MA Health Care Sector: Sustainability and Energy

EEAC, November 12, 2013

PARTNERS HEALTHCARE

John Messervy
Director of Capital and
Facilities Planning

Heywood Hospital

Michael Grimmer
VP Support Services and
Chief Administrative Officer

Agenda

1. Climate/health context, & sector's importance
2. National & Massachusetts health care sustainability efforts
3. Partners, Heywood Hospitals' and Sector Energy efforts
4. Innovation hub & partnerships with utilities
5. Opportunities for collaboration with EEAC & PAs

Healthcare's Importance to Sustainability/Energy

- Emerging awareness of the impact of climate change on the healthcare sector
- WHO, AMA, The Lancet, IPCC all expressing deep concern, even alarm, about the scale and speed of climate disruptions impact on health
- **Healthcare is the most intensive energy user per sf.**
- Largest employer in MA, one of the largest real estate holders
- 18% of GDP - changes in practices shift entire markets
- We see the consequences of healthy people living on an unhealthy planet: increases in environmentally-based disease – asthma, emphysema, diabetes, cardiovascular, pulmonary and cancer
- Targets of our concern: energy, chemicals and food
- Motivated by "Do No Harm"

healthierhospitals.org

Sponsoring Systems and NGO's

Advocate Health Care

BON SECOURS HEALTH SYSTEM

PARTNERS HEALTHCARE

MedStar Health

CATHOLIC HEALTH INITIATIVES®
A spirit of innovation, a legacy of care.

INOVA
Join the future of health.

Dignity Health.

