

FOREN 2020

Energy use behaviour of
British Asian households:
a contextual study of
Plymouth, UK

Revolutions in Renewable Energy in 21st Century 17-18 Nov 2020

The background image shows a sun-dappled courtyard at a university. Large, leafy trees frame the scene, casting shadows on the ground. In the background, a multi-story building with a light-colored facade and windows is visible. In the foreground and middle ground, several students are seen walking or standing, some carrying backpacks. The overall atmosphere is bright and academic.

Associate Head of School (T&L) |
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Technology Stream Leader |
Architecture

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Dr Satish BK

(2005) Seating area: students cafeteria, MS Ramaiah Institute of Technology (MSRIT), India Role: Principal Architect

01

INDOOR TEMP

Energy use and carbon emission in buildings.

02

PREVIOUS RESEARCH

Lifestyle adaptation and its implication on sustainable housing

03

Energy use behaviour of British Asians

Primary study –Plymouth Analysis

04

WORKING SUMMARY

AGENDA

“There is enough for everybody's need, but
not enough for anybody's greed.”

— M K Gandhi

01

INDOOR TEMPERATURE

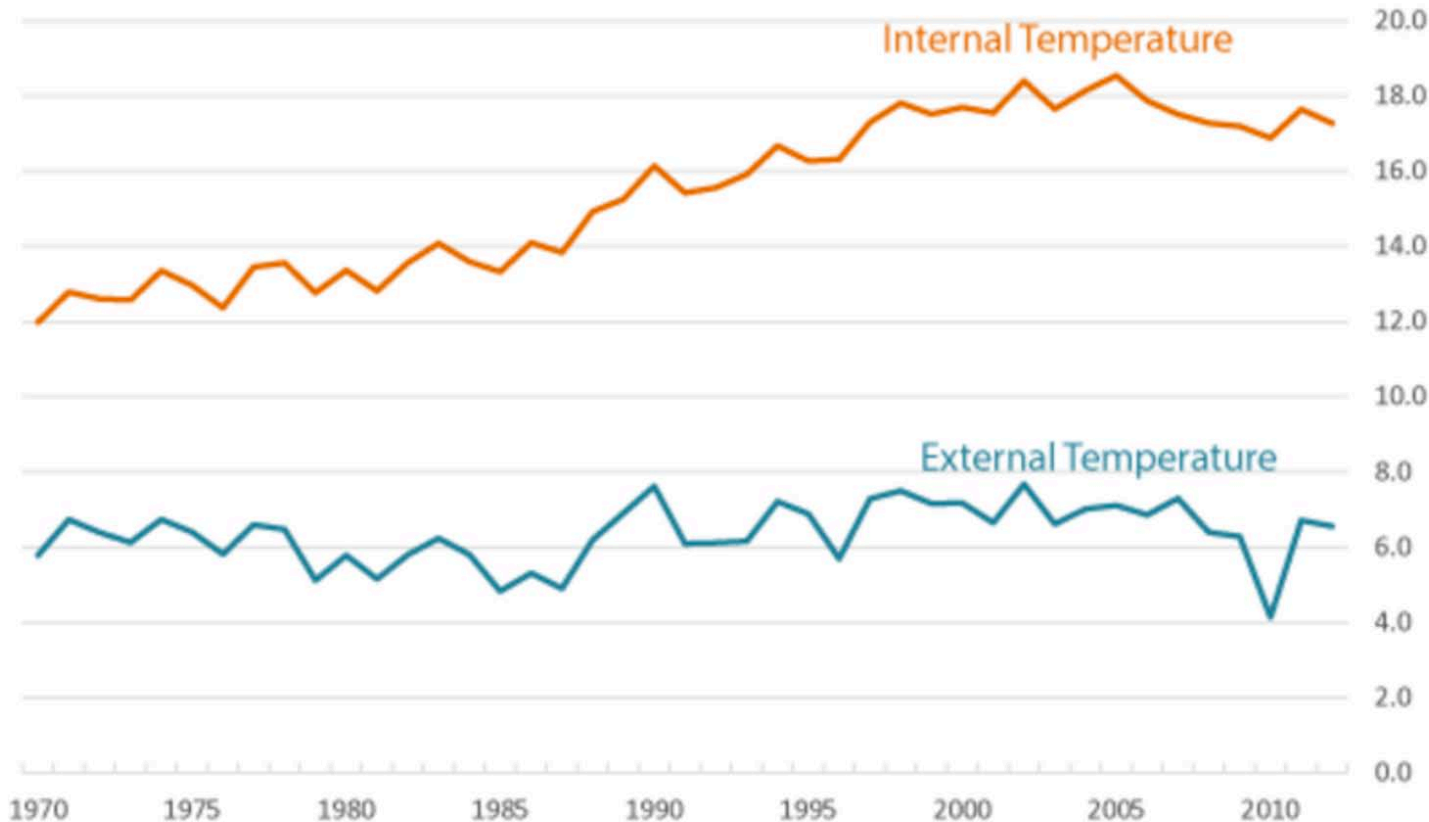
Energy use and carbon emission in buildings.

How warm is
your home?

The average room temperature in a UK home during the
winter season is roughly ...?

Average internal and external winter temperature (°C)

Figures based on the average modelled temperature from October to March



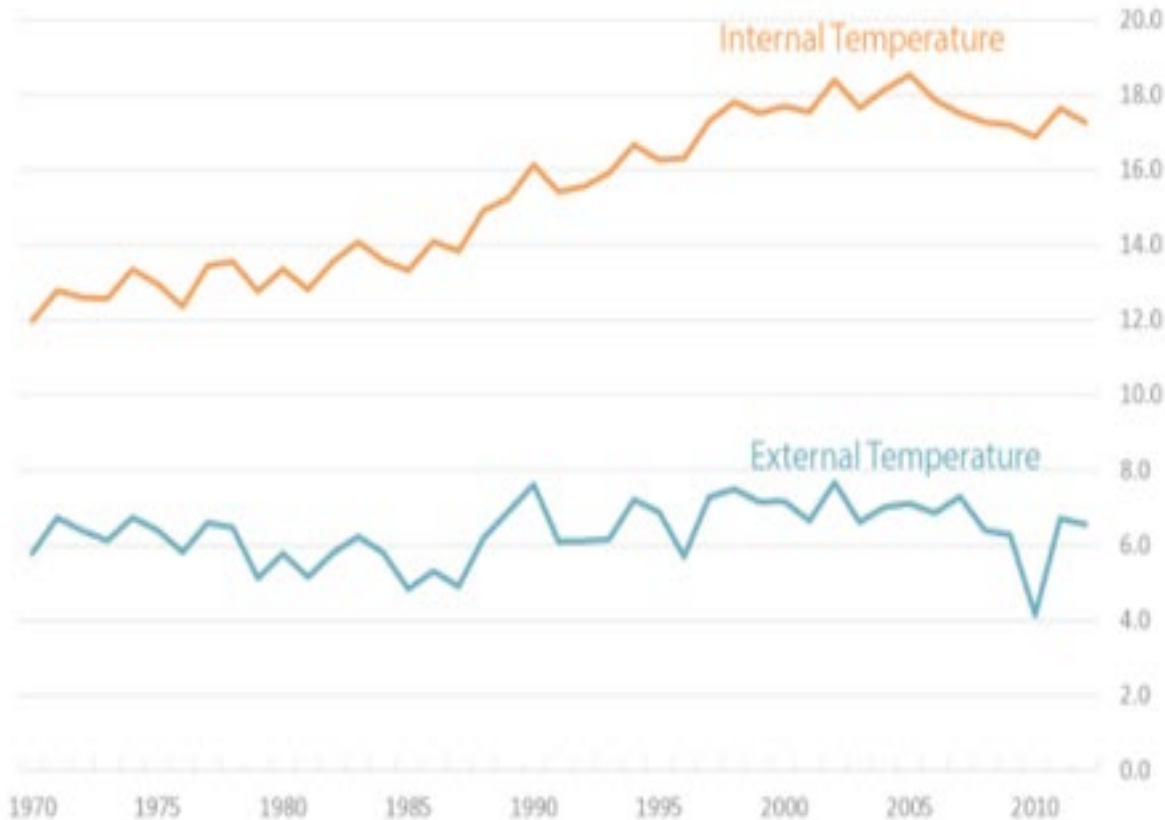
Source: Energy Consumption in the UK (ECUK), 2015 data tables

The average room temperature in a UK home during the winter season is

roughly ... **18°C**

Average internal and external winter temperature (°C)

Figures based on the average modelled temperature from October to March



Source: Energy Consumption in the UK (ECUK), 2015 data tables

The basic level of warmth required for a healthy and well-dressed person is 18°C.

[Ref. World Health Organization and Min std in the latest UK cold weather plan].

Basic benchmarks for indoor temperatures:

> 24°C - cardiovascular risk

18-21°C - comfortable temperature

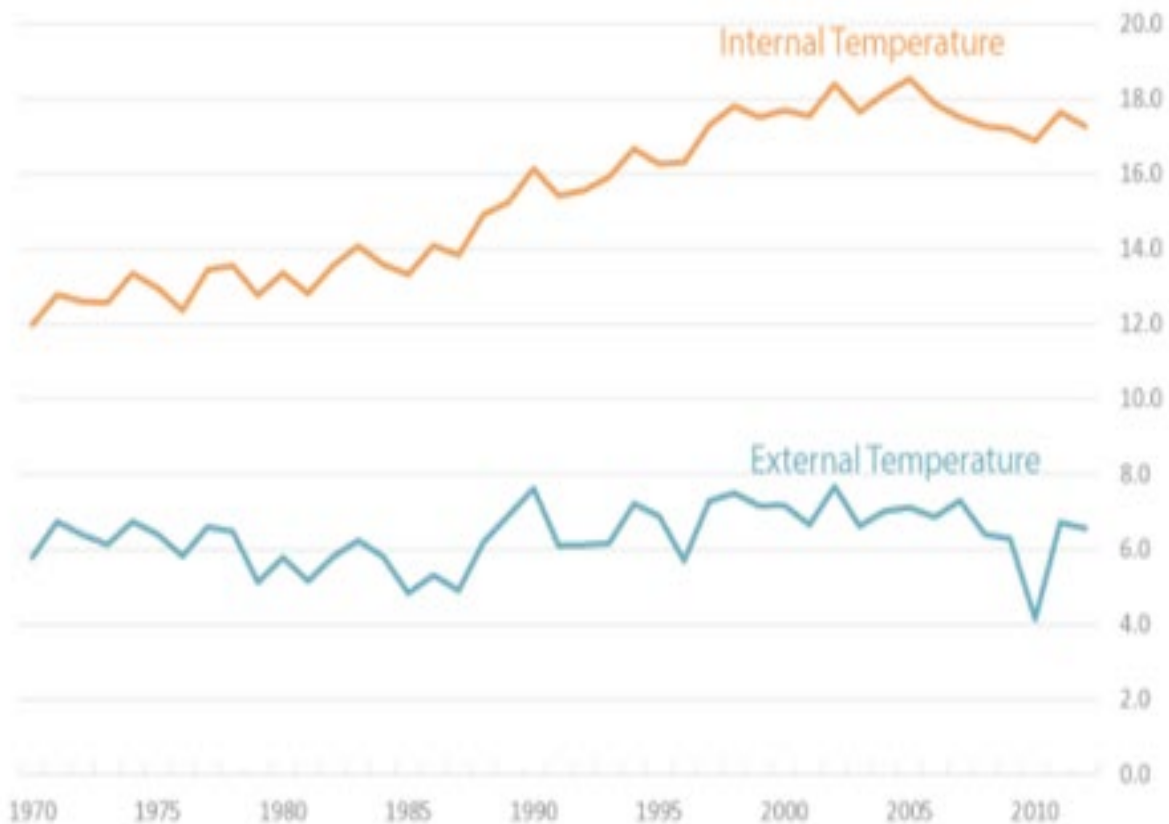
18°C - minimum for comfort

12-16°C - respiratory risk

<12°C - cardiovascular risk

Average internal and external winter temperature (°C)

Figures based on the average modelled temperature from October to March



Source: Energy Consumption in the UK (ECUK), 2015 data tables

The basic level of warmth required for a healthy and well-dressed person is 18°C.

[Ref. World Health Organization and Min std in the latest UK cold weather plan].

