

Nissan Showcases the Results of an Energy-Wise Corporate Culture

Nissan, a global automotive giant, showcases the importance of instilling a deep-rooted, company-wide culture of energy efficiency for achieving long-term success in energy management.

Nissan's commitment to smart energy management goes well beyond bringing its cutting-edge electric car, the Nissan LEAF™ to the market—it starts at the top with corporate leaders who are true environmental champions and have nurtured an energy-wise culture that flows throughout the company's three U.S. manufacturing facilities to improve their technologies, operations, and processes. In partnership with the U.S. Department of Energy's Industrial Technologies Program, Nissan has gainfully implemented a highly productive energy management program that has yielded reduction in energy usage even as the production scheduling has provided a unique set of challenges.

The Company

Nissan Motor Company was founded in 1933 with its first manufacturing location in Japan. It now has 16 sites worldwide and employs 180,000 staff members across the globe.¹ Nissan North America has three production plants—the Smyrna and Decherd facilities in Tennessee and a third location in Canton, Mississippi². These three U.S. facilities will be the focus of this case study.

The corporate leadership in Nissan's U.S. plants has established the mindsets and actions necessary for continuous improvements within the company. No matter what goals the company may reach or how many awards it wins,



Nissan's emphasis on "aggressive learning" encourages its staff to challenge themselves to always be the best at what they do—including managing plant energy use.

Part of Nissan's recipe for success in energy management is the company's strong partnership with government agencies, regional coalitions and nonprofit groups that support energy efficiency. Nissan is a proud partner of both Environmental Protection Agency's ENERGY STAR® program and the U.S. Department of Energy's (DOE's) Industrial Technology Program (ITP). The ENERGY STAR program offers multiple energy management tools and communications support resources. Benchmarking tools also help participating companies identify how various aspects of their energy management program are performing against peer industries. ITP, in turn, facilitates the implementation of energy efficiency improvements through a variety of tools, training, and technical and financial resources. Further, Nissan leverages both ENERGY STAR and ITP's resources to forge relationships with other leading companies so it can share ideas and help these companies meet their goals for energy reduction.³¹

Partnership with ITP

Nissan has a long history of partnering with ITP. Its three U.S. manufacturing plants have received a combined total of nine Energy Savings Assessments from ITP in conjunction with the Oak Ridge National Laboratory, and the Tennessee Tech University and Mississippi State University Industrial Assessment Centers. These assessments yielded recommendations for a variety of energy savings projects. Implementation of several of the recommended projects has enabled the plants to reduce their overall energy consumption by more than 30% and save more than \$11.5 million per year in energy costs. These energy savings projects included the following:

- Installed variable-frequency drives
- Reduced number of air compressors
- Sub-metering & monitoring
- Upgraded and replaced chillers
- Upgraded lighting and controls
- Air recirculation

"Working to manage our energy use is just good business. By increasing our energy efficiency, we use resources wisely, save money on our energy bills, and reduce our carbon footprint. This approach aids in our quest to be a sustainable 21st century manufacturer."

- Mike Clemmer, Director/Plant Manager of Paint and Plastics and Sub-Leader for the Energy Management Team



In its continual quest for energy efficiency improvement, Nissan became a *Save Energy Now* LEADER in October 2009, pledging to reduce its energy intensity by 2.5% annually. Nissan also became the first company to host the [Save Energy Now LEADER Industrial Sustainability and Energy Management Showcase](#) at its Smyrna facility in April

Nissan's Energy Efficiency Showcase: Smyrna Plant, Tennessee

Nissan's Smyrna, Tennessee, plant opened in 1983. The first vehicle the facility produced was the Datsun truck. The plant has since grown to occupy close to 6 million square feet of floor space with an annual production capacity of 550,000 vehicles per year, as of 2010.

- Since 2007, the facility has undergone three Energy Savings Assessments.
- In 2010, the facility received a \$1.4 billion loan from the DOE Loan Guarantee Program to retrofit the plant for producing the zero-emission, electric NISSAN LEAF®.
- Production of the NISSAN LEAF® is expected to create up to 1,300 jobs.
- In 2010, Nissan North America was named ENERGY STAR® Partner of the Year. The facility has received multiple ENERGY STAR awards and is a distinguished ENERGY STAR labeled facility.

