

MINISTÉRIO DE MINAS E ENERGIA

Energy Management Information Best Practices in Brazil

OLADE – Energy Week in Lima/Peru

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November 2019

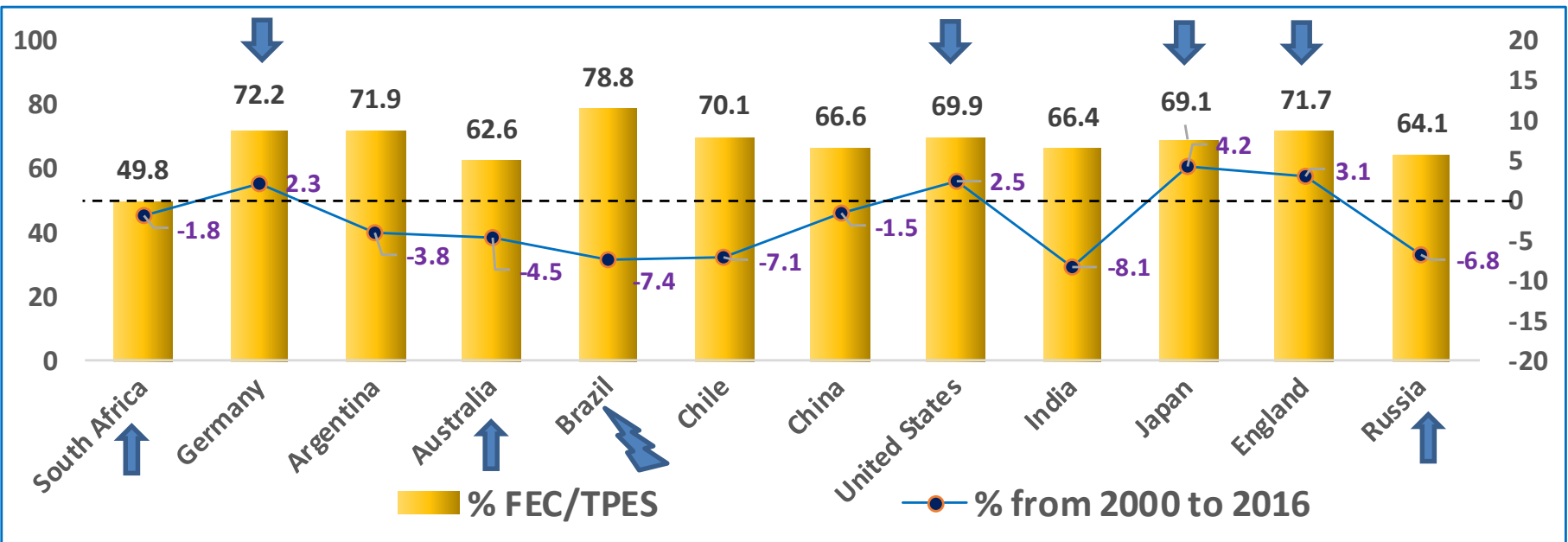


Best Practices

- What are worth for?
- Which are they?



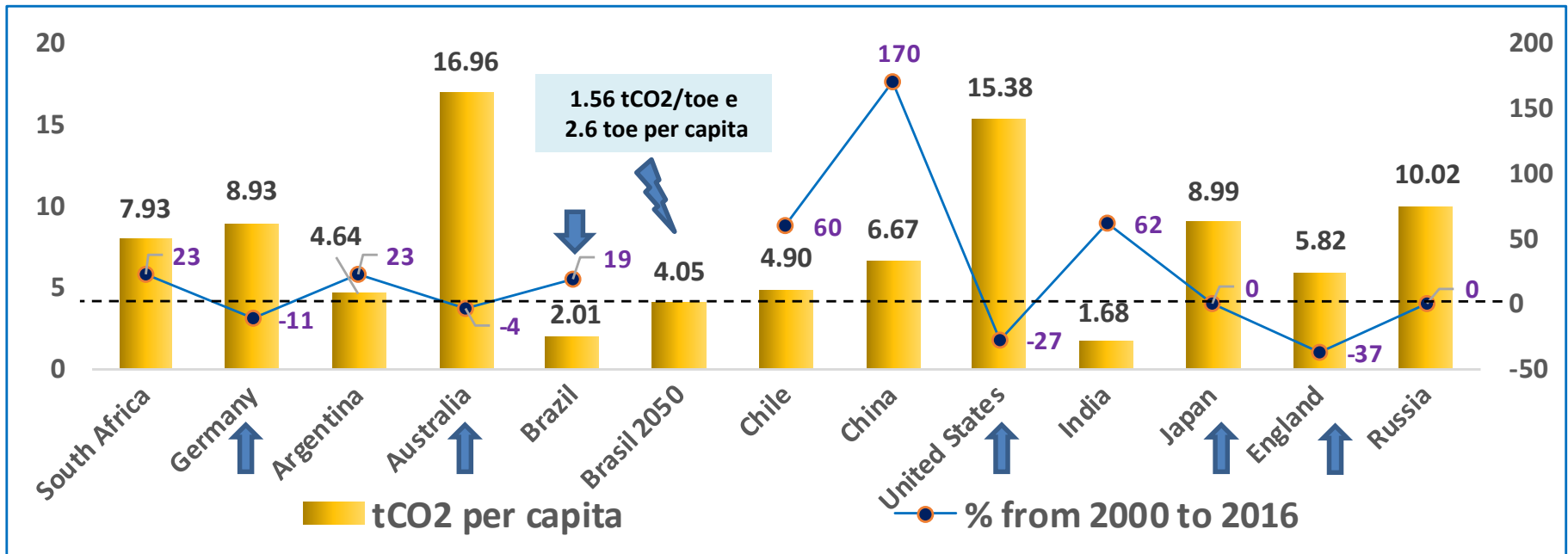
% of Final Energy Consumption / Total Primary Energy Supply (2016)





