Better Buildings
U.S. DEPARTMENT OF ENERGY

Zero Energy Buildings: Defining Them and Building Them

May 28, 2015

U.S. DEPARTMENT OF ENERGY

Today's Presenters

- Cody Taylor, U.S. Department of Energy
- Jason Robbins, Walgreens Co.
- Chad Harrell, Lend Lease
- Yuri Millo, Better Place International

Overview and Agenda

- Welcome and Overview
- Defining Zero Energy Buildings: DOE's Recent Work with Stakeholders
- Success Story: Walgreens' Zero Energy Store in Evanston
- Success Story: Lend Lease and Zero Energy Homes
- Toward Zero Energy Healthcare with Better Place International
- Q&A/ Discussion

Defining Zero Energy Buildings:
DOE's Recent Work with Stakeholders

Cody Taylor, U.S. Department of Energy

U.S. DEPARTMENT OF ENERGY

Defining Zero Energy Buildings

Better Buildings Summit

May 28, 2015

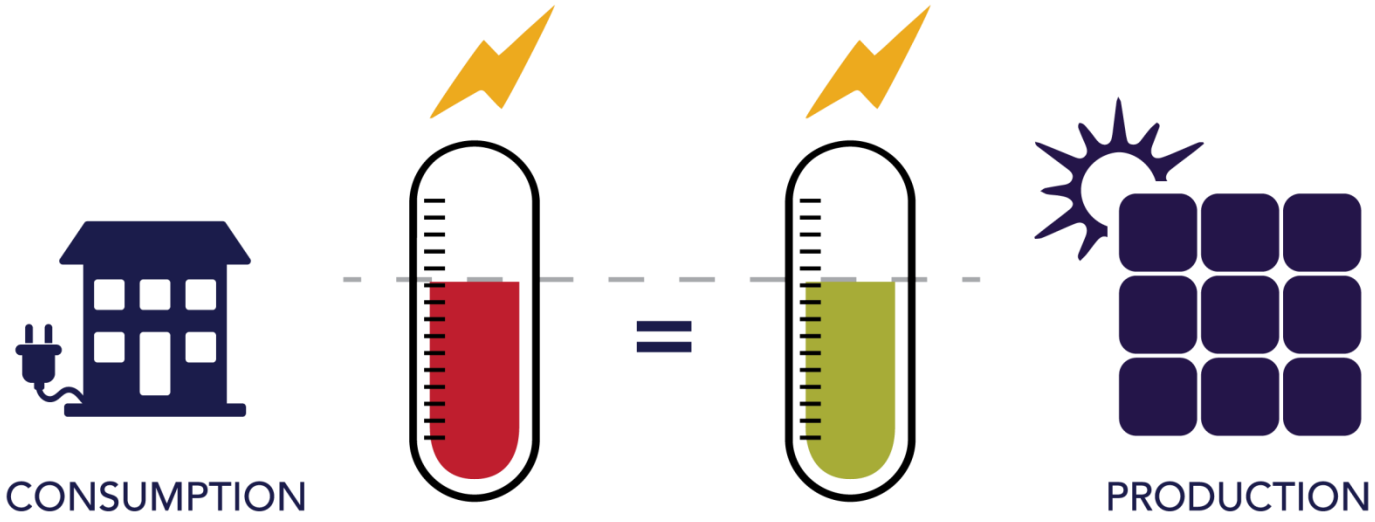
Cody Taylor
U. S. Department of Energy
Building Technologies Office

Project Goal

Converge on an industry-accepted national DOE definition for ZE that will support program and policy goals and encourage commercial new construction and major renovation projects to design, construct, and operate buildings that achieve a high level of energy efficiency.

Zero Energy Building (ZEB) Definition

An energy-efficient ***building*** where the actual ***annual source energy*** consumption is balanced by ***on-site renewable energy***.



ZEB Definition Variations

Zero Energy Campus

- An energy-efficient *campus* where the actual *annual source energy* consumption is balanced by *on-site renewable energy*.

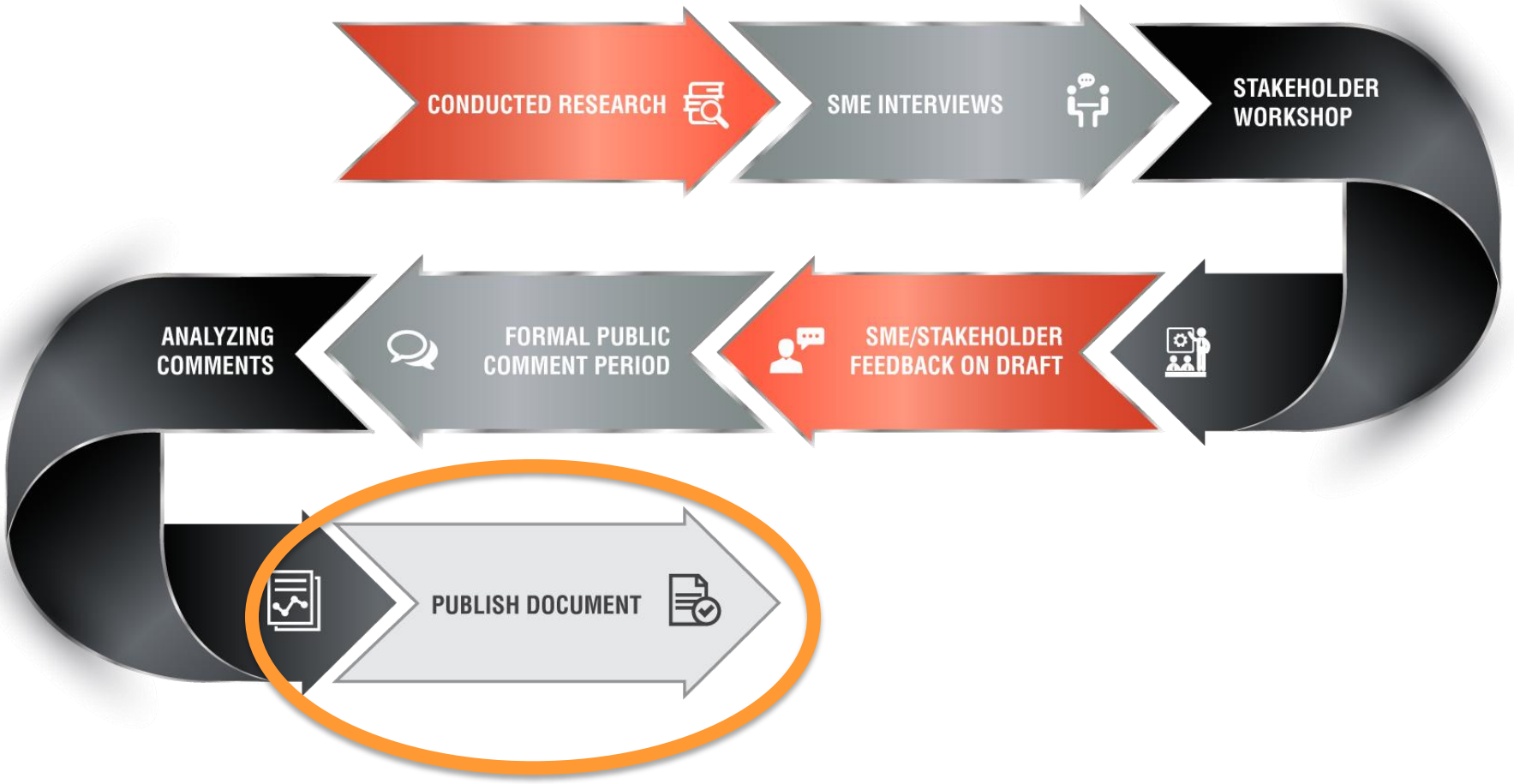
Zero Energy Portfolio

- An energy-efficient *portfolio* where the combined actual *annual source energy* consumption is balanced by *on-site renewable energy*.

Zero Energy Community

- An energy-efficient *community* where the actual *annual source energy* consumption is balanced by *on-site renewable energy*.

Status


CONDUCTED RESEARCH
SME INTERVIEWS
STAKEHOLDER WORKSHOP
SME/STAKEHOLDER FEEDBACK ON DRAFT
FORMAL PUBLIC COMMENT PERIOD
ANALYZING COMMENTS
PUBLISH DOCUMENT

Resources

Questions?

Cody Taylor

Cody.taylor@ee.doe.gov

Success Story: Walgreens' Zero Energy Store in Evanston

Jason Robbins, Walgreen's Co.

U.S. DEPARTMENT OF ENERGY

Walgreens

AT THE CORNER OF HAPPY & HEALTHY®

Vision

To create a showcase for innovative, sustainable, high-performance design at a retail location without altering the operational characteristics of the store in order to make it as highly-scalable as possible. To share this information with the sustainability, architecture, and retail communities in a completely transparent fashion as a means of encouraging the adoption of green building practices wherever reasonably feasible.

Close proximity to key project team

A cooperative developer

A supportive community

Correct timeframe

20% IRR over 5 years

120,000 kWh in refrigeration

14,820 SF of roof space

15/7/365

Technology

Technology

Footprint

8,215

120,000,000

28W to 25W

$765/year/store

$765 x 8,215 = $6,284,475


Walgreens

Project goals

- First net-zero energy retail store in the US
- LEED Platinum Certification
- Living Building Challenge Net Zero Certification
- Better Building Challenge Showcase project
- Green Chill Platinum certification
- Energy Star
- Open before Thanksgiving 2013 (14 months for design & construction)

What is “net-zero”, zero net energy, zero energy

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& \left.+4\lambda y-\frac{\pi^2n^2}{l^2}\right)\left\{\frac{\alpha\eta\lambda}{2\pi l}\sin^2(n\pi x)\mathrm{e}^{-2y}\theta\right.\\
& \times\left[1-\frac{\alpha\eta\lambda}{2\pi l}\sin^2(n\pi x)\mathrm{e}^{-2y}\right]\\
& \left.+\theta\left[\frac{\alpha\eta\lambda}{2\pi l}\sin^2(n\pi x)\mathrm{e}^{-2y}-1\right]\right\}\\
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& \times\theta\left[1-\frac{\alpha\eta\lambda}{2\pi l}\sin^2(n\pi z)\mathrm{e}^{-2y}\right]\\
& \left.+\theta\left[\frac{\alpha\eta\lambda}{2\pi l}\sin^2(n\pi z)\mathrm{e}^{-2y}-1\right]\right\}.
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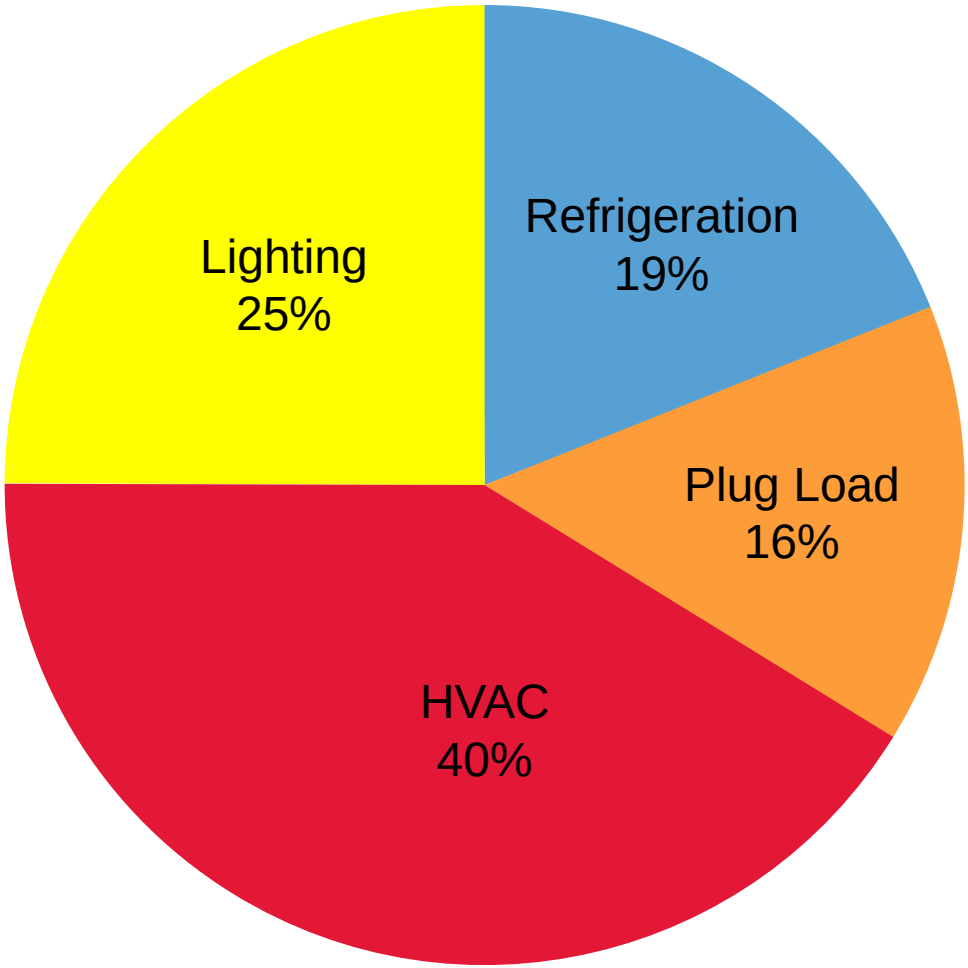
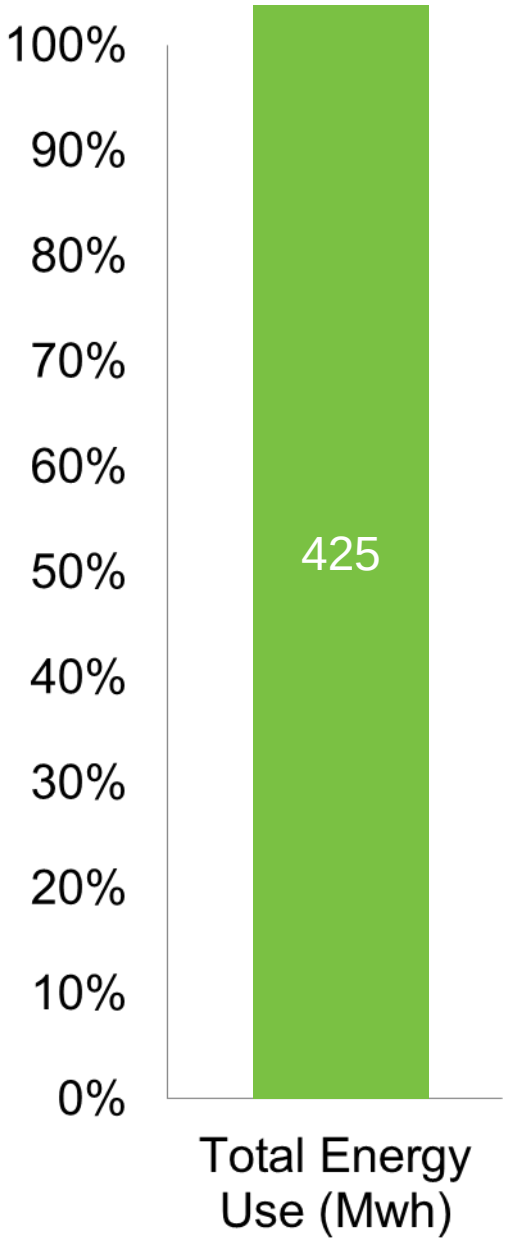
Energy Produced – Energy Consumed > 0

