



Kyoto University
Institute of Advanced Energy

ON THE USE OF HARD DATA IN ENERGY-RELATED RESEARCH
FROM SOCIAL SCIENCE AND HUMANITIES (SSH):
*PERSPECTIVES FROM ELECTRIFICATION AND QOL RESEARCH IN
SOUTHEAST ASIA*

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Content

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Brief research summary

- Motivations, Methods
- Electrification-QoL findings (SE Asia)

2

Challenges

- Questionnaires
- QoL nexus, methodologies

3

Conclusions

- On the use of hard data in energy-related SSH research

BRIEF RESEARCH SUMMARY

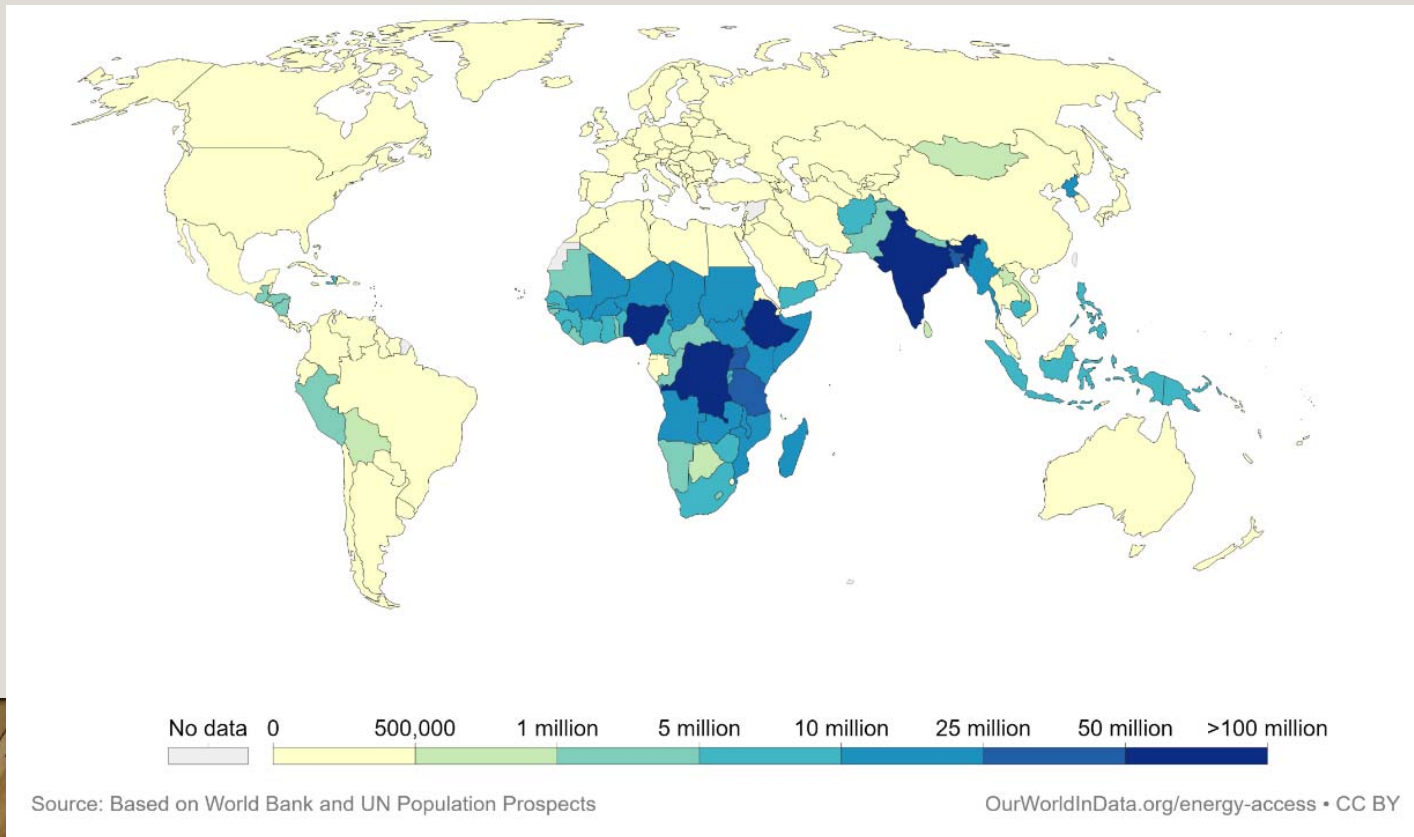
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ELECTRIFICATION IN THE WORLD (2020)

