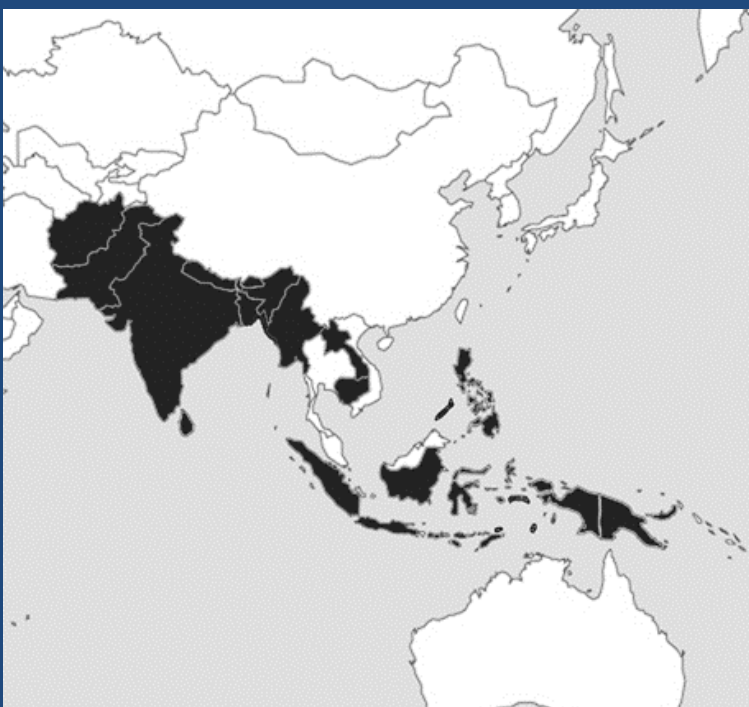


# OBIN

## Off-Grid Business Indicator 2014



South(East)  
Asia

# OBIN

Global Off-Grid Business Indicator

## Asia

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# Introduction

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The global efforts for a reliable power supply in off-grid regions of developing countries have increased significantly in recent years. Together with the number of companies operating in this segment, the number of investors has also rapidly augmented. Data that can serve as a basis for business and investment decisions become increasingly necessary for both actors.

The collection of reliable market data for both the regions as the relevant customer groups is difficult, sometimes even impossible. Therefore and most frequently, the number published by the World Bank is repeated over and over, according to which 1.2 billion people live without access to energy<sup>1</sup>. However, with this number the importance of the off-grid market is far from being gathered. Additional data can be found occasionally in studies and publications, though dispersed and not processed.

OBIN brings together information from different data sources and prepares them focused on their relevance for the off-grid market.

"OBIN Asia" takes account of all countries of this continent that have an electrification rate of less than 90%<sup>2</sup>. Thus, the countries China, Brunei, Chinese Taipei, Malaysia, Singapore and Vietnam are not taken into account. In addition, due to the lack of sufficient off-grid data about Thailand, this country (80% electrification) could not be included. The information for each country is divided into information on the off-grid market potential and the country-specific business environment.

Regarding the information on the market potential, data on mobile communication and cell phone use were also recorded because especially the mobile phones have proven to be in recent years an accelerator of the off-grid energy market. In the future, perhaps internet and consumer electronics will have an equally strong importance.

For the assessment of the "business environment", a selection of ten indicators was made, which reflect the economic conditions of aspects relevant for the off-grid business.

Neither the information on the "Business Environment" nor on the "Market potential" claim to be exhaustive or of scientific accuracy. This is not possible because of the imprecision and inhomogeneity of the sources of information.

But OBIN is a reliable and realistic indicator for the potential and the general conditions of the off-grid market in Asia. OBIN is especially able to demonstrate the great economic potential of this so far largely untapped market.

Stiftung Solarenergie - Solar Energy Foundation

March 2014

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<sup>1</sup> <http://www.worldbank.org/en/topic/energy/overview>

<sup>2</sup> Source: International Energy Agency (IEA), World Energy Outlook 2012.

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  - Market Size..... 7
  - Business Environment..... 7
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# Summary Results

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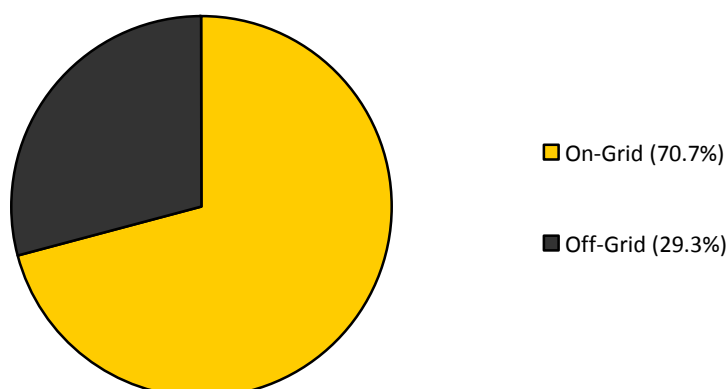
# Overview

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## Asia<sup>3</sup>

Afghanistan, Bangladesh, Bhutan, Cambodia, India, Indonesia, Lao PDR, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Timor-Leste

Population total 2010 .....	2021.4 mill.	Rural population 2010.....	1341.4 mill.
2012 .....	2075.1 mill.	2012.....	1359.7 mill.
Population Off-Grid .....			593.0 mill.
Households Off-Grid + under-serviced .....			129.7 mill.
Kerosene lamps (glass cover, simple wick) .....			308.8 mill.
Mobile cellular subscriptions .....			1556.7 mill.

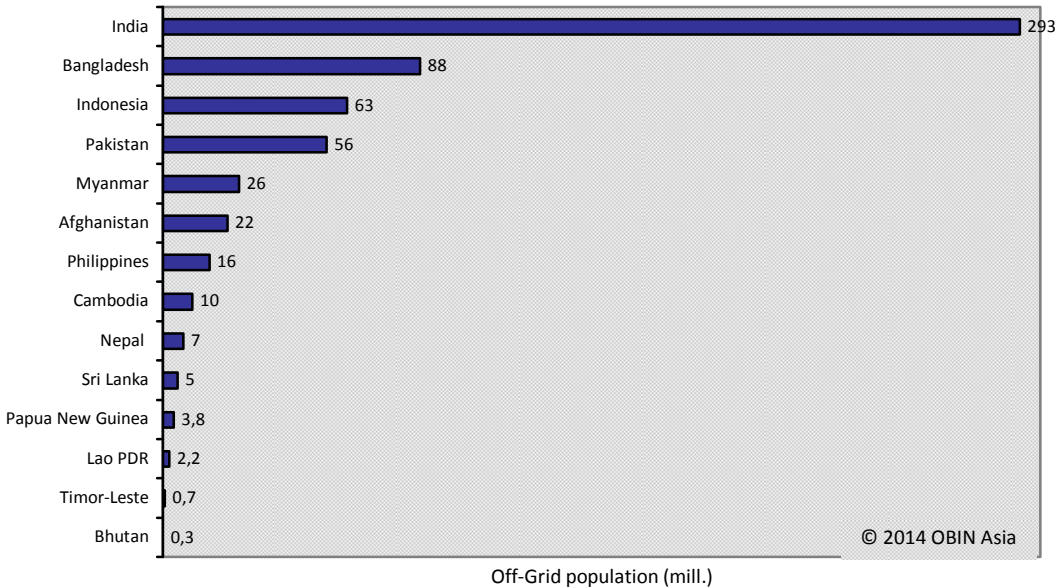


**Market Potential: electrification households ..... US\$ 64850 mill.**  
**replacement kerosene lamps..... US\$ 9264 mill.**

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<sup>3</sup> Sources and Methodology: p. 26-28.