220,000 kwh – 200,000 kwh > 0

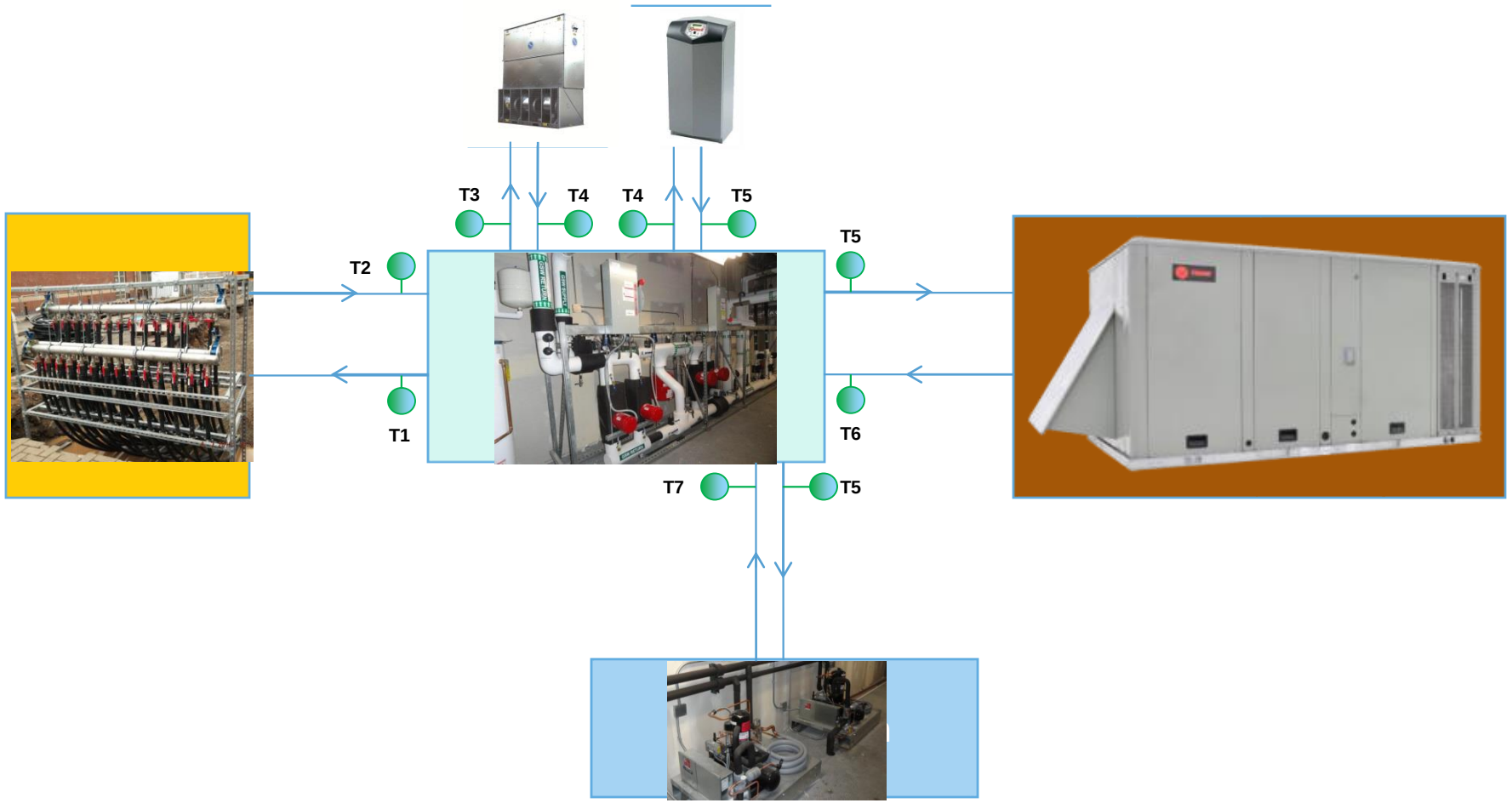

Lighting
25%
Refrigeration
19%
Plug Load
16%
HVAC
40%


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
425
Total Energy
Use (Mwh)

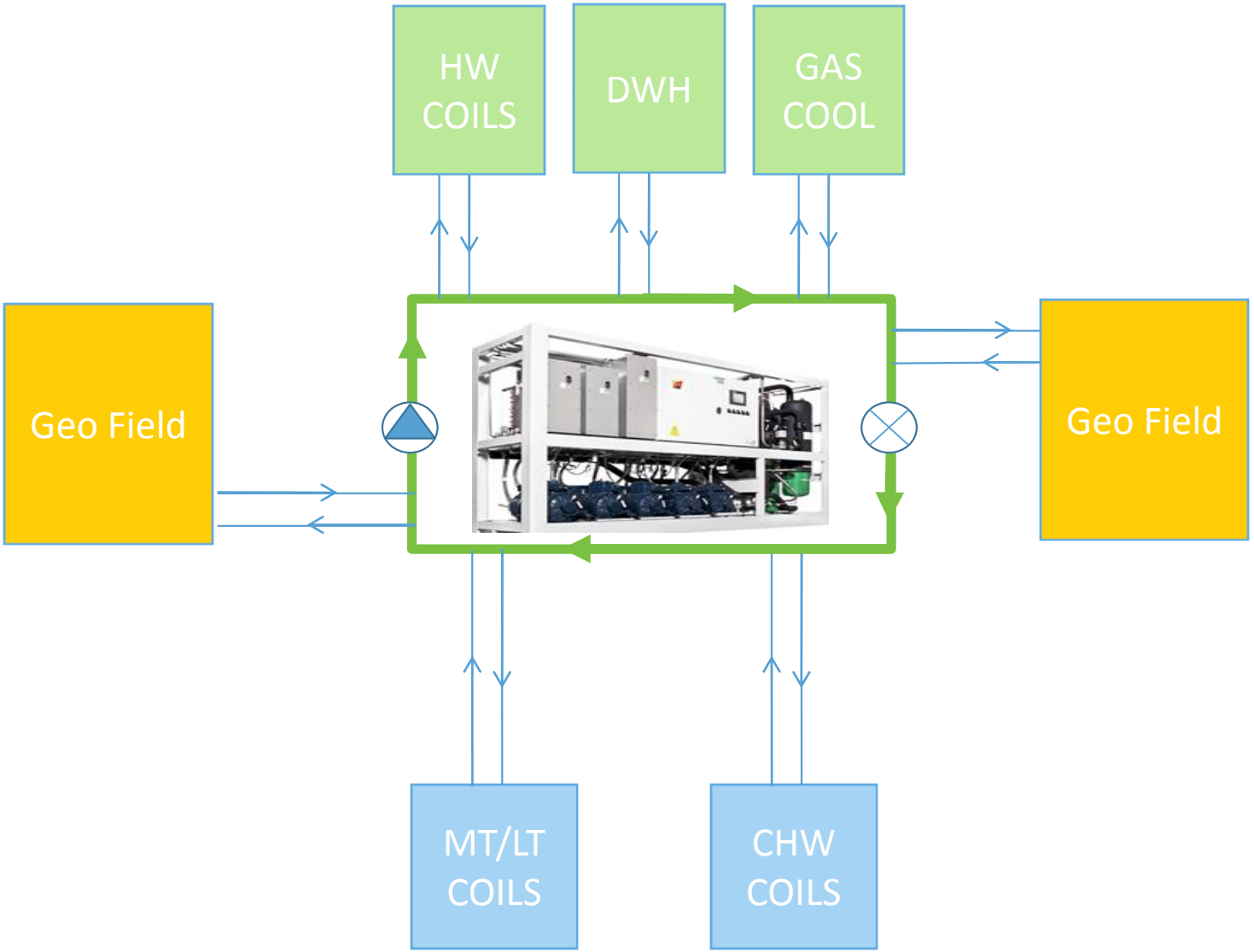
Energy reduction strategies

- Ultra-high-efficiency mechanical and refrigeration system with carbon dioxide as the refrigerant
  - Uses 8 geothermal bore holes, each 550’ deep, as main heat source and heat sink
- All LED lighting
- Daylight harvesting
- Natural ventilation with operable windows
- 5 separate dimming zones, including peak output reduction after dark
- Revolving door
- Building automation system and a weather station to allow building systems to react to local climate conditions

“Typical” Hybrid Geothermal Design



CO2 Central Plant Design




Well at Walgreens
naturals
lotion
beautiful

It’s not just about energy . . .

