



Energy Managers Learn to Hunt for Energy Treasure

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ENERGY STAR for Industrial Plants

After an 8% reduction in energy intensity, a construction company thought it had squeezed all the efficiency gains out of its asphalt plant in Florida. How much extra savings could a one-day energy treasure hunt really yield?

What Is “Energy Treasure?”

Buried treasure at an asphalt mix plant? It’s not just found beneath the rocks in the stockpile. Treasure is right in plain view!

Energy treasure is the dollar savings that add up from energy that is no longer wasted in routine plant operations. Unless this treasure is hunted down, cost savings will often go unnoticed. That’s where energy treasure hunts come in.

Energy treasure hunts are designed to identify no-cost or low-cost ways to save energy with quick returns on investment (ROIs). Originating at Toyota in the early 2000s, energy treasure hunts are a strategic tool the ENERGY STAR program uses to help its manufacturing partners enhance the efficiency of their operations and save money in the process. Between 2020 and 2023, manufacturers participating in the EPA’s [Find the Treasure Campaign](#) reported finding more than \$70 million in savings.

Treasure hunts can help plants that are just starting to manage energy as well as those that are more advanced. “Sometimes there are managers who think they are already efficient and that there’s no more energy to be conserved,” said Bruce Bremer, ENERGY STAR Strategic



Figure 1: Participants on the hunt for buried (energy) treasure.

Industrial Energy Advisor. “Yet when they do a treasure hunt, they identify 5, 10, and, in some cases, 15% savings potential—much of which can be achieved through changes to operational procedures.”

Training the Trainers

Recognizing the potential of treasure hunts to help asphalt mix manufacturers reduce energy waste—and widen their operating margins—the EPA’s ENERGY STAR program and the National Asphalt Pavement Association (NAPA) teamed up to train mix companies on how to conduct treasure hunts. Designed as a train-the-trainer activity, ENERGY STAR brought together energy managers from a dozen mix companies to observe the planning of and to participate in an actual treasure hunt. The goal was to equip these energy managers with the right tools and understanding to implement hunts in their own plants.

Picking the Right Plant

The first step was to find a plant that was ready for a treasure hunt. ENERGY STAR partner VINCI Construction and their subsidiary Hubbard Construction offered to host the event at their Loughman Asphalt Plant in Davenport, Florida. Hubbard's Senior Environmental Manager and site energy coordinator Andrew Krentz confirmed the plant's interest, saying, "We've been successful in reducing our energy intensity by 8%. But we need fresh ideas on where to find that extra two percent. We're excited to see how a treasure hunt can help us."

Next, the VINCI/Hubbard planning team secured the buy-in from senior management, a key step for an effective treasure hunt and for the train-the-trainers event. The Loughman plant already had a goal to reduce its energy intensity by 10% between 2020 and 2025—part of the [ENERGY STAR Challenge for Industry](#). This made it easy for senior management to give their support. "Hosting the train-the-trainer event was a great opportunity to get our own folks up to speed on treasure hunts while also helping the industry as a whole advance toward net zero greenhouse gas emissions," said Phil Addison, Vice President of Hubbard Construction.

Creating a Culture of Energy Efficiency

The main goal of the event was to familiarize participants with the planning, execution, and follow-up phases of a treasure hunt so that they could use this knowledge to conduct treasure hunts at their own facilities. An important step in this training was ensuring that everyone understood that people at a plant are key to a treasure hunt's success.

Typically, treasure hunts are also used to enhance a company's ability to integrate energy efficiency in

PLANT PROFILE

Location: Davenport, Florida

Annual Energy Use:

Fuel: 38,500 MMBtu

Electricity: 550,000 kWh

Fuel source: Natural gas and waste oil

Number of staff: 4

Goal: Reduce energy intensity by 10% by 2025

everyday operations. "At the end of the day, energy is managed by people," said Bill Jerald, CalPortland Corporate Energy Manager, who facilitated this treasure hunt. "If they do not practice energy-efficient habits and feel ownership for the energy they use, energy will continue to be wasted."

To create a culture of efficiency, treasure hunts need to involve people across all operations. Plant operators may not be making the policies, but they are the first to see when energy is being wasted. Accounting staff review energy bills and understand the cost of energy, and managers should attend to see first-hand the potential the plant has to improve efficiency and cut costs.