# Market Size



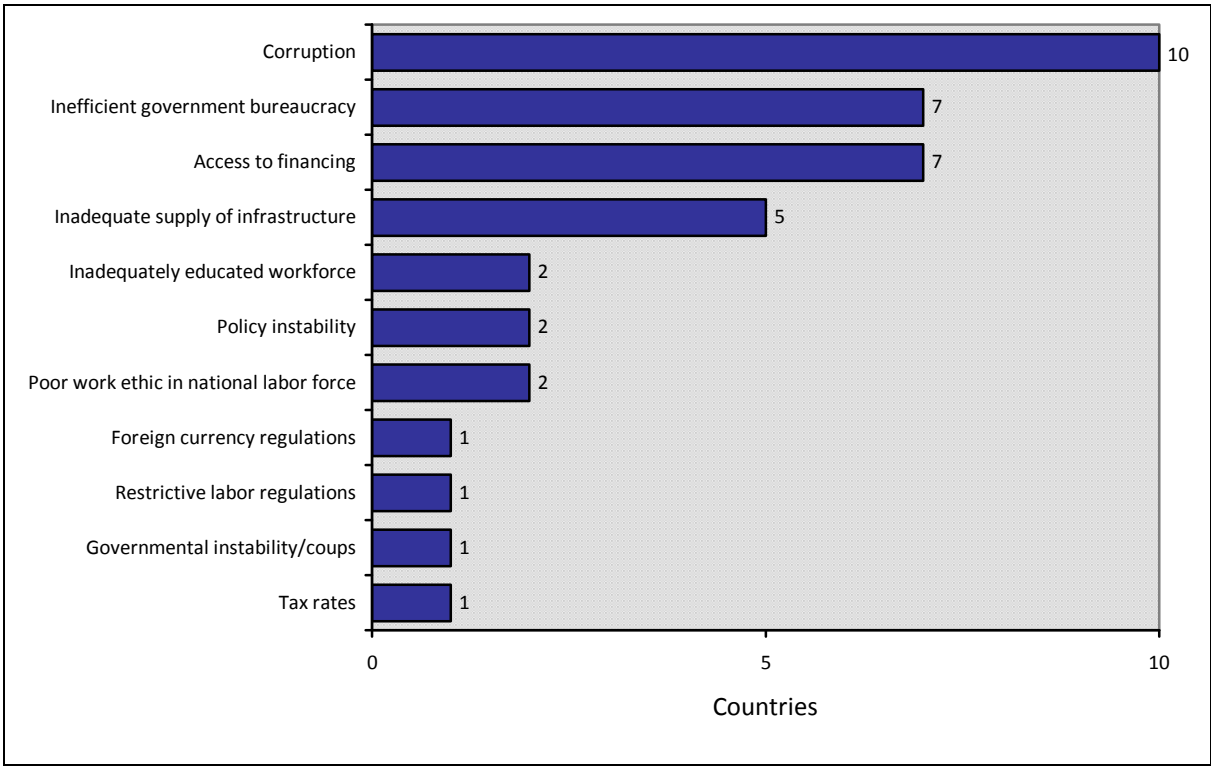
# Business Environment

(Countries in alphabetic order)

Outstanding	Above average	Average	Below average	Unacceptable
		Bangladesh Bhutan Cambodia India Indonesia Pakistan Papua New Guinea Philippines Sri Lanka	Lao PDR Nepal Timor-Leste	Myanmar

**No valuation due to lack of information:** Afghanistan

# The most problematic factors for business



Source of country data: World Economic Forum, The Global Competitiveness Report 2013–2014, Geneva 2013.



# Country Profiles

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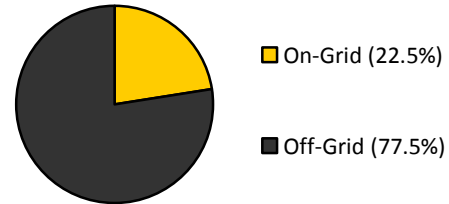
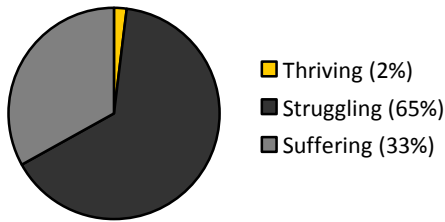
# Afghanistan

**Market size:**

**Rank 6 / 15**

Population total 2010 ..... 28.4 mill.  
2012 ..... 29.8 mill.

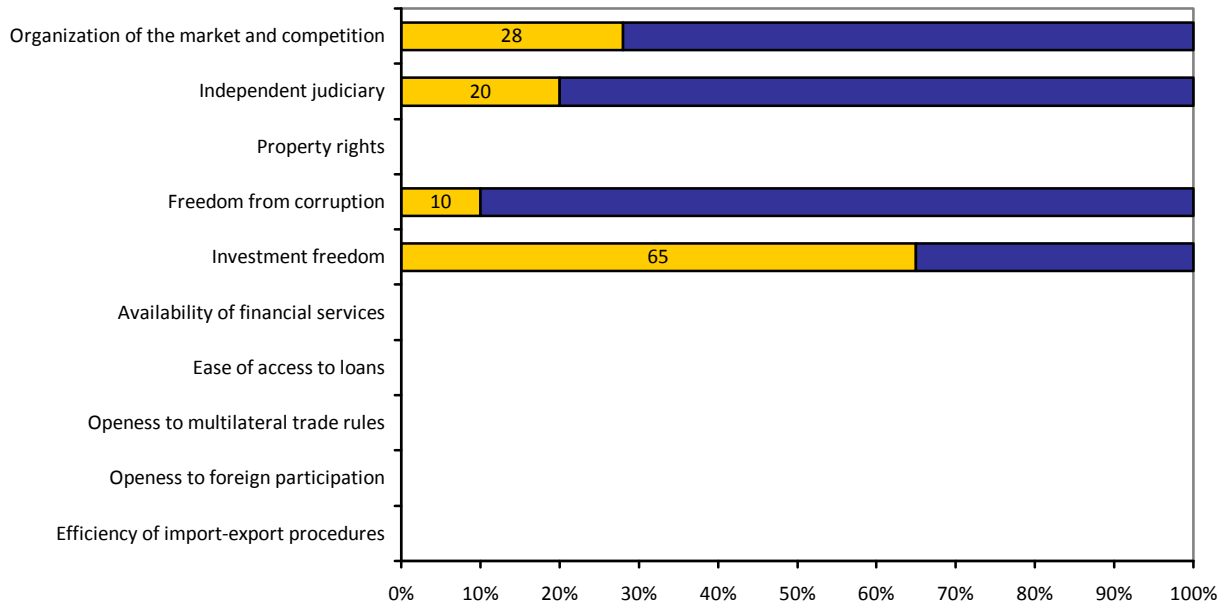
Rural population 2010..... 21.8 mill.  
2012..... 22.7 mill.



Population Off-Grid ..... 22.0 mill.  
Households Off-Grid + under-serviced ..... 8.2 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 14.6 mill.  
Mobile cellular subscriptions ..... 18.0 mill.  
Internet users ..... 5.5 %  
Market Potential: electrification households ..... US\$ 4100 mill.  
replacement kerosene lamps ..... US\$ 438 mill.

**Business environment:**

**n/a**



The most problematic factors for business:

1. Corruption
2. Access to financing
3. Inefficient government bureaucracy

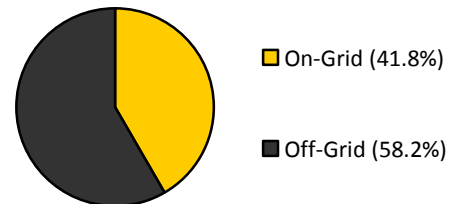
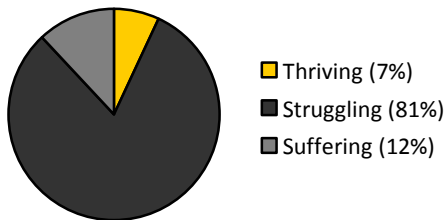
# Bangladesh

**Market size:**

**Rank 2 / 15**

Population total 2010 ..... 151.1 mill.  
2012 ..... 154.7 mill.

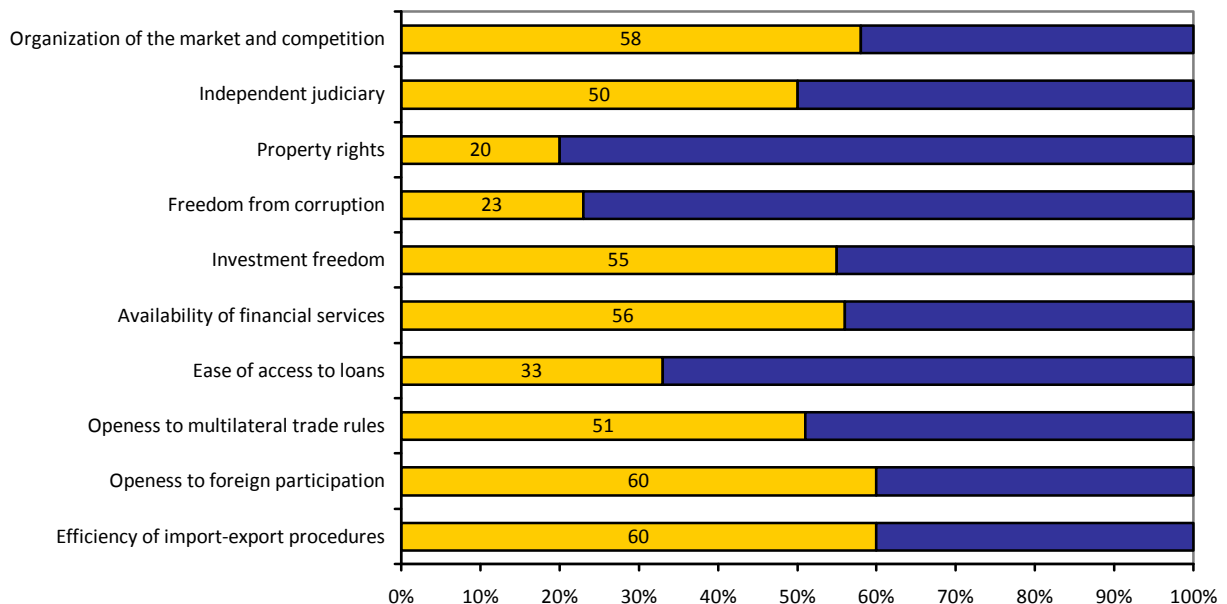
Rural population 2010..... 109.0 mill.  
2012..... 110.0 mill.