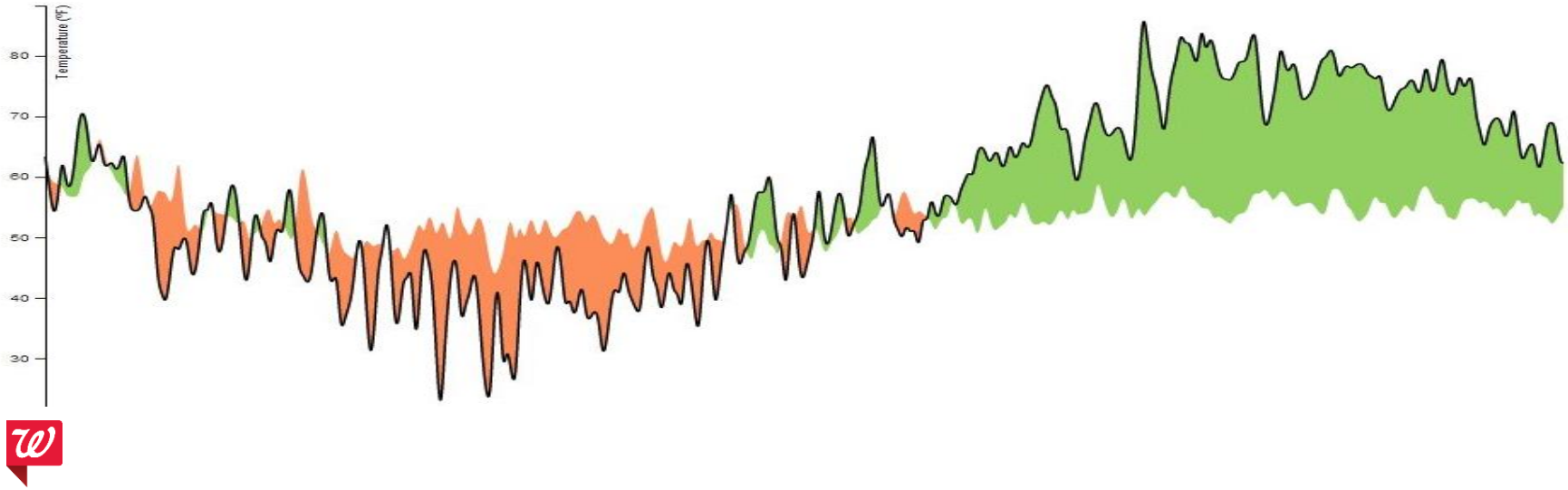
- Recycled of over 84% of the existing building
- Used natural and adaptive plant species and eliminated water used for irrigation
- All low flow water fixtures
- Stormwater from the site is captured beneath the parking lot and allowed to percolate back into the soil
- Low-VOC finishes and fixtures used throughout the space
- Electric vehicle charging station
- Educational signage throughout the site, including a viewable mechanical space.

Everything is always perfect the first time

T – 1 year… and counting

It's actually a continual process

- Collect data
- Diagnose
- Corrective actions



Overall Lessons Learned

Don’t Rush!

