



September 2013

# Solar Heating & Cooling Market in Brazil



Departamento Nacional de  
Aquecimento Solar da ABRAVA

**Carlos Artur Alencar**  
**President**



September 2013

- **DASOL**
- **Global context**
- **Brazilian market**
- **Future vision**



Departamento Nacional de  
Aquecimento Solar da ABRAVA



## ABRAVA

Since 1962

400 companies

250,000 jobs

Turnover: US\$ 12,6 bi/year\*

## DASOL

Since 1992

20 companies

65% of Brazilian market

Turnover: US\$ 630 mi/year\*

(\* estimate)



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ASSOCIAÇÃO BRASILEIRA DE REFRIGERAÇÃO,  
AR CONDICIONADO, VENTILAÇÃO E AQUECIMENTO

**DASOL**

**21 YEARS**

**REPRESENTING INDUSTRY  
FOSTERING MARKET**



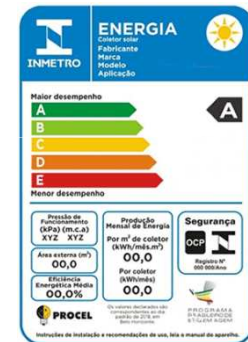
[www.dasolabrava.org.br](http://www.dasolabrava.org.br)



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## MAIN STRUCTURING ACTIONS

- ✓ Brazilian Labeling Program - Inmetro since 1996
- ✓ Tax free: ICMS since 1997 and IPI since 1998
- ✓ Sol Brazil Magazine since 2005
- ✓ Qualisol Brasil Program (installers) since 2005
- ✓ Cidades Solares Initiative
- ✓ Electricity Utility Companies – Energy Efficiency Projects
- ✓ Housing Programs





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## MAIN STRUCTURING ACTIONS



- ✓ Solar Heating WG - Ministry of Environment - 2009
- ✓ Professional training: over 120 professionals / year
- ✓ CB-SOL / Exposolar
- ✓ SHS insert on Minha Casa, Minha Vida Program - 2011
- ✓ Cidades Solares Initiative
- ✓ New INMETRO's Regulation 2012 - Labeling mandatory July/2014





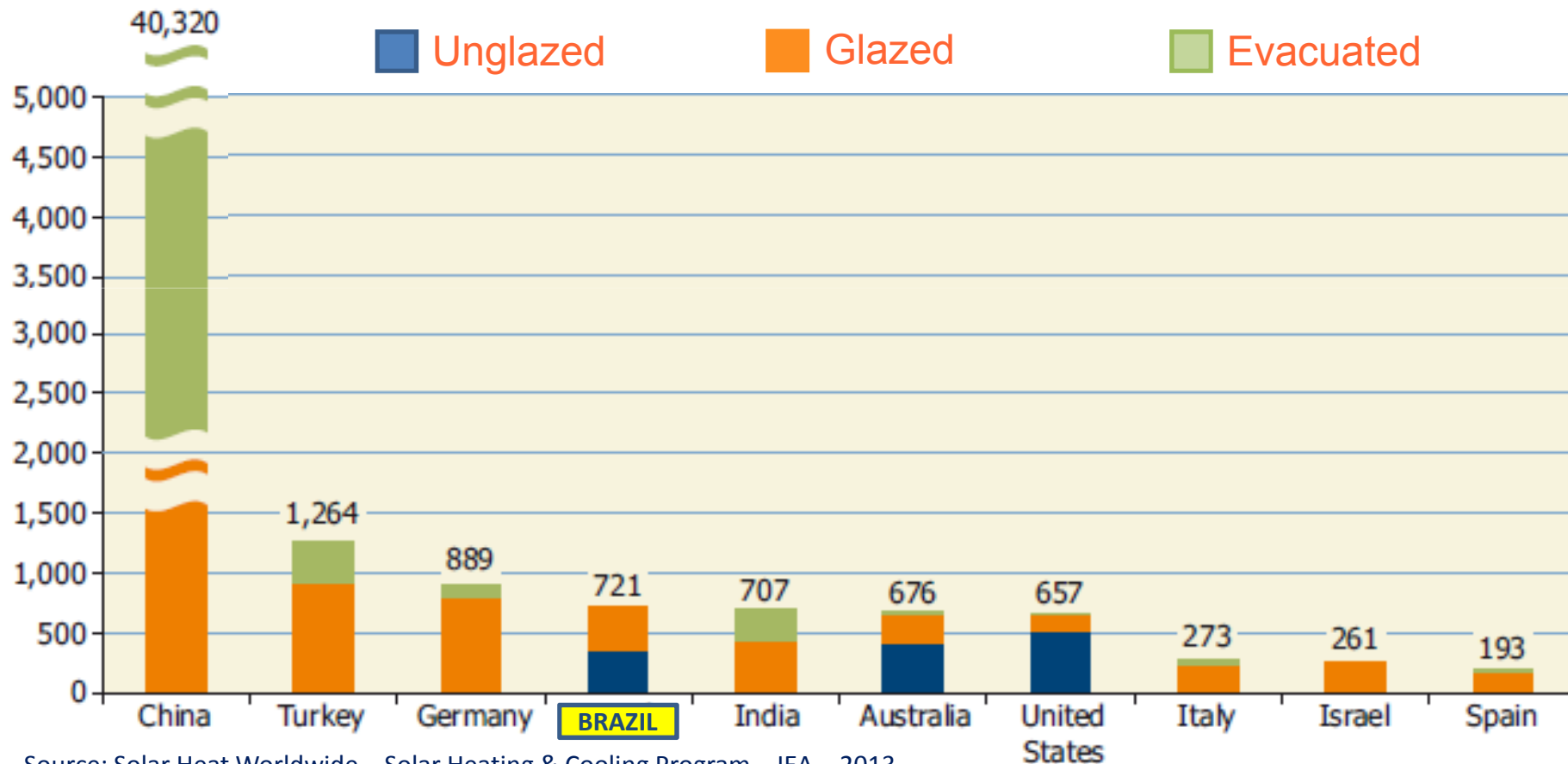
**ABRAVA**  
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A stylized world map with a blue background and green landmasses, presented as a folded map with white borders. The text 'Brazil Global context' is overlaid in red.