Preparing for The Hunt & Assembling the Team

Planning takes time and cannot be underestimated. The planning team consisted of Andrew Krentz (Hubbard Construction site coordinator), Gene Weldon (VINCI Construction USA corporate energy and environmental lead), and Bill Jerald (treasure hunt facilitator). A few others from NAPA and the EPA's ENERGY STAR program also joined, focusing on the train-the-trainer portion of the event. The planning team invited staff to participate,

obtained the plant's energy and operations data, arranged day-of logistics, and prepared training materials.

The planning team met several times in a period of 2–3 months leading up to the event and followed the steps in the EPA's [Treasure Hunt How-To Guide for Industrial Plants](#). As part of the planning process, the Hubbard site coordinator compiled:

- Utility rates to quantify cost savings opportunities from energy reduction projects;
- The past 12 months of the plant's fuel and electricity usage and associated costs to quantify the magnitude each savings opportunity would have to help the plant meet its energy goal; and
- An inventory of equipment with nameplate capacity so teams could quickly quantify savings.

Regarding the ease of securing this data, the Hubbard site coordinator noted that Hubbard's facilities did a good job of keeping records on production and fuel use, but electricity usage and rates were not as handy to those at the facility level. The coordinator found that working with utility companies made it easier to access this information.

Finally, staff were identified to participate in the hunt. When selecting staff to participate in a treasure hunt it is best to select a cross section of positions across the company, from people who use energy onsite to those who are in management and support positions. In addition to Hubbard staff, the VINCI/Hubbard team welcomed participants from other mix plants and peers in related sectors—including ready-mix concrete, oil & gas,

and others to create an opportunity for learning and cross-industry sharing of knowledge.

On-Site Treasure Hunting

This event was abbreviated in several ways due to limited time. The day of the training started with a safety briefing. Next, participants were assigned to groups with a particular area of focus: compressed air, heating, electricity, or operations.

In most treasure hunts, the facilitator spends about an hour explaining what a treasure hunt is and what teams are expected to do during each part of the day. Given time constraints with this event, the explanation of expectations occurred during a virtual meeting prior to the event.

Another adaptation for the abbreviated hunt was to allow each team to focus on all the areas. For larger plants, companies may choose to assign one team to focus on a single area of expertise, such as the compressed air system. But "since the plant footprint was relatively small, during this treasure hunt we made the decision for all teams to rotate between the four areas," explained the treasure hunt facilitator.

Following the briefing, teams visited portions of the plant and recorded observations. They were given copies of the [ENERGY STAR Treasure Map for Asphalt Mix](#) plants to assist in identifying potential savings.

Evidence of learning was obvious during the plant tour. As part of the review of the plant's drum, one participant asked how often the plant tunes its burners. The plant representative in the group explained that it is common for burners to be tuned once a year. Another participant from a peer industrial sector explained that although they

“don’t change the fuel sources as much as an asphalt plant, they tune all the time.”

A benefit of treasure hunts is the observation of the plant for energy waste during both production and non-production periods. The treasure hunt was planned so that teams would be able to observe the plant running in the morning and shutdown in the afternoon. The treasure hunt facilitator noted equipment left running during non-production hours. Further, several teams noted that the aggregate conveyor and vibrating screens did not automatically stop moving when the dryer drum was not operating.

Compressed air systems are perennial sources of energy waste and provide quick savings opportunities in manufacturing plants. Teams observed how long the compressed air system took to deplete, giving clues about the existence of large leaks in the system. “Don’t be shy about looking at the compressor manual for set points and parameters,” encouraged the treasure hunt facilitator. He noted that when plant operators leave the company, their replacements often continue using the same setpoints without questioning whether they are best for current operating conditions.



Figure 2. Thermal imaging gun showing a hot spot at the opening of a silo.