Basic benchmarks for indoor temperatures:

> 24°C - cardiovascular risk

18-21°C - comfortable temperature

18°C - minimum for comfort

12-16°C - respiratory risk

<12°C - cardiovascular risk

Average Temperature setting in

a British Asian Home **21.4°C**

[survey conducted in Plymouth- June 2017]

02

PREVIOUS RESEARCH

Lifestyle adaptation and its implication on sustainable housing –
Mysore, India
EnerGAware project, Plymouth, UK

Previous RESEARCH

University of Edinburgh:
Dr. Satish BK



University of Plymouth:
Dr. Alba Fuentres, Dr. Rory Jones



**Lifestyle adaptation and
its implication on
sustainable housing:
contextual study of
Mysore, India**



EnerGAware

Energy Game for Awareness of energy
efficiency in social housing communities



Satish B. K.
Edinburgh School of Architecture and Landscape Architecture
The University of Edinburgh

Programs Leader, ATE
Lecturer, School of Architecture,
Plymouth University

'Innovative Engagement for Sustainable Development: the Edinburgh-India Story'

"There is enough for everybody's need, but not enough for anybody's greed!" M K Gandhi



UNIVERSITAT POLITÈCNICA
DE CATALUNYA



CITEC - Research Center in
Intelligent Computing Systems

advanticsys

RESEARCH
WITH
PLYMOUTH
UNIVERSITY



SUSTAINABLE
SOCIETY
(Skea 2008)

Developed
Nations

"inventing low carbon technology and reducing carbon dioxide emission by the middle of 20th century"

Developing
Nations

achievement of Sustainable communities must go hand in hand with achieving wider development goals

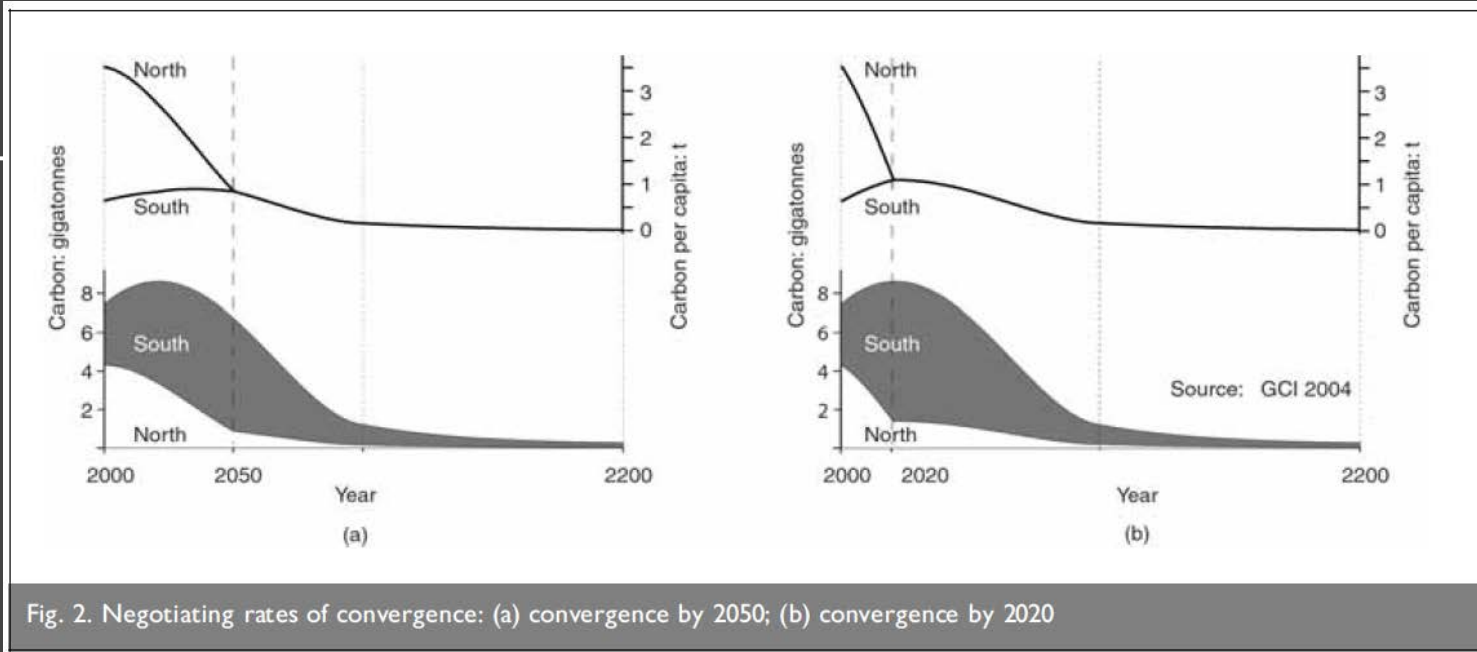
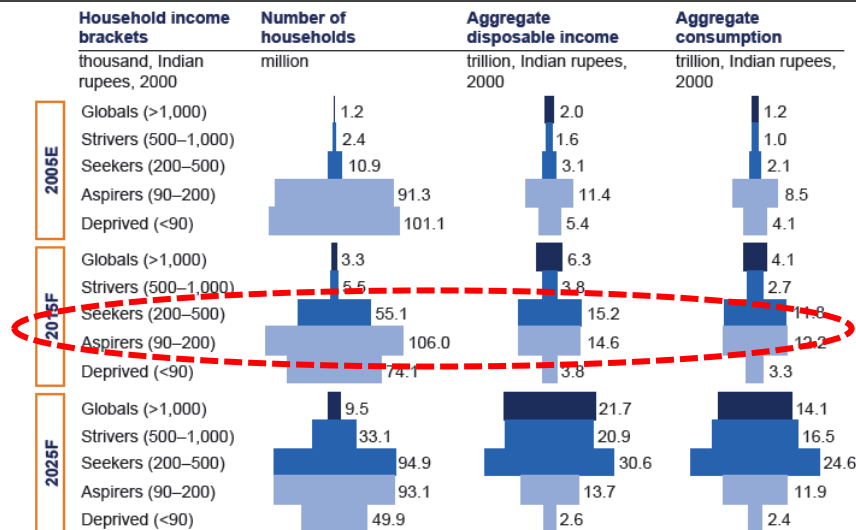
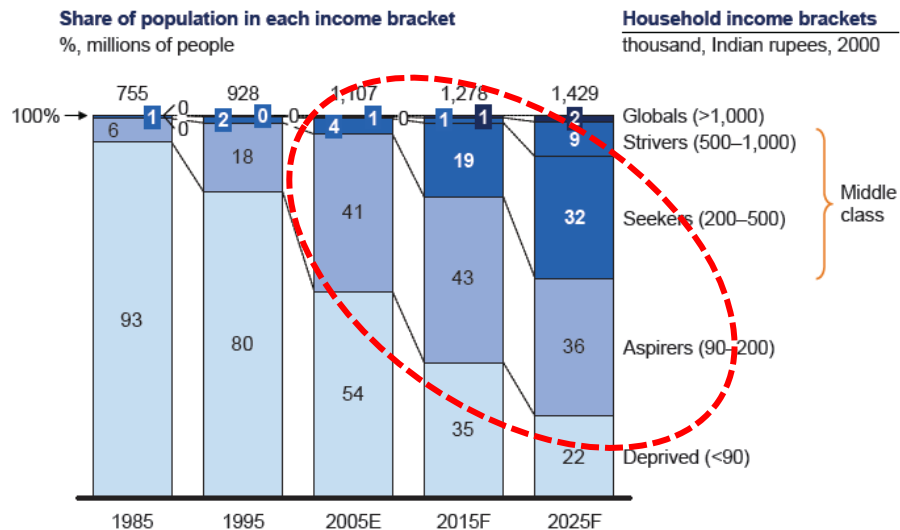


Fig. 2. Negotiating rates of convergence: (a) convergence by 2050; (b) convergence by 2020

INDIAN MIDDLE CLASS



Source: McKinsey Global Institute

Middle Class

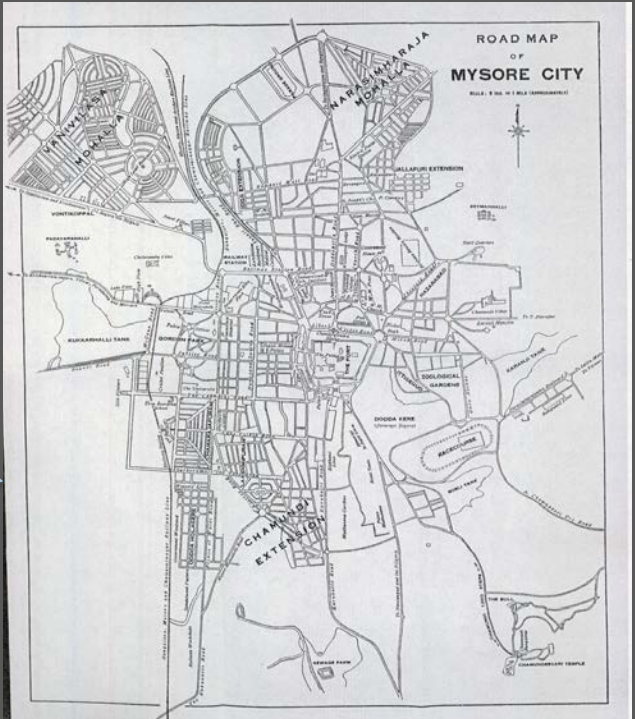
Growth

Income consumption

Study area



India

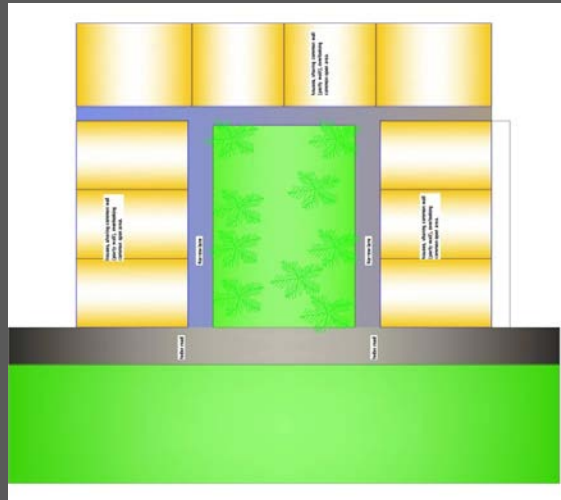
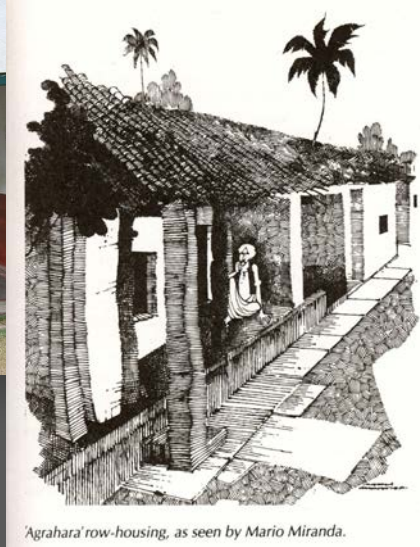


Mysore - 1938

(Parsons, Constance E. 1930. "Mysore City", Oxford University press, London.)

