

# Life in the Dark

Overcoming the barriers that prevent  
electricity access from advancing human  
development outcomes

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**PhD Candidate**

# Acknowledgement of Country

The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet.

We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.

We recognise their valuable contributions to Australian and global society.

*The Brisbane River pattern from A Guidance Through Time  
by Casey Coolwell and Kyra Mancktelow.*



# Tammy MacGinley

BEng, Grad Dip Ed., MSE, PhD Candidate



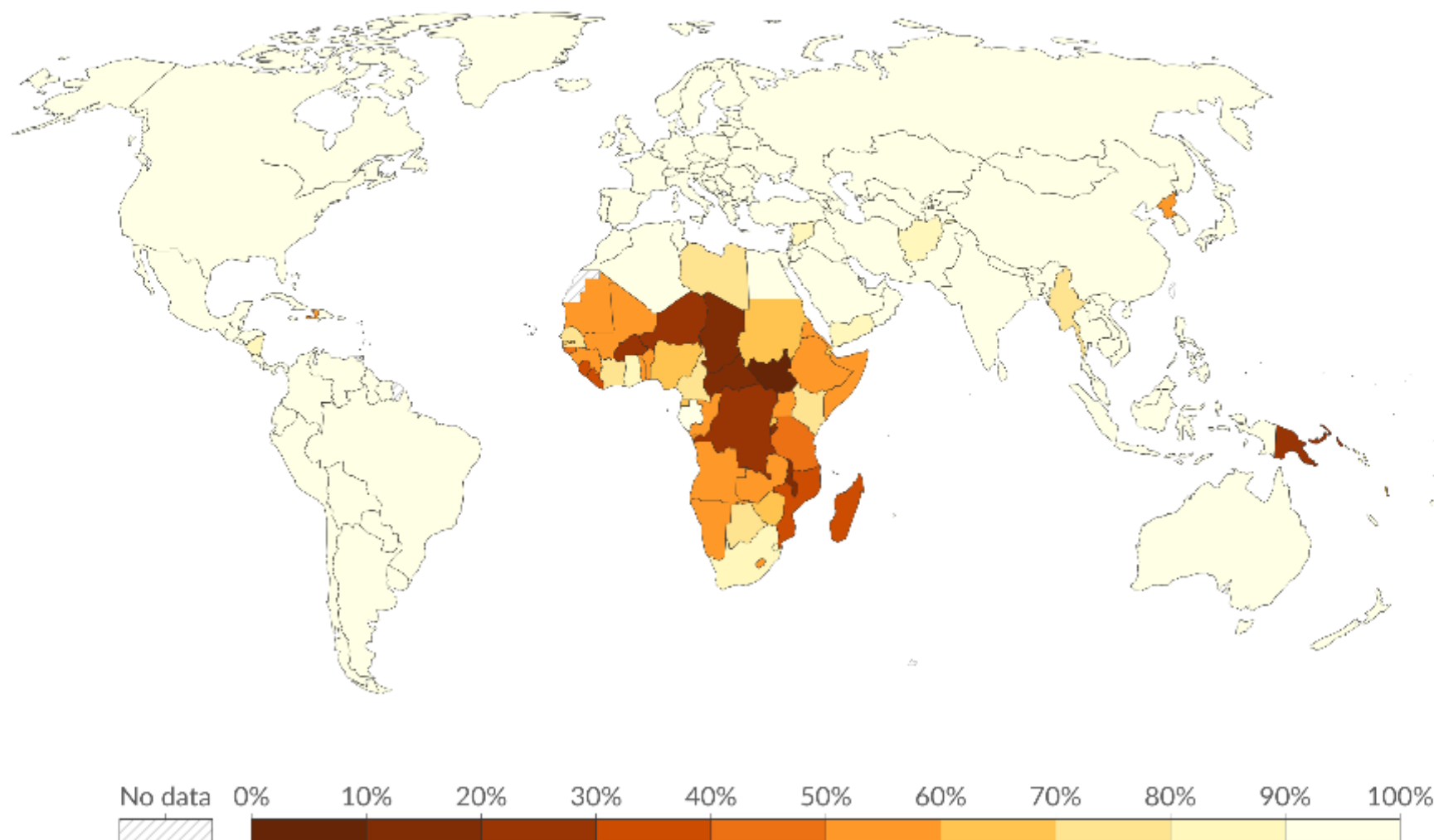
# Energy Poverty

# Share of the population with access to electricity, 2023

Our World  
in Data

THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA

Access to electricity means having an electricity source that can provide very basic lighting, and charge a phone or power a radio for 4 hours per day.





