PPG Energy Management Strategy

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ABSTRACT

External reviews of PPG Industries often cite strong, effective management of manufacturing operations with a concentration on cost control. This article describes the development of PPG's position on energy sustainability and climate change, followed by the creation of, and commitment to, energy reduction goals. The theme is one of securing management support and then designing the implementation process in alignment with our internal strengths. Energy reduction would be a core component of cost reduction.

PPG IS…

PPG Industries is a leading diversified manufacturer that supplies paints, coatings, chemicals, optical products, specialty materials, glass, and fiberglass around the world. PPG Industries was founded in 1883 when Capt. John B. Ford and John Pitcairn started the first commercially successful plate glass factory in the United States at Creighton, Pennsylvania. Known as the Pittsburgh Plate Glass Co., the enterprise focused on innovation and quality. 125 years later, PPG Industries is still dedicated to these priorities.

Today, PPG produces and markets well-known brands such as Pittsburgh, Lucite, and Olympic paints. Coatings by PPG protect airplanes, golf balls, circuit boards, packaging, appliances, flooring, automobiles, bridges, and buildings. PPG's chemicals help purify water and enable transitions photochromic lenses to darken and protect eyes from harmful UV rays. Windows in houses and high rises, and windshields in aircraft, use PPG glass.

PPG STRATEGY DEVELOPMENT

PPG recognizes its responsibility to address two of the critical issues facing the world today: energy security and climate change. There are scarcities of some energy supplies, and changes occurring in the climate may pose risks to health, the environment, and the global economy. Growing competition for reliable, affordable, and environmentally sustainable energy is a keen concern to PPG's energy-intensive coatings, chemicals, and glass businesses.

PPG is taking this issue seriously. In 2007, PPG formed an Energy Security and Climate Change steering committee, charged with developing and implementing strategies related to global energy security and climate change [Figure 1]. Subcommittees are charged with developing and implementing strategies on energy security; global climate change domestic advocacy; energy and greenhouse gas emissions; markets, products, and services; and communications.

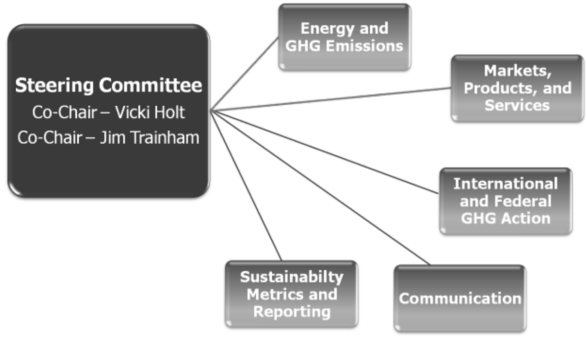

Figure 1

In late 2007, PPG announced its intent to reduce its total energy intensity 25 percent from 2006 to 2016, and its total global greenhouse gas [GHG] emissions 10 percent from 2006 to 2011. The reduction of GHG emissions demonstrates PPG's corporate-wide commitment to improving the global environment and increasing the efficiency of its operations. PPG previously committed to reducing its GHG emission intensity from sources in the United States 18 percent from a 2002 to 2012. It achieved this in 2006; six years earlier than the projected date [Figure 2].