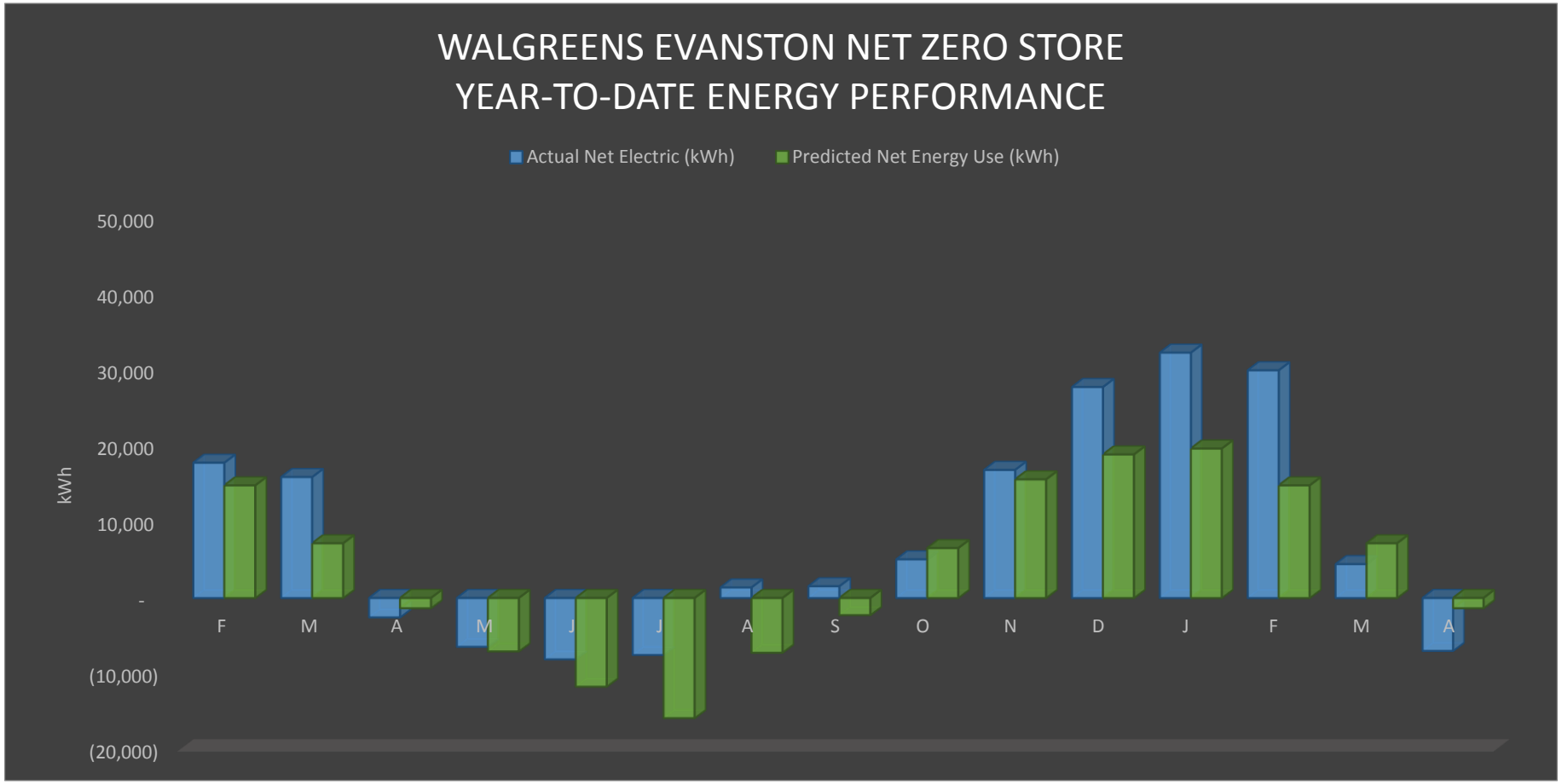
Commissioning before opening

Engage all contractors early

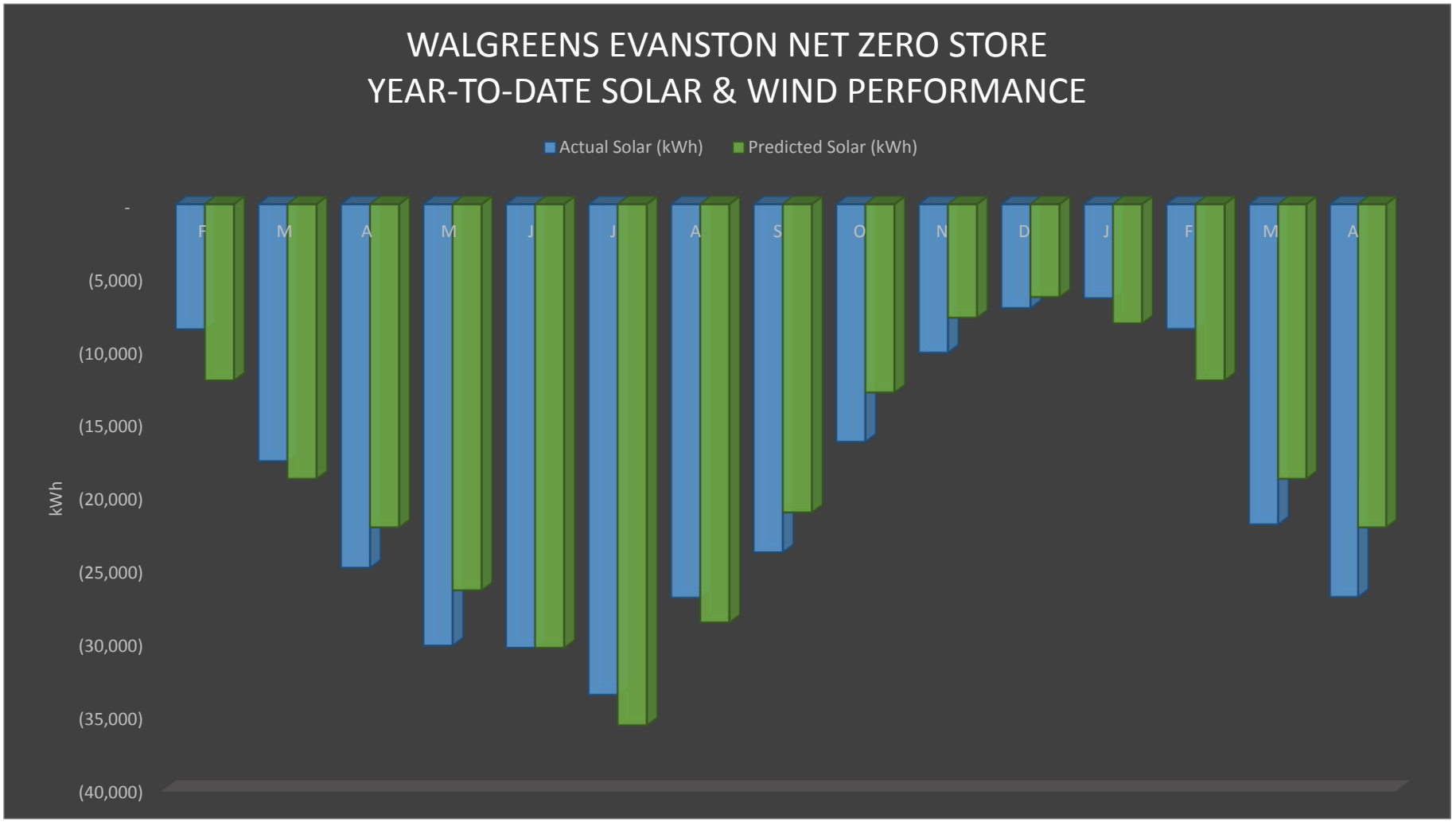
Punchlist

Employ a psychic- Don’t do this project before historically cold winters

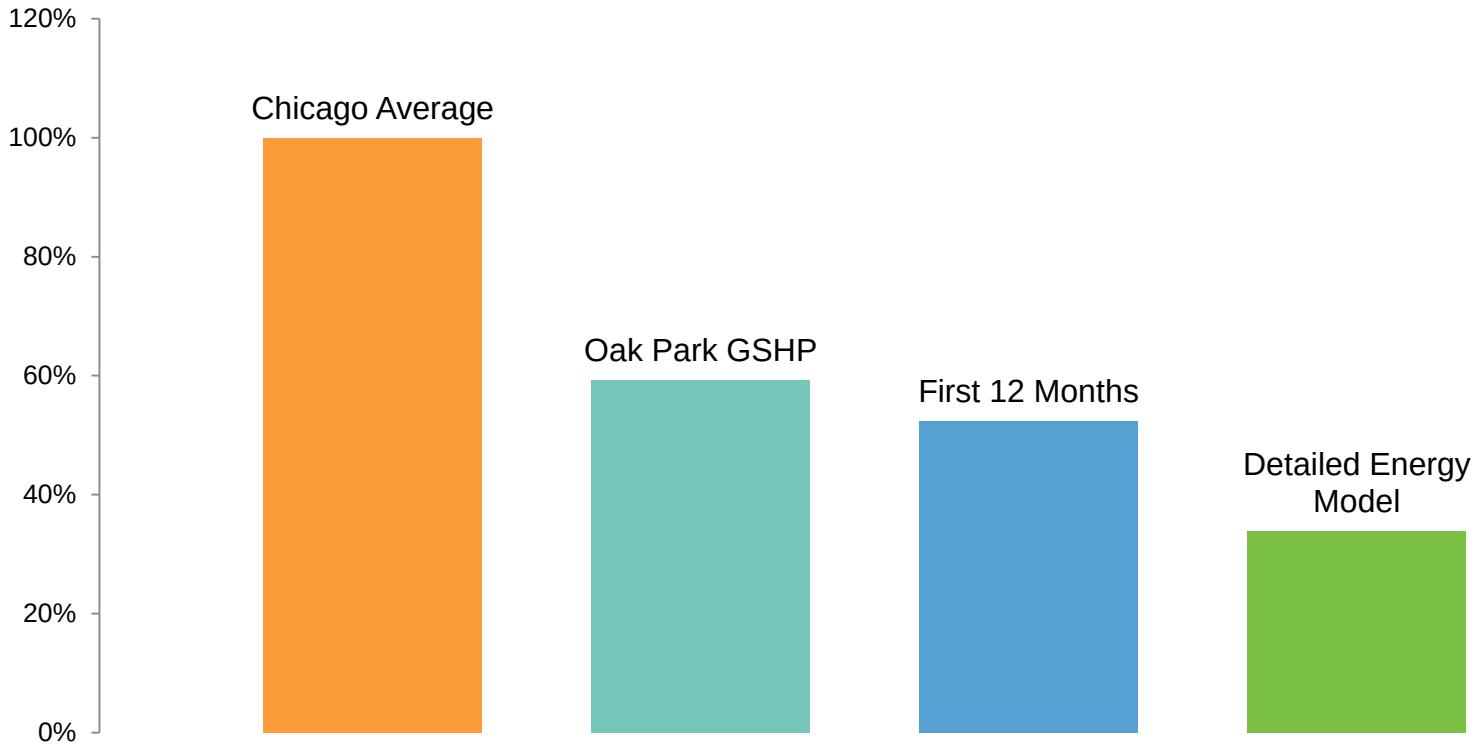
The Results



The Results

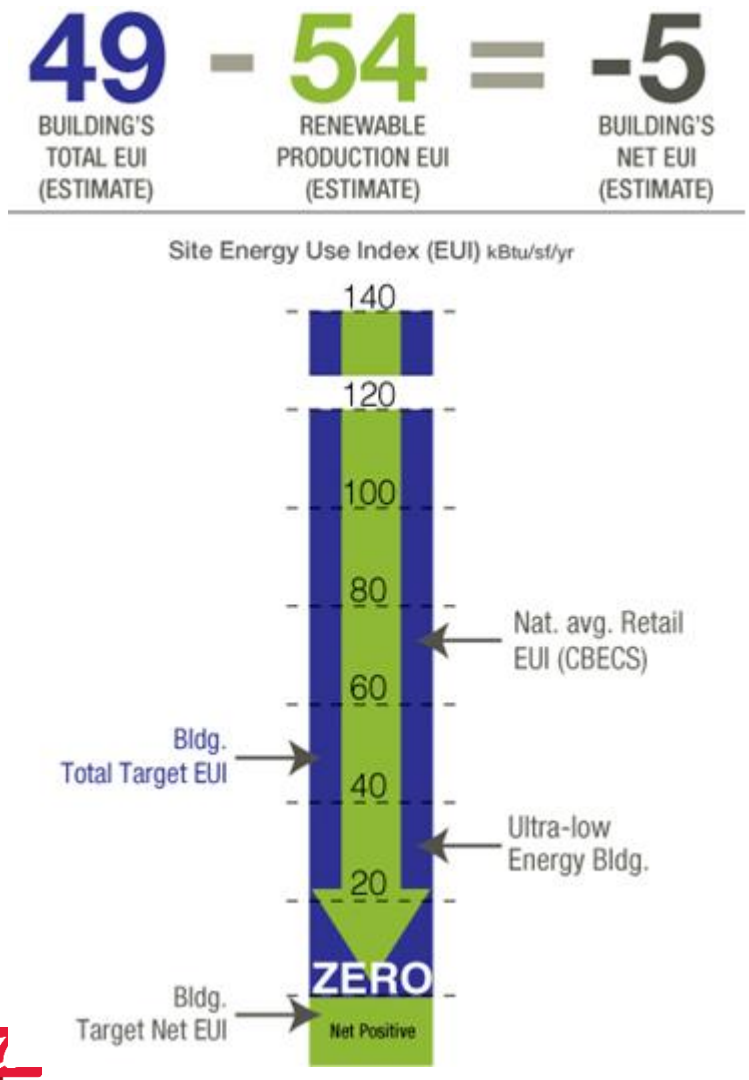


The Results



Net zero predicted energy use comparison (not including solar and wind energy production)

The Results



Predicted EUI = -5

Actual EUI after 1st year of operation = 20

Several corrective measures taken from issues found during commissioning.

- Replacing oversized refrigeration compressors
- Re-piping Dedicated outside air handler
- Diagnosing and repairing anti-condensate heaters
- Dimming system properly set up
- Replaced incorrect lighting fixtures
- Security system lighting override
- Malfunctioning Gas cooler

Today, our appreciation for this Chicagoland-based mega company has hit an all-time high.

Walgreens Continues Journey Into Future

Good For You Walgreens: First Net-Zero Retail Store

Walgreens does the right thing, again

Sometimes **Walgreens** really just blows our socks off.

THE WALL STREET JOURNAL.

U.S. EDITION Thursday, November 21, 2013 As of 11:05 AM EST

PRESS RELEASE | November 21, 2013, 11:05 a.m. ET

Walgreens Debuts Nation's First Net Zero Energy Retail Store in Evanston, Ill.

By utilizing solar panels, wind turbines and geothermal technology, engineers anticipate the new store will produce energy equal to or greater than it consumes

Energy Retail Store in Evanston, Ill.


eat well
Every day we help people get, stay and live
pharmacy
BURT'S BEES
beautiful

Questions?

Success Story: Lend Lease Zero Energy Military Housing

Chad Harrell, Lend Lease

U.S. DEPARTMENT OF ENERGY

Lend Lease

ZERO ENERGY BUILDINGS

DEFINING IT AND DOING IT

The Lend Lease Energy Story and Path to Zero Energy

LEND LEASE ENERGY DEVELOPMENT GROUP

Lend Lease

DELIVERING CLEAN, RELIABLE AND AFFORDABLE ENERGY SOLUTIONS

Leadership in Energy & Sustainability

Energy Conservation & Efficiency

Environmental & Energy GMRs

Energy Policy & Action Plans

Renewable Energy & Storage

Green Retrofits

Utility Awareness & Education

Client Relationships

BBC Partner Commitment

Building Energy Management Systems (BEMS)

OUR VISION

CREATE THE BEST ENERGY SOLUTIONS

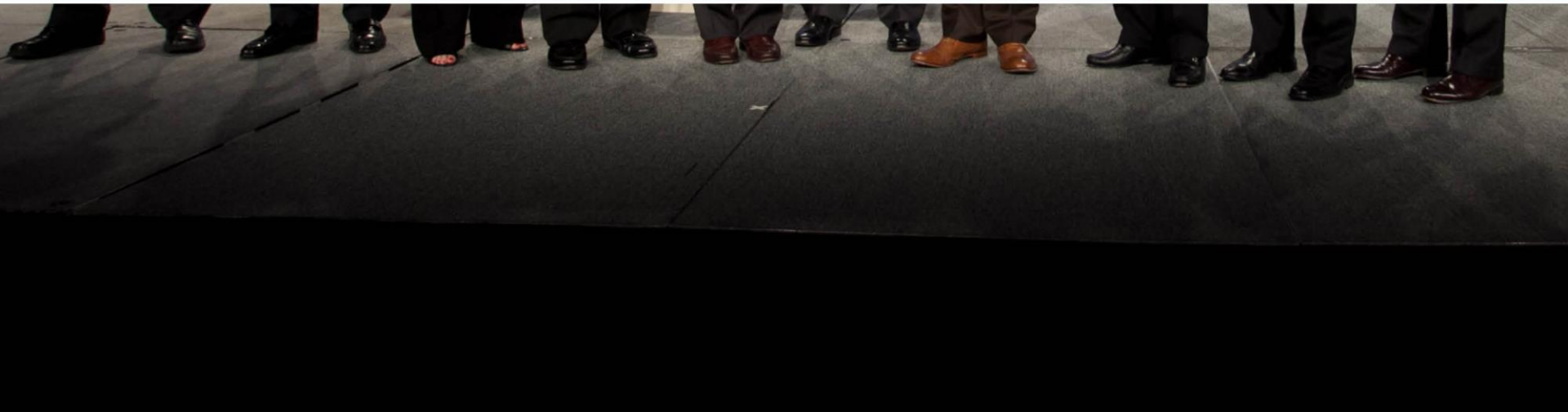
OUR COMMITMENT

BETTER BUILDINGS CHALLENGE

Lend Lease accepted President Obama's Better Buildings Challenge and committed to achieving a 20% reduction in energy consumption for our entire military housing and hotel portfolio by 2020.

We are proud to announce we hit our goal early, achieving a 25% reduction as of December 31, 2014.

Lend Lease



LEND LEASE'S ENERGY JOURNEY

Lend Lease

BBC COMMITMENT

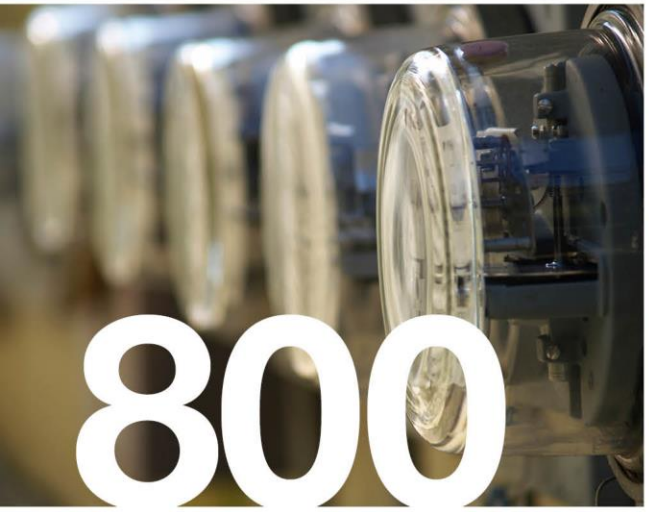
Sharpened our focus and awareness to energy risks and opportunities

- Realized the lack of industry accepted definition or vision for Zero Energy
  - Shaped Lend Lease's working definition and approach to an emerging vision
    - Formed Lend Lease's definition of Net Zero Energy – ability to offset all energy demand from on-site renewables generation or allowable off-site solutions.

BASELINE

Lend Lease

US DEPARTMENT OF DEFENSE IS THE SINGLE LARGEST ENERGY CONSUMER IN THE US



TRILLION BTU

FY11 Consumption:
800 trillion BTU

(80% operational
and 20% buildings)

Energy Bill for Buildings: $3.6 Billion

TRILLION BTU

2.7 trillion BTU is 15.6% of the total consumption of the bases we operate on

Our military housing portfolio represents **1.7% of DoD buildings** total energy consumption

COMMITMENT

Army, Air Force and Navy have publicly committed to **25% renewable energy** procurement by 2025 (3-4GW of on-site renewable generation).

OUR APPROACH

Lend Lease

CORE CONCEPTS AND TECHNOLOGIES

SYNERGY

SAVING OUR NATION'S ENERGY, CONSERVING OUR RESOURCES

CONSERVATION & EFFICIENCY

- LIGHTING
- HVAC
- BUILDING ENVELOPE

BUILDING ENERGY MANAGEMENT SYSTEMS

- SOFTWARE
- HARDWARE

DISTRIBUTED GENERATION & STORAGE

- GEOTHERMAL
- SOLAR
- STORAGE
- WIND

OUR APPROACH

Lend Lease

ENERGY SOLUTIONS & SECURITY STRATEGIC OBJECTIVES

Our Approach and Rationale

PROJECT OBJECTIVES

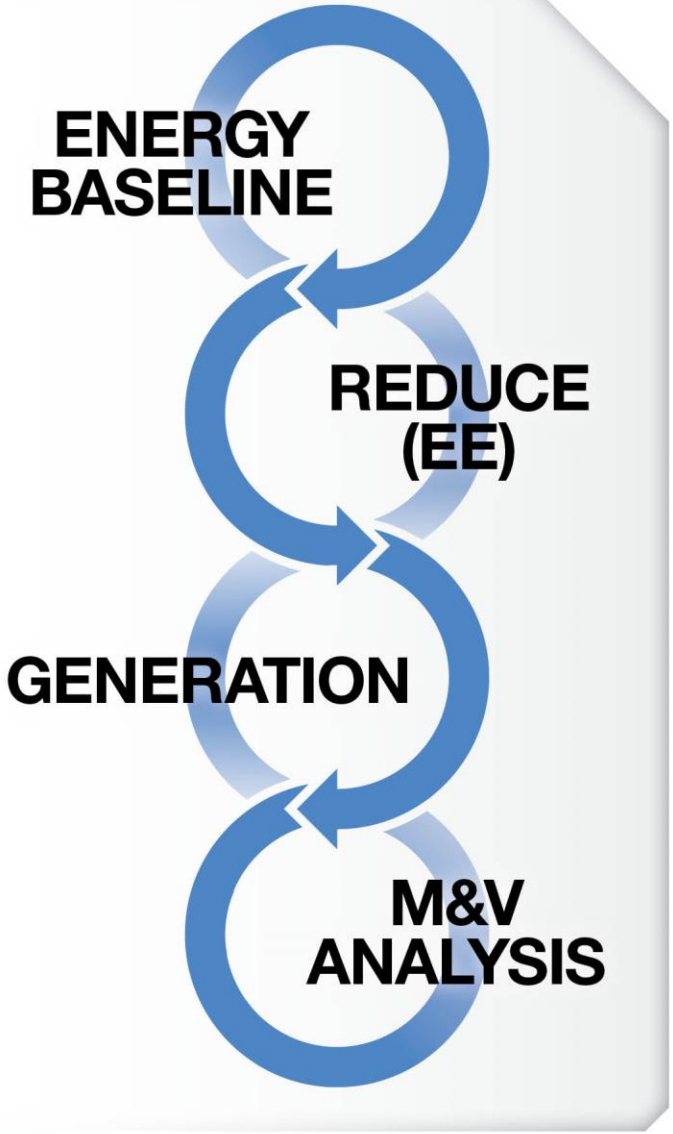
VISION	INDEPENDENCE	Ultimate goal is strive towards 'independence' from the grid (and net zero where feasible) to ensure resilience of supply and sustainability of economic operations.
ECONOMIC OBJECTIVES	PROJECT COMPANY FREE CASH FLOW	Improve Project Co. NOI over time – reinvest savings into core facilities for residents
	LONG TERM HEDGE	Mitigate volatility of energy prices and future escalation
QUALITATIVE OBJECTIVES	CHANGE THROUGH LEADERSHIP	Showcase the DoD and Lend Lease as market leaders – a catalyst for change. Enable our client and utilities to achieve their energy goals
	ENVIRONMENT	Benefit the environment through less energy consumption and more efficient and cleaner forms of energy generation
STRATEGIC OBJECTIVES	BASE PORTFOLIO WIDE ENERGY SOLUTIONS	Create solutions for the overall base where we have a MHPI presence
	BEYOND DOD AND ENERGY	Create a "Living Utilities" business in the Americas, inclusive of energy, to support our development pipeline and strategic clients

