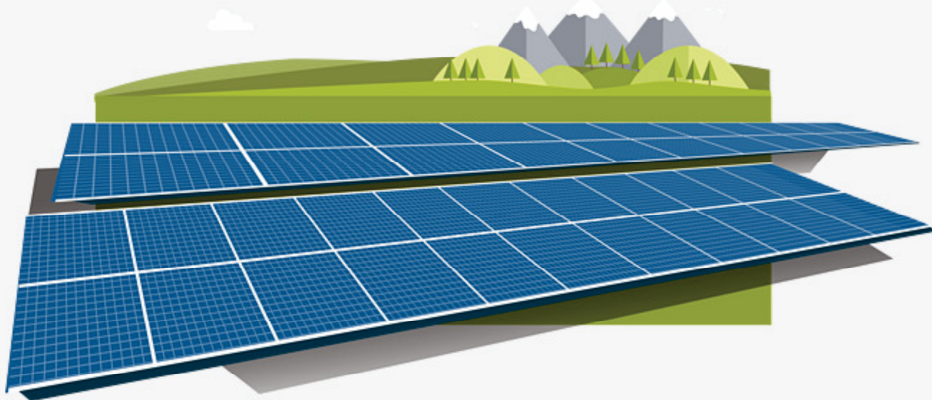




Modelagem e Controle de Sistemas Fotovoltaicos

Aula 01 – Parte 2 - Introdução às Fontes Renováveis de Energia

Prof. Heverton Augusto Pereira
heverton.pereira@ufv.br



Oferta Interna de Energia

RENOVÁVEIS ▶ 45,3%



**Biomassa da
Cana
17,4%**



**Hidráulica¹
12,6%**



**Lenha e
Carvão Vegetal
8,4%**



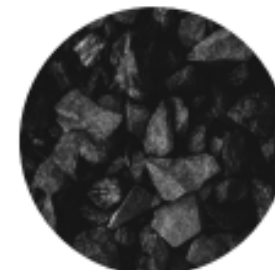
**Lixívia e outras
renováveis
6,9%**



**Petróleo e
derivados
34,4%**



**Gás
Natural
12,5%**



**Carvão
Mineral
5,8%**



**Urânio
1,4%**

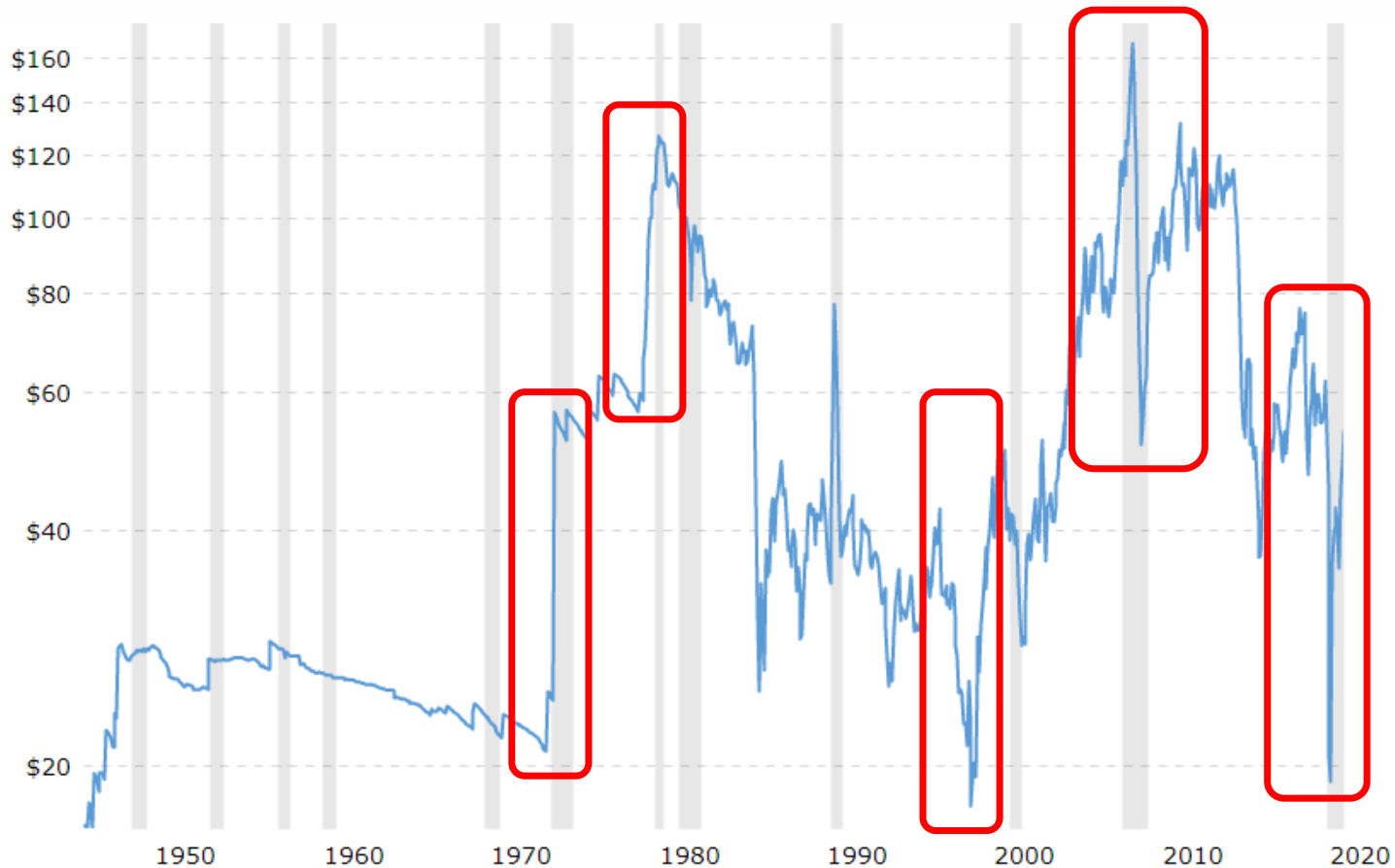


**outras não
renováveis
0,6%**

NÃO RENOVÁVEIS ▶ 54,7%

¹ Inclui importação de eletricidade oriunda de fonte hidráulica

Qual o Impacto do preço do petróleo?