- 850 mill without electricity (11% of 7.8 bill / 7-times pop JAPAN!)



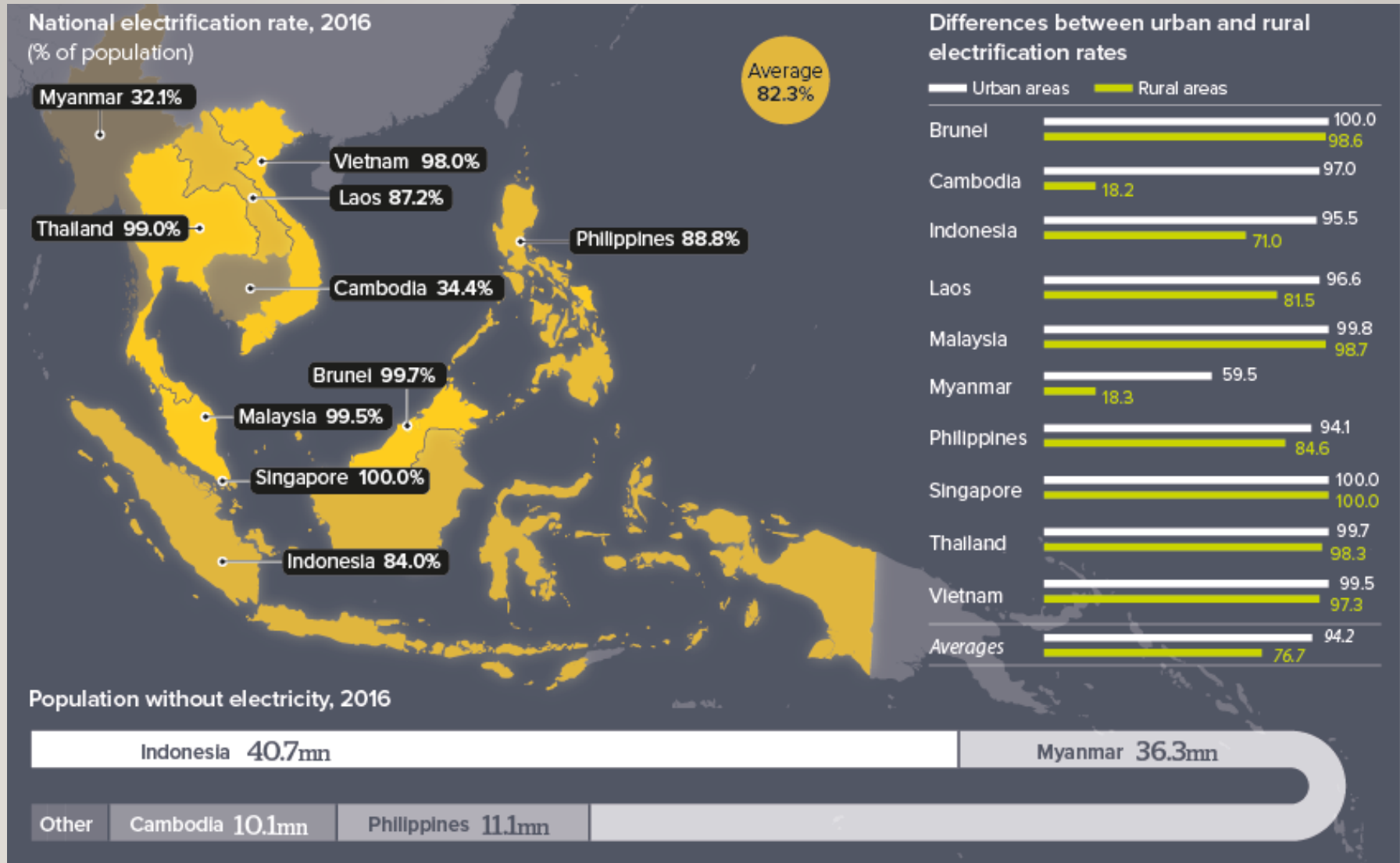
- Most live in *rural areas of developing countries*



