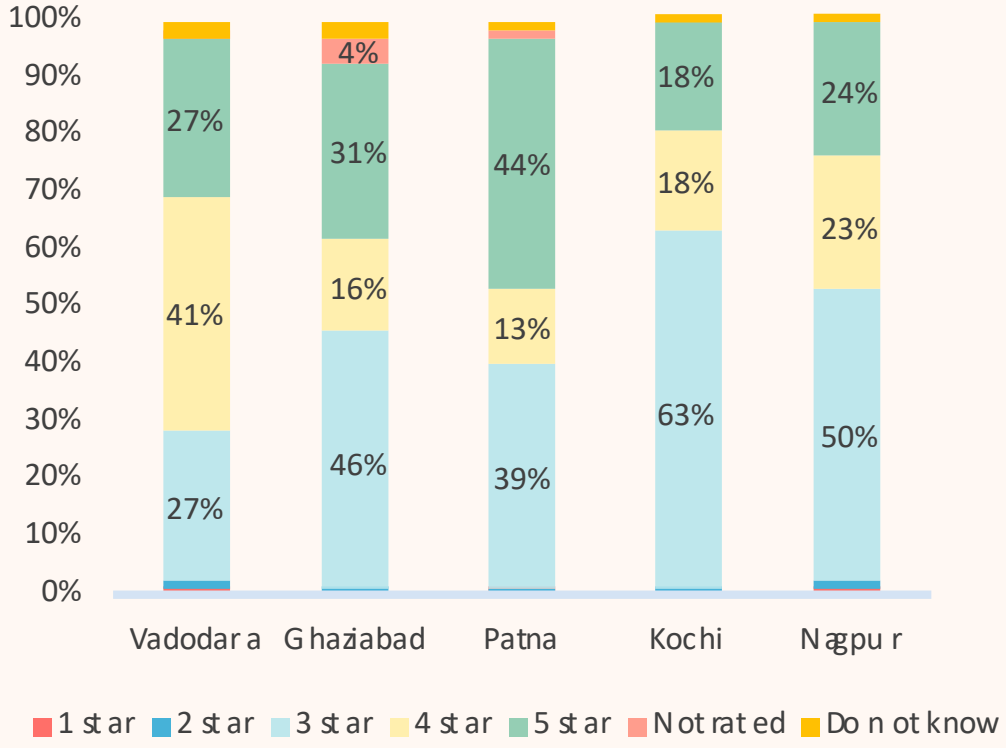


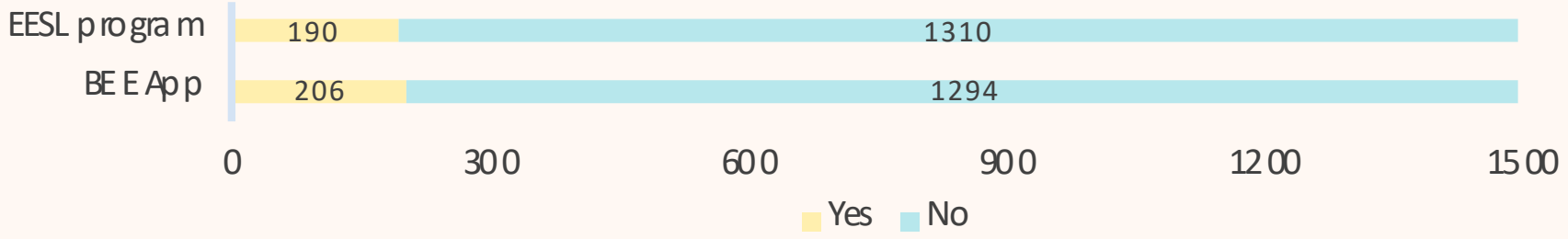
Window
Split type (Inverter)
Split type (Fixed speed)
Split type (Do not know)

