Reward Your Clients for Your Good Work

Obtaining Energy Conservation Incentives in New Construction and Retrofit Projects

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Roadmap

- The ESI Program
  - Why do conservation incentive programs exist?
  - What's in it for me and why should I care?
  - Ok, now that I care, how do I proceed?
- Designing with Conservation Programs in Mind
- If we have time - Savings Opportunities
  - New Construction
  - Retrofits
    - Hint: It's not just VFD's . . .

Why does conservation matter?

- Water/Wastewater sourcing, treatment, distribution, collection, conveyance, treatment, and disposal accounts for about 3% of the nation's energy consumption.
- BPA capacity is becoming constrained, and conservation is the lowest cost resource.
- "Tiered" rate structures start in FY2012– so local utilities (BPA's customers) want to keep their base allocation open to attract new customers and allow for growth.

Why should you care?

- Your electric rates are going to go up. Have they ever gone down?
- Electrical costs associated with pumping and treatment is often the highest non-labor cost for a municipality– and one of the few costs that can be reduced without impacting water quality.
- The lifetime costs of most equipment is incredibly dependent on its efficiency.
- Systems are designed for 20 year predicted flows and built by low bid project delivery methods.
  - Chances are you're running at less than best efficient point on much of your equipment.
  - Often that means equipment is working harder than it needs to.
- The SRF grants and loans have "green" requirements now, and energy projects qualify.

What's in it for you and your clients?

- Significant incentive rates.
- Normally free assistance in identifying potential projects, shepherding projects through the system, and performing measurement and verification on the installed measures.
- Ongoing energy savings for life of the measure.
- Often reduced maintenance cost from turning off or turning down equipment.
- Aesthetic and comfort improvements – e.g. better lighting, better HVAC.

So what is the ESI program?

Energy Smart Industrial Program Components

Energy Smart Industrial Partner (ESIP)
Face of the program

Custom Projects

Traditional Capital Projects

Energy Management - Pilot

- **Energy Project Manager (EPM)** — Addresses End User Staffing
- **Track and Tune (T&T)** — Addresses O&M Savings
- **High Performance Energy Mngt. (HPEM)** — Addresses Corporate Management And Culture

Trade Ally Driven

- **Small Industrial (SI)** — Addresses Small Projects
- **NW Trade Ally Network (NW TAN)** — Addresses Lighting Projects
- **Green Motors Initiative** — Motor Rewinds

Technical Service Proposal (TSP) Consultants
Provides Technical Consulting

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Custom Projects

- Classic, utility-funded incentives for traditional capital projects.

- Pumps
- Fans
- Compressed Air
- Refrigeration
- Lighting
- Motors
- Variable Frequency Drives
- Control Upgrades
- Process Upgrades

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-Current incentives are up to 25 cents per kWh saved in first year, depending on individual utility's program.

-Capped at 70% of project cost

- -You get the lesser of the incentive OR 70% of project cost.
- -Project cost can include design fees, and can be incremental cost between "baseline" and "efficient" equipment for new construction

-Paid based on Measured and Verified (M&V) savings.

- -The payment comes after the project is complete, so capital funds still needed upfront to cover the project.

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Things to keep in mind . . .

aka – The Rules.

- Incentives are rebates, not grants.
  - Payment is made only after the project is complete, the M&V period is complete, and the Completion Report is accepted.
- Incentives are not fixed; the amount depends upon actual kWh saved.
- Except for rare, special circumstances (to be discussed soon), project costs cannot be incurred until a Project Proposal is submitted and approved.
  - This is the contract between BPA and the local utility that guarantees payment for measured and verified savings.

- There is no minimum or maximum project size.
- The program is “agnostic” as to technology, vendor, other funding sources, use of the incentive money, etc.
- If the more efficient alternative costs less initially, there is no rebate.
- We can “bundle” multiple measures to help avoid leaving incentive money on the table.
- A project that has a simple payback of 6 months or less before incentives does not qualify for incentives.

The most common – and frustrating – tripping point is calling us too late to take advantage of the program.

A few more guidelines to keep in mind.

- For retrofits, we look at what is installed now as the baseline.
  - The cost of the retrofit is the project cost.
  - The *actual* post-project energy usage vs. *actual* pre-project energy usage is the basis for savings.
  - If existing equipment is at the end of life, then we are closer to “new construction” mode.

A few more guidelines to keep in mind.

- For new construction, we look at the difference between a “baseline” approach and a more energy efficient approach.
  - The savings is the difference between *estimated* baseline usage and actual, post-project energy efficient installation usage.
  - The project cost to be incentivized is the <u>difference in cost</u> between baseline and the more efficient alternative.
- For end of life equipment, baseline can be replacement with identical equipment, if still available and viable.

How can we best utilize the program for our client's benefit?

First Steps -

- Call the local power utility and ask if conservation incentives are available for water and wastewater infrastructure.
  - In Washington, Oregon, ID, western MT, *for public utilities (i.e. coops, PUDs, municipal light department)*, contact me.
  - In Oregon, for investor-owned utilities, contact the Energy Trust of Oregon (ETO).
  - In Washington and Idaho, for investor-owned utilities, contact their industrial conservation engineers
- When?
  - As soon as possible . . .