Source: Based on World Bank and UN Population Prospects

OurWorldInData.org/energy-access • CC BY


ELECTRIFICATION IN SOUTH EAST (SE) ASIA






<https://dailybrief.oxan.com/Analysis/GA220581/Uneven-electrification-will-affect-ASEAN-competition>

ELECTRIFICATION EFFECTS & SDGS



-  *Energy services access*
-  *Use of pumps*
-  *Refrigeration, cooling-heating*
-  *Lighting*
-  *Active time*
-  *Diversify activities, productivity, higher incomes*



-  Disrupt local practices and culture
-  Increase inequalities / vulnerability
-  Create environmental and land rights controversies, etc.

PROBLEM

- Solid knowledge about:
 - Economic effects (income, productivity, etc.)
 - Technology & applications
 - Institutional effectiveness
- Less so for social outcomes in short / longer spans
- SE Asia information limited:
 - Indonesia & Philippines (critical by total population)
 - Myanmar & Cambodia (critical by population percentage)

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- Quality of life (QoL) allows to gauge into social perspectives about electrification (experiences / expectations)
- Can also highlight vulnerable groups and intersecting conditions of vulnerability

OBJECTIVE

- Present energy-related SSH research on rural electrification and QoL & discuss challenges

More detailed content :

- Cravioto et al. (2020) *The effects of rural electrification on quality of life: A Southeast Asian perspective*. *Energies*, 13, 2410
- Cravioto et al. (2021) *Household lighting and quality of life in rural Philippines: the effect of PV lamps use in non-electrified communities*. 40th Ann Meeting Jap Soc of Ene and Res.



RE-QOL METHODOLOGY

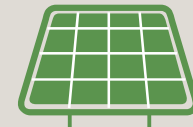
1. Villages selection:

- No electrification, similar conditions
- Willingness to participate in the research



2. Electrification scheme based on:

- Government / utilities / other stakeholders plans
- Project budget (solar home systems)



3. Surveys (QoL questionnaire):

- Prior (baseline) and after (endpoint) electrification



4. Post-collection analysis:

- (Quantitative / qualitative) data analysis to examine differences



QOL QUANTITATIVE MEASUREMENT

No.	Category	Dimensions	Domains	Items	Type of Variable
I	Demographics	-	(1) Gender, (2) age, (3) education, (4) family type, (5) occupation	5	Nominal
II	Quality of Life	Quality of life (Self-reported and satisfaction sub-domains)	Self-reported quality of life	1	Ordinal (10p scale)
			Satisfaction sub-domains: (1) Time use, (2) time alone, (3) housing, (4) cooking, (5) personal safety	5	Ordinal (5p-likert scale)
		Psychological well-being	Self-reported mental health	1	Ordinal (5p-likert scale)
		Physical health well-being	Self-reported physical health	1	Ordinal (5p-likert scale)
		Social well-being	Perception on social support from family and friends	1	Ordinal (5p-likert scale)
	Economic well-being	(1) Feelings about personal wealth, (2) regularity of lack of money preventing activities, (3) income	3	Ordinal (5/4p scale)/Scale	
III	Occupations	-	Satisfaction with (1) main activity, (2) hours of work	2	Ordinal (5p-likert scale)/Scale
IV	Time of activities	-	Total active time	1	Time scale

