Healthcare Sector Meet-Up

Corey Zarecki, Gundersen Health System
Yuri Millo, Better Place International

Moderators: Priya Swamy, DOE; Erin Richmond, JDM Associates

May 27th, 2014

Agenda

- 10:00 Welcome & Introduction
  - Program Updates
  - Member Introductions
  - Summit Sessions of Interest
- 10:10 Year in Review and Emerging Trends
- 10:15 Zero Energy Buildings
  - Better Place International
  - Gundersen Health System
- 10:50 Roundtable and Q&A
  - Challenges and strategies for success
- 11:30 Adjourn

About Better Buildings

- **Better Buildings:** A broad, multi-strategy initiative aiming to improve the energy use of our nation's commercial, industrial, residential, and public buildings by 20% over 10 years
  - **Better Buildings Challenge:** A leadership initiative calling on CEOs, university presidents, building owners, state and local government leaders, and residential housing developers to publically pledge to reduce entire portfolio's energy use
  - **Better Buildings Alliance:** Members address energy efficiency needs in their buildings by setting savings goals, developing innovative resources, and adopting cost-effective technologies and market practices.

Better Buildings Challenge Snapshot, 2014

Membership	
Number of Partners and Allies	250+
Square Feet Represented	3.5 billion
New Members in 2014	60
Solutions	
Partner Solutions Available for Replication	160+
Results	
Energy Saved (Btus)	94 trillion
Dollars Saved	$840 million
Avoided $C0_2e$ emissions (tons)	5.8 million
Funding Committed/Placed	$5.5 billion / $3 billion

Better Buildings Alliance Snapshot, 2014

Membership	
Number of Member Organizations	185
Square Feet Represented	10 billion
Percent of U.S. Commercial Buildings	11%
New Members in 2014	14
Activities	
Energy Savings Activities Available to Members	50+
Results	
Increase in Member Activity in 2014	More than 20%
Average Annual Energy Savings Reported	More than 2%

Water Savings Expansion

Last year, DOE launched a Water Savings Pilot with 23 BBC Partners

- Partners reported water savings between 10% and 20%, against their baseline years
- In 2014, total water savings of 440 million gallons are equal to about 570 Olympic-sized pools
- Partners are sharing solutions!
  - Best practice guides for water efficiency
  - Strengthening the business case for water saving projects

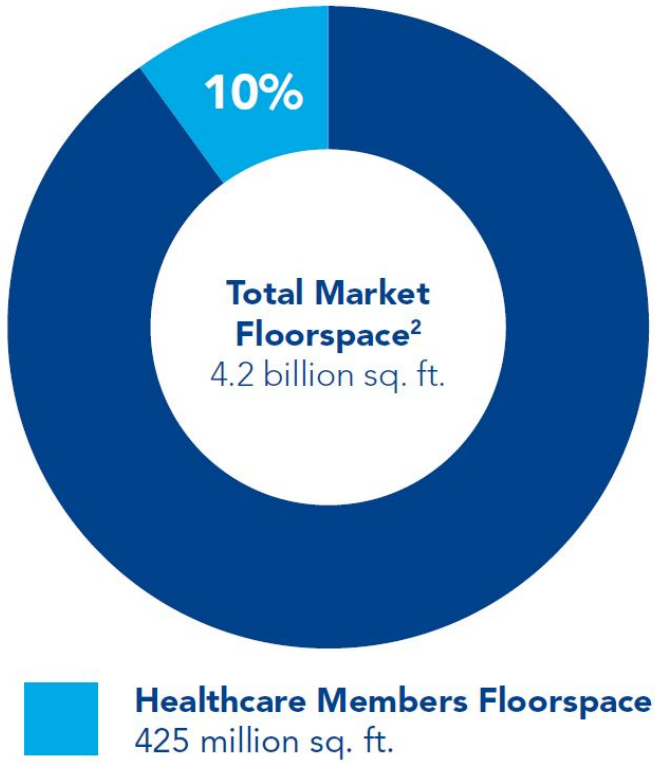
Water Savings Expansion

- Based on the success working with this group, DOE **is expanding** its water-saving efforts
- Organizations partnering in the Water Savings Expansion will set water efficiency goals, report progress and share solutions with the market
- Participation is open to all partners with a complete energy data display and one energy-focused showcase project or implementation model
- DOE will work with other federal agencies, including EPA and HUD, as well as leading NGOs, to deliver greater water-related expertise to partners
- Talk to your sector lead or account manager about this opportunity today!

The Healthcare Sector

- **28 members 425 million sq. ft.**
- **10% of the sector's 4.2 billion square feet in the U.S.**
- **Top 3 Technology Teams:**
  - Lighting & Electrical
  - Space Conditioning
  - Energy Management Information Systems
- **Key Links**
  - **Sector Webpage**
  - **Sector Opportunities document**

Healthcare Members as a Percent of Market Floorspace



New Resources & Activities

- **Technology Solutions Updates**
  - Interior Lighting Campaign
  - Advanced Power Strip Specification
- **Market Solutions Updates**
  - 2015 Green Lease Leaders announcement today
- **Annual Progress Update Reports**
  - Better Buildings Alliance
  - Better Buildings Challenge
- Check the Summit webpage in June for all session presentations!

Summit Sessions of Interest

- Wednesday:
  - 1:30: Maximizing Energy Savings in Laboratories (Maryland B)
  - 3:30: GWU Building Tour
- Thursday:
  - 10:00:
    - Driving Energy Savings in the Supply Chain (Roosevelt 5)
    - Turning Building Life-Cycle Milestones into Energy Efficiency Opportunities (Washington 5)
    - Strategies for Ensuring Real Energy Savings in New Construction and Existing Building Retrofits (Delaware A)

Sector Tour

Tour Today!

GW University

Milken Institute SPH Building

Meet in the Lobby at 3:05

Energy Efficiency Topics for Healthcare

Topics Covered This Year

- HVAC for Healthcare
- Financing Energy Efficiency through Green Revolving Funds
- Lighting for Improved Environment of Care
- Business Case for Energy Efficiency

Emerging Trends

- CHP
- Building Thermal / Minimize Reheat
- HVAC controls, scheduling, setbacks
- Chiller / tower optimizations

Yuri Millo

Better Place International

U.S. DEPARTMENT OF ENERGY

BETTERPLACE INTERNATIONAL

Delivering Next Generation Healthcare, Today.

Renewable Energy, Off Grid Independence and Net Positive Goals

Where the need and the opportunities are the greatest.

Yuri Millo MD
President BPI
ym@bpi.ngo

Our Team and timeline

President

Yuri Millo, MD

Dr. Yuri Millo is the president and founder of Better Place International, a non-profit organization committed to improving healthcare in the emerging markets.

Dr. Millo is an innovative leader, social entrepreneur, and executive with more than 15 years of national and international experience in patient centered healthcare delivery including operation management, patient safety, healthcare quality improvement health IT and simulation training. He is a Graduate of Caregi School of Medicine and holds an MBA from MIT's Sloan School of Management. Dr. Millo speaks English, Hebrew, Italian, and Romanian.

CDO

Chuck Siconolfi

Chuck Siconolfi is the chief regenerative design Officer at Better Place International. Chuck is a Registered Architect specializing in healthcare design, medical master planning and programming. He is a member of the AIA, an Emeritus member of the America College of Healthcare Architects, and a LEED AP. For over twenty five years, Chuck directed the global healthcare design practice at HOK. Teams that Chuck lead won competitions for the design of prototype Hospitals of the Future conducted by both HCA and Kaiser Permanente. Most recently, he developed a programmatic and design approach for the US DOD to better deliver care to service members deployed overseas called Rapid Cycle Evaluation and Treatment.

CTO

Jenna Lee

Jenna Ji-Eun Lee is the chief technology officer at Better Place International. In this role, Ms. Lee is responsible for the U.S.-based ZIA Lab, where she oversees the design, partnering, and development of technologies, solutions and healthcare data science into regenerative healthcare facility and operations.

Prior to joining BPI, Ms. Lee spent 15 years with Microsoft in IT operations, engineering, finance, consulting, sales, marketing, business and strategy. Ms. Lee is a graduate of MIT's Sloan School of Management. Ms. Lee speaks English and Korean.

COO

Rafael Mazuz

Rafael Mazuz is the chief operating officer at Better Place International. His background includes international business, healthcare operations management, and competitive intelligence. He also served as a squad leader and combat medic in the special forces.

Prior to joining BPI, Mr. Mazuz directed a top ranked hospital wound care unit for Healogics. Mr. Mazuz holds a BS in Business Information Systems from the Robert H. Smith School of Business, and an MBA from the Leon Recanati School of Management, with studies in China and Singapore as well. Mr. Mazuz speaks English, Hebrew, Spanish, and Mandarin Chinese.

BPI Country Leadership and Board

Country Manager
Nigeria

Bola Gobir, MD

Country Manager
Ethiopia

Sofanit Adeniew, MD

Country Manager
Kenya

Andrew Karani, MD

Country Manager
Democratic Rep. Congo

Nancy Nswal, MD

DR Congo Leadership and Board

Malonga MIATUDILA, MD ,MPH
SANRU

Desire BALAZIRE
Advisor Prime Minister RDC

Noelle Odio, MD
Medical Affair Director
DRC

Annette Lutale, MD
Development Director
Kinshasa Zozlu

Francis SELEMANI MTWALE
CEO BGFI Bank

Nathan BUILA, MD
Represents the community of
.....