**Brazil**  
**Global context**

# MAIN MARKETS

## Technologies / Sales (MW<sub>th</sub>)



Source: Solar Heat Worldwide – Solar Heating & Cooling Program – IEA – 2013

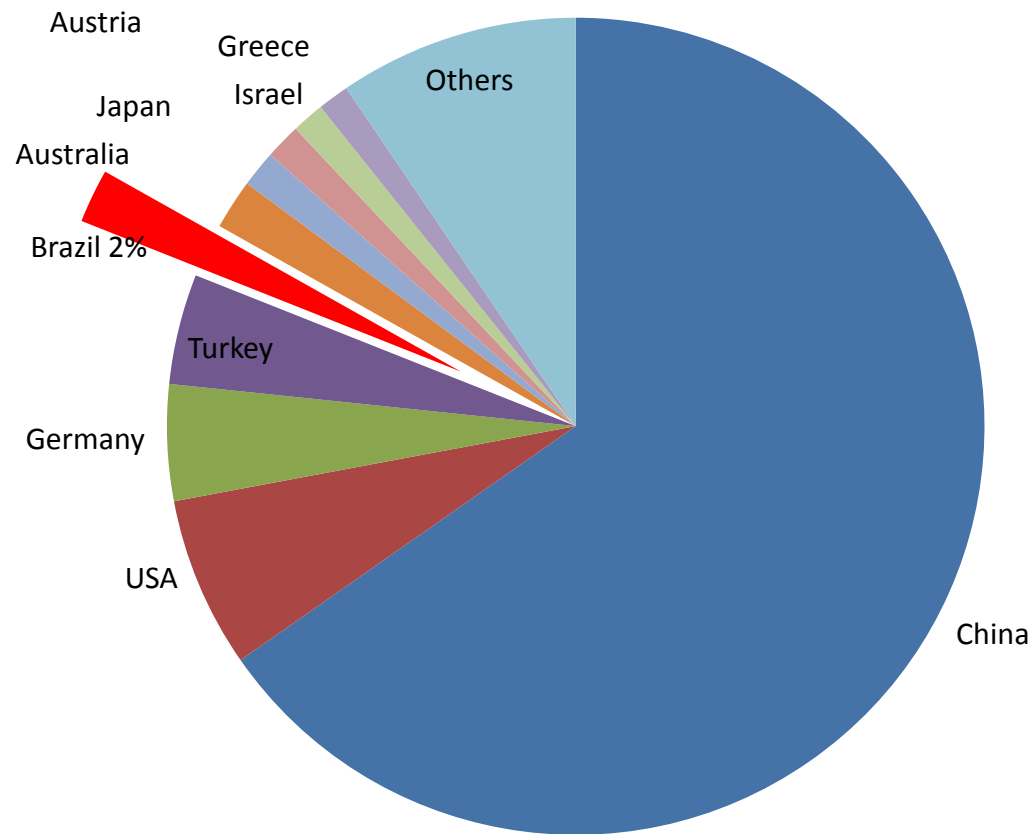
Operate historic of 25 years (base 2011).

Source: ABRVA-DASOL - Brazil total accumulated in 2012: 8,4 millions of m<sup>2</sup> - 6,1 GW<sub>th</sub> - growing 600 MW<sub>th</sub> (2011 to 2012)



# WORLDWILDE DISTRIBUTION

## Installed base – 2011



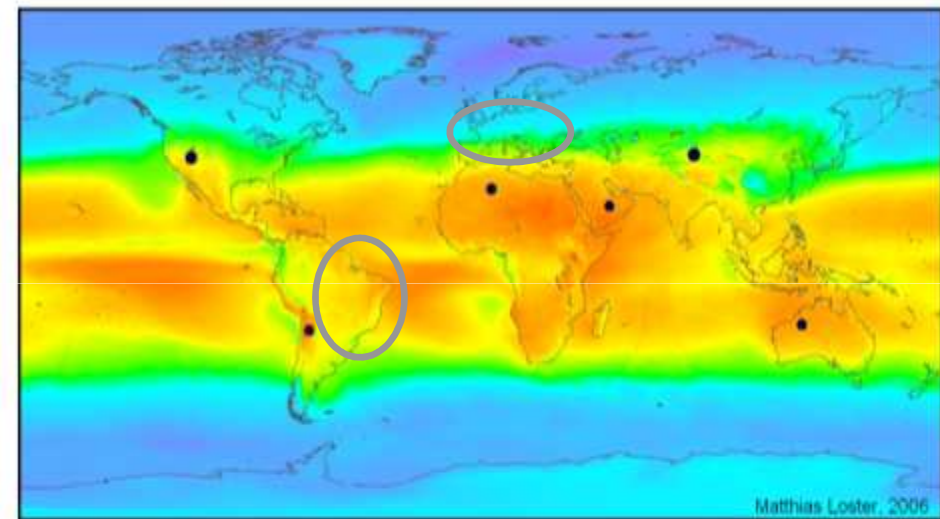
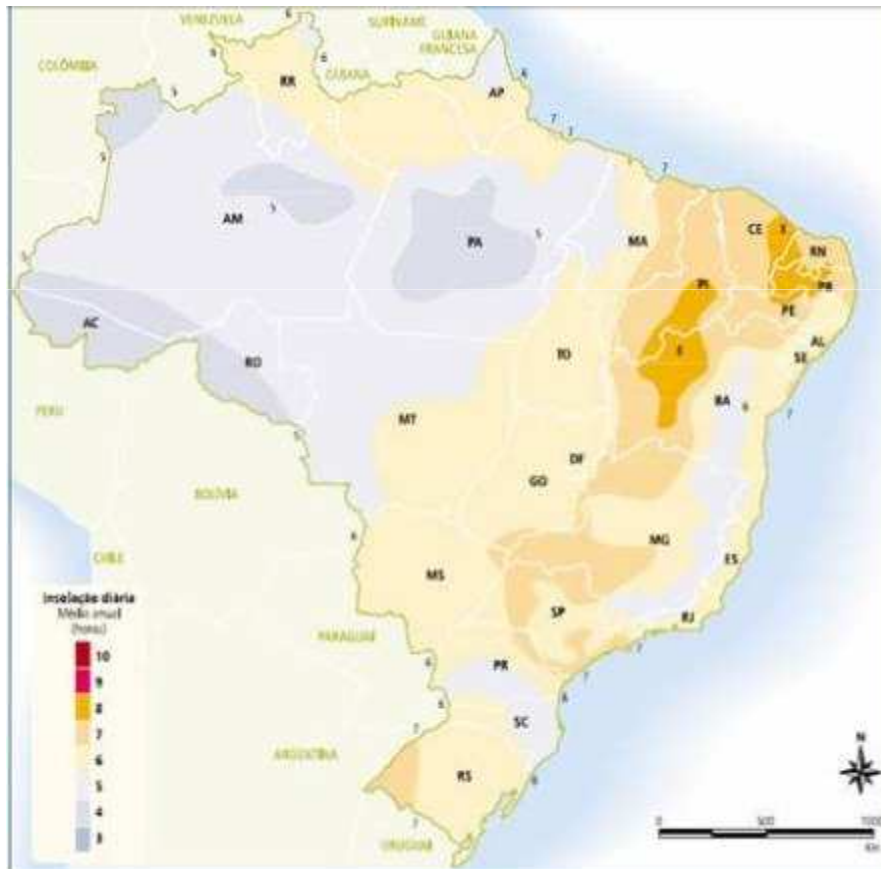
	Millions <u>m<sup>2</sup></u>	<u>GWth*</u>
1 – China	217,4	152,2
2 – USA	22,5	15,8
3 – Germany	15,3	10,7
4 – Turkey	14,5	10,2
<b>5 – Brazil</b>	<b>7,1</b>	<b>5,0</b>
6 – Australia	6,6	4,6
7 – Austria	4,8	3,3
8 – Japan	4,7	3,3
9 – Israel	4,3	3,0
10 – Greece	4,1	2,9
Others	31,6	22,0
	<b>332,9</b>	<b>233,0</b>