KAISER PERMANENTE®

Tenet

HCA
Hospital Corporation of America

STANFORD HOSPITAL & CLINICS

Vanguard HEALTH SYSTEMS

Envision®
GUNDERSEN HEALTH SYSTEM

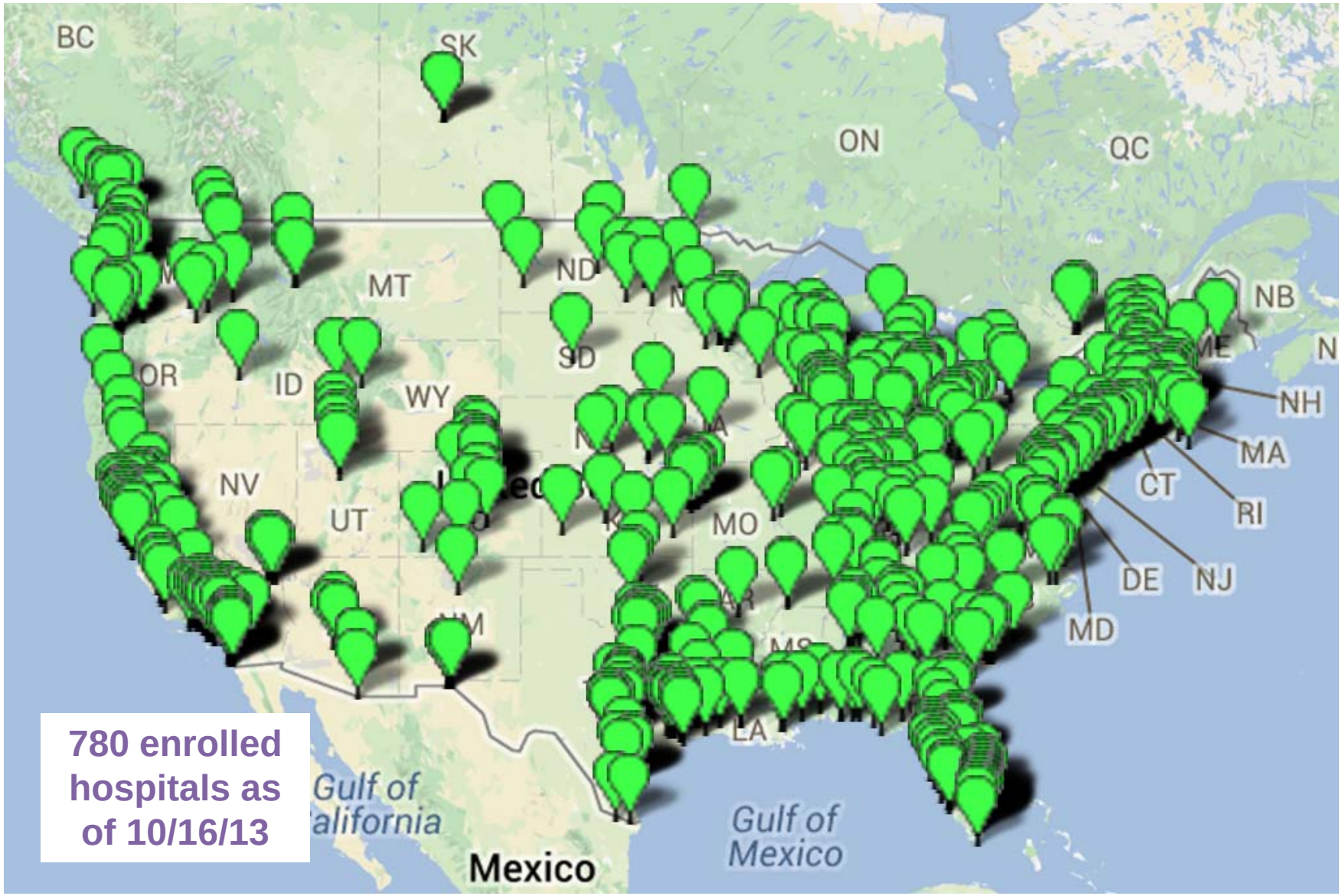
Convening NGO's

PRACTICE Greenhealth

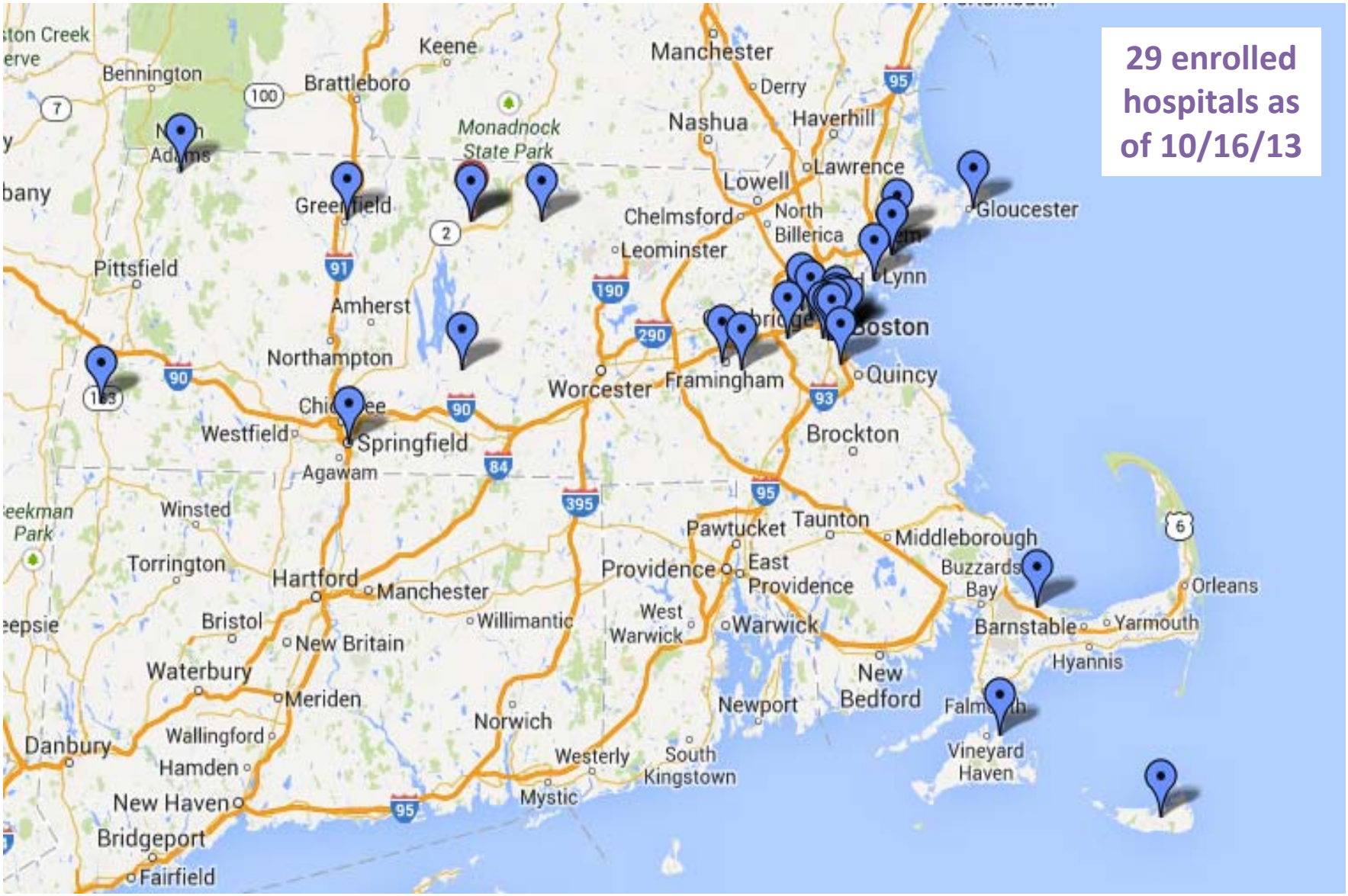
Health Care Without Harm

THE CENTER FOR HEALTH DESIGN®

HHI Enrolled Hospitals



HHI Hospitals in Massachusetts



HHI Overview

CEO Commitment

"From the beginning, Partners HealthCare has made a commitment to improving the health of our communities, locally and globally. We accept the responsibility to take a leadership role in protecting our environment through a focus on sustainability."