Population Off-Grid ..... 88.0 mill.  
Households Off-Grid + under-serviced ..... 19.5 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 7.8 mill.  
Mobile cellular subscriptions ..... 97.2 mill.  
Internet users ..... 6.3 %  
Market Potential: electrification households ..... US\$ 9750 mill.  
replacement kerosene lamps ..... US\$ 234 mill.

**Business environment:**

**average** →



The most problematic factors for business:

1. Corruption
2. Inadequate supply of infrastructure
3. Inefficient government bureaucracy

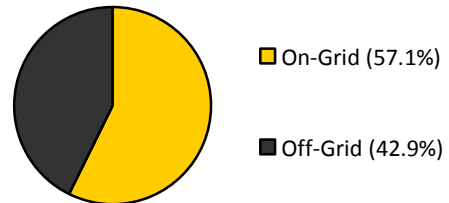
# Bhutan

**Market size:**

**Rank 15 / 15**

Population total 2010 ..... 0.7 mill.  
2012 ..... 0.7 mill.

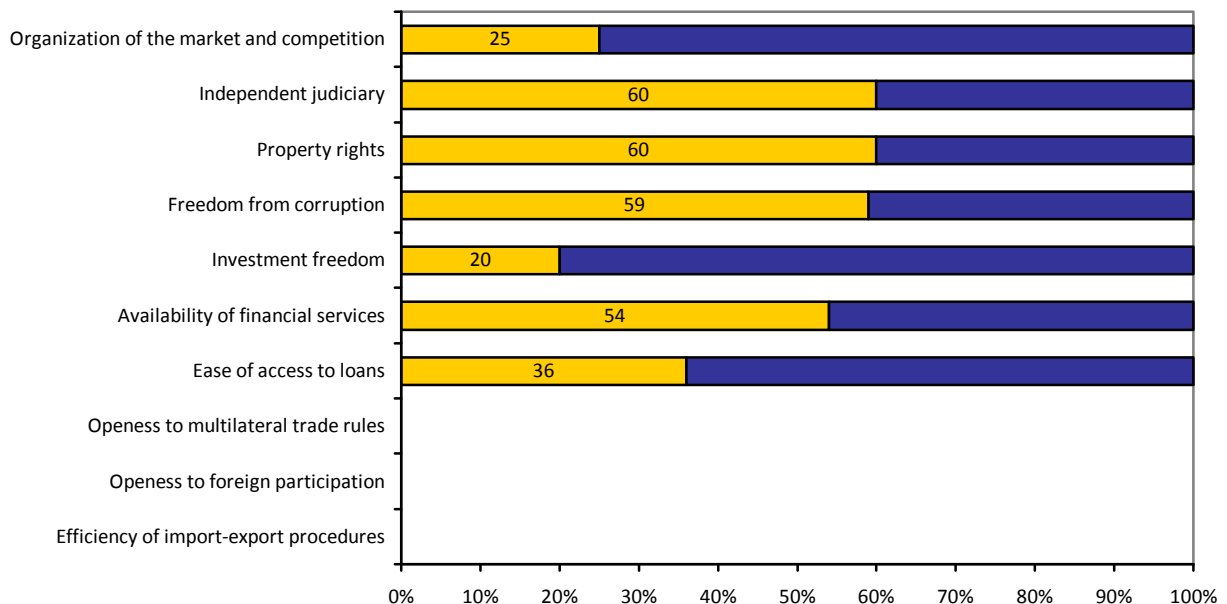
Rural population 2010..... 0.5 mill.  
2012..... 0.5 mill.



Population Off-Grid ..... 0.3 mill.  
Households Off-Grid + under-serviced ..... 0.1 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 0.2 mill.  
Mobile cellular subscriptions ..... 0.6 mill.  
Internet users ..... 25.4 %  
Market Potential: electrification households ..... US\$ 50 mill.  
replacement kerosene lamps ..... US\$ 6 mill.

**Business environment:**

**average** →



The most problematic factors for business:

1. Access to financing
2. Restrictive labor regulations
3. Foreign currency regulations

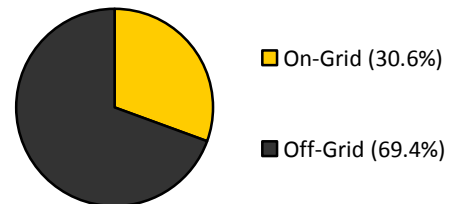
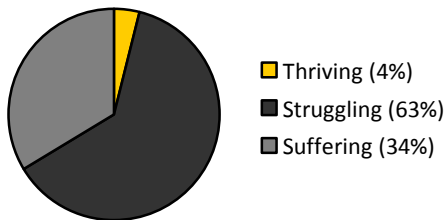
# Cambodia

**Market size:**

**Rank 8 / 15**

Population total 2010 ..... 14.4 mill.  
2012 ..... 14.9 mill.

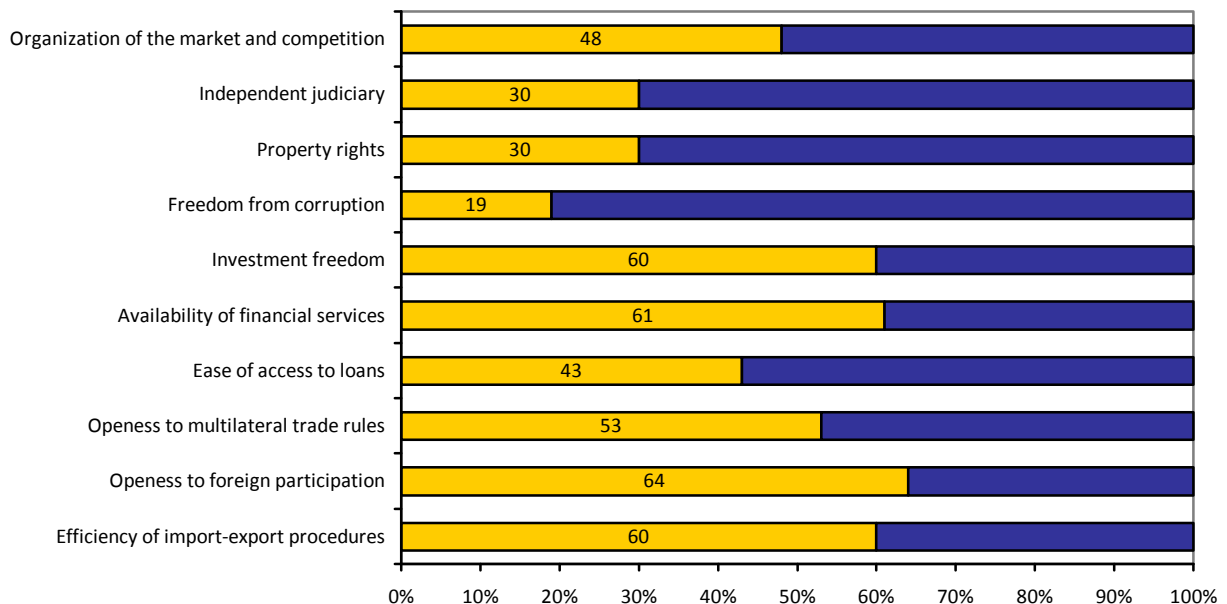
Rural population 2010..... 11.5 mill.  
2012..... 11.9 mill.



Population Off-Grid ..... 10.0 mill.  
Households Off-Grid + under-serviced ..... 2.4 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 6.5 mill.  
Mobile cellular subscriptions ..... 19.1 mill.  
Internet users ..... 4.9 %  
Market Potential: electrification households ..... US\$ 1200 mill.  
replacement kerosene lamps ..... US\$ 195 mill.

