Global Iron and Steel Sustainable Technology Roadmap
Brazilian Steel Conference

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São Paulo
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INSTITUTO AÇO BRASIL

Brazilian Steel Industry

Brazilian Steel Industry Profile*

Steel companies: 29 sites (15 integrated and 14 mini-mills), administrated by 10 groups
Installed capacity: 50,4 Mt/year crude steel
Crude steel current production: 34,4 Mt (9th largest steel producer worldwide)
Revenues: R$ 82 billion
Payed taxes: R$ 14 billion
Employees: 103.150
GDP participation: 4,0%**
Investments from 2008 up to 2017: US$ 25,8 billion

* *Aço Brasil Associated Companies*

** *Including directs and indirect effects also income effects*

Aço Brasil Associated Companies Sites

PARÁ
Sinobrás

CEARÁ
Cia. Siderúrgica do Pecém
Gerdau Aços Longos (Cearense)

PERNAMBUCO
Gerdau Aços Longos (Açonorte)

BAHIA
Gerdau Aços Longos (Usiba)

ESPÍRITO SANTO
ArcelorMittal Tubarão

MINAS GERAIS
Aperam South America
Gerdau Açominas (Ouro Branco)
ArcelorMittal Aços Longos (Monlevade)
ArcelorMittal Aços Longos (Juiz de Fora)
Gerdau Aços Longos (Barão de Cocais)
Gerdau Aços Longos (Divinópolis)
Usiminas (Ipatinga)
Vallourec (Barreiro)
Vallourec (Jeceaba)

RIO DE JANEIRO
Companhia Siderúrgica Nacional - CSN (Volta Redonda)
ArcelorMittal Sul Fluminense (Resende)
ArcelorMittal Sul Fluminense (Barra Mansa)
Gerdau Aços Longos (Cosigua)
Ternium

SÃO PAULO
ArcelorMittal Aços Longos (Piracicaba)
Gerdau Aços Especiais (Pindamonhangaba)
Gerdau Aços Especiais (Mogi das Cruzes)
Gerdau Aços Longos (São Paulo)
Usiminas (Cubatão)
Villares Metals

RIO GRANDE DO SUL
Gerdau Aços Especiais (Piratini)
Gerdau Aços Longos (Riograndense)

PARANÁ
Gerdau Aços Longos (Guaíra)

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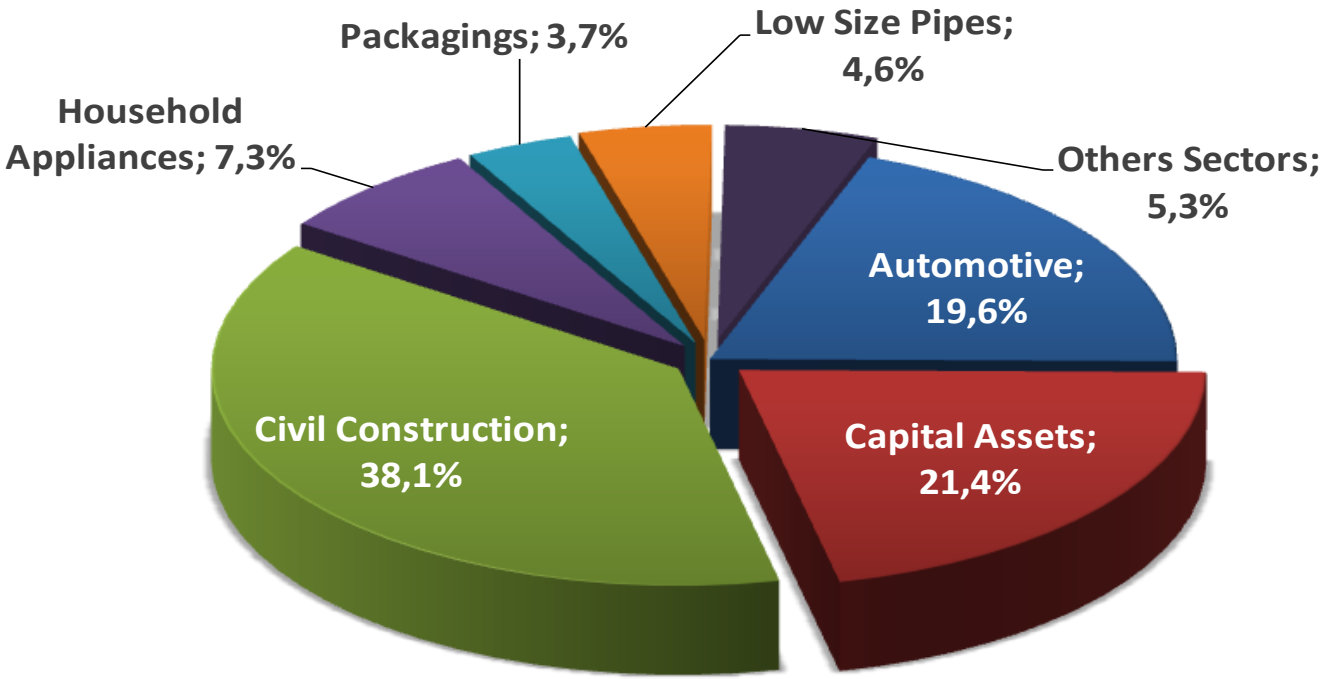
Brazilian Steel Production and Market