tCO₂ per capita (2016) by the use of energy

World 2018:
2.33 tCO₂/toe



Brazil: 44% of renewables in the total primary energy supply, due to 80.4% of renewables in the electricity supply matrix, 44.6% of bioenergy in the industrial consumption matrix and 19.9% of bioenergy in the transports energy consumption matrix.



Best Practices from International Organizations

- **The International Organizations** present here are fundamental to establish uniform criteria that guarantee the quality and comparability of the indicators.



Which are the Best Practices?

- Agents
- Researches
- Tools
- Information System



Brazil-Institutional Structure of the Energy Sector



CNPE

National Council of Energy Policy

CMSE

Electrical Sector Monitoring Committee

MME
Ministry of Mines and Energy



Energy Research Company



National System Operator



National Agency of Petroleum, Natural Gas and Biofuels



National Electric Energy Agency



Electricity Trading Chamber



Main Good Practices

- Supply and demand of oil, gas and bioenergy – ANP, MAPA
- Generation Information Bank (BIG) – ANEEL
- Distributed Generation Information System – ANEEL
- Distributors sales by economic sector (+or- 30 sectors, each): EE, GN, Oil Derivatives and Mineral Coal - EPE, ANEEL, ANP e Coal Unions
- Generation of Electricity by Plant, losses, own consumption, exchanges with countries, in the basic grid - ONS, CCEE
- Import and export data by product – SECEX
- Direct survey for thermal and EE self-production (> 300 industries) – EPE
- Direct survey for EE self-production (100 plants) – DIE/MME
- Direct survey of physical production in energy intensive sectors -EPE, DIE
- Direct survey of fuel consumption in the thermal plants (grid) – DIE/MME
- Useful energy balance studies 1984, 1994, 2004. 2018 under preparation (MME, EPE)



Tools

AUTOPRODUCTION OF ELECTRIC POWER

● File: APE.xls

⇒ Generation by plant, by source and fuel consumption and by economic sector.

ENERGY BALANCE

● File: CADE.xls (Energy Chains)

⇒ 31 sheets , 11 of them for energy sources, 16 for sectors, 2 for support and 2 for consolidated energy matrices.

⇒ 105 tables related by business rules, resulting in the energy matrix of 110 activities by 58 energy sources.

⇒ QA rules on all tables.

⇒ Each cycle (annually, from January to April): a) agents enter their data directly, b) data from self-production surveys are transported to their respective sectors, and c) models of residential and agricultural bioenergy estimates are fed with the necessary variables.

JODI OIL

● File: JODI.xls

⇒ Primary ANP information is entered and business rules define IEF and OLADE formats

BRAZIL'S ENERGY INFORMATION SYSTEM - sieBRASIL



Brazilian Energy Balance

110 activities x 58 sources (1970 onwards)