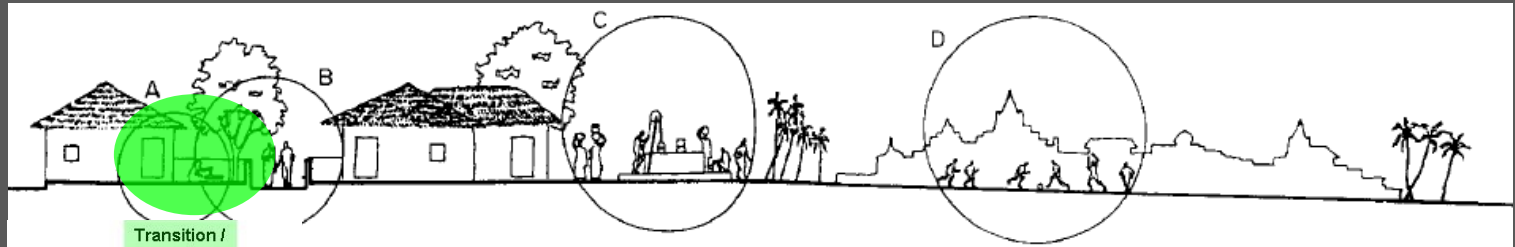


Pre-Independence:
'Agrahara' Typology



Post - Independence:
Contemporary
Housing Typology

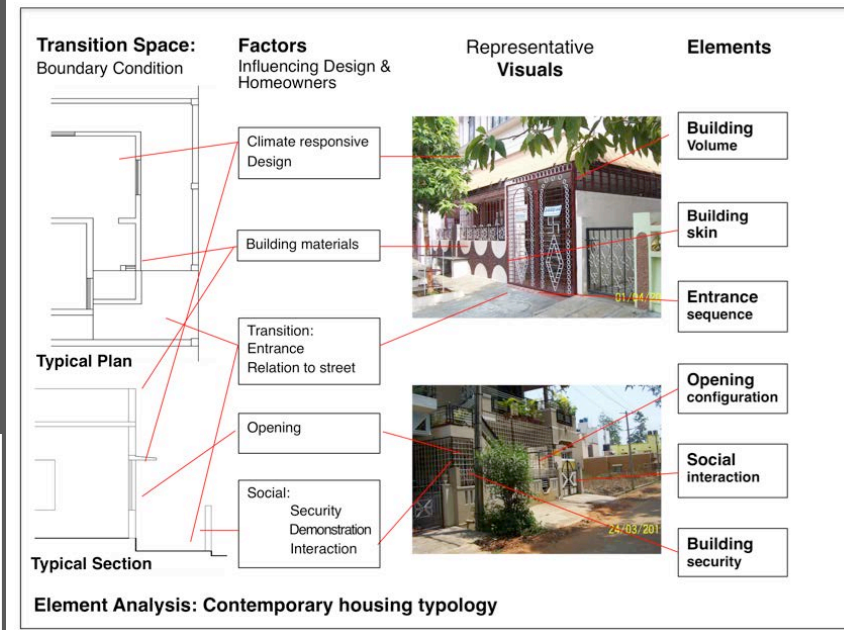
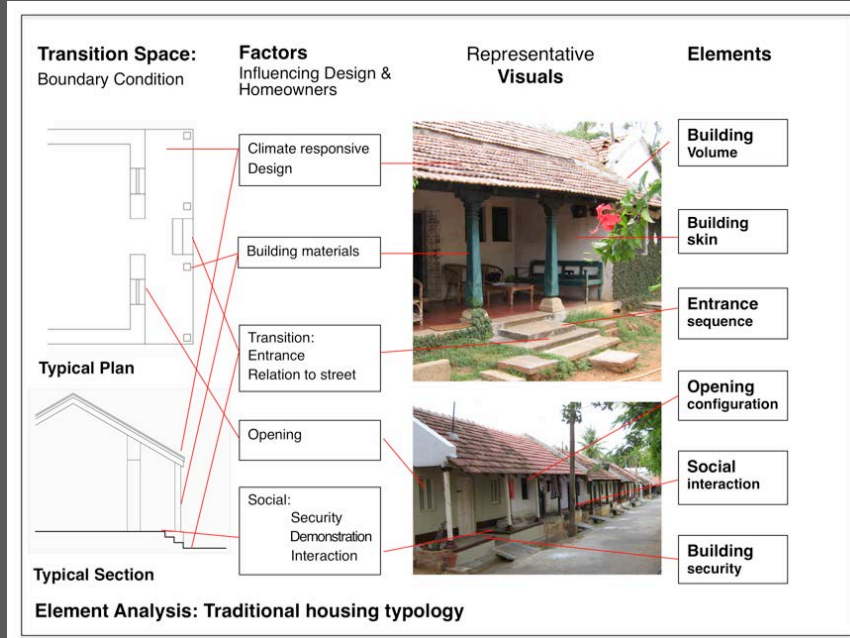
BOUNDARY CONDITION



Transition /
Boundary
condition

archy of spaces. (A) Courtyard ; (B) doorstep ; (C) water tap ; (D) the community space.





ELEMENT ANALYSIS -
boundary condition

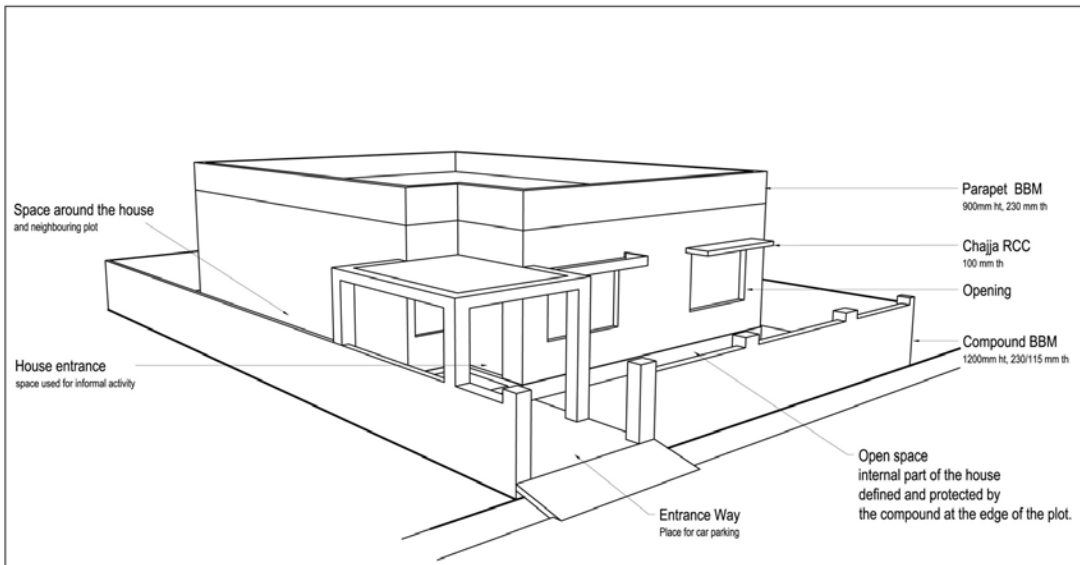


Figure 3.1: Typical Plot Typology House Model

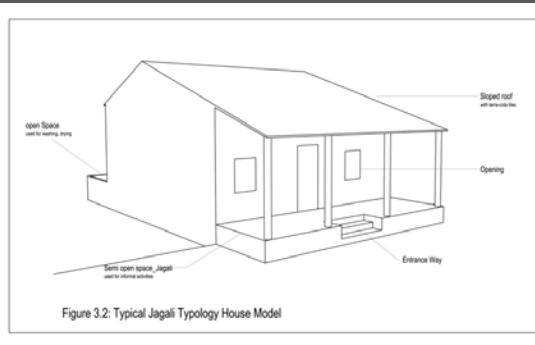


Figure 3.2: Typical Jagali Typology House Model

Plot with high
gate

Jagali

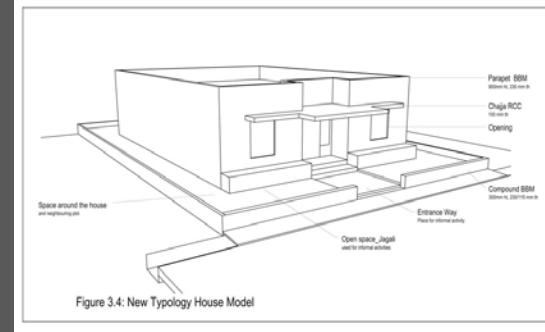


Figure 3.4: New Typology House Model

Plot with Jagali

Plot

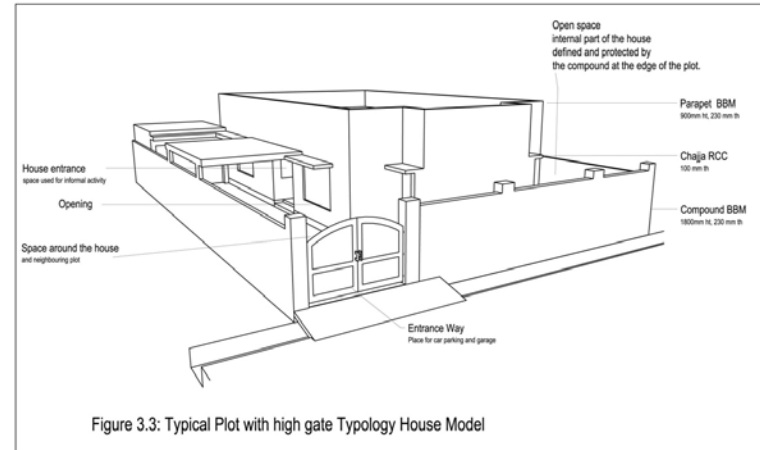
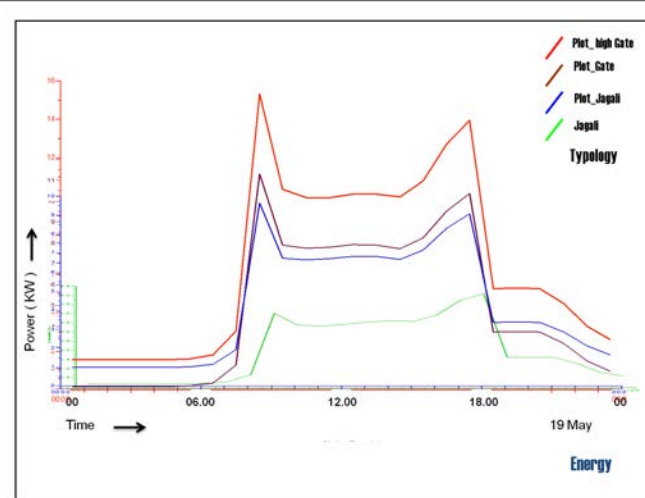
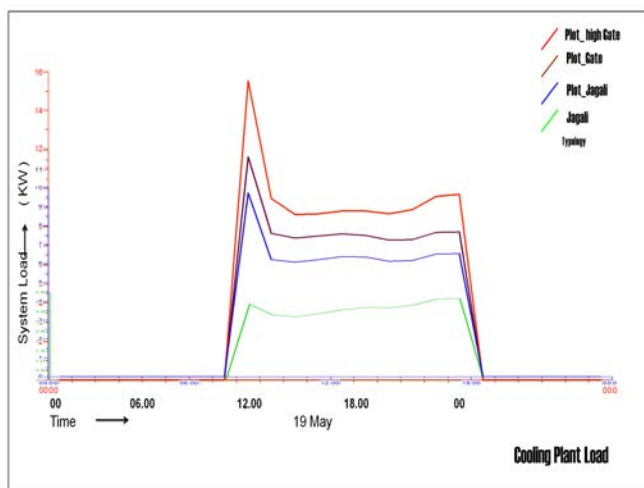
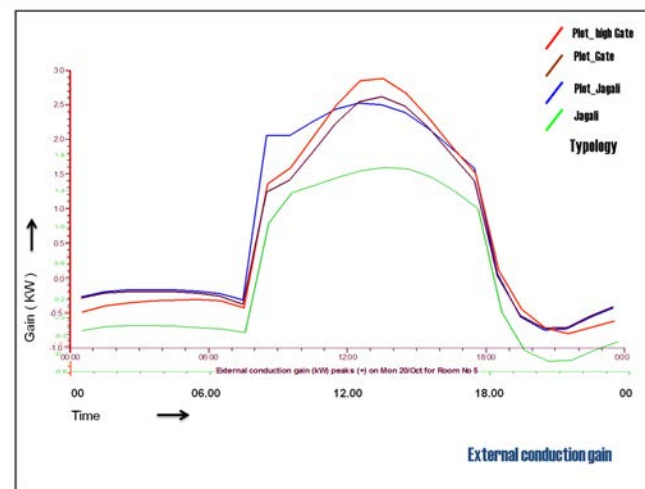
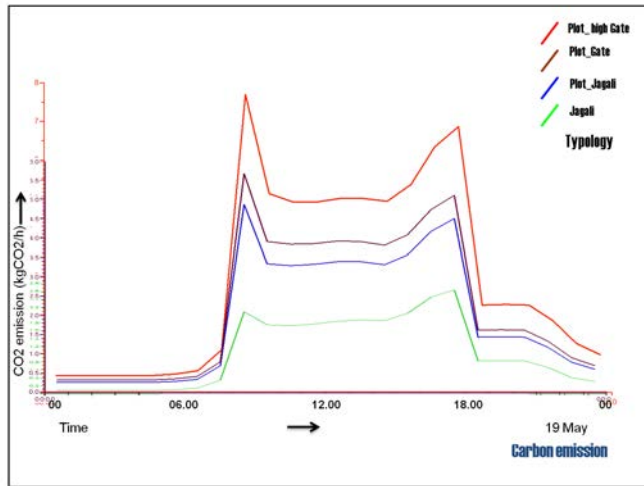