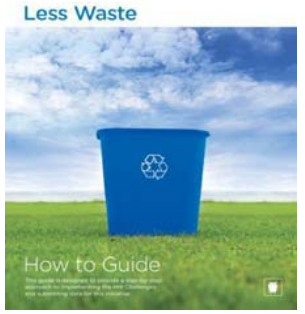
Gary Gottlieb, MD, MBA
CEO, Partners HealthCare
Boston, MA

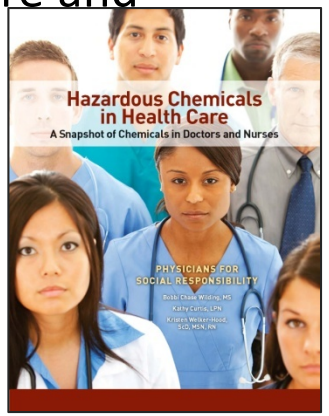
Partners HealthCare:

Less Waste: Brigham & Women's Hospital (FY'12-'16) increase recycling from 12% to 30%, reduce regulated medical waste from 16% to 10%, increase composting from 1% to 12%. Predicted $30,000 in cost savings on 5,600 ton waste stream.

Healthy Food: Menu Choice promoting healthy food choices for patients and staff; SRH joined Partnership for a Healthier America; Managing programs in support of and in partnership with the City of Boston Public Health to tackle Obesity and Hypertension in African-American and Hispanic/Latino patients and employees.

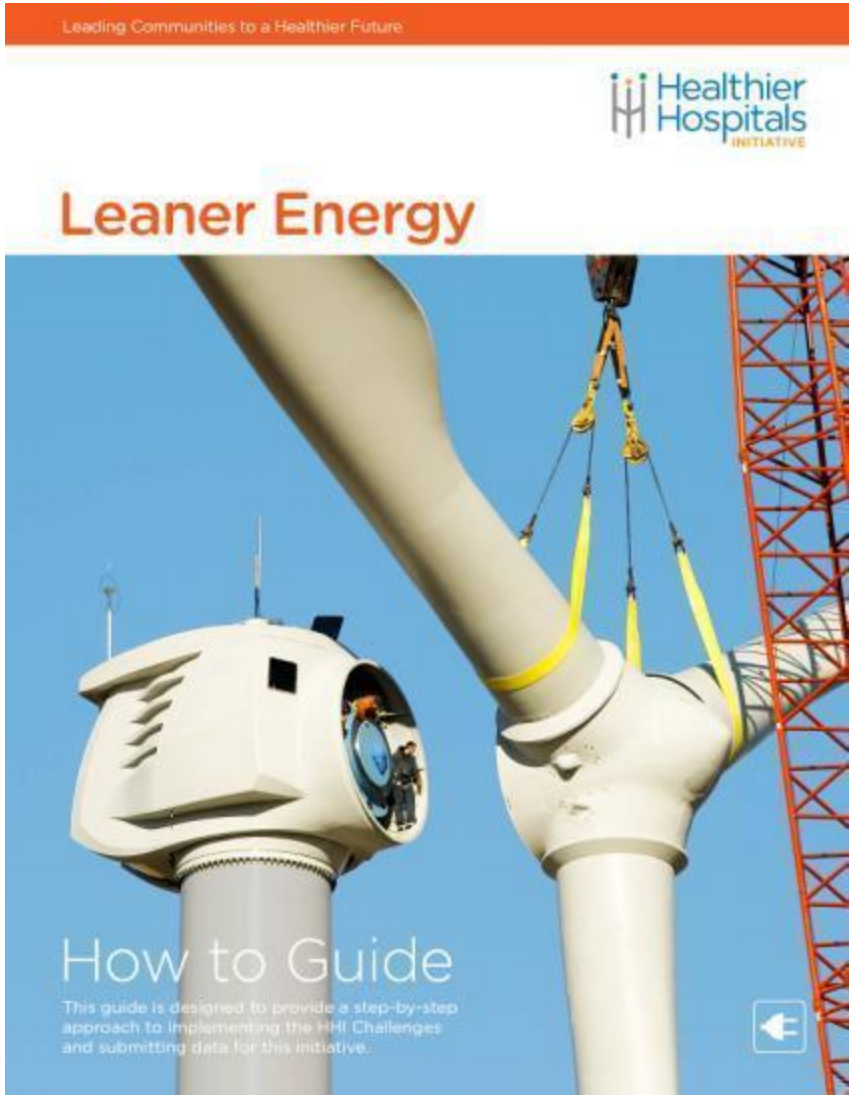
Smarter Purchasing: Virtual elimination of mercury; DEHP free IV bags and tubing; Green cleaners; Sustainable labs reducing quantity and types of chemicals; Green building materials in construction; green furniture and furnishings; Safe disposal of pharmaceutical products.