ACTIVITIES

SOURCES

110 ACTIVITIES	10	TPES (9 sub-accounts)
	TOTAL TRANSFORMATION	
		OIL REFINERIES
		NATURAL GAS PLANTS ← not at IEA
		GASIFICATION PLANTS ← not at IEA
		COKE PLANTS
		NUCLEAR CYCLE
	63	PUBLIC SERVICE POWER PLANTS INPUT
		OUTPUT (GWh)
		SELF-PRODUCERS POWER PLANTS (42 subaccounts)
		CHARCOAL POWER PLANTS
	DISTILLERIES	
	OTHER TRANSFORMATIONS (8 subaccounts)	
LOSSES IN DISTRIBUTION AND STORAGE		
FINAL CONSUMPTION		
	NON ENERGY FINAL CONSUMPTION	
	ENERGY FINAL CONSUMPTION	
	ENERGY SECTOR (7 subaccounts)	
	RESIDENTIAL	
	COMMERCIAL	
	PUBLIC	
	AGRICULTURE	
	TRANSPORT (4 subaccounts)	
	INDUSTRIAL (13 subaccounts)	
	UNIDENTIFIED CONSUMPTION	
35	STATISTICAL ADJUSTMENTS	

58 SOURCES	FOSSILS	
		OIL (2 types)
		OIL DERIVATIVES (15 types)
		NATURAL GAS (2 types)
		NATURAL GAS LIQUIDS (1 type)
	39	CITY GAS (2)
		MINERAL COAL (12 types)
		MINERAL COAL DERIVATIVES (3 types)
		PRIMARY RECOVERIES (2 types)
	BIOENERGY	
		PRIMARY RECOVERY (1 type)
13	SOLID BIOENERGY (5 types)	
	LIQUID BIOENERGY (6 types)	
	GAS BIOENERGY (1 type)	
HYDRAULIC WIND		
6	SOLAR	
	NUCLEAR (2 types)	
	ELECTRICITY	



Main Differences Between Brazil and IEA 2016 (Energy Balance)

ACTIVITY	BRAZIL	IEA	BR-IEA
NATURAL GAS PRODUCTION (a)	37.6	20.1	17.5
OIL PRODUCTION (b)	130.4	134.4	-4.0
ENERGY INTERNAL OFFER (c)	288.3	284.5	3.8
LOSSES IN THE HIGH FURNACES (d)	0.0	3.1	-3.1
FINAL CONSUMPTION (e)	229.2	224.3	5.0

(a) IEA excludes reinjected, unused and liquid

(b) IEA includes natural gas liquids.

(c) Brazil includes primary blast furnace gas recovery for EE generation and non-energy use of ethanol

(d) Brazil considers blast furnace as final consumption equipment

(e) In Brazil all coal coke goes to final consumption



Brazil Energy Information System

SIE Brazil

- **GOAL:**
 - Provide the Ministry of Mines and Energy with an Energy Information System, capable of centralizing on a single platform a set of executive information, necessary for its management and society.
 - The project has the technical support of **OLADE** and financial resources from the **Latin American Development Bank**.



SIE Brazil - Background

- SIEE - Energy Information System (OLADE)
- SIEN - National Energy Information System (OLADE)
- Databases from other international institutions and countries
- Brazil Data Exchange Commitments
- Harmonization of statistics
- Data dispersion and poor transparency
- Institutional information governance



SIE Brazil Architecture

Themes	Modules	Queries							
		Brazil	States	Coun- ties	Countries / World	Expan- sion	Legis- lation	Publi- cations	Adminis- tration
		Numeric					Access to laws and regulati ons	Access to electron ic archives of publicati ons	Parameteriza tion of content and reports. Maintenance , data update, permissions, security
Energy Supply and Demand		yes	yes	yes	yes	yes			
Energy Installations		yes	yes			yes			
Energy Resources and Reserves		yes	yes			yes			
Monthly Statistics		yes							
Environmental		yes	yes		yes	yes			
Socioeconomics		yes	yes	yes	yes	yes			
Efficiency		yes				yes			
Indicators		yes	yes	yes	yes	yes			
Units		unic theme							

Notes: Themes are subdivided into items as needed. Brazil has greater content coverage.



Access to SIE Brazil

www.mme.gov.br

Minas e Energia - Google Chrome

Não seguro | mme.gov.br/web/guest/sie-brasil?sessionId=AE7E6C6G4E465B6ACDB273A25880BCA7.srv154

Balanco Estático | DOCFLOW - Gerenc... | Google Tradutor | Google | Home Broker BB | Login | MINISTÉRIO DE MI... | Minas e Energia | Sites Sugeridos | [bb.com.br] | http--doctflow.mme... | Agora | Importado do IE | http://www.iea.org/...