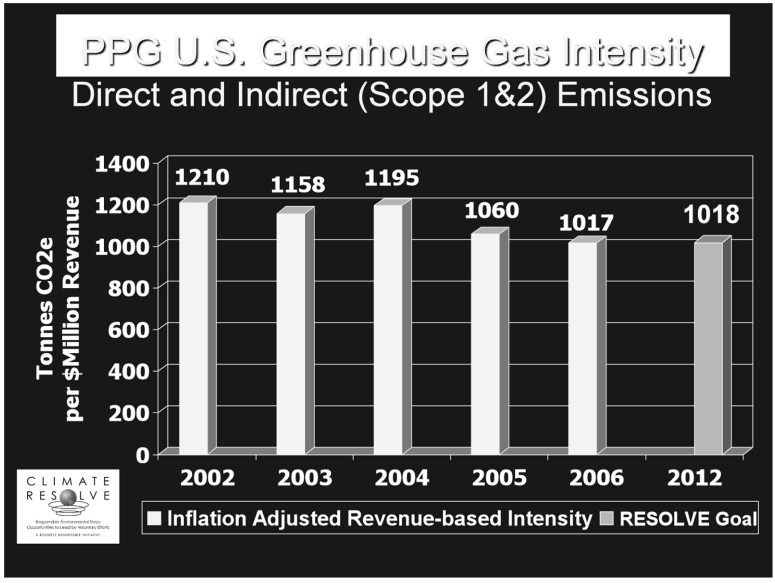

Figure 2

We continue to develop strategic energy management plans that consider suppliers, internal business and operations strategies and investments, product-development strategies, and customers' needs. PPG is bringing together its innovative talent, global reach, and technology to bring new products and processes to market that will reduce energy usage and bring new ecological solutions to its customers. Our strategy is designed to recognize and address the risks associated with unsustainable practices and the opportunities for products which save energy and favorably impact our lives and our environment. This is consistent with PPG's long history of global ethics, products, and environmental stewardship.

PPG's Position on Energy Security and Climate Change

As the world's leading coatings and specialty products company, we recognize our responsibility to address two of the critical issues facing the world today: energy security and climate change.

Our Beliefs

We believe that:

Growing competition for access to abundant, reliable, affordable, and environ-

mentally sustainable energy and feedstock sources has had a significant impact on the global economy.

Human activity has likely contributed to an increase in greenhouse gas [GHG] concentrations.

Both of these trends will likely continue, and as such pose risks to the global economy, physical environment, and human health.

PPG is well positioned to develop new and innovative solutions that address energy security and climate change concerns.

Solutions to the issues of energy security and climate change will require sustained and coordinated global cooperation and investment.

Our Commitments

We will continue to conserve energy and increase our use of renewable energy and raw materials.

We will continue to implement GHG emissions reduction programs throughout our global operations and set more challenging goals to further limit these emissions.

We will work with other interested parties to develop fair and effective international policies regarding energy security and climate change.

We will advocate a market-based price of carbon and credits for benefits derived from energy-saving products and products derived from renewable resources.

We will continue to develop and market leading-edge products that benefit the environment and conserve energy.

We will communicate with key stakeholders the risks and opportunities associated with energy security and climate change.

Charles E. Bunch
Chairman and Chief Executive Officer

ENERGY GOAL DEVELOPMENT

In 2007, PPG became an Energy Star® Partner member. Energy Star is a U.S. Environmental Protection Agency [EPA] partnership program. The EPA Energy Star guideline for energy management [Figure 3] is an excellent template for setting goals and action plans. Defining what would become PPG's energy goals was among the first tasks of the energy and GHG team. Any goals must be accepted at the top by the

CEO and be implementable by the businesses. Our goals would need to have relevance both internally and externally, and goal achievement must be consistent with improving the performance of PPG's strategic business units [SBUs] and the overall performance and reputation of the company.

It is at the SBU and facilities level where implementation will take place. To make the goals actionable, they had to be expressed in terms relevant to the manufacturing organizations and consistent with each business' continuous improvement process. The plan was to describe intended energy savings in terms of dollars saved, and while our goal would be to reduce energy use, we would implement in terms of reducing energy costs. The implications of this approach will be discussed later.

PPG uses about 90 trillion Btu of energy per year as measured on a net-purchased basis. This energy is roughly 68 percent natural gas, 12 percent purchased electricity, and 11 percent coal, with the remaining from a variety of sources. Annual energy spending is about $800 million a year. A 2½ percent annual reduction in energy may be expressed as roughly $20 million in savings. This captures the attention of management. Driving this further, if income is 10 percent of sales, this represents the equivalent of a $200 million increase in sales.