Source IEA - 2013: Operate historic of 25 years (base 2011).  
 Source ABRAVA-DASOL: Total Accumulated Brazil in 2012: 8,4 millions of m<sup>2</sup>

# SOLAR RADIATION

Brazil: 2,200 sunshine hours / year

Potencial: 15B GWh



0 50 100 150 200 250 300 350 W/m²

$\Sigma \bullet = 18 \text{ TWe}$

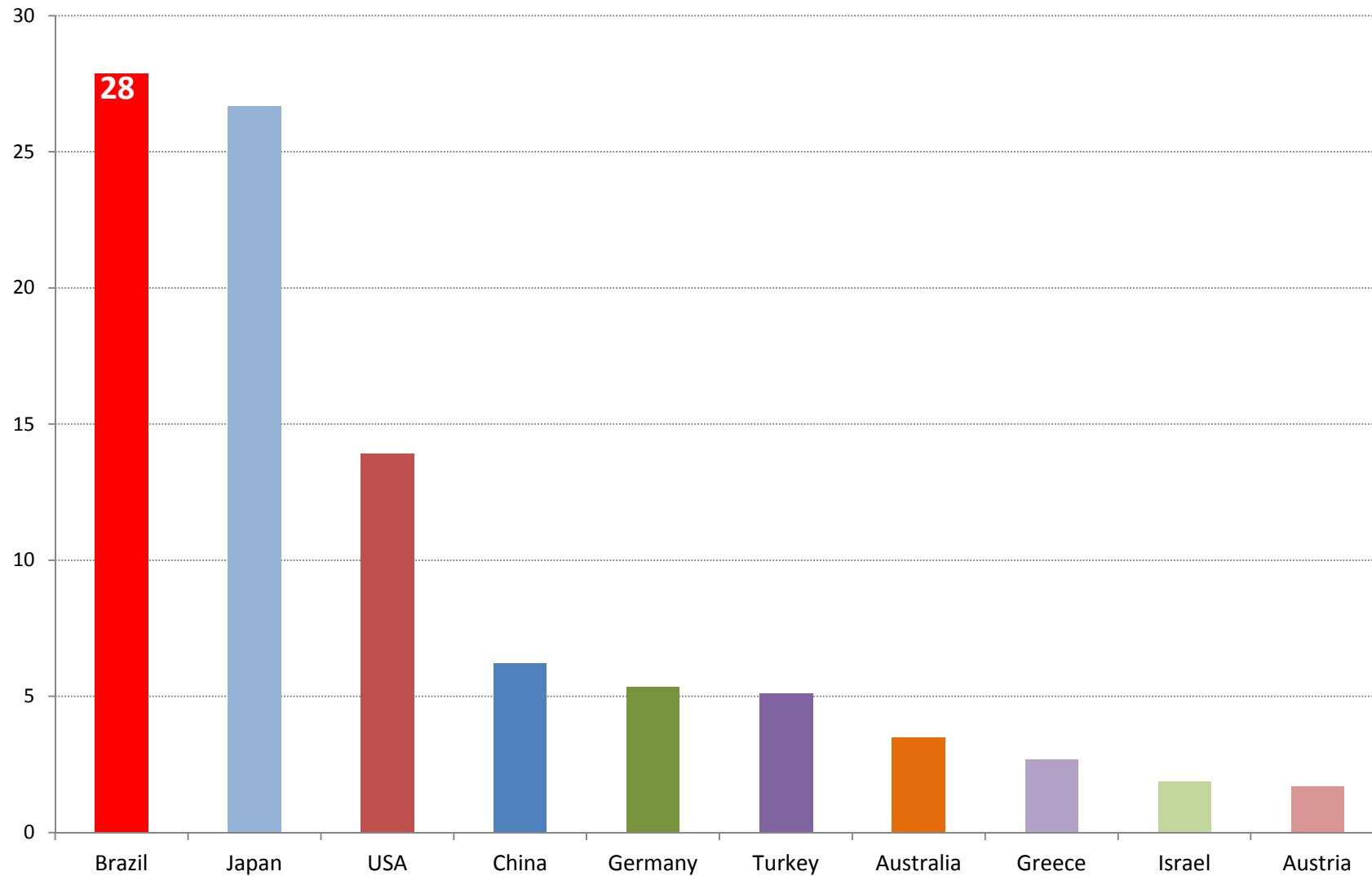
Germany: 140 W/m²

Brazil: 240 W/m²

70% more radiation

# WORLDWIDE POTENTIAL

## Inhabitants / m<sup>2</sup> of collectors – 2011



Sources: IEA - 2013: Operate historic of 25 years (base 2011) / ABRAVA-DASOL / Google



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# What a lucky combination !

