With support from: OAK FOUNDATION

4th Global Climate Policy Conference 'Harnessing Research for Climate Ambition and Transparency'

Session 7: Innovation in Renewable Energy Policies

# SOLAR LEASING POLICY

## Lessons Learned & Implications for Latin America

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17 August 2018, São Paulo, Brazil

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# Background

## Overview of South Korea

**Unfavorable natural and social conditions for large-scale renewable energy**

- Area: 99,720 $km^2$ ($107^{th}$), mostly mountainous terrain
- Climate: a humid continental climate and a humid subtropical climate, low GHI (solar irradiation, clear days)
- Population: 51,635,256 (51 million)
- Rising peak electricity demand in the summer and summer
- Residential type: Apartment (76%), detached houses (24%)

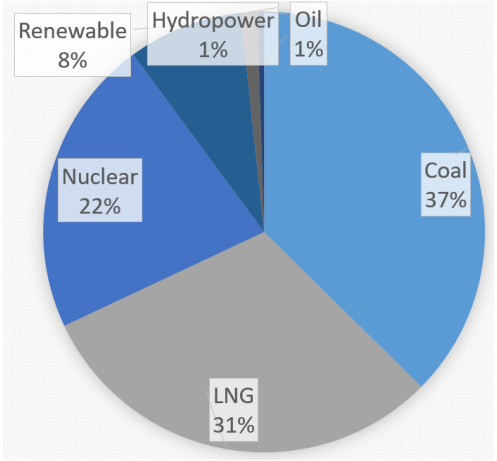
## Energy policies

**Favorable to renewables**

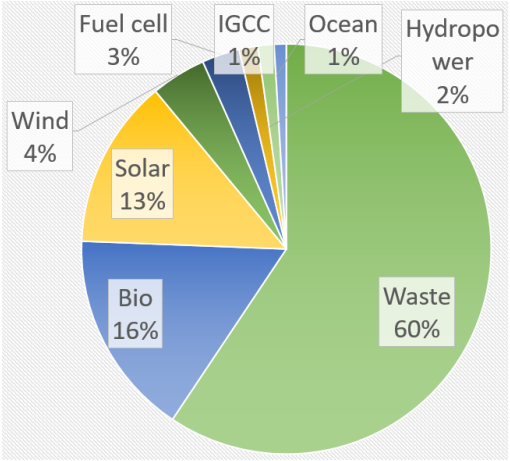
- NDC: 37% emissions reduction target by 2030 compared to BAU (851 Mt)
- 8th Basic Plan for Electricity Supply and Demand (Dec 2017): Nuclear phase-out roadmap, Shutdown of aging coal-fired power plants ahead of the end of their design lifetime to tackle air pollution

## Energy sector

- Energy Overseas Dependence 94.7% ($ 80.9 bn USD)
- Vertically integrated energy market: KEPCO
- Energy regulatory framework: RPS, REC, FIT
- Electricity mix and renewable energy production: 40,656 GWh (7.24%) (2017)




Power Mix (2018)




Renewable Energy Mix (2017)

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- **Global Horizontal Irradiance** (GHI)