0.5 ton
0.75 ton
1 ton
1.5 ton
1.8 ton
2 or more than 2

Need for promoting uptake of more efficient ACs

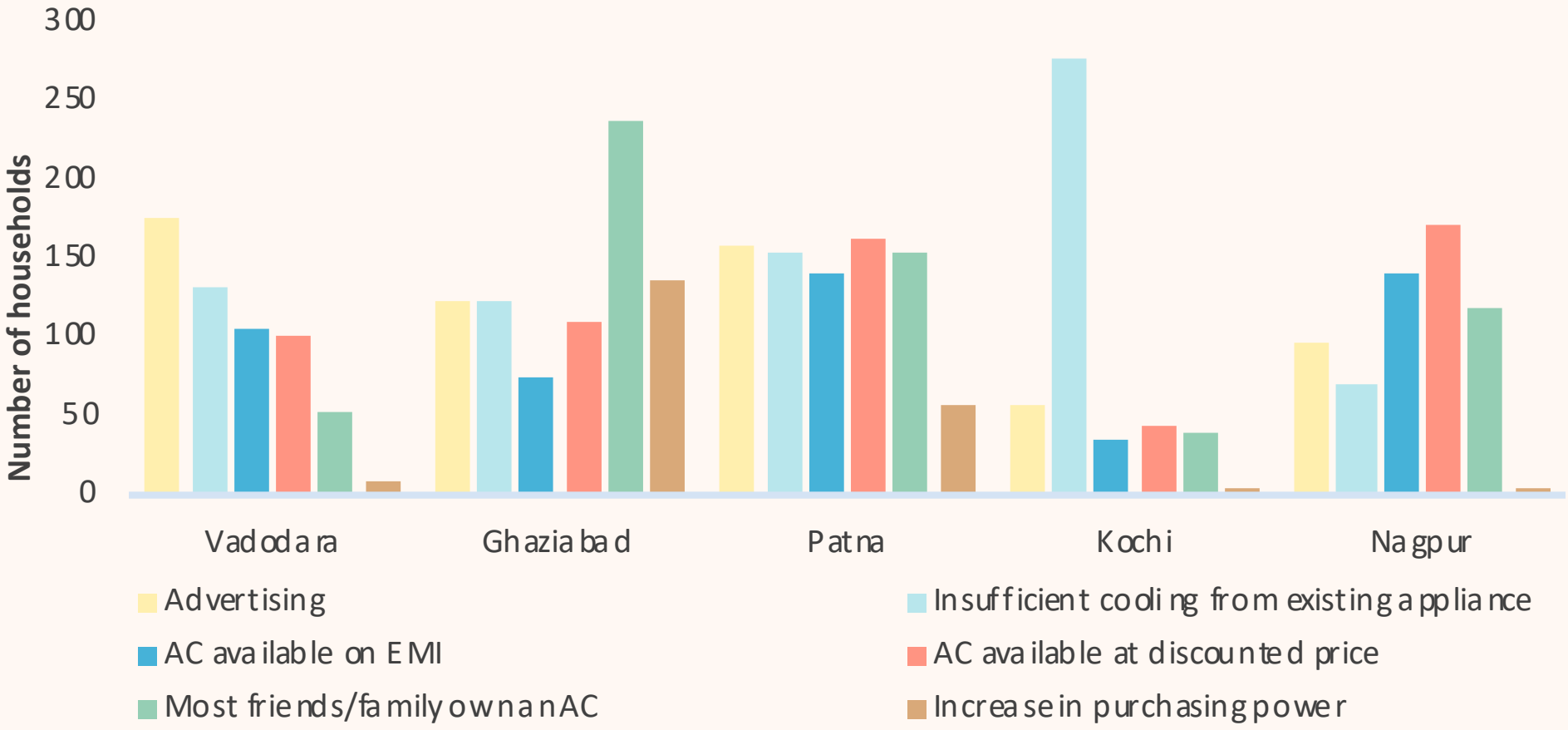
- 44% of all the ACs owned are rated 3 star
- Low awareness about initiatives which promote efficiency
- Potential for reduction of consumption due to super efficient ACs