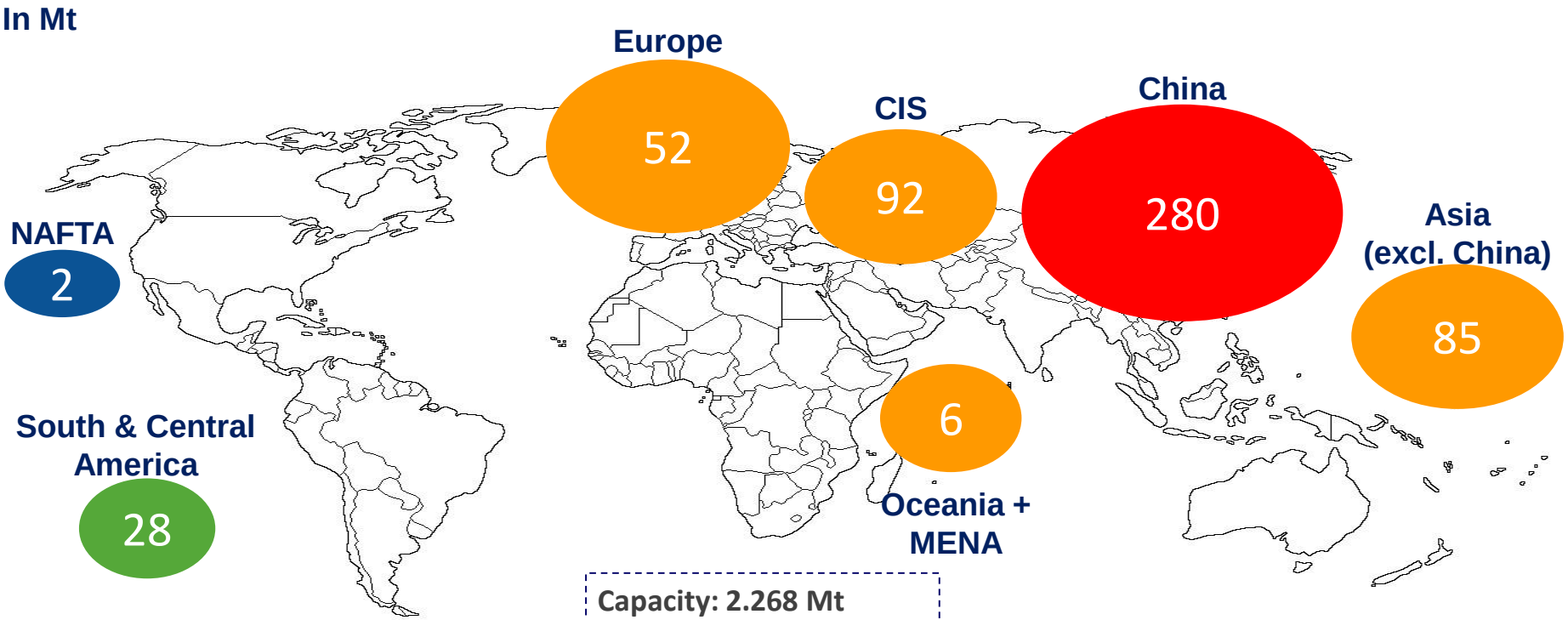
Brazilian Steel Current Situation

Steel Apparent Consumption Sectoral Distribution



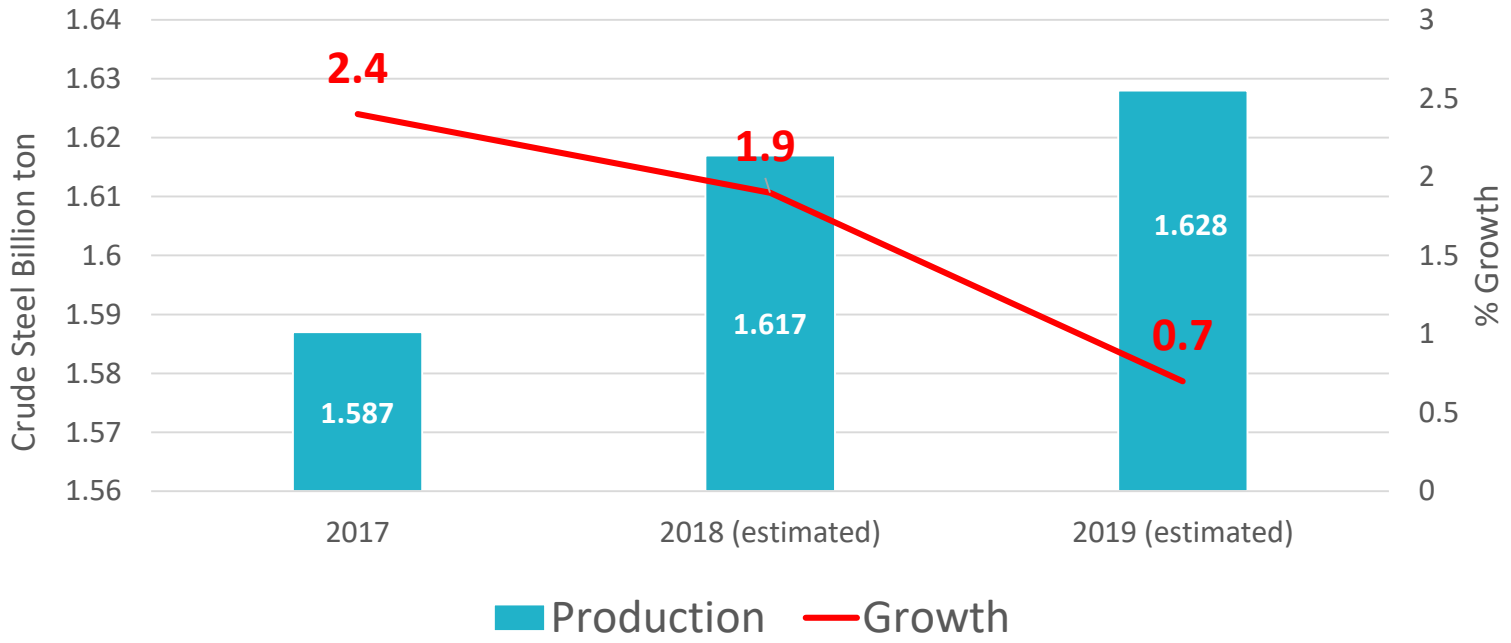
Source: Aço Brasil

World Current Excess Capacity: 545 Mt



*Equivalent crude steel consumption
Source: OCDE / World Steel Association (April/18), IABr elaboration.