*Source: World Bank Group, ESMAP, Solargis*

http://globalsolaratlas.info/?c=21.125478,-124.13671,2&m=sg:ghi

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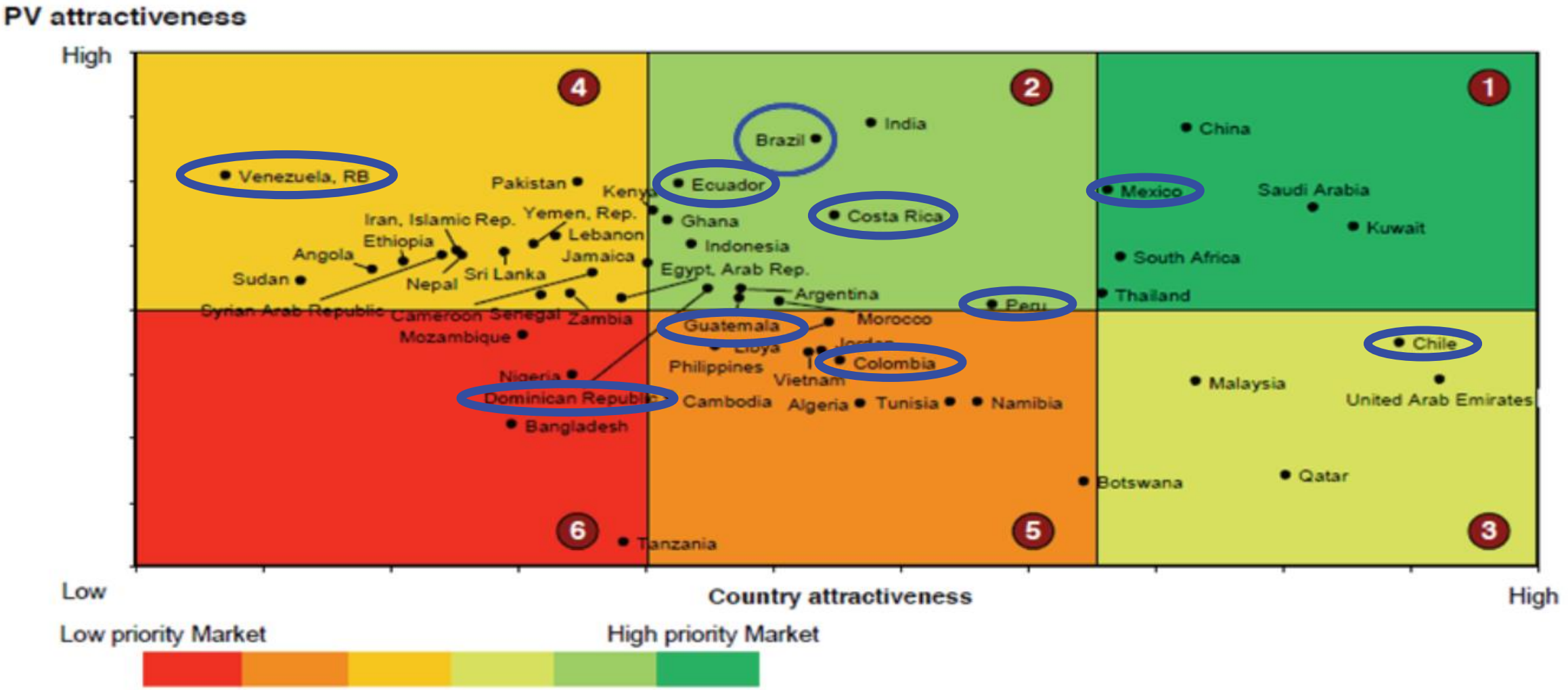
- **Solar PV Market Attractiveness**




*Source: AT-Kearney, 2009*

# Solar leasing policy was created to meet different needs from different stakeholders.

- **Maximization of profits**
- **Minimization of risks**
- Low public awareness

Solar PV Leasing companies

Government

- **Efficient use of budget**
- **Stable supply of electricity**
- **Deployment of renewables**
- Concerns for long-term subsidy burden
- Needs to address complaints on harsh penalty from utilities

- **Minimization of electricity bill**
- High upfront cost ($1,200)
- Difficult maintenance
- Reluctance to sign a long-term contract with unknown lessors

Households

Utilities

- **Minimization of REP costs**
- Heavy penalty for non-/under-compliance with RPS
  USD 22 million (2012), USD 44 million (2013)

