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Evolution of Solar Photovoltaic Support Policies in Brazil and Portugal: a review

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GESEL Grupo de Estudos do Setor Elétrico UFRJ · GRUPO energisa · Universidade de Coimbra · inesc Coimbra · MIT Portugal

SUMMARY

1. BACKGROUND AND MOTIVATION

This research is part of an R&D program developed by **GESEL**, in partnership with **Energisa**.

The project aims to better understand the **economic impact of growing share of DG PV** for electricity distribution system operators.

This study was developed as part of the "**International experiences review**" work package.

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1. BACKGROUND AND MOTIVATION

The diffusion of solar PV technology has gained significant momentum as a competitive renewable energy source.

Often as centrepiece on **climate and energy policies** aiming at a transition toward higher levels of **distributed energy resources**.

Alongside its benefits, some **complexities** can arise for the electricity sector as installed **capacity expands**.

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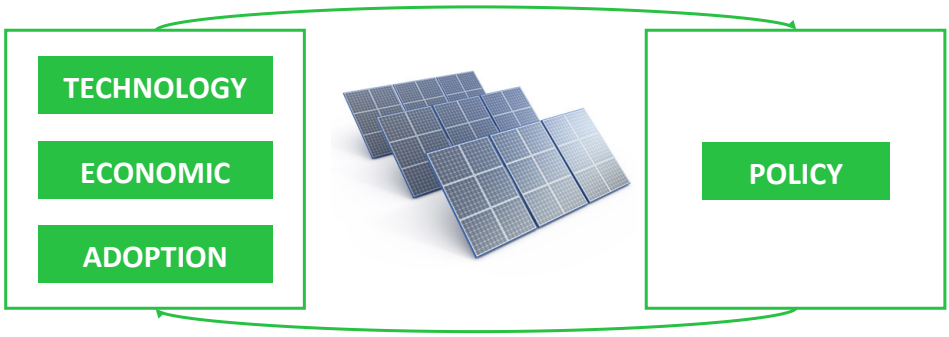
1. BACKGROUND AND MOTIVATION

As the techno-economic framework of solar PV evolves, the policy framework is often adapted.



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1. BACKGROUND AND MOTIVATION

Through this study we aim to explore

How are solar PV support policies evolving?

This can contribute to:

- Identifying best case practices
- Understanding patterns
- Mapping public policy evolution

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2. METHODOLOGY

1 CASE SELECTION

2 POLICY REVIEW

3 ADJUSTMENTS CATEGORIZATION

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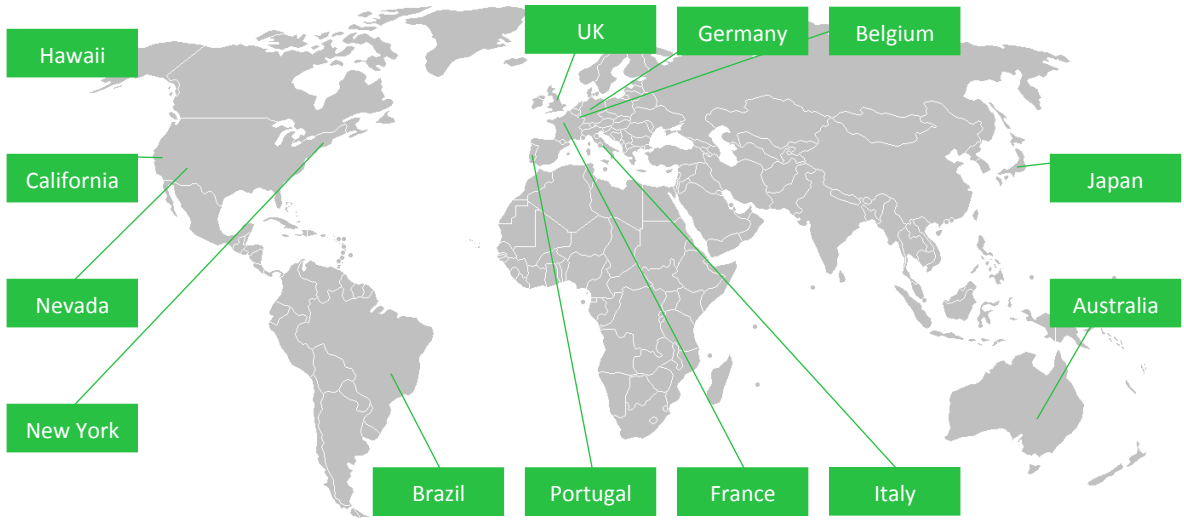
3. ANALYSIS