Mike Nyoto, MD
Development Director
Lubumbashi Zozlu

The problem

“ *I’ve joined medical missions to perform surgeries in developing nations across Africa, Asia, and Latin America for more than 20 years. Still, I’m always disturbed when I return to the same countries years later, only to find nothing has changed:*

The lack of modern facilities, medical equipment, and qualified staff rarely improve. Overall, hospital conditions are inadequate as ever. This, despite millions of new patients, billions in aid, booming GDPs, and an exploding need for better health care. ”

- Yuri Millo, MD, MBA
Founder & President
Better Place International

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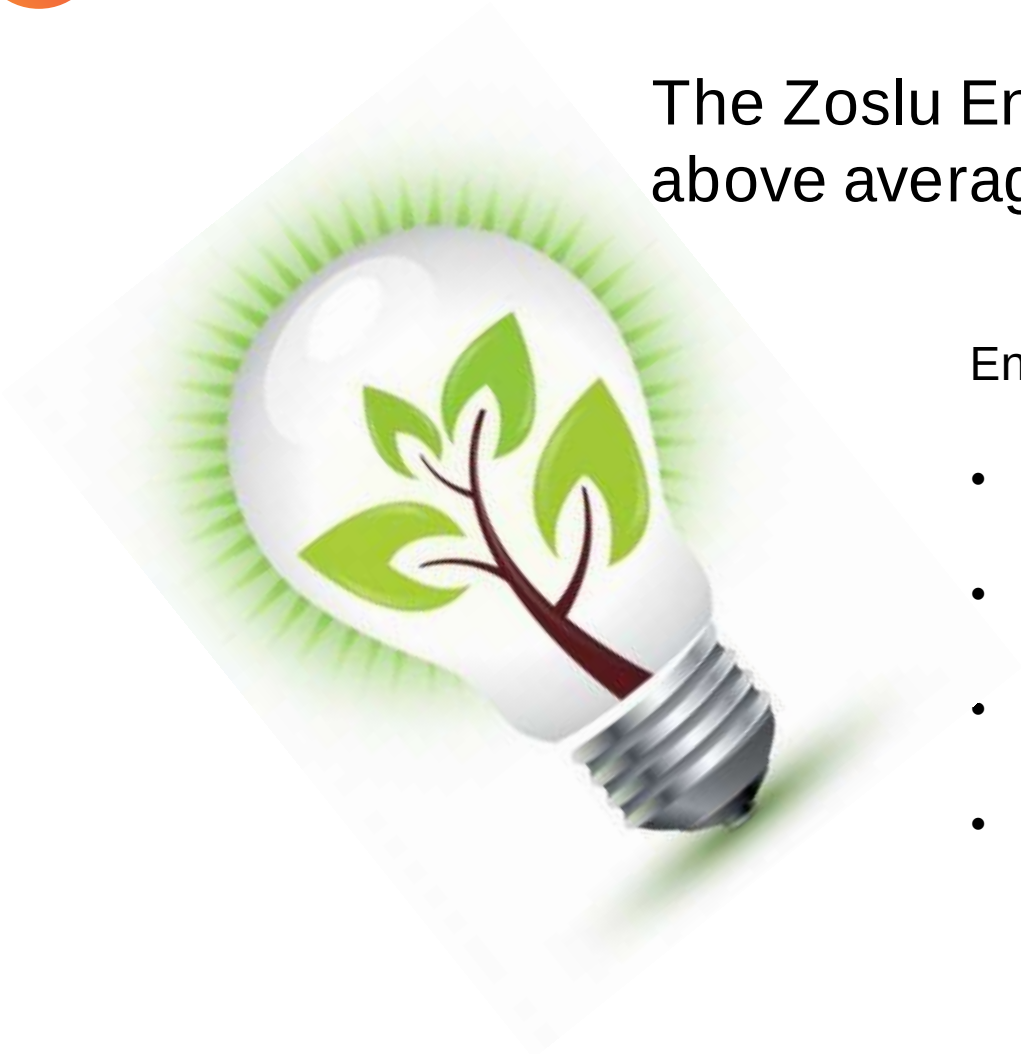


The Zoslu Energy Performance Indicators (EPI) will be 20% above average (KWH / Treatment Hour).

Energy guidelines:

- Production and consumption optimization via dedicated design tools.
- Energy production and consumption monitored, analyzed and controlled remotely.
- The Zoslu will generate all the energy that he consumes and use as much renewable energy sources as it can.
- The Zoslu will use innovative solutions for better production and consumption of energy.

"Across the developing markets, there exists the opportunity to leapfrog contemporary healthcare delivery models: To build new, sustainable healthcare solutions, from the ground up, fully integrated with mobile and cloud-based systems, to optimize services for today's rapidly growing emerging populations."

- Yuri Millo, MD, MBA
Founder & President
Better Place International

The Opportunity

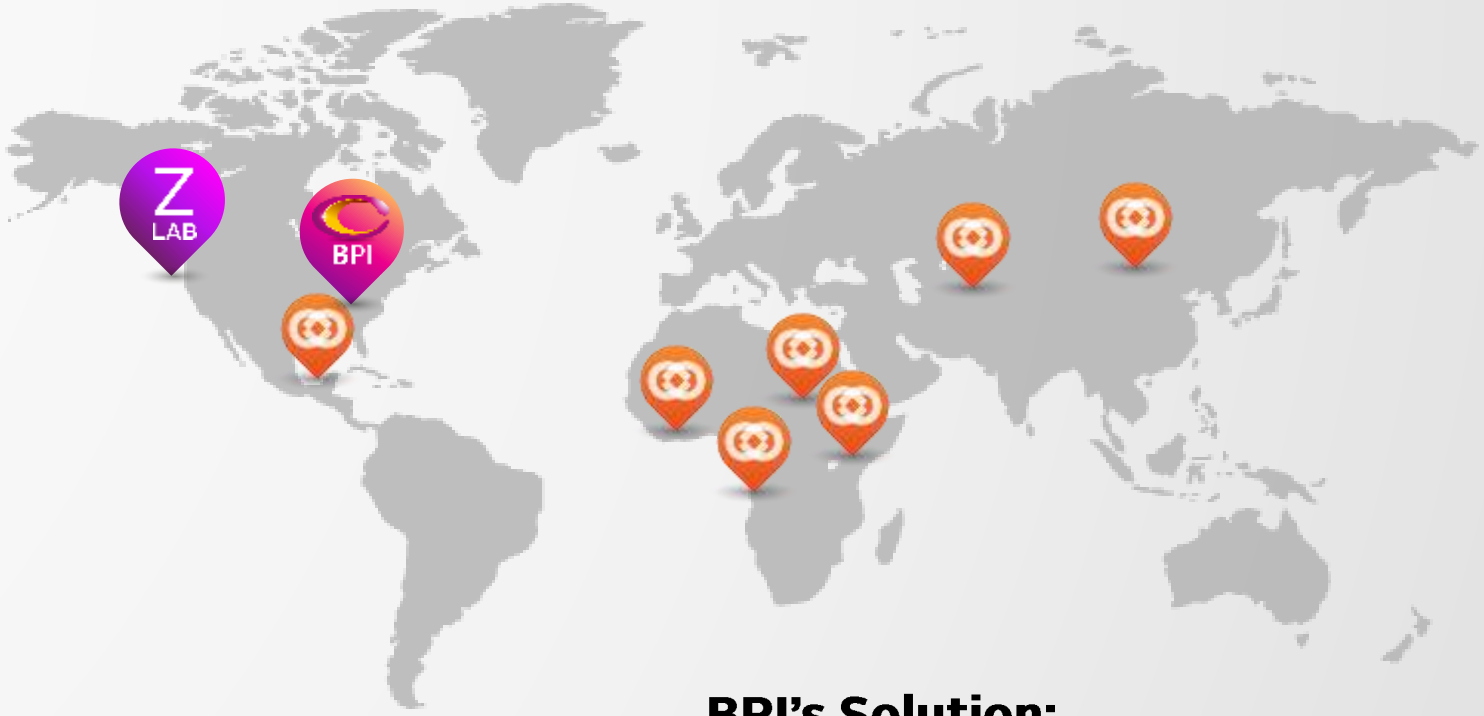
" Today, 21st century medical technology is delivered with 19th century organization structures, management practices, and pricing models."

- Michael E. Porter
Harvard Business School

ZOSLU

BPI's Healthcare Facility of Tomorrow: TODAY.

Where the need and the opportunities are the greatest



BPI's Solution:

Design, Develop & Manage Healthcare Facilities

We focus in countries of Sub Sahara Africa,

Among the countries we focus on are DR Congo, Kenya, Ethiopia, Nigeria, Angola, Ghana, Uganda and Tanzania

We explore additional opportunities in South East Asia, North Africa, Middle East and South America

Value-Based Healthcare

1 Facility Design

- Additive construction
- Regenerative design
- Replicable
- Ultra energy efficient
- Solar powered
- Water optimization & purification

2 Connected Technology

- Sensors, devices and monitors connected to cloud
- Low energy
- Integrated into design operation & medicine
- Telemedicine
- ZIA Integration Lab

3 Value-based Operations

- Designed around value to the patient:
- Device & pharma partnerships
- Value-based prices
- Value-based outcomes

4 Personalized Medicine

- Screening, analytics, + R&D partnerships
- Data-driven: effective and efficient care
- Driver for new medical innovation

THE 4 PILLARS of Better Place International

"We are at a turning point in innovation where we can design and implement regenerative facilities, ultra hi-tech cloud and mobile technologies, modern operations management, and cutting edge medical science for patients and communities willing to disrupt today's healthcare and achieve sustainability for tomorrow."

- Yuri Millo, MD, MBA
Founder & President
Better Place International

1
Facility Design

Traditional hospitals of today:

↙ $100-500 mil
↙ Years to build

Different Ways to think about Building Healthcare facilities

Zoslu healthcare facilities of tomorrow:

↗ $10-12 mil
↗ Months to build

↙ Cradle-to-grave design
↙ Traditional construction
↙ Energy guzzlers, infrastructure-dependent, polluting
↙ Inefficient, outdated layout
↙ Enormous recurring costs
↙ Net negative (drain)

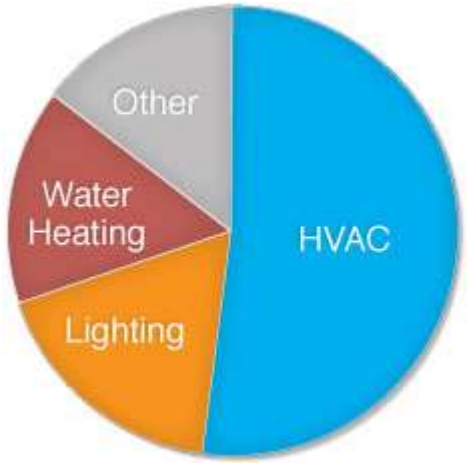
↗ Cradle-to-cradle (regenerative) design
↗ Rapid additive construction
↗ Efficient, self-reliant, solar-powered
↗ Optimized layout
↗ Sustainable recurring costs
↗ Net positive (contribution)