Leaner Energy

Carbon dioxide and other pollutants can contribute to chronic bronchitis, asthma attacks, respiratory symptoms and premature death. The Healthier Hospitals Initiative (HHI) is teaming with hospitals to conserve energy and reduce emissions to benefit patients, staff and local communities.



Leaner Energy

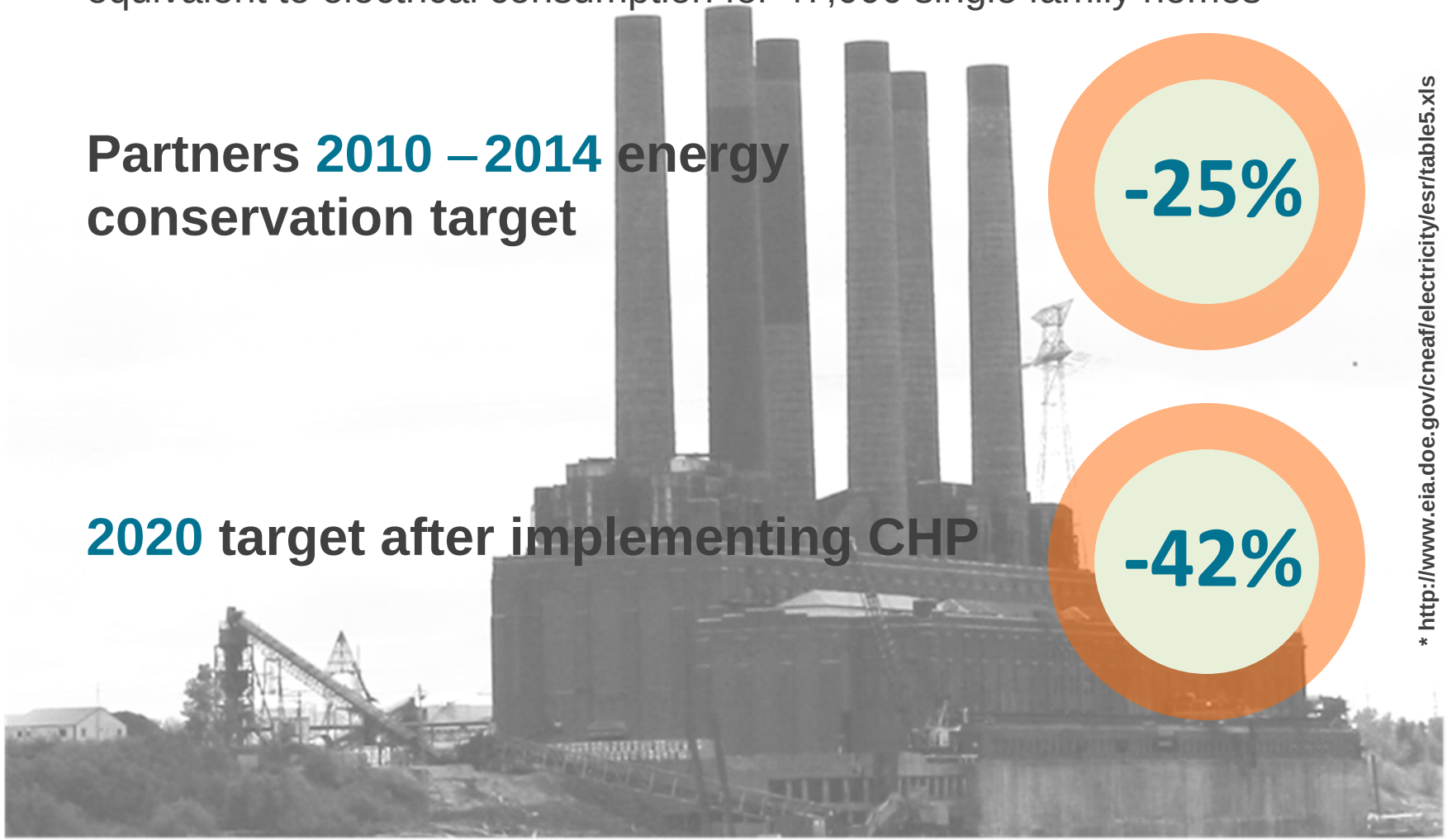
Level 1	Level 2	Level 3
Reduce greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by three percent from baseline.	Reduce greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by five percent from baseline.	Reduce greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by ten percent from baseline OR if facility is already an ENERGY STAR rated facility (> 75), maintain ES status.