**Business environment:**

**average** →



The most problematic factors for business:

1. Corruption
2. Inefficient government bureaucracy
3. Inadequately educated workforce

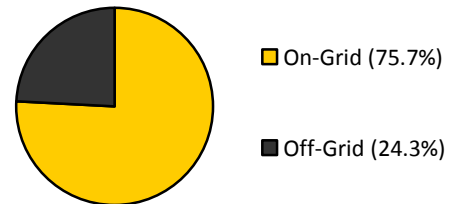
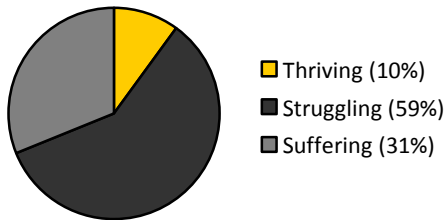
# India

Market size:

Rank 1 / 15

Population total 2010 ..... 1205.6 mill.  
2012 ..... 1236.7 mill.

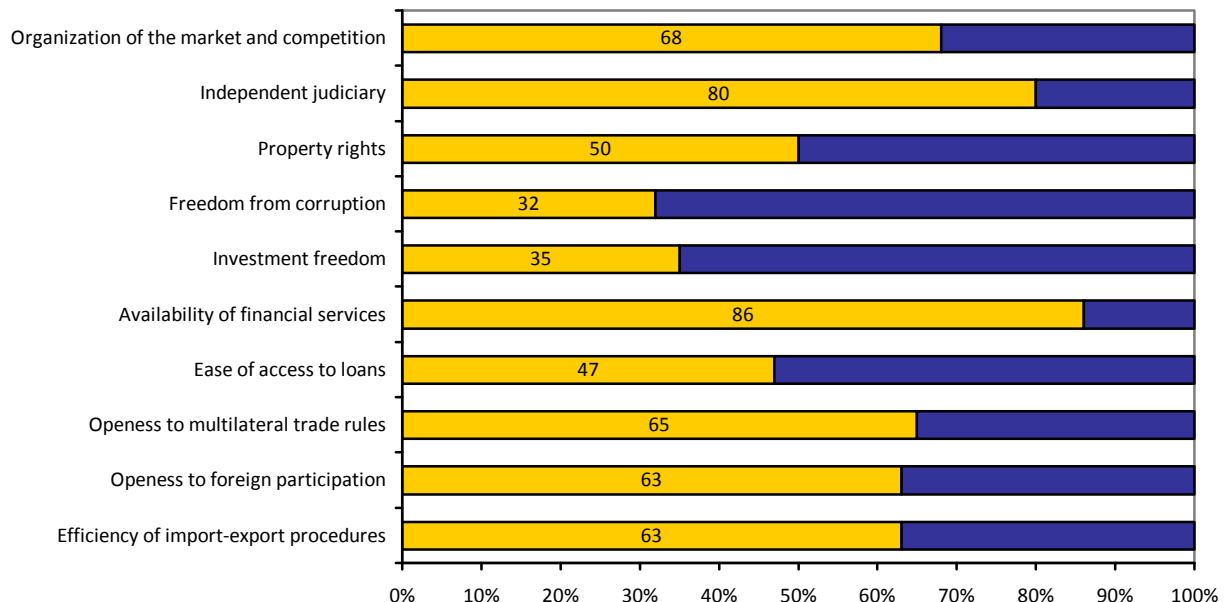
Rural population 2010..... 832.7 mill.  
2012..... 845.1 mill.



Population Off-Grid ..... 293.0 mill.  
Households Off-Grid + under-serviced ..... 54.2 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 176.6 mill.  
Mobile cellular subscriptions ..... 864.7 mill.  
Internet users ..... 12.6 %  
Market Potential: electrification households ..... US\$ 27100 mill.  
replacement kerosene lamps ..... US\$ 5298 mill.

## Business environment:

average →



The most problematic factors for business:

1. Inadequate supply of infrastructure
2. Inefficient government bureaucracy
3. Corruption

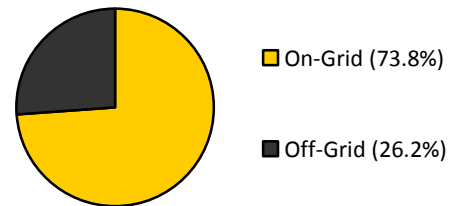
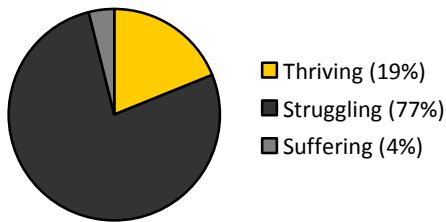
# Indonesia

**Market size:**

**Rank 3 / 15**

Population total 2010 ..... 240.7 mill.  
 2012 ..... 246.9 mill.

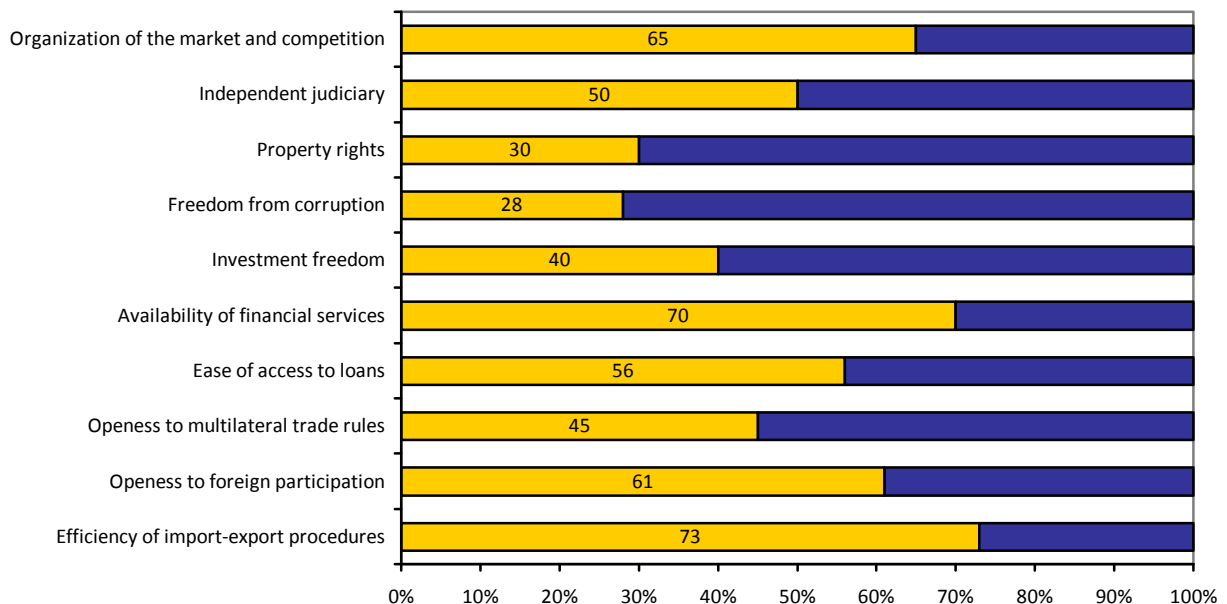
Rural population 2010..... 120.5 mill.  
 2012..... 119.9 mill.



Population Off-Grid ..... 63.0 mill.  
 Households Off-Grid + under-serviced ..... 18.7 mill.  
 Kerosene lamps in use (glass cover, simple wick) ..... 51.3 mill.  
 Mobile cellular subscriptions ..... 282.0 mill.  
 Internet users ..... 15.4 %  
 Market Potential: electrification households ..... US\$ 9350 mill.  
 replacement kerosene lamps ..... US\$ 1539 mill.

## Business environment:

average →



The most problematic factors for business:

1. Corruption
2. Inefficient government bureaucracy
3. Inadequate supply of infrastructure

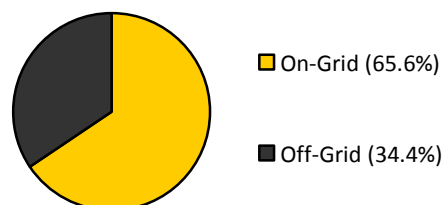
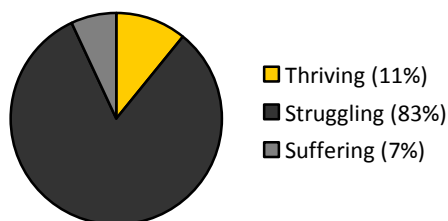
# Lao PDR

**Market size:**

**Rank 12 / 15**

Population total 2010 ..... 6.4 mill.  
2012 ..... 6.7 mill.