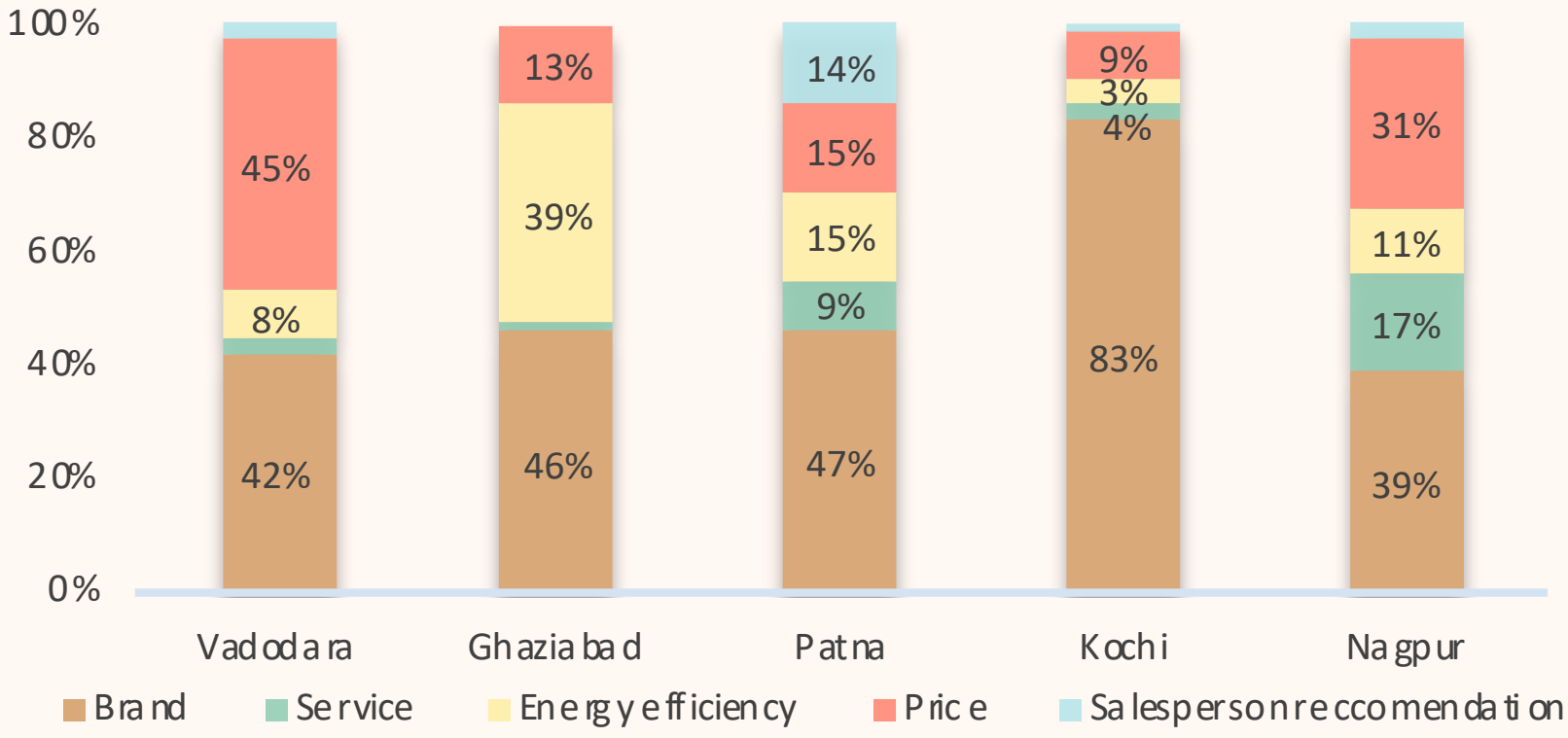
*EESL: Energy Efficiency Services Limited
BEE: Bureau of Energy Efficiency

Multiple factors influence buying decision with varying relative importance across cities



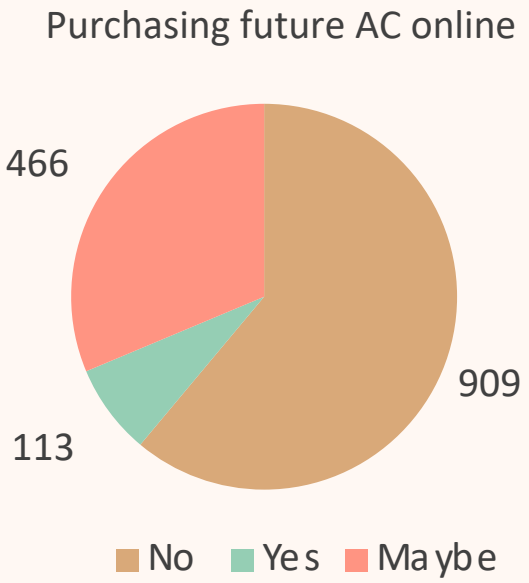
Multiple factors influence buying decision with varying relative importance across cities(cont.)