World Current Steel Demand



Source: WorldSteel

Brazilian Steel Current Situation

Data	2017	17/16 (%)	Jan-Jun		18/17 (%)
			2017	2018	
Production (Kt)					
Crude Steel	34.350	9,8	16.711	17.192	2,9
Internal Sales (Kt)	**16.893**	**2,2**	**8.038**	**8.830**	**9,9**
Exports					
Semi Finished	9.758	15,5	4.787	4.434	-7,4
Rolled Steel	5.593	12,2	2.513	2.447	-2,6
Total(Kt)	15.351	14,3	7.300	6.881	-5,7
(KUS$)	8.046	43,8	3.699	4.291	16,0
Imports					
Total(Kt)	2.329	23,9	1.215	1.264	4,0
(KUS$)	2.232	32,6	1.078	1.339	24,2
Apparent Consumption (Kt)	**19.169**	**5,2**	**9.201**	**10.060**	**9,3**

Source: Industry, External Trades and Services Ministry / Aço Brasil

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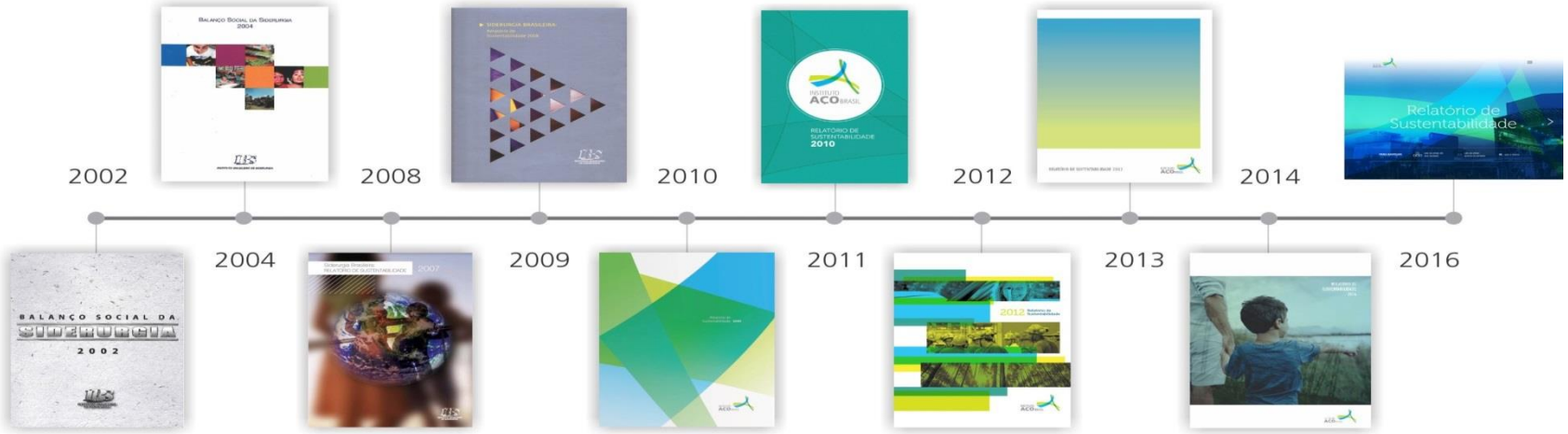
Sustainability Report

11ª edition highlights

Timeline



Since 2002 Aço Brasil has been publishing the Sustainability Report of the sector emphasizing the main achievements conquered so far.