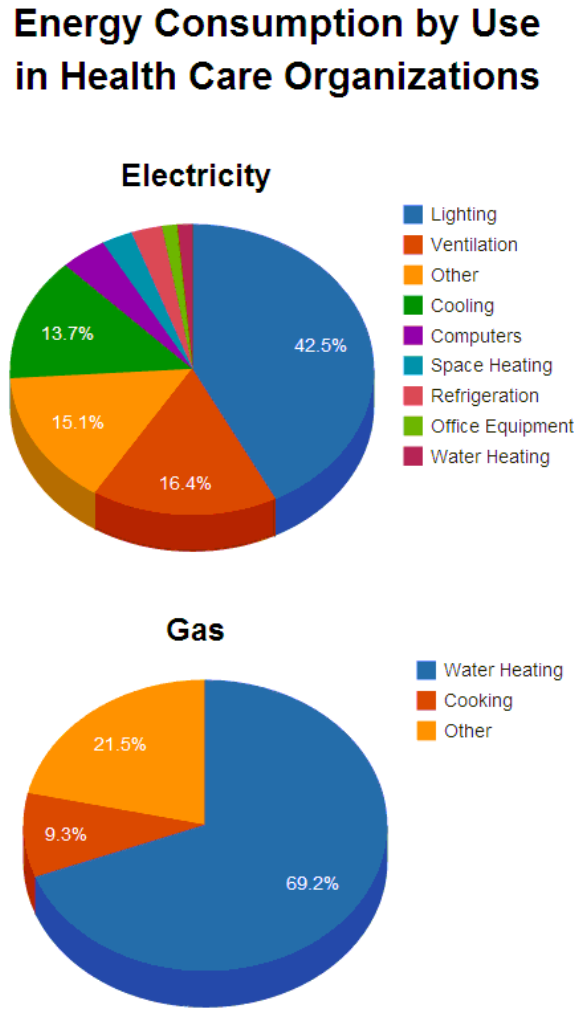
"Global Study Finds Majority Believe Traditional Hospitals Will Be Obsolete In The Near Future"

Forbes

Energy Consumption In Healthcare Facility in US

A typical 200,000-square-foot (ft2), 50-bed hospital in the U.S. annually spends $680,000 – or roughly $13,611 per bed – on electricity and natural gas... An average U.S. hospital uses 27.5 kWh of electricity and 109.8 cubic feet of natural gas per ft² annually... the average cost of power per ft² for hospitals in North America is approximately $2.84 for electricity and $0.94 for natural gas.





Major Opportunities to Focus Effort

	Energy consumer	Increase	Reduce
eConsumers	HVAC	Envelop isolation	Gas or Electrical HVAC (Use None electrical chiller)
	Light	Day light	Eliminate none efficient light source (Use LED only)
	Water heating	None water cleaning	Water usage
	Cooking	Offsite source natural food	
	Smart Building Sensors		
eGenerators	Energy Source Electricity	Only PV	Off Grid
	Energy Source HVAC	Only Bio-fuel	Off Grid

Major Opportunities - Construction

Using new technology with 3D Printer, which is 20 feet tall, 33 feet wide and 132 feet long in less than 24 hours. The parts, such as frame, wall were printed separately. Such a new type of 3D-printed structure is environment-friendly and cost-effective.

All materials used are created from recycled construction waste, industrial waste and tailings.
We produce a mix of cement and construction waste to construct the walls layer by layer, a process much like how a baker might ice a cake.
This process saves between 30 and 60 percent of construction waste, and can decrease production times by between 50 and 70 percent, and lab hour costs by between 50 and 80 percent.

Major Opportunities - None Electrical Chiller

Application
Provide chilled/heating water for Healthcare facilities
Produce chilled water over 41°F and heating water below 203°F

Cooling capacity
6.6-3,307Rt(23-11,630kW)

Energy sources
Biogas, gas & waste heat, hybrid (multiple energy) waste heat from power generation industrial waste streams (steam, hot water, exhaust, etc)

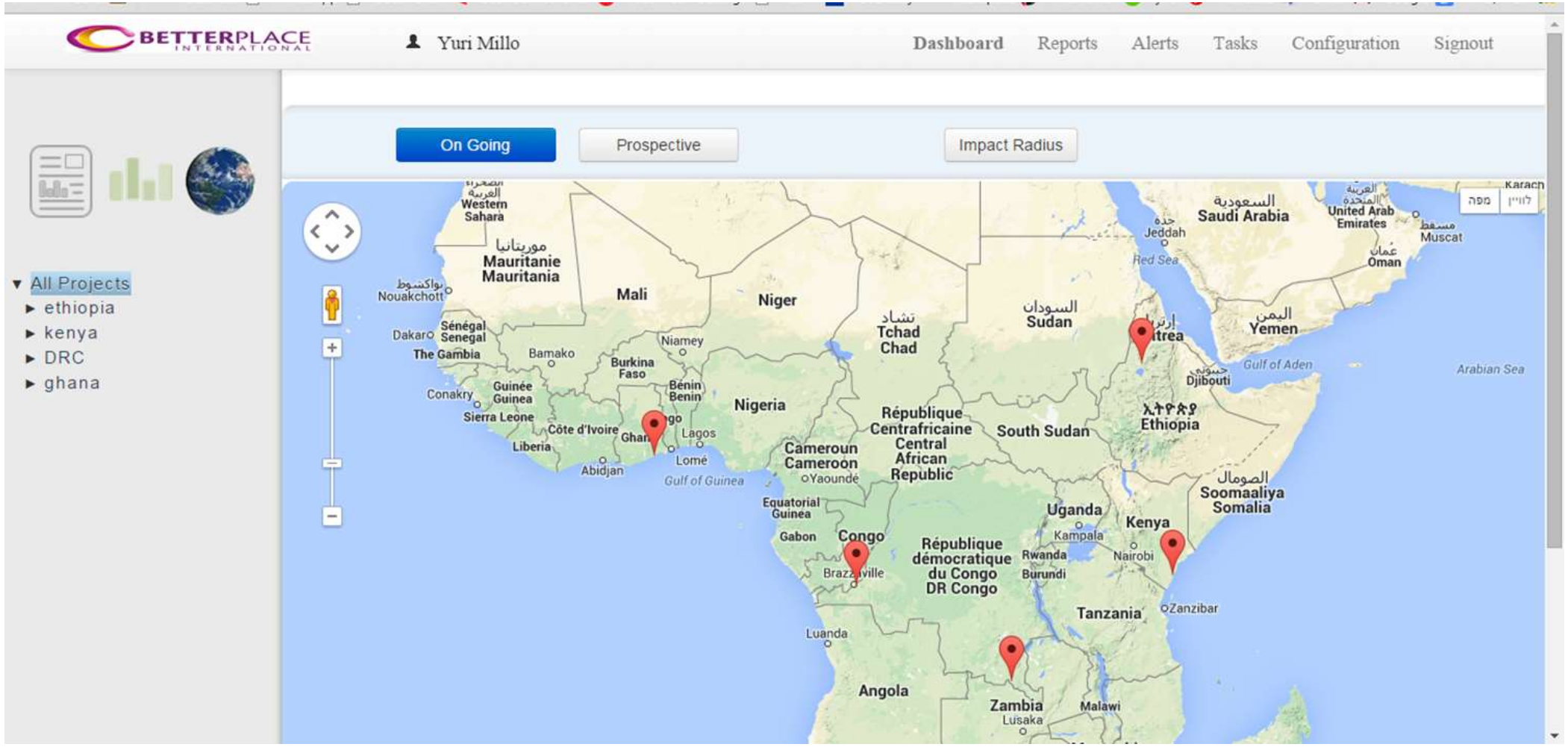
Energy-saving
Compared with conventional electric air conditioning, the energy efficiency of BROAD non-electric air conditioning is 2 times higher, while their CO2 emissions are 4 times lower.
Compared with conventional water distribution systems, packaged pumpset system reduces the rated power demand by 40-60%, and the operating electricity consumption by 60-75%.

Major Opportunities - PV Energy

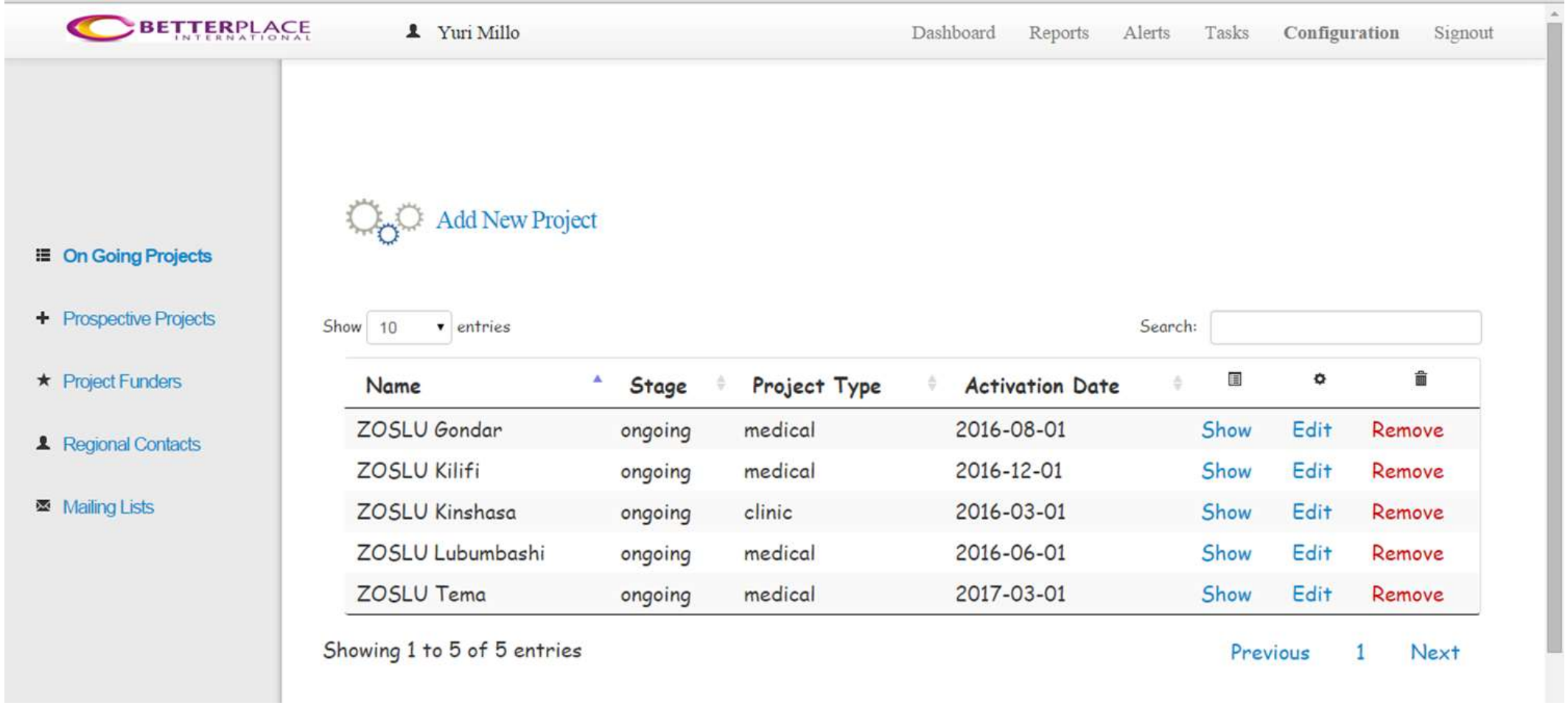
Energy security – Parking top solar plants can deliver power during load-shedding, ensuring that critical loads are always running Not all solar plant configurations can deliver power during load-shedding.
Cost-effective – Rooftop solar power has a levelised cost of 30% considerably lower than diesel power. Additionally, energy cost is now fixed for the next 25 years, unlike diesel power which keeps increasing
Reliable – A solar power plant has no moving parts, ensuring reliable power over 25 years
Minimal maintenance – A solar plant requires very little maintenance from the energy consumer
Flexible configurations – Solar panels can be installed on different kinds of roofs, including covered parking areas, as long as the structure can bear the weight of the panels. They are also highly scalable, with rooftop plants ranging in capacity from less than 1 kW to more than 1 MW