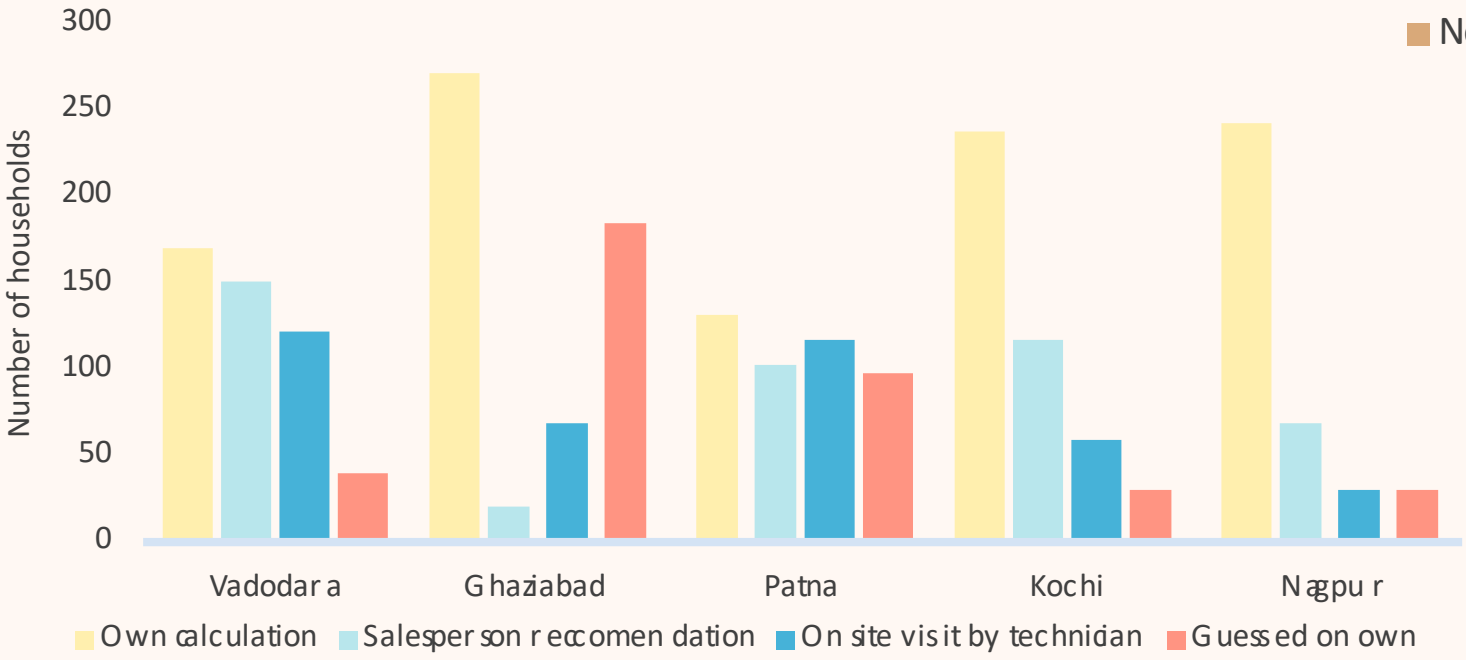
- Factors ranked in order of importance for HH's choice of AC
- Brand emerged as the most important factor across all cities