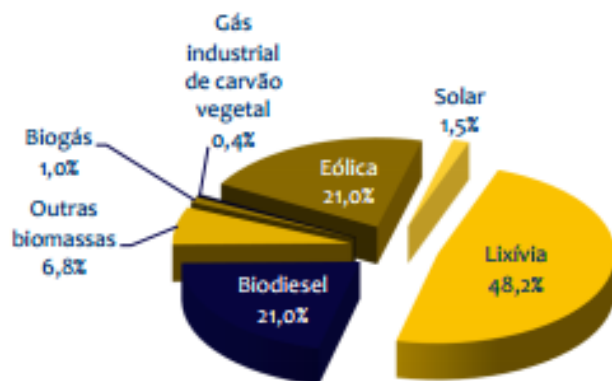


Fonte: <http://www.macrotrends.net/1369/crude-oil-price-history-chart>

Repartição de ‘lixívia e outras renováveis’



Lixívia e outras renováveis
6,9%

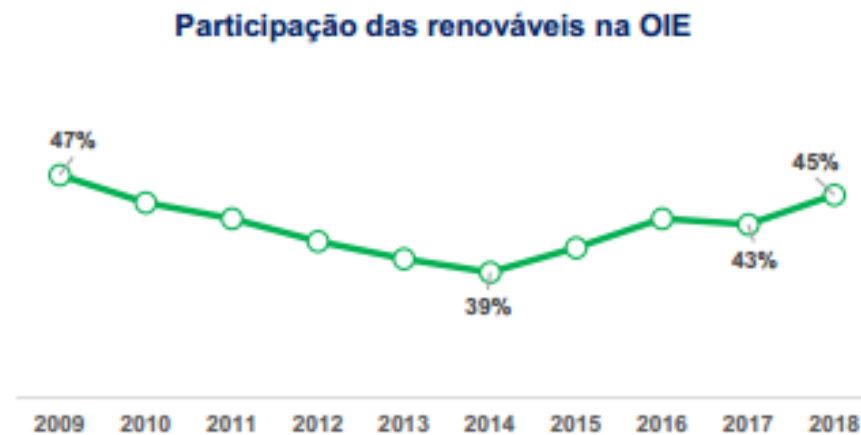
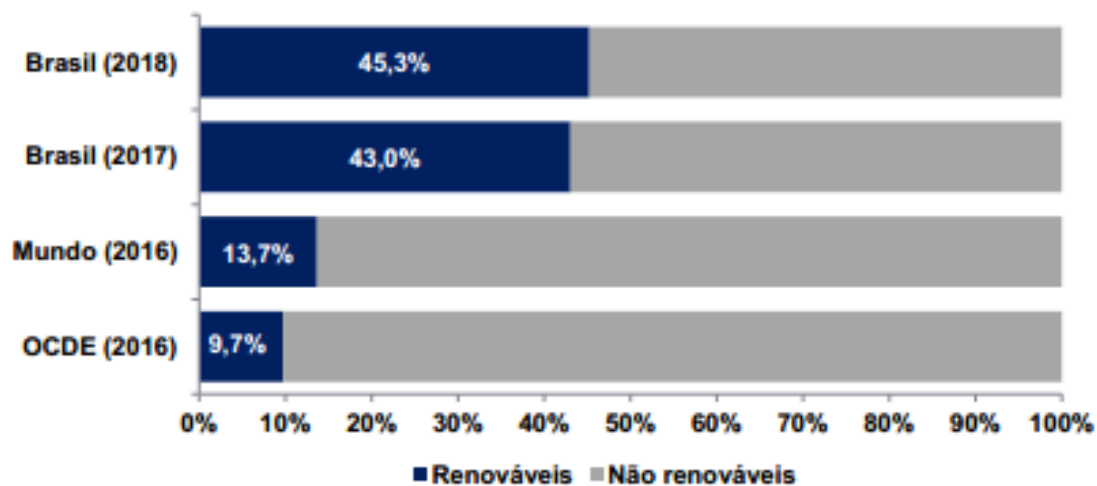


Biodiesel ultrapassa Eólica

Lixívia e outras renováveis (mil tep)	2017	2018	Δ 18 / 17
Lixívia	8.892	9.553	7,4%
Biodiesel	3.313	4.174	26,0%
Outras biomassas ¹	1.280	1.351	5,5%
Biogás	191	204	6,7%
Gás industrial de carvão vegetal	74	88	18,7%
Eólica	3.644	4.169	14,4%
Solar	72	298	316,2%
Total	17.467	19.837	13,6%

¹ Inclui casca de arroz, capim-elefante e óleos vegetais

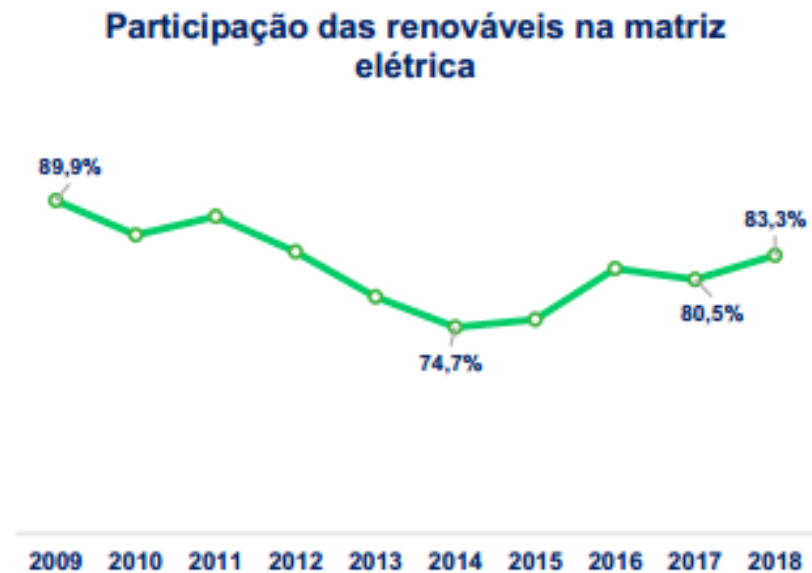
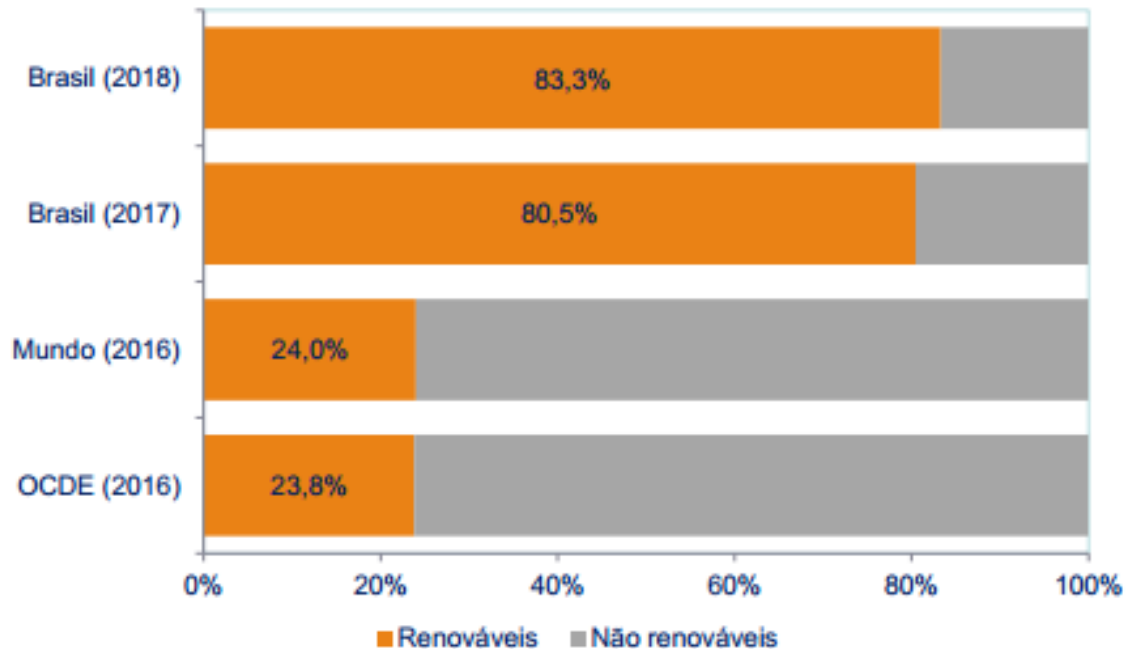
Participação das renováveis na OIE