ZOSLU Design

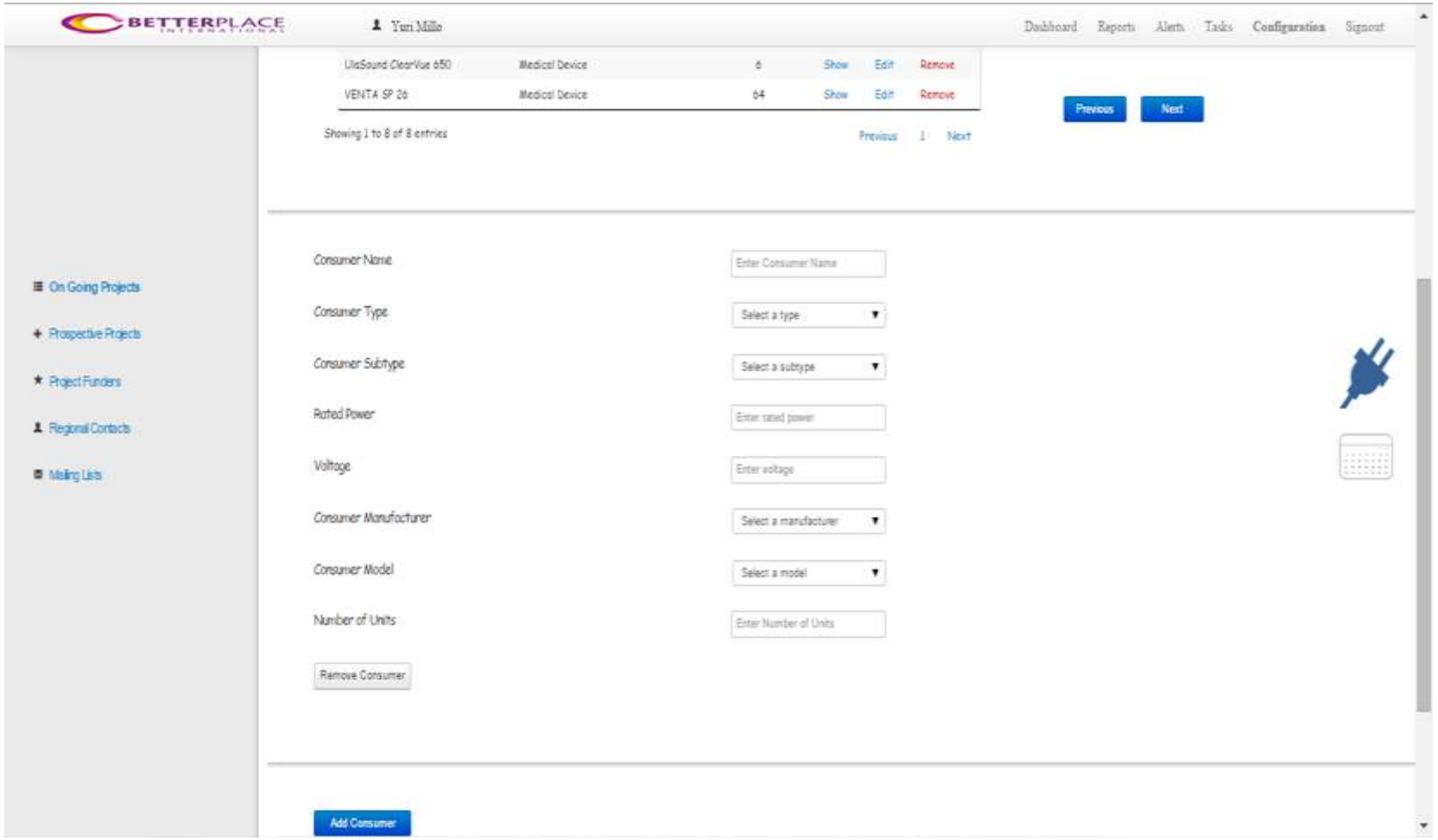
What we do not Measure we cant Account for