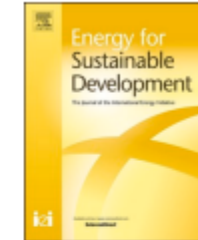
# Problem statement:

In some contexts, providing electricity access does not lead to improved human development outcomes



Contents lists available at ScienceDirect

## Energy for Sustainable Development

journal homepage: [www.journals.elsevier.com/energy-for-sustainable-development](http://www.journals.elsevier.com/energy-for-sustainable-development)

## Electricity access advances human development...but not always

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## ARTICLE INFO

## Keywords:

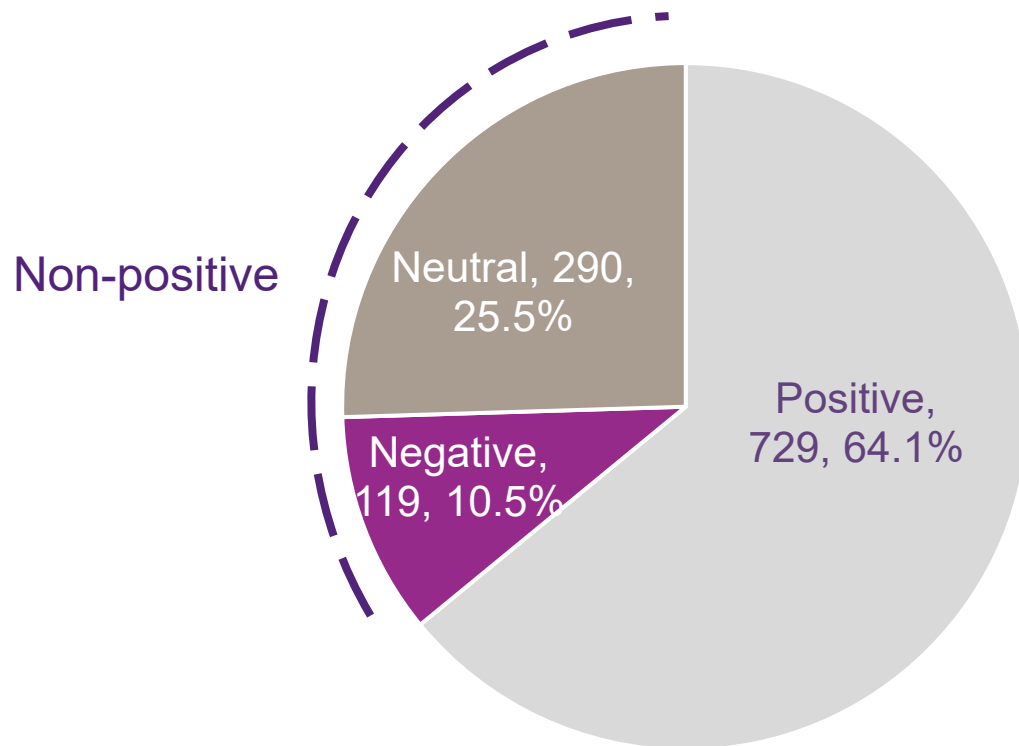
Electricity access  
Human development  
Sustainable Development Goals  
Systematic literature review

## ABSTRACT

Substantial academic literature establishes that access to electricity positively advances many facets of human development. Nevertheless, there is a not-insignificant minority of findings that deviate from this trend. This work aims to provide a broad understanding of this relationship across contexts, analysing the circumstances under which non-positive outcomes occur. The work comprised a systematic literature review which identified 92 academic works inclusive of geography, scale and method of investigation and considers human development

<https://doi.org/10.1016/j.esd.2025.101770>

# Systematic literature review results



92 studies

1138 findings:

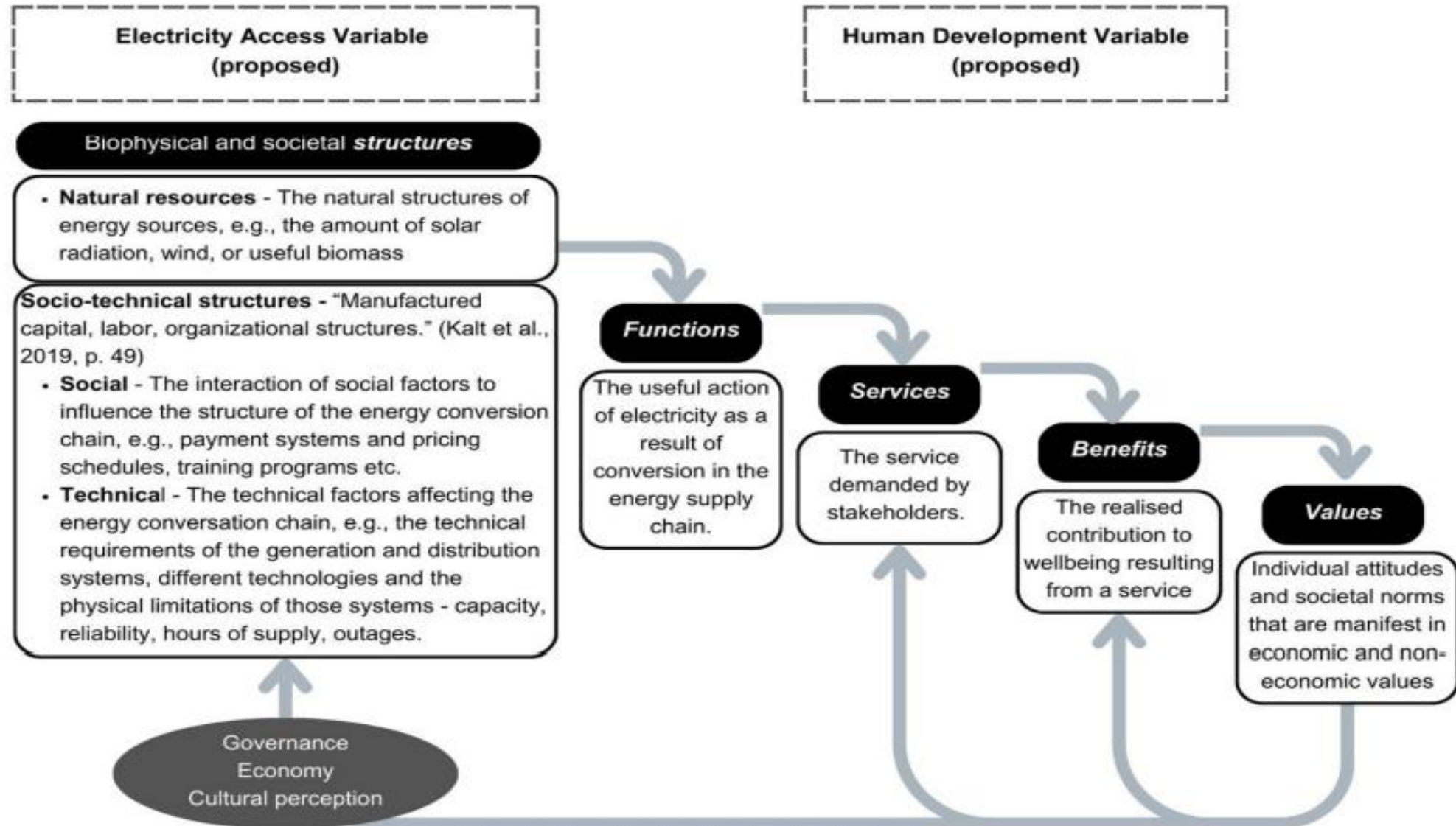
64.1% positive

10.5 % negative

25.5% neutral

*A **finding** is a claim made by the original author of an effect of electricity on a human development measure for a given entity.*

# The Energy Services Cascade



# Systematic literature review results

## 409 non-positive findings

### Structures barriers:

- affordability, equitable service, reliability, fuel choice and continued use of traditional fuels

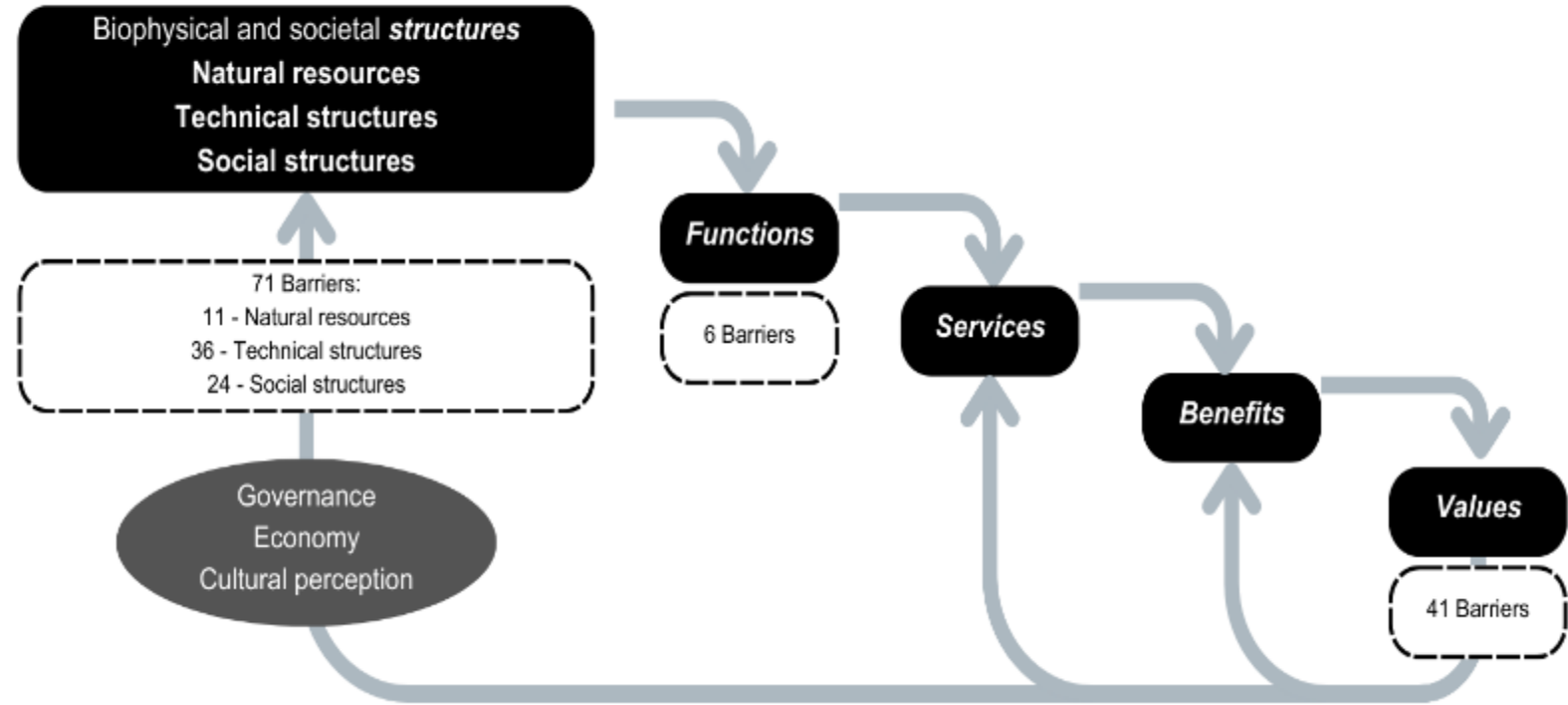
### Functions barriers:

- Ability to access (purchase or replace) appliances / equipment

### Values barriers:

- Traditional income generation methods, changing values

## 291 'unmapped' findings



Framework adapted from Kalt et al.'s (2019) Energy Services Cascade

# Systematic literature review

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**Conclusions**     The proportion of non-positive findings (35.9%) is significant.

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Poor quality and quantity of electricity supply, and unaffordability prevent use of electricity to advance development outcomes in some cases

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Societal and individual values play a fundamental role in effective electrification programs

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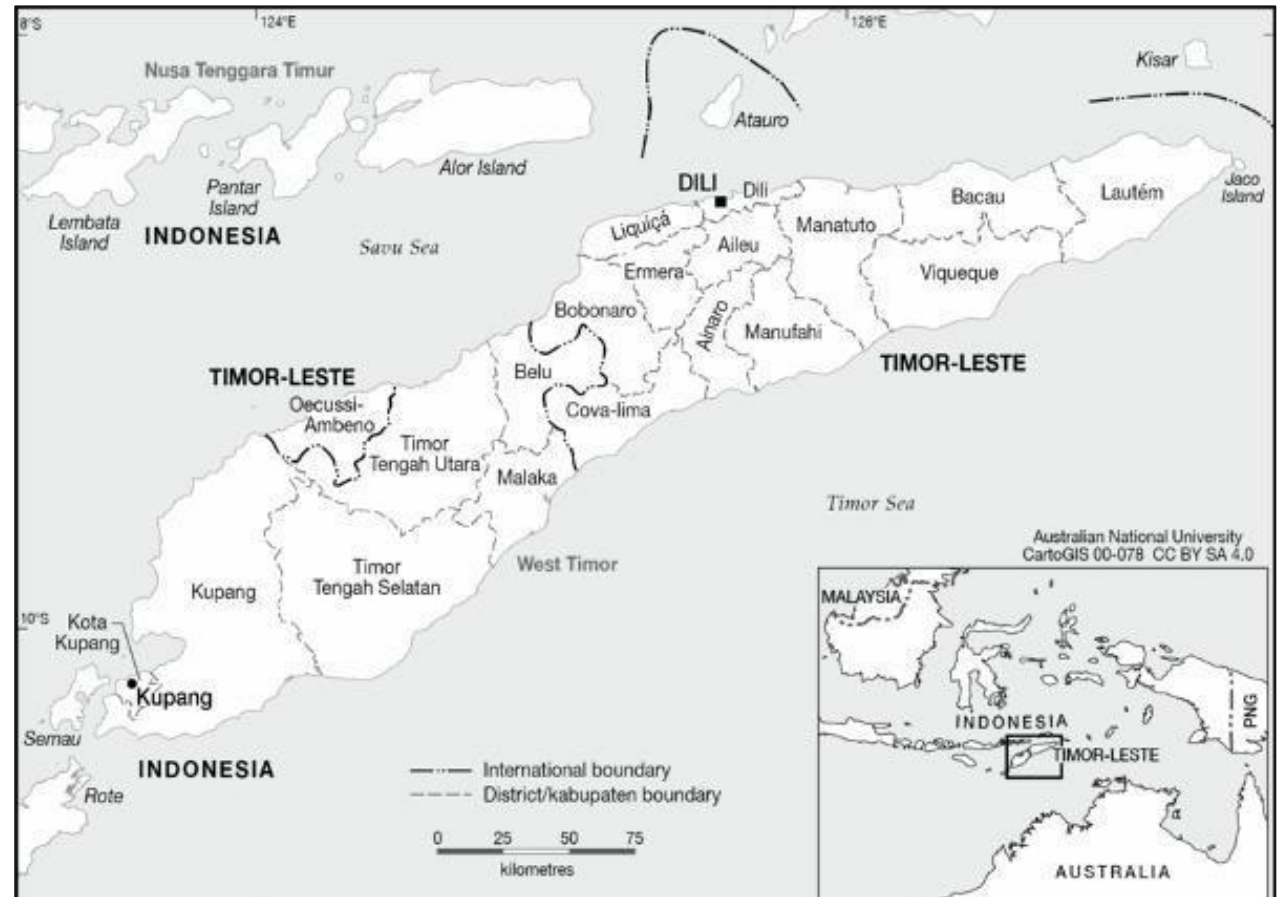
Further research is required to determine why non-positive outcomes occur