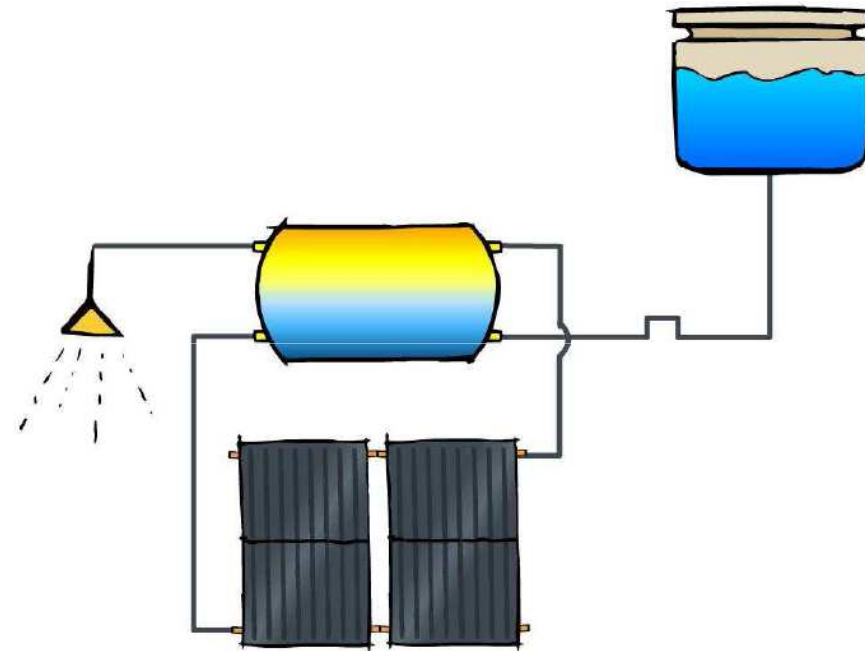
High radiation

Ideal weather conditions

Low pressure

Combined to

High energy prices



**Simplicity = Lower costs**

**Not so much.**

**High Interest rates**

**High tax burden**

**Lack of subsidies**

**Combined to**

**Low purchasing power**



**Complexity = Higher acquisition efforts**

## IMPORTANT FACTORS

- **Competitive investment for the end user**
  - High energetic efficiency
  - Low costs of maintenance and operation
- **Distribution infrastructure relief**
  - Distributed generation
  - Peak demand reduction
- **Intensive job generation**
  - Thousands of jobs throughout Brazil





# BRAZILIAN CONQUEST

## The long and winding road

**>33 years of existence**

**>100 Factories**

**~ 30,000 Jobs**

**~ 8.4M m<sup>2</sup> of solar thermal collectors**

**~1.2 % of Brazilian electricity consumption**

## BRAZILIAN CONQUEST

**8.4M m<sup>2</sup> of solar thermal collector corresponds to:**



**0.96 “Angra 1” nuclear plant (average 2011/2012)**



**470,000,000 m<sup>2</sup> of flooding for hydroelectric**



**1,800,000 Tons of wood per year**



**613,000,000 liters of gasoline per year**



**462,000,000 kg of LPG per year**

# BRAZILIAN LABELING PROGRAM - PBE INMETRO

## Industry initiative (DASOL) - 1996

- Industry competitiveness stimulus
- Fair competition
- Transparency for consumers