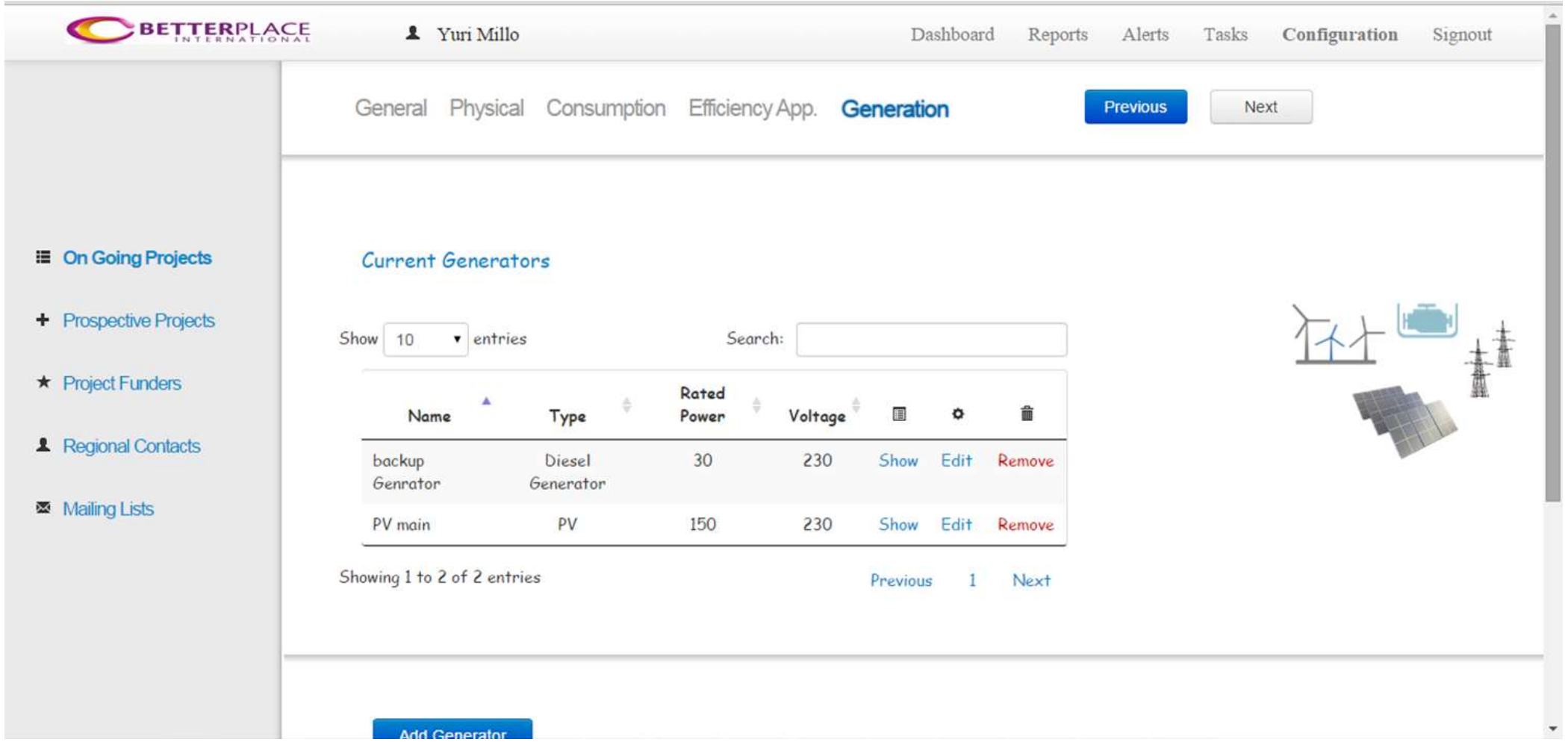
Energy Consumption Location/Project



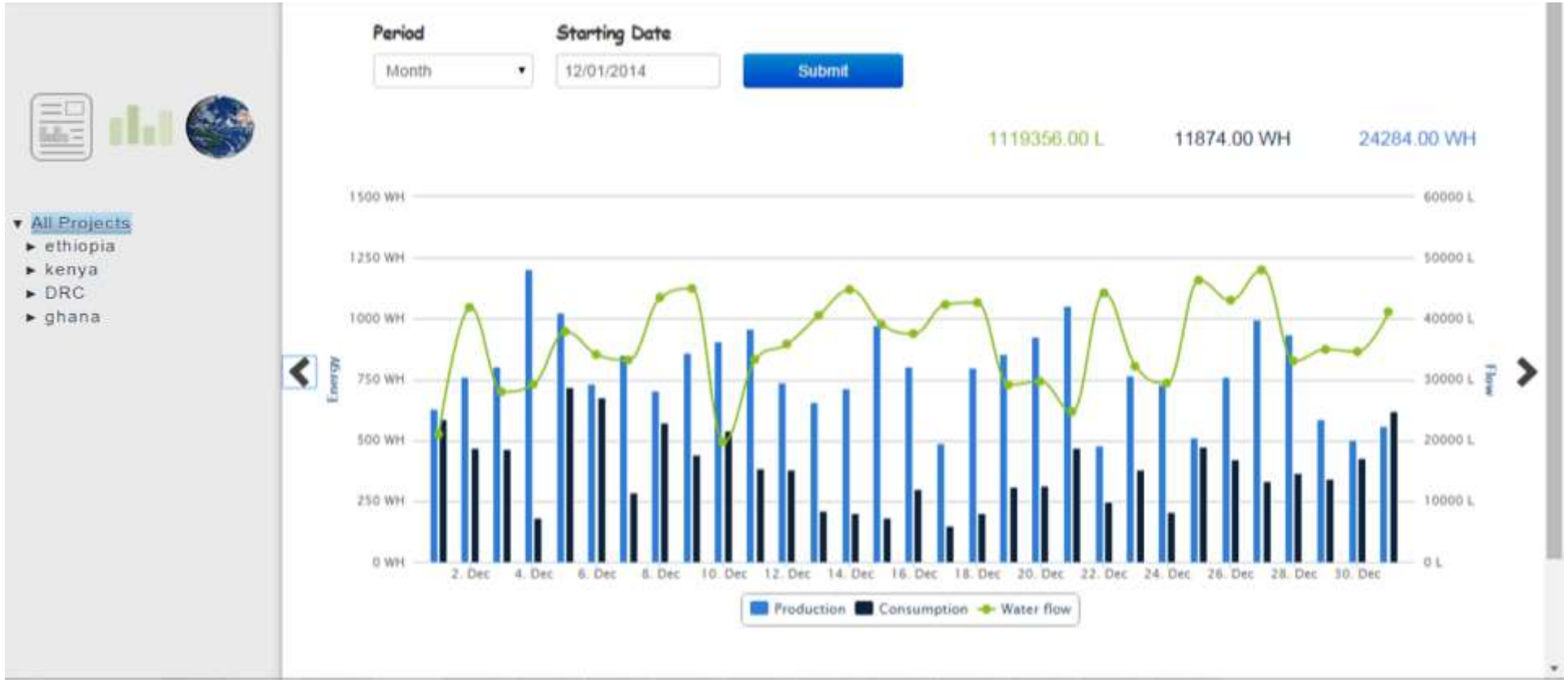
Energy Consumption by Device



Energy Generation



Monitoring Energy Consumption



2 Connected Technology

- People centered design
- Smart sensor / devices integration
- Drive smarter operation and insights
- Gain better insights
- Create value in the ecosystem

Connecting and cloud technologies of today makes the future of healthcare delivery REAL

- Our partners and experts optimize and integrate sensors, devices, software, and services to power our Zoslu healthcare facilities and their communities
- Integrated and connected mobile and cloud technologies are deployed into our Zoslu healthcare facilities, operations, and delivery of medical care
- Together, we establish the right ecosystem of partners and solutions to identify and apply new technologies that transforms healthcare delivery

"Smart mobile devices and applications, working in concert with cloud computing, social networking and big data analytics, will be at the core of global health care transformation. These transformative technologies will continue to lead with ways to help rein in cost, broaden access, change behaviors and improve outcomes."

Ernst & Young

- Pat Hyek, Global Technology Industry Leader

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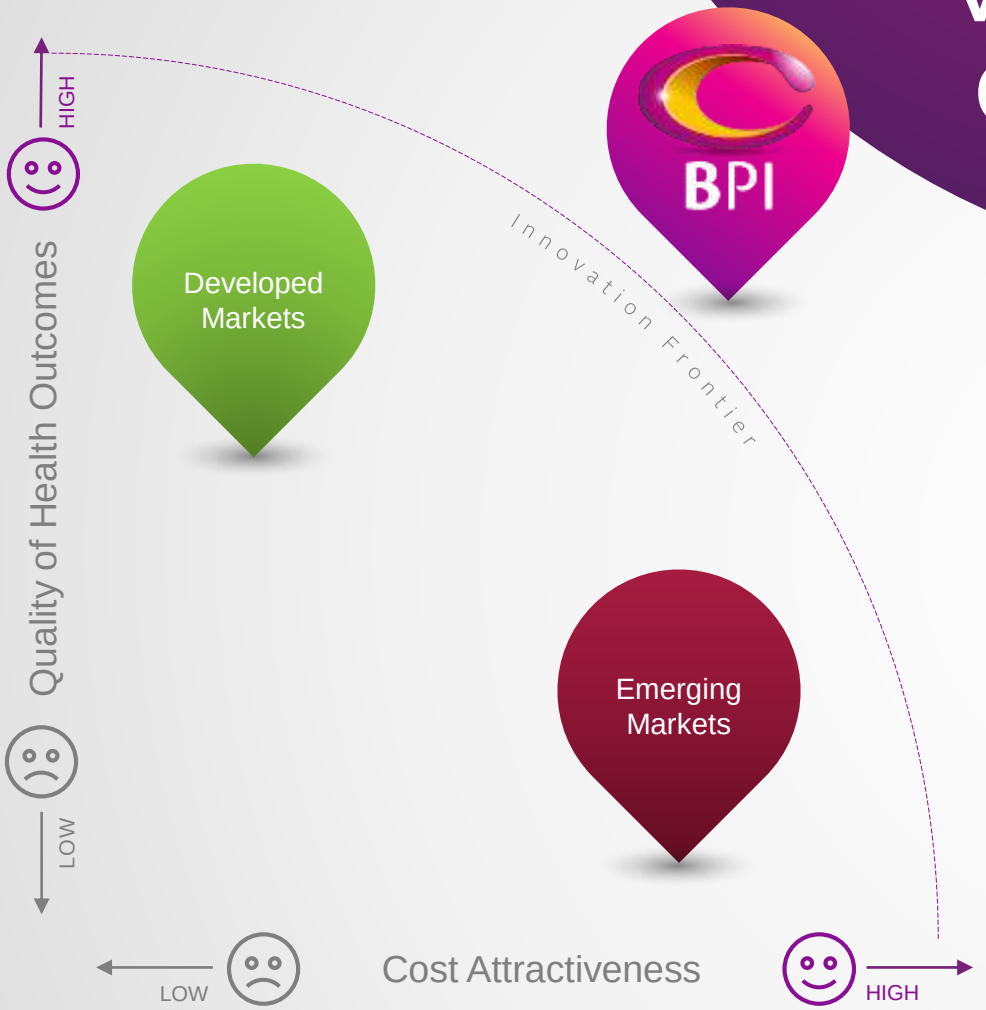
3 Value-based Operations



- Many Developed Markets deliver service-based health care, which tends to have high quality outcomes, but encourages additional, unnecessary services and procedures, resulting in out-of-control costs and discourages cost-saving innovations.
- Most Emerging Markets deliver cost-based health care, which is low-cost, but tends to disincentivize the usage of newer, advanced medical technologies and contains few incentives to yield high quality clinical outcomes.

- **Better Place International** delivers value-based health care, which aligns all stakeholders around the value of the care to the patient. This ensures that value is to the patient (customer) is maximized. Every aspect of our operations—from partnerships, to medical care, to pricing—is designed around patient value. Since value-based care increases quality while simultaneously driving down cost, it is also the care delivery model best aligned with driving health care innovation.

$$\textbf{Patient Value} = \frac{\text{Health Outcomes}}{\text{Cost}}$$

The Result

$$F_{(x)}=4X^3$$

When the four pillars are executed together, the effectiveness of Better Place International's healthcare delivery approach exponentially surpasses those of traditional private and public hospitals.

- ✓ Strategy
- ✓ Innovation
- ✓ Integration

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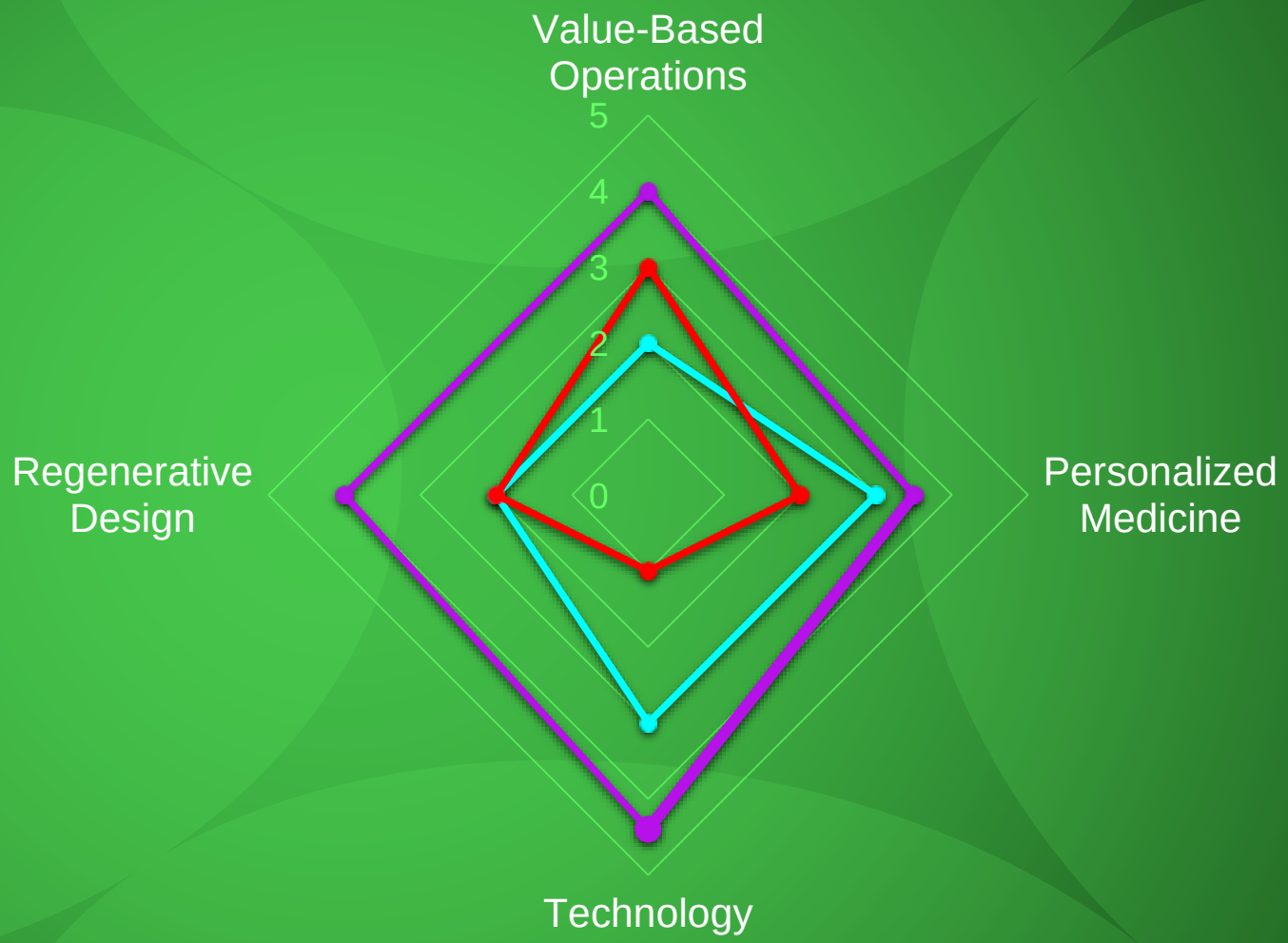
Connecting the 4 pillars



Projects

1st &2nd &5th ZOSLU

Kinshasa and Lubumbash | DR Congo (DRC)

The capital of The DRC, Kinshasa is an urban area with a population approaching 10 million. As the third largest urban center in Africa, with only one or two semi-modern healthcare facilities and enormous income disparities, the need is extremely high.