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# **Electricity access to human wellbeing, the benefits and barriers: the case of a community in Timor-Leste**

# Timor-Leste

- **Timor-Leste's complex history:**
  - Portuguese colony: 1600s-1975
  - Brief independence: 1975
  - Indonesian annexation: 1975-1999
  - Independence: 2002
- **100% electrification** (World Bank, 2024)
- **Most, but not all, communities alongside main grid**
- **80% work in agriculture, mostly subsistence, subject to climate change**
- **Very high levels of 'food insecurity'**
- (Heynen et al., 2024)

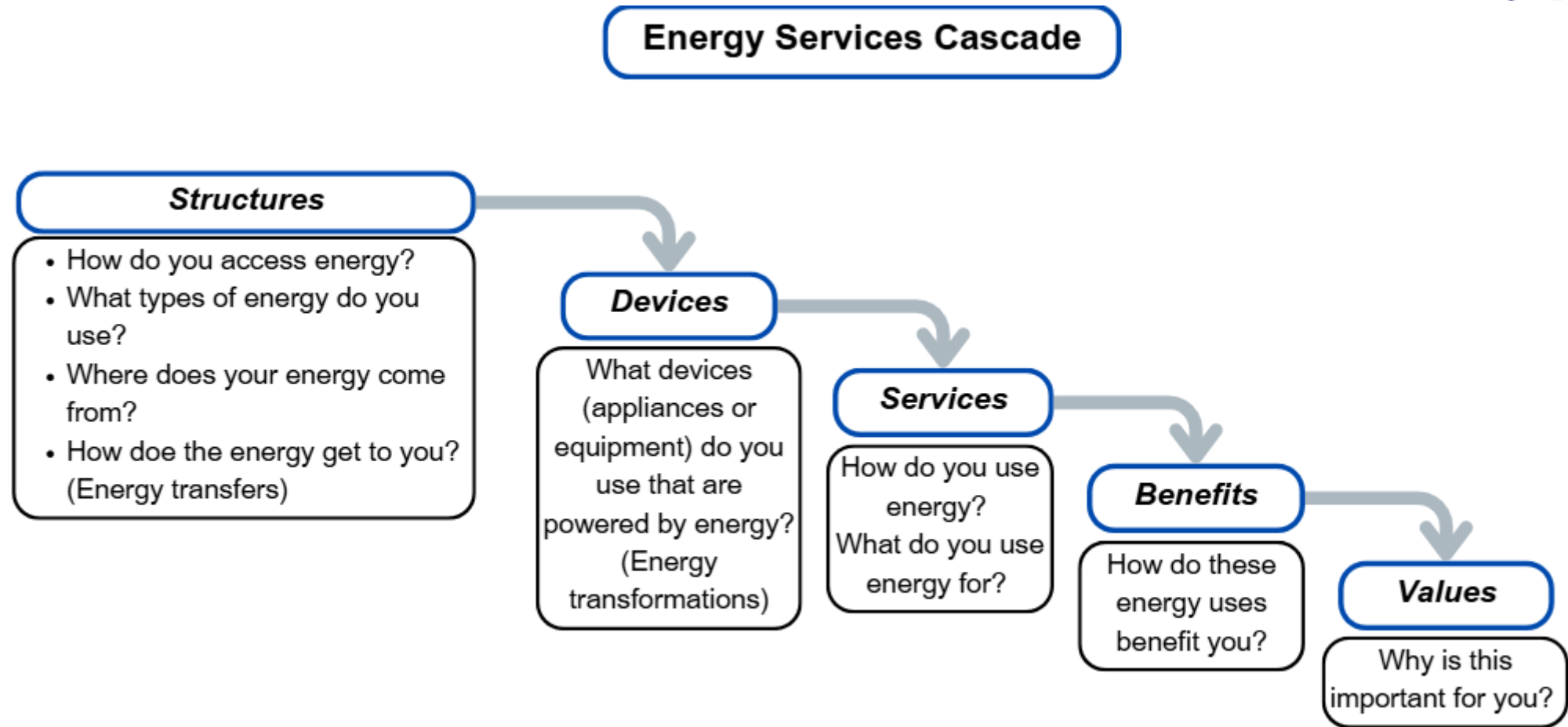


[Map of Timor-Leste]. Source: CartoGIS Services, Scholarly Information Services, The Australian National University





# Activity – applied example of the ESC for a rural community in Timor-Leste



# Energy services in a rural community of Timor-Leste

January 2025

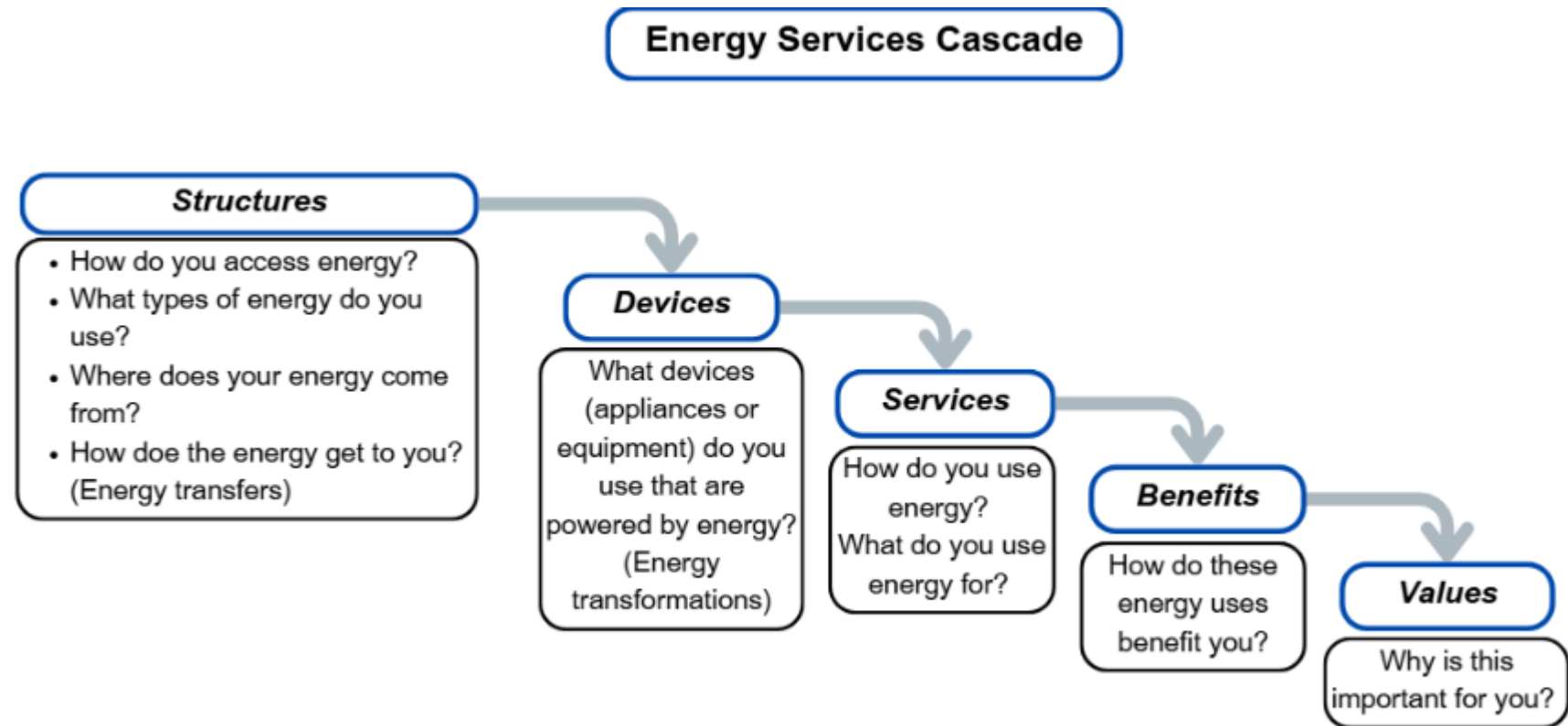


# Activity

- Apply the Energy Services Cascade Framework to analyse the energy uses in the rural Timorese community