5p likert Scale: very unsatisfied (1) – very satisfied (5)



LOCATIONS

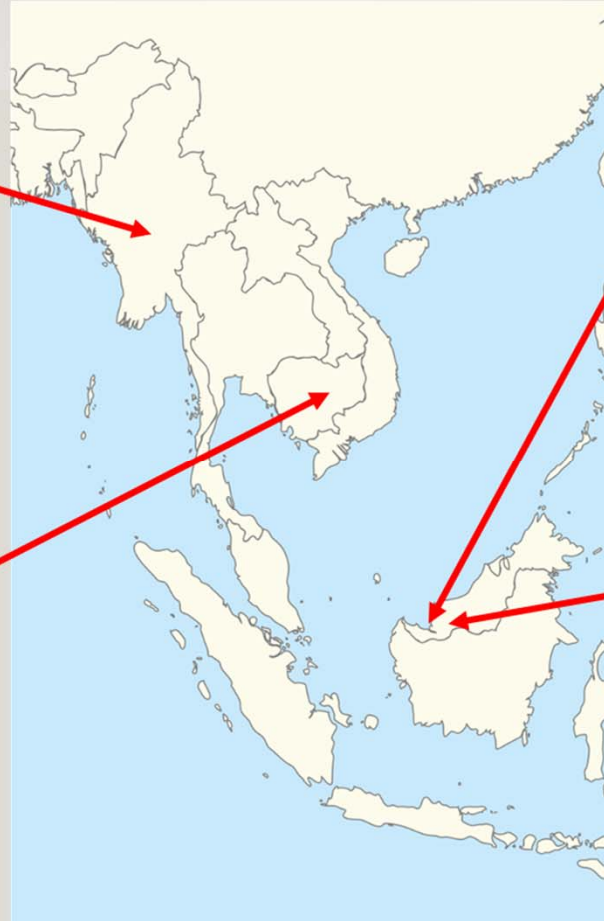
- Similar income levels/economic activities (farming and fishing)
- Similar climate (tropical typical of the South-east Asian region)