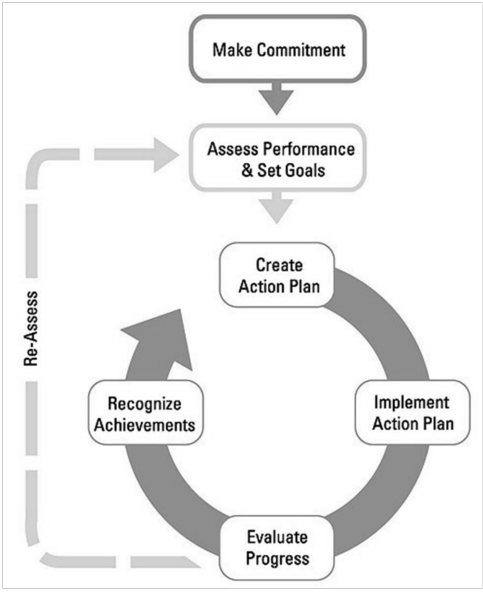

Figure 3

EPA Energy Star encourages member corporations to establish energy goals. PPG also participates in the U.S. Department of Energy [DOE] Save Energy Now® Leadership program. The DOE is asking corporations to commit to reduce energy intensity by 2½ percent per year, for 10 years to reach 25 percent. These initiatives, along with those of various non-governmental organizations [NGOs],

provide an external relevance to PPG's energy intensity goal. With the financial incentive described above and the external relevance described here, PPG management accepted the energy intensity goal.

The question became how to present this goal to the manufacturing leaders within the PPG strategic business units. PPG's businesses are quite diverse, not only in terms of products, but also in terms of energy intensity and energy cost as a component of manufacturing cost. PPG has a manufacturing leadership council whose members are accountable for all the manufacturing facilities around the world. This would be the target group for selling the intended energy goals. For external reporting, energy intensity is often expressed in terms of energy units per $1 million of revenue, or a similar revenue-based expression. This holds little relevance within a manufacturing facility where the effort is to maximize the amount of saleable product relative to the inputs. Thus our goal is expressed in terms of energy per ton of saleable product. Driving productivity in terms of yield of product is a drive towards meeting this energy goal.

Energy may also be reduced via the use of alternative fuels which may act more efficiently on the product. However, certain alternatives, while potentially more efficient may cost more, even on a net basis. Certain fuels may also yield more or less CO_2 equivalents (CO_2e) per unit consumed. We have an absolute goal for greenhouse gas reduction that I have not discussed as yet. For the moment, the point here is that the facilities are being asked to reduce energy dollars rather than Btu's or gigajoules. This is consistent with productivity goals and generally consistent with energy reduction goals. Alternative fuels are part of the equation, to be used based on availability and financial justification.

Finally, in selling this energy intensity goal to our manufacturing teams, we had to define the term "sustainability." This word has come to mean many things to many people in the context of climate change and finite supplies of energy. For the practical implementation of our energy intensity goal, "sustainable" means available and affordable. This will guide our implementation behavior.

Our second goal is the absolute reduction of greenhouse gases, expressed in tons of CO_2e by 2 percent per year for five years, 10 percent total by 2011. At constant production levels, this goal would follow the achievement of our energy intensity goal, but like most strategic business plans, ours calls for growth. We recognize that with any significant growth in production, achievement of this goal will require additional

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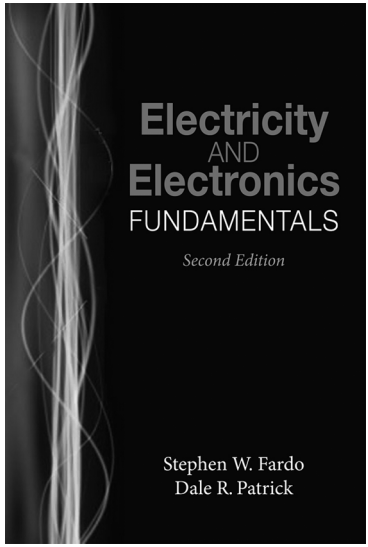

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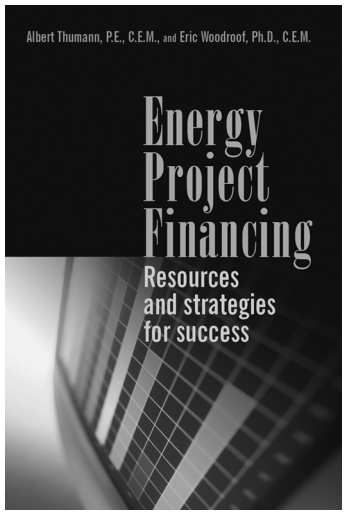

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management of our emissions. Also, a number of our new energy savings products, such as our super Low-E coating on glass, Solarban 70XL®, require additional processing steps. This means additional energy and an additional challenge for both of our energy goals. The good news is that the life-cycle energy savings from the use of this specially coated glass far exceeds that of production. Also, incorporating this and similar products into building design enables significant investment savings for heating, ventilation, and air conditioning [HVAC] systems followed by lower ongoing costs.