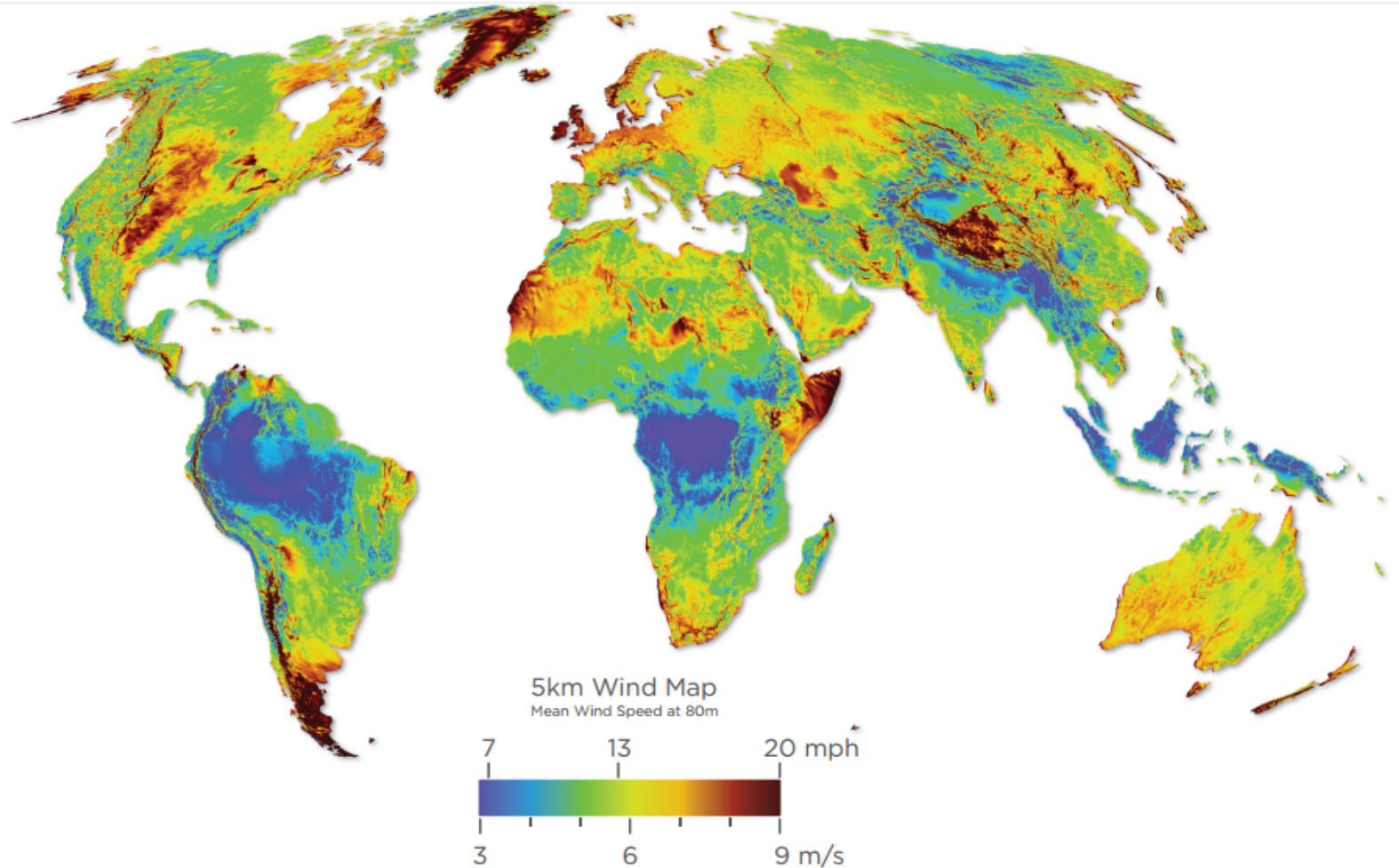


Quem usou a energia no Brasil

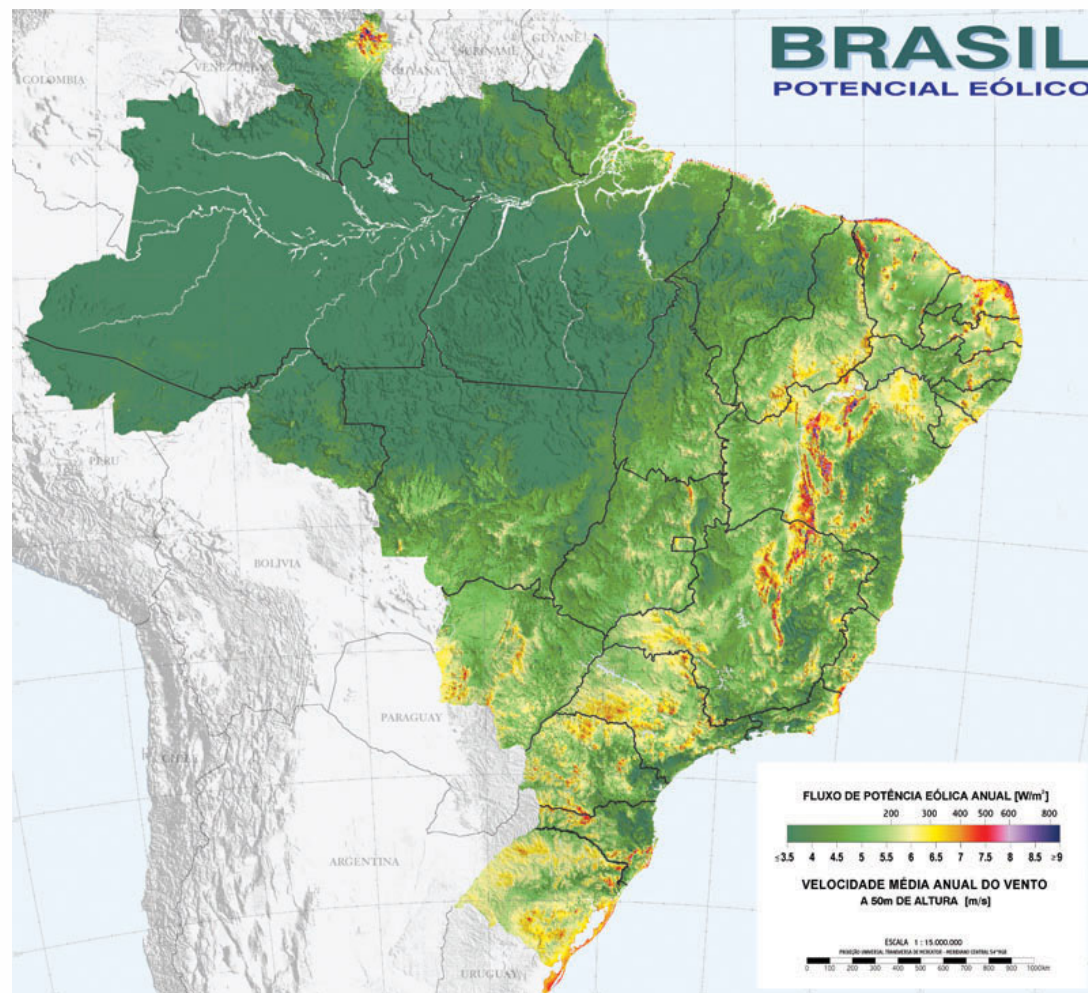


Matriz Elétrica Brasileira