Online/offline and sizing

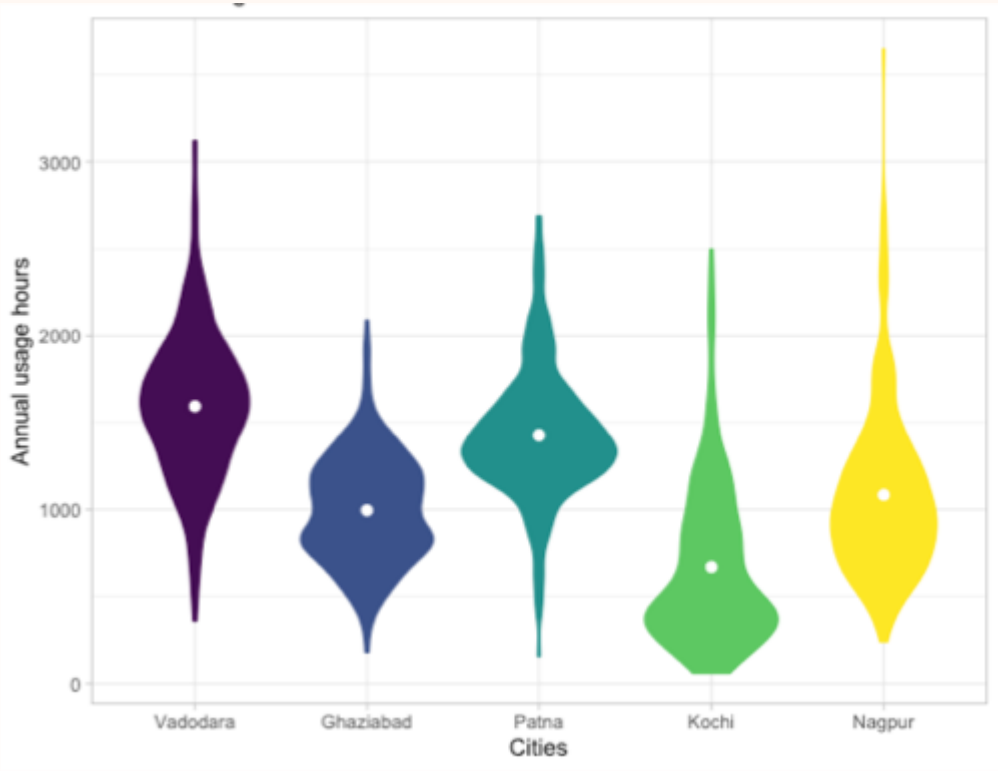
- Only 12 HH purchased their AC online
- Most HH rely on themselves for estimating size of the AC





Restrained AC usage with significant variation

- Average annual usage of all ACs in the stock is 1077 hours
- Average annual electricity consumption of all ACs is 1250kWh
- Significant variation across cities in usage patterns
- Higher payback periods due to lower usage hours