ZERO ENERGY HOME CASE STUDY

AMCC CAMP LEJEUNE

ATLANTIC MARINE CORPS COMMUNITIES, LLC (AMCC)

Lend Lease



POINT SOLUTION - BEGINNING OF OUR ZERO ENERGY JOURNEY

- Pilot home design/construction 2011
- Net Zero Energy Process
  - **BASELINE** Consumption: 12,108kWh/yr and set EPIs
  - Green design to **REDUCE** by 35% to 9,700 kWh/yr - fabric/ envelope improvements & right sized mechanicals (BEMS*)
  - Onsite **GENERATION** – 6.7 kw PV
  - **M&V** Net Positive results
- LEED Platinum home

ZERO ENERGY HOME CASE STUDY

AMCC CAMP LEJEUNE

Lend Lease

Net Zero Energy Home at Midway Park

The Midway Park neighborhood at Camp Lejeune is the first on a Marine Corps Installation to have LEED Silver certified homes and AMCC has once again set the bar by building a Net Zero Energy Home in this neighborhood. The Midway Park Net Zero Energy Home offers specific features to allow its occupants a more sustainable living environment.

1. **Sustainable Site**
The Midway Park land was previously developed which means that the new community is not disturbing any new land and is also limiting the amount of new resources required by reusing the existing roads and infrastructure. The site is within ½ mile of numerous community resources such as a convenience store, bank, post office, etc. making the neighborhood more pedestrian friendly.

2. **Water Efficiency Outside the Home**
There is no need for irrigation systems within the Midway Park Community as drought tolerant grass and plants that do not require watering are being used for landscaping.

3. **Pollutant Protection**
Storm water is directed to bio retention swales in lieu of storm drains, which is reducing runoff and pollution into the local storm systems. Rain gardens and bio-retention swells allow for recharging the aquifer which means that the rain water is reused within this area and not diverted to waterways.

4. **Water Efficiency Inside the Home**
If going green is important to you then you will find a unique feature in this homes bathrooms! An advanced water conservation technology provides a hand washing system from which greywater is recycled to charge the next flush. The homes qualify for LEEDS advanced water saving rating.

5. **Existing Roads**
Existing road patterns are reused to eliminate deforestation and to minimize dust and noise.

6. **HVAC Systems**
The homes are extremely energy efficient due to the tight building envelope created by advanced framing techniques and highly rated insulation. The home is also healthier for residents to live in due to well planned construction practices such as a preoccupancy air flush, use of exhaust fans and controlling contaminants that enter the homes.

7. **Recycled Materials**
The majority of materials during demolition of the old homes were recycled and diverted from landfills. Material for the new homes such as fiberglass insulation and carpet have recycled content. More than 60 percent of all construction debris was diverted from local landfills for recycling.

8. **Triple Pane Windows**
Reduce the amount of heat infiltration, which is perfect for the subtropical North Carolina Climate.

9. **Energy Star Appliances**
Kitchen Appliances that use 20%-30% less energy are installed in every Midway Park home.

10. **Lighting**
All homes are equipped with CFL lighting to help reduce heat in the home and provide more efficient lighting.

11. **Garages**
The homes have a rear entry feature allowing for private entry. In addition, mechanical systems and ductwork are not located in the garage eliminating pollutants that would typically infiltrate these systems and get into standard homes.

12. **Walls**
Thicker insulated walls with a higher thermal value lead to better heating and cooling efficiency in all seasons. R-25 walls were utilized in this home which is a combination of closed cell foam and blow fiberglass insulation.

13. **Carbon Emission Reduced**
We made a conscious effort to purchase as many materials as possible locally to reduce carbon emissions from the transportation of these materials. In addition, by creating a neighborhood pathway network, Residents will be enabled to walk more and drive less to get to the convenience store, playgrounds or dog parks.

14. **Additional Insulation**
In the Net Zero Energy Home, the underslab of the home is insulated and there is upgraded insulation in the attic and walls that reduce the heat and cooling lose between the inside and outside of the home.

15. **Photo voltaic Panels**
The photo voltaic array is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photo voltaic effect. The home provides more energy than calculated demand.

16. **Radiant Barrier Roof Sheathing**
This radiant barrier roof sheathing is located on the roof under the roofing shingles and reflects the heat rather than absorbing it which makes the home cooler.

Atlantic COMMUNITIES
Marine Corps
A Lend Lease Community

www.atlanticmcc.com

ENERGY SOLUTIONS & SECURITY PROJECT CASE STUDY

HICKAM COMMUNITIES

Lend Lease

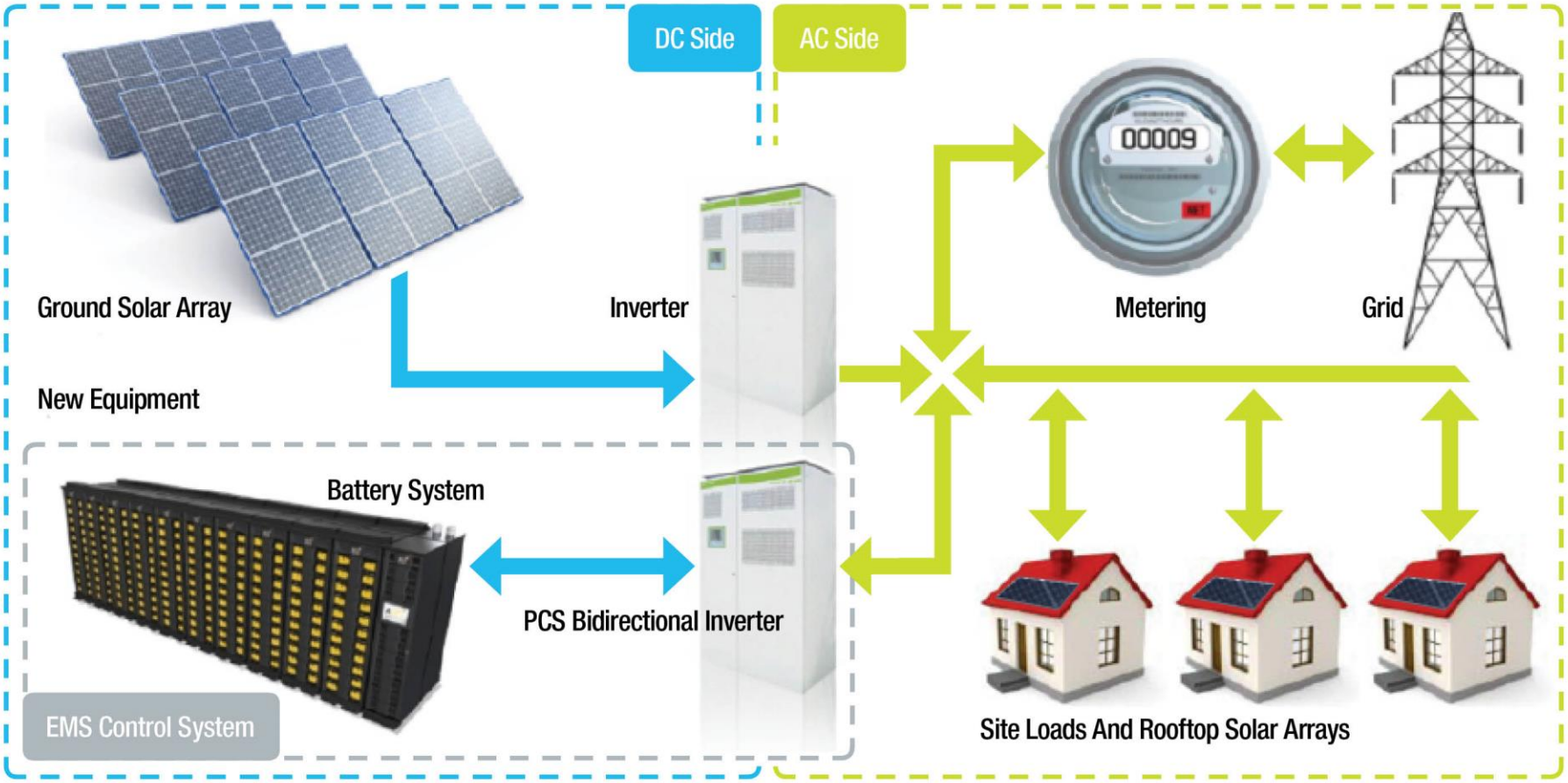
ENERGY SOLUTIONS & SECURITY PROJECT CASE STUDY

HICKAM COMMUNITIES

Lend Lease

SMART MICRO-GRID / STORAGE PILOT PROJECT

- Drive to Independence and Net Zero
- Demonstrate Energy Leadership
- Alignment with DoD and Hawaii Clean Energy 2030 goals



Lend Lease

Thank you.

For more information, please contact:

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Director Energy Solutions, Energy Development
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chad.harrell@lendlease.com

www.lendlease.com

Toward Zero Energy Healthcare with Better Place International

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.

BETTERPLACE INTERNATIONAL.org

BPI Country Leadership and Board

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Bola Gobir, MD

Country Manager
Ethiopia

Sofanit Adeniew, MD

Country Manager
Kenya

Andrew Karani, MD

Country Manager
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Nancy Nswal, MD

DR Congo Leadership and Board

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RDC

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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

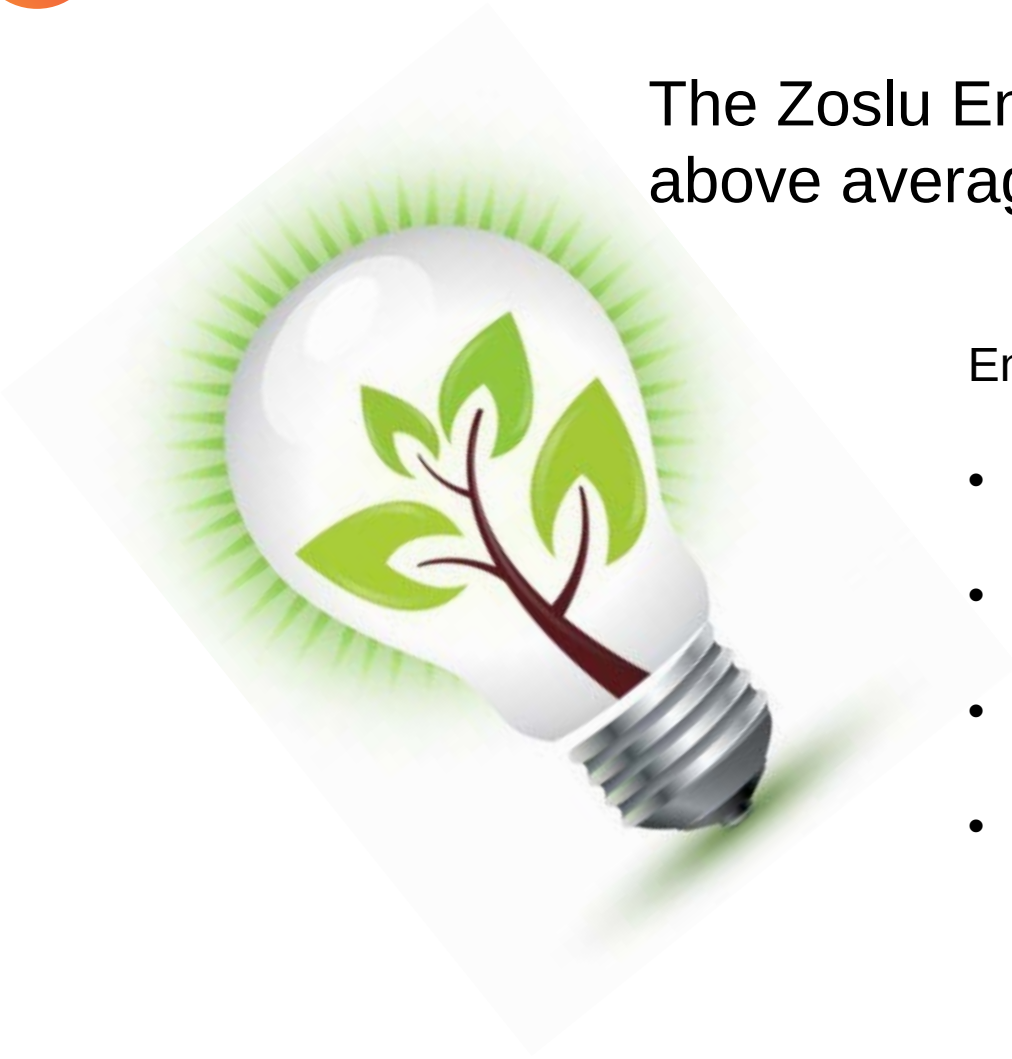
“I’ve joined medical missions to perform surgeries in developing nations across Africa, Asia, and Latin America for more than 20 years. Still, I’m always disturbed when I return to the same countries years later, only to find nothing has changed:

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

BETTERPLACE INTERNATIONAL.org

PROBLEM



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

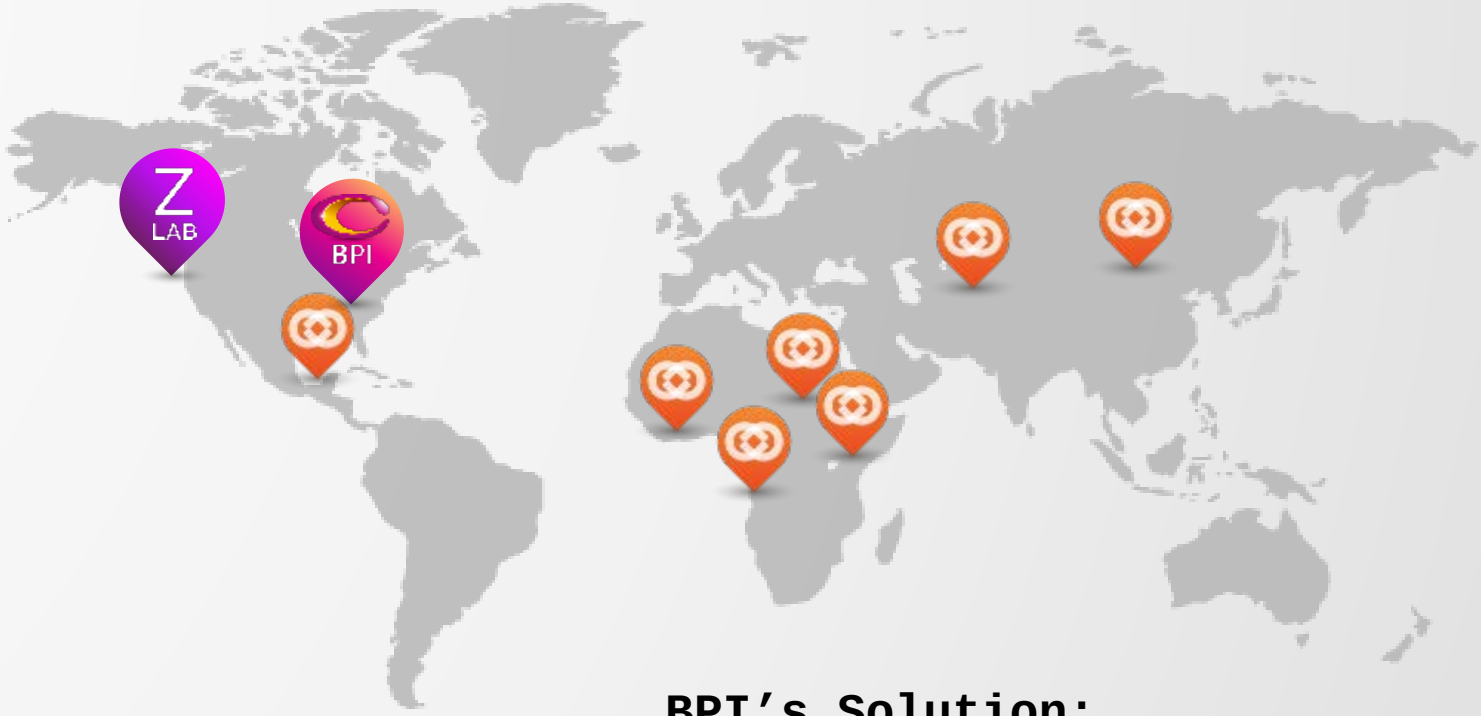
“ Today, 21st century medical technology is delivered with 19th century organization structures, management practices, and pricing models.”

- Michael E. Porter
Harvard Business School

ZOSLU

BPI's Healthcare Facility of Tomorrow: TODAY.

re 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)

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

Forbes

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

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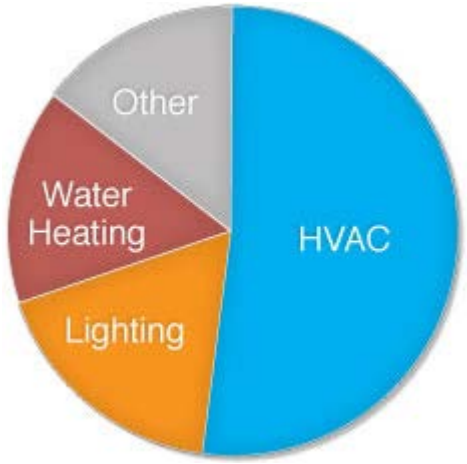
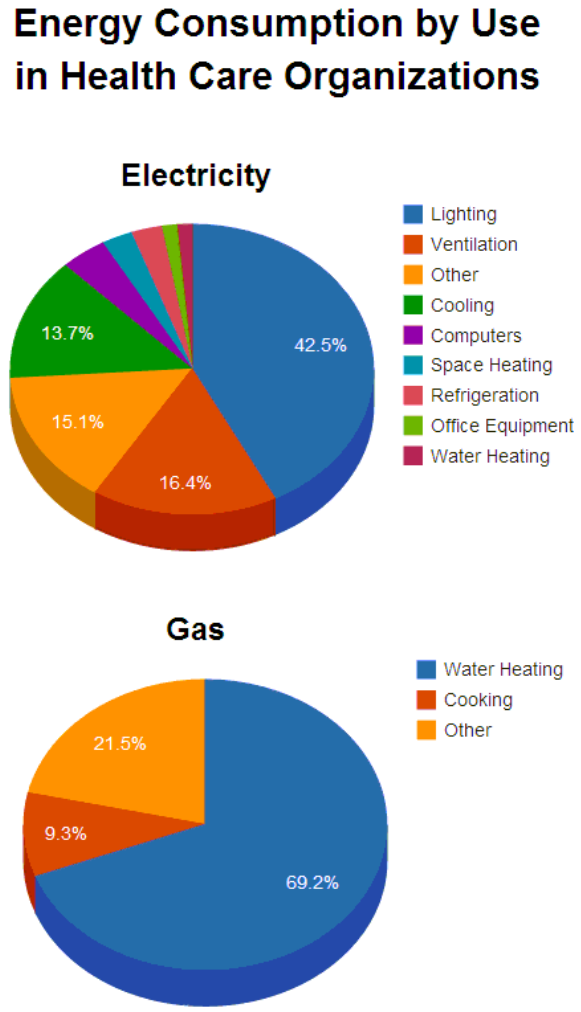
Energy Consumption In Healthcare Facility in US

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)

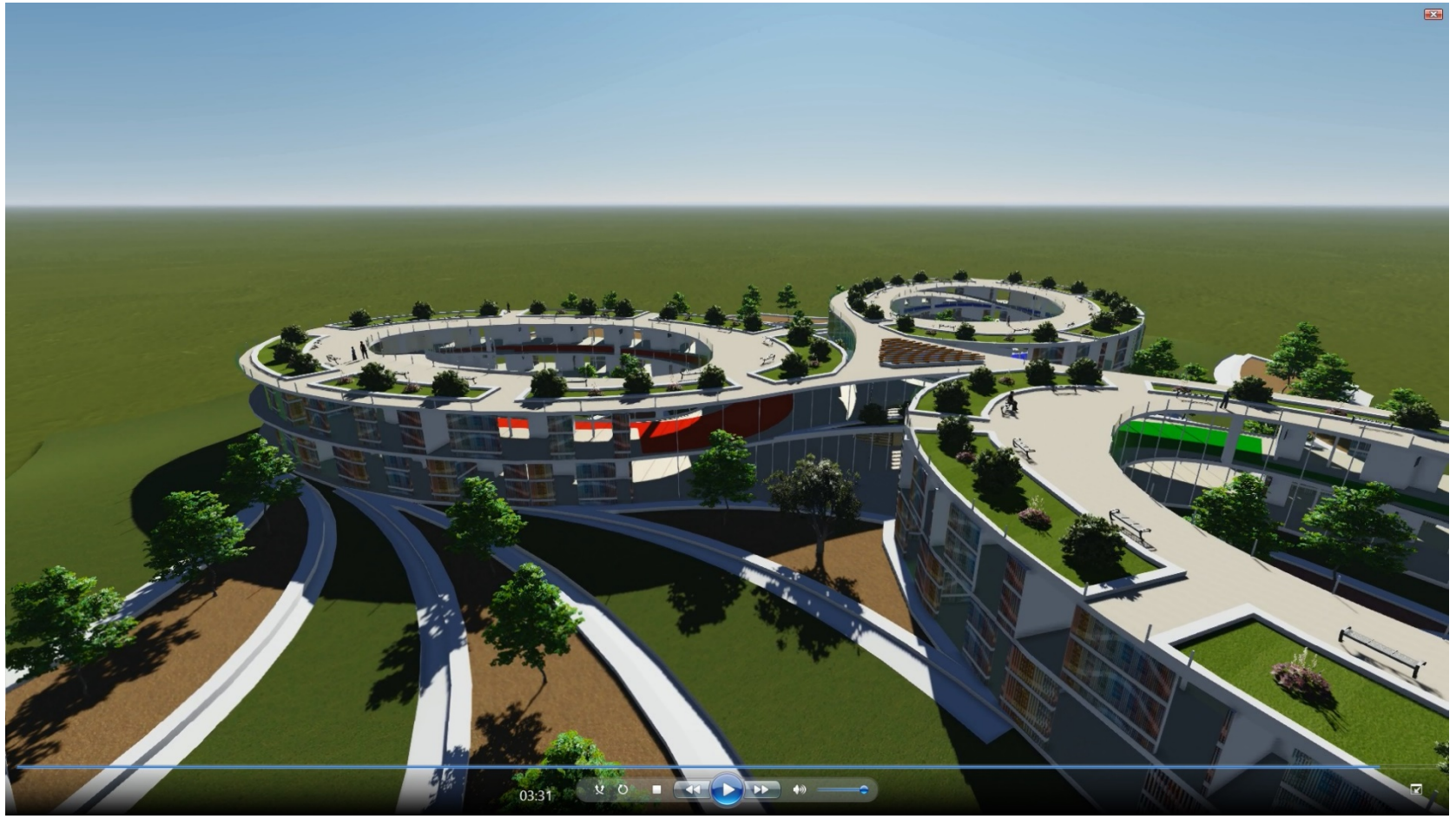
Energy sources
Biogas, gas & waste heat, hybrid (multiple energy)
waste heat from power generation industrial waste streams (steam, hot water, exhaust, etc)

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%.