3nd & 6th ZOSLU

Gondar and Adama | Ethiopia

Gondar, the formal capital of Ethiopia, has an official population of 207k, but when factoring in the surrounding area, that figure jumps to several million. With only one, underequipped area hospital, locals have few options for surgical care, despite an extremely high rate of traumatic and orthopaedic injuries requiring surgical interventions.

4th7th and 8th ZOSLU

Kilifi , Nakuru | Kenya

The head of the Kenyan Port Authority is eager for BPI to build a Zoslu near Kilifi, a port city just north of Mombasa. The government is planning a huge expansion of Kilifi's port, which will turn it into the busiest in East Africa.

Other high potential projects:

- Accra, Ghana
- Kabul, Afghanistan
- Quito, Ecuador
- Ulan Bator, Mongolia

"Good fit" major investors:

- Philanthropists/foundations
- Corporations with local operations/workforce
- Developers (Zoslu as ideal anchor for surrounding property)



← Start again

The world is ready for tomorrow's healthcare delivery.
The need and opportunity are there.
Better Place International is here to provide value based healthcare .
The time is now.

CONTACT US

What questions do you have?

Where do you see collaboration opportunities?

Yuri Millo, MD, MBA

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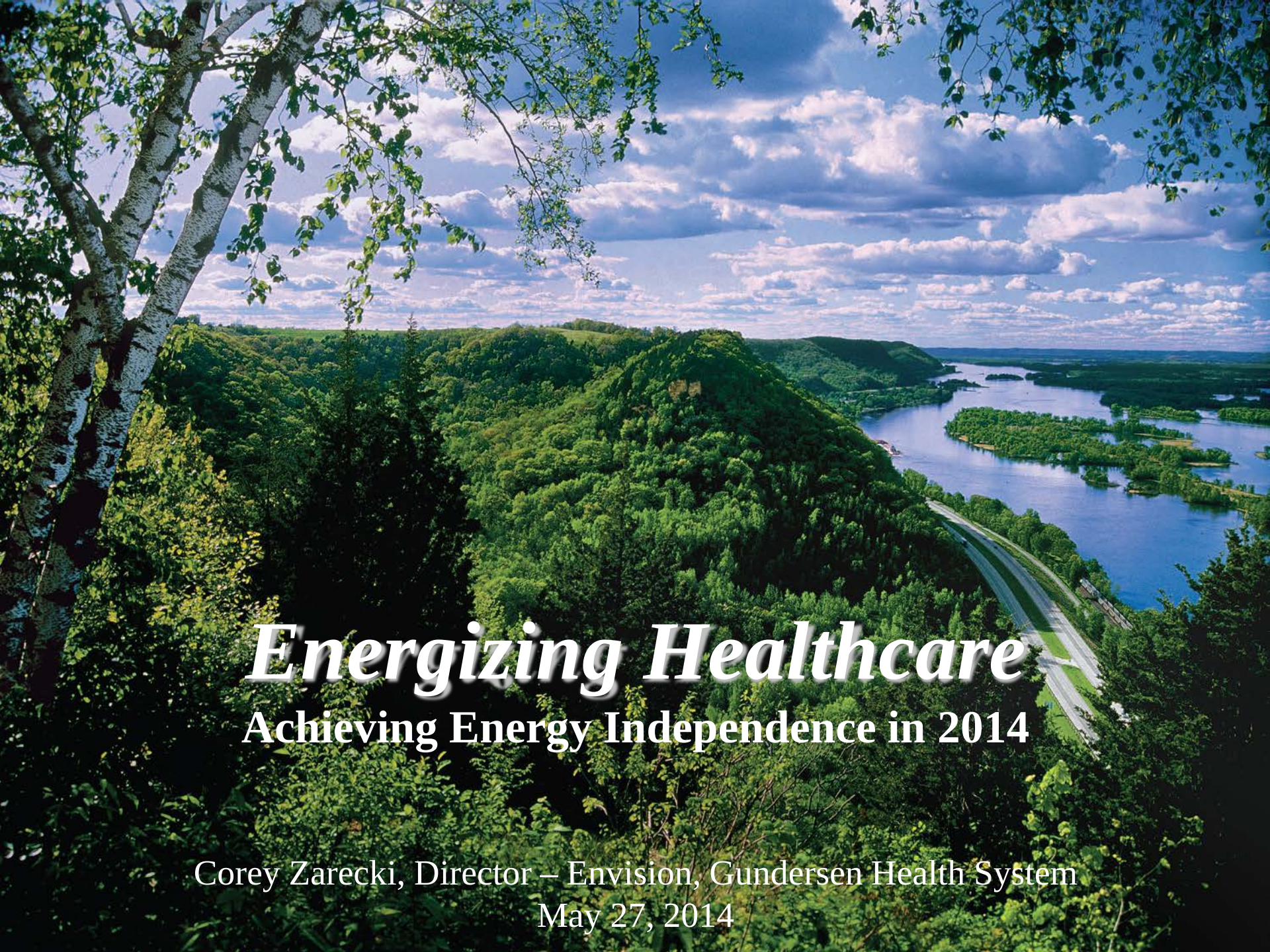
Corey Zarecki

Gundersen Health System

U.S. DEPARTMENT OF ENERGY



Energizing Healthcare

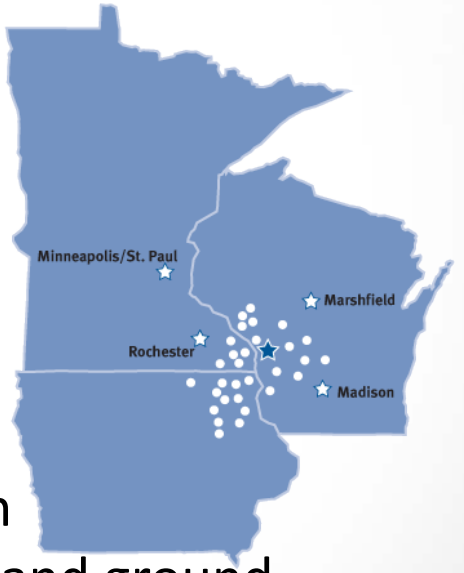
Achieving Energy Independence in 2014

Corey Zarecki, Director – Envision, Gundersen Health System

May 27, 2014

About us…

- Mission: We distinguish ourselves through excellence in patient care, education, research, and improved health in the communities we serve
- GL Health System
  - Physician-led Integrated delivery system
    - ~750 providers and ~7,000 employees
  - 325 bed tertiary care hospital
  - 51 clinic locations
  - Western Campus of the University of Wisconsin School
  - Residency and medical education programs
  - Multiple Top 100 Hospital & Service Line recognition
  - A variety of affiliate organizations including EMS air and ground ambulance service, rural hospitals, nursing homes, hospice, etc.
  - Health Plan



Envision®
GUNDERSEN
HEALTH SYSTEM

Primary Objective
Energy Independence in 2014

Produce more power than Gundersen consumes from fossil fuel source

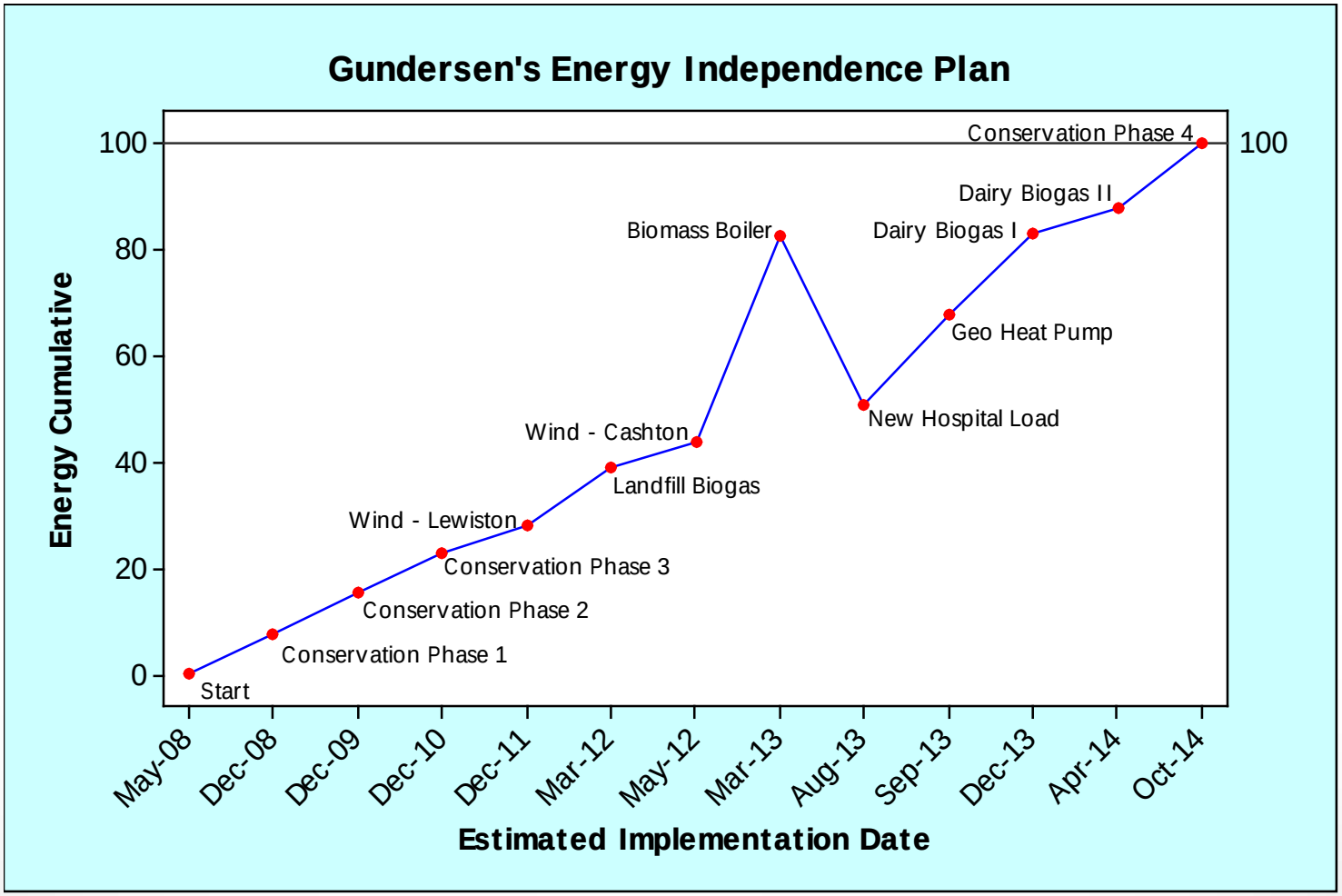
- Makes our healthcare delivery more affordable to patients
- Benefits human health
- Strengthens our regional economy
- Improves our environment