Baseline: Input energy data into ENERGY STAR Portfolio Manager to track energy use and GHG emissions

Why not every hospital in MA at Level 3 in 2015?

Partners HealthCare – Leaner Energy

Partners consumes 364,761,721 kWh of electricity per year, equivalent to electrical consumption for 47,000 single family homes*



Partners 2010 – 2014 energy conservation target

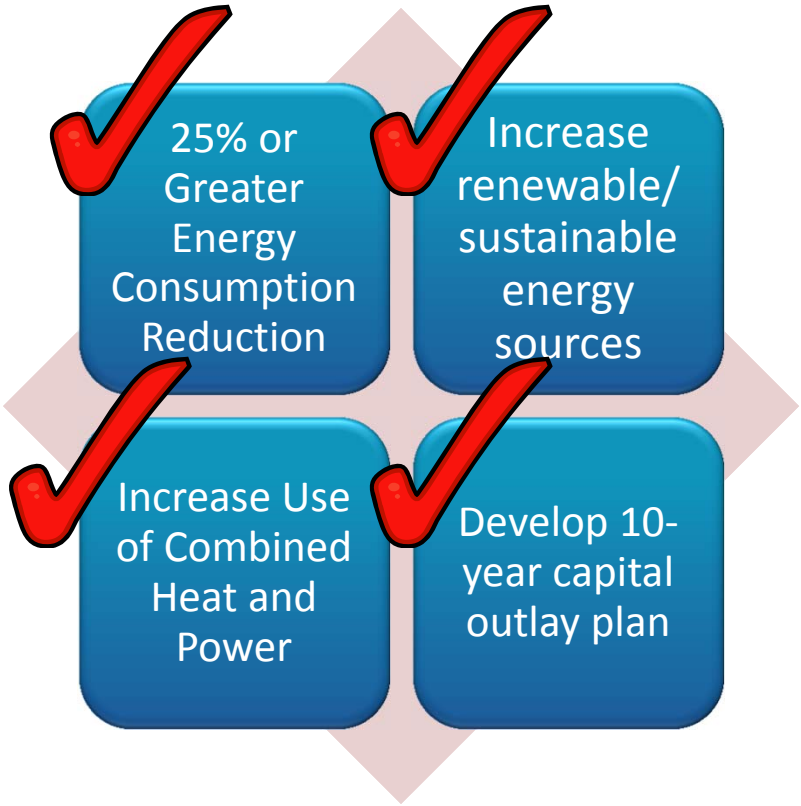
-25%

2020 target after implementing CHP

-42%

* http://www.eia.doe.gov/cneaf/electricity/esr/table5.xls

Partners HealthCare – Leaner Energy



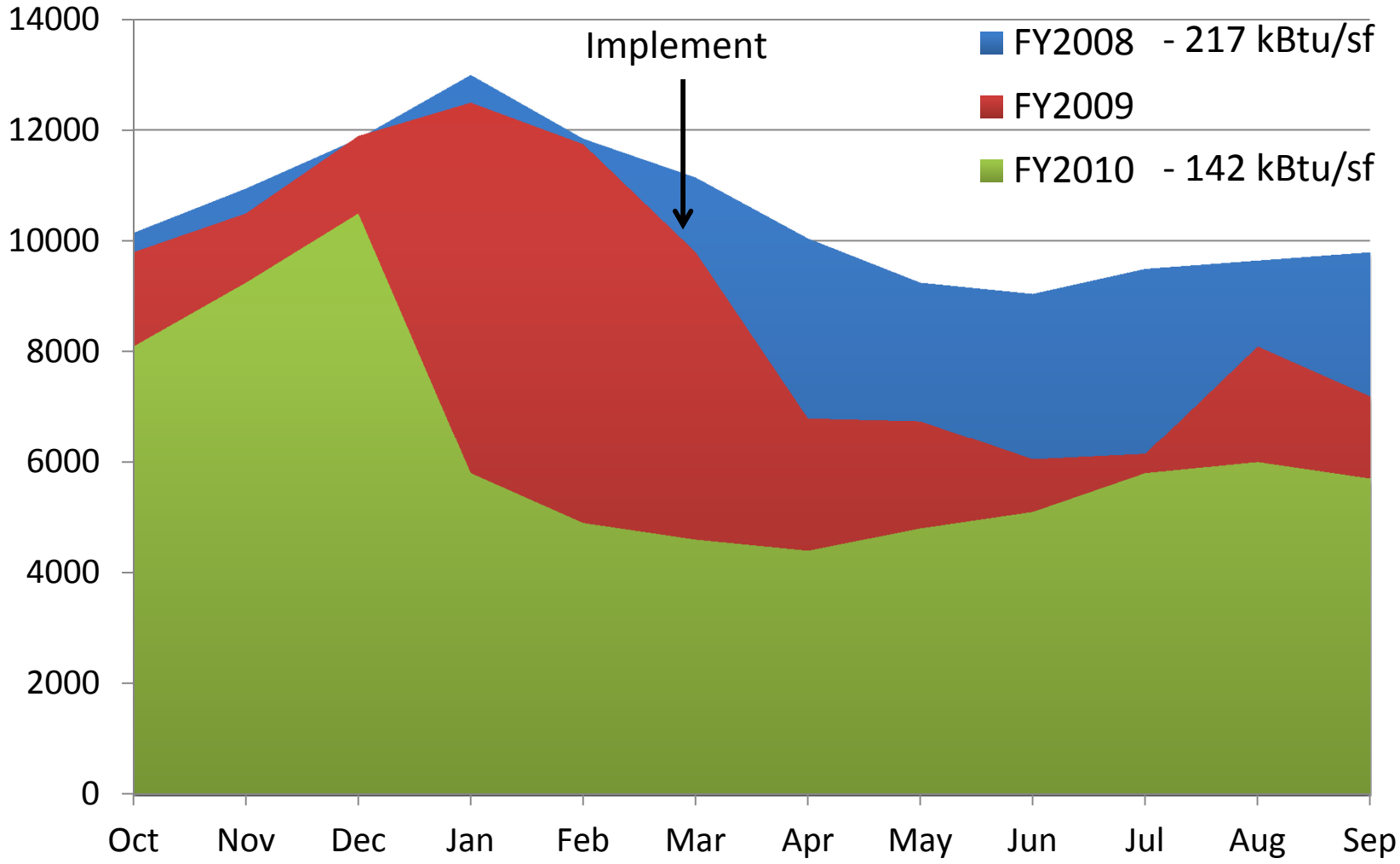
Partners HealthCare – Leaner Energy

Energy Conservation Program

- **230 projects,** ranked for implementation phasing
- **5 year implementation timetable**
- Projected **28% reduction** in energy consumption **compared to 2008 base year**
- **$61M capital investment**
- **3.7 year payback; 27% ROI**
- Implement projects which can be accomplished with **minimal facility disruption**