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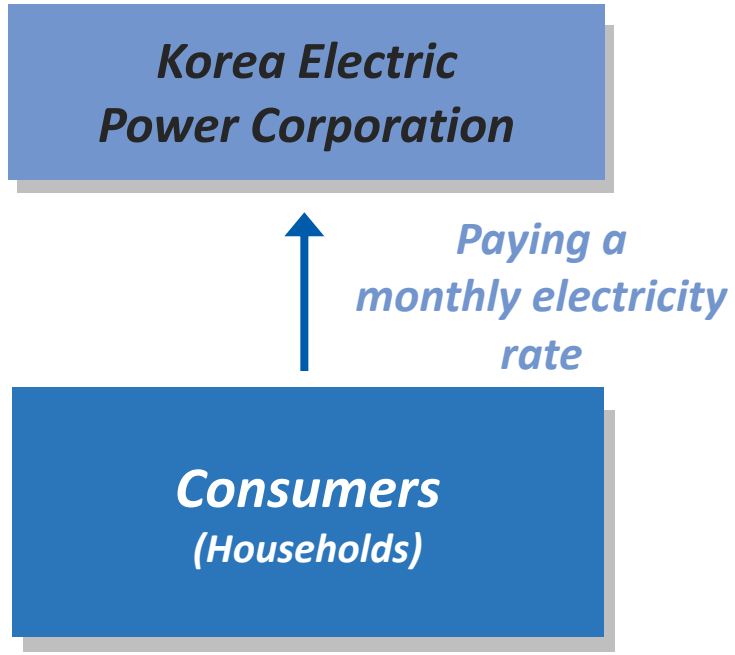
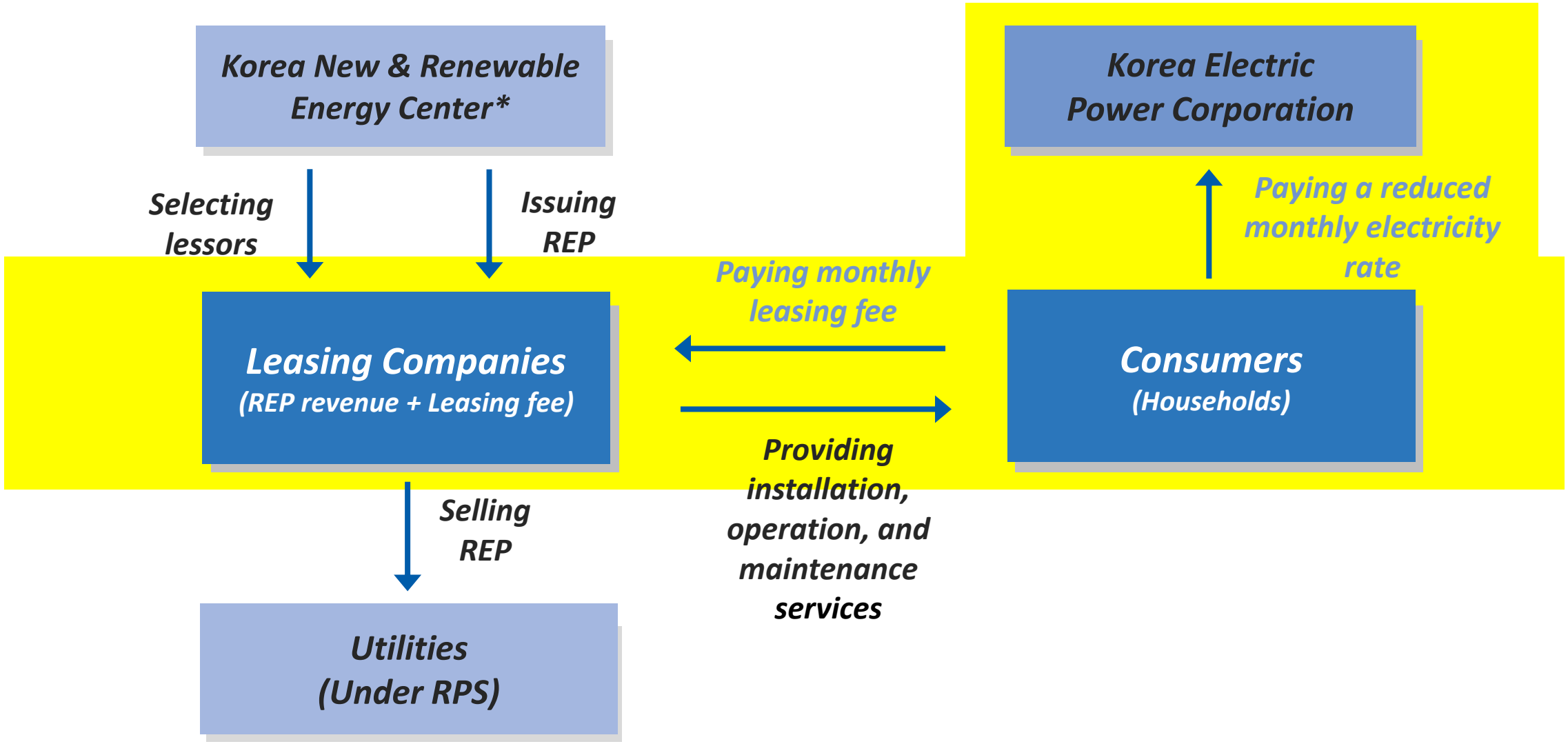
# Korea's solar leasing policy



