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Vale creates Energy Management System to reduce emissions and operations cost

The company plans to save, in an intermediate scenario, R$920 million in 10 years through the installation of smart meters in its units in Brazil and worldwide; the system is expected to decrease 120,000 tons of CO2 by improving energy efficiency in operations

R$20 million will be invested in the implementation of a smart energy management system to improve equipment performance and process automation across Vale's production chain – from mine to port –, thus reducing its air emissions. The system knowns as SmartEnergy is planned to install, by 2021, 2,000 intelligent electric power meters at 57 operating units and large equipment of the company in Brazil – for example, in ore grinding circuits, long-distance conveyor belt systems, and pumping systems. The smart meters reduce production losses through continuous evaluation of quality and identification of the causes of failures in power supply. Tests using this technology in two mines have saved R$90 million per year, as it eliminated equipment shutdown due to incorrect activation of the electrical protective system.

According to Vale's Energy Efficiency Project coordinator, Renato Arantes, smart meters can detect voltage and electric current variations very accurately, which is critical for adjusting protectors. These meters also register the power consumption and submit data to SmartEnergy, which enables interactions with several enterprise systems, including management of energy efficiency programs, among other functions. "Often, the electrical protective system shuts down important equipment or processes due to electric power fluctuations that could be tolerated without adding any risks to operations" explained Arantes. "These small interruptions affect productivity, as energy is wasted in restarting the equipment and processes as well as resuming normal operating capacity, not to mention the impact on production and increased CO2 emissions."

SmartEnergy IT coordinator, Laysa Mello, explained that the system will standardize the data generated by smart meters to analyze the energy use in the company. "This standardization enables better planning of energy consumption and demand in all operations, offering unprecedentedly higher data availability and accuracy," she added. Although it is an off-the-shelf software, that is, already available on the market, SmartEnergy had to be customized for Vale's needs. A team of 65 employees was trained to operate the system already deployed in mines in Pará and Minas Gerais and at Ponta da Madeira port complex, in São Luís (Maranhão).

Vale plans to deploy this equipment in its operations worldwide by 2020. In an intermediate scenario over 10 years, the company expects to save R$920 million with electric power through the installation of smart meters and process management automation in plants in Brazil and abroad. The estimate is to reduce 120,000 tons of GHG/year, equivalent to emissions from the average power consumption of 14,400 homes per year. Variables considered in this calculation included the cost of electric power, iron ore, nickel, and copper prices, as well as Vale's production. In the long run, the project will also focus on reducing other fuels used by Vale, such as diesel, natural gas, and the bunker used in ore carriers. That brings an even greater potential to reduce emissions. At a recent meeting with investors in New York and

London, the company announced a long-term goal of neutralizing CO_2 emissions from its operations by 2050 and also revising its emission reduction goal by 2030 to comply with the Paris Agreement. The percentage decrease will be announced in the first half of 2020.

In 2017, Vale tested the smart meters at S11D iron ore mine and Salobo copper mine, in southeastern Pará. Salobo saw a reduction of 107 hours of unexpected production shutdown caused by power quality issues, which translated into a production increase of 1.2 million metric tons/year compared to 2017 and 2018. In the case of S11D, 18 hours of production shutdown were avoided at the plant, resulting in an increase of 130,000 metric tons in annual production. By the end of 2019, more than 100 smart meters at S11D will be connected to SmartEnergy.

Other Scenarios

In addition to the intermediate, Vale evaluated other two scenarios – one conservative and the other optimistic (aggressive) –, to estimate savings in 10 years through the universalization of smart meters at its units across Brazil and around the world. The conservative scenario would see savings of approximately R$370 million and a reduction of 60,000 tons of GHG/year, equivalent to emissions from the average energy consumption of 7,200 homes for a year. In the aggressive scenario, the company would save approximately R$1.4 billion and reduce 180,000 tons of GHG emissions/year, equivalent to the average consumption of 21,500 homes/year.

More information

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