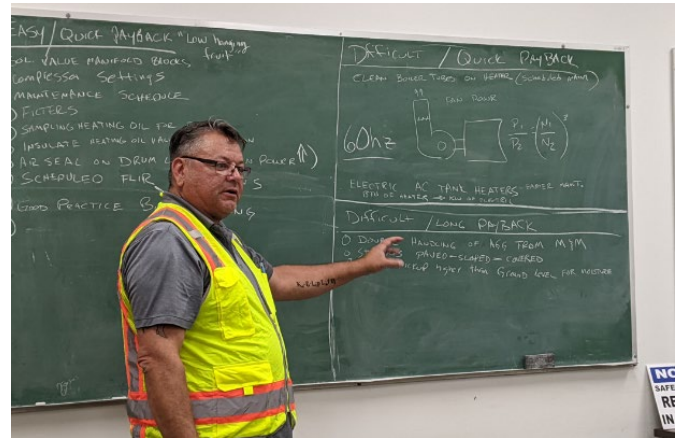


Figure 3. Treasure hunt facilitator, Bill Jerald, helps participants group savings opportunities based on their difficulty of implementation and payback period.

Post-Hunt Debrief

After the hunt, the teams came together for a post-hunt debrief where they compared findings and agreed on a list of the opportunities with the most potential. For this hunt, the treasure hunt coordinator, with the help of the group, organized savings opportunities by ease of implementation and payback period.

One participant showed pictures taken with a thermal imaging camera of heat escaping the hot oil heater, the bottom of the binder silo, the binder silo manhole, parts of the dryer drum, and pipe joints. Another participant noted, “There’s a lot of insulated pipe, but the joints aren’t insulated. If that’s the case, why insulate at all?” Insulation was an opportunity everyone agreed on.

Another participant noted “maintenance over repair” is the way to go—not only to extend the life of equipment but also to save energy along the way. He shared that “[some operators] don’t like having a maintenance system. They like having everything that needs to be done in their heads. No work orders.” The group agreed that creating a more controlled maintenance system could

improve efficiency but might require convincing operators to change their behavior.

Two hours in, the group had identified more than a dozen savings opportunities. The treasure hunt facilitator cautioned the teams that “you have to be okay with not finding everything. You can make lists forever, but at some point you need to stop analyzing and start implementing.”

Opportunities Identified:

1. Air compressor preventative maintenance schedule optimization.
2. Replacement of dirty compressor filter.
3. Evaluate maintenance sampling of heating oil for effective heat transfer.
4. Evaluate maintenance schedule FLIR inspections for other heat loss points.
5. Interlock feed conveyor system.
6. Install photocell light sensors in MCC room.
7. Repair driver door access for paperwork, HVAC loss.
8. Evaluate compressor modes of operation.
9. Repair solenoid manifold to prevent air leaks in silo loadout system.
10. Insulate heating oil valve bodies and other insulation points.
11. Repair air seal on dryer drum reducing cold air into system.
12. Regularly tune heating burners.

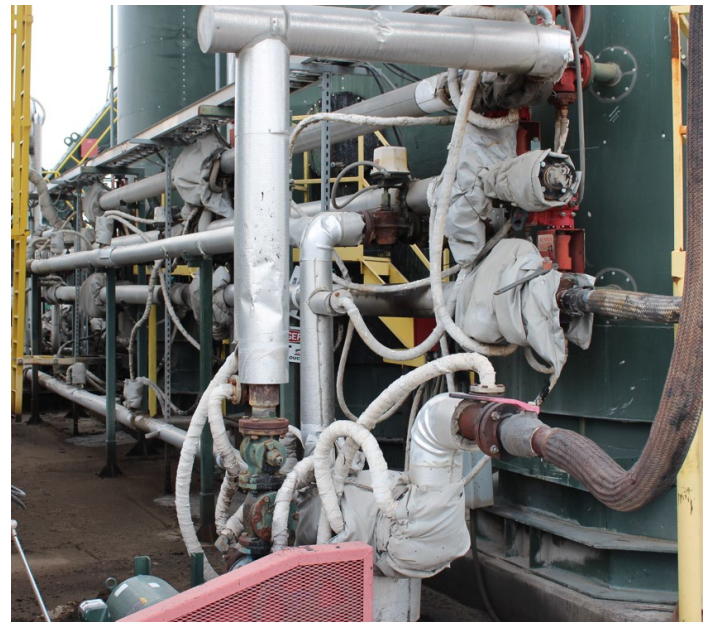


Figure 1. Piping that is partially insulated.