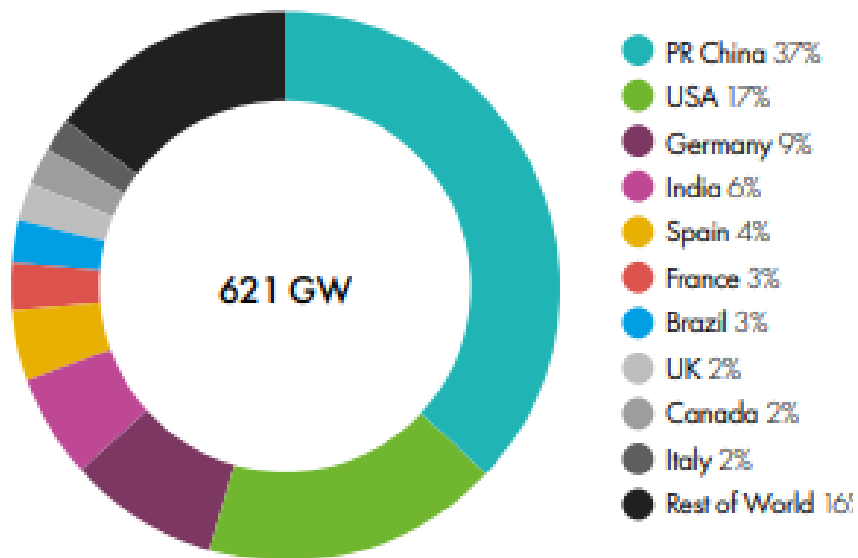


Fonte: <http://www.vaisala.com/>

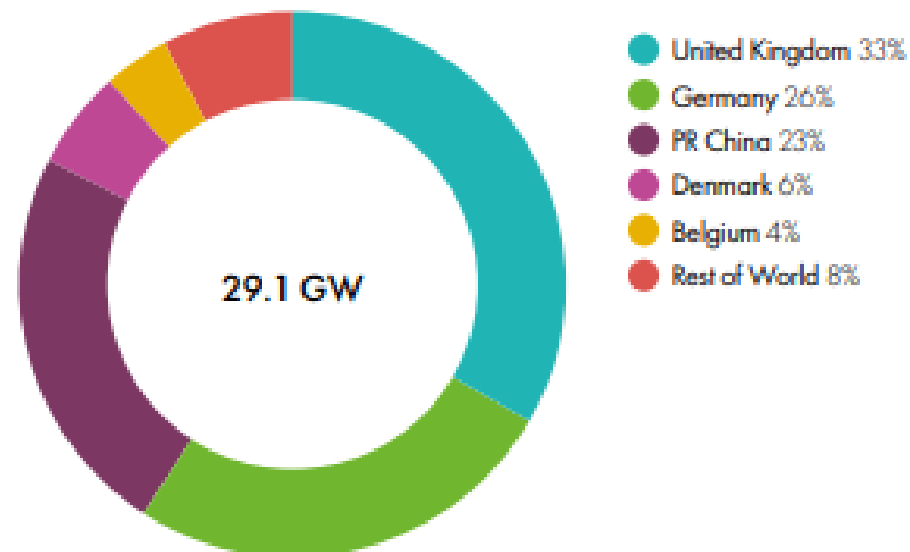


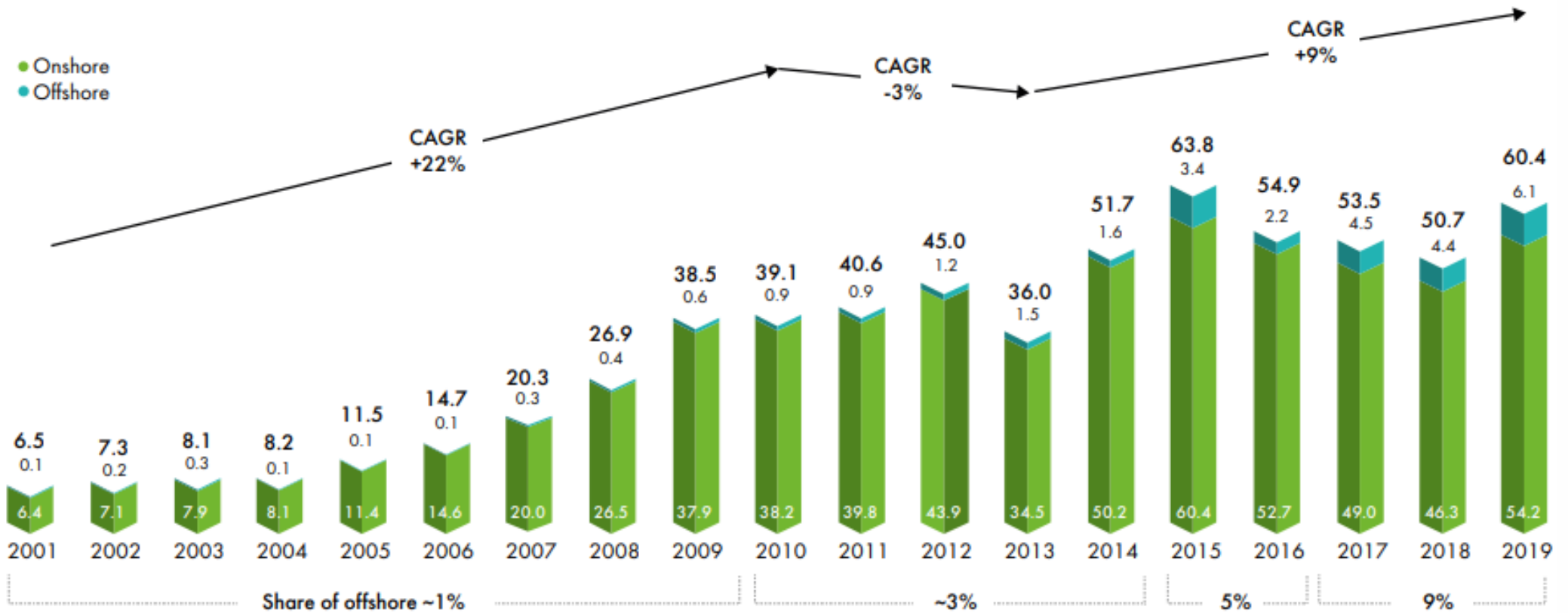