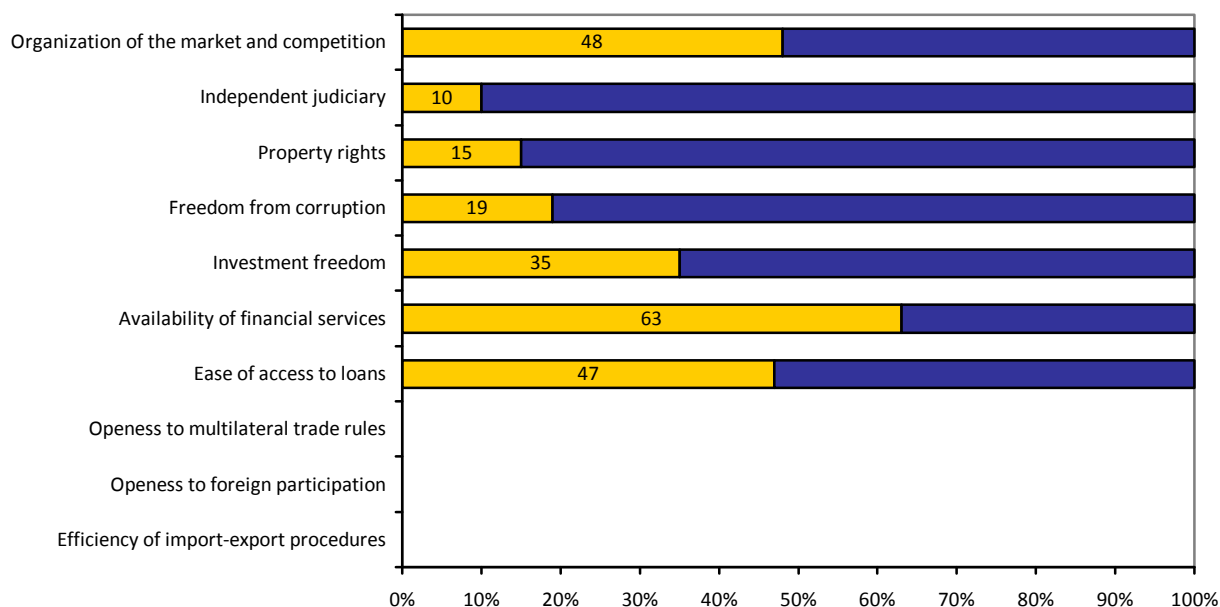
Rural population 2010..... 4.3 mill.  
2012..... 4.3 mill.



Population Off-Grid ..... 2.2 mill.  
Households Off-Grid + under-serviced ..... 0.6 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 1.7 mill.  
Mobile cellular subscriptions ..... 6.5 mill.  
Internet users ..... 10.8 %  
Market Potential: electrification households ..... US\$ 300 mill.  
replacement kerosene lamps ..... US\$ 51 mill.

**Business environment:**

**below average** ↘



The most problematic factors for business:

1. Inadequate educated workforce
2. Access to financing
3. Inadequate supply of infrastructure



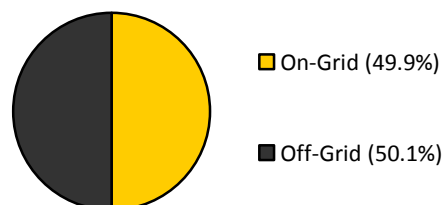
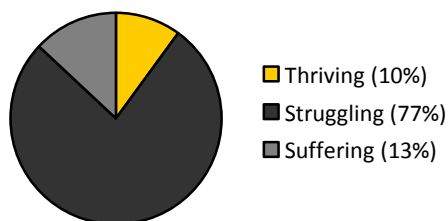
# Myanmar

Market size:

Rank 5 / 15

Population total 2010 ..... 51.9 mill.  
2012 ..... 52.8 mill.

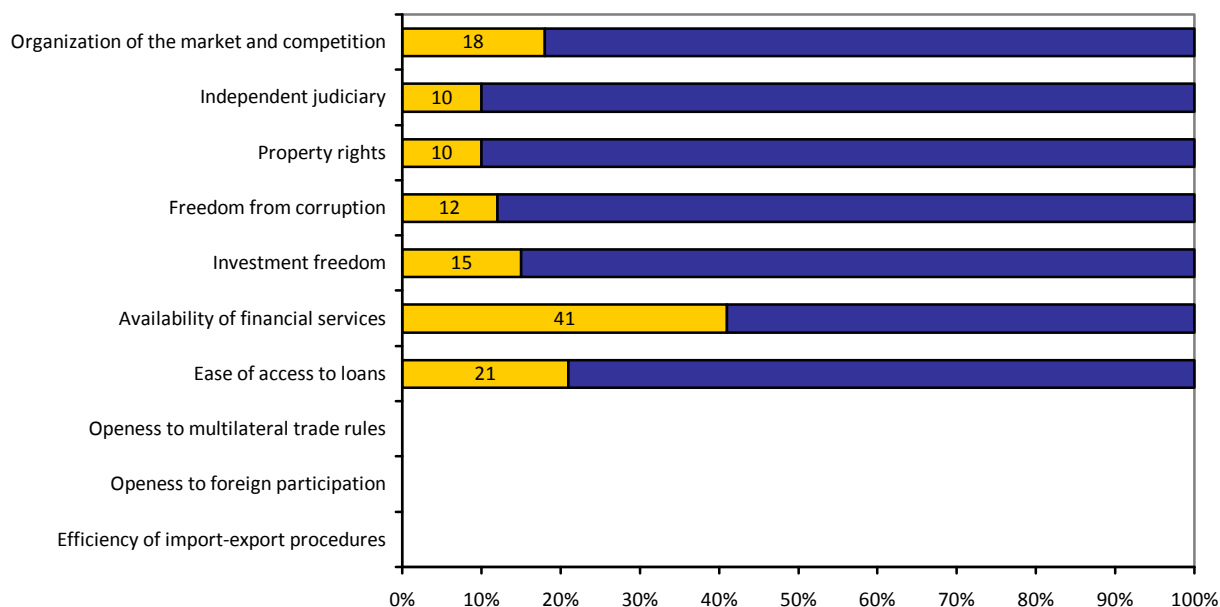
Rural population 2010..... 35.3 mill.  
2012..... 35.3 mill.



Population Off-Grid ..... 26.0 mill.  
Households Off-Grid + under-serviced ..... 9.2 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 25.1 mill.  
Mobile cellular subscriptions ..... 5.4 mill.  
Internet users ..... 1.1 %  
Market Potential: electrification households ..... US\$ 4600 mill.  
replacement kerosene lamps ..... US\$ 753 mill.

Business environment:

unacceptable ↓



The most problematic factors for business:

1. Access to financing
2. Policy instability
3. Corruption

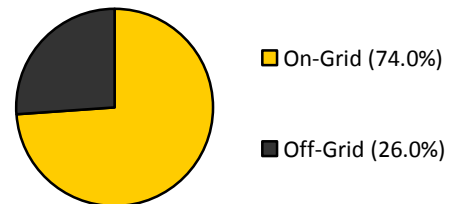
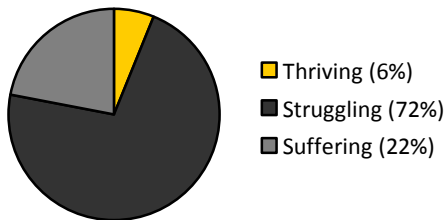
# Nepal

**Market size:**

**Rank 9 / 15**

Population total 2010 ..... 26.9 mill.  
2012 ..... 27.5 mill.

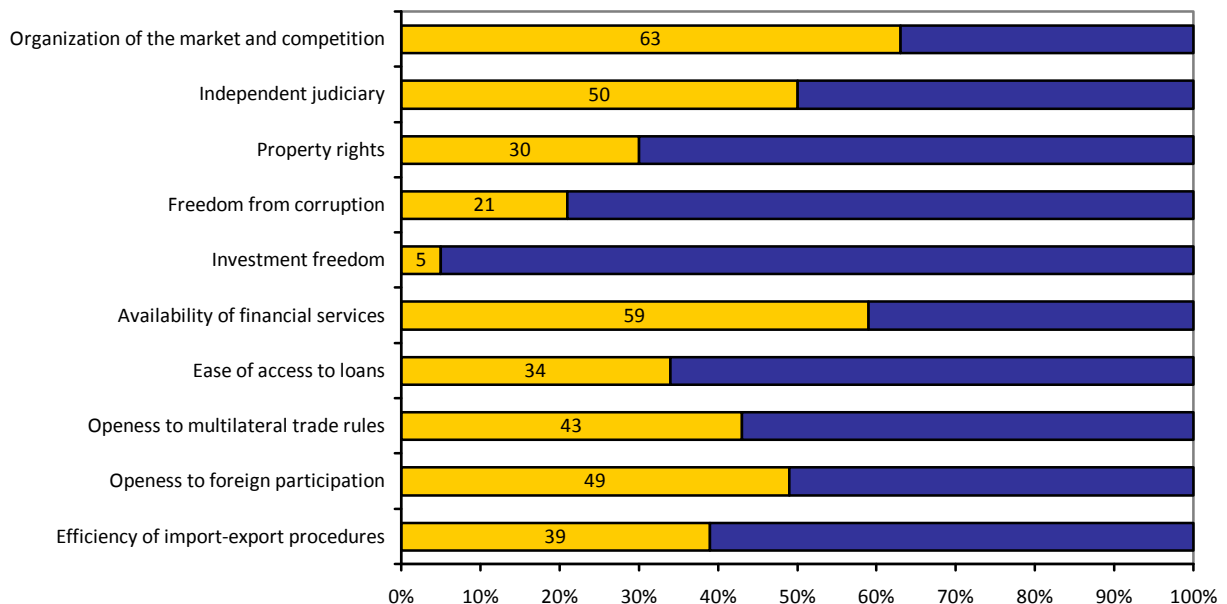
Rural population 2010..... 22.4 mill.  
2012..... 22.7 mill.



