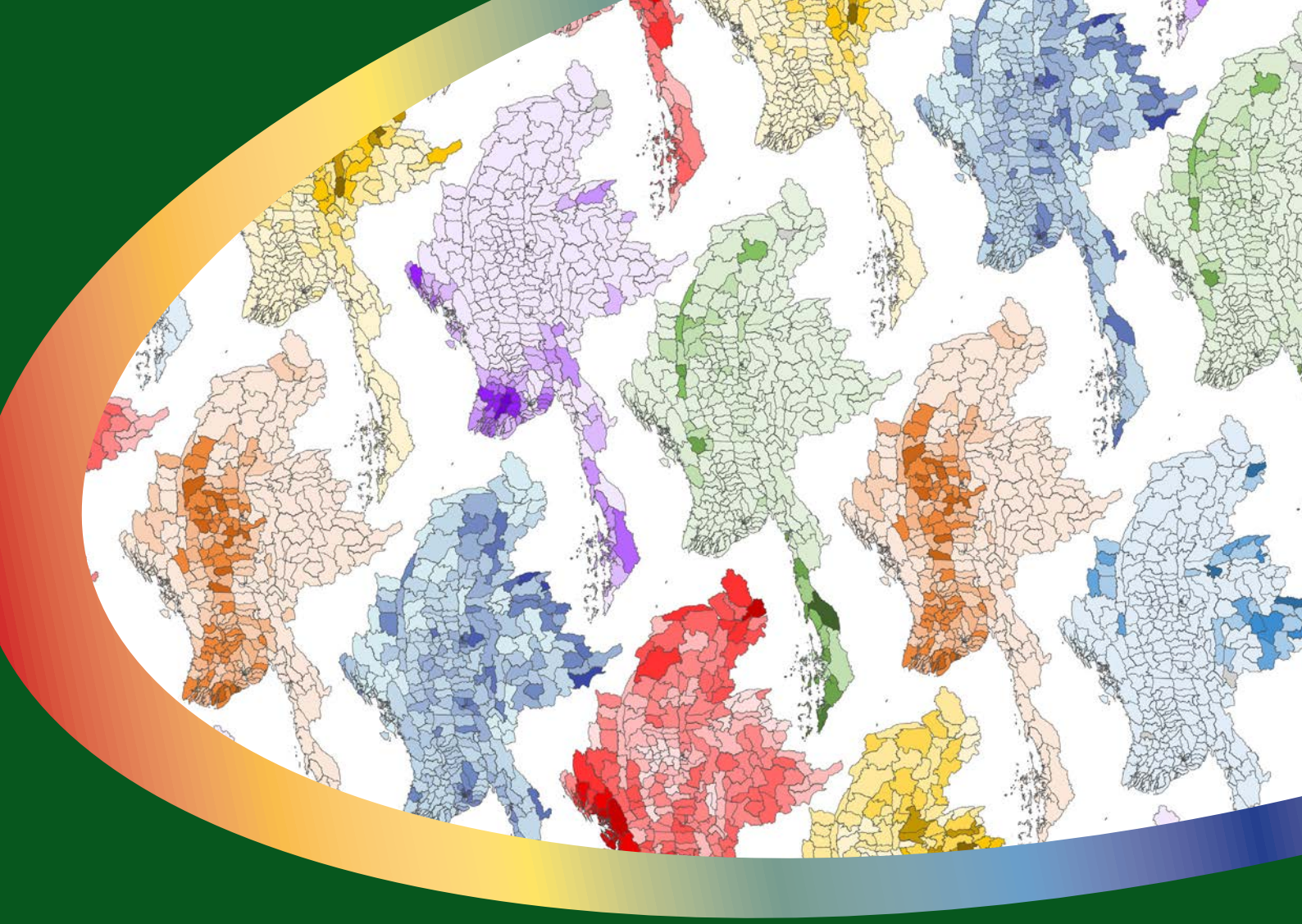


Developing a renewable energy policy for Myanmar: Insights from the 2014 census

Energy Briefing Paper

The 2014 Population and Housing Census provides critical information to guide the design of an effective, evidence-based renewable energy policy for Myanmar. This briefing paper highlights insights from the census that are relevant to developing a renewable energy policy that can provide fast and low-cost energy services to Myanmar people.

