DECARBONIZING THERMAL PROCESSES IN MANUFACTURING

Partnering with Honeywell Thermal Solutions enabled a leading wallboard manufacturer to build decarbonization strategies that align with their corporate net zero carbon goals.

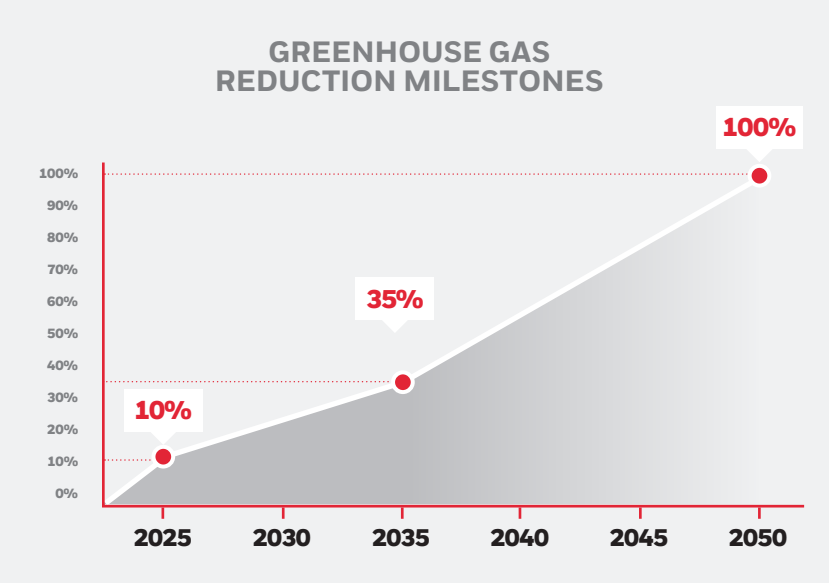
Case Study

Honeywell

MAKING A MEANINGFUL COMMITMENT

As global demand for improved sustainability, lower CO_2 emissions and greater environmental responsibility increase, companies that rely on thermal processes carry much of the weight in evaluating and reshaping their operations to be more viable and climate-friendly. This is especially true for a leading gypsum wallboard manufacturer.

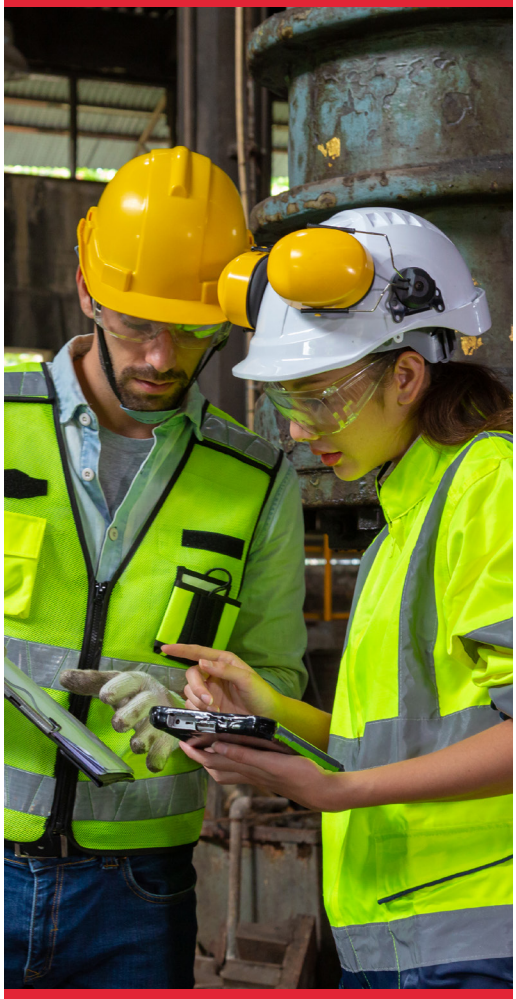
Building versatile, durable, high-quality wallboards—more commonly known as drywall—requires the manufacturer to deploy a variety of fuel-fired systems. While the fuel-fired systems are safe and operational, the manufacturer recognizes that they release a significant amount of carbon emissions when in use. Wanting to improve the sustainability of its operations and comply with its corporate operational transformation initiative, the manufacturer committed to achieving zero greenhouse gas (GHG) emissions by 2050 built on three reduction milestones: 10% by 2025, another 25% by 2035 and the remaining 65% by 2050.



A TRUSTED ADVISOR STEPS IN

The manufacturer realized that meeting these targets was a daunting task. They lacked the thermal application expertise and resources to establish a GHG baseline, roadmap, project feasibility, funding targets and ways to deploy multi-year energy and emissions reduction projects. Additionally, uncertainty about the future of technologies, fuel costs, government actions and green energy sources required a great deal of flexible decarbonization options to meet publicly announced targets while future-proofing their operations. **Honeywell's Sustainability Transformation Advisors stepped in to help.**

Since 2018, Honeywell Thermal Solutions (HTS) has worked with this wallboard manufacturer as a trusted safety and combustion advisor. Services performed by our teams over the last five years include but are not limited to training, thermal safety and reliability assessments across its portfolio. Our reliability, competency, thoroughness and success across these services have only strengthened the partnership with this manufacturer.