Population Off-Grid ..... 7.0 mill.  
Households Off-Grid + under-serviced ..... 3.1 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 8.1 mill.  
Mobile cellular subscriptions ..... 16.4 mill.  
Internet users ..... 11.2 %  
Market Potential: electrification households ..... US\$ 1550 mill.  
replacement kerosene lamps ..... US\$ 243 mill.

**Business environment:**

**below average** ↘



The most problematic factors for business:

1. Government instability / coups
2. Corruption
3. Inefficient government bureaucracy

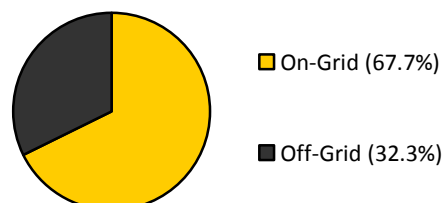
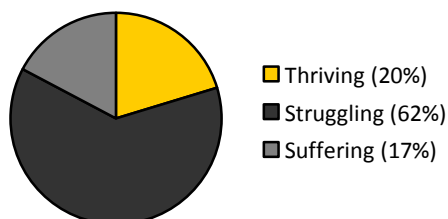
# Pakistan

**Market size:**

**Rank 4 / 15**

Population total 2010 ..... 173.2 mill.  
2012 ..... 179.2 mill.

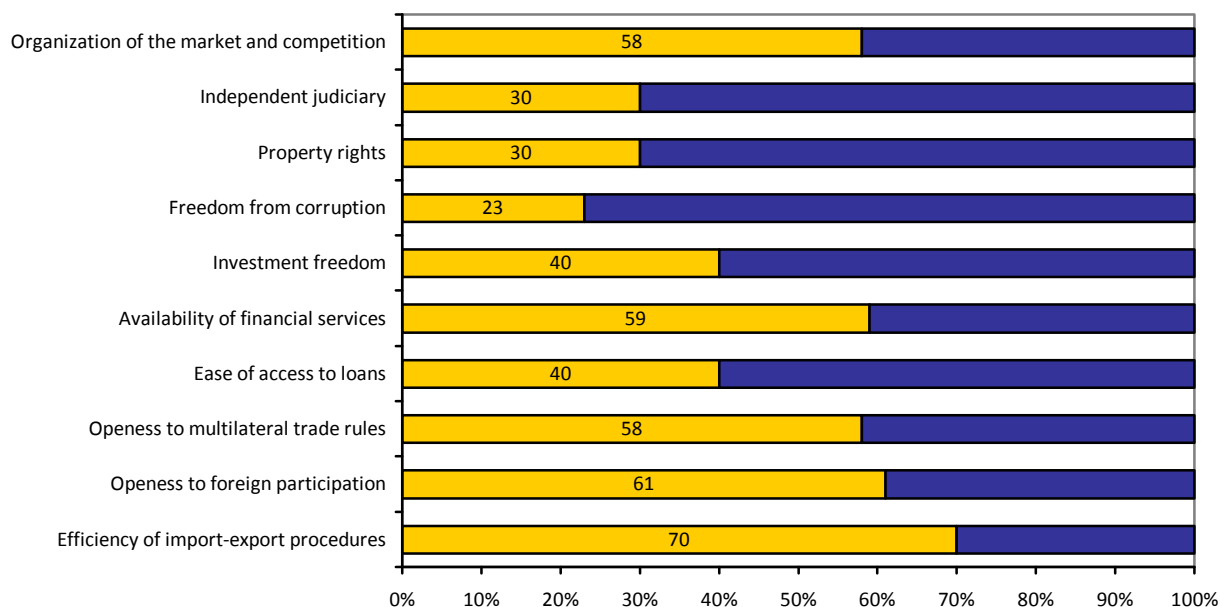
Rural population 2010..... 111.0 mill.  
2012..... 113.7 mill.



Population Off-Grid ..... 56.0 mill.  
Households Off-Grid + under-served ..... 9.6 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 5.3 mill.  
Mobile cellular subscriptions ..... 120.2 mill.  
Internet users ..... 10.0 %  
Market Potential: electrification households ..... US\$ 4800 mill.  
replacement kerosene lamps ..... US\$ 159 mill.

**Business environment:**

**average** →



The most problematic factors for business:

1. Corruption
2. Policy instability
3. Access to financing

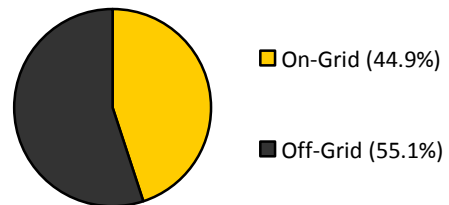
# Papua New Guinea

**Market size:**

**Rank 11 / 15**

Population total 2010 ..... 6.9 mill.  
 2012 ..... 7.2 mill.

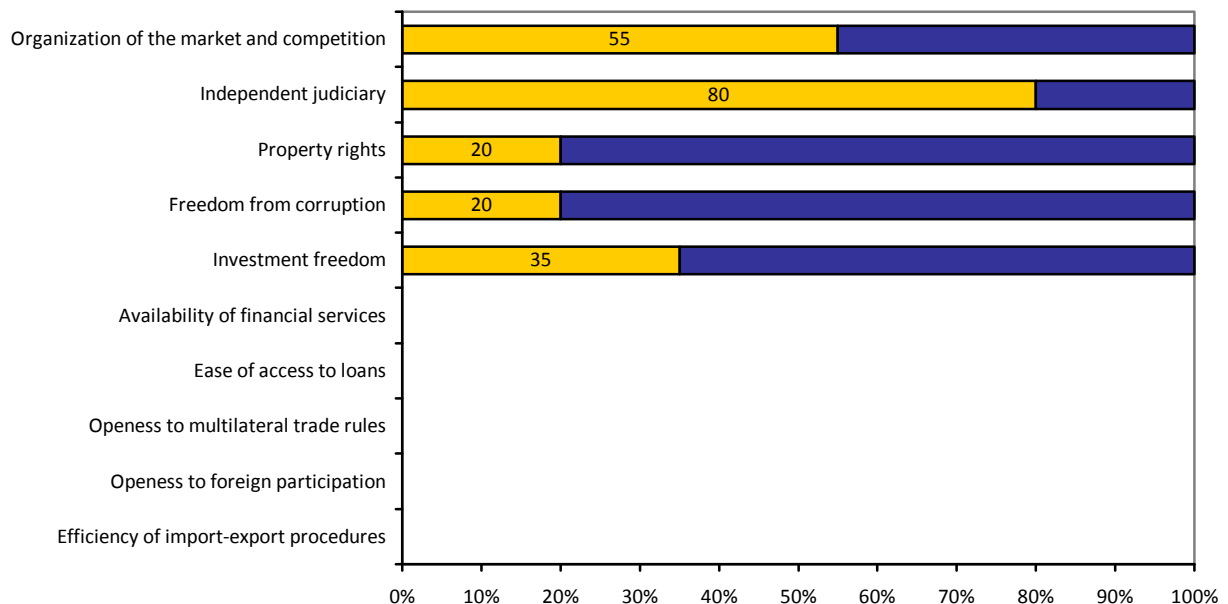
Rural population 2010..... 6.0 mill.  
 2012..... 6.3 mill.



Population Off-Grid ..... 3.8 mill.  
 Households Off-Grid + under-serviced ..... 0.8 mill.  
 Kerosene lamps in use (glass cover, simple wick) ..... 2.3 mill.  
 Mobile cellular subscriptions ..... 2.7 mill.  
 Internet users ..... 2.3 %  
 Market Potential: electrification households ..... US\$ 400 mill.  
 replacement kerosene lamps ..... US\$ 69 mill.