MEASUREMENT AND VALIDATION

To act on a goal, one must be able to measure it. Being a cost and efficiency driven company, PPG's businesses have long had systems in place for measuring raw material use, energy, production quantities, quality, and overall performance. This is part of our culture and a necessary component of our drive for continuous improvement. Goals, milestones, and action plans are a way of life which fits well within the U.S. Environmental Protection Agency's energy management circle of action, review, recognition, and renewal.

PPG uses an energy sources input form which is automatically emailed monthly to the energy coordinators at each of our facilities. Data from these forms are compiled in a central database along with process data to enable calculation of CO_2e quantities per standard conversion formula as described below. Process data are required as a number of our processes produce quantities of CO_2e in addition to that from the input energy source.

Reports are generated from this database showing usage, trends, graphs, and of course progress compared to our goals. We are currently in the process of improving our data and reporting system, seeking to add an element of automation and validation to the data input, plus improved feedback reporting to the business units. We also will add an energy project tracking system to improve awareness and promote adoption of best practices.

PPG uses the World Resource Institute/World Business Council for Sustainable Development [WRI/WBCSD] GHG protocol to develop the inventory. PPG has been tracking global GHG emissions from its manufacturing and R&D facilities since 2000. PPG reports 100 percent of

the Scopes 1 and 2 GHG emissions from operations under our control. In 2007, PPG began tracking selected Scope 3 emissions.

PPG uses US EPA's Climate Leaders program to review our emissions inventory data, as well as our progress towards our GHG emissions goal. In addition, PPG is receiving technical assistance from the EPA in determining organizational and operational boundaries, identifying the most appropriate emission factors, and documenting these decisions in an inventory management plan [IMP] that will ensure consistency and transparency in the inventory over time. The EPA performs desktop reviews of both the inventory data and IMP to ensure they meet the EPA's quality standards, and also conducts a risk-based on-site IMP review to ensure that the management plan is being implemented at the facility level. These reviews provide assurance to the EPA that a well-implemented GHG data collection and management system is in place to track progress towards our GHG reduction goal of ten percent from 2006 to 2011, and result in EPA recognition of PPG's corporate leadership on the climate change issue.

In 2008, PPG Industries became a founding reporter of the Climate Registry as it set greenhouse gas emissions reduction goals. The Climate Registry is a US-based non-profit organization established to measure and publicly report GHG emissions in a common, accurate, and transparent manner consistent across industry sectors and borders.

By joining the group, PPG has voluntarily committed to measure, independently verify, and publicly report its GHG emissions on an annual basis using the Climate Registry general reporting protocol. The protocol is based on the internationally recognized WRI/WBCSD protocol. Third party verification is a requirement for membership.

INTEGRATION WITH OUR BUSINESS SYSTEMS

All of us familiar with the corporate world are familiar with the constant addition of new business themes, processes, programs, report requirements, and other "extra" activities thrust upon us seemingly every day. Now we have new energy goals. So how do we deal with this? There is no shortage of accountabilities, reports, and activities that our people must already accomplish. Our answer was to look at the business processes already in place and incorporate our energy commitments within them.

At the core of PPG's corporate culture is our Global Code of Ethics. This policy states:

Our company's reputation for being an honest, fair and capable firm with which to do business, wherever we operate, is one of our most valuable assets. To ensure we maintain this crucial competitive advantage, it's important that everyone within PPG knows, understands, and conforms to one standard. As PPG continues to grow, one aspect that will not change is our company's commitment to ethical behavior. As PPG enters new markets, makes acquisitions and expands, we must reinforce our already excellent standards of conduct. It's crucial that new and veteran employees alike keep pace with the evolving legal and compliance standards affecting our company and their respective jobs.