Solar Collectors: 331 models

Storage tanks: 352 models



Ensuring a solid market



# Main Applications

**Residential**



**Hospitals**



**Swimming Pools**



**Resid. Buildings**



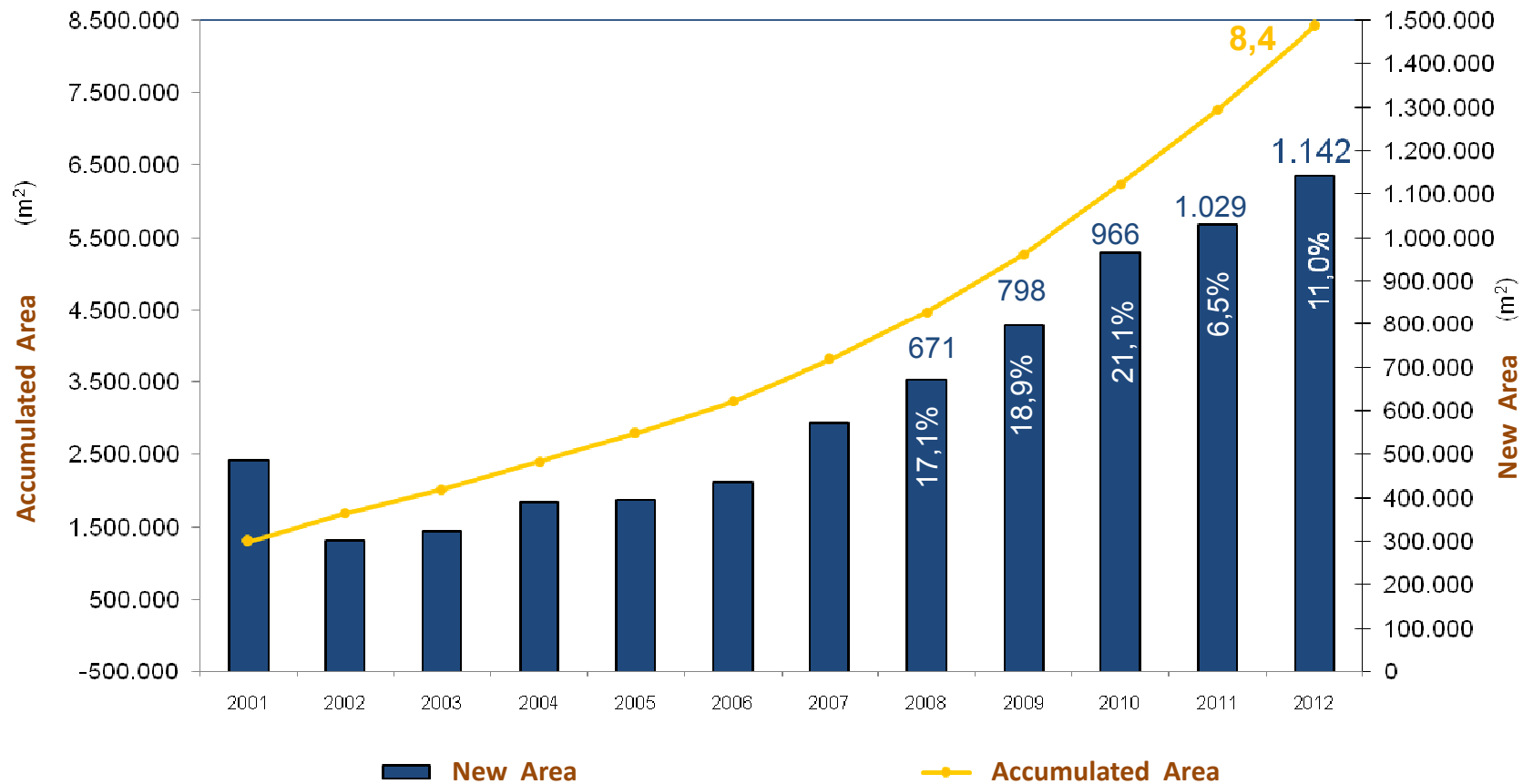
**Social Housing**



**Hotels**



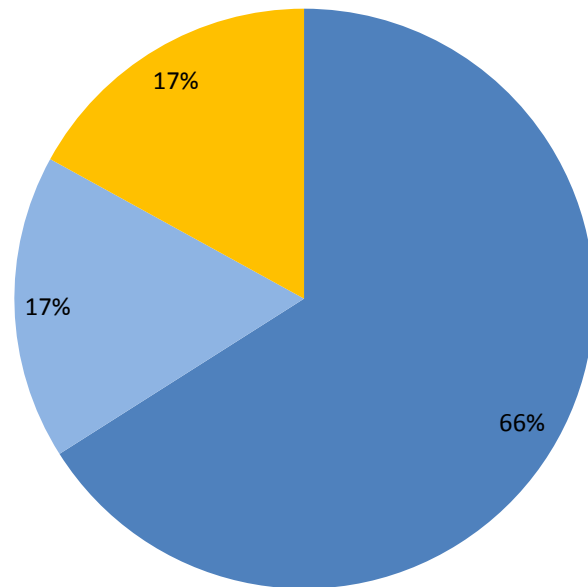
# MARKET EVOLUTION



2012 growth = 11.8%

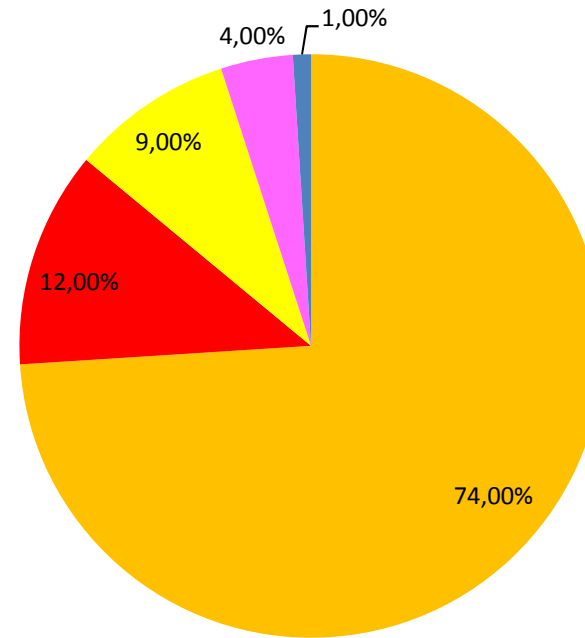
# DISTRIBUTION 2012

By use



- Residential
- Residential Social Programs
- Industry, commerce and services

By region



- Southeast
- South
- Midwest
- Northeast
- North



# OFFICIAL SOCIAL PROGRAMS

## Energy Efficiency - ANEEL

Social Housing Programs  
Hospitals  
Public Shelters and NGO



## Social Development Companies

Caixa Econômica Federal  
Cohab  
CDHU





## **MINHA CASA, MINHA VIDA PROGRAM**

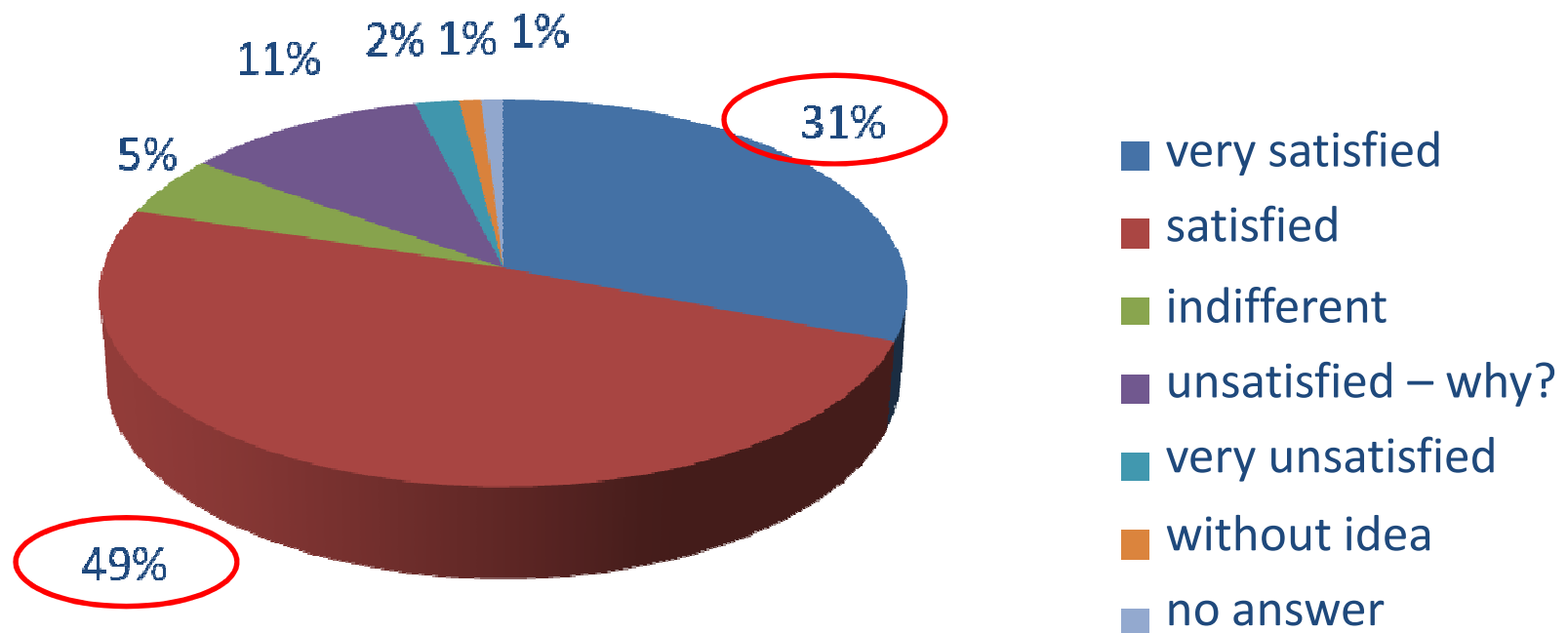
- 260,000 houses with SHS
- 250 GWh / year