Figure 3.3: Typical Plot with high gate Typology House Model

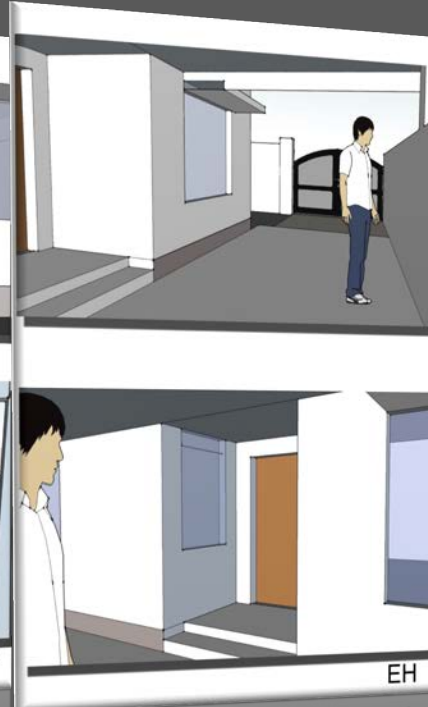
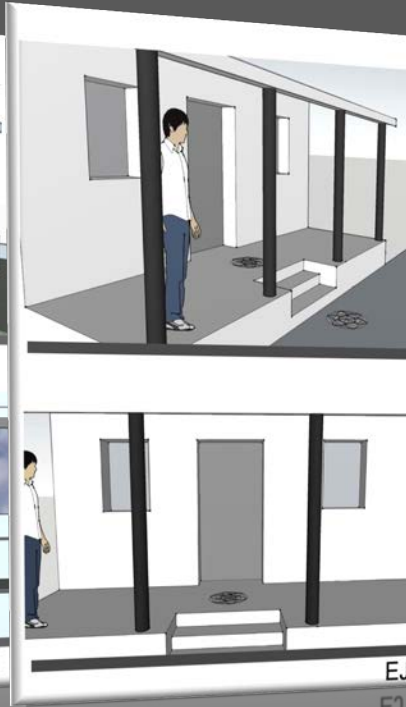
MODEL _ SIMULATION



Environmental
simulation for
performance



multi sorting
task



Entrance Sequence

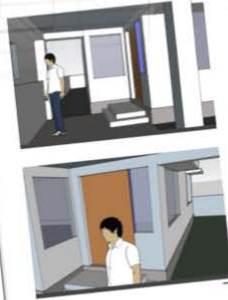
Model Cards prepared for the field work

QUALITATIVE STUDY

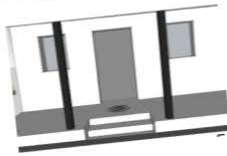
Name		Age group					Owner	
Area/ Address								
Room Area	Opening area						Remarks	
	most	5	4	3	2	1		least
Volume	First							
	Second							
Entrance	First							
	Second							
Opening	First							
	Second							
Security	First							
	Second							
Interaction	First							
	Second							
Skin	First							
	Second							
Other relevant Discussion								

Most likely to use

5



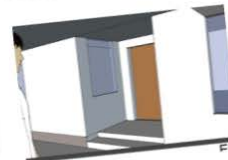
4



3



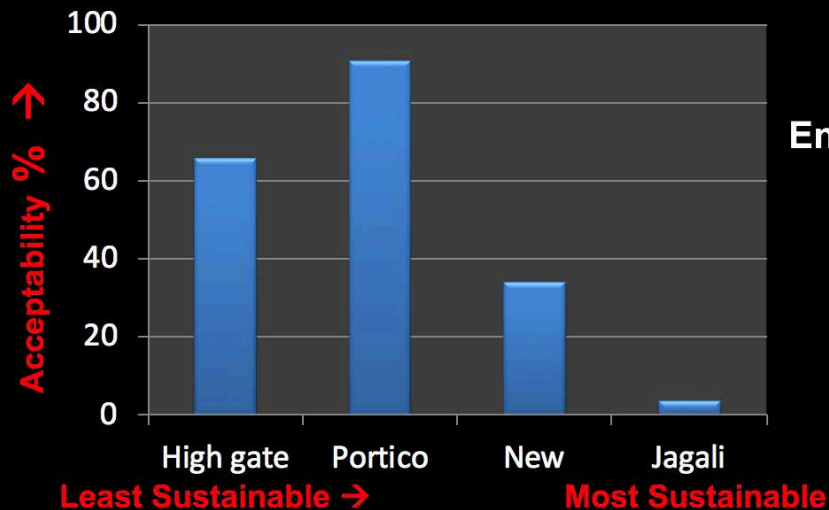
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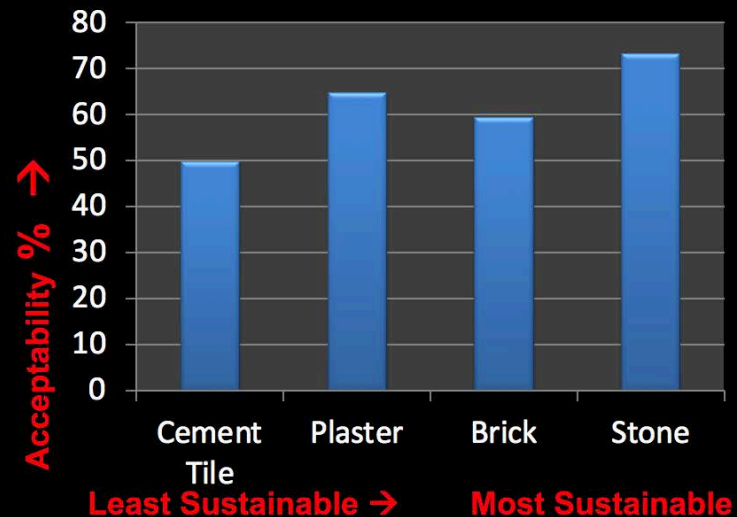
Least Likely to use

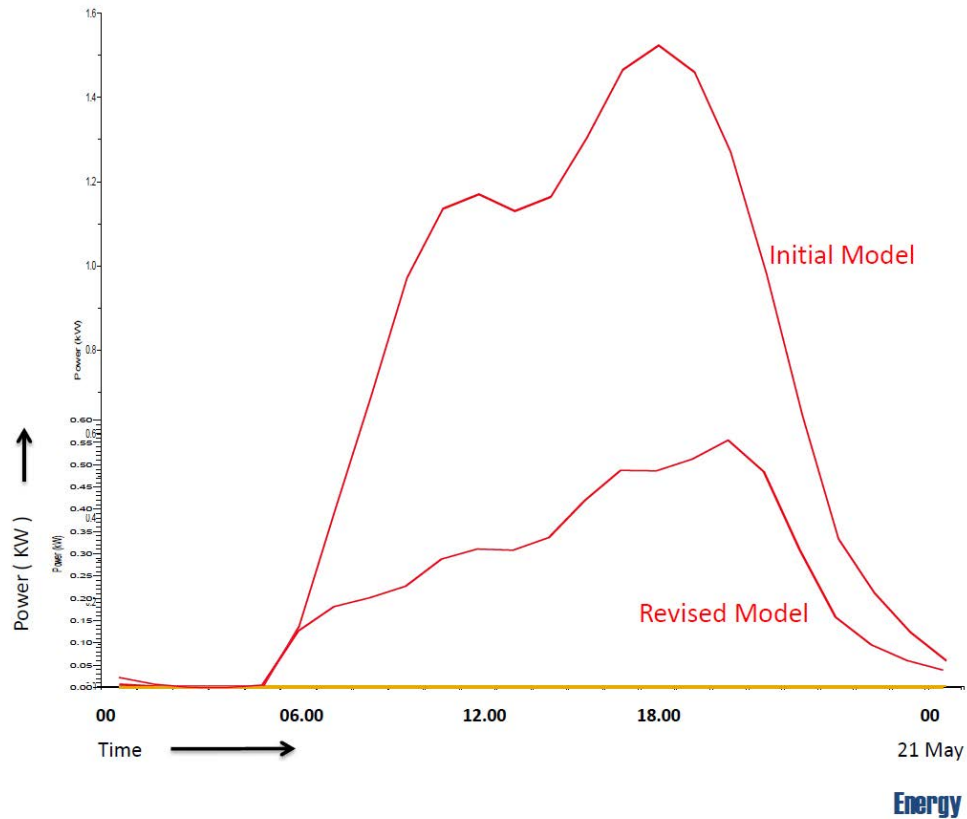
1

multi sorting task

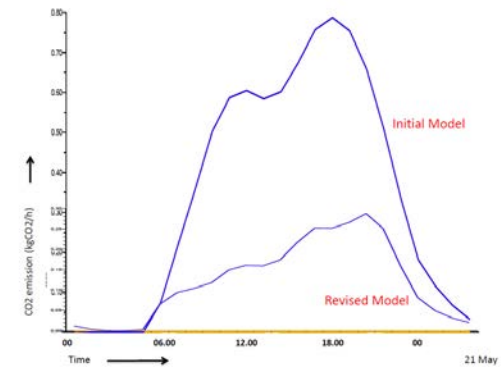
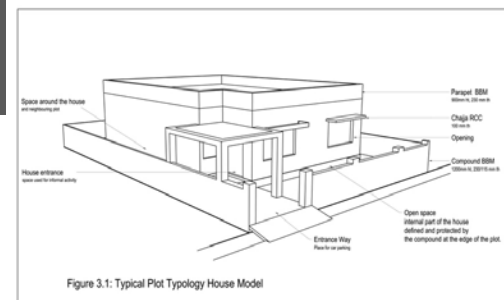


Field Work Reflections		
	level of acceptance of sustainable models	Probability of aligning towards Sustainable Housing
Volume	Least	Negative
Entrance	Least	Negative
Openings	Most	Positive
Interaction	Moderate	Perhaps
Security	Least	Negative
Skin	Most	Positive

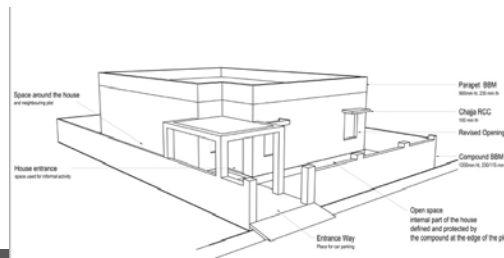




Post field work simulation

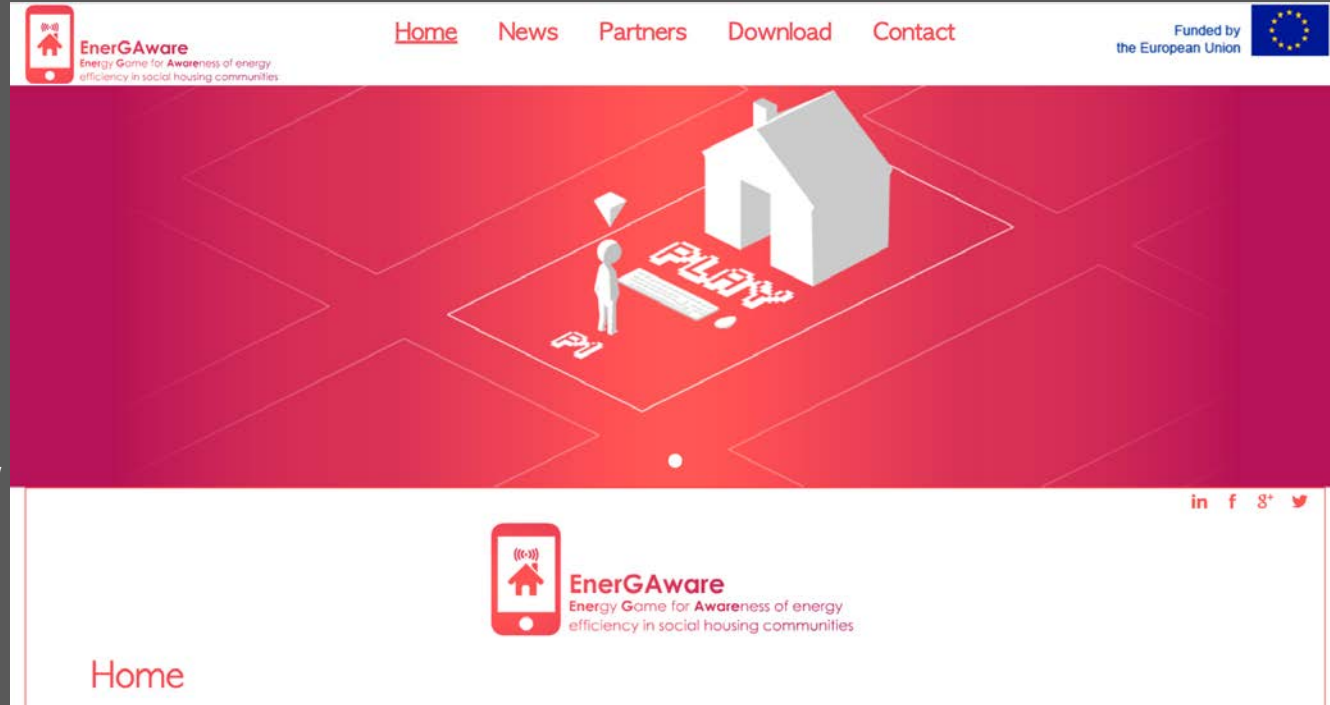


Carbon emission



EnerGAware Project

a large-scale, city wide, socio-technical household survey was administered to 2772 social houses in Plymouth (UK). It provided self-reported energy use behaviour and socio-economic characteristics.