Spectrum
Sustainable Development Knowledge Network

August 2017

Introduction

Data collected in the 2014 Population and Housing Census provides critical information to guide the design of an effective, evidence-based renewable energy policy for Myanmar. This briefing paper highlights insights from the census that are relevant to developing a renewable energy policy. This can assist with the provision of fast and low-cost energy services to Myanmar people, improving job creation and economic performance.

The 2014 census

The Population and Housing Census was conducted by the Ministry of Immigration and Population in April 2014. It was the first census to be conducted since 1983. Information was collected from 10.9 million households in all 15 states and regions of Myanmar.

The results of the census were made publicly available on the government website.[1] While other smaller surveys have been undertaken since then, the 2014 census data remains the most comprehensive dataset on household energy patterns currently available in Myanmar.

The 2014 census collected data on several energy-related topics including source of electricity for lighting, source of energy for cooking, and access to communications equipment and transport. The focus of this briefing paper is on electricity used for lighting and phone charging, since these are generally the first energy services that decentralised renewable energy sources are used to provide.

Many aspects of life in Myanmar are changing very quickly, and energy is no exception. The energy landscape is therefore likely to have already changed since the "snapshot" taken by the census in 2014. Nevertheless, the key messages below that were derived from the 2014 data still remain relevant today.

Different approaches needed for urban and rural areas

The 2014 census results revealed stark differences between the energy situation in urban and rural areas. In particular, there are significant differences between urban and rural areas in terms of access to on-grid electricity for lighting (see Figure 1).

The national average on-grid electrification rate was around 32% in 2014. However, nearly all urban areas had an on-grid electrification rate above the national average, ranging from 41% in Chin State to 90% in Kayah State. The single exception was Tanintharyi Region, which had an unusually low urban on-grid electrification rate of 11%. This is because there are only three major cities in this region and they operate using isolated regional grids.[2]

In nearly all rural areas, the share of households with access to on-grid electricity for lighting was below the national average. Four states and regions had a particularly low rural on-grid electrification rate of below 10%: Chin State (8%), Tanintharyi Region (7%), Rakhine State (7%) and Ayeyawady Region (4%).

These findings underline the need for different approaches in urban and rural areas. In particular, in many remote rural areas it is likely to be a long time before the national grid arrives. A strong focus on decentralised energy solutions such as solar energy is therefore suggested to be appropriate in these areas.

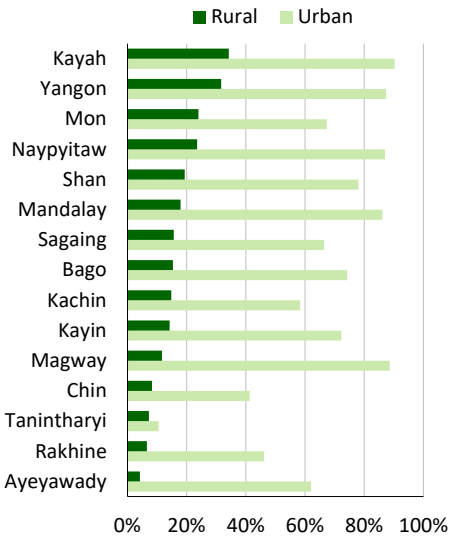
Access to on-grid electricity

In addition to differences between urban and rural areas, access to on-grid electricity was unequally distributed geographically (see Figure 2a). Access rates were generally highest in the central dry zone and in townships near the border with China and Thailand. This is likely due to informal connections to the electricity grid in neighbouring countries.

Generators

Use of private generators for lighting was very high in Tanintharyi Region and parts of Mon State (see Figure 2b). This might be because these areas are far from the national grid and have relatively high household income levels (due to remittances