BRASIL | Simplifique! | Participe | Acesso à Informação | Legislação | Canais

Ir para o conteúdo | Ir para o menu | Ir para a busca | Ir para o rodapé

ACESSIBILIDADE | ALTO CONTRASTE | MAPA DO SITE

Ministério de
Minas e Energia

Dados Abertos | Legislação | Área de imprensa | Comunidade MME

Minas e Energia > Sistema de Informações Energéticas - SIE Brasil

ASSUNTOS

- Página Inicial
- Consultas Públicas
- Agendamento Usina Solar
- Acesso a Informação
- Agenda de Autoridades
- Conselhos e Comitês
- Comissão de Ética
- Ouvidoria
- Secretarias
- Entidades Vinculadas e Afins
- Publicações e Indicadores
- Sistema de Informações Energéticas - SIE Brasil**
- Reidi/Repeneç
- Projeto Meta

SIE BRASIL

O que é o SIE Brasil

O Sistema de Informações Energéticas (SIE Brasil) é uma ferramenta útil ao processo de gestão e transparência de informações energéticas do País.

O sistema permite ao MME o gerenciamento e disseminação de informações de oferta e demanda de energia, instalações energéticas, recursos e reservas, preços de energéticos, equipamentos de consumo, produção industrial, eficiência, demografia, economia, emissões de partículas e prospectiva, além de informações legais e documentais. Os módulos do Brasil, dos Estados, dos Municípios e de Países e Mundo, permitem a comparabilidade entre indicadores, a partir de critérios uniformes de tratamento dos dados.

Assista ao vídeo de apresentação do SIE Brasil

Acesse o SIE Brasil

Dúvidas, sugestões ou correções

Access

SIE Brasil



Opening Screen – SIE Brazil

SIE - Google Chrome

Não seguro | mme.gov.br/SIEBRASIL/

Balanco Estático | DOCFLOW - Gerenc... | Google Tradutor | Google | Home Broker BB | Login | MINISTÉRIO DE MI... | Minas e Energia | Sites Sugeridos | [bb.com.br] | http--docflow.mme... | Agora | Importado do IE | http://www.iea.org/...

OsieBRASIL Sistema de Informações Energéticas

Cadastrar-se | Login | Português ▾

Atenção: Os itens de menu esmaecidos (em cinza) estão temporariamente desativados, porque se encontram em fase de testes e revisões por parte do Ministério de Minas e Energia. Por outro lado, a carga de dados do sistema ainda não está finalizada, o que limita a abrangência temporal das consultas. Favor dirigir as suas dúvidas, sugestões, críticas ou comentários ao e-mail siebrasil@mme.gov.br.

Brasil | Municípios | Estados | Legislação | Países e Mundo | Publicações | Expansão

Register and Login

Modules

Cadastre-se ou faça login para verificar os relatórios com informações atualizadas.



Information for other Institutions

Administration

The screenshot shows the SIE BRASIL web application interface. The browser address bar displays the URL `mme.gov.br/SIEBRASIL/reports/reporte-balance-outras-agencias.aspx?Opcion_Id=373`. The page title is "SIE BRASIL Sistema de Informações Energéticas". The navigation menu includes "Administração" and "Relatórios". The left sidebar shows a tree view with "Informações" expanded, containing "Relatórios para Outras Entidades" and "Informações para Outras Instituições". The main content area displays a form with the following fields:

Unidade de Informação:	Brasil
Tempo:	2018

Below the form is a button labeled "Gerar Excel".

Year

Generate
Excel



Query Example - SIE Brazil (1)

1.3 OFERTA INTERNA DE ENERGIA ELÉTRICA (GWh)

ACCESS		1970	2018
BRAZIL	ENERGIA NÃO RENOVÁVEL	5.428,0	106.106,6
ENERGY SUPPLY AND DEMAND	DERIVADOS DE PETRÓLEO	3.727,4	9.292,7
ENERGY BALANCE	GÁS NATURAL		54.621,7
1 AGGREGATED DATA	CARVÃO VAPOR	1.369,5	14.204,4
1.3 DOMESTIC ELECTRIC ENERGY SUPPLY	URÂNIO		15.673,9
	GÁS INDUSTRIAL (a)	331,1	12.313,9
	ENERGIA RENOVÁVEL	40.295,9	530.268,8
	HIDRÁULICA	39.781,5	423.950,0
	GERAÇÃO INTERNA	39.801,5	388.971,1
	IMPORTAÇÃO / EXPORTAÇÃO (b)	-20,0	34.978,9
	EÓLICA		48.475,1
	SOLAR		3.461,4
	BIOENERGIA	514,5	54.382,2
	LENHA E CARVÃO VEGETAL	54,9	2.360,1
	BAGAÇO DE CANA	360,8	35.435,2
	LIXÍVIA	98,8	14.080,8
	BIOGÁS		871,1
	BIODIESEL		390,6
	OUTRAS BIOMASSAS (c)		1.244,4
	TOTAL	45.723,9	636.375,4

(a) Gases recuperados de refinarias, petroquímicas e indústria do aço

(b) Se positivo = importação

(c) Resíduos de árvores e da agroindústria

Fonte: sieBRASIL



Query Example - SIE Brazil (2)