<http://energaware.eu>

03

Energy use behaviour of British Asians

Primary study – Plymouth

Analysis

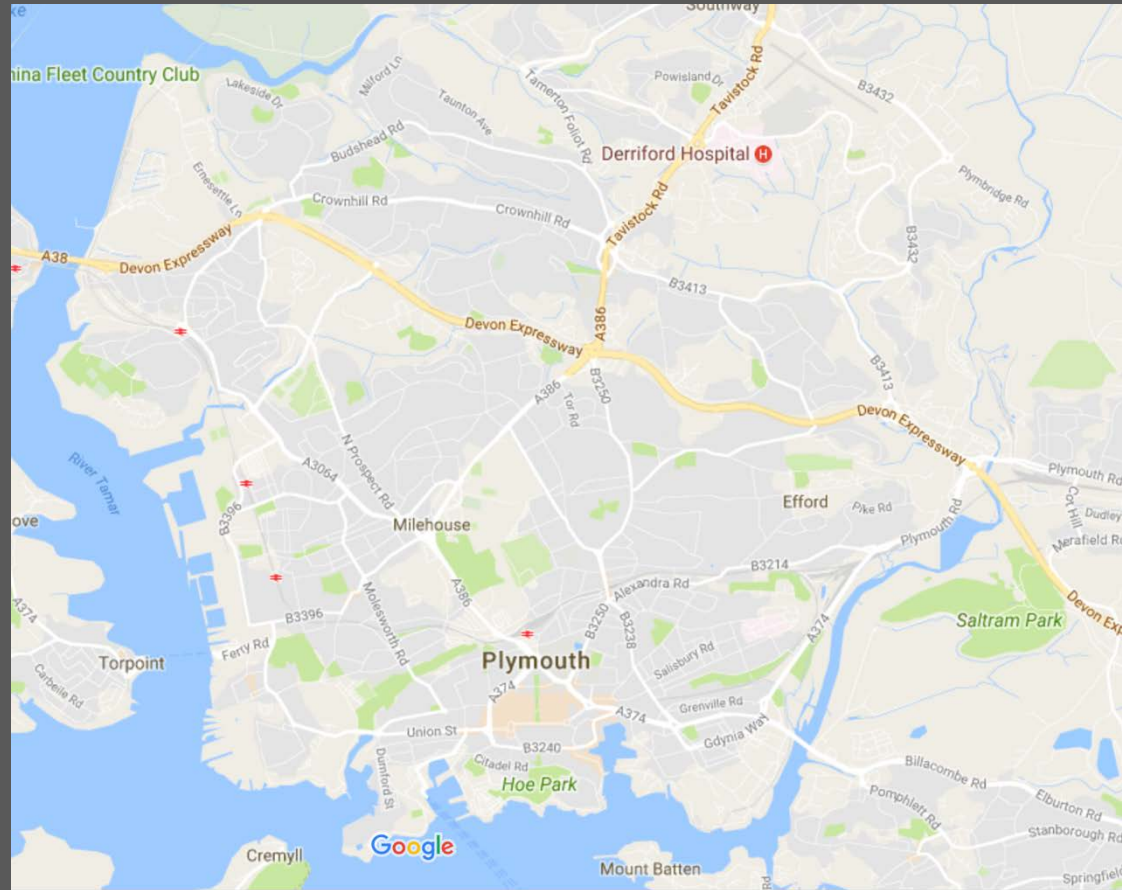
Working summary.

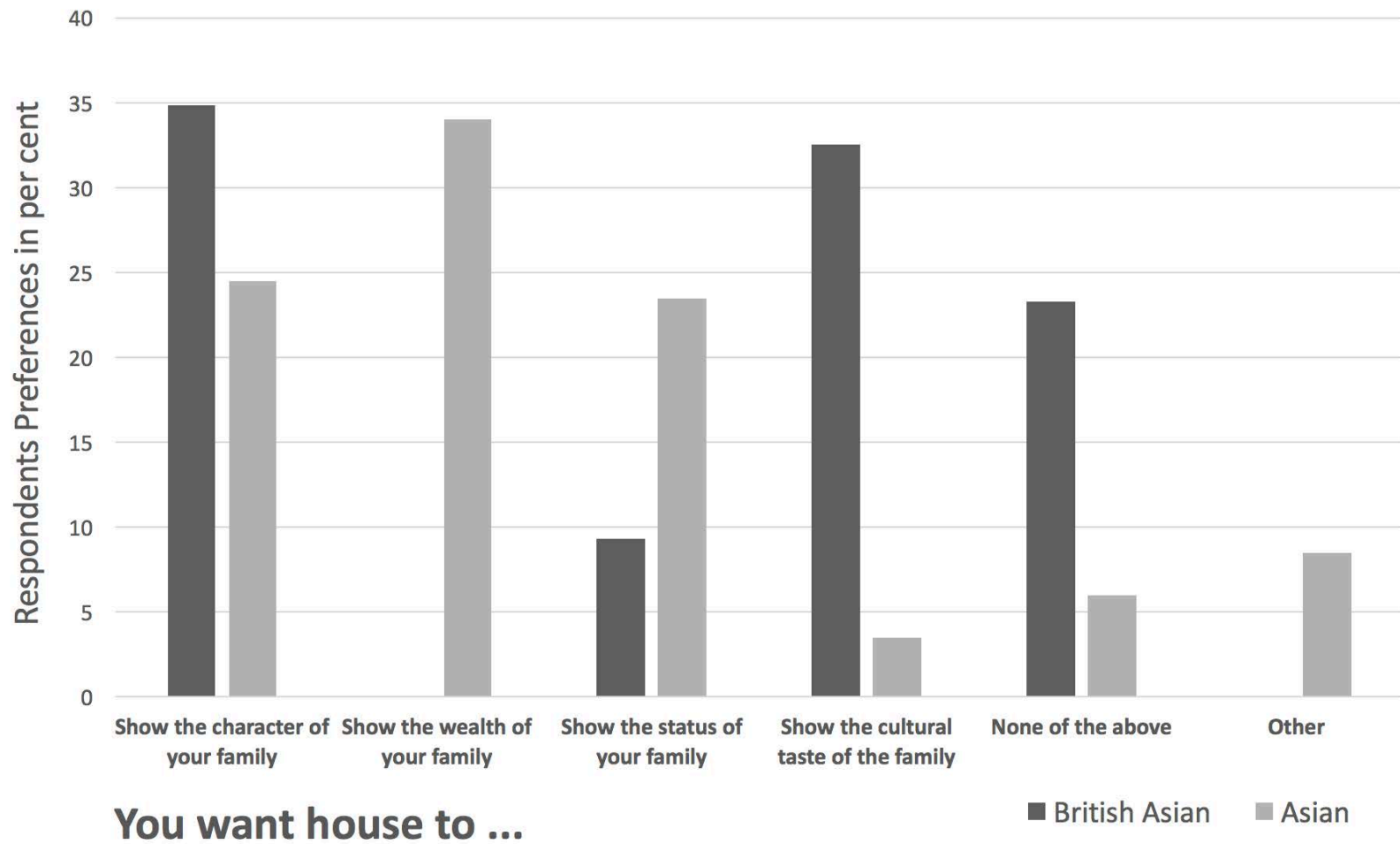
Modelling energy use behaviour of British Asian households