Product stewardship and environmental stewardship are natural extensions to our Global Ethics Policy. Product and environmental stewardship is inclusive of energy and environmental sustainability. No new program or process is required, just the recognition and inclusion of these concerns and criteria.

Similarly, PPG has a well-documented and formalized capital project authorization process. Projects must be fully described in terms of scope, purpose, cost, and performance as part of our authorization of capital transaction [ACT] process. All capital projects require an environmental impact statement which must be signed by business and corporate environmental representatives. This statement describes the environmental impact of the project along with compliance with all regulations and permitting. With energy in mind, this statement has been enhanced to include changes in energy consumption, water and other resources, and emissions. Energy and resource efficiency alternatives are evaluated and outlined on this form. Project evaluation for approval of capital expenditure, still financially based, includes these factors.

All of PPG's businesses are required to develop and implement strategic business plans. These are multi-year plans for the business inclusive of environmental compliance, productivity, new products, and revenue and profitability projections. These plans are subject to review and approval by senior management. Our energy goals are now incorporated within these plans and part of the deliverables for which each business is accountable.

On a tactical level, each of our facilities has productivity goals inclusive of energy cost reduction. This "closes the loop" on driving

progress on reducing energy intensity. Performance is a component of personal compensation on almost all levels within PPG. Clear goals and measures of success lead to achievement, which is recognized and rewarded.

REVIEW AND RENEWAL

Integration within PPG's business processes continues here. Each year brings with it a renewal of our budgeting process along with our drive for continuous improvement. This means productivity enhancements to offset inflationary pressures, including energy and improved process and product performance. Our manufacturing excellence process includes a compilation of productivity enhancement projects along with their expected performance for inclusion in new productivity standards. As the saying goes "today's achievements are tomorrow's standards." Energy is, of course, a component of this. The drive is for demand reduction and efficiency improvement.

With review and renewal comes evaluation. That is, do we have the necessary resources and technology along with the financial justification to meet our goals? If not, what else must we do? What are the alternatives? These are tough questions, for some of which we have no answer. We compile and test ideas, part of our innovation process; develop and present projects; and continue our search for alternatives. Our goal is to implement what we can while always having a series of potential projects in waiting. Projects not implemented today due to technical limitations and limited returns may do better as technology improves and the cost of alternatives change.

CONCLUSION

This article presents a pragmatic, implementable approach to setting meaningful and relevant energy and GHG reduction goals and the elements of a management system to measure, track, and recognize progress. The intent of the approach was to establish goals that demonstrate both internally and externally PPG's commitment to energy conservation and the environment. The process started with developing PPG's basic beliefs and commitments, followed by top management's

acceptance of the proposed goals. Next, the businesses were brought on board via the manufacturing organizations. Here, the criteria for action were designed in alignment with business and productivity goals and consistent with our manufacturing excellence process.

Integration with PPG's business processes is central to our energy management approach, starting with our corporate ethics, products, and environmental stewardship; and extending to our continuous improvement process and capital allocation process. We are in our first year of implementation, still learning what needs to be done, and fully expecting to make changes as we move forward.

ABOUT THE AUTHOR

Jeff Yigdall is now in his 35th year with PPG, having worked and lived throughout the U.S. and Canada, working in float glass production, process development, business development, research, automotive glass, and engineering. He began his career with PPG in 1974 as a production engineer. During the course of his career, he has held positions as business venture manager, manager of operations, plant manager, research manager, director of production, and his current role, director of engineering. In this capacity, Yigdall is involved with engineering and process technology, international business development, and PPG's energy management strategy. Currently, he serves as chairman of PPG's corporate Energy & Greenhouse Gas team, also serving on the company's Energy Security & Climate Change steering committee. He also has several process and combustion related patents.

Yigdall holds a bachelor of science degree in ceramic engineering and glass science from Alfred University, Alfred, N.Y., College of Ceramics and a master's in business administration from Shippensburg University of Pennsylvania.

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