Oak Pho, Myanmar



Thmor Keo, Cambodia



**Kampung Sungai Merah,
Malaysia**



Menangkin, Malaysia





**Occidental Mindoro,
Philippines**



Tanay, Philippines



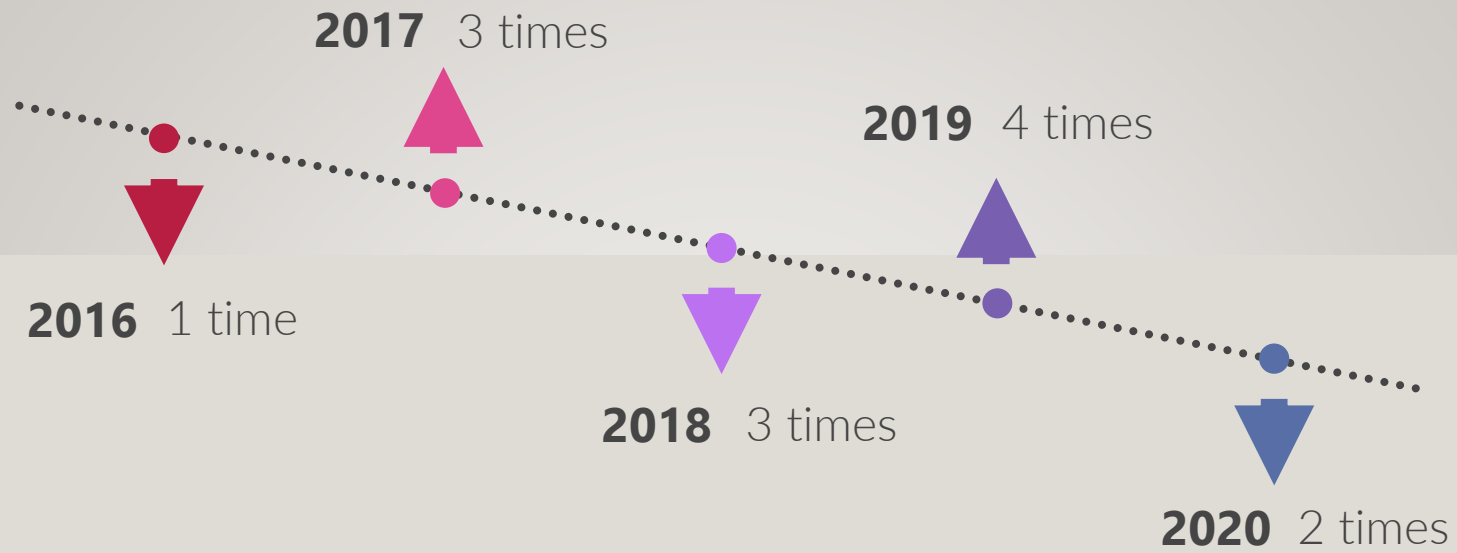
Blora, Indonesia



Sumba, Indonesia



DATA COLLECTION TIMELINE



	2016	2017	2018	2019	2020
Cambodia		1°	2°		
Indonesia				1°	2°
Malaysia	1°	2°	3°	4°	
Myanmar		1°	2°	3°	
Philippines				1°	2°

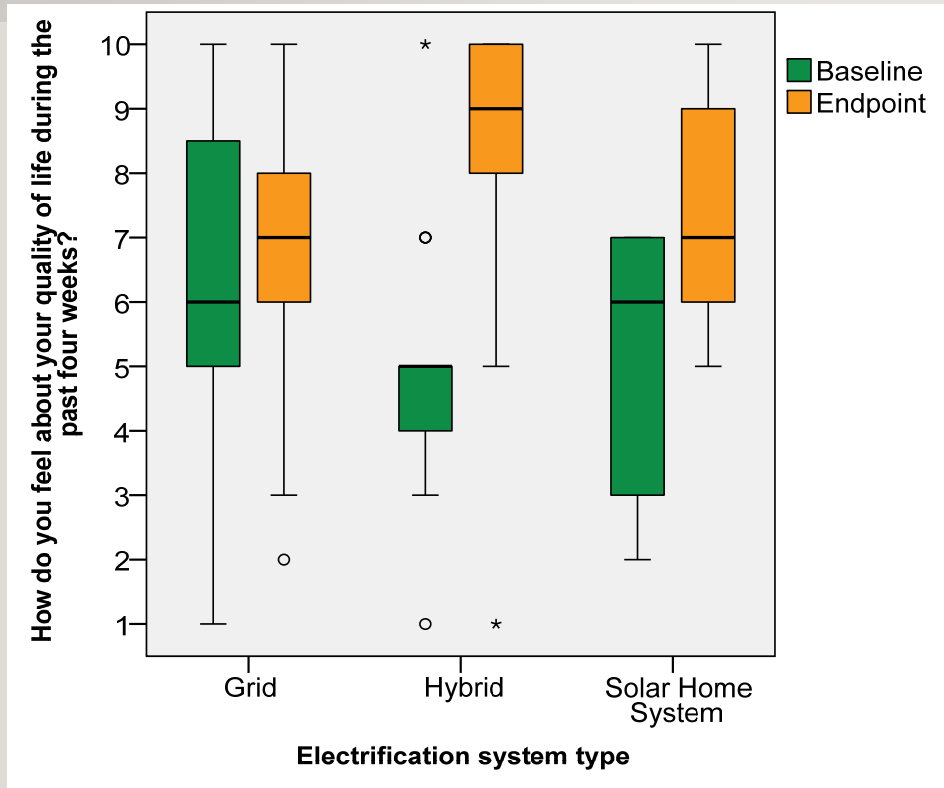
SUMMARY OF RESULTS

No.	Category	Dimensions	Domains	Items	Type of Variable
I	Demographics	-	(1) Gender, (2) age, (3) education, (4) family type, (5) occupation	5	Nominal
II	Quality of Life	Quality of life (Self-reported and satisfaction sub-domains)	Self-reported quality of life	1	Ordinal (10p scale)
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GENERAL QOL (MALAYSIA, CAMBODIA, MYANMAR)