Fonte: <http://www.cresesb.cepel.br/>

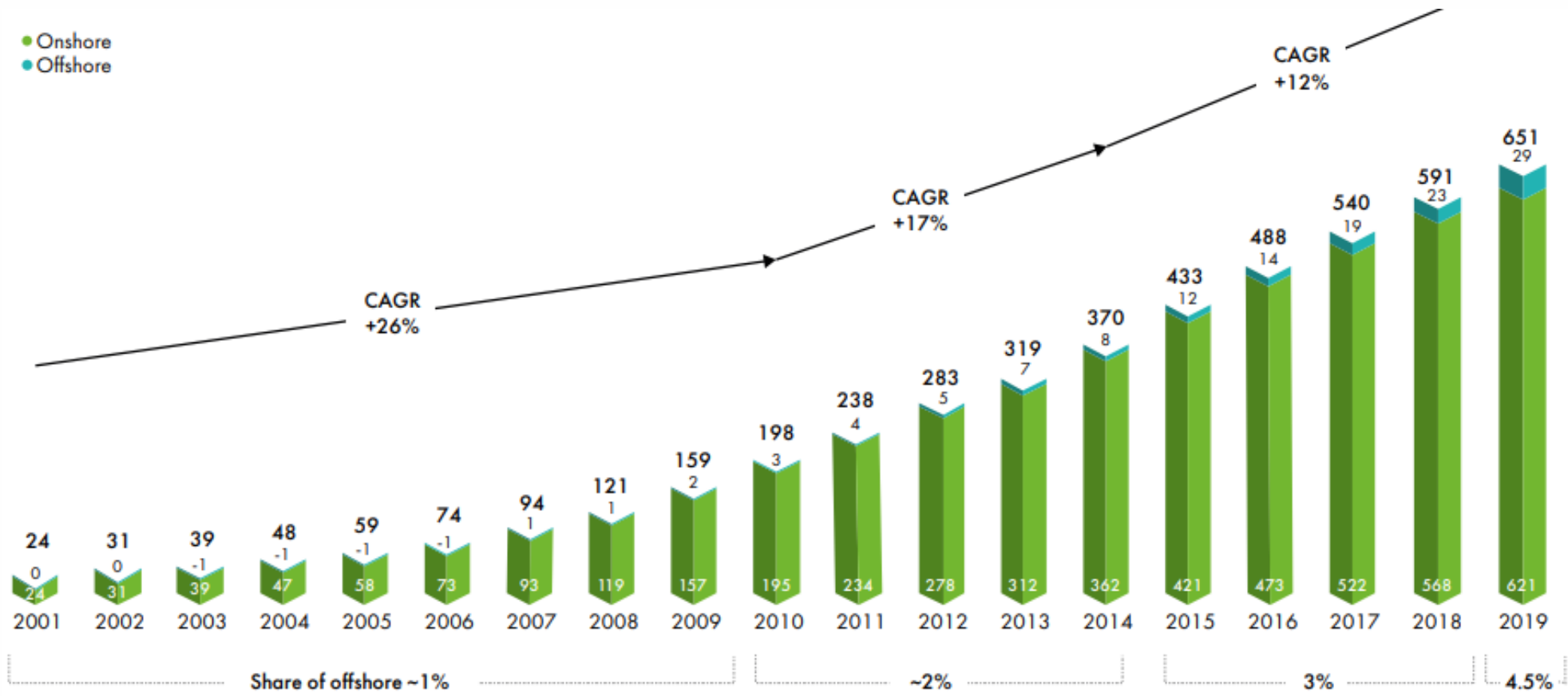
Total installations onshore (%)



Total installations offshore (%)



