

# POWER

## SUSTAINABILITY REPORT



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## OUR APPROACH

### DESIGNING FOR A SUSTAINABLE FUTURE

POWER Engineers understands that every project we undertake has an impact on the earth, its resources and society. We believe it is important to do our very best to help meet the world's present needs without compromising the ability of future generations to do the same.

This vision drives us to operate our business in a sustainable fashion, which includes implementing energy and materials conservation measures, maintaining a healthy workplace and developing relationships with the surrounding community. However, it's how we approach each consulting opportunity that makes the biggest difference for future generations. Through our relationships with our clients, we can promote sustainable design and construction practices. We can educate and lead them to choices that meet their needs and objectives while limiting the environmental impact of their project.

That's what sustainability means to POWER. We live it through our people, our projects and our practices.



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POWER Engineers is 100% employee-owned, and that means we're all involved in creating sustainable solutions. Many employees participate in national programs and present sustainable design practices to international audiences. In some areas, our people are sustainability thought leaders.

**OUR CORPORATE SUSTAINABILITY COMMITTEE** Now entering its eighth year, POWER's Sustainability Committee continues to promote how we can be better stewards of the planet. This includes creating design philosophies, publishing regular communications to all POWER employees and welcoming suggestions on how we can be even more sustainable. It's a way to ensure we stay responsible and practice what we preach.

## CORPORATE MEMBERSHIPS

INSTITUTE OF SUSTAINABLE INFRASTRUCTURE (ISI)  
 U.S. GREEN BUILDING COUNCIL (USGBC)  
 AMERICAN SOLAR ENERGY  
 AMERICAN WIND ENERGY ASSOCIATION (AWEA)  
 GEOTHERMAL ENERGY ASSOCIATION (GEA)

ENV SP  
 CERTIFICATIONS **9**

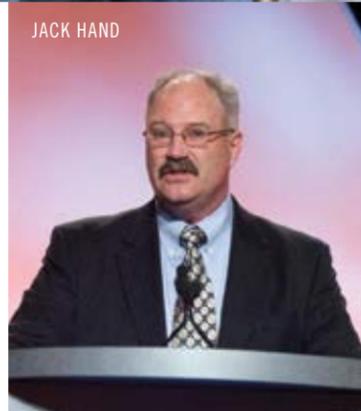
LEED  
 CERTIFICATIONS **19**

SIAB BOARD  
 MEMBERS **1**

## PEOPLE



PETER CATCHPOLE (LEFT)



JACK HAND



DICK COROLEWSKI

**IN SOME AREAS,  
 OUR PEOPLE ARE  
 SUSTAINABILITY  
 THOUGHT LEADERS.**

### TAKING A LEADERSHIP ROLE

POWER Chairman of the Board Jack Hand serves as chair of the American Council of Engineering Companies (ACEC) Energy and Environmental Subcommittee.

In addition to recommending policy positions to the full committee, he has advocated and testified before Congress for legislation and regulatory proposals for responsible energy development.

Federal Business Unit Director Dick Corolewski is a representative on the Sustainable Infrastructure Advisory Board (SIAB) for the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design. Corolewski joins other industry leaders responsible for promoting topics of sustainability within today's global infrastructure.

As a charter member of the Institute of Sustainable Infrastructure (ISI), POWER has been participating in the development of an infrastructure rating system. Generation Senior Project Manager Chun Chin has served as chair of the ISI Energy & Emissions Technical Subcommittee, which covers the technical aspects of energy, reducing energy consumption and carbon emissions, climate threats, heat island reduction and other related issues on potential infrastructure projects that would be scored and rated. Chin has also

written many articles and papers regarding the use of sustainable design in power generation projects, most notably in the area of geothermal and cogeneration plants.

When it comes to sustainability in the energy industry, most of the focus has been on renewable generation methods. Power Delivery Senior Project Manager Peter Catchpole has taken the responsibility to address the often neglected power delivery system. He, along with other POWER employees, has worked to develop sustainability assessment tools, design process and design criteria that would allow owners/developers of transmission line facilities to address the societal, economic and environmental impacts of their development.

Other employees have been key contributors to sustainable practices and design, and have written papers and presented at conferences. For example, Senior Project Manager Bill Harvey presented "Managing Sustainable Design for Geothermal Plants: the Engineer's Perspective" at the World Renewable Energy Congress in Linkoping, Sweden in May 2011.

Finally, when Harvard University's Graduate School of Design worked with Envision™ to write a textbook on the subject of strategic planning for sustainability, they turned to POWER to author the introduction to the chapter on energy.

# PROJECTS



## CREATING AWARENESS. PROVIDING OPTIONS.

As POWER Engineers, we have the opportunity to perform consulting and engineering services on many types of projects that have a sustainable end-use, for example, our renewable power generation work.