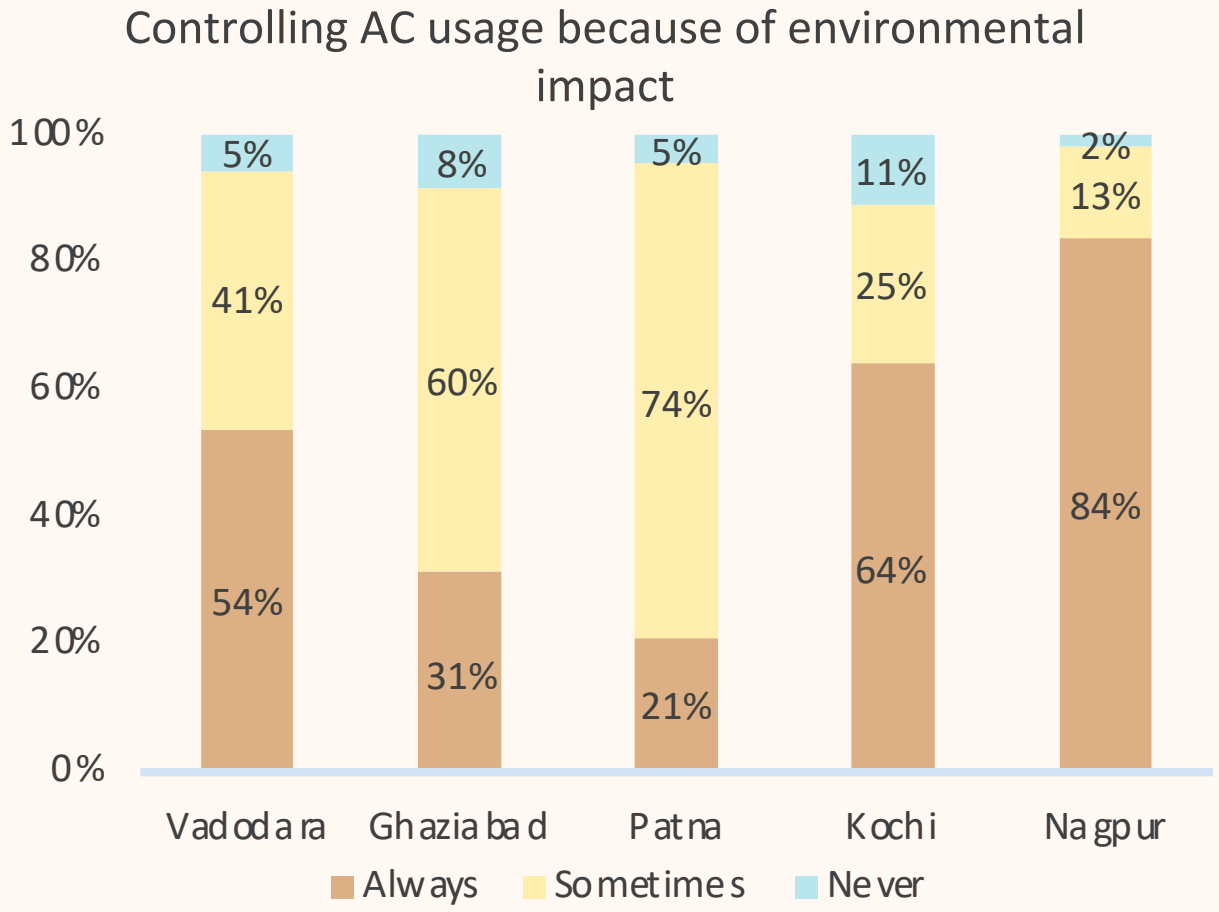
Average AC temperature setting

- BEE's current initiatives encourage setting AC at 24 degree Celsius
- Average AC temperature is set around 21 degree Celsius

City	Average temperature in degrees Celsius	Proportion of HH who set their AC temperatures at or above 24 degree Celsius
Vadodara	21.6	22%
Ghaziabad	21.8	22%
Patna	19.6	3%
Kochi	21	19%
Nagpur	22	24%