So, when the manufacturer's leadership team attended one of Honeywell's leadership business transformation workshops and shared details with our experts about their decarbonization efforts, we responded with information about our unique ability to help manufacturers with sustainability audits and emissions reduction solutions.

OUR APPROACH TO DECARBONIZATION

WE COLLABORATIVELY DEVELOPED FOUR KEY ACTIONS TO HELP THE MANUFACTURER MEET ITS IMMEDIATE AND LONG-RANGE GOALS

1 **Set reduction targets, compile GHG emissions data**

2 **Assess feasibility of EE, electrification, flexible fuels and renewable energy**

3 **Identify strategies and define portfolio reduction scenarios**

4 **Develop and display GHG emissions reduction plan and update regularly**

Honeywell's decarbonization approach has four main themes. The first requires establishing emissions reduction goals and compiling enterprise or pilot site GHG data. Once we understood the corporate GHG goals, the manufacturer and our **Sustainability Transformation Team** selected one of the manufacturer's sites to serve as its launch site for our programmatic approach to decarbonization. Prior to the on-site audit, Honeywell builds a detailed energy and thermal systems framework for the target site with pre-visit data collection forms covering facility thermal equipment, operations and the site's energy use (electric, natural gas, propane, etc.).

The second theme launched the decarbonization audit. Once on site, Honeywell Thermal Solutions deployed two tiger teams of subject matter experts specializing in data science, burner R&D, energy systems (electric, natural gas, hydrogen and propane), industry systems and process optimization.

The on-site tiger teams collaborated with the manufacturer's site and corporate personnel to review previously collected site data and assess operations in person. The teams evaluated 29 thermal processes:

- 8 production (i.e., kilns, kettles, calcidynes, rock dryers)
- 21 non-production (i.e., HVAC, hot water heaters, boiler propane lift trucks, etc.)

The teams' efforts included reviewing equipment drawings, process control reports and incoming utilities; surveying and capturing nameplate data, photos, temperature readings and operational logs; and interviewing key maintenance and operational employees. Prior to leaving the site, Honeywell reported preliminary equipment optimization and energy reduction findings, and completed additional information requests.

ENERGY TRANSITION ROADMAP: REDUCE, REPLACE, RECAPTURE

The third theme covers identifying strategies and defining portfolio reduction scenarios.

Our teams then aggregated all pre-audit and onsite data to establish the manufacturer's site-specific CO_2 emissions baseline of ~43,000 tons of CO_2 (tCO_2). Achieving 100% commitment drove the following milestone equivalents:

- **Milestone 1:** 2025 (~4,300 tCO_2)
- **Milestone 2:** 2035 (10,750 tCO_2)
- **Milestone 3:** 2050 (27,950 tCO_2)

Our team created a multi-year roadmap comprised of three strategies:

- **Reduce** – Digitizing and optimizing existing systems through energy efficiency improvements, better controls and burners, emissions monitoring, burner turning and heat recovery
- **Replace** – Provide transitional and flexible burners, fuel delivery and controls encapsulating the mixing of natural gas with 5% hydrogen or biogases on up to replacing natural gas with 100% hydrogen or green-sourced electric (i.e., wind, solar, hydro, nuclear)
- **Recapture** – These include carbon capture sequestration units post-combustion to recapture CO2 for storage or re-use in the thermal process or project

We also analyzed all equipment types against varying standalone and hybrid reduction strategies as well as technology advancements, forecasting models, ROI calculations and overall alignment with the manufacturer's goals. Ultimately, this created the plan for the fourth theme.

A PLAN TO MOVE FORWARD

Creating an objective energy transition roadmap for this leading wallboard manufacturer helped improve the sustainability of its operations and kickstart its journey to net zero emissions by 2050. Our decarbonization guidance, expertise and resources throughout this journey—along with our tenured success in thermal processes—provided the manufacturer with achievable goals to make short-term and long-term sustainable impacts. As the manufacturer looks to implement emissions reduction opportunities and map out plans across its other sites, Honeywell will be there every step of the way.

With sustainable change already underway and a strategy in place to make sure it continues; this leading wallboard manufacturer can simultaneously reduce emissions and its carbon footprint without sacrificing its high product quality.

The fourth theme includes developing and deploying a GHG emissions reduction plan and updating it regularly for progress and compliance reporting.

The manufacturing site's roadmap included dozens of energy transition opportunities compared against varying types of traditional energy use and green energy-use scenarios. We also outlined necessary CapEx/OpEx budgetary investments, operational risks (financial, technical and timing), ongoing cost impact, feasibility and a time horizon.

The energy transition roadmap achieved the following for this manufacturer:

1. Tangible OpEx projects to meet—and overdrive—the immediate milestone of 2025
2. Clear understanding of optimization, electrification, and hydrogen approaches to replacing energy sources
3. 23+ detailed carbon reduction scenarios that achieved all three milestones:
   - **10 REDUCE** opportunities
   - **11 REPLACE** opportunities
   - **2 RECAPTURE** opportunities

The manufacturer and Honeywell now have a collaboratively built roadmap that is a multi-year, objective decarbonization project planning resource.

For more information
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