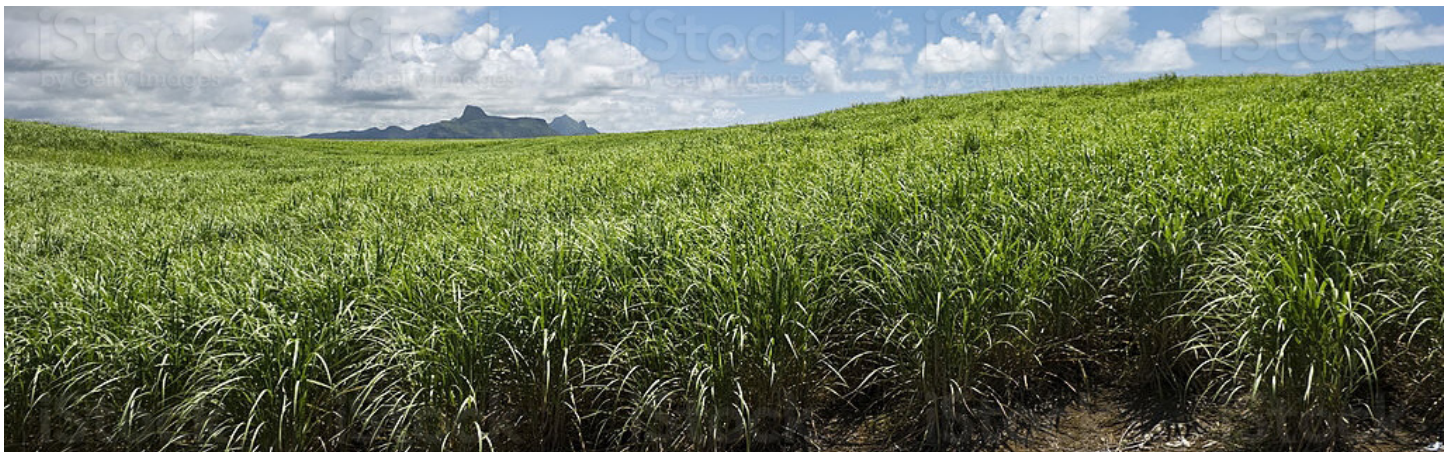




## Powering Manufacturing – Naturally: Generating Renewable Biomass Energy



### Objective

Produce steam and electricity from eucalyptus biomass and sugarcane bagasse to dramatically reduce greenhouse gas (GHG) emissions

### Challenge

Demonstrate the viability of using renewable energy at scale for continuous manufacturing operations

### Solution

Switch from natural gas to other energy sources, including sustainable biomass processing and reforestation along with cogeneration of steam and electricity

As of 2014, Brazil was the third largest energy consumer in the Americas (behind the U.S. and Canada), and energy demand in that country is expected to rise. As outlined in the country's INDC,<sup>1</sup> Brazil intends to achieve a 45-percent share of renewables in the energy mix by 2030.

Dow's large-scale production facilities in Brazil, the Aratu industrial complex and Santa Vitória, rely heavily on steam to operate. Dow partnered with Energias Renováveis do Brasil (ERB), a leading solution provider for biomass energy, to partially displace the use of natural gas and deliver more steam and power from renewable sources.

### A Long-Term Solution

These are pioneering projects in the Brazilian petrochemical industry. By generating steam with eucalyptus and sugarcane bagasse, Dow is demonstrating that industries can be

powered by clean energy – an innovation that sets a new standard in sustainable manufacturing:

Aratu:

- The eucalyptus biomass comes from dedicated farmlands in Bahia, meeting all of the criteria set forth in the Timber Standard for Heat and Electricity. The project also reforests approximately 5,000 hectares of degraded lands.
- This project combines innovation and job creation, contributing to more sustainable local development.
- More than 12 MW of electricity is sent back to Bahia's grid – energy equivalent to the consumption of a small city with approximately 230,000 inhabitants.

#### Santa Vitória:

- The plant produces 38 MW of power and 250 tons of steam per hour and consumes approximately 102 tons of biomass, meeting all the energy needs for Dow's operations in Santa Vitória and producing excess energy for the grid.
- Dow and ERB are working with The Nature Conservancy to identify priority land bank areas for conservation to ensure the protection and restoration of vital forests in the region.
- Dow will plant 2 million trees by 2019. The plant operates a large nursery supporting sugarcane species and local reforestation, producing an average of 500,000 seedlings per year.

#### Delivering Tangible Results

As the Official Carbon Partner of the first Olympic Games in South America, Dow has committed to delivering third-party-verified primary climate benefits of 500,000 tons of CO<sub>2</sub>e by 2026 to address the owned emissions of the Organizing Committee. Together, we are using the Olympic Games as an opportunity to implement energy-efficient and low-carbon technologies across major sectors of the Brazilian economy, demonstrating the power of innovation to reduce carbon emissions.

Working with NatureBank as our carbon consultant, we developed the Dow Climate Solutions Framework, quantified

the emission reductions associated with our projects and demonstrated how these emission reductions are beyond business as usual. NatureBank specializes in advisory, technology and project investment services with a primary focus on carbon.

We selected Environmental Resources Management (ERM) to provide third-party validation of the Project Plans against the Dow Climate Solutions Framework and verify GHG emission reductions. In addition, ERM conducts an assessment of forecasted generation of climate benefits based on verified evidences.

#### Leaving a Lasting Legacy

Through a comprehensive portfolio of solutions and our deep heritage and relationships in the region, we are working with customers in food packaging, construction, agriculture and industrial processes to increase awareness and adoption of energy-efficient and low-carbon technologies. Ultimately, the portfolio is designed to impact key sectors in Brazil and Latin America and will enable industries to do more with less, switch to lower-carbon energy sources and conserve energy through efficient solutions. These projects push beyond normal operations to

achieve more innovation, overcome real or perceived barriers and catalyze long-term change in market practices.

#### Commitment to the Future

Dow and Rio 2016 are also collaborating to enable an additional 1.5 million tons of CO<sub>2</sub>e in climate benefits to compensate for emissions beyond the direct control and influence of the Organizing Committee, such as those caused by travel, lodging and other activities.

To broaden awareness of climate change and related issues, we are also partnering

with Rio 2016 through the *Transforma* program to reach more than 7 million students in Brazil with science, technology, engineering and math (STEM) curricula in 2016. This program uses the Games to demonstrate the applicability and relevance of the sciences, and as an opportunity to teach sustainable practices that students can use in their everyday lives.

#### To Learn More

Go to [dow.com/carbonmitigation](http://dow.com/carbonmitigation) to learn more about Dow's carbon mitigation program with the Rio 2016 Organizing Committee and to view its results.

<sup>1</sup> Intended Nationally Determined Contribution towards achieving the objective of the United Nations Convention on Climate Change: [HTTP://WWW4.UNFCCC.INT/SUBMISSIONS/INDC/PUBLISHED%20DOCUMENTS/BRAZIL/1/BRAZIL%20INDC%20ENGLISH%20FINAL.PDF](http://WWW4.UNFCCC.INT/SUBMISSIONS/INDC/PUBLISHED%20DOCUMENTS/BRAZIL/1/BRAZIL%20INDC%20ENGLISH%20FINAL.PDF)

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