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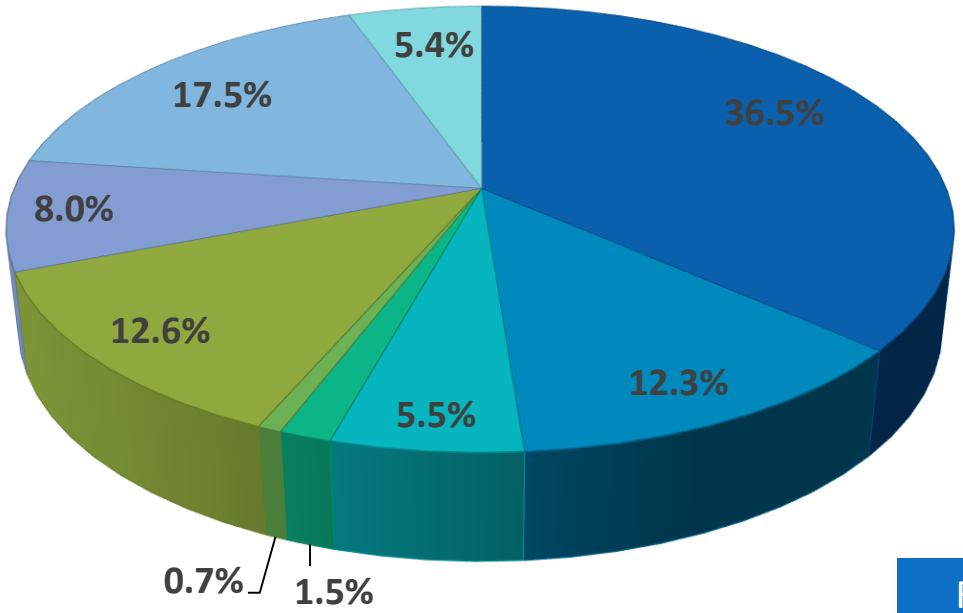
Energy Efficiency

Brazilian Energy Grid - 2016



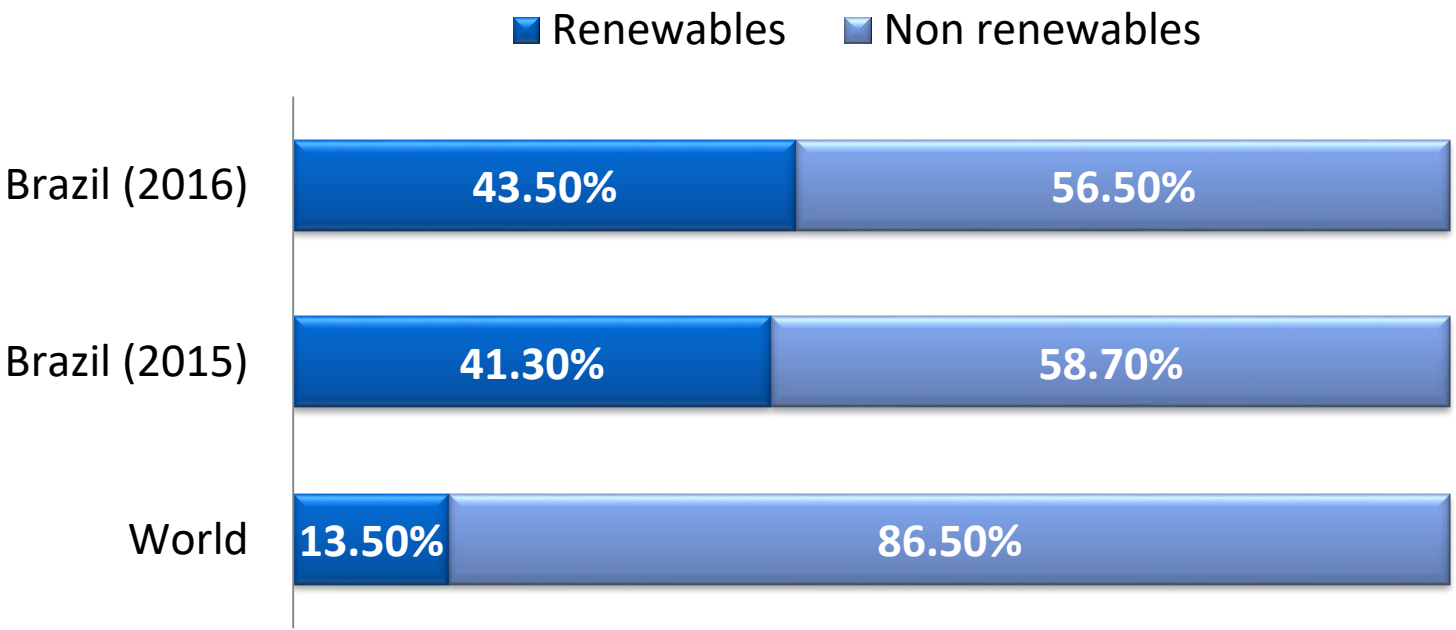
- Petroleum and oil products
- Natural gas
- Coal and coke
- Uranium
- Others non renewables

