# BRIDGESTONE AMERICAS TIRE OPERATIONS

DES MOINES

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**COMPANY PROFILE**

Bridgestone is one of the world's leading tire producers. Their Des Moines facility produces Bridgestone and Firestone brand agriculture tires. This Bridgestone product is regarded as the highest quality agriculture tire available on the market. The Des Moines facility is the largest agricultural tire plant in the country and operates 24 hours a day, 7 days a week to meet demand.

**PROJECT BACKGROUND**

To support production needs, Bridgestone's Des Moines plant purchases on average more than 150 million gallons of water per year. Bridgestone is taking measures to optimize and conserve water usage with a corporate goal to reduce water usage by 13 percent, per unit of production. For the Des Moines location, this translates to a goal of achieving additional 7 percent reduction as compared to 2012 values.

**INCENTIVES TO CHANGE**

Bridgestone Corporation strives to improve their product and production processes in all ways, including continuous efforts to minimize their environmental impacts. Among other environmental improvement initiatives, the company is embarking on a water conservation program at all of their manufacturing facilities. In addition to their dedication to a sustainable manufacturing process, reducing water usage can generate a significant cost savings for Bridgestone.

**RESULTS**

**Reverse Osmosis:** A reverse osmosis system implemented to treat the boiler feed-water could allow for the boilers to increase their cycles of concentration from approximately 11 up to more than 50. This could save substantial amounts of water and reduce the amount of fuel the boilers consume to heat water that is ultimately rejected as blowdown.

**Condensate Recovery:** The plant's contact heaters account for approximately 90 percent of the plant's total steam usage. The contact heaters utilize directly injected steam as the energy supply to the system, which creates the need for significant excess makeup water. By closing off the steam loop and utilizing heat exchangers instead of direct injection, the condensate could be sent back to the boilers. This could dramatically reduce the makeup water required for the boilers and generate significant cost savings.

**Cooling Tower Improvements:** Improving the efficiency of the facility's cooling towers could provide significant environmental and cost savings. Repairing leaks and improving their overall operating efficiency could save more than 2 million gallons of water and more than $11,000 per year.

| PROJECT | ANNUAL COST SAVINGS | ENVIRONMENTAL RESULTS | STATUS |
|---|---|---|---|
| REVERSE OSMOSIS | $57,451 | 7,712,258 GALLONS<br>137,924 THERMS | RECOMMENDED |
| CONDENSATE RECOVERY | $587,641 | 35,402,877 GALLONS<br>962,340 THERMS | RECOMMENDED |
| COOLING TOWER IMPROVEMENTS | $11,475 | 2,016,000 GALLONS | IN PROGRESS |
| RAINWATER HARVESTING | $134,788 | 23,680,000 GALLONS | RECOMMENDED |
| FIRE LOOP LEAK REPAIR | $12,700 | 2,231,250 GALLONS | RECOMMENDED |

**Rainwater Harvesting:** The Bridgestone Des Moines plant has approximately two million square feet of rooftop. During a year of average rainfall, approximately 45 million gallons of rainwater falls on the roof and flows off into the creek next to the plant. It is estimated that as much as 31 million gallons of this rainwater could be captured and treated for use as boiler feed-water. Using this collection and reuse method could reduce the plant's water intake from the city by a conservative 15 percent.

**Fire Loop Leak Repair:** A study performed on the fire loop makeup line revealed that the system was leaking water. Repairing the leaks in the system could save more than 2 million gallons of water per year, at a cost savings to the facility of more than $12,000 annually.

**ESTIMATED CONVENTIONAL AIR POLLUTANTS DIVERTED IN METRIC TONS**

For Implemented and In Progress Recommendations

| TOTAL FOR ALL SECTORS | | | | | | |
|---|---|---|---|---|---|---|
| $CO_2$ | $NH_3$ | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC |
| 20.43 | 0.00 | 0.03 | 0.01 | 0.00 | 0.04 | 0.03 |

**ESTIMATED GREENHOUSE GASES DIVERTED IN METRIC TONS**

| TOTAL FOR ALL SECTORS | | | |
|---|---|---|---|
| $MTCO_2e$ | $CH_2$ | $N_20$ | CFC |
| 89.73 | 6.93 | 1.16 | 0.10 |

**ESTIMATED CONVENTIONAL AIR POLLUTANTS DIVERTED IN METRIC TONS**

For Recommendations in Recommended Status

| TOTAL FOR ALL SECTORS | | | | | | |
|---|---|---|---|---|---|---|
| $CO_2$ | $NH_3$ | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC |
| 1,713.53 | 0.10 | 2.73 | 0.52 | 0.25 | 3.09 | 2.18 |

**ESTIMATED GREENHOUSE GASES DIVERTED IN METRIC TONS**

| TOTAL FOR ALL SECTORS | | | |
|---|---|---|---|
| $MTCO_2e$ | $CH_4$ | $N_20$ | CFC |
| 3,940.92 | 590.97 | 42.28 | 8.42 |