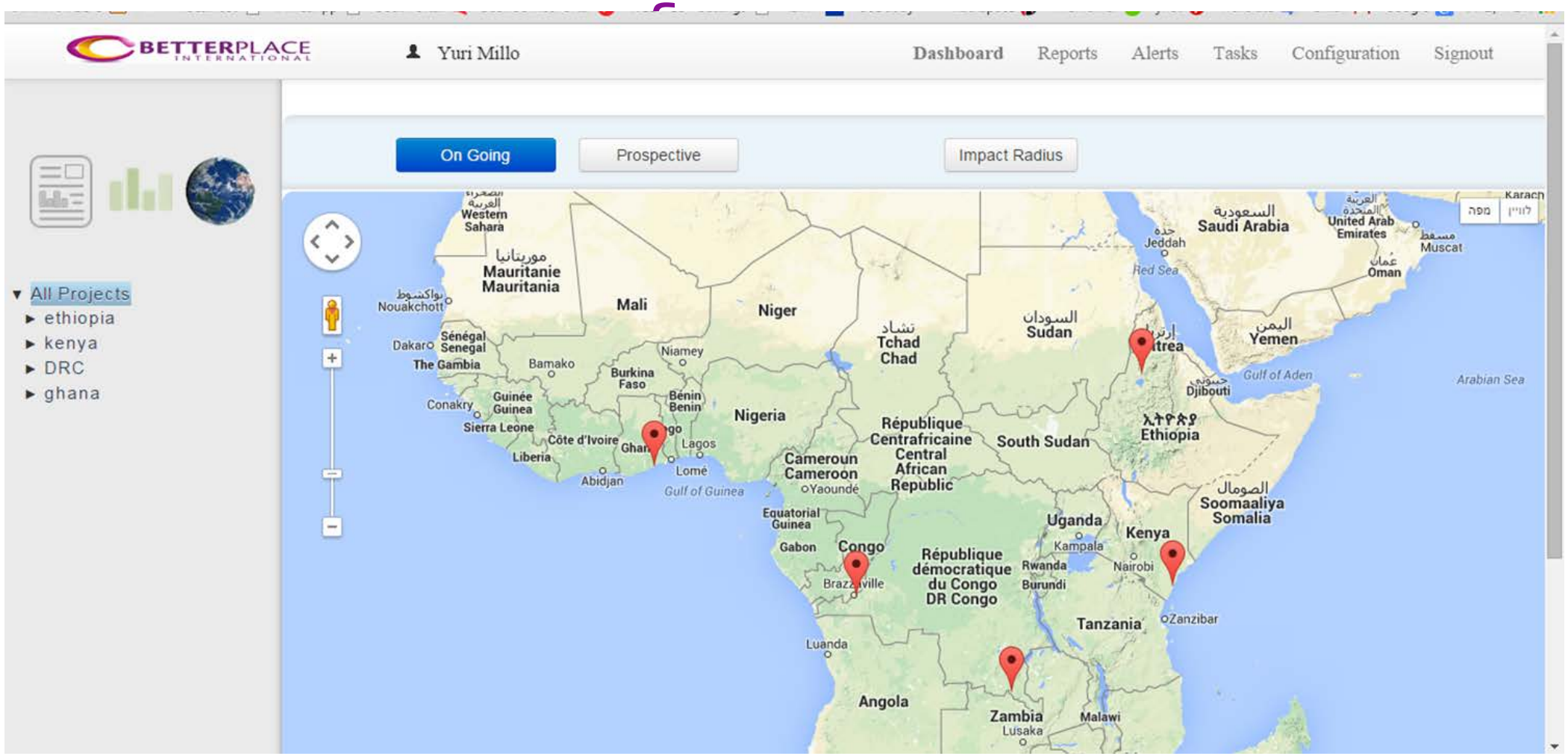
Major Opportunities - PV Energy

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

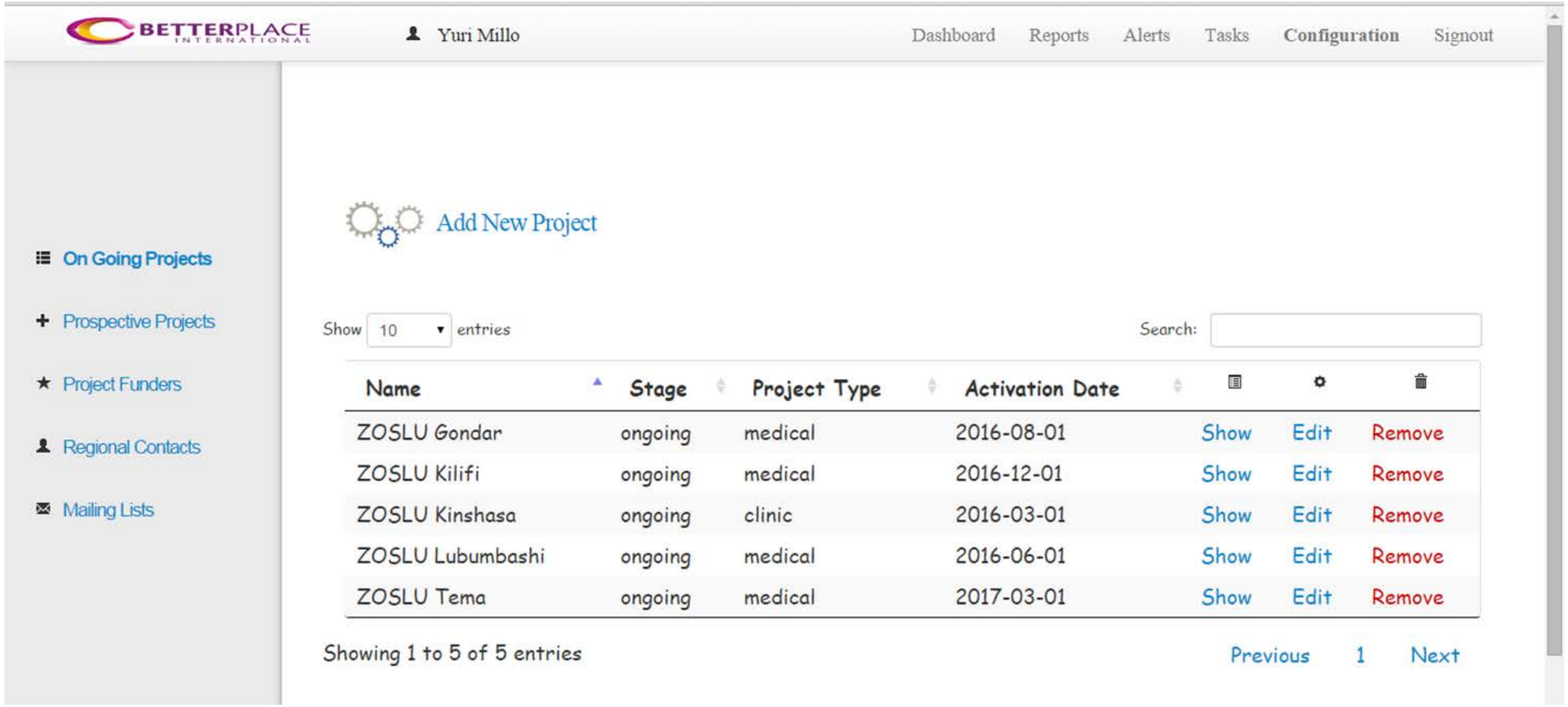
ZOSLU Design



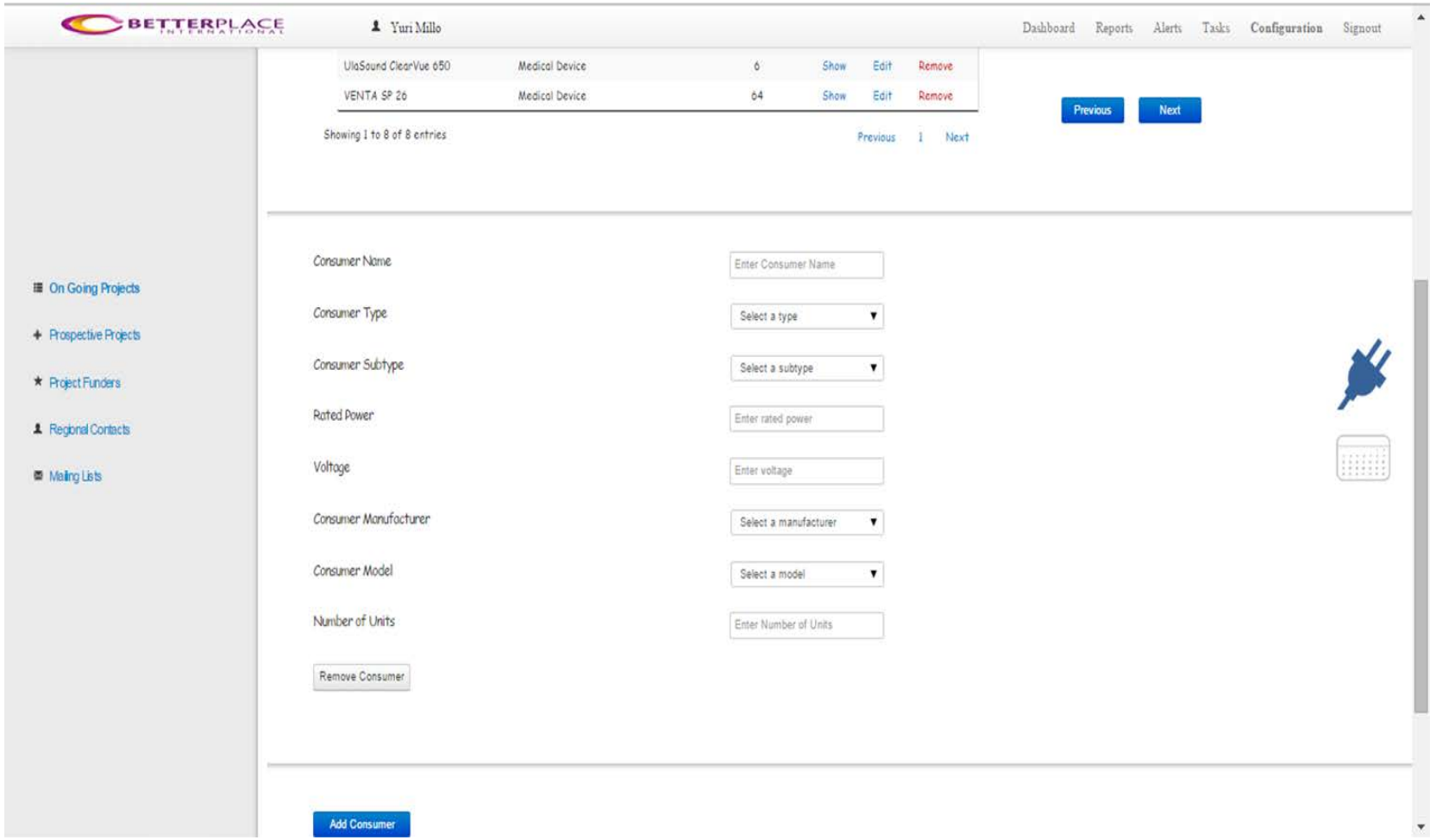
What we do not Measure we cant Account



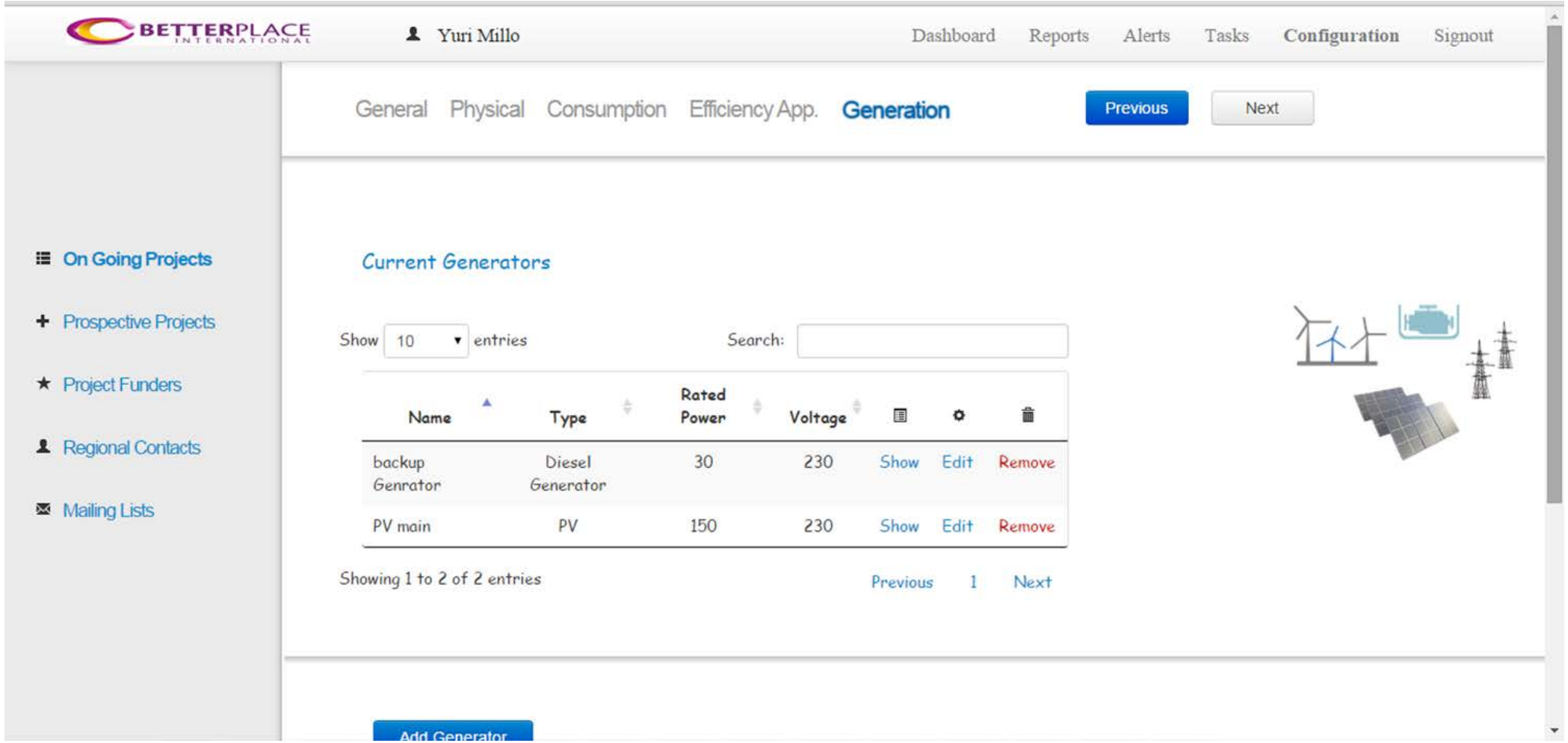
Energy Consumption Location/Project



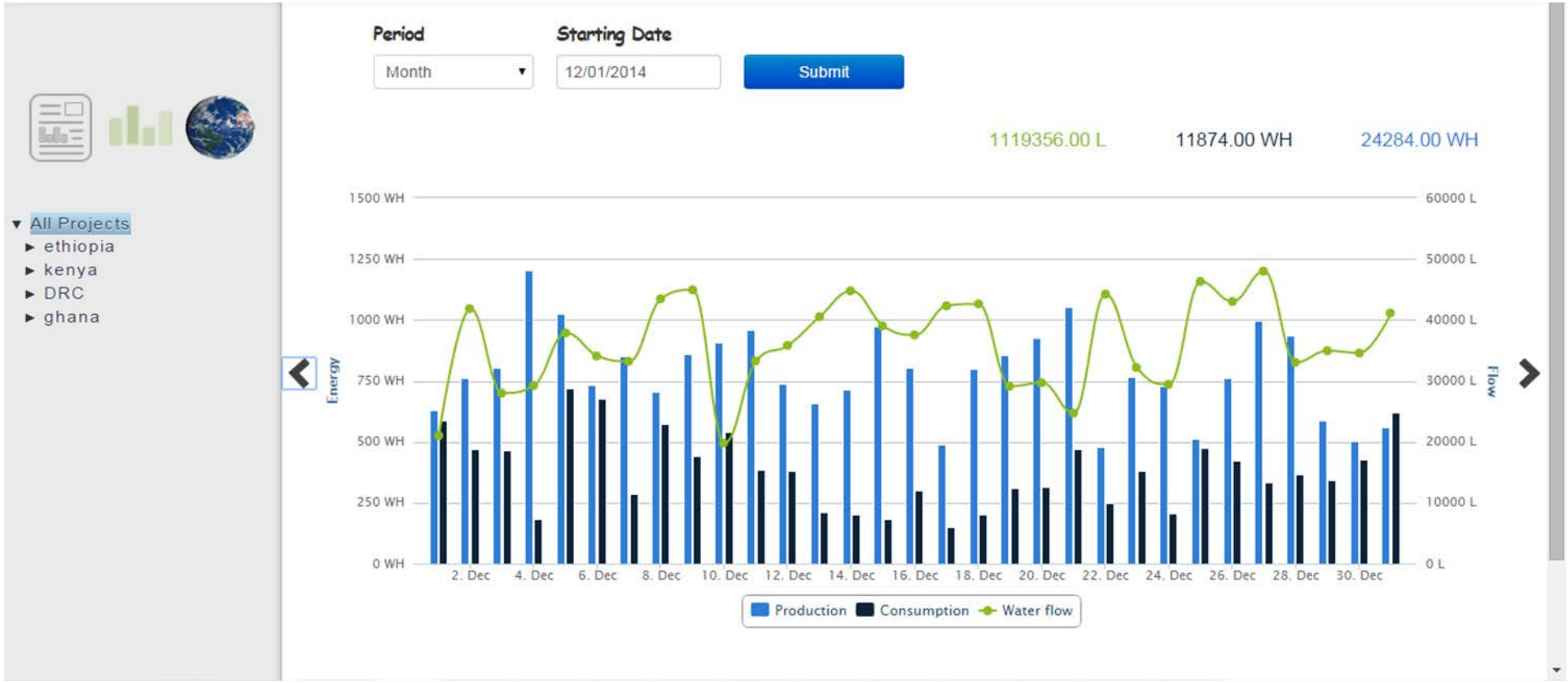
Energy Consumption by Device



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

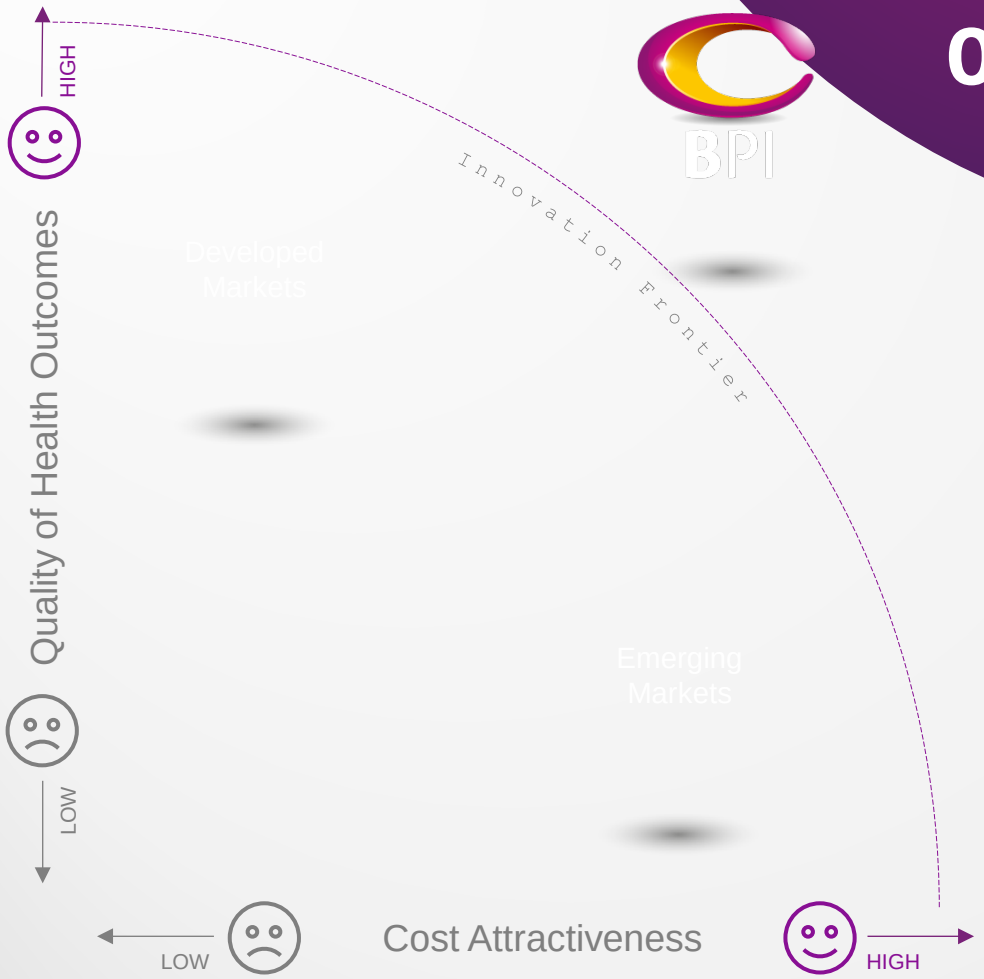
- Our partners and experts optimize and integrate sensors, devices, software, and services to power our Zoslu healthcare facilities and their communities