(1) Very Bad ... (10) Very Good



(n=136, $\chi^2=13.1, p<0.05$)

- **Finding: General QoL levels Increased after electrification**
- ❖ Energy services were expanded
- ❖ More options for cultural/leisure activities, productivity, communication, cooking/preservation food, sanitation
- Greater increase for hybrid mini-grid systems (Solar PV + Diesel generator)

QOL SUB-DOMAINS (MALAYSIA, CAMBODIA, MYANMAR)

HOUSING

Satisfaction with housing

➤ **Finding: No change**



TIME USE / ALONE

Satisfaction with how time is spent

time spent alone

➤ **Finding: No change**



COOKING

Satisfaction with food consumed

➤ **Finding: Slight increase
(Grid)**

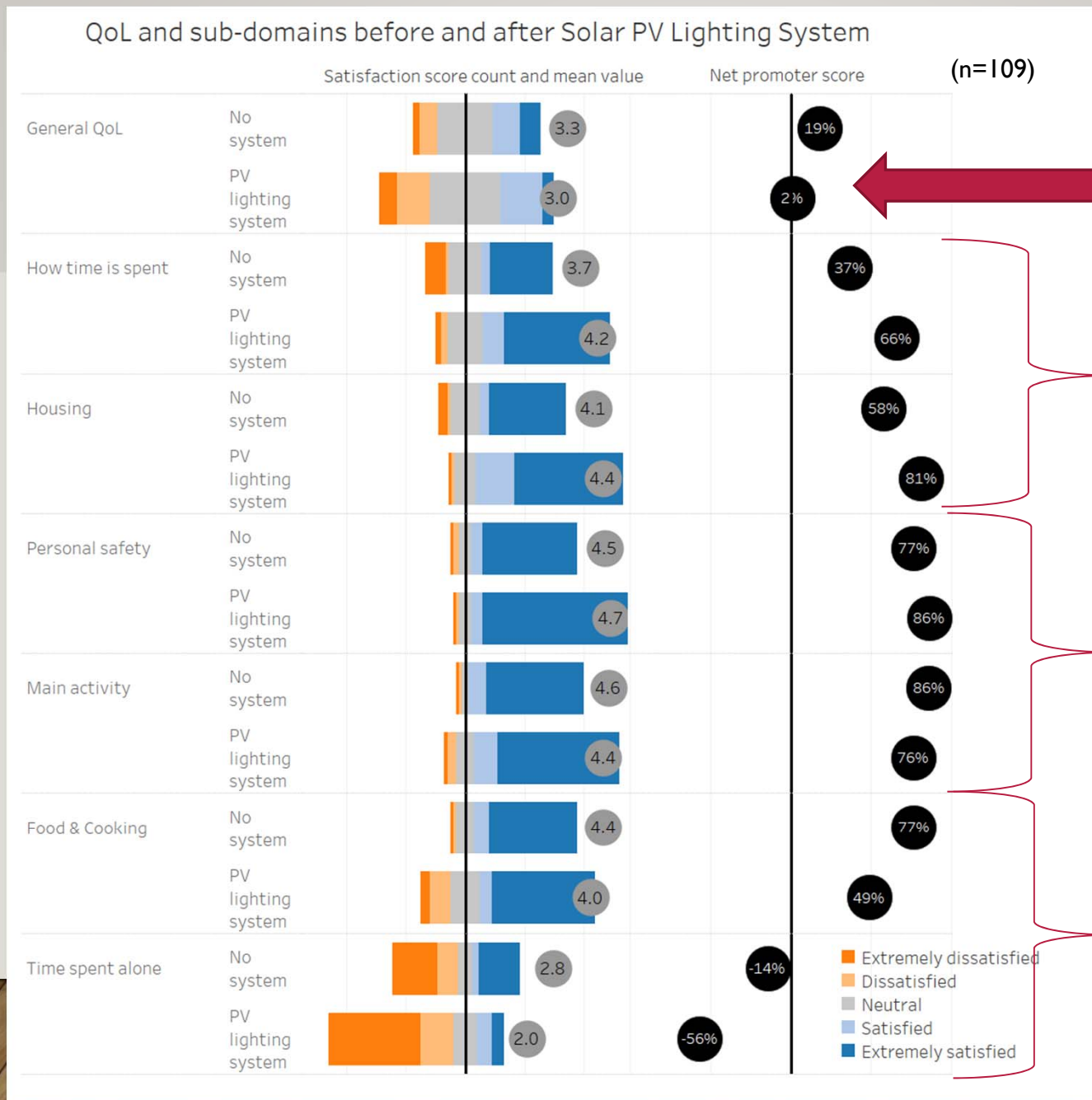
SAFETY

Perceived personal safety

➤ **Finding: Slight increase
(Grid / Solar Home)**



17 QOL AND SUB-DOMAINS LEVEL CHANGE (PHILIPPINES)



General QoL

➤ **NO change**

$t(95.48)=1.68, p=0.576$

Positive domains

➤ **significant increase**

$t(73.26)=-1.99, p<0.01$

$t(71.63)=-1.37, p<0.01$

Neutral domains

➤ **NO change**

$t(78.85)=-1.01, p=0.076$

$t(96.09)=0.88, p=0.167$

Negative domains

➤ **significant reduction**

$t(99.91)=1.79, p<0.01$

$t(74.09)=2.75, p<0.001$

SUMMARY OF FINDINGS (SE ASIA)

- Electrification has positive effects on Quality of Life
- Yet, for specific QoL domains range from positive to negative
- Differences by type of systems (capability, expectations, etc.)
- Differences among social groups - *on-going research* -

Future directions

- Vulnerability intersections (social position, gender, family composition, income/poverty, household features, etc.)
- Results reflect short-term effects, longer-spans analyses

CHALLENGES IN QOL-BASED ENERGY-RELATED SSH RESEARCH