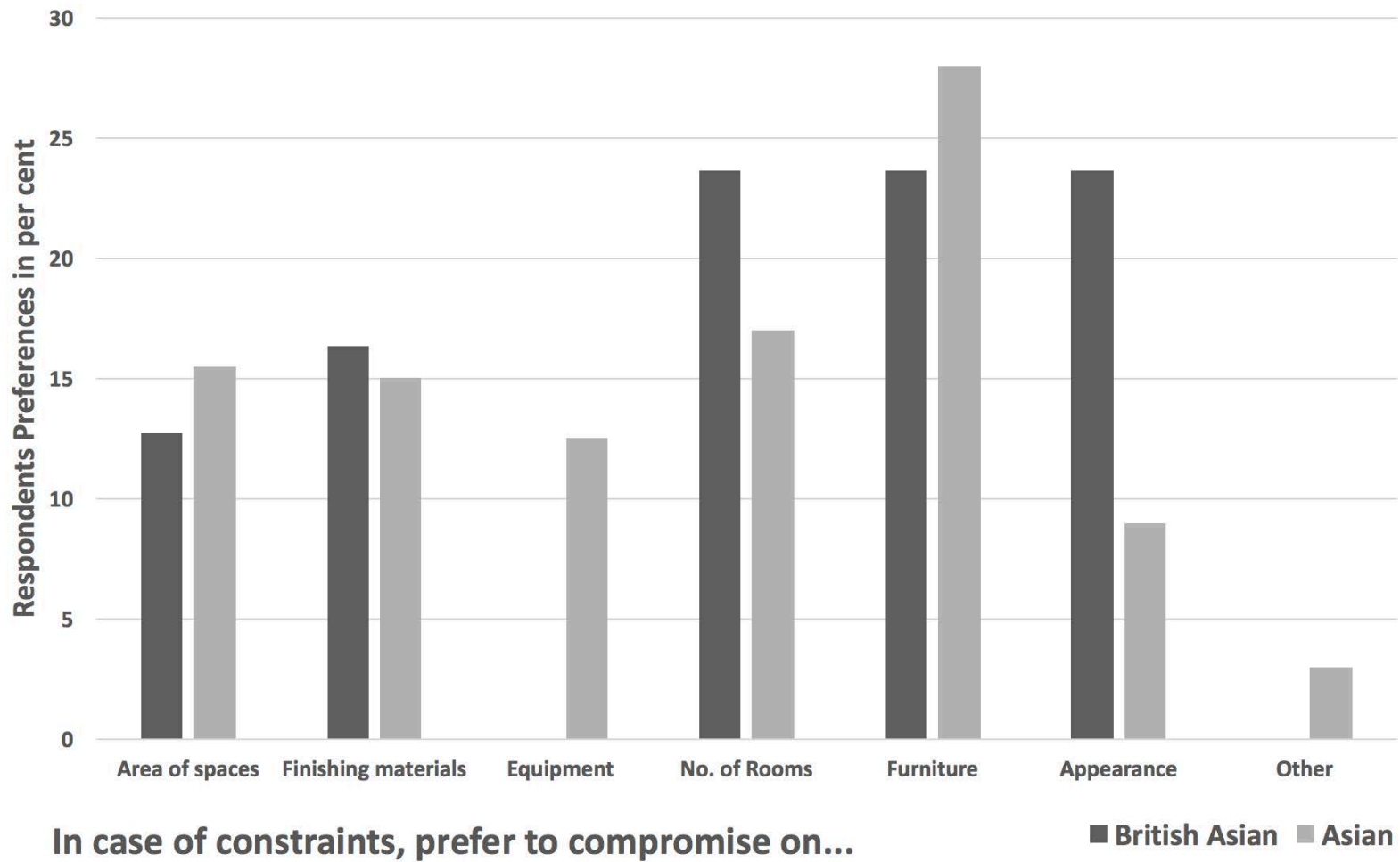
Questionnaire Survey

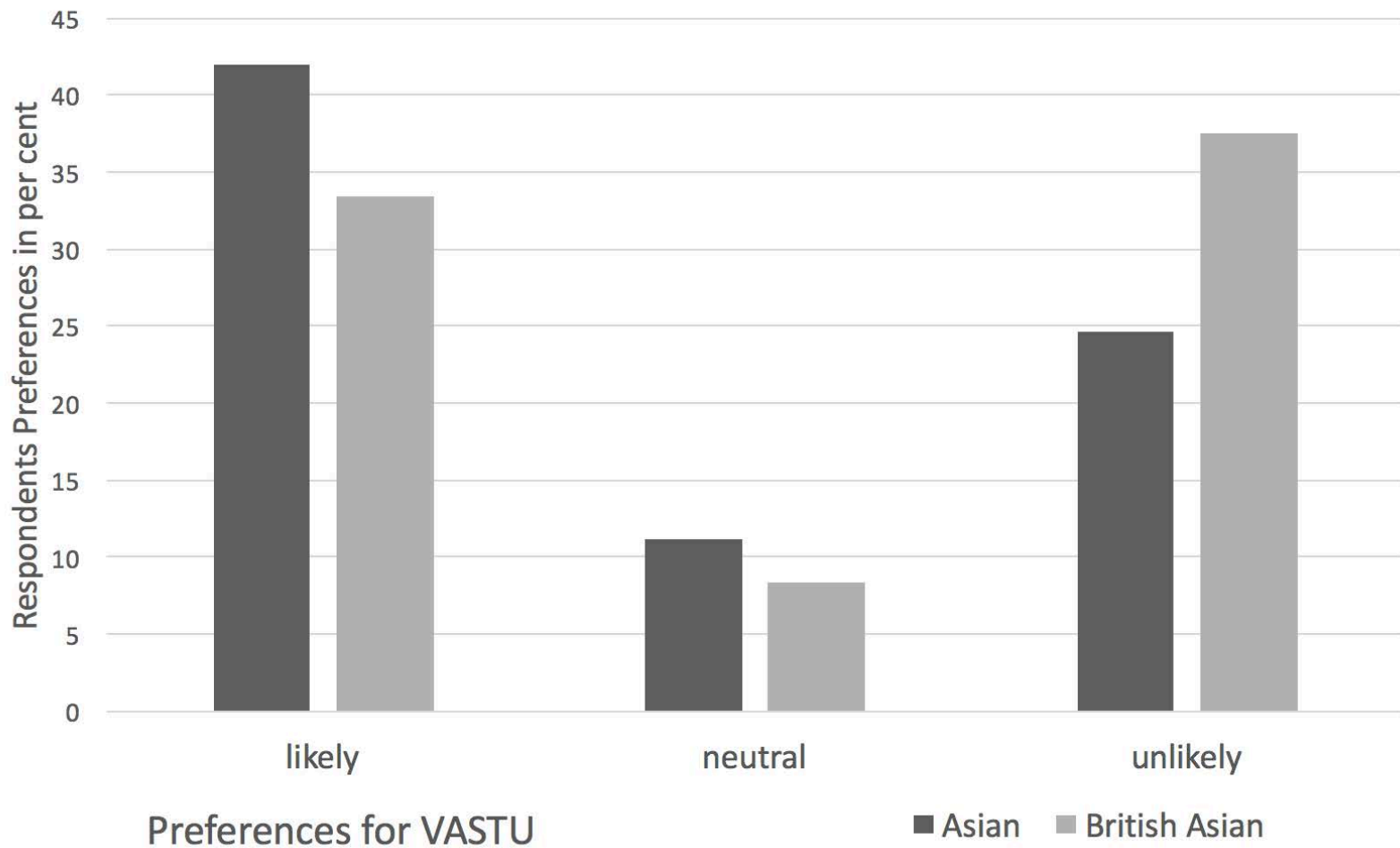
1. Household –
Preferences
2. Ventilation
Comfort and odors
Cooking
Additional house characteristics
3. Your home
Comfort and condensation
4. Your home – energy
5. You and your household

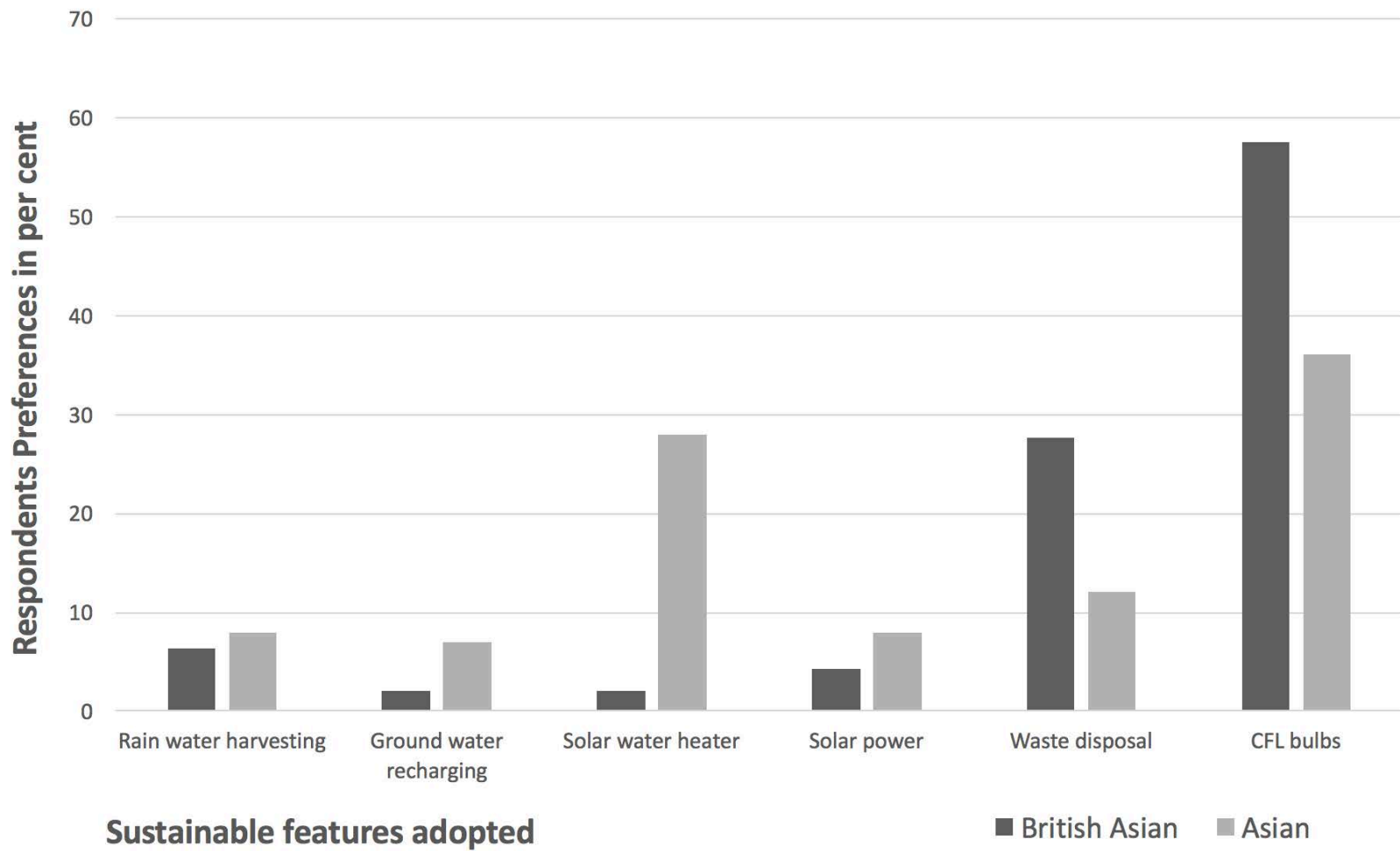
Ethnicity
Occupation
Geographical location
Domicility
Age group