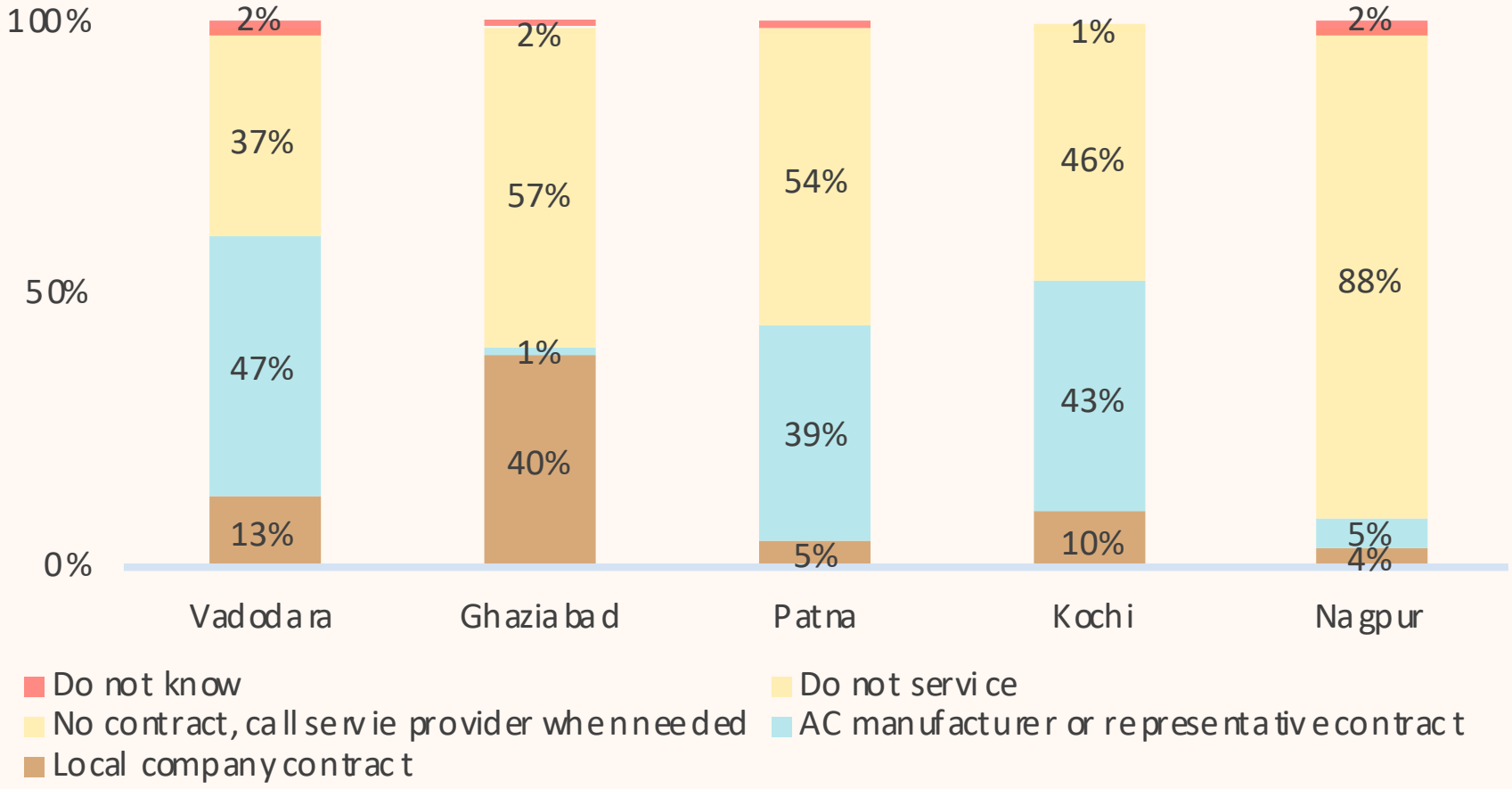
Awareness about environmental impact of AC usage is high

- 62% of the HH in the sample agree that use of ACs has a negative impact on environment



Heavy reliance on local companies for AC servicing

- Majority HH service their ACs at least once a year
- 71% HH rely on local companies for their servicing needs



Conclusion

- More middle income households from tier 2 cities may buy air-conditioners
- 3 star models are more popular
- Awareness about programmes is low
- Average use of AC is restrained
- Multiple factors influence choice hence localized awareness programmes are necessary
- Temperature setting and AC servicing
- Need to have more insights on behaviour to inform programmes