Fossil: 55%
Nuclear: 1,5%
Hydro: 12,6%
Renewable: 30,9%

Total Renewable 43,5%

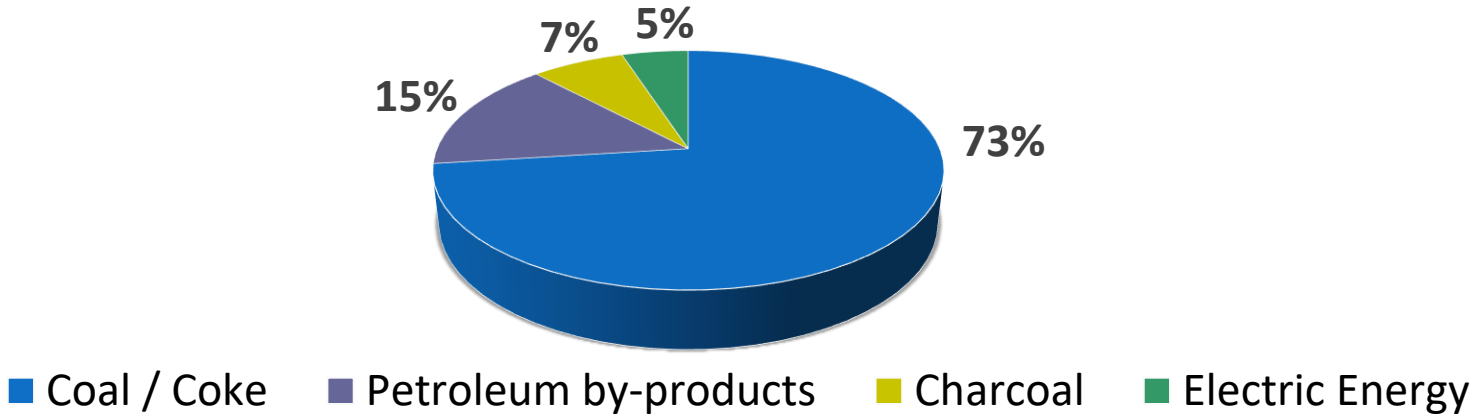
Source: National Energy Balance, 2017.

Renewable Energy Participation on the Grid



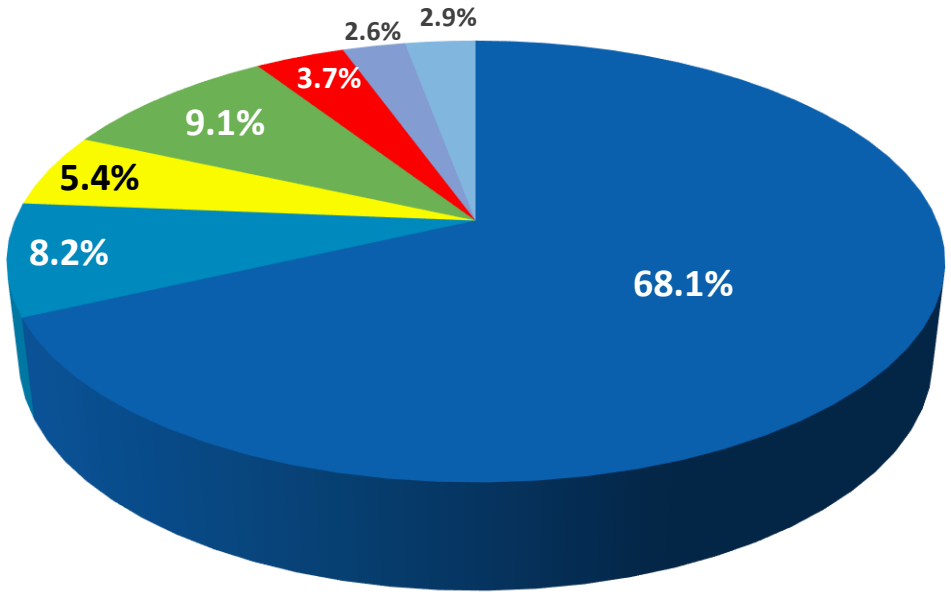
Source: National Energy Balance, 2017.