2010. While underscoring ITP's extensive support to companies in implementing energy efficiency projects, the event showcased Nissan's energy management best practices to more than 100 attendees. These included other LEADER Companies, DOE and state-level officials, university representatives, and personnel from Oak Ridge National Laboratory. Attendees also received a tour of the plant floor and demonstration of several energy efficiency and sustainability projects that have been implemented by Nissan and have generated significant financial and environmental benefits.

Cultivating a Culture of Energy Efficiency

What makes Nissan's approach to energy efficiency notable is it's all out emphasis on creating and maintaining a corporate-wide culture of energy efficiency. To this end, Nissan developed its energy program in 2006. The energy management team was one of 10 cross-functional teams created by the newly-appointed Nissan North America Senior Vice President Bill Krueger. Mr. Krueger took his post with a major goal in mind – to empower all of Nissan's employees to take responsibility for the future of the company and to drive its competitiveness in the marketplace.

The Energy Management Team

Initially dubbed "Manufacturing Competitiveness Teams" or MCTs, the Energy Management Team was the first of the new cross-functional teams established. Mr. Krueger appointed the paint plant director as the head of this

working group—an appropriate choice as that segment of the automotive manufacturing process typically consumes 70% of the energy used in production. The founding members of the Energy Management Team were given the choice to build the best team they could by hand selecting the right employees to fill the additional roles.

The team started by addressing no-cost operational improvements like turning off anything they could when it wasn't needed during weekends or between shifts. In the first year, the Energy Management Team saved 11.4% in absolute energy usage. In 2007, they were tasked with trimming another 30% over the next four years—a goal they achieved by the end of 2008, shortly before the economic downturn began.

Responsibility for the energy budget falls on each plant's director. This not only supports the development of an energy culture at the plant level but also implies that the person who is responsible for decisions on the shop floor is deeply attuned to the importance of energy use. As they see and become aware of projects and opportunities for energy savings, an empowered choice or decision can be made with limited delay for approval.

The team's success is based on transparent, data-driven systems. Each of Nissan's plants has energy meters that measure the facilities' usage and over time, their progress toward efficiency goals. Nissan's measurement and verification (M&V) system takes a broad

approach to data gathering on a variety of processes, including lighting, space temps, production equipment and hourly utilities monitoring. Seeing the results of their efforts motivates employees and has raised awareness of the team company-wide. The Energy Management Team regularly has a waiting list of employees volunteering to serve on the team, but with this energy culture, everyone has the opportunity to participate.

“Employees are encouraged to internalize sustainability at a personal level, at home and in their community, so they come to the workforce with a new perspective and new vision.”

- Susan Brennan
Vice President,
Smyrna & Dechard Facilities

Top-Down / Bottom-Up Approach

Nissan’s strong corporate leadership is a driving factor in creating the type of energy-conscience culture that has made it so successful.

Mr. Krueger has maintained considerable involvement on energy matters, in addition to all of his other significant responsibilities. Despite his busy schedule, Mr. Krueger took the time to participate in Nissan’s LEADER showcase and shared his corporate vision with other peer and competitor companies, such as Ford and Hyundai, who had representatives in attendance. His active involvement reinforces the continued emphasis on Nissan’s culture of energy efficiency, and his enthusiasm helps prompt the team to keep challenging them to innovate in new ways.

At the core of Mr. Krueger’s vision is a bottom-up approach. From the beginning, he wanted the cross-functional teams to be comprised of a variety of people who were responsible for the day-to-day operations of the company and who could



Nissan 2010 Employee Earth Day Fair

bring unique perspectives and value to the process. The Energy Management Team is made up of personnel from manufacturing, engineering, legal, environmental, finance and other operational roles. Nissan thus effectively propagates a corporate-wide culture of energy efficiency – driven by the top management and implemented at the plant level.

This model’s value is reiterated by NNA’s Energy Team Facilitator, Ken Roden: “Creating an energy culture at Nissan starts with corporate management that embraces an environment for change. Our executive leaders promote a learning attitude in an environment where employees are encouraged and motivated to change, challenge mindsets, and think ‘outside the box.’”

Engaging Employees in Energy Efficiency

Employee engagement is something that many companies strive to achieve but can oftentimes prove elusive. In this regard, Nissan’s strategy was simple – consider what it is that employees want and how they perceive the actions of management. To that end, the Energy Management Team, with the support of Mr. Krueger and other corporate leaders, took the time to explain the company’s energy goals and how improved efficiency would eliminate waste and make jobs more secure.