Indicators : Environment

2015

		Amazonas	Espírito Santo	São Paulo
CO₂ Emissions by Area	t CO₂/km²	6.7	554.6	365.3
CO₂ Emissions by Energy Use	10³ t CO₂	10,461.2	25,554.9	90,663.4
CO₂ Emissions by GDP	t CO₂/10⁶ US\$	247.3	366.9	96.5
CO₂ Emissions per capita	t CO₂/inhab.	2.6	6.5	2.0
CO₂ Emissions per toe	t CO₂/toe	2.0	2.3	1.2
Fossils in the Electrical Matrix	%	75.5	35.1	5.6
Fossils in the Energy Matrix	%	79.9	74.6	47.1
Renewables in the Electrical Matrix	%	24.5	64.9	94.4
Renewables in the Energy Matrix	%	20.1	25.4	52.9

Notes

CO₂ Emissions by GDP

Dolar Purchasing Power Parity (PPP), constant 2011

Source: sieBRASIL



Query Example - SIE Brazil (3)

Indicadores : Factor de Capacidad

2018

		Brasil	OCDE	Mundo
Factor de Capacidad en Generación Total	%	42.8	42.3	43.9
Factor de Capacidad Eólico	%	41.5	31.3	26.5
Factor de Capacidad Hidráulica	%	43.4	41.8	41.6
Factor de Capacidad Nuclear	%	89.9	74.5	77.1
Factor de Capacidad Térmica	%	39.3	42.4	46.4

Notas

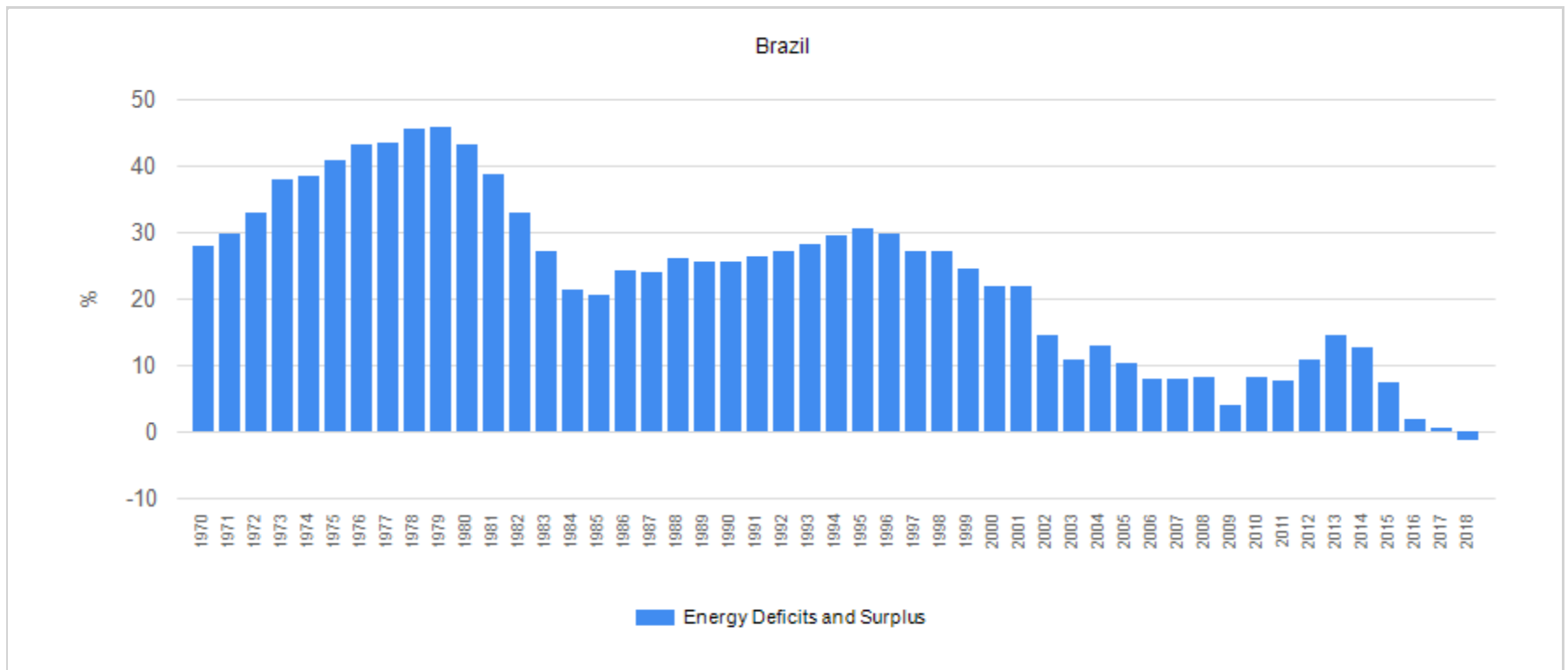
Factor de Capacidad en Generación Total	Generación total de energía eléctrica / ((capacidad instalada total de n-1 + mitad de la expansión de n) * 8760 horas) * 100.
Factor de Capacidad Eólico	Generación total de eólica / ((capacidad instalada de n-1 + mitad de la expansión de n) * 8760 horas) * 100.
Factor de Capacidad Hidráulica	Generación total de energía hidráulica / ((capacidad instalada de n-1 + mitad de la expansión de n) * 8760 horas) * 100.
Factor de Capacidad Nuclear	Generación nuclear / ((capacidad instalada de n-1 + mitad de la expansión de n) * 8760 horas) * 100.
Factor de Capacidad Térmica	Generación total térmica / ((capacidad instalada de n-1 + mitad de la expansión de n) * 8760 horas) * 100.