Steel Industry Energy Grid - 2016



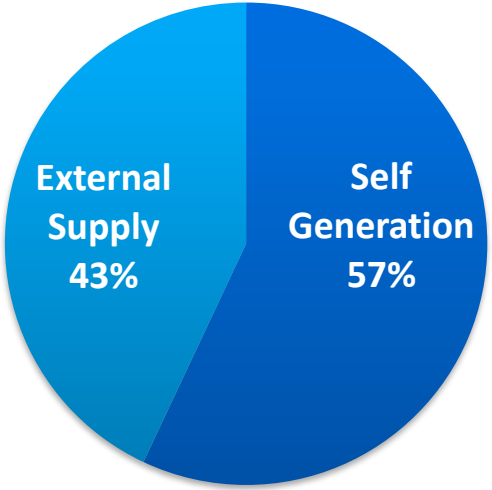
- **Despite having a relative sufficient electric grid based on hydro, Brazilian Steel sector is most dependent on coal as the main energy source, due to the majority of integrated route participation.**
- **High levels of electric energy cogeneration based on process gases reuses.**
- **Charcoal produced from renewable forests for pig iron and steel production as an outstanding characteristics from Brazil.**
- **ISO 50001 certification as a reference on efficiency in energy. 02 associated companies already certified and others searching for.**

Brazilian Electric Energy Grid - 2016



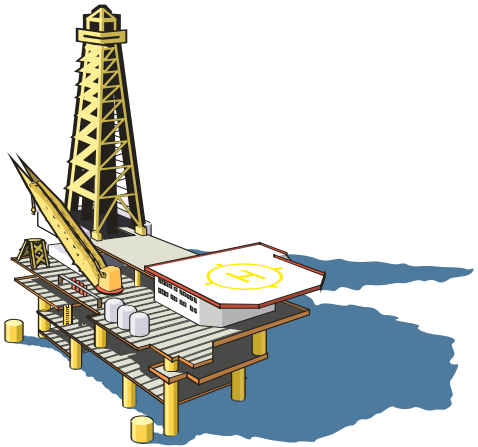
Steel Industry Electric Energy Grid - 2017