**Business environment:**

**average** →



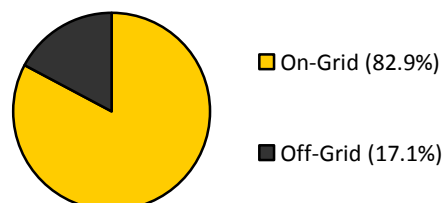
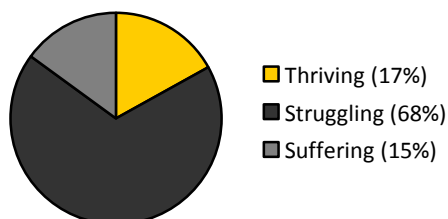
# Philippines

**Market size:**

**Rank 7 / 15**

Population total 2010 ..... 93.4 mill.  
2012 ..... 96.7 mill.

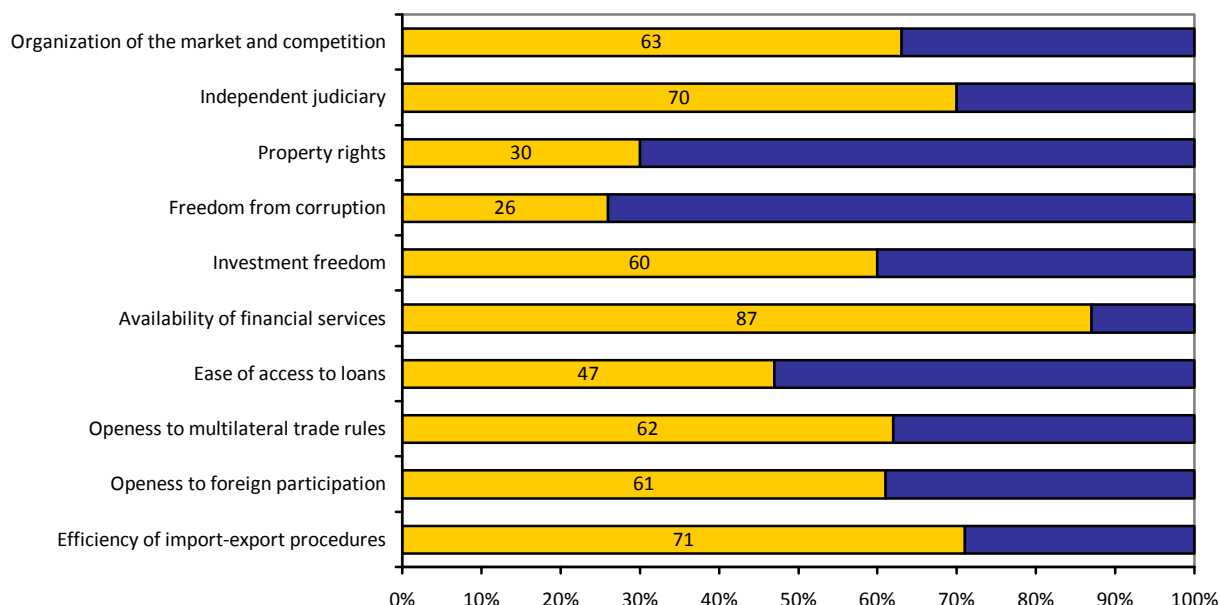
Rural population 2010..... 48.0 mill.  
2012..... 49.2 mill.



Population Off-Grid ..... 16.0 mill.  
Households Off-Grid + under-serviced ..... 1.8 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 5.8 mill.  
Mobile cellular subscriptions ..... 103.0 mill.  
Internet users ..... 36.2 %  
Market Potential: electrification households ..... US\$ 900 mill.  
replacement kerosene lamps ..... US\$ 174 mill.

**Business environment:**

**average** →



The most problematic factors for business:

1. Inadequate supply of infrastructure
2. Corruption
3. Inefficient government bureaucracy

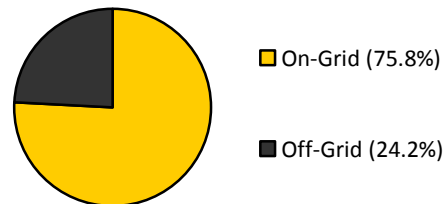
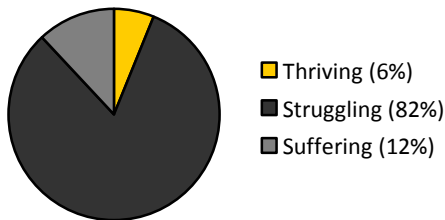
# Sri Lanka

**Market size:**

**Rank 10 / 15**

Population total 2010 ..... 20.7 mill.  
2012 ..... 20.3 mill.

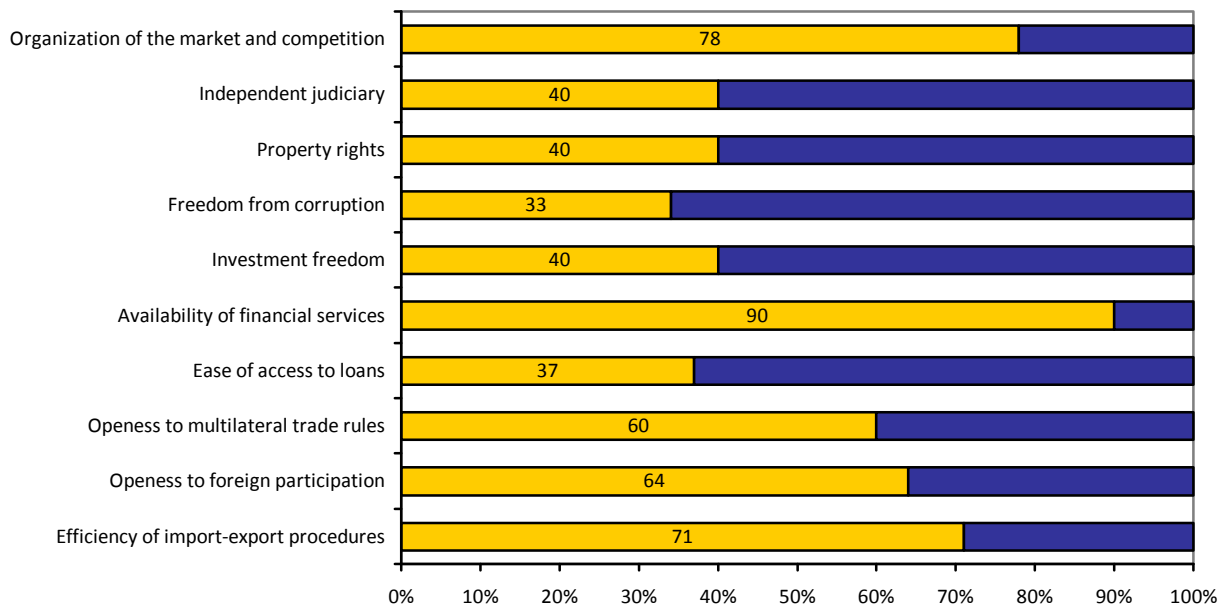
Rural population 2010..... 17.6 mill.  
2012..... 17.2 mill.



Population Off-Grid ..... 5.0 mill.  
Households Off-Grid + under-serviced ..... 1.3 mill.  
Kerosene lamps in use (glass cover, simple wick) ..... 3.0 mill.  
Mobile cellular subscriptions ..... 20.3 mill.  
Internet users ..... 18.3 %  
Market Potential: electrification households ..... US\$ 650 mill.  
replacement kerosene lamps ..... US\$ 90 mill.

## Business environment:

average →



The most problematic factors for business:

1. Access to financing
2. Tax rates
3. Poor work ethic in national labor force

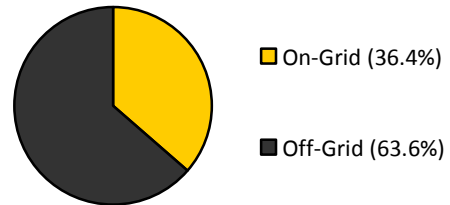
# Timor-Leste

**Market size:**

**Rank 13 / 15**

Population total 2010 ..... 1.1 mill.  
 2012 ..... 1.2 mill.