# Minha Casa Minha Vida Program Survey

## Satisfaction Level

80% are “Satisfied” or “Very Satisfied” with Solar Heating



# COMPETITIVE INVESTMENT

## What if SHS were in an energy generation auction?

SOLAR THERMAL - DELIVERY COST	
SHS price, 200 liters, installed (R\$):	1500.00
Life time (years):	18.0
Internal rate of return, annual without inflation (%):	8.0
Monthly amortization (R\$):	12.87
Energy production, INMETRO (kWh/m):	160.0
Annual correction factor:	0.60
Average energy generation (kWh/m):	96.0
<b>Delivered energy cost (R\$/MWh):</b>	<b>134.09</b>

**Transmitted, Distributed, Ready to use.**

## COMPETITIVE INVESTMENT

### What about the ESCO business model?

SOLAR THERMAL - OPPORTUNITY COST	
MCMV's SHS price, 200 liters, installed (R\$):	1500.00
Expected amortization time (years):	6.0
Energy production, INMETRO (kWh/m):	160.0
Annual correction factor:	0.60
Average energy generation (kWh/m):	96.0
Delivered energy cost (R\$/MWh):	279.80
Electricity price for the end user with taxes (R\$/kWh):	0.35
Savings in the houses` energy bill (R\$):	33.60
House owner`s portion (%):	20.0
Monthly amortization (R\$):	26.86
<b>Internal rate of return, annual without inflation (%):</b>	<b>9,1</b>