- Implement projects where energy savings can be **measured and identified**

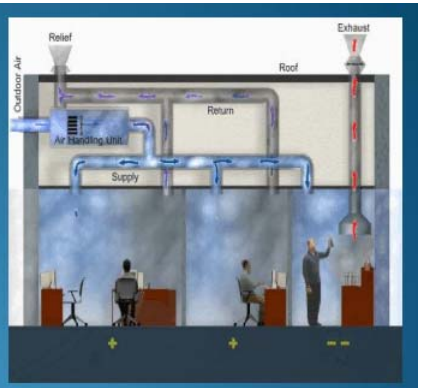
Partners HealthCare – Leaner Energy

MGH Yawkey Center – 35% Energy Reduction (MMBTUs)



Energy Alarm Systems Preserves EE gains

Energy Alarms Look At



- VAV Airflow
- VAV Heating Coil
- VAV Occupancy Hours
- HW HX Valve Leaking
- AHU Preheat Valve Leaking
- AHU CHW Valve Leaking
- AHU Simultaneous Heating & Cooling
- CHW Low Delta T
- CHW Economizer w/ Chiller(s) Running
- AHU Should be in Economizer; Excessive CHW Use
- AHU Should Not be in Economizer; Excessive Outside Air
- More than 79 difference types of Energy Alarm are monitors

Yawkey Flr 9 Found Overridden ON

Cancer Center Psychiatric Oncology Area

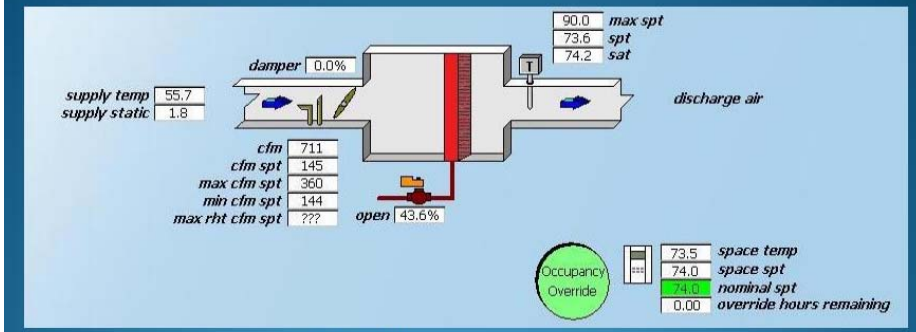
Normal Occupancy Schedule:
5:00AM-6:30PM Mon-Fri
Unoccupied hrs/week: 100.5 hr/wk
Total Minimum CFM: 8,063 CFM
Assuming $ 4/CFM yr

8,063 cfm x (100.5hr/168hr) x $4 /cfm yr

Annual Savings: $ 19,294

Occupancy Override

What is One Air Flow Alarm Worth?