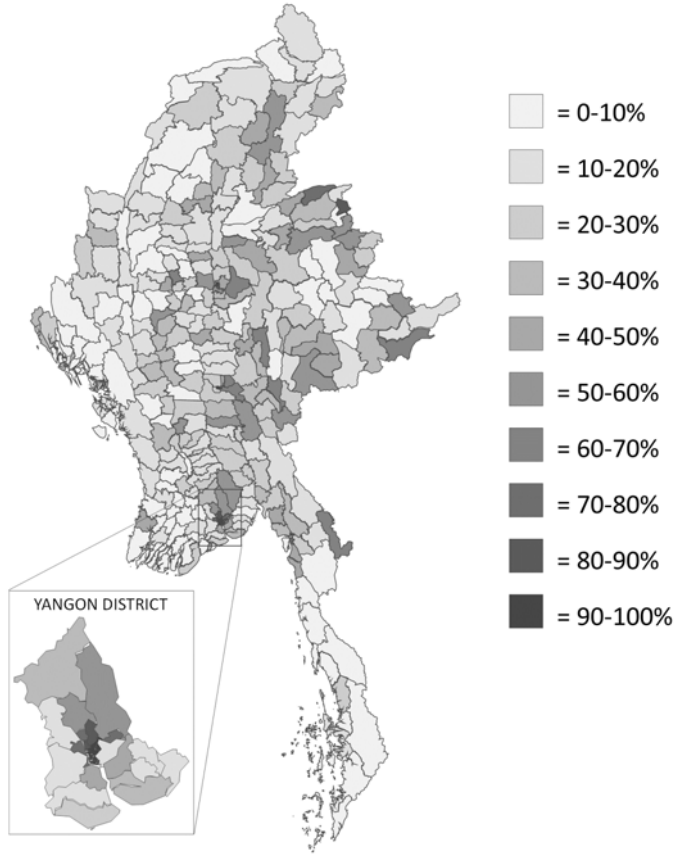
Figure 1. Share of households with access to on-grid electricity for lighting in 2014



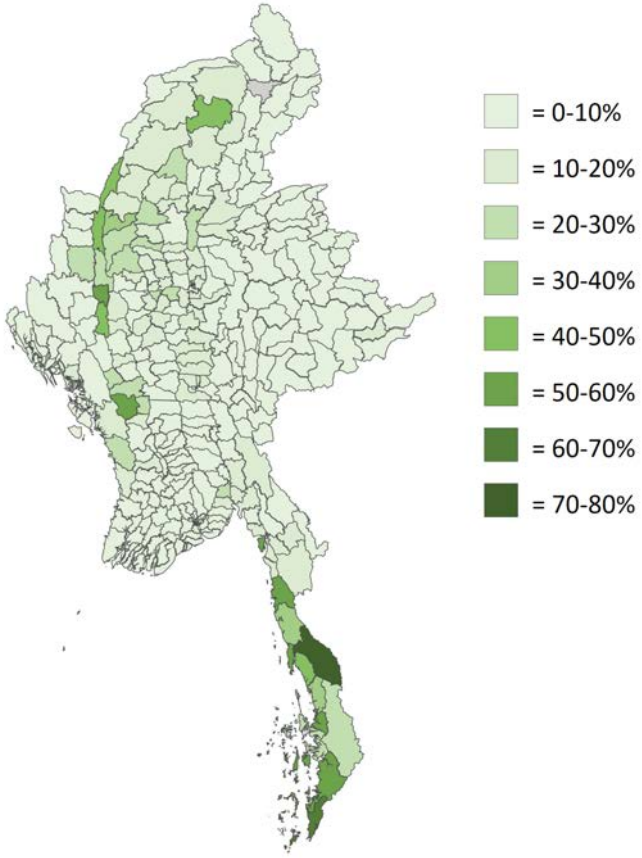
Source: Based on the 2014 census results