**Reliable, Win-Win, Opportunities.**

# COOLING AND INDUSTRIAL PROCESS

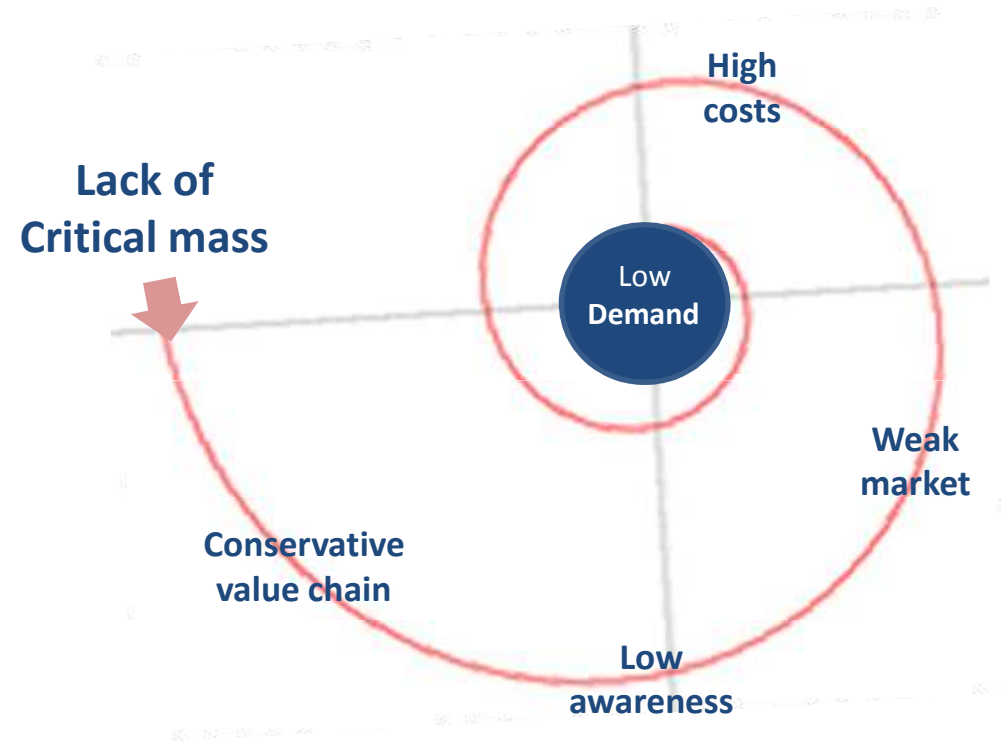
Everything is to be done

## Air conditioning

Absent  
Critical feasibility  
PV threat

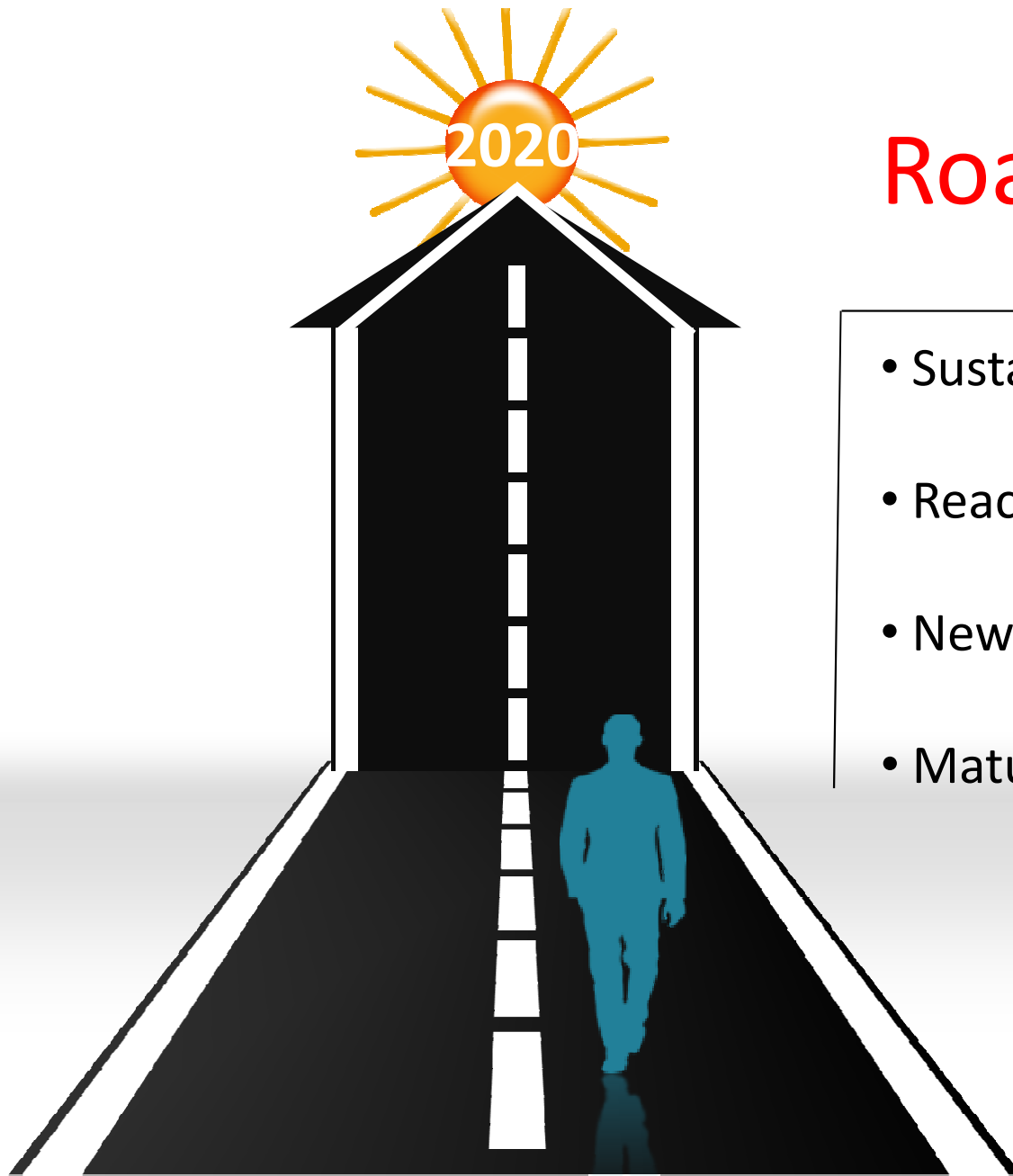
## Industries

Almost absent  
Low attractiveness  
Not-noticed



A close-up photograph of a person's hands, wearing a dark suit jacket, holding a large, glowing, translucent yellow sphere. The sphere is the central focus and has a bright white center. The background is dark, making the glowing orb stand out. The text "What about the Future?" is overlaid in red on the sphere.

**What about  
the Future?**



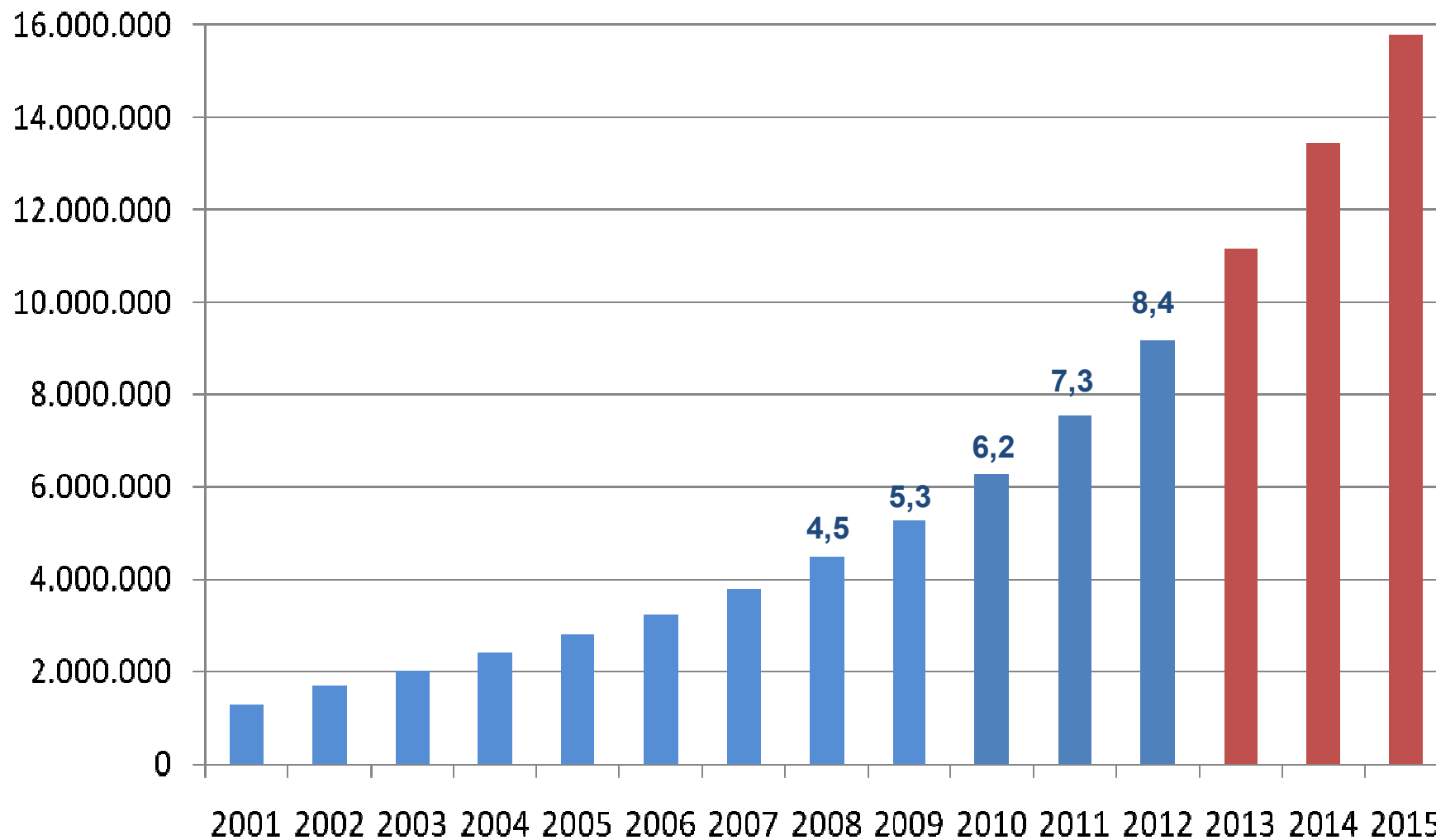
# Road to growth

- Sustain achievements
- Reach new segments
- New Technologies / materials
- Mature the value chain