Schedule:
5:00AM – 6:30PM Mon-Fri
Occ hrs/wk = 67.5 hr
Unocc hrs/wk = 100.5 hr

Occupied:
(Extra CFM) x (hrs of CFM per week / Total hrs in a week) x ($6/cfm)
(711 cfm – 145 cfm) x (67.5 hr/168 hr) x $4/cfm yr = $ 909 /yr

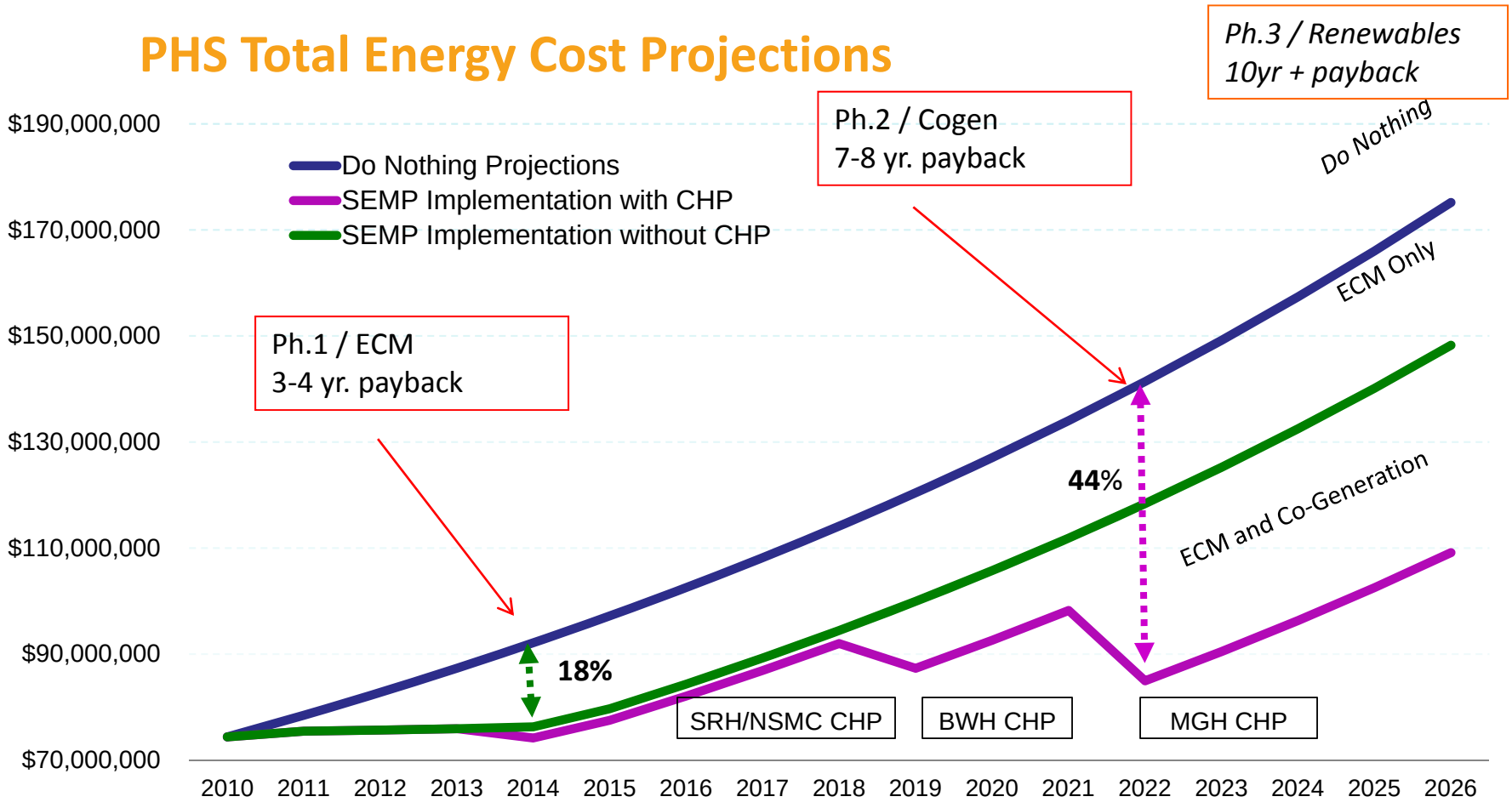
Unoccupied:
711 cfm x (100.5 hr/168 hr) x $4/cfm yr = $ 1,701 /yr