Q&A

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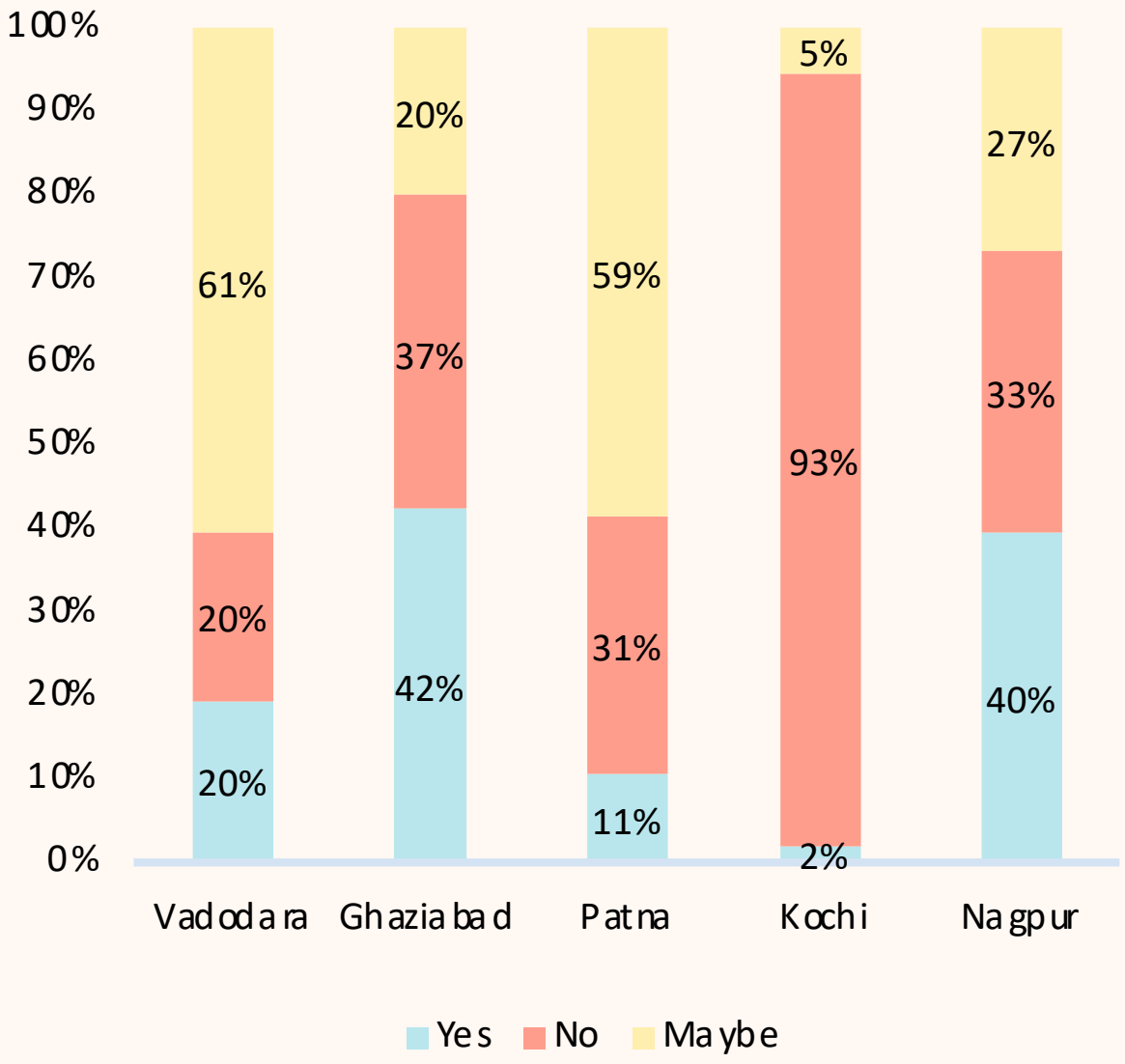
Awareness about environmental impact of AC usage is high

- Demand response program:
  - Majority in Ghaziabad (42%) and Nagpur (40%) are willing to take part
  - 93% in Kochi opposed such a programme



Regression analysis

Annual usage hours and related variables - Regression coefficients	
(Intercept)	1164.23 ***
Ghaziabad	-680.83 ***
Patna	-174.44 ***
Kochi	-953.96 ***
Nagpur	-420.17 ***
Floor level	-8.53
AC usage impacts environment	141.17 ***
Autoclaved concrete (Siporex)	-119.83 .
Concrete block	182.57 **
Most used AC: 2 star rated	90.32
Most used AC: 3 star rated	402.27 .
Most used AC: 4 star rated	456.91 .
Most used AC: 5 star rated	408.55.
Monthly per capita expenditure	-0.011 *
Undersized	54.71 .
Oversized	0.83

Demographics

City	Average MPCE (Rs)	Average household size	Average carpet area (sq.ft)	Avg. number of rooms
Vadodara	7261	4	801	4
Ghaziabad	4960	5	1089	5
Patna	3228	6	804	5
Kochi	8067	4	1051	4
Nagpur	6106	4	1171	5

Usage hours and electricity consumption (cont.)

City	Average number of months of usage	Average number of hours of usage / day (weekday)	Average number of hours of usage / day (weekday)	Annual usage hours
Vadodara	7	9.4	9.9	1593
Ghaziabad	4	8	8.8	995
Patna	4	11.5	11.8	1427
Kochi	7	3.9	4.3	668
Nagpur	5	8.3	8.9	1083