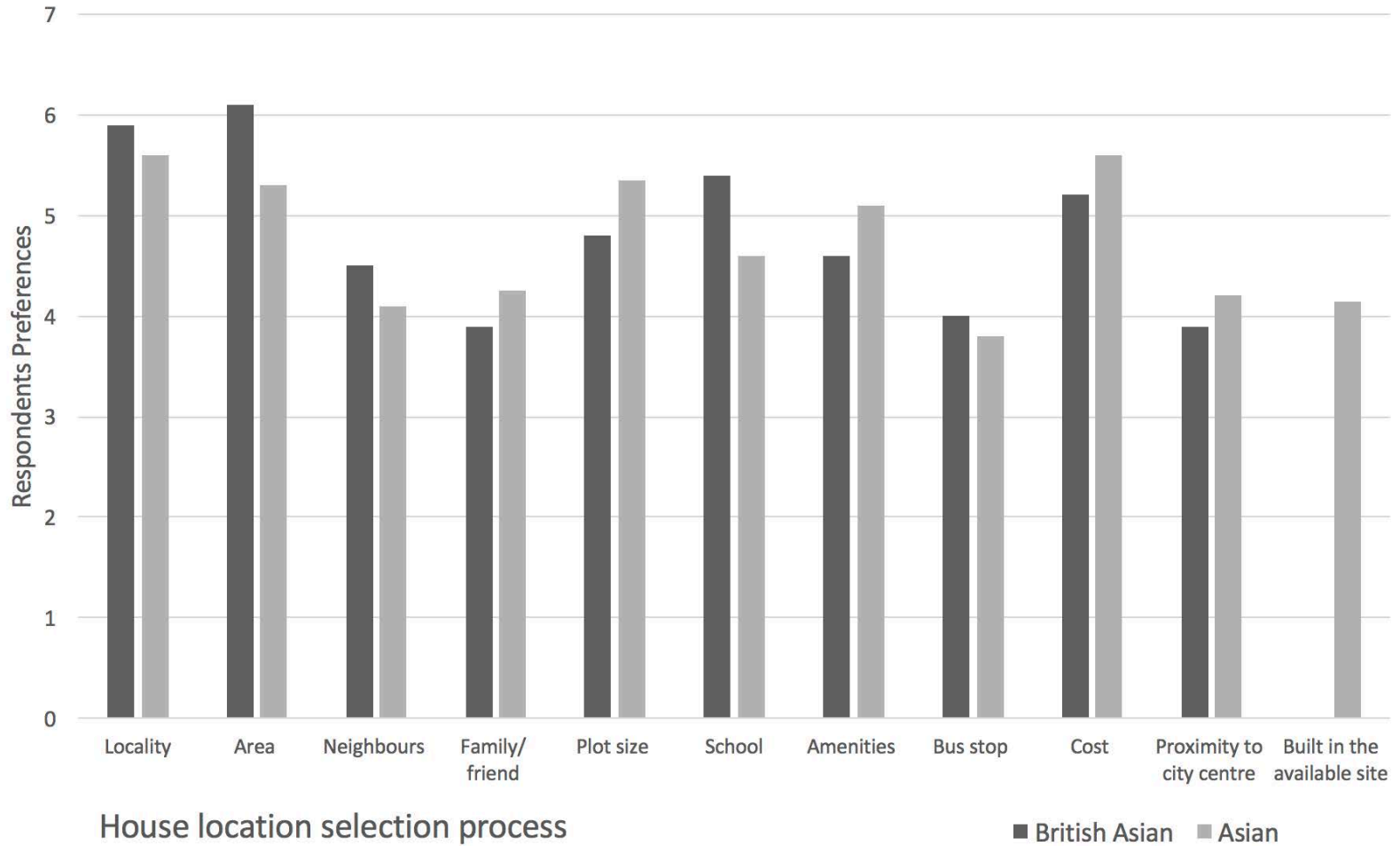


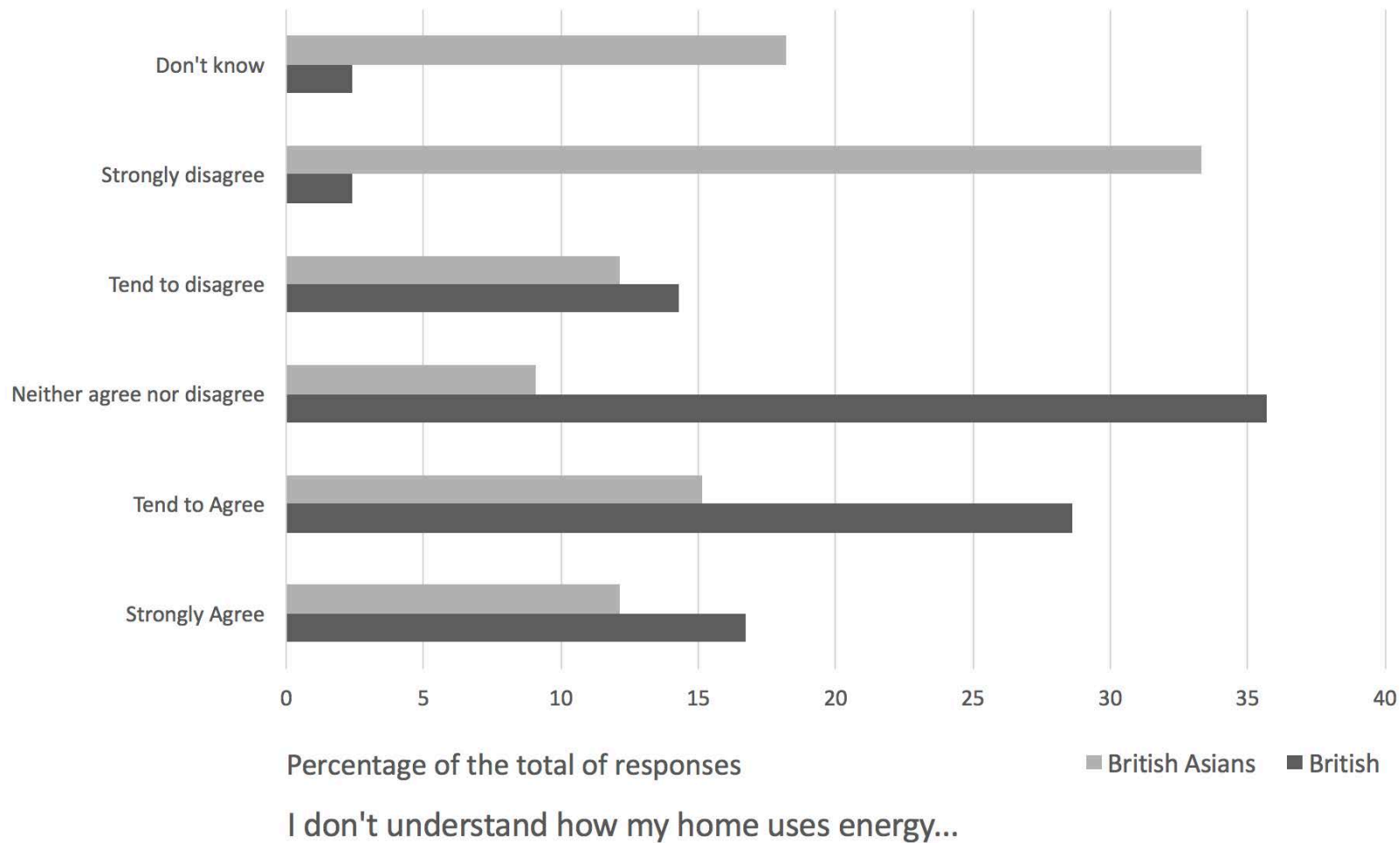


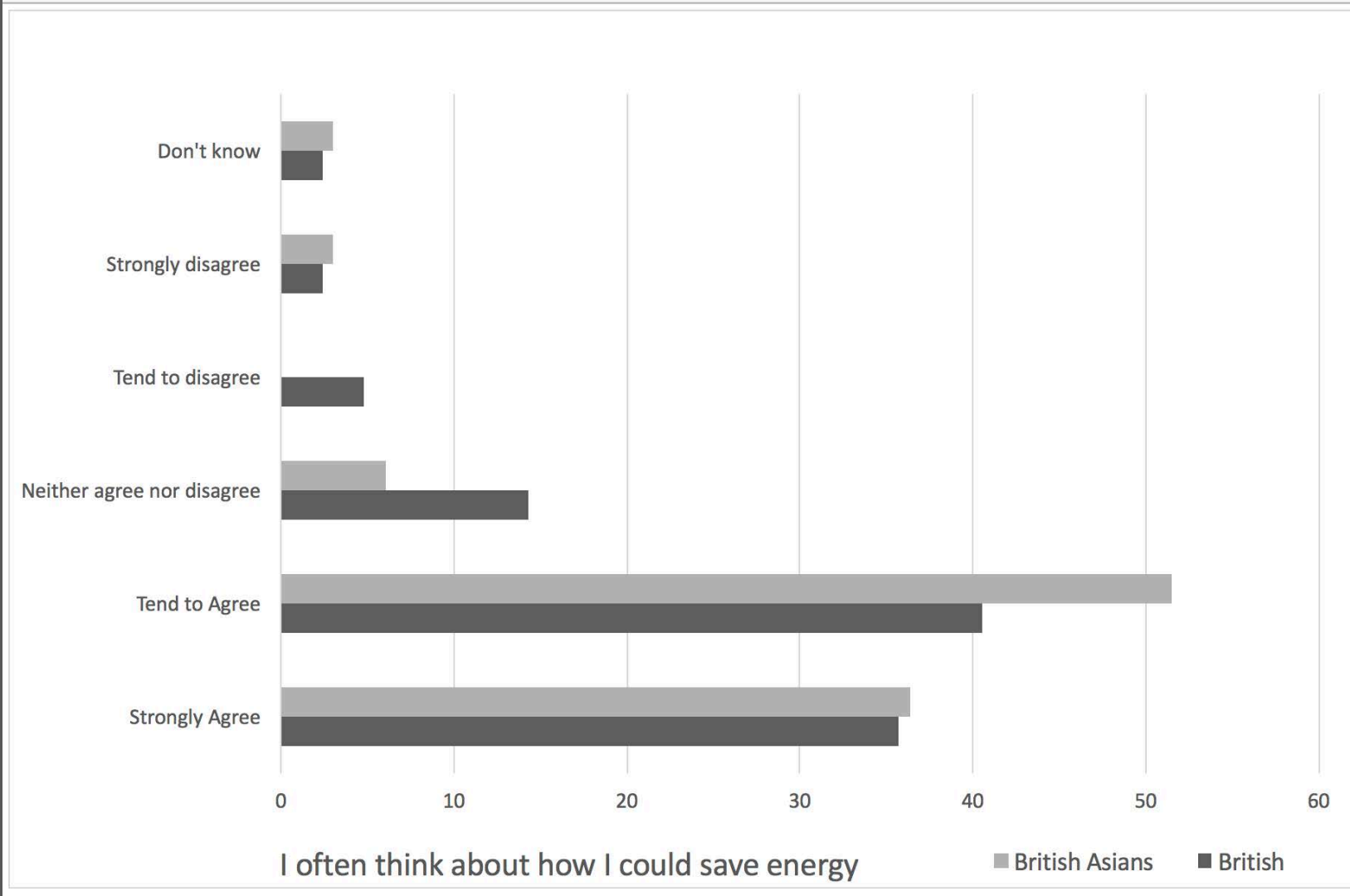


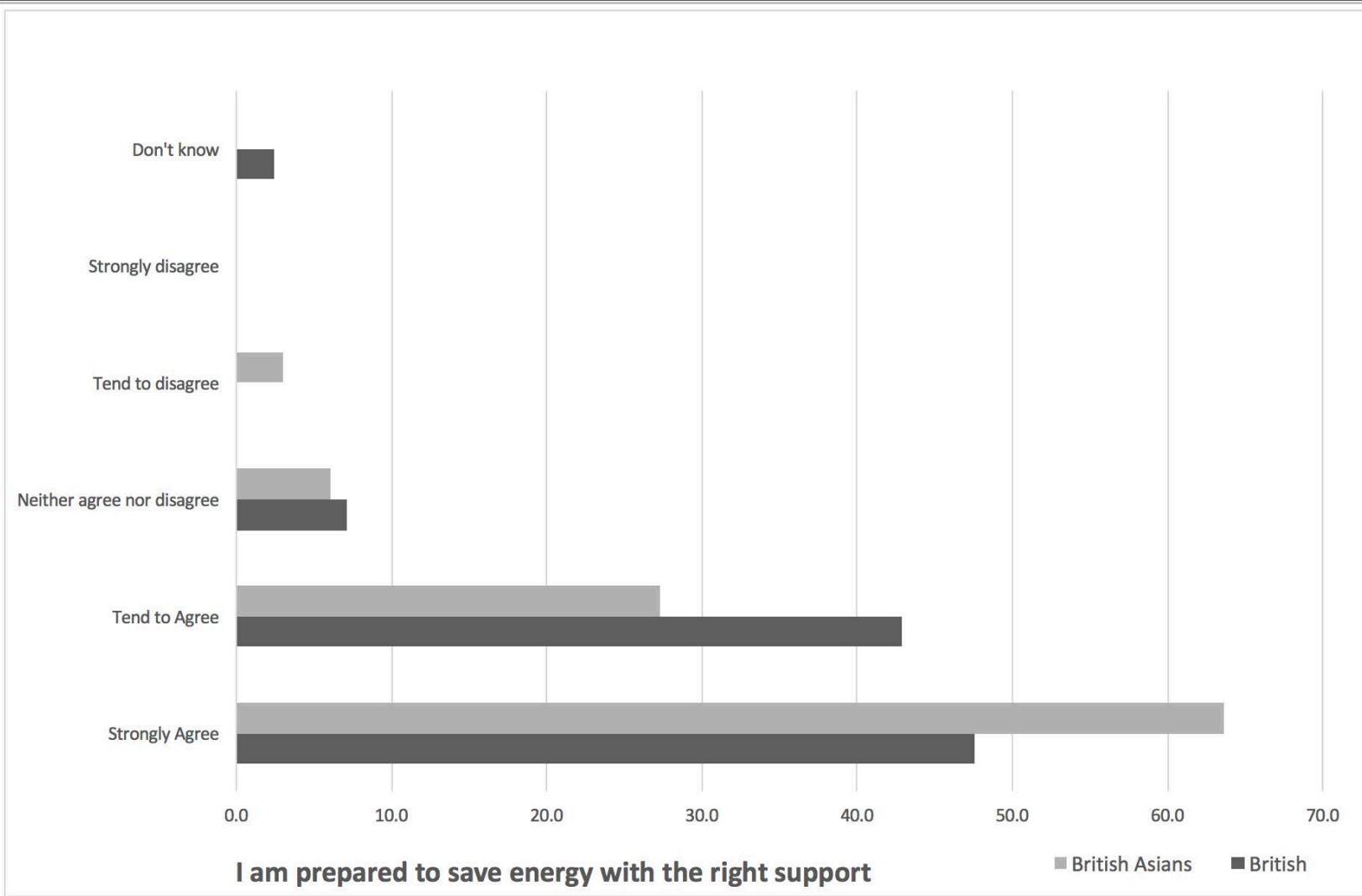


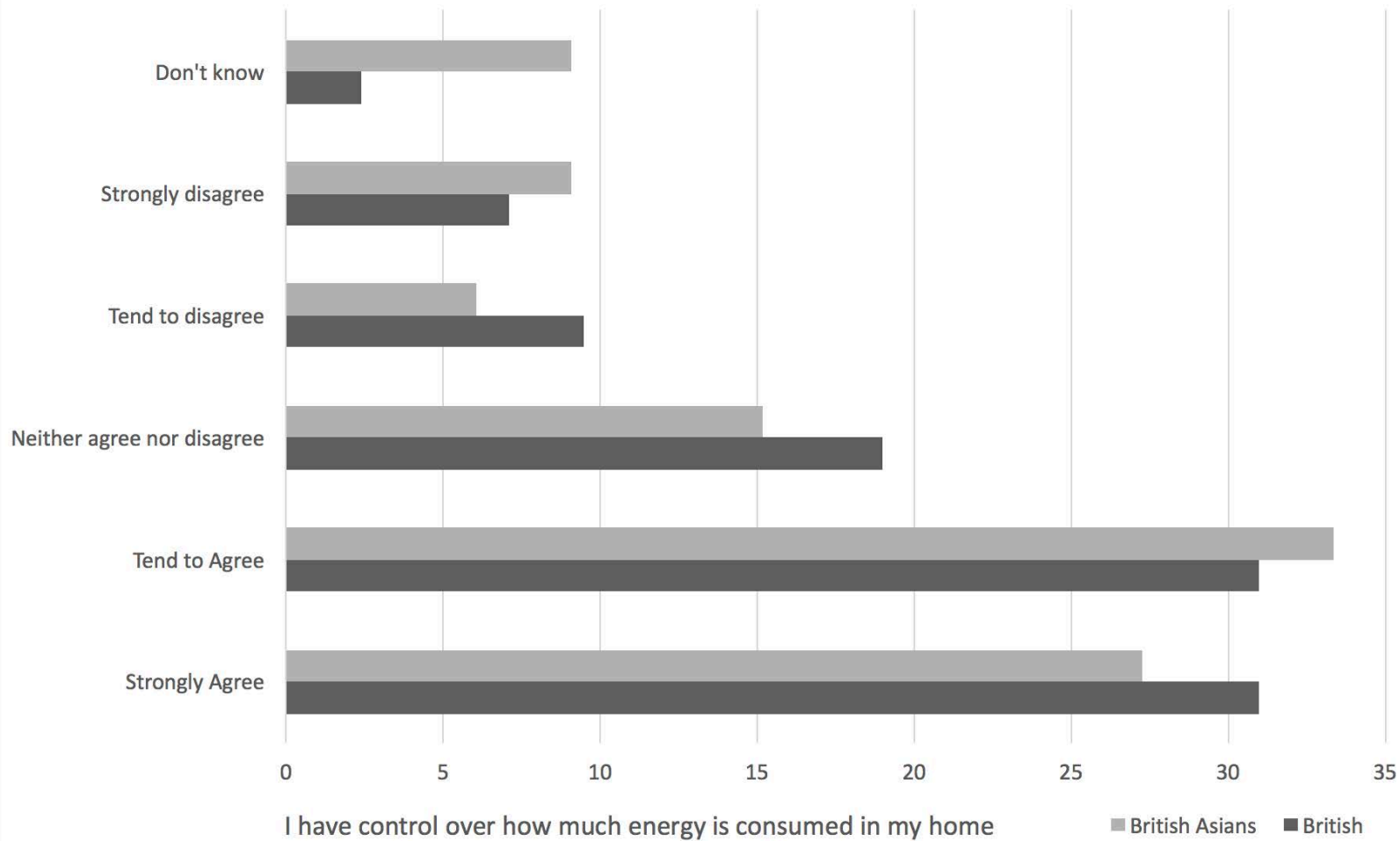


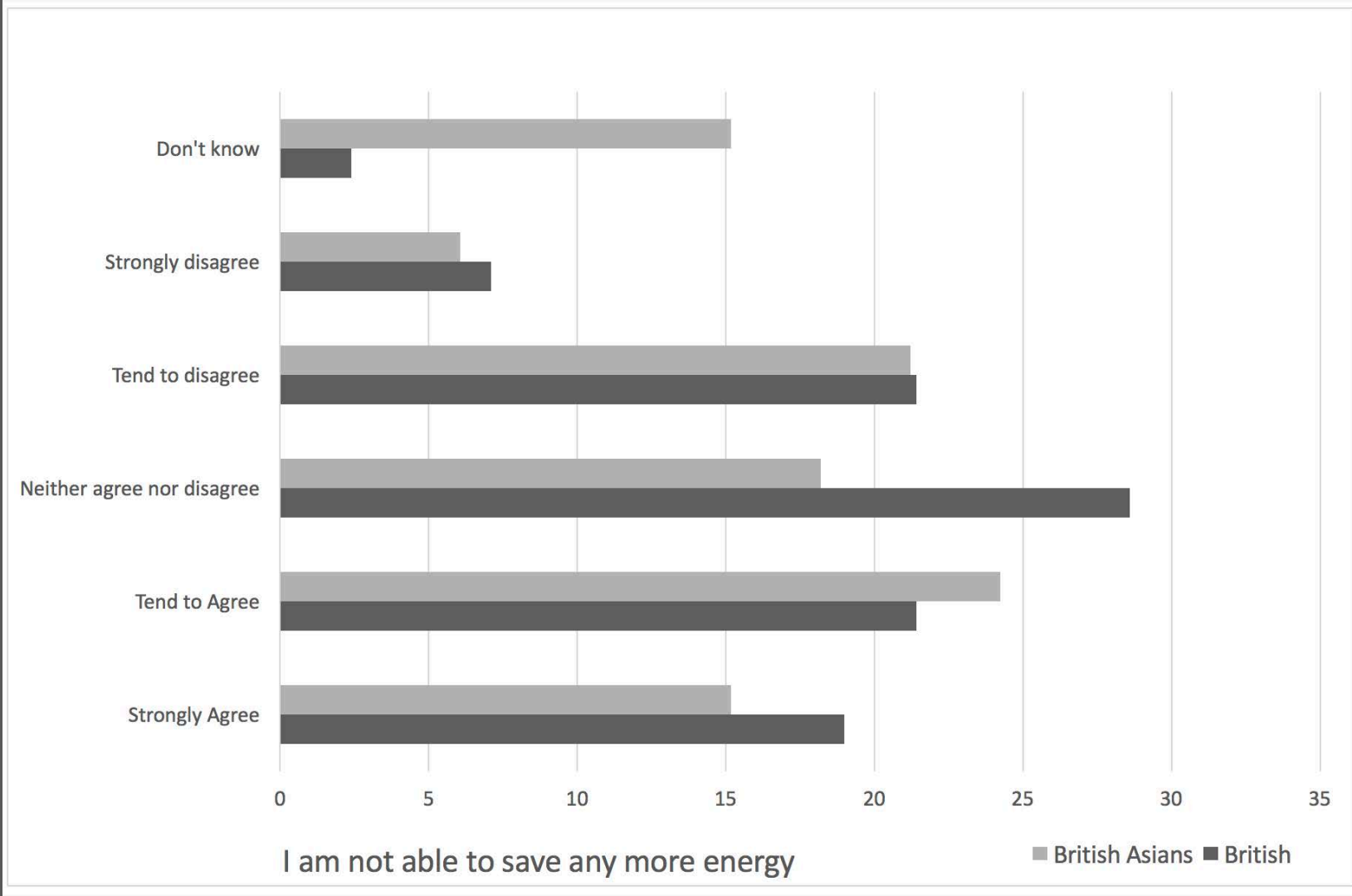


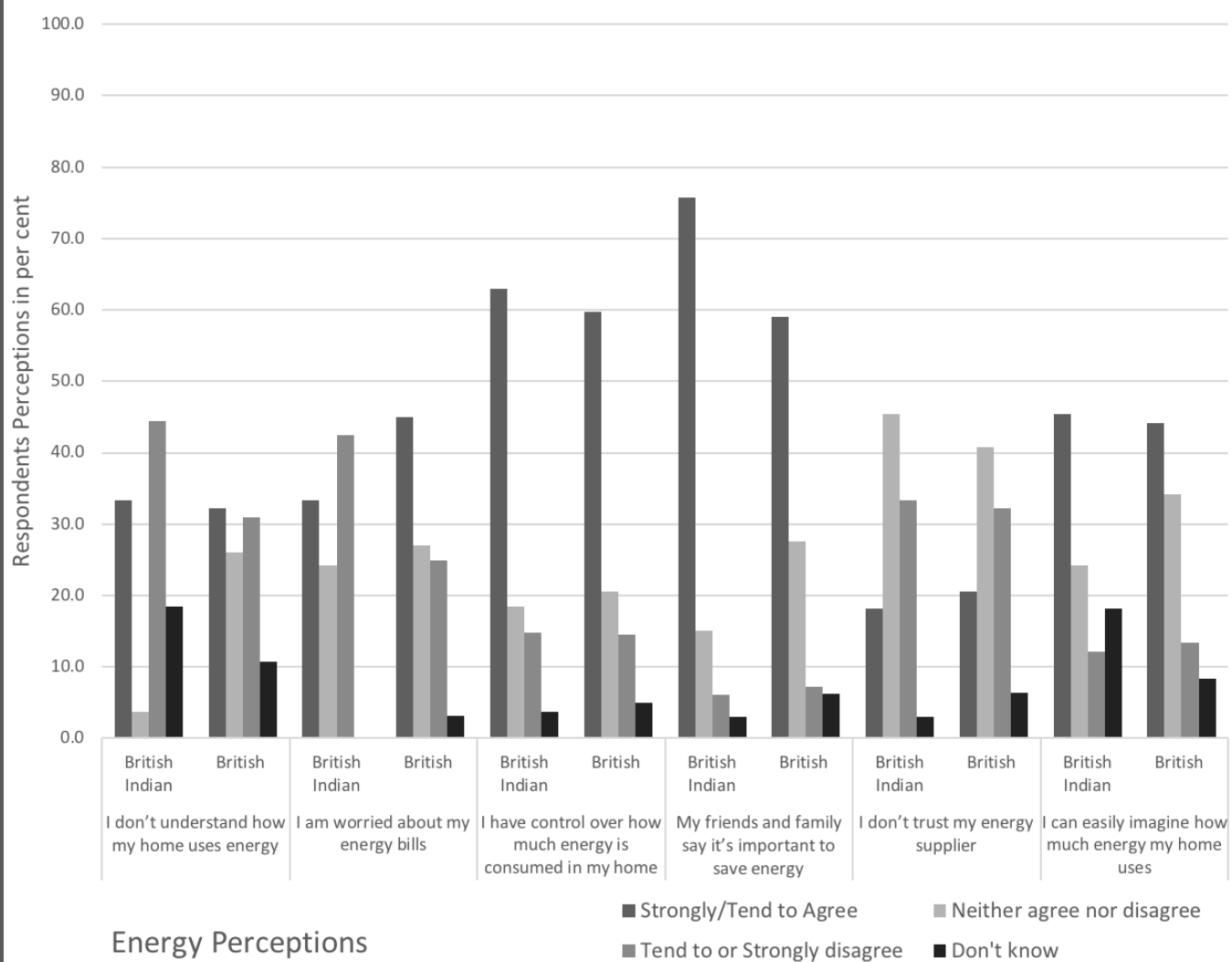


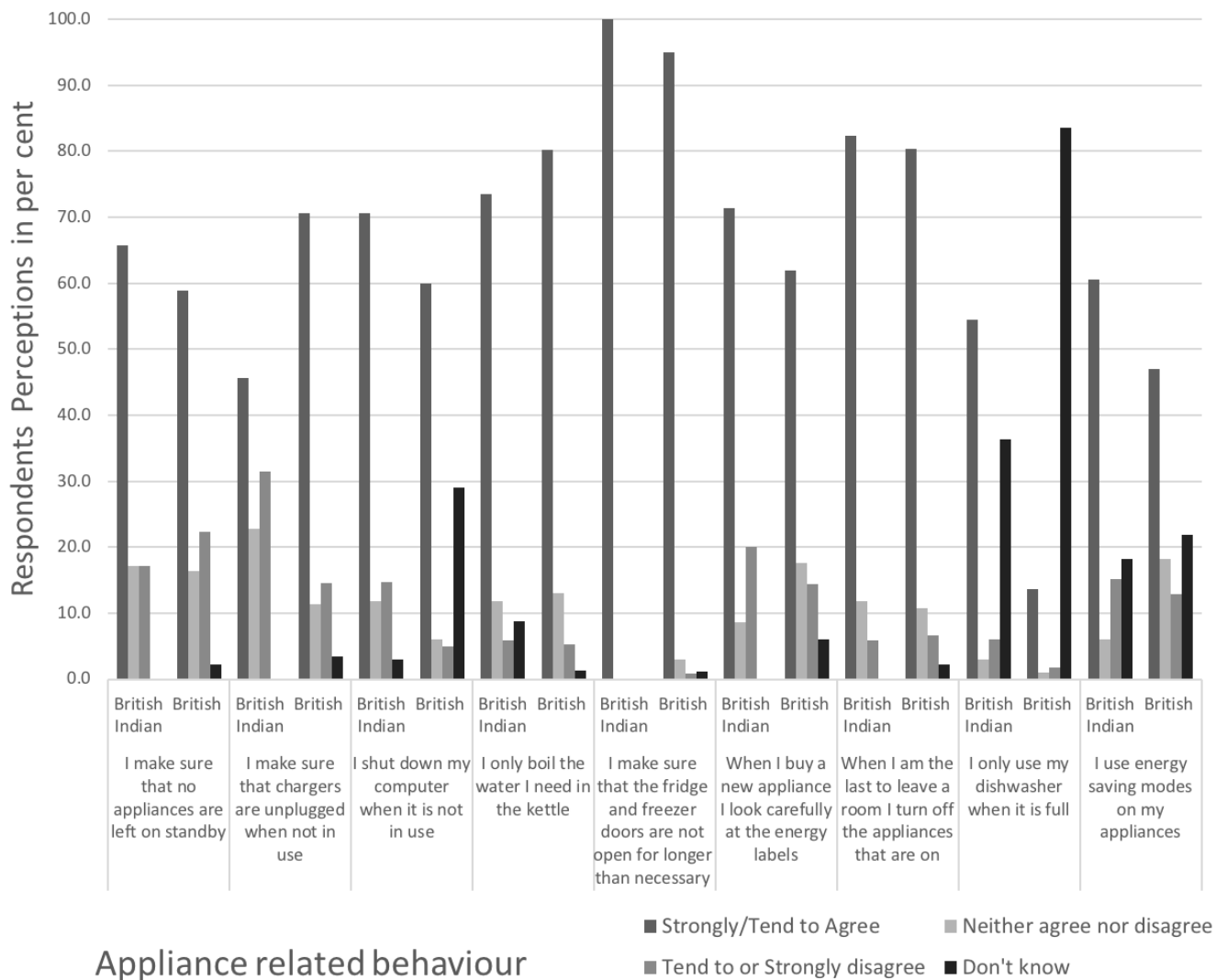












04

WORKING SUMMARY

Energy use and carbon emission in buildings.

Working Summary:

Neutral thermal comfort Vs
pleasurable climatic variations (seasonal)

The user's cultural values-based action
growth/offset of household energy

Individual's behaviour and values
Plays pivotal role while complying with renewable energy

Does anyone have any
questions/Feedback?

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THANKS!