Adding Up the Treasure: Savings Identified and Next Steps

Following the hunt, participants work together to calculate savings using [Detail Sheets](#). Detail Sheets are used to systematically document and calculate potential energy-saving measures and provide a standard format for quantifying the energy cost and consumption reduction opportunities identified during the Energy Treasure Hunt. The sheets used for the hunt were developed by the EPA and have separate tabs for each energy optimization project, which are then compiled into a summary dashboard of all potential savings.

Participants can use other resources for help in calculating the benefits of specific projects, including worksheets from [QIP 132: Production Strategies for Saving Money and Reducing Emissions](#) and calculators available through the Department of Energy’s [MEASUR](#) tool.



Figure 2. Treasure hunt participants including staff from Hubbard Construction Co., VINCI Construction, EPA/ENERGY STAR, NAPA, CalPortland, CEMEX Inc., CITGO Petroleum, Colas Inc., Construction Partners Inc., Curran Contracting Co., CWR Contracting, Heaven Hill Brands, N.B. West Contracting, O&G Industries Inc., Payne & Dolan Inc., Rogers Group, and Walbec Group.

The detail sheets were used to develop an action plan for achieving the results, and the plan was presented to management to for buy-in.

For the train-the-trainer event, VINCI and Hubbard energy managers met separately after the onsite treasure hunt to calculate the potential savings opportunities that had quick ROIs and were easiest to implement. They reported the high-level results to the group. The opportunity with the largest potential for savings was regular tuning of the burner, with an estimated annual savings of almost \$20,000. The second-largest savings opportunity came from insulation projects, with the potential to save upwards of \$3,000 per year in energy costs. However, the quickest fix identified was repairing a leaking solenoid valve in the compressed air system, which was potentially wasting about \$2,000 per year in energy costs. The total savings identified added up to about 2.4% of the annual energy use of the plant.

“That 2.4% will have us exceed our 10% energy intensity reduction goal,” explained Krentz. Eager to secure EPA’s recognition for achieving the [ENERGY STAR Challenge for Industry](#), VINCI and Hubbard energy and environmental managers shared the results of the treasure hunt with both upper management and plant operators and set timelines for implementation of the recommendations. They also received a certificate of recognition from the EPA for completing a treasure hunt through the [ENERGY STAR Find the Treasure Campaign](#).

Debrief

Overall feedback from the participants was positive. Attendees left the training with new areas of focus and a renewed vigor for saving energy. Andrew Kowalski of Rogers Group said, “Sharing information between the other participants and jointly coming up with ideas was greatly beneficial.”

Others felt the experience prepared them well to conduct their own treasure hunts. Rachel Nally of Heaven Hill Brands commented, “Despite the differences between the distilling and asphalt mixing industries, the equipment and processes we use have surprising similarities.” She cited the drying processes used to remove moisture from spent grain at distilleries and aggregate at asphalt plants. She continued, “this experience helped me feel more confident in my ability to facilitate a treasure hunt at one of Heaven Hill Brands’ facilities.”

“Creating a culture of efficiency and teaching people how to find savings is key,” said ENERGY STAR’s Bremer.

“Make sure team leaders are briefed on the important role they play in facilitating the hunt, rather than being responsible for finding the opportunities.”

Additional Tips

When conducting a treasure hunt, reach out to staff from multiple plants in your portfolio to participate. Also invite your utilities, local [Industrial Assessment Centers](#), industry peers, and other third-party consultants to help fill out your on-site team.

Resources

Plenty of resources are available to help you conduct a treasure hunt at your facility. Here are a few that were utilized in this training:

From the EPA’s ENERGY STAR Program (energystar.gov/treasurehunt)

- [Treasure Hunts: A How-To Guide for Industrial Plants](#)
- [Asphalt Mix Plant Energy Guide & Treasure Map](#)
- [Detail Sheet for Industrial Plants](#)

Other Resources

- [QIP 132: Production Strategies for Saving Money and Reducing Emissions](#) (NAPA document authored by TJ Young)
- [Industrial Assessment Centers](#) (<https://www.energy.gov/mesc/industrial-assessment-centers-iacs>)