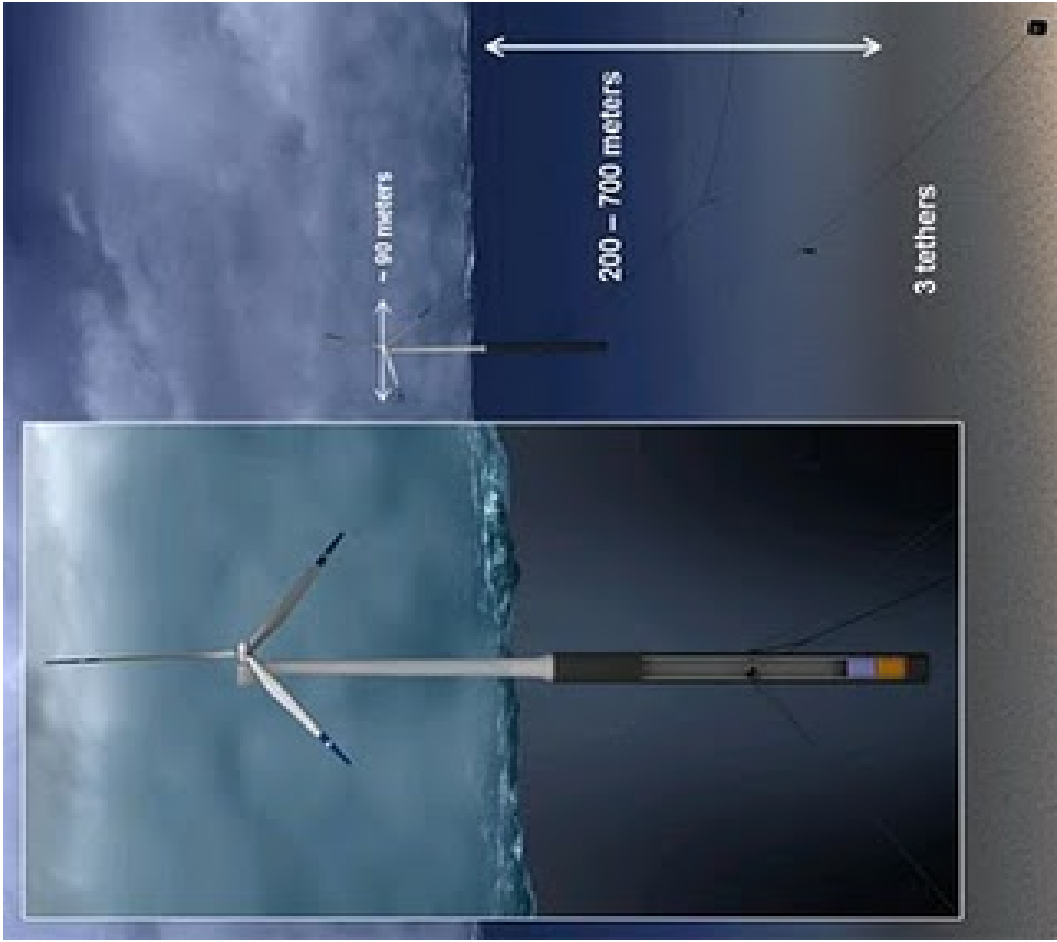


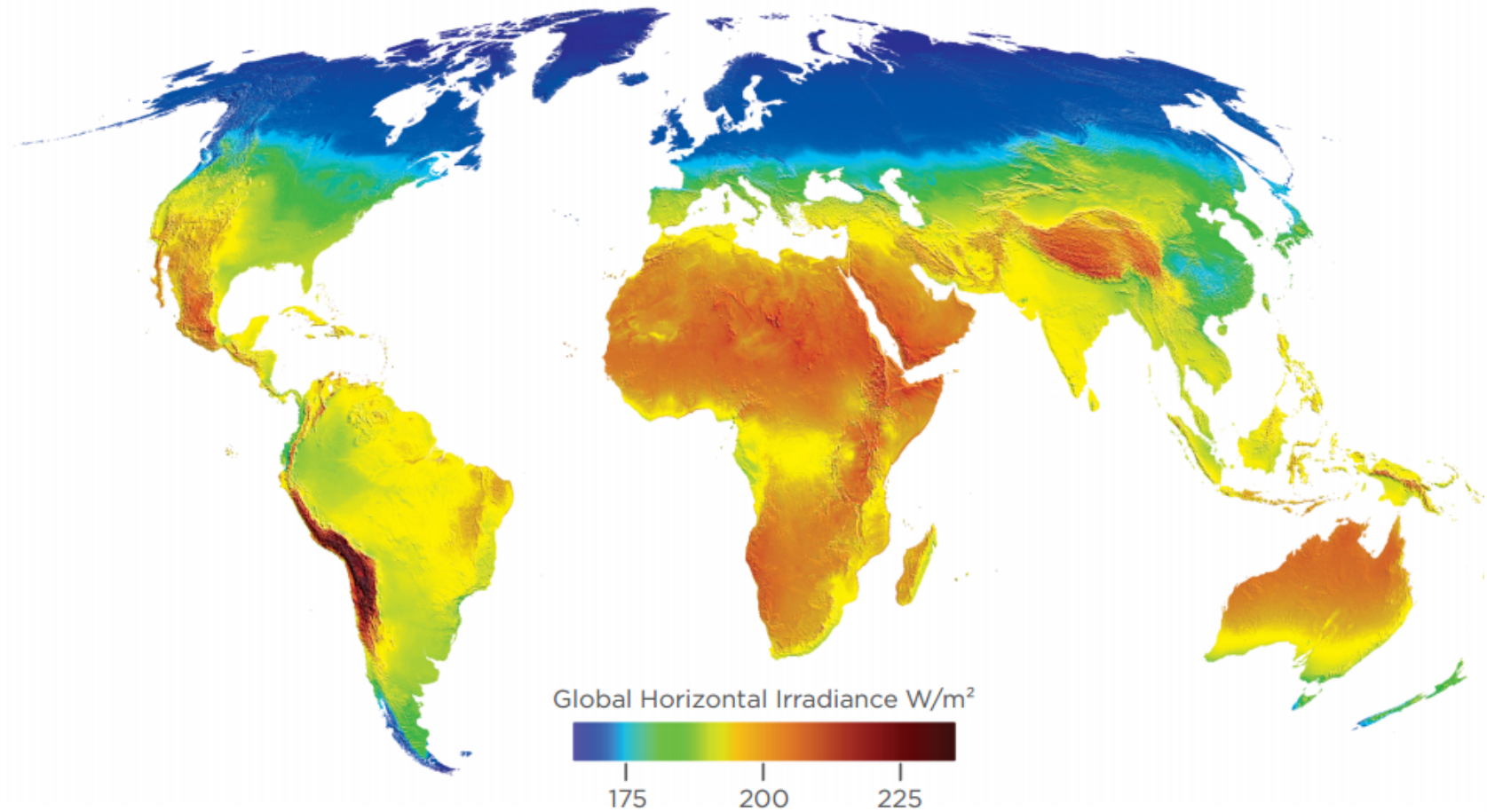




Fonte: <https://www.youtube.com/watch?v=h12M7LKafkc>







Fonte: <http://www.vaisala.com/>

Energia Solar no Brasil x Alemanha

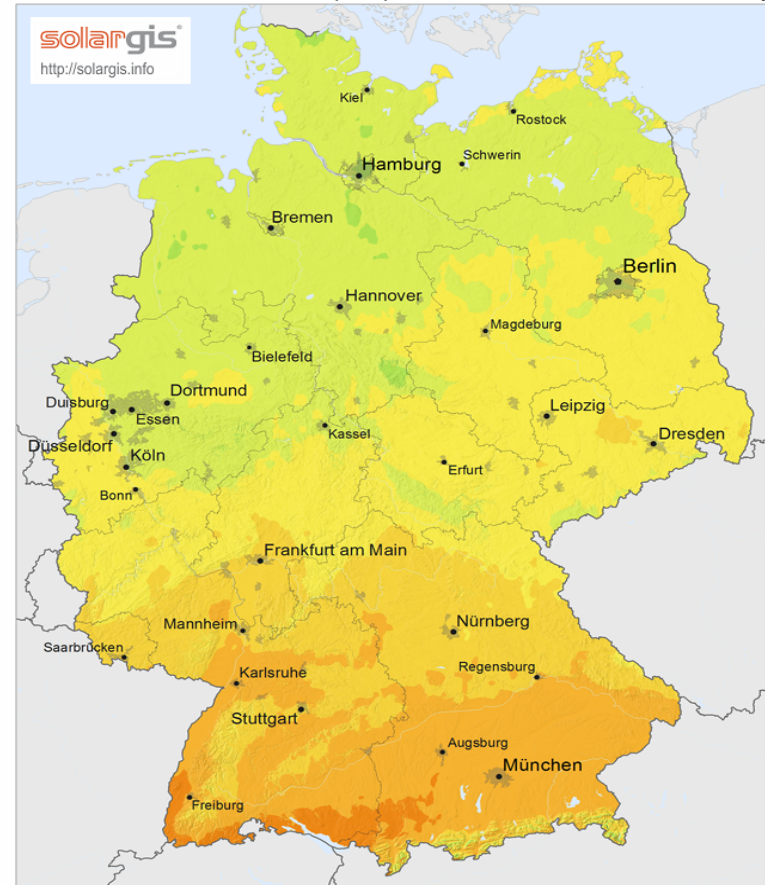
Global Horizontal Irradiation (GHI) Brazil