- Early is better for several reasons:
  - The CIP timing might be impacted by incentives.
  - During pre-design, “big picture” ideas are batted around and thrown out or kept in play – incentives can impact those decisions.
  - By 30%, the process (and most of the process equipment) has been selected.
  - If you move forward knowing what paperwork will be required for the incentives, you can efficiently collect and store it for submission / support.
  - Feasibility studies can be included if a project results, but only if we obtain permission to include those costs up front.
  - If practical, bid options can be utilized for different equipment or processes. This creates the “baseline” and “alternate” cost estimate automatically.

- Help the program help you:
  - For new construction, “baseline” can be difficult to define, unless there are code issues (e.g. Washington Energy Code and new rules for Premium Efficiency motors), so you can help define that.
  - Perform or obtain “place holder” estimates for equipment and features that could have been, but aren’t, included in the project.
    - These help form the “baseline” cost estimate.
  - Write specs or bid forms to make it easy to collect actual cost information.
  - Call as often as you want / need / must to ask questions and get clarification; we are here to help make the process as easy as possible.
  - Be open-minded, and encourage your project team to take a fresh look at everything.

Some Ideas For Your Consideration

Designing for the Day After Tomorrow

- An “efficient” machine’s energy consumption drops as fast as, or faster than, the load.
  - However, even great equipment remains efficient across a fairly narrow range of loads
- An efficient system, then, must encompass enough individual, parallel machines to cover the entire range of loads expected over the course of its lifetime.
  - We are really good at picking out efficient equipment to satisfy the peak loads of the future.
  - We tend to ignore or downplay what happens the day after start-up.

Designing for the Day After Tomorrow

- Assume peak demand of 800 GPM in 2031
  - The lowest cost alternative (while insuring redundancy) is to install 2 ea. 800 GPM pumps.
  - We recognize that you can't get 8:1 turndown, so often the next (and selected) choice is 3 ea. 400 GPM pumps.
- But, look at that 800 GPM peak. It will be needed during the peak week of summer watering season. That's 1/1040th of the lifespan of the system.
  - The incentive programs exist to help cover the cost of installing 5 @ 200 GPM pumps, or 1 @ 100 GPM + 3 @ 400 GPM.

Guidelines for finding conservation opportunities

- Find loads that run continuously or nearly continuous
- Look at your electrical diagram and pick out big motors
- Systems that are run on simple (or no) control
- Seasonal loading / seasonal permits
- Systems that could, but don’t, turn down.

Pumps, Fans, and Blowers Are Big Users

- Main idea:
  - Pumping power equation:
    - BHP (water hp) = (GPM * TDH') / (3960 * pump eff.)
    - Electrical hp = water hp / motor efficiency
  - Similar equations for fans and blowers
  - Power can be reduced by:
    - Reduce flow rate
    - Operate at lower differential pressure
    - Higher efficiency equipment

Some project ideas based on pump equation:

- Match (reduce) power to load
  - VFD's in lieu of control valves
  - VFD's in lieu of dampers on odor control or foul air systems
  - Install an additional, smaller pump in lieu of internal recycle flows

- Use efficient equipment – (increase denominator)
  - Check that your pump impellers are correct for actual conditions
  - Use your most efficient equipment first and most often

Project ideas – cont.

- Reduce line pressure or pump lift – and incorporate the incentive amounts into your life cycle cost analysis
  - Upsize sewer force main or water main size.
  - Most process pumps are fairly low head, so 2 or 3 feet of pressure difference can be a good percentage of total head.
  - Minimize recycle piping length and elevation gain

Project ideas – cont.

- A project doesn't have to touch an electrical panel to be an "energy project"

- Eliminating electrical consumption completely
  - Replace lift station with gravity sewer
  - Situate the treatment plant to take advantage of gravity
  - Possible to select groundwater source points to reduce or eliminate pumping energy?

- Or – Use electricity instead of gravity
  - Use VFD's in lieu of reservoirs to avoid pumping up the hill and then burning that hard-earned elevation through a PRV.

For wastewater folks . . .

- Aeration systems are huge consumers
  - Fine bubble diffusers – 30% + reduction over coarse air
  - Active DO control
  - Modern blowers with good turn down capability
  - Are you nitrifying? Do you need to? Could you denitrify and get that oxygen back?
  - Improve performance of primary clarifier

- Aeration systems are huge consumers
  - Investigate alternative aeration options on oxidation ditches
  - Newer floating aerators and surface aerator paddle design are more efficient at transferring O2 into water
  - Circulators and mixers in lieu of using aeration for mixing
  - Bio-domes are a recent development

Summary

- Programs exist to save energy, and the incentives can be lucrative – so take advantage of them.
- New construction and retrofit projects qualify.
- A project doesn't have to touch an electrical panel to be an "energy project."
- Early is better.

Please call or email to discuss anything presented today, or regarding your projects. We are here to help!

Thanks!

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