Fuente: sieBRASIL



Query Example - SIE Brazil (4)

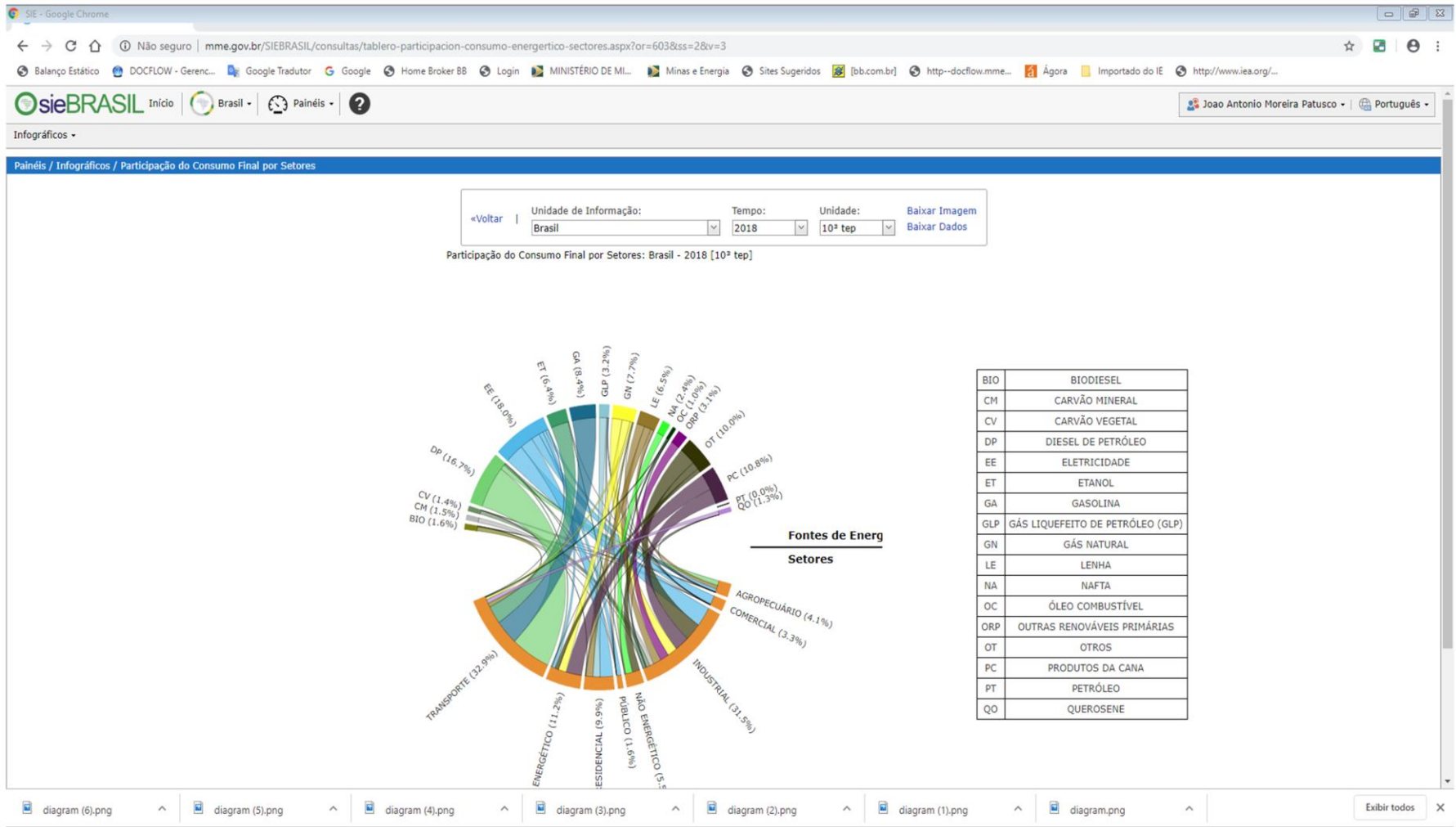
Indicators : Energy sources