Total Estimated Annual Savings= $ 2,610

- HVAC at least 40% of total facility energy consumption
- Energy Alarms were developed to improve system efficiency
- Also to provide Measurement and Verification for ECM's
- 133 total alarms currently
- Operation:
  - Alarms based on BAS control points
  - Points are monitored continuously
  - If algorithm is true for the specified "delay" time, the alarm will be triggered

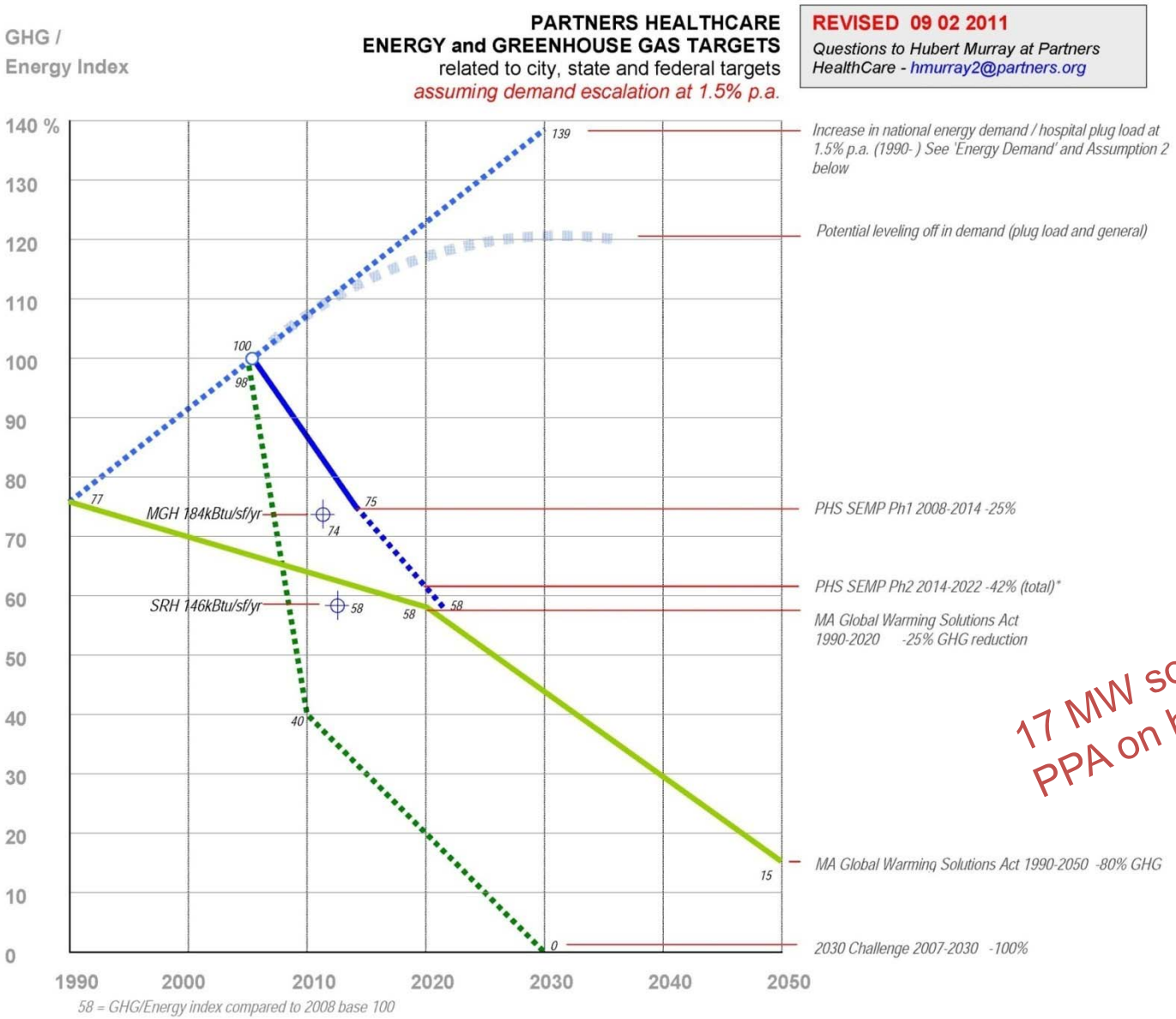
Partners HealthCare – Leaner Energy

PHS Total Energy Cost Projections