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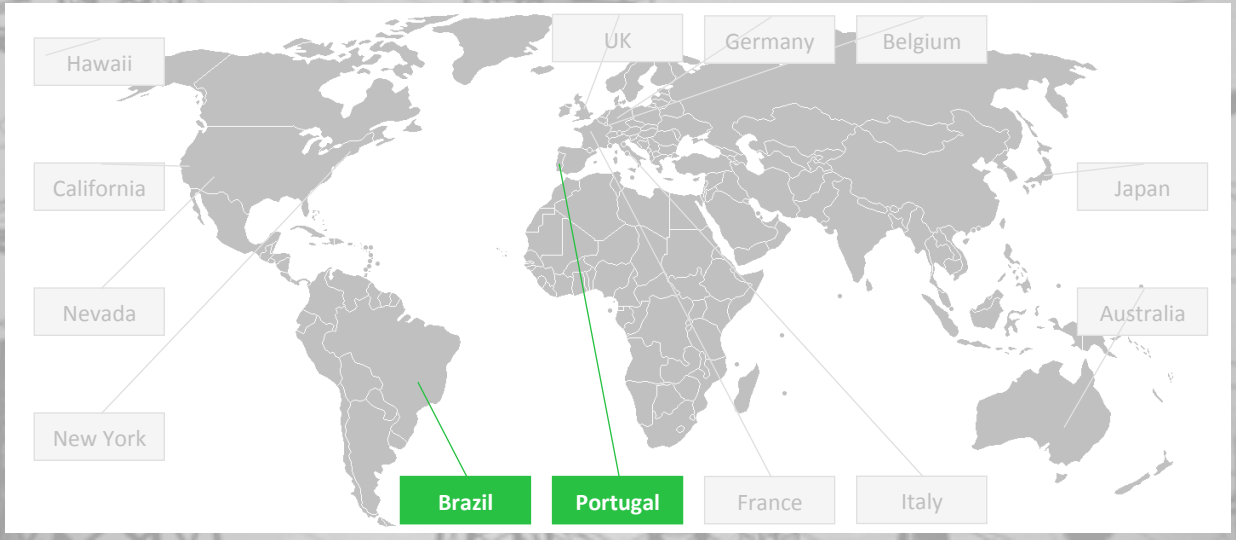
3. ANALYSIS



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3. ANALYSIS – THE BRAZILIAN CASE

Case for PV

Significant solar PV **potential**, estimated at **230%** of the residential consumption verified in 2013.

[1]

This potential, however, had **not been widely exploited until 2012**, given a generation mix strongly reliant on hydro power.

The **2012 hydro crisis** and the intense dry period the country was experiencing, other sources, complementary to hydro generation, came into light. *[2]*

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3. ANALYSIS – THE BRAZILIAN CASE

Policy context (1/2) — 2012

In 2012, a **Net Metering** scheme is introduced, through the Normative Resolution no. 482, from ANEEL.

The scheme granted access to **micro** and **mini** generation

Micro generation	Mini generation
≤ 100 kW	≤ 1 MW

PV production could be self-consumed or injected into the grid, resulting in energy credits to be compensated over a period of **36 months**.