Source: sieBRASIL

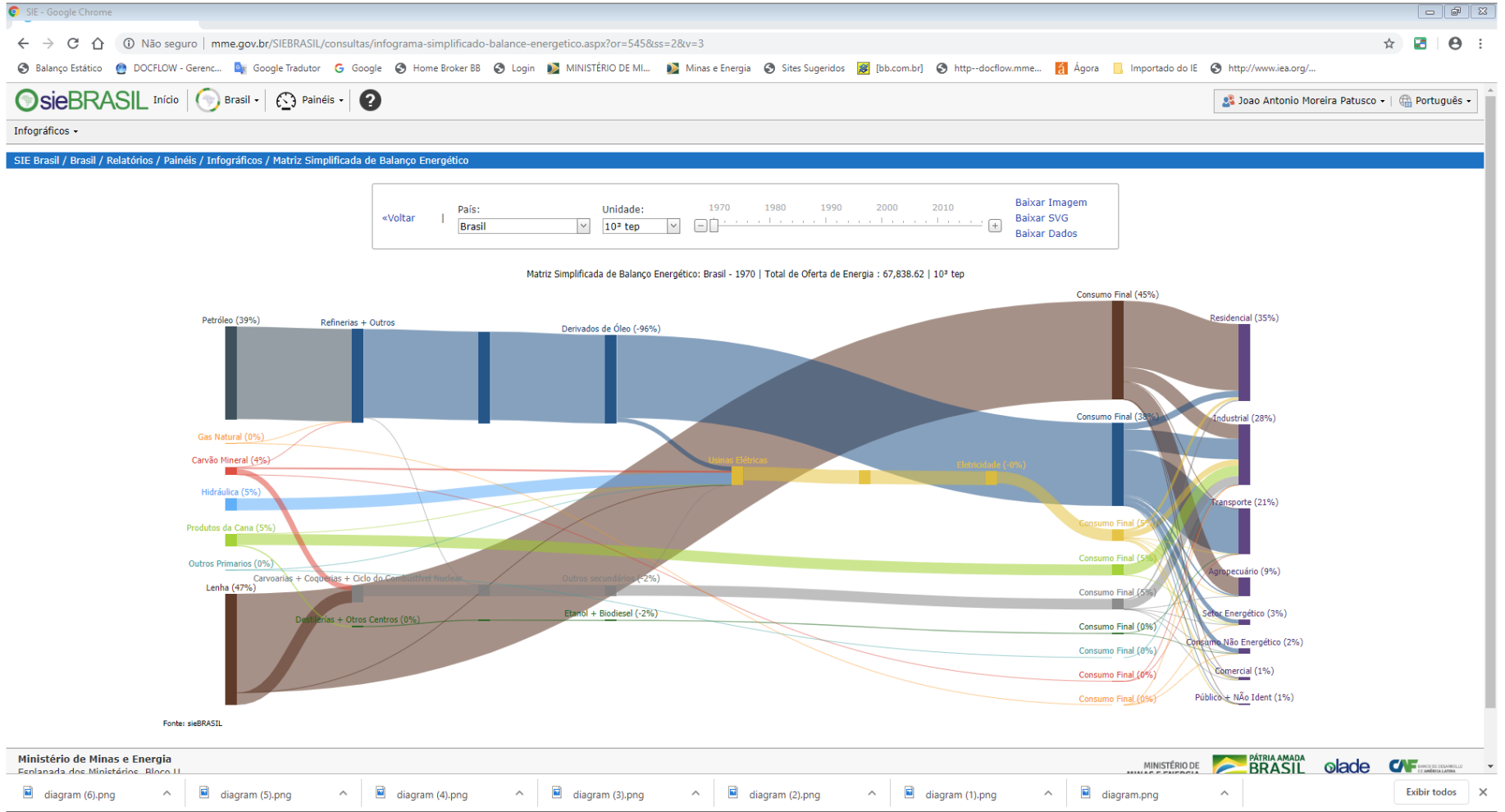


Query Example - SIE Brazil (5)