Nissan communicates to its employees through multiple channels, including e-mail, company intranet, monthly

newsletters, scrolling messages on TVs located in break areas, as well as presentations in company meetings. Utilizing more than one communication method allows employees to take in the information through their preferred method, increasing the chances of retention and implementation. In addition, Nissan has established internal certificates and awards to provide recognition to high-performing employees from each plant. Onsite contractors and security personnel also help prevent and minimize energy waste during weekends and holidays. With the full support of employees from the bottom-up, Nissan’s culture of energy efficiency is firmly in place.

Taking the Culture Beyond the Plant Walls

Nissan employees are not only encouraged to practice good energy management at work, but they are also encouraged to incorporate it into every part of their lives. This tactic, known as *Behavioral Based Sustainability*, reinforces good habits and also helps to spur other ways of thinking about and addressing energy problems. It is a circular process where employees have the tools to be environmentally conscious at work and are encouraged to further develop those best practices in their homes and communities to help them think about their work in a more sustainable way.⁵

Nissan holds Energy and Earth Day fairs each year, which showcase outside experts offering solutions and

demonstrating products that help remove barriers to smart energy efficiency decisions that employees make as customers. Fall 2010 will also provide an opportunity for Nissan's second annual Supplier Energy Conference. At this event, Nissan's supply chain partners will be onsite to provide energy efficiency information and resources to assist employees in making energy efficiency improvements.

Further, to promote its energy and environmental programs to employees and visitors alike, Nissan makes use of plant signage, media resources and has begun incorporating the energy management program into their public plant tours.⁶

Employee Ownership: Sustainability Project

Nissan is working on a project dubbed the 21st Century Sustainable Manufacturing Project. The project is being led by Susan Brennan, a vice president of Nissan's two Tennessee plants. The goal of the project is to make Nissan's facilities as green as they can be and to further drive the energy culture by making its products and processes sustainable. This program compliments and builds on Nissan's shop floor management, employee engagement and safety awareness programs. With coordination between the Sustainable Manufacturing project and the Energy Management Team, a pilot program has been modeled to include an Environmental representative, or Green Team member, from each work group. Similar representation exists and has proven effective with Nissan's safety awareness program. Through this initiative, Nissan is able to offer yet another opportunity to engage its employees in energy and environment efforts.

Conclusion

The economic downturn has been detrimental to companies across all sectors and countries. However, Nissan North America has relied on its history of innovative thinking and willingness to take on tough tasks to maintain a strong business model that reaches into the future to do more than just sustain the company, but to also help it grow. Through the downturn, the Energy Management Team has focused on driving fixed energy usage to variable energy usage. As Ken Roden explained, "a large plant design can operate at larger volumes more efficiently, but the equation changes when you have a large plant operating at low volumes with the same fixed usage."⁸ Nissan undertook the daunting task of making its energy consumption optimized at variable production rates. To do this, they had to clearly define the fixed and variable usages within the plants and develop a more accurate method to predict or forecast usage at ever-changing production operating patterns. Next was to examine and segment each area of the production process and even shift schedules whenever possible. In the end, Nissan has put its North American production facilities in a place of strength and stability—ready to take on whatever economic and energy challenges come their way. All of this is made possible because of the corporate-wide culture of energy efficiency that Nissan has been able to foster.

The Nissan showcase demonstrated the extensive benefits and success that can be accomplished by any company from growing a company culture of good energy management practices, combined with support from ITP.

Endnotes

- ¹ Nissan Motor Company Global Website. <http://www.nissan-global.com/EN/COMPANY/PROFILE/>. Accessed May 19, 2010.
- ² Nissan in North America - Nissan USA. <http://www.nissanusa.com/about/corporate-info/nissan-in-north-america.html>. Accessed May 28, 2010.
- ³ Discussion with Ken Roden on May 18, 2010.
- ⁴ Wade Royal, "Smyrna Paint Plant Energy Reduction Strategy Presentation." http://www1.eere.energy.gov/industry/saveenergynow/pdfs/smyrna_paint_plant_energy_reduction_strategy.pdf. Accessed May 28, 2010.
- ⁵ Brennan, Susan. "Nissan: 21st Century Sustainable Manufacturing Presentation." http://www1.eere.energy.gov/industry/saveenergynow/pdfs/nissan_sustainability_showcase_21st_century_sustainable_manufacturing.pdf. Accessed May 28, 2010.
- ⁶ E-mail follow-up from Ken Roden on May 18, 2010.
- ⁷ Discussion with Ken Roden on May 18, 2010.
- ⁸ Discussion with Ken Roden on May 18, 2010.

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