Figure 2. Township-level maps of energy sources used for lighting

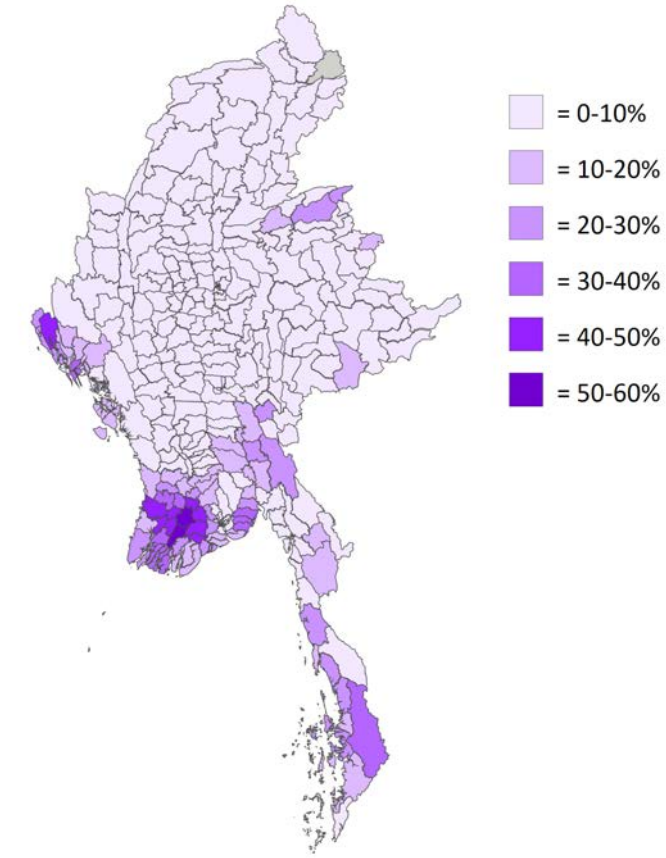
(a) On-grid electricity



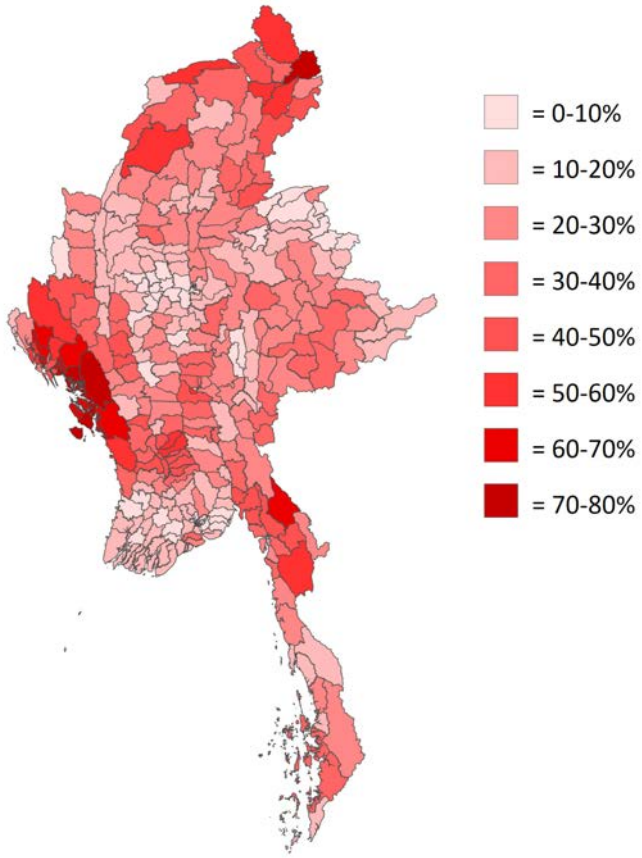
(b) Generator



(c) Kerosene



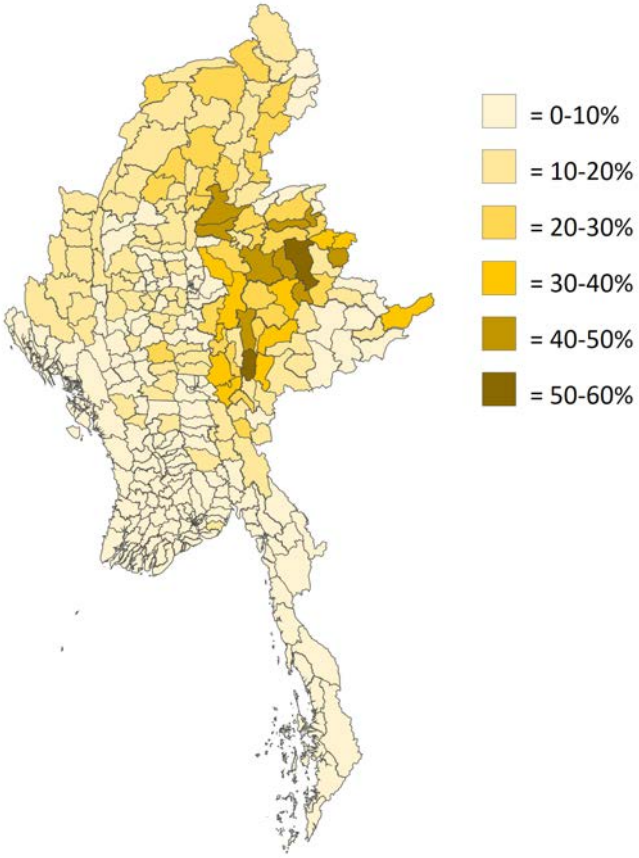
