Green Rio 2019

Henrique Petersen Paiva July 2019

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Leading in Electrification, Automatization and Digitalization

379,000

Employees

€83 bn Revenue

€6.1 bn

Net profit

11.3% Profit margin industrial business

Siemens presence in Brazil





Continuing operations; in R\$ millic except where otherwise stated	ons FY 2018 ¹		
Volume			
Orders	4,236		
Revenue	4,112		
Employees	Sept. 30, 2018		
Total ⁴	4,257		





Environment – Decarbonization: Own operations SIEMENS Siemens' direct contribution to decarbonization is to be CO2-neutral by 2030 Ingenuity for Life Levers for CO2-neutral Siemens CO2-reduction on track Drive Energy Efficiency Program FY 2014 FY 2018 By 2020 By 2020

By 2030 Leverage Distributed Energy Systems 33% 2.2 50% **CO₂-neutral** reduction million tons of operations reduction achieved CO₂emissions **Reduce Fleet emissions Purchase Green Energy** Annual savings from Energy Efficiency projects total to at least €20 million

Siemens is investing €100 million to reduce the company's own carbon emissions and to become one of the world's first CO₂-neutral industrial companies by 2030.

Environment

Our biggest lever toward decarbonization is the Environmental Portfolio





Environment – Decarbonization: Examples

Automation and Digitalization enable emission reductions



Electrification

Wind Power – 7 MW gearless offshore turbine



Ships – World's first electric ferry



Metros – Driverless operation

Automation



Wind Power – Remote Service

Digitalization



E-buses – Automated fast charging



E-aircraft – World-record electric motor

SIEMENS

Industry 4.0 – Energy savings with PLM Software



Smart grids – Virtual Power Plants





Collective Actions



Collective Actions





City Performance Tool



Pictures of the Future



and Biofuels Institute







UN Global Compact



United Nations Global Compact

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Digitalization in 2005





Digitalization in 2013







Digitalization changes everything

How much data is being created and stored?





Big data

By 2020, the volume of all data stored will amount to 44 zettabytes = 44 trillion gigabytes

44 ZB

≈ amount of all grains of sandon all beaches on earth

From centralized, unidirectional grid ...





...to decentralized and bidirectional energy balancing





In the future, autonomous buildings will talk to each other





Building Technology leveraging digital tools



Smart Buildings talking to one another





Intelligent Infrastructure enabling autonomous buildings & living cities



What does this mean for cities?

Digitalization: a disruptive force across all sectors... Cities have the second biggest impact



Economic impact of IoT in 2025 in €bn



Source: McKinsey (2015)

Factors driving the transformation in smart cities



Breakthrough technologies Changing customer behavior - Cloud, platforms - From passive consumers to active participants – Big data - Own energy generation - Artificial intelligence **Decarbonization** and distribution systems Sensors Digitalization - Small scale power generators Energy storage **Decentralization** Political/social goals e-Mobility, e-Highways - Electrical heating/cooling, heat pumps - Decarbonization - Power-to-x – Sustainability - Energy efficiency - Resiliency



How can data make cities resilient?

Brazilian cities require smart investments





5570 is the total number of Brazilian municipalities 22% of Brazilians live in the 17 cities with a population of over 1 Million

Investment into Smart Cities will require more than **59 Billion US\$** in Brazil in the coming years

Sources: IBGE; PUC

What impact can the right usage of data have in a city?







What is Siemens doing in cities?

Siemens knows IoT and connected devices Powered by MindSphere



Siemens is the #1 automation provider, delivering mission critical operation and automation technology, with:

- **30M** automation systems
- 75M contracted smart meters
- over 1M connected products in the field today



What is the City Perfomance Tool (CyPT)?





Contact





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City Portfolio: City Performance Tool (CyPT)



City Performance Tool

•A leading-edge simulation tool that can be used in many different decision-making scenarios

•Evaluates buildings, transport and energy technologies in a city through more than 70 technologies deployed at the desired time period and required implementation level

•Measures the impacts of a city's strategic plans, and compare traditional methods with state-of-the-art technologies

•Determines the implementation rate needed for any city to meet its future environmental targets

•Reports both environmental and economic KPIs across transport, building and energy sectors

In 2018...

Siemens signed an MoU with the city of Jundiai and the City of Sao Paulo and launched CyPT in both cities. The agreement signature for CyPT Sao Paulo happened during the World Economic Forum on Latin America 2018 in São Paulo.



MoU with the city of Sao Paulo, witnessed by Joe Kaeser & then incumbent mayor, Joao Doria

Solutions for future-proof cities



Benefits can result in significant CO2 reductions, air quality improvements and jobs created per unit of investment.



Picture of the Future (PoF) – Rio de Janeiro – A study on sustainable and innovative solutions for cities

Rio de Janeiro received the PoF study in 2012 and 2018





Trend Analysis Documentation/ snapshots 2030/40

		Adversariation and anticomposition anticomposition of an adversariation of a constant of a constant	Manada Ma				
-300 trends → 14 Trend Clusters							

Scenarios 2030/40





Solution Modules with Enablers

- Healthy Cariocas 12. Protective citv 2. Wellness Infrastructure 13. City as a service and Experience Empower the lower classes Smart Housing and Infrastructure Public Transport for Everyone Sustainable Energy Clean water everywhere
- Purified Rio 8.
- 9. City intelligence
- 10. Resilient city
- 11. Pulsating city

5.

6.

- 14. Integration of mobility provider by master plan and pricing
- 15. Extension of BRT ring to a high performance MRT system
- 16. Car-free downtown
- 17. Integration of last mile into public transportation network
- 18. Logistics network for city distribution

Comprehensive assessment, 80 Interviews, workshops, desk research

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