Average annual sum, period 1999-2013
 < 1500 1700 1900 2100 2300 > kWh/m²

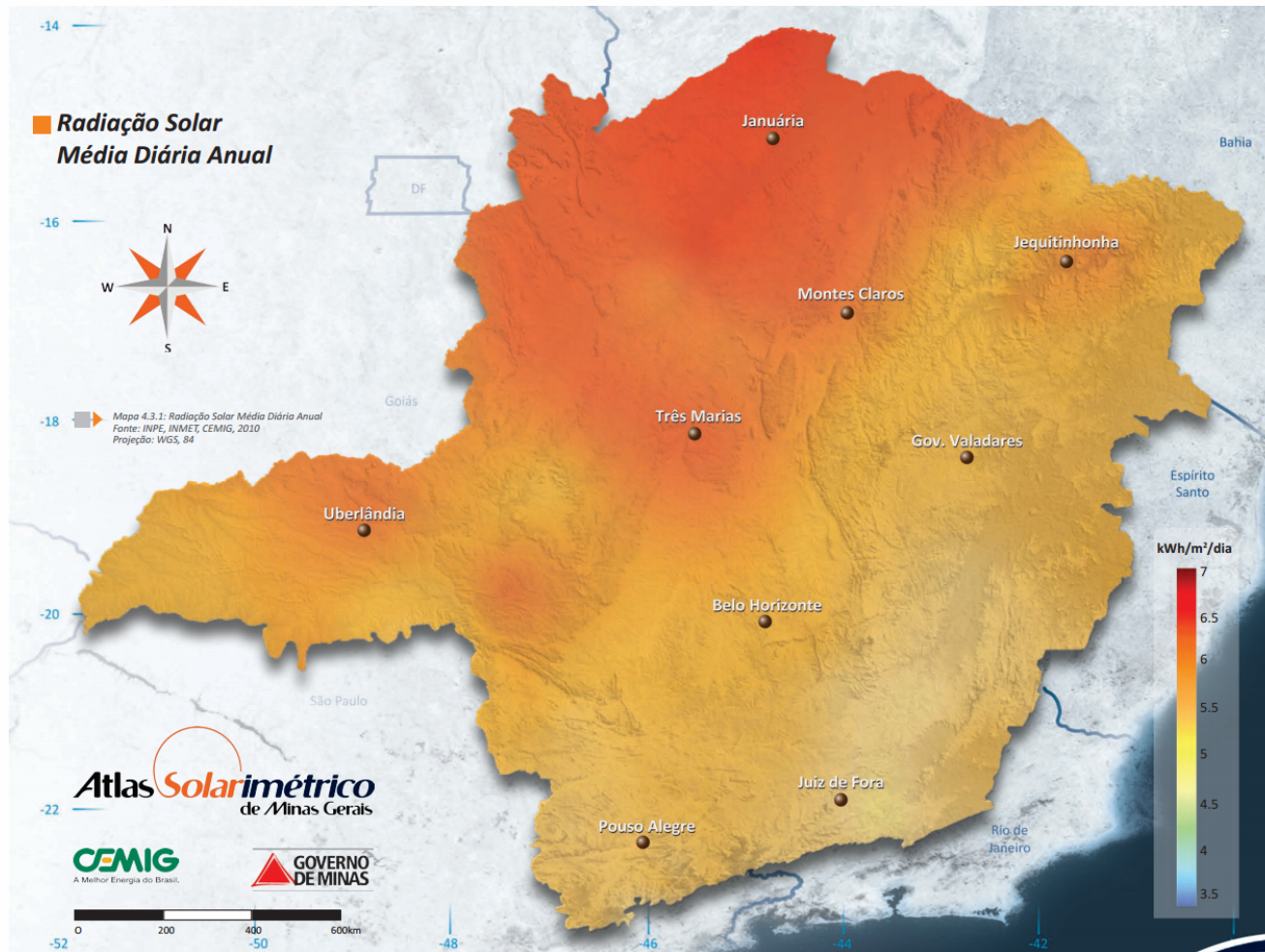
Fonte: Solargis (2016)