WELL-BEING DATA / QUESTIONNAIRES LIMITATIONS

1. Heuristic answers

- Substitution of QoL questions with quicker, easier, and more accessible answers (Kahneman, 2011).

2. Confusions between experience and memory

- Feeling satisfied in life (experience)
- Feeling satisfied about your life (storytelling)



CHALLENGES IN THE NEXUS

- RE-QoL nexus is context-sensitive
 - Examining people's priorities (ethnographies)
 - Family life and roles
 - Consider alternative social interactions
 - Non-economic systems of exchange / relations

OTHER CHALLENGES METHODOLOGIES

Data collection

- Risk of cultural bias (from researchers/informants)
- High dependency on informants/collaborators (community access, language interpretation, cultural meanings)
- Limitations to interact remotely (no electricity, limited access)

Complementary options

- In-depth interview / focus groups (active local collaboration)
- Day reconstruction methods (energy diaries)
- Immersion & field notes (longer field work)



CONCLUSIONS

1. Use of hard data in the context of QoL-RE nexus

- Create/verify hypotheses
- Design scales
- Compare outcomes

2. Hard data in QoL domains

1. Innovative
2. Precise dimensions
3. Identify trade-offs

1. Challenges for hard data:

- Overcome questionnaire limitations
- Explore cultural meanings in detail
- Underlying explanations of outcomes (diversity of frameworks)

2. Complexity in nexus

- Complexity in causality of nexus
- Diverse groups: genders, household types, social groups, stakeholders, etc.

3. Robustness can be resourceful

4. Longer spans of interventions

Thank you
for your attention



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