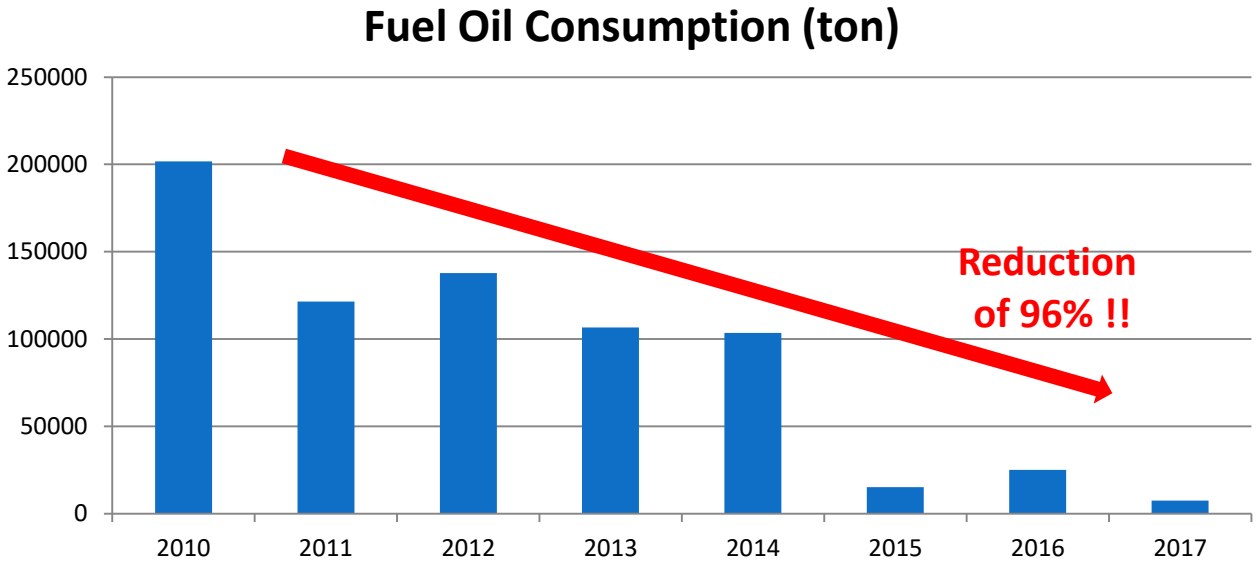
Electric Energy Sources



In 2017, 57% of electric energy consumption were supplied through self generation (49% thermo and 8% hydro).

Natural Resources and Energy Consumption Optimization





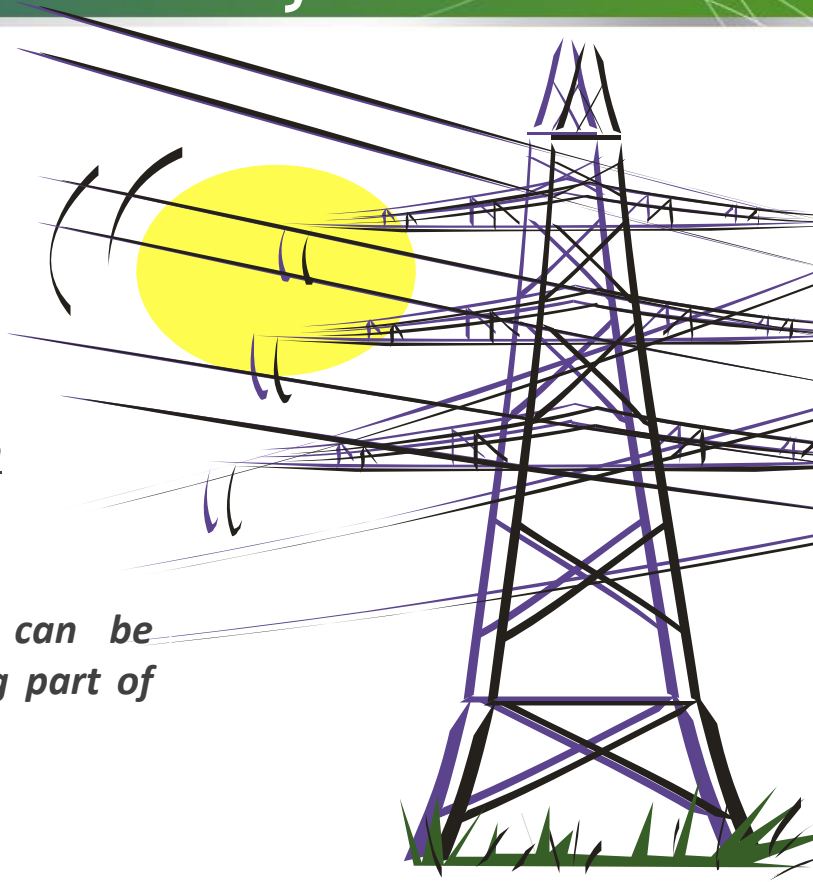
Fuel oil substitution for natural gas, a cleaner resource, made possible the dust and SO_2 emissions reductions.

Natural Resources and Energy Consumption Optimization in Steel Industry

***Process gases** produced on Coke, Blast Furnace and Steel Making Plants are recovered, treated and reused as fuels as a substitution of petroleum by-products, and as a consequence **supplying 40% of total energy** demand required by integrated steel sites.*

***Shredder** use for scarp processing leads to **7% reduction on EAF plants electric energy consumption**.*

***Charcoal fines**, formerly considered as "residues", can be injected through tuyeres at blast furnaces, substituting part of PCI coal consumption with similar energy efficiency.*



Certificação ISO 50.001

- Sistema de Gestão de Energia;
- Reconhecido internacionalmente;
- 2 Empresas Certificadas *

** Empresas associadas ao Instituto Aço Brasil*

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Thank you!