Global Horizontal Irradiation (GHI) Germany

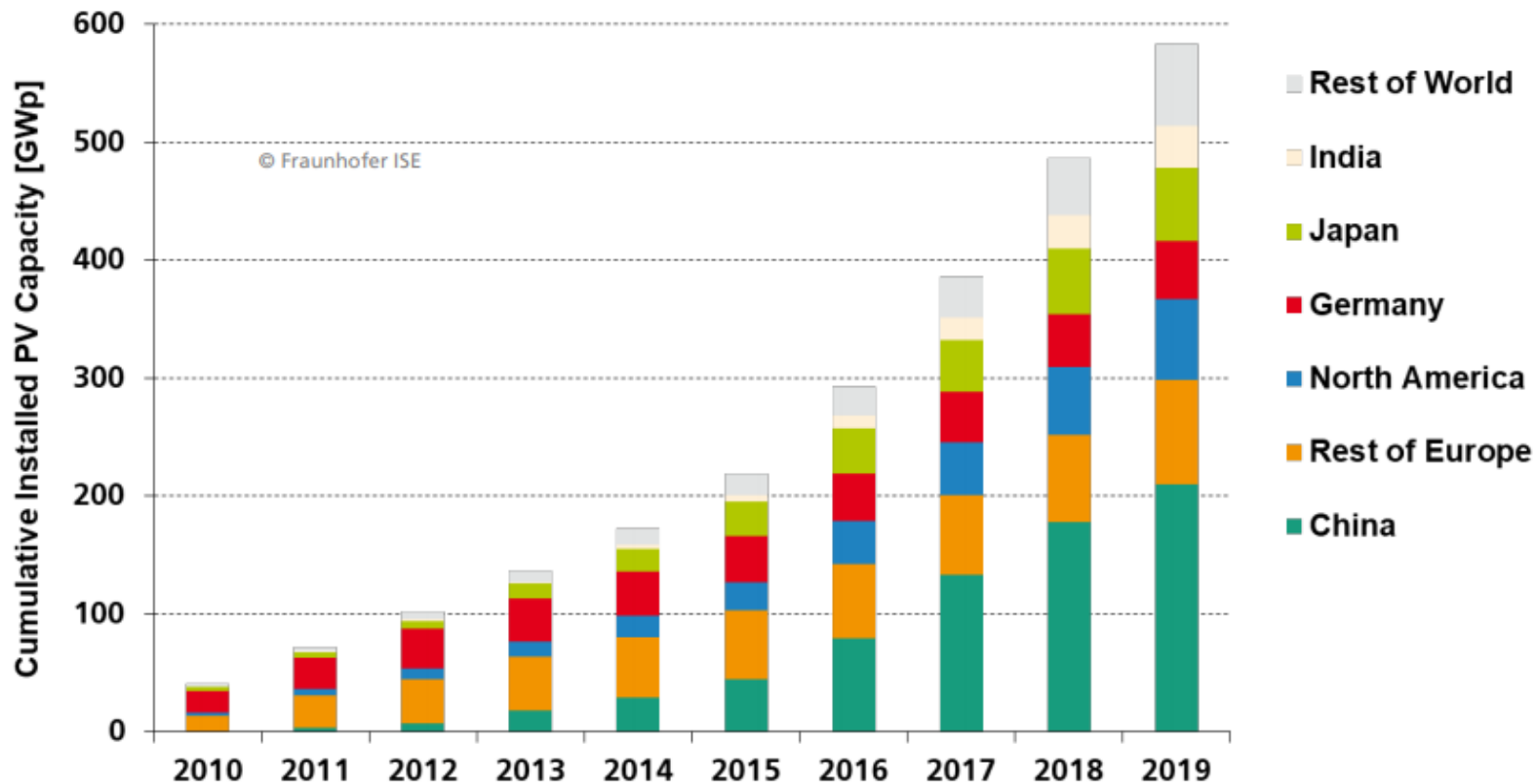


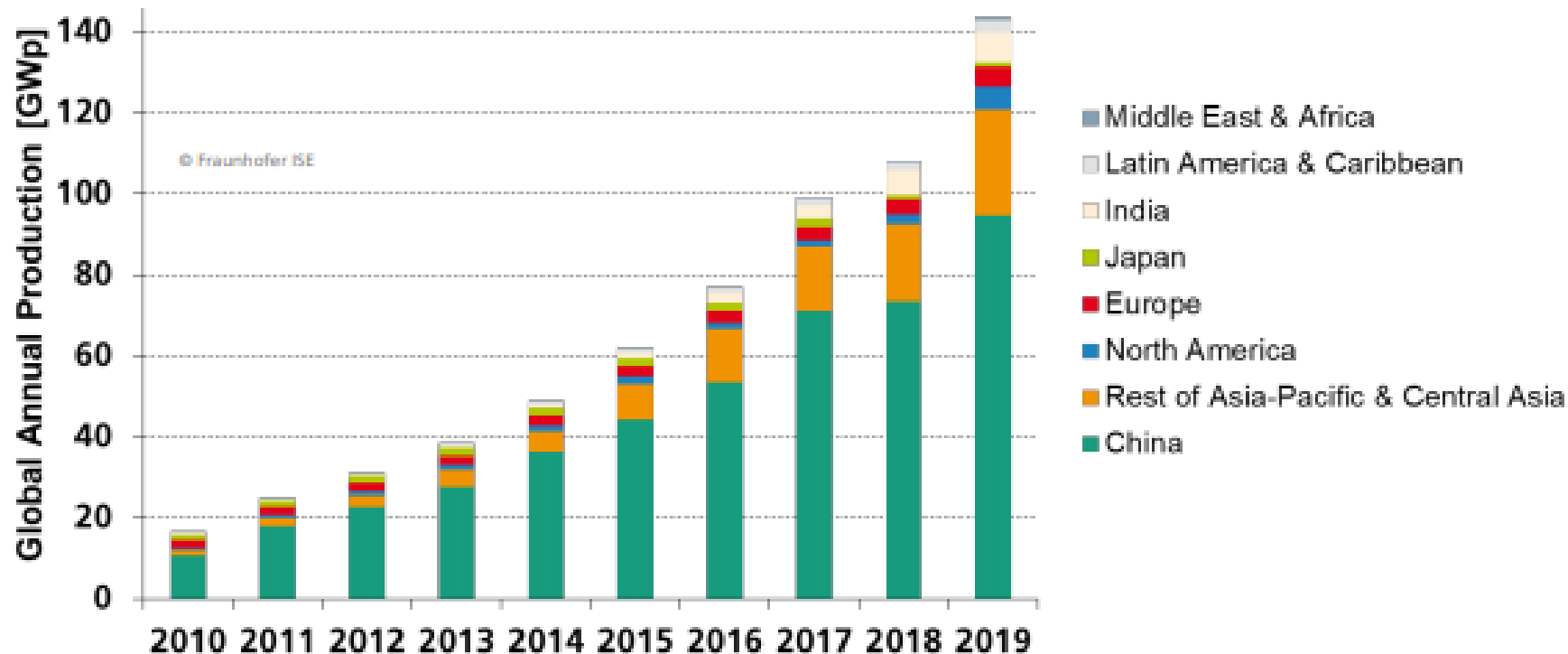
Average annual sum, period 1994-2013
 < 1000 1100 1200 > kWh/m²

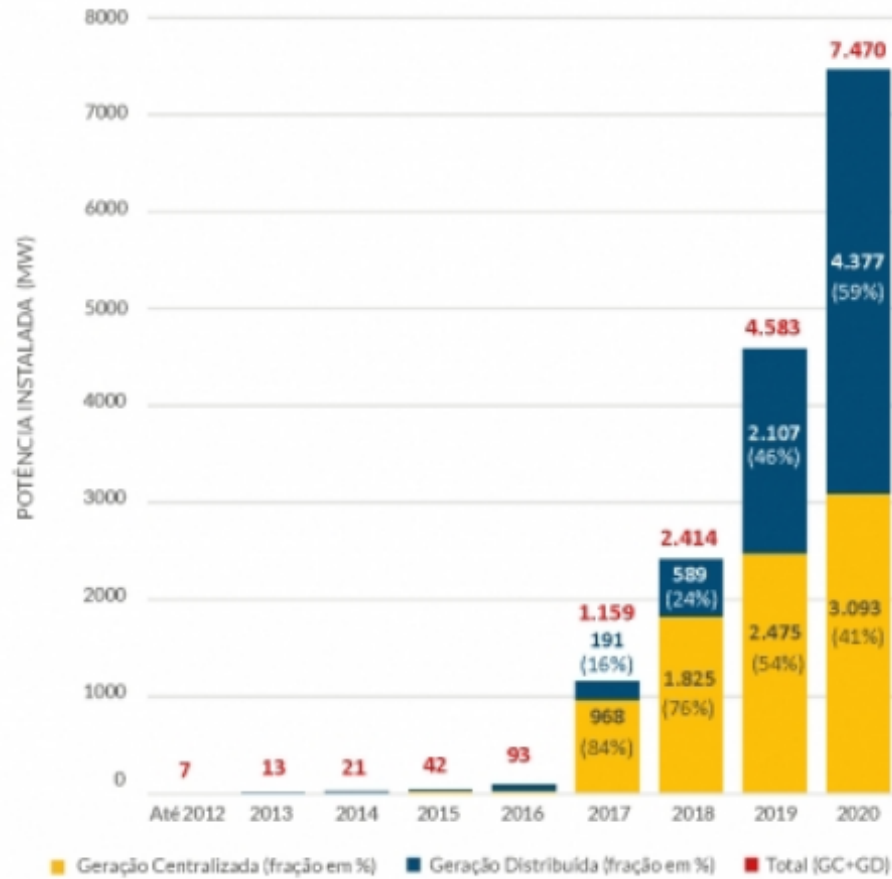
GHI Solar Map © 2015 GeoModel Solar



Fonte: <http://www.cemig.com.br/>









www.gesep.ufv.br



Gesep



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Gesep UFV



ES
Estimate - Sistemas
Fotovoltaicos



<https://play.google.com/store/apps/details?id=br.developer.gesep.estimate>



Obrigado!

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