(d) Candles



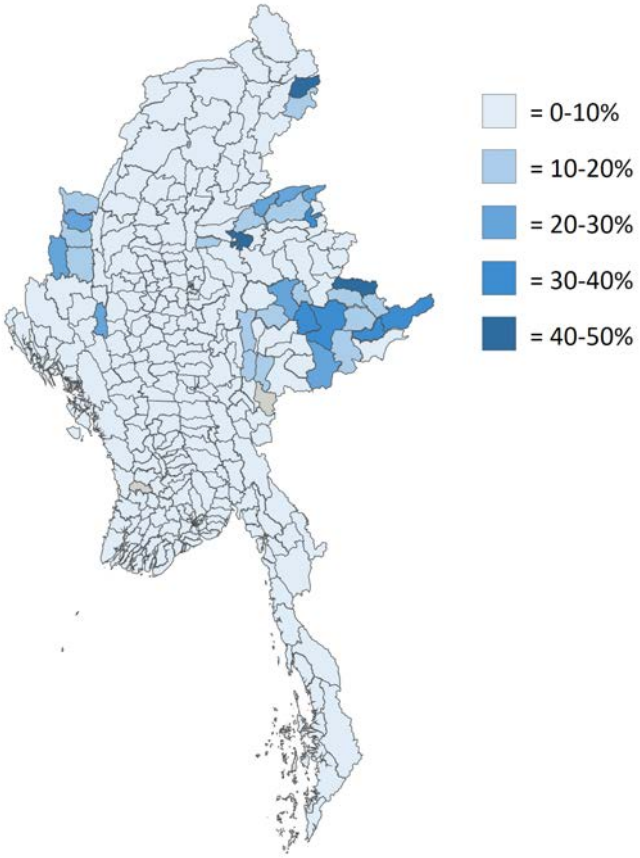
Source: Created using the 2014 census results and the MIMU heat mapping tool

Figure 2. Township-level maps of energy sources used for lighting (continued)