About me…

- Corey Zarecki
  - 15 years in industry
    - 8 years in HVAC (Trane) and 7 years in the chemical industry
      - Various roles in engineering, process improvement, customer satisfaction, and leadership
  - Last 7 years at Gundersen Health System
    - Healthcare process improvement opportunities
      - Reduce cost/waste
      - Improve efficiency and quality
    - Energy

Envision® GUNDERSEN HEALTH SYSTEM

The Roadmap



We will improve health & lower cost

Why Health Care Providers Should Care About Clean Energy

Envision® GUNDERSEN HEALTH SYSTEM

- Pollutants from the burning of fossil fuels cause:
  - Birth defects[1]
  - Negative effects on the kidneys, lungs, and nervous system[1]
  - Cardiovascular deaths and stroke[2]
  - Increased carcinogens contributing to cancer risk

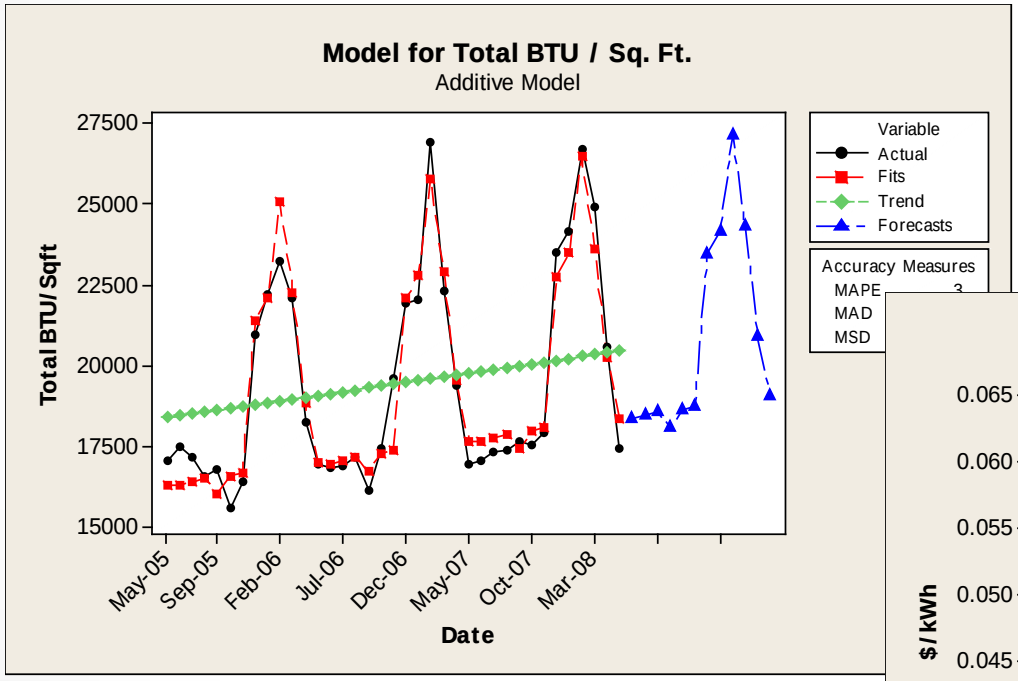
- According to the Department of Energy, hospitals are 2.5 times more energy intensive than other commercial buildings[3]
  - This is inconsistent with our mission… we are responsible for contributing to disease through our wasteful consumption.
  - US Hospitals spend $8 billion dollars on energy each year
- 2-sided green is possible: Environmental and Financial

[1]Source: American Lung Association , Emissions of Hazardous Air Pollutants From Coal - Fired Power Plants: EH&E Report 17505, March 7, 2011
[2]Source: American Heart Association Scientific Statement: DALLAS, May 10, 2010
[3]Source: http://www.energy.gov/news2009/7363.htm

The Cost of Energy

Envision® GUNDERSEN HEALTH SYSTEM

Energy Use Increasing ~4%

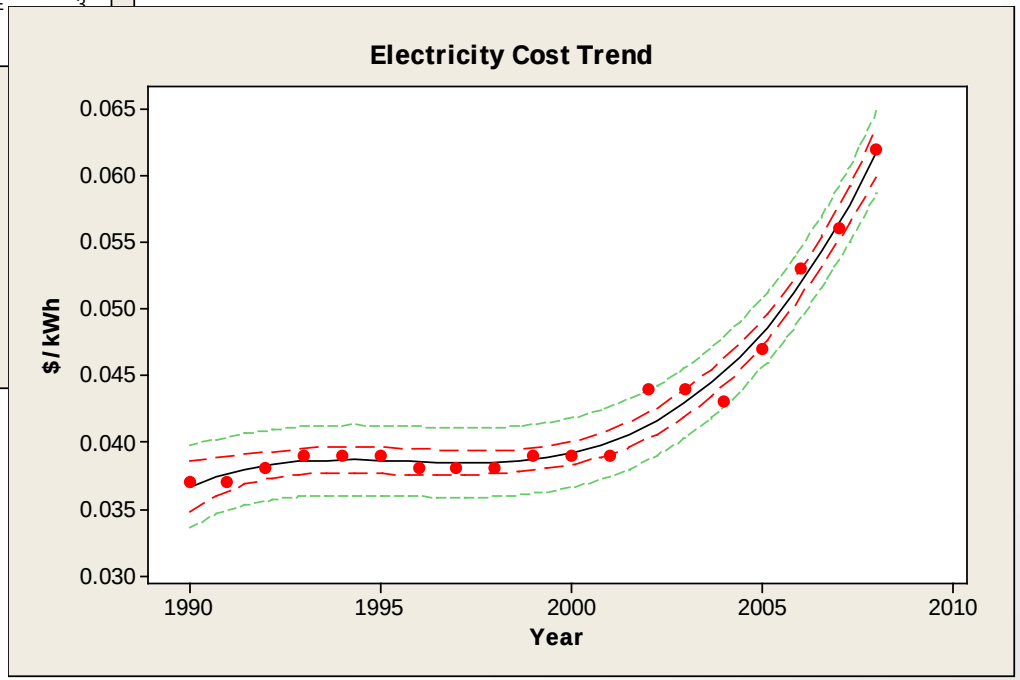


Energy Bill in 2008

$5,300,000

Price Increasing

>$350,000



The need for affordable healthcare compels us to address this trend

Conservation

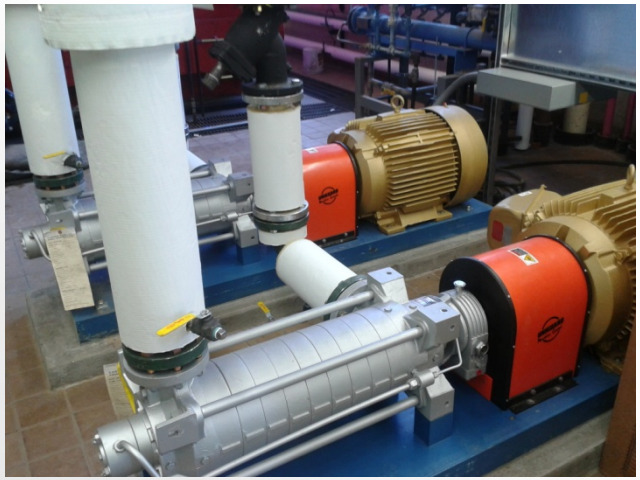
Envision® GUNDERSEN HEALTH SYSTEM

Boilers

Chillers

Cooling Tower Fans

Pump Motors



Exhaust Fan Motors

Air Handlers

Conservation

Lighting

Occupancy

- 24/365 Operations
- Frequent air exchanges
- High filtration requirements
- Pressure Relationships