In groups:

- Discuss what you observed in the video in terms of the 5 elements of the ESC.
- Use the butchers paper and Post-it notes to map out your observations of energy use for the Timorese community



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# References

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# Images

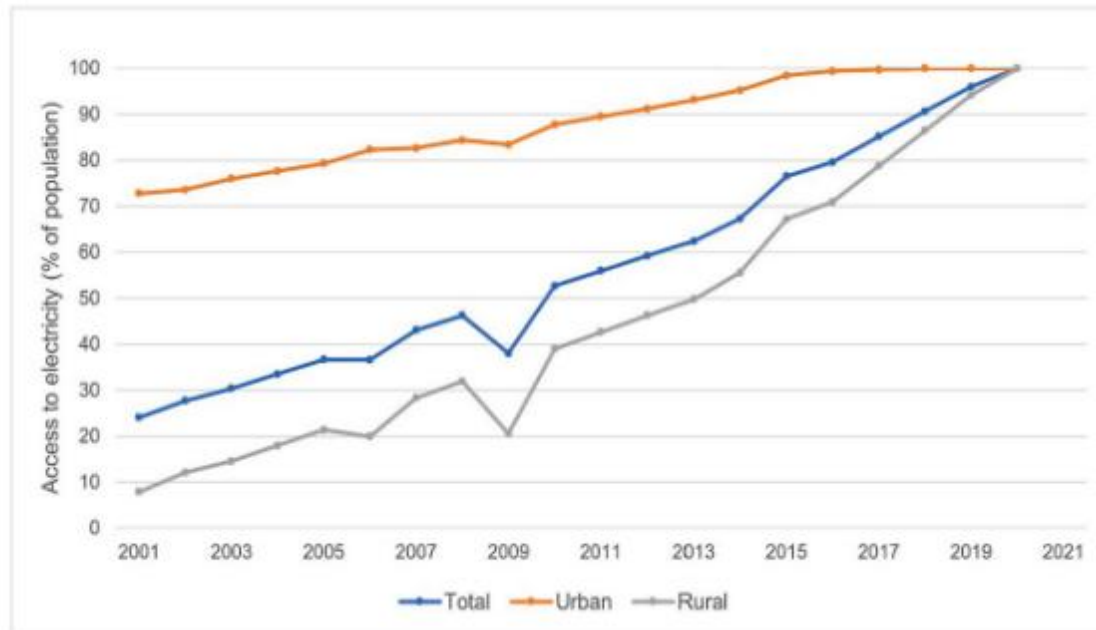
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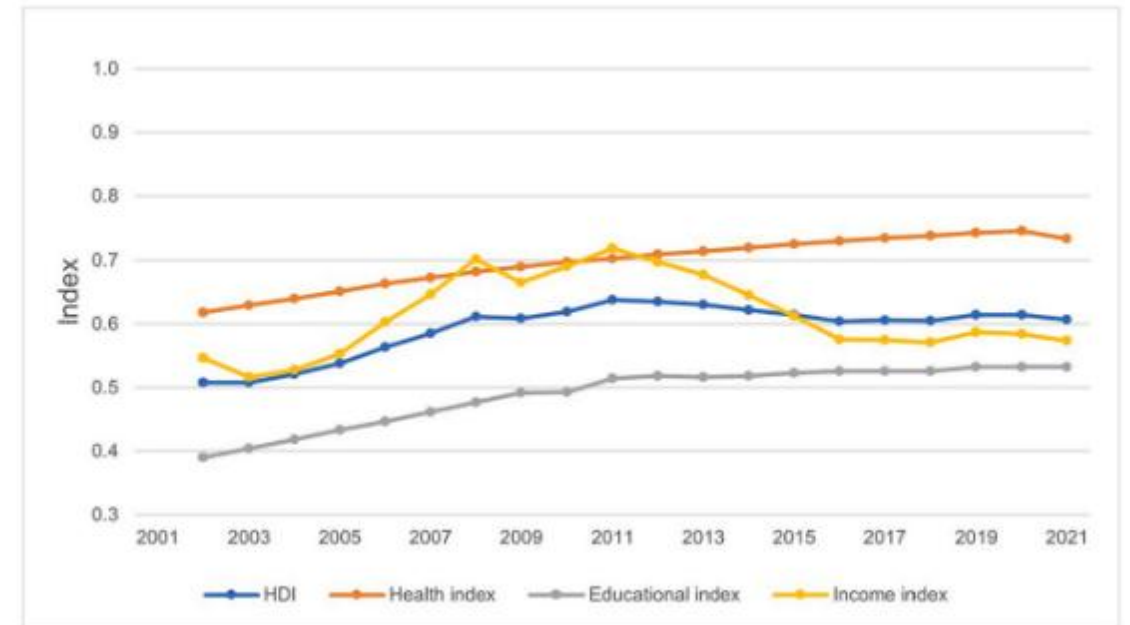
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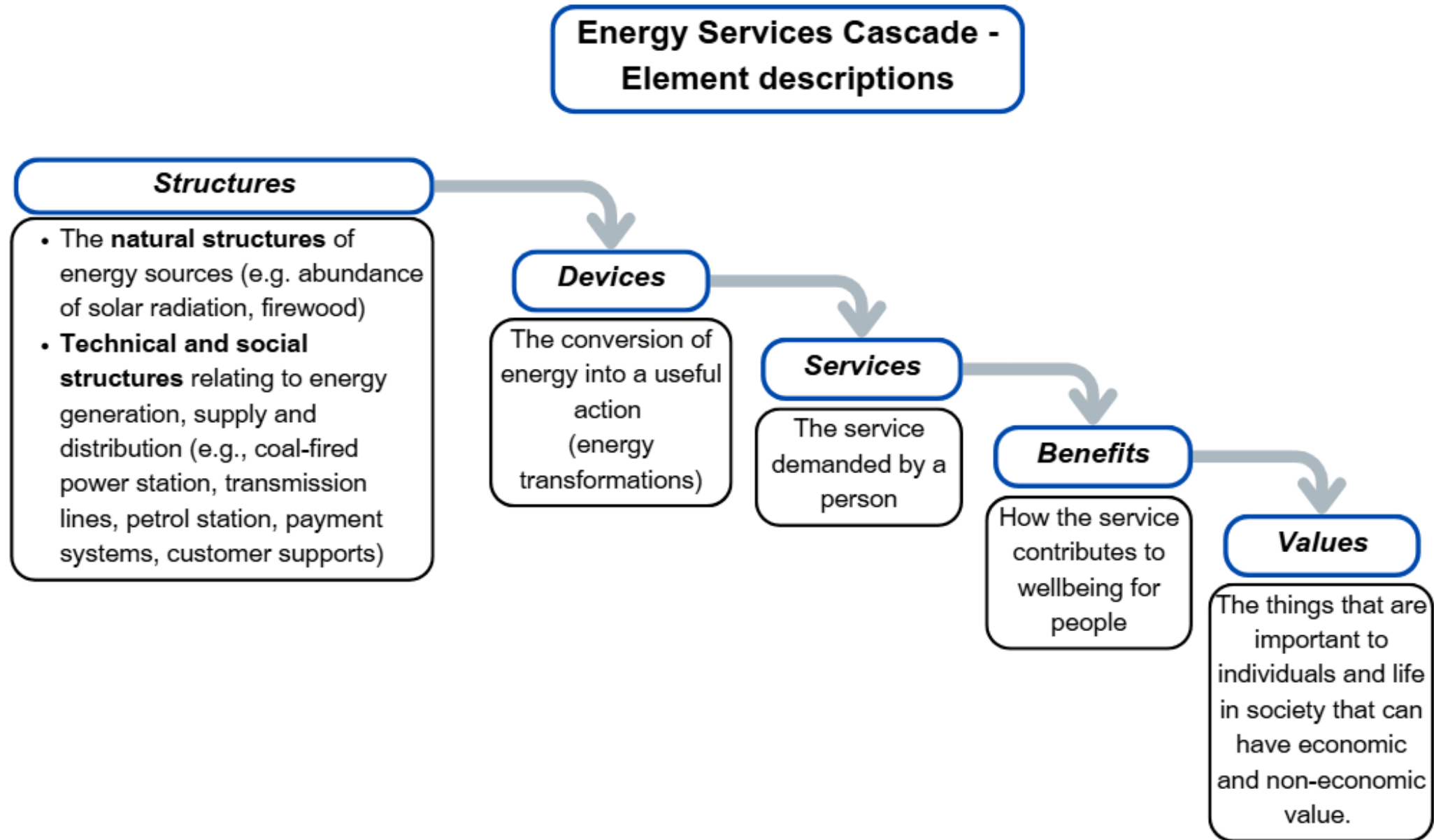
# Spare

## Timor-Leste: Electricity access rates (2001-2021)



## Timor-Leste: Human Development Index (2001-2021)





# What is energy?

# Energy

- The ability to do something, make something move, heat something up, make something change

## Energy generation

- Produced energy
- How we capture energy from natural sources like fossil fuels, sun or wind.
- Different energy generation technologies



## Energy supply

- How energy is transferred
- How energy gets from a generation source to you



# How do you use energy?

# Energy Services

- Energy itself does not do anything for us
- It is how we can use energy to create benefit for how we live that is important
- The services provided by energy, rather than produced energy or energy supply, that people demand and that generate well-being
- **Services:**
- E.g., Lighting, Cooking, Refrigeration, Entertainment, Transport, Thermal comfort