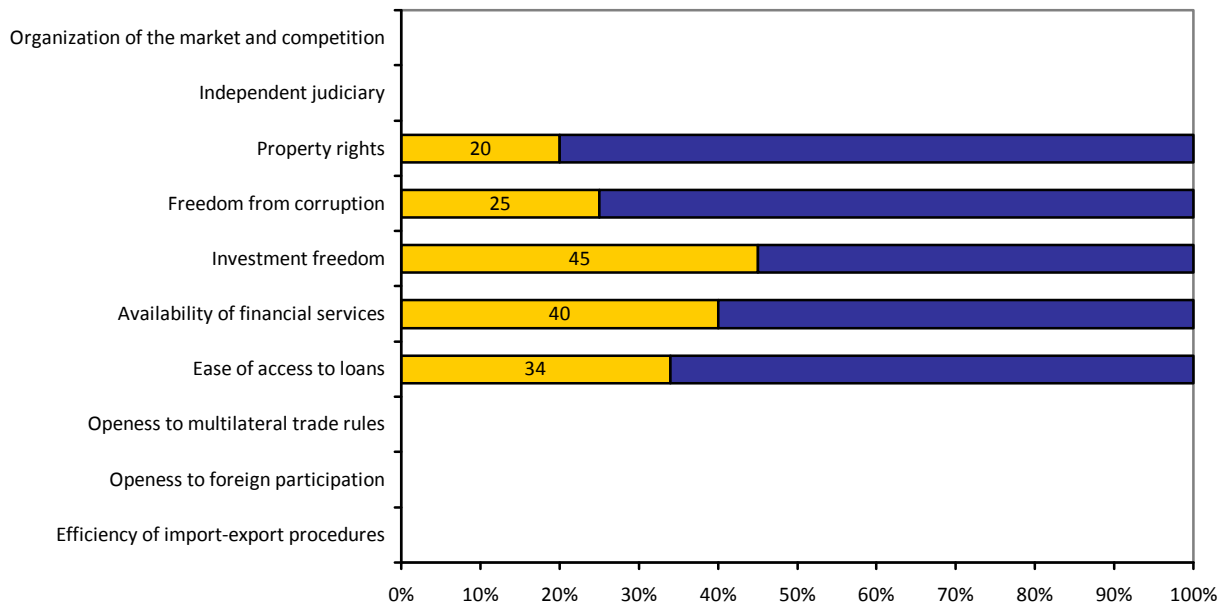
Rural population 2010..... 0.8 mill.  
 2012..... 0.9 mill.



Population Off-Grid ..... 0.7 mill.  
 Households Off-Grid + under-serviced ..... 0.2 mill.  
 Kerosene lamps in use (glass cover, simple wick) ..... 0.5 mill.  
 Mobile cellular subscriptions ..... 0.6 mill.  
 Internet users ..... 0.9 %  
 Market Potential: electrification households ..... US\$ 100 mill.  
 replacement kerosene lamps ..... US\$ 15 mill.

**Business environment:**

**below average** ↘



The most problematic factors for business:

1. Corruption
2. Poor work ethic in national labor force
3. Access to financing





## Sources and Methodology

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# Off-Grid-Market

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## **Market size**

Population living Off-Grid

## **Population total**

Source: Worldbank, 2010/2012: <http://data.worldbank.org/indicator/SP.POP.TOTL>

## **Rural population**

Rural population refers to people living in rural areas as defined by national statistical offices. It is calculated as the difference between total population and urban population.

Source: Worldbank, 2010/2012: <http://data.worldbank.org/indicator/SP.RUR.TOTL>

## **Thriving / Struggling / Suffering**

Source: Gallup, Inc., 2011-2013: <http://www.gallup.com/>

## **Population Off-Grid**

Bhutan, Papua New Guinea: en.lighten. Off-Grid Lighting Assessment, 2010: <http://www.enlighten-initiative.org/CountrySupport/CountryLightingAssessments.aspx>

All other countries: International Energy Agency (IEA), World Energy Outlook 2012

## **Households Off-Grid + under-serviced**

Source: en.lighten. Off-Grid Lighting Assessment, 2010: <http://www.enlighten-initiative.org/CountrySupport/CountryLightingAssessments.aspx>

## **Kerosene lamps (glass cover, simple wick)**

Source: en.lighten. Off-Grid Lighting Assessment, 2010: <http://www.enlighten-initiative.org/CountrySupport/CountryLightingAssessments.aspx>

## **Mobile cellular subscriptions**

Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service using cellular technology, which provide access to the public switched telephone network. Post-paid and prepaid subscriptions are included.

Source: Worldbank, 2012: <http://data.worldbank.org>

## **Internet users (per 100 people)**

Source: Worldbank 2012: <http://data.worldbank.org/indicator/IT.NET.USER.P2>

## **Market potential electrification household**

Households Off-Grid and under-serviced x US\$ 500 (= Assumption: price of 12V-Solar-Home-System with 4-6 LED, possibility to connect TV, radio, fan and other 12V-devices)

## **Market potential replacement kerosene lamps**

Kerosene lamps x US\$ 30 (= Assumption: price of a medium level mobile torch light)

# Business environment

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## Organization of the market and competition

Consists of these elements:

- Market-based competition: To what level have the fundamentals of market-based competition developed?
- Anti-monopoly policy: To what extent do safeguards exist to prevent the development of economic monopolies and cartels, and to what extent are they enforced?
- Liberalization of foreign trade: To what extent has foreign trade been liberalized?
- Banking system: To what extent have a solid banking system and a functioning capital market been established?

Source: Transformation Index of the Bertelsmann Stiftung, Gütersloh 2012.

## Independent judiciary

An independent judiciary has the ability and autonomy to

- interpret and review existing laws, legislation and policies, both public and civil
- pursue its own reasoning, free from the influence of political decision-makers or powerful groups and individuals and from corruption
- develop a differentiated organization, including legal education, jurisprudence, regulated appointment of the judiciary, rational proceedings, professionalism, channels of appeal and court administration

Source: Transformation Index of the Bertelsmann Stiftung, Gütersloh 2012.

## Property rights

"The ability to accumulate private property and wealth is understood to be a central motivating force for workers and investors in a market economy. (...) The protection of private property requires an autonomous and accountable judicial system that is available to all equally and without discrimination. The independence, transparency, and effectiveness of the judicial system have proven to be key determinants of a country's prospects for long-term economic growth. (...) A key aspect of property rights protection is the enforcement of contracts. The voluntary undertaking of contractual obligations is the foundation of the market system and the basis for economic specialization, gains from commercial exchange, and trade among nations."

Source: The Heritage Foundation, 2014 Index of Economic Freedom, Washington D.C. 2014.

## Freedom from corruption

"In the context of economic freedom, corruption can best be understood as the failure of integrity in the economic system, a distortion by which individuals or special-interest groups are able to gain at the expense of the whole. (...) Ensuring transparency is key to dealing effectively with corruption. Openness in regulatory procedures and processes can promote equitable treatment and greater efficiency."

Source: The Heritage Foundation, 2014 Index of Economic Freedom, Washington D.C. 2014.

## Investment freedom

A free and open investment environment provides maximum entrepreneurial opportunities and incentives for expanded economic activity, greater productivity, and job creation. (...) An effective investment framework will be characterized by transparency and equity, supporting all types of firms rather than just large or strategically important companies, and will encourage rather than discourage innovation and competition.

Restrictions on the movement of capital, both domestic and international, undermine the efficient allocation of resources and reduce productivity, distorting economic decision-making. Restrictions on cross-border investment can limit both inflows and outflows of capital, thereby shrinking markets and reducing opportunities for growth."

Source: The Heritage Foundation, 2014 Index of Economic Freedom, Washington D.C. 2014.

## Availability of financial services

Does the financial sector in a country provide a wide variety of financial products and services to businesses?

Source: World Economic Forum, The Global Competitiveness Report 2013–2014, Geneva 2013.

### Ease of access to loans

How easy is it to obtain a bank loan in a country with only a good business plan and no collateral?

Source: World Economic Forum, The Global Competitiveness Report 2013–2014, Geneva 2013.

### Openness to multilateral trade rules

Source: World Economic Forum, The Global Enabling Trade Report 2012. Reducing Supply Chain Barriers, Geneva 2012.

### Openness to foreign participation

Source: World Economic Forum, The Global Enabling Trade Report 2012. Reducing Supply Chain Barriers, Geneva 2012.

### Efficiency of import-export procedures

Consists of:

- Efficiency of the clearance process
- Time to import (hard data)
- Documents to import (hard data)
- Cost to import (hard data)
- Time to export (hard data)
- Documents to export (hard data)
- Cost to export (hard data)

Source: World Economic Forum, The Global Enabling Trade Report 2012. Reducing Supply Chain Barriers, Geneva 2012.






### The most problematic factors for business

"This list summarizes those factors seen by business executives as the most problematic for doing business in their economy. The information is drawn from the 2013 edition of the World Economic Forum's Executive Opinion Survey. From a list of 16 factors, respondents were asked to select the five most problematic and rank them from 1 (most problematic) to 5. The results were then tabulated and weighted according to the ranking assigned by respondents." (For OBIN we listed the three most problematic factors for business.)

Source: World Economic Forum, The Global Competitiveness Report 2013–2014, Geneva 2013.

### Valuation

Average of all ten criteria:

80,1-100		outstanding
60,1-80,0		above average
40,1 - 60,0		average
20,1 - 40,0		below average
0-20,0		unacceptable

To make a valuation a minimum of five data is required (out of 10).

# OBIN

Off-Grid Business Indicator

2014