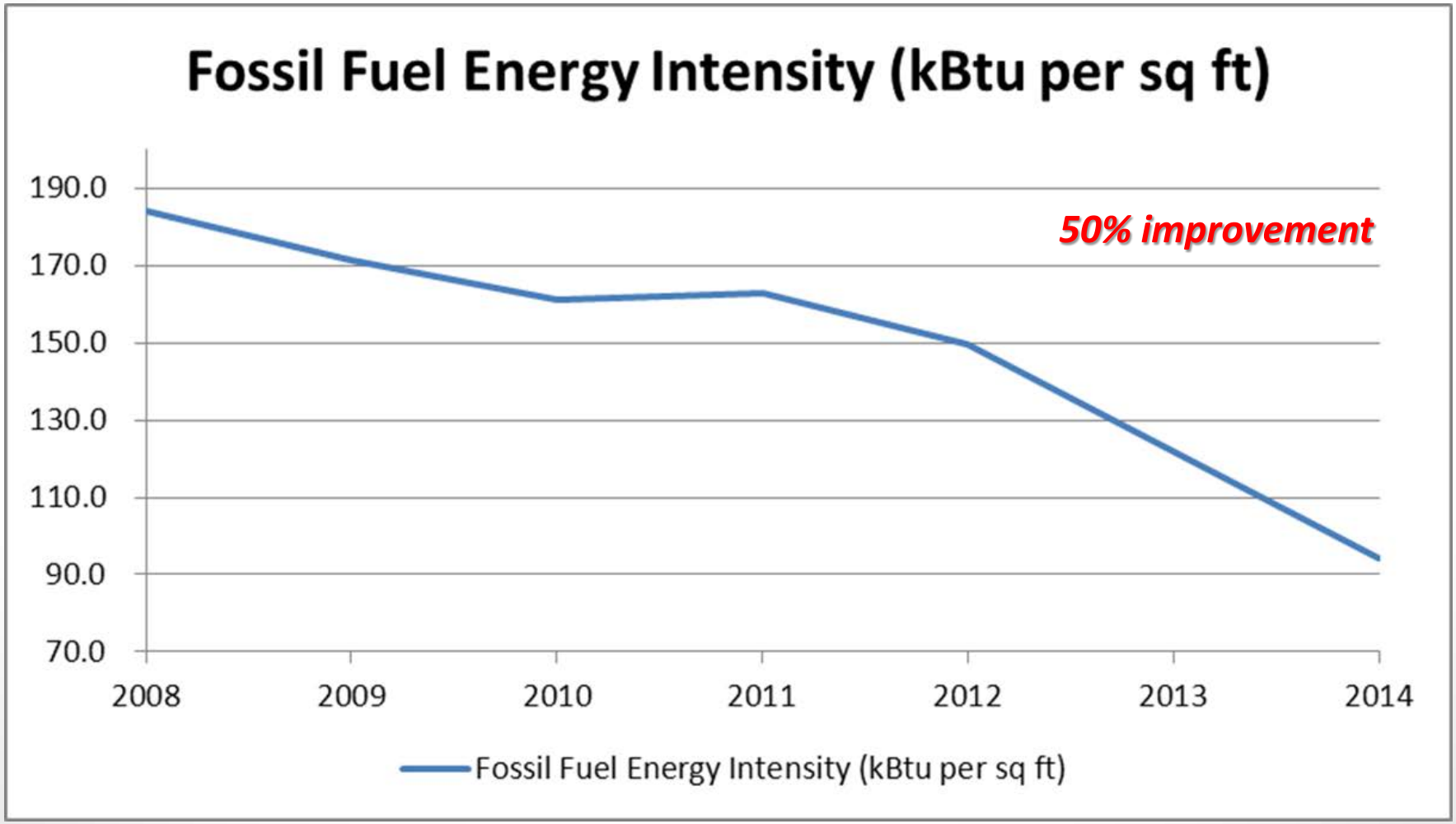
Data Centers

Personal Computers

Equipment

Insulation & steam traps

Results to Date



$2M annual savings from energy efficiency improvements

Generation

Envision® GUNDERSEN HEALTH SYSTEM

Solar - Photovoltaic
Parking Garage, La Crosse

Solar - Thermal
Child Care Center, La Crosse

Solar – Thermal
Renal Dialysis, Onalaska

Wind - GL Wind
Lewiston, MN

Wind - Cashton Greens
Cashton, WI

Geothermal
Lot F, La Crosse

Generation

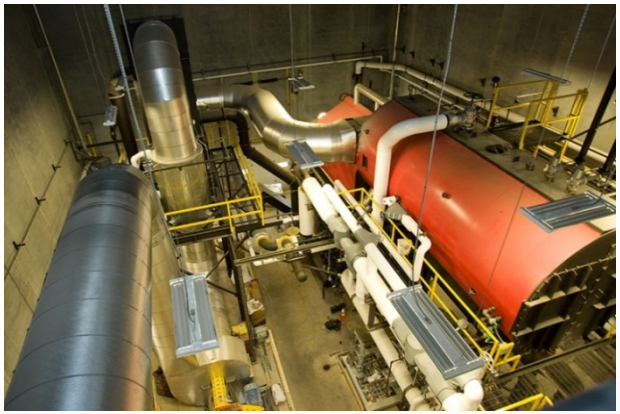
Biogas - Waste Water
City Brewery, La Crosse

Biogas - Landfill
Onalaska, La Crosse

Biogas - Dairy Manure
Community, Middleton

Biogas - Dairy Manure
On farm, Sun Prairie

Biomass Boiler/CHP - wood chips
Power Plant, La Crosse



Hydro - low head kinetic
Lock & Dam #7, La Crosse

Results

Envision® GUNDERSEN HEALTH SYSTEM

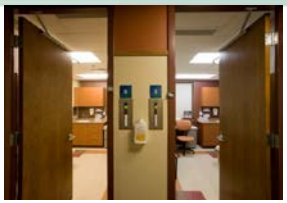
2008 – 2014 Emissions Reductions

Sulfur Dioxide	55%
Nitrous Oxide	56%
Carbon Dioxide	56%
Mercury	50%

2014 asthma attacks avoided: 5.4

Envision®

Gundersen's Vision for Energy & Environmental Stewardship















- **Energy Management**
  - Energy Efficiency
  - Renewable Energy
- **Waste Management**
- **Recycling**
- **Sustainable Design**

Energy Intensity (kBtu/sqft/yr)

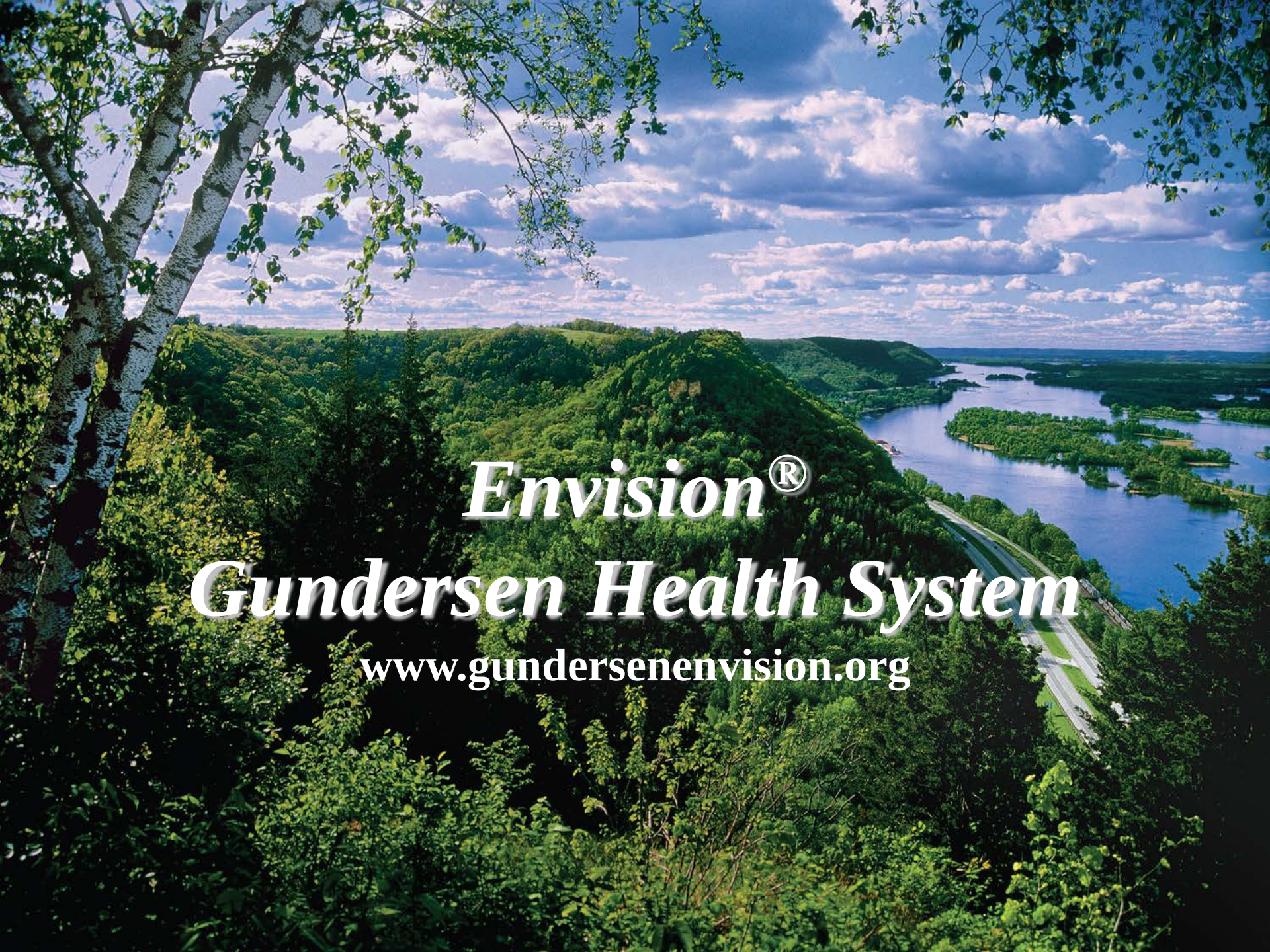
Envision® GUNDERSEN HEALTH SYSTEM

~$700k Savings/year

Why Health Care Providers Should Care About Clean Energy

Envision® GUNDERSEN HEALTH SYSTEM

- Reduce the Cost of Healthcare
- Decrease Emissions Harmful to Health
- Decrease Emissions Harmful to Environment
- Provide Benefit to Regional Economy
- Achieve Energy Independence
- Use Renewable Resources
- Reduce our Dependence on Fossil Fuel
- Local Jobs
- Improve Patient Experience & Cost
- Partner with Public and Private Organizations
- Make Cost Effective and Sound Investments
- Hedge against inflation
- Power Security/Reliability
- Wisconsin imports ~$15B in fossil fuels each year……
  every bit of local production keeps dollars in our region


Envision®
Gundersen Health System
www.gundersenenvision.org

Why focus on such a "minor" expense item?

Envision® GUNDERSEN HEALTH SYSTEM

501C3 Healthcare Example

• Annual gross revenue	~ $1B
• Operating margin %	~4% ($40M)
• Annual energy bill	~1% ($10M)

A 25% drop in the energy bill is equivalent to $63M (6%) of new revenue!

Thank You

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