# Brazilian Target

## 15 million m<sup>2</sup> in 2015



# NEW FRONTIERS

## Technologies

- Conceptions
- Materials
- Systems

## Applications

- Industrial processes
- Air conditioning

## Demographic

- Spread throughout all social classes
- Better territory distribution

## Scale

- Industry concentration
- Horizontal value chain

# COOLING AND INDUSTRIAL PROCESS

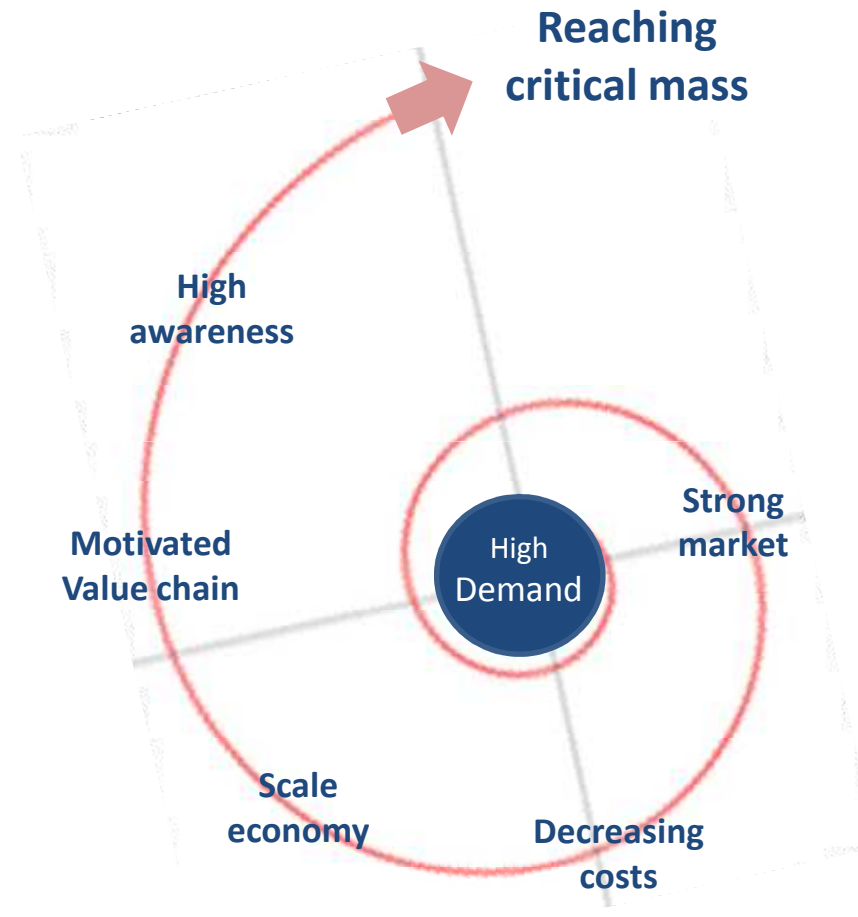
## Challenges ahead

### Air conditioning

Reach Integrated projects  
Identify opportunities

### Industries

Great potential  
Integration to efficiency  
Identify niches  
Sectorial actions

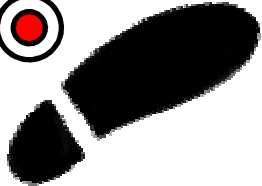


# REACHING THE SUN



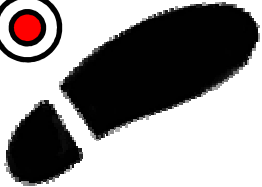
16M m<sup>2</sup>  
2020

Awareness



Regulations /  
Incentives

Training



Reference  
projects



R&D

8M m<sup>2</sup>

There are opportunities but integrated structured actions must be carried on.

## **NEW PBE SOLAR THERMAL - INMETRO Certification**

Mandatory: All the SHS to be sold in the national market must be registered in INMETRO

Certification: The process is to be performed by an INMETRO accredited Product Certification Organism - OCP.

### Agenda:

1. Manufacturing and importing must have INMETRO's register  
From July/10/2014
2. Sales by manufacturers and importers must have INMETRO's register. From January/10/2015
3. Trading only in accordance with the new regulation  
From July/10/2015



## CertificaSol

Orientação para a Certificação  
Compulsória de Equipamentos para  
Aquecimento Solar de Água

## CertificaSol

O CertificaSol é o resultado de um projeto financiado pela GIZ, em parceria com a ABRAVA, com o objetivo de orientar fornecedores sobre a certificação compulsória dos equipamentos de aquecimento solar de água, facilitando a adequação dos produtos e contribuindo para fortalecer a cadeia produtiva e aumentar a qualidade dos coletores solares e reservatórios térmicos comercializados no Brasil.

### **A obtenção da certificação é responsabilidade do fornecedor.**

A certificação compulsória dos equipamentos de aquecimento solar de água esta prevista na Portaria 352/2012, publicada em julho pelo Instituto Nacional de Metrologia , Qualidade e Tecnologia (INMETRO) no âmbito do Sistema Brasileiro de Avaliação da Conformidade (SBAC)

A Portaria 352/2012 estabelece critérios para a avaliação da conformidade nos coletores solares e reservatórios térmicos com foco na segurança, meio ambiente e desempenho térmico. A certificação deve ser realizada por um Organismo de Certificação de Produto (OCP), acreditado pelo INMETRO.

### Datas Limites

**Após 10/07/2014:** Fabricação e importação somente de produtos certificados e registrados no INMETRO.

**Após 10/01/2015:** Comercialização por fabricantes e importadores somente de produtos certificados e registrados no INMETRO.

**Após 10/07/2015:** Comercialização, no mercado nacional, somente de produtos certificados e registrados no INMETRO.

# PAVING THE WAY

## Vocational training

### Solar Network Procel

Several training centers along the country  
Target: train 2000 installers until 2015



### Qualisol

Focused on the installation  
Certification of professionals and companies  
Partnership with Senai





**TO SUCCEED**  
**Integrated and harmonized actions**

**We continue working together**

Government

Academic sector

INMETRO

Eletrobrás

Social developing companies

Class associations



## **NEXT DASOL COURSES**

**25 de Setembro de 2013 - Polysun: Software p/ Projetos de SAS**

Andreas Wolf

Letizia Manni

**22 de Outubro 2013 - Certificação Compulsória de SAS**

Profa. Elizabeth Duarte Pereira

Ph.D. Lucio Mesquita

Eng. Aluisio Gonçalves

Inscrições:

[www.dasolabrava.org.br](http://www.dasolabrava.org.br)

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