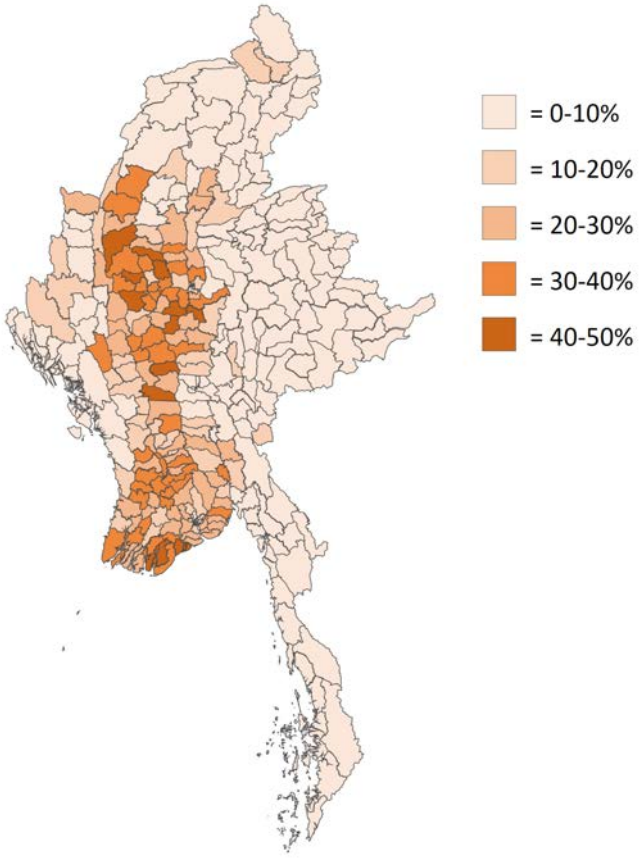
(e) Solar PV



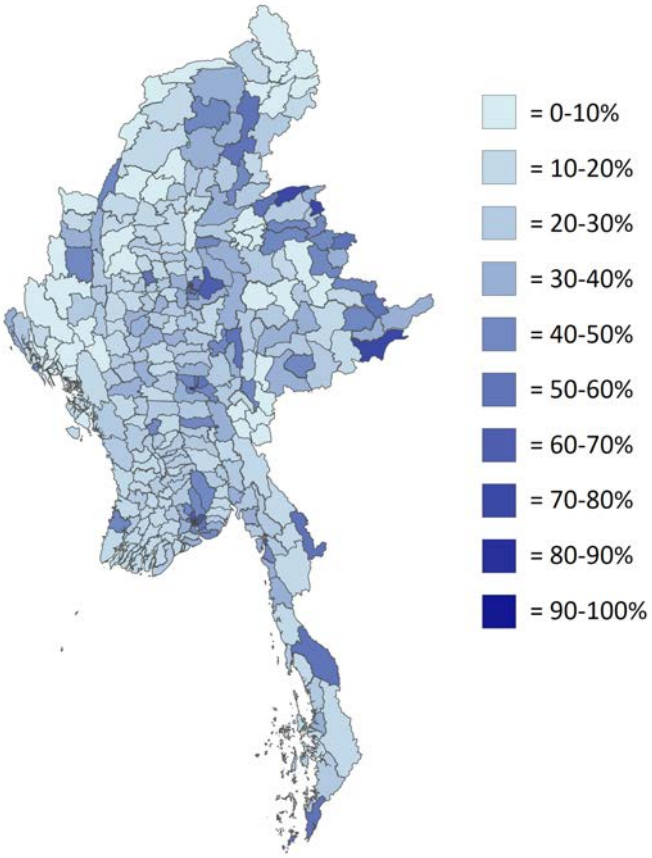
(f) Small hydro



(g) Battery



(h) Mobile phone ownership



Source: Created using the 2014 census results and the MIMU heat mapping tool

Figure 3. Topographic map

Image by Hel-hama on Wikipedia, CC BY-SA 3.0

from migrants working in Thailand), which means that people can afford to purchase and run generators.

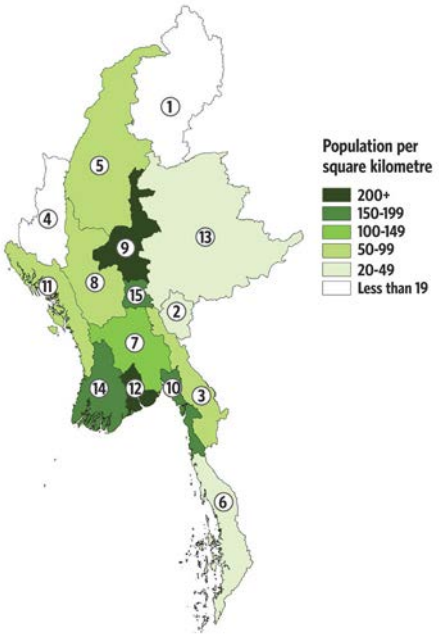
Kerosene

Use of kerosene was highest in rural parts of Ayeyawady Region, Tanintharyi Region, Yangon Region, Rakhine State, Kayin State and Bago Region (see Figure 2c). It was close to zero in most urban areas.

Candles

On average, 26% of households in rural areas and 7% of households in urban areas relied on candles for lighting in 2014. The highest usage rates were in rural townships in Rakhine State, Kayin State, Naypyitaw, Kachin State and Mon State (see Figure 2d). In some rural

Figure 4. Population density



Source: Ministry of Immigration and Population (2014), *Population and Housing Census of Myanmar 2014: Summary of the Provisional Results*

townships in Rakhine State, four out of five households relied on candles for lighting. Candles are an expensive and often dangerous source of lighting. Switching from candles to solar PV systems can provide a safer, higher quality and in many cases cheaper source of lighting.

Solar PV

Use of solar photovoltaic (PV) systems for lighting was highest in Shan State, Kayah State and Kachin State (see Figure 2e). In some rural townships in Shan State, over 50% of households used solar PV for lighting. Many solar PV panels cross the border from China. These high rates are therefore probably due to the proximity of these areas to the Chinese border. There remains considerable potential for promoting solar PV in other areas of Myanmar, particularly the central dry zone where the sunniest areas are located and battery usage is already high.

In rural areas, use of solar PV (11.5%) had already overtaken use of generators (10.7%) at the national level by 2014. The solar PV sector is continuing to grow rapidly – some experts estimate that the number of solar PV systems installed has roughly doubled since the census was conducted in 2014.[3]

Small hydro

Use of private small hydro systems for lighting was highest in Shan State, Kachin State and Chin State, with nearly 50% of households using small hydro for lighting in some townships in Shan State and Kachin State (see Figure 2f). A renewable energy policy should promote new small hydro systems in areas with suitable resources, as well as upgrades to existing small hydro systems.