- Integrated and connected mobile and cloud technologies are deployed into our Zoslu healthcare facilities, operations, and delivery of medical care
- 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

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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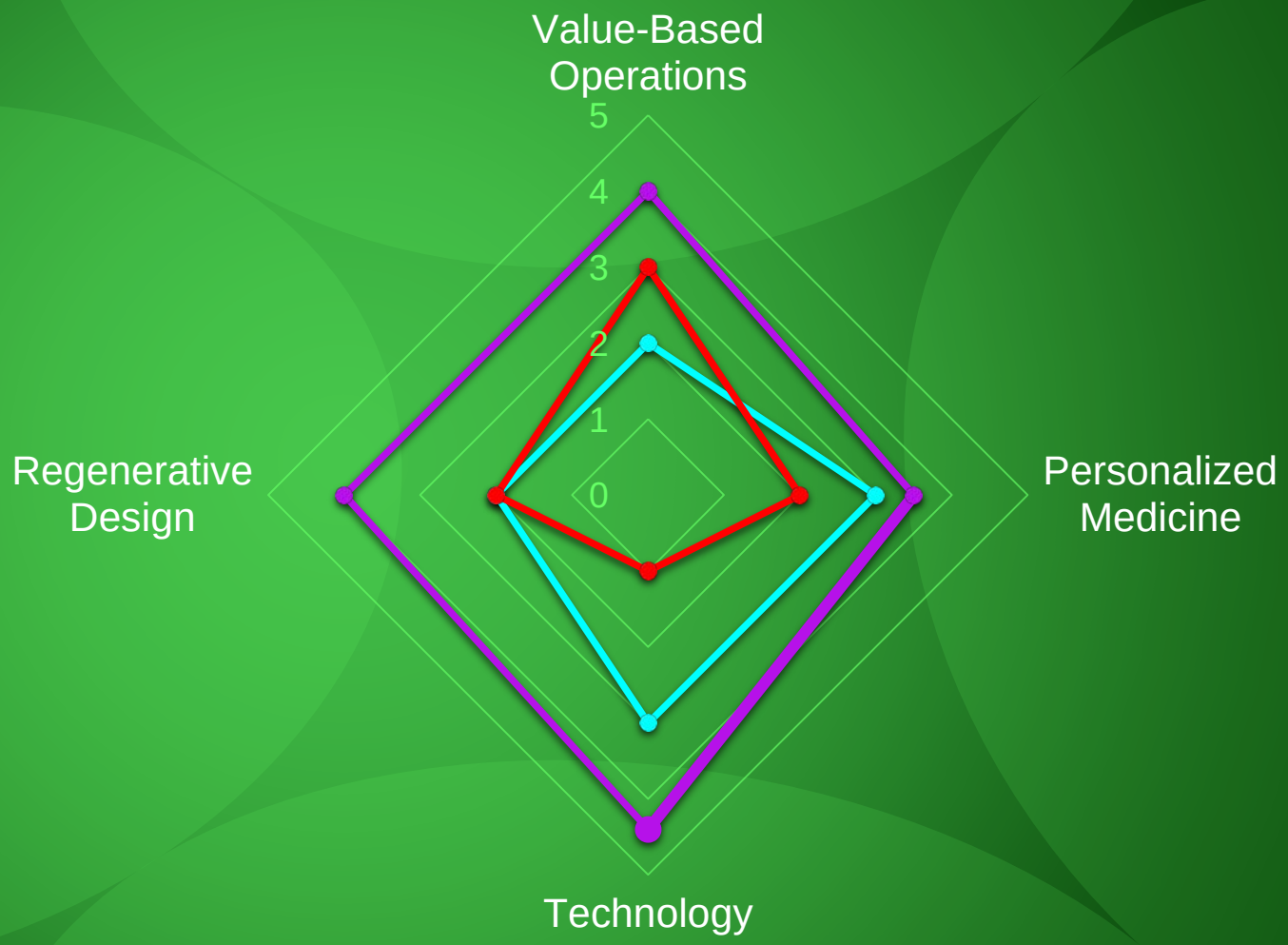
Connecting the 4 pillars



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

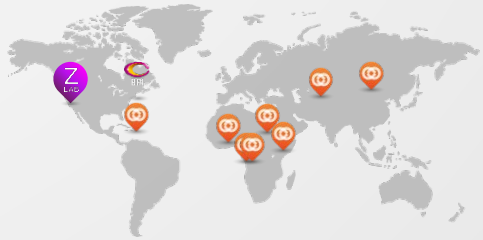
Gondar and Adama | Ethiopia

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?

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Discussion