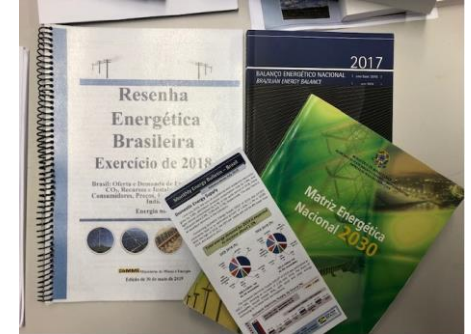
Query Example - SIE Brazil (6)





Energy Publications - Brazil

(integrated energy information)



- Energy Balance (EPE-yearly)
- Brazilian Energy Review (MME-yearly)
- Monthly Energy Bulletin (MME)
- Ten-Year Power Espansion Plan (EPE-yearly)
- National Energy Plan (≥ 30 years- EPE?)
- Useful energy balance studies 1984, 1994, 2004.
2018 under preparation (MME, EPE)



Thanks

- SIE Brazil access

www.mme.gov.br /

Sistema de Informações Energéticas – SIE
Brasil

Atenção: Os links do menu embaixo (em cinza) estão temporariamente desativados, porque se encontram em fase de testes e revisões por parte do Ministério de Minas e Energia. Por favor, volte à carga de dados de sistema após esse teste finalizado, o que levará a aproximadamente 15 dias úteis. Favor enviar as suas dúvidas, sugestões, críticas ou comentários ao e-mail siebrasil@mme.gov.br.

Ministério de Minas e Energia
Esplanada do Ministério, Bloco U
70005-900 Brasília DF
<http://www.mme.gov.br>

Sobre SIE | Termos de Uso



Oil, Gas and Biofuels

AGENTS

● NATIONAL OIL, GAS AND BIOFUEL AGENCY (ANP)

- ⇒ Regulates: production, foreign trade, stocks, distribution, prices, facilities, reserves
- ⇒ Distribution of derivatives: **30 economic subsectors** (sales by derivative, by distributor and by state)

● MINISTRY OF AGRICULTURE, LIVESTOCK AND SUPPLY (MAP)

- ⇒ Regulates, for anhydrous and hydrous ethanol: production, deliveries to distributors, deliveries for other purposes and stocks

● ENERGY RESEARCH COMPANY (EPE)

- ⇒ Natural gas distribution: **28 economic subsectors** (follow up with state distributors)

● BRAZILIAN OIL S.A. (PETROBRAS)

- ⇒ Self-production and direct delivery data



Electricity

Which are they?

AGENTS

● NATIONAL ELECTRIC POWER AGENCY (ANEEL)

- ⇒ Regulates: generation, foreign trade, distribution, losses, prices, infrastructure and potentials
- ⇒ **Generation Information Bank (BIG)**: registration of all public and self-producing power generation plants.
- ⇒ **Distributed Generation Information System**: registration of distributed generation facilities existing in distributors.

● NATIONAL SYSTEM OPERATOR (ONS) AND ELECTRIC POWER COMMERCIALIZATION CHAMBER (CCEE)

- ⇒ a) Generation of electricity by the Interconnected and Isolated Systems, by plant, b) exchanges with countries, d) deliveries to free consumers of the basic grid, e) supply to distributors, f) losses in the basic grid and, g) own consumption of power plants.

● ENERGY RESEARCH COMPANY (EPE)

- ⇒ Distribution: more than **50 economic subsectors** (follow up with state distributors - **SIMPLES** system)

● MINISTRY OF MINES AND ENERGY (MME)

- ⇒ Annual collection of fuel consumption data in the generation of thermoelectric plants of the Interconnected System



Other Agents

MINERAL COAL

● MINERAL COAL PRODUCERS UNIONS

⇒ Industry Production and Sales Information

FOREIGN TRADE

● FOREIGN TRADE SECRETARY

⇒ Import and export data by product, country of origin and country of destination.



Energy Self-Production

RESEARCHES

● ENERGY RESEARCH COMPANY (EPE)

⇒ Annual collection system with more than **300 large self-generating energy establishments** (industrial thermal uses and electric power generation).

● MINISTRY OF MINES AND ENERGY (MME)

⇒ Annual collection from around **100 major self-producers of electricity** (for consumption and sales to the market).

● MINISTRY OF AGRICULTURE, LIVESTOCK AND SUPPLY (MAP)

⇒ Annual grain production, herd numbers, crushed cane, sugar production, and energy indicators from agricultural and livestock research.

● CLASS ENTITIES (Unions, Associations, Confederations, etc)

⇒ Physical production for extrapolation of indicators obtained in direct surveys (steel, pellets, aluminum, cement, ceramics, cellulose, nickel, ferroalloys, grains, herds, etc.)