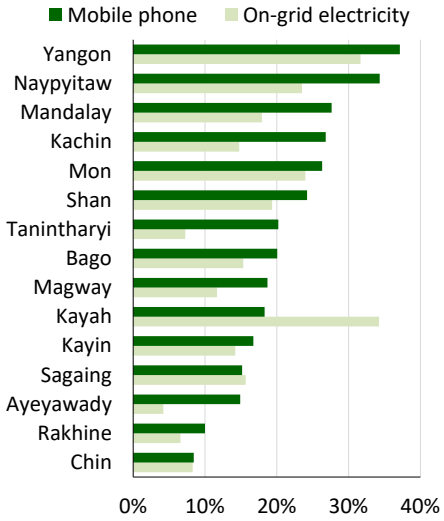
Battery

Use of batteries for lighting appeared to be concentrated in the central dry zone and reached over 20% in rural parts of Ayeyawady Region, Magway Region, Mandalay Region, Sagaing Region, Bago Region and Yangon

Notes and references

1. The results of the 2014 census are available online at: http://www.dop.gov.mm/moip/index.php?route=census/state&path=21.
2. WWF (2017), *Electricity Status of Tanintharyi Region*.
3. Gallery, B. (2017), *Off-grid renewables: Private sector approaches*, IFC presentation at Renewable Energy Roundtable in Naypyitaw, July 2017.
4. For example, the number of Telenor mobile subscribers increased by 11% between 2016 and 2017, reaching 18.8 million by June 2017. See Telenor Group (2017), *Interim Report Q2 -2017*, https://www.telenor.com/investors/reports-and-presentations/.

Figure 5. On-grid electrification rates and mobile phone ownership rates in rural areas



Source: 2014 census results

Region (see Figure 2g). This might be because the flat terrain in these areas makes distribution of batteries more economic than in more hilly parts of the country. Households that rely on batteries may be well suited for transitions to solar PV systems, since they are likely to already own low-voltage appliances and be familiar with the basic concepts of battery charging and energy management.

Mobile phone charging

Around 33% of households had a mobile phone in 2014 and this share is rising quickly.[4] Consequently the electricity demand for phone charging is also increasing quickly. Figure 5 shows how in all rural areas except Kayah and Sagaing, the mobile phone ownership rate is higher than the on-grid electrification rate, i.e. more households have mobile phones than access to on-grid electricity. This illustrates the huge potential of decentralised renewable energy solutions for meeting mobile phone charging and other low-power demands (e.g. lighting) in rural areas.

Recommendations

- **An evidence-based renewable energy policy should be implemented for Myanmar as soon as possible.**
- **Myanmar's data collection systems should be improved as soon as possible and used to collect regular and reliable statistics on household energy use.**
- **Tailored approaches are needed for urban and rural areas. In many remote rural areas it is likely to be a long time before the national grid arrives. A strong focus on decentralised renewable energy solutions such as solar energy is therefore recommended for these areas.**
- **The use of candles is surprisingly high. Given the high cost of candles, there is likely to be a strong economic case for switching to lower-cost and higher-quality alternatives.**
- **There is large potential for using solar PV to meet the demand for lighting in rural areas, particularly the central dry zone where the sunniest areas are located. Battery systems are used and energy management is already practiced. Solar PV systems can offer a safe and increasingly inexpensive alternative to using candles for lighting.**
- **New small hydro systems can be promoted in areas with suitable resources, as can further upgrades to existing small hydro systems to generate more power and extend use.**
- **Solar PV and small hydro systems can be effective ways to meet the rapidly-growing demand for off-grid mobile phone charging services in rural areas.**
- **Mobile phone data is particularly useful, as it shows the services that people have already chosen and, by proxy, their priority electricity uses.**

Acknowledgements

This analysis was undertaken by Gregory Briner. The author would like to thank David Allan (Spectrum), Natalie Fuller (Spectrum) and Shoon So Oo (WWF) for their helpful comments and inputs, as well as Bill Gallery (IFC) and MIMU for their help in developing the heat maps. Financial support was kindly provided by Tearfund.

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