But to us, sustainability has a much broader application. POWER's definition of sustainability includes how all projects are designed, how they are constructed and even how they are maintained and operated.

As consulting engineers, our challenge is to create awareness of a project's effects on the environment and society, and to provide our clients with options to mitigate those effects.

To accomplish this goal, we need to be able to measure sustainability, to evaluate alternatives and to incorporate industry sustainability standards.

By making sustainability measurable, practical and implementable, we are doing our job to responsibly influence decisions that will ultimately benefit us, our clients and future generations.

**Index Entry Form**

Facility Name:

Line Length:

Number of Circuits:

Voltage:

Design Capacity (MVA):

Delivered Power (MVA):

Predominant Structure Type:

Estimate weight of structures (kg/km) ±15% is OK:

Estimate weight of steel core in conductors (kg/km) ±15% is OK:

Estimate volume of concrete (m<sup>3</sup>/km) ±15% is OK:

Estimate volume of earth moved for flood, roads, etc. (m<sup>3</sup>/km):

Volume of Aluminum in conductors on the line. Express as area in mm<sup>2</sup> (re):

Forest removed from existence (m<sup>2</sup>/km):

Land removed from cultivation (m<sup>2</sup>/km):

Type of ROW clearing done:

Roads, bridges maintained (average along facility):

Country:

Climatic Zone:

Terrain Zone:

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### THE CALCULATOR

The application allows a designer to see how a transmission line facility scores against comparable transmission lines. Data entry screen (left) and results screen (right).

**Index Results**

Facility Name	SD Score (Low value is better)	Length (km)	Number of Circuits	Voltage	Design Capacity (MVA)	Average Delivered Power (MW)	Predominant Structure Type	Weight of Metal (MT/km: MWD)	Volume of Conc (m <sup>3</sup> /km: MWD)
Alcan - Kildala Pass R-Line	5.658	20	1	287	500	300	Lattice Steel	0.157	0.01
Alcan - Kildala Pass L-Line	5.644	20	1	287	500	300	Ribular Steel	0.099	0.01
Alcan - Valleys	3.763	60	2	287	800	600	Lattice Steel	0.110	0.01
Gateway South	3.229	670	1	500	3000	1400	Lattice Aluminum	0.038	0.01
Gateway South - CRS option	1.803	670	1	500	300	1400	Lattice Steel	0.017	0.01
2_Alcan - Kildala Pass R-Line	5.658	20	1	287	500	300	Lattice Steel	0.157	0.01
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## MEASUREMENT

### The Project Sustainability Index Calculator

POWER has developed a tool that measures how a proposed facility scores against comparable alternatives.

The tool is designed to be useful to a project of any type, anywhere in the world. Currently, the tool supports assessment of overhead transmission lines with future plans to support other project types. The scoring is based on guidance by the Envision Sustainable Infrastructure Rating System.



## INFRASTRUCTURE STANDARDS — ENVISION™

Envision™ is a rating system for sustainable infrastructure (non-building projects). It was developed by the Institute for Sustainable Development, ISI, and the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design.

Envision™ was designed to improve a project's sustainability performance from a technical as well as a social, environmental and economic perspective. Envision™ provides an opportunity for owners and designers to be publicly recognized for collaborating with communities and using a life-cycle and restorative approach to infrastructure projects.

POWER is a charter member of ISI and the chair of the Envision™ Energy Committee—a ground-breaking group that's developing ways to measure exactly how sustainable a design project really is, including how it addresses social, economic and environmental concerns.



## THE CHEMICAL BATTALION HQ SUSTAINABLE METRICS

- » STORMWATER QUANTITY AND QUALITY CONTROL
- » 46 PERCENT REDUCTION IN BUILDING POTABLE WATER USE
- » 34 PERCENT ENERGY REDUCTION FROM BASELINE
- » 95 PERCENT DIVERSION OF CONSTRUCTION WASTE
- » DAYLIGHTING IN 79 PERCENT AND VIEWS FOR 90 PERCENT OF REGULARLY OCCUPIED SPACES

## PROJECTS

## IMPLEMENTATION

### The POWER Sustainability Review

The Power Generation team has developed a type of audit program which defines, identifies, assesses and summarizes design, construction and operational alternatives for more sustainable generation projects. The program uses a set of predefined parameters and rankings and is documented to demonstrate the project's commitment to sustainable principles.

The Sustainability Review encourages a holistic perspective and clear goals as we consider short- and long-term effects on local and regional environments and economies. There are always ways we can reduce energy consumption, lower operating costs and improve overall system performance. Better systems and processes lead to energy savings, payback, less maintenance and repair, and improved uptime.