# Korea's solar leasing policy




*Under Korea Energy Agency, Ministry of Trade, Industry and Energy

*Source: Korea Energy Agency*

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# Timeline

## 2012

### First failure of the private-led solar leasing

- SolarCity's business model
- Low level of public awareness

## 2013

### Pilot project

- **KNREC**
- Government Intervention
- Demands for REC from lessors
- Consideration of RPS planning

## 2014

### Introduction of the policy

- Redesign with lessons from failure
- Continuous interactions among stakeholders

## 2015

### Expansion to apartments

- Emergence of a new startup **Haezoom**
- Launch of the second private-le d model

## 2016

### Second failure of the private-led solar leasing

**S-Energy**

- Market not ready yet

## 2017

### Recent changes

- Progressive electricity rate reform
- Integration of solar and non-solar REC market

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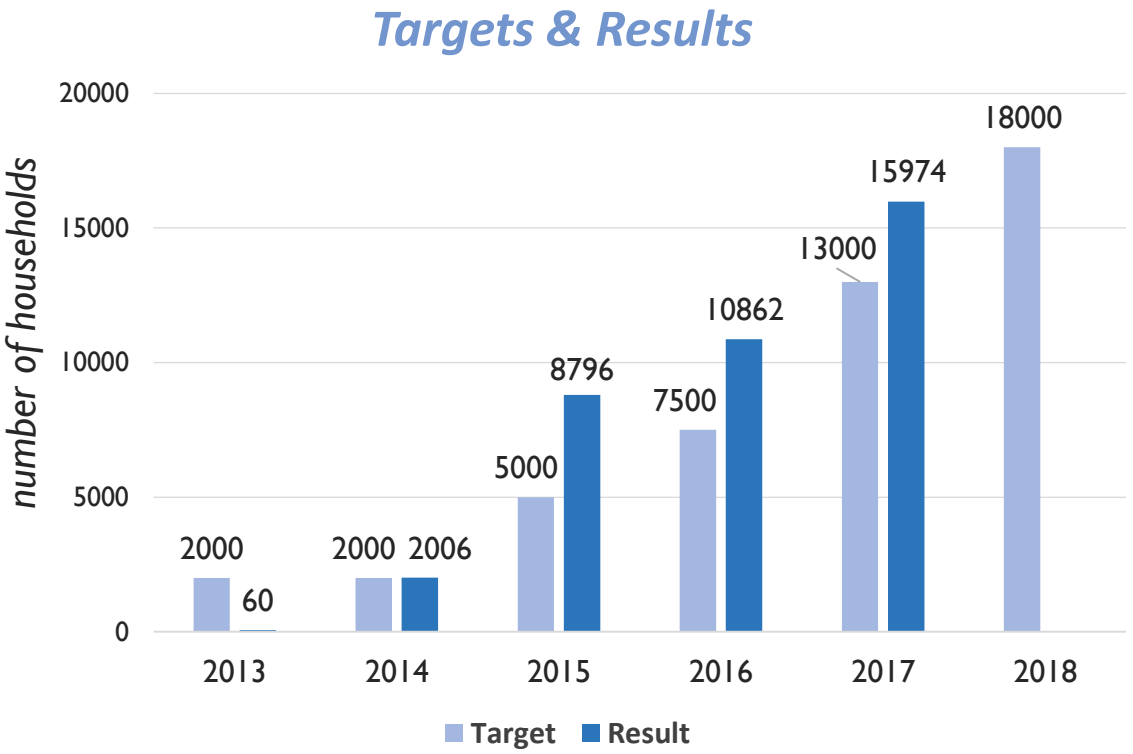
# Results and impacts

**As of 2017;**

- **37,698 households** in total have signed contracts with solar leasing companies and installed solar PV.
- **42.5 MW of solar energy** has been deployed. **54,595 MWh of electricity** is generated per year.
- **13,000 toe of energy*** has been saved.
- Korean government has **saved USD 31 million** (KRW 35.6 billion)* of the national budget.




*Estimated

*Source: Korea Energy Agency*

# What makes it a good policy for innovation in renewable energy policies?

- **Local context is well embedded in the solar leasing policy.**
  - Korea, with a small territory and unfavorable climate for solar PV, inherently has limitation of large-scale solar power plant. To maximize solar power generation, rooftop solar PV for detached houses was introduced.
  - 76% of the population lives in apartments; therefore, rooftop solar PV was extended to apartments.
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    private sector on the stage.

# What makes it a good policy for innovation in renewable energy policies? (cont.)

- **It was well adapted to dynamic market/institutional conditions.**
  - It quickly responded to external changes such as *Progressive Electricity Rate Reform (2016) and Solar and non-solar REC market integration (2016).*
  - It evolved every year by reflecting feedback from markets and households:
    (a) Consumers from apartments wanted to participate;
    (b) Lessors wanted to expand the market to apartments.
- **By engaging different stakeholders from the policy design stage, different needs from different stakeholders could be addressed.**
  - KNREC encouraged active interactions and communication among the stakeholders by holding formal and informal meetings.
  - Early engagement helps ensure active participation of all stakeholders in developing the plan, as well as personal investment in the long-term viability of the plan.
- **Effective monitoring system was implemented.**
  - KNREC conducts random monitoring at households without any notice to leasing companies to guarantee good services.

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# Lessons learned, limitations and way forward

- **Pushing initial solar PV deployment with large government subsidy might not necessarily be a good idea.**
  - In the first place, KNREC supported half the cost of solar PV installation. It contributed to initial surge; however, in the long term it could lead people to think that solar PV is not worth installing by themselves.
- **REP is not a direct subsidy, but an indirect way of financial support from the government; It is essential to diversify financial support options.**
  - REP can play a significant role to gradually turn people away from subsidies; however, REP is still covered by governmental agencies. Then how different is it from subsidies?
  - Government → Large firms → SMEs → Citizens (crowd-funding)
- **Low electricity bill is the root cause of a problem.**
  - It discourages people to think about and act upon saving electricity.
- **The policy should be expanded beyond residential buildings; e.g. commercial buildings.**

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# Implications for Latin America

- **Things to consider:**
  - Local contexts such as geographical condition, economic/industrial structure differ by country, province and city.

    ex. Cities with a lot of apartments (Brazil, Mexico)
  - Institutional framework and market structure also differ by country.
    ex. Vertically integrated regulated monopoly (Paraguay), vertically integrated utility + IPP (Bolivia, Ecuador, Uruguay), wholesale market (Argentina, Brazil, Chile, Costa Rica, Mexico), wholesale market + retail competition (Colombia)

- **Suggestions:**
  - It is important to design a scheme which harmonize with the local context as well as existing regulatory framework.
  - It is a good idea to engage stakeholders from the design stage of the policy.
  - Highlighting co-benefits can help deploy solar PV in rural and/or remote areas through microfinance (ex. Shakti in Bangladesh) which will contribute to energy access as well as local economy (ex. training, capacity building).
  - Stable determination to implement the policy matters.

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# THANK YOU

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