Two business models were allowed**: remote self-consumption** and **local self-consumption**

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3. ANALYSIS – THE BRAZILIAN CASE

Policy context (2/2) — 2015

On November, 2015, the 482 Resolution was **amended**, through the Normative Resolution 687.

System capacity caps for micro and mini generation here **redefined**.

Micro generation	Mini generation
≤ 75 kW	≤ 5 MW

Energy credits compensation period extended to **60 months.**

Creation of two new operational models: (1) installation of photovoltaic systems in **apartment block** and (2) creation of a **cooperative** or a consortium to install a PV system.

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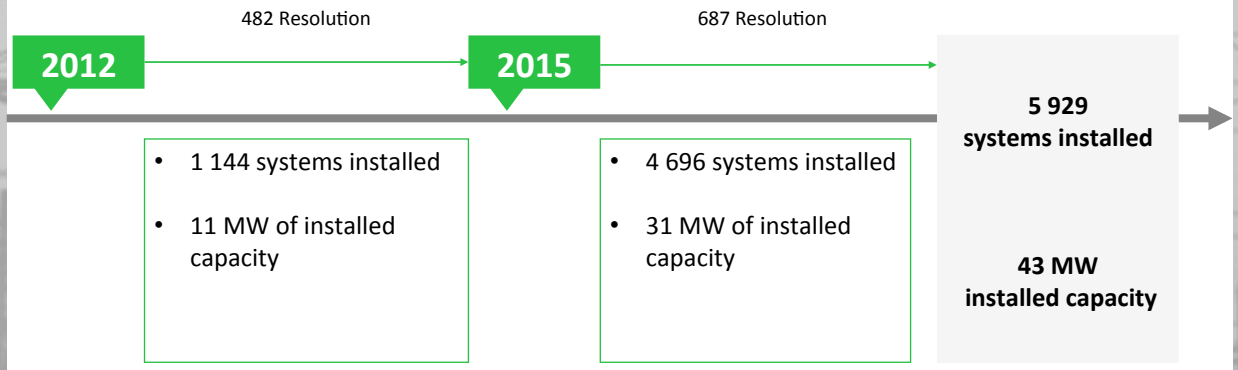
3. ANALYSIS – THE BRAZILIAN CASE

Solar PV market evolution



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3. ANALYSIS – THE BRAZILIAN CASE

Policy adjustments characterisation

- Increasing system capacity for mini generation
- Bureaucratic burden reduction
- Net metering credits extension
- New operational models for PV installations

The **policy adjustments** in the Brazilian case are within the scope of measures for **diffusion acceleration through incentive policies.**

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3. ANALYSIS – THE PORTUGUESE CASE

Case for PV

Climate and energy policies in line with EU agenda toward increasing shares of renewables.

[9]

Sustained growth of renewables contribution.

RES	2007	32.3%	2014	52.1%
PV	2007	0.05%	2014	1.19%

Significant solar **PV potential**, among the **highest** in the **EU.**

[12]

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context

2007

Introduction of a **Feed-In Tariff scheme** for **micro generation** systems, through Decree Law no. 363/2007.

Micro generation
≤ 3.68 kW

FIT for PV systems starting at **€ 0.65/kWh.**

Degression schedule per **10MW** blocks, **5%** reduction.

15 years contract granted, after which the SLOR tariff is applied.

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context **2010**

The **FIT** structure is adjusted by the Decree Law no. 118-A/2010

15 Years	
8 Years	7 years
€ 0.4/kWh	€ 0.24/kWh
€ 0,02/year Degression	

Creation of an operational model for apartment block buildings to receive the incentive, for systems up to **11.04kW.**

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context **2011**

Introduction of a **Feed-In Tariff scheme** for **mini generation** systems, through the Decree Law no. 34/2011.

Mini generation	
Individual	Apt. block
[3.68 – 250] kW	[11.04 – 250] kW

Aiming at **incentivising** the systems **not covered** by the mini generation scheme.

Compensation structured by system capacity.

≤ 20 kW systems **€ 0.25/kWh**

> 20 Kw systems **FIT set through auction**

Incentive limited to **50 MW** of **aggregate** installed **capacity.**

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context 2014

In 2014 structural changes are implemented in the previous schemes, through Decree Law no. 153/2014.

Contributing to a stronger framework for **self-consumption**, rather than **grid injection**.

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context 2014

from	to
Micro generation	Small Generation Units
Mini generation	Self-consumption

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context 2014

The **Small Production Unit** regime introduces a new FIT structure.

The FIT are set through competitive **auctions**.

Base FIT	
Solar PV system	€ 0.095kWh
Solar PV + EV Charging or EV	€ 0.105/kWh
Solar PV + Thermal Collector	€ 0.11/kWh

A limited **aggregate capacity cap** of **20/MW/year** is introduced.

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3. ANALYSIS – THE PORTUGUESE CASE

Policy context 2014

The **self-consumption** regime aims to incentivise **DG for local consumption**.

Surpluses are paid at 90% of the wholesale market price (OMIE).

Systems above 1.5kW of capacity are subject to a 10 year fixed fee for energy policy and system costs recovery.

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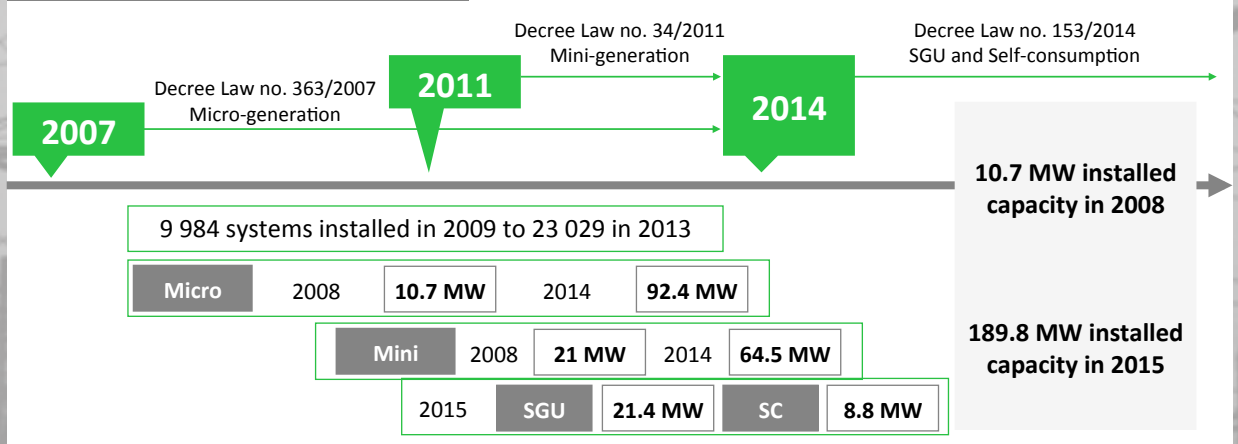
3. ANALYSIS – THE PORTUGUESE CASE

Solar PV market evolution



3. ANALYSIS – THE PORTUGUESE CASE

Policy adjustments characterisation

- Decreasing FIT compensation
- Decreasing aggregate installed capacity caps
- Transition from **administrative set** to **auction based** FIT

The **policy adjustments** in the Portuguese case are within the scope of measures of transition for **market integration of distributed generation.**

4. EVOLUTION TRAJECTORIES

NEM (Brazil) **and FIT** (Portugal) incentive evolutions where presented as flexible mechanisms for distributed generation support.

The Brazilian case analysis unveils an early stage public policy support framework.

The identified adjustments aim at increasing policy support.

The Portuguese case revels a maturing public policy support framework.

The identified adjustments aim at transitioning from policy support to market integration

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4. FUTURE WORK

Identify solar PV incentive mechanisms impacts on the economic and financial dimensions of DSOs.

Model a policy framework that minimizes potential negative impacts on DSOs.

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