By being open-ended, the sustainability review is designed to promote discussion and generate ideas. As a tool to help us design a more sustainable power plant, the sustainability review can also serve as the documentation required for Envision™, the ISI rating system.



## BUILDING STANDARDS — LEED

POWER Engineers remains a member of the U.S. Green Building Council (USGBC)—the organization that developed the Leadership in Energy and Environmental Design (LEED) certification system.

LEED provides third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

Recent Facilities Division LEED Design-Build Projects:

- » Refueling Vehicle Maintenance Facility, Fairchild Air Force Base, Spokane, WA  
– Silver Rating
- » Chemical Battalion HQ, Joint Base Lewis-McChord, WA  
– Silver Rating
- » SOAR Dining Facility, Joint Base Lewis-McChord, WA  
– Gold Rating

## AWARENESS

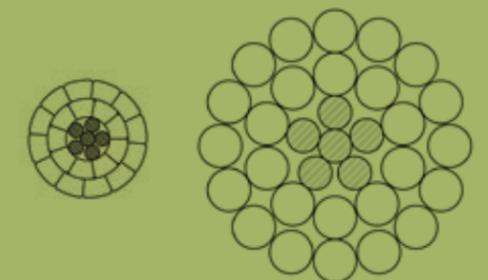
### A More Sustainable Shape

The standard form of transmission line conductor uses round aluminum wire strands, which creates 21 percent air in the spaces between the wires (see diagram).

Conductor strands are also available in trapezoidal shapes. Although the purchase cost increases by about five percent, the air content drops to about two percent.

Since losses are nearly inversely proportional to the amount of aluminum in the conductor, a near 20 percent increase in aluminum content can offer a nearly 20 percent reduction in losses. This can come with only a five percent cost increase and no increase in diameter (i.e. no increase in wind load).

Averting losses in the line saves fuel that is used to generate the power.



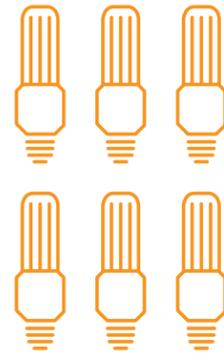
#### AVERT LOSSES AND SAVE FUEL

The trapezoidal wire-stranded conductor (left) with very few air voids between strands is a more sustainable choice compared to the round-stranded conductor (right) with 21 percent air.

**ALL POWER EMPLOYEES ARE EMPOWERED** to find sustainable solutions in their work place. Here's how we're measuring and improving our sustainability practices at our corporate headquarters in Hailey, Idaho.

# PRACTICE

ENERGY-EFFICIENT LED AND CFL LIGHTS WERE INSTALLED **100% CAMPUS-WIDE.**



POWER FROM ROOFTOP SOLAR PV HAS SEEN A **245% INCREASE** IN KW GENERATED.



**80% OF ALL PURCHASED PLASTIC BOTTLES ARE RECYCLED.\***

FREESTANDING WATER COOLERS RESULTED IN **27% REDUCTION** IN BOTTLED WATER PURCHASES.\*\*

**85% OF ALL PURCHASED ALUMINUM CANS ARE RECYCLED.\***

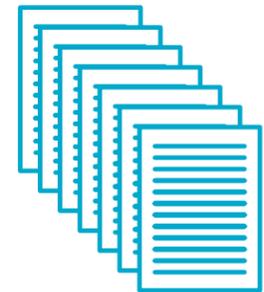
**15,000 LBS OF E-WASTE IS RECYCLED.\***



SHEET PAPER USAGE WAS **REDUCED BY 40%.\*\***

**1,100 CUBIC FEET OF PAPER WAS RECYCLED.\***

**231 CUBIC YARDS OF CARDBOARD WAS RECYCLED.\***

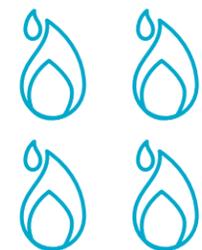


WE TRAVEL LESS: **WEB-BASED CONFERENCING UP 67%.**



POLICY TO REPLACE DESKTOPS WITH ENERGY-EFFICIENT LAPTOPS YIELDS AN AVERAGE **ENERGY SAVINGS OF 40 – 60% PER SYSTEM.**

WE BURNED LESS NATURAL GAS: MAIN BUILDING **GAS USAGE WAS DOWN 18%.\*\***



\* ANNUAL MEASUREMENTS  
\*\* MEASURED FROM 2010 TO 2013

# VISION

POWER Engineers understands that every project we undertake has an impact on the earth, its resources, and society. We believe it is important to do our very best to help meet the world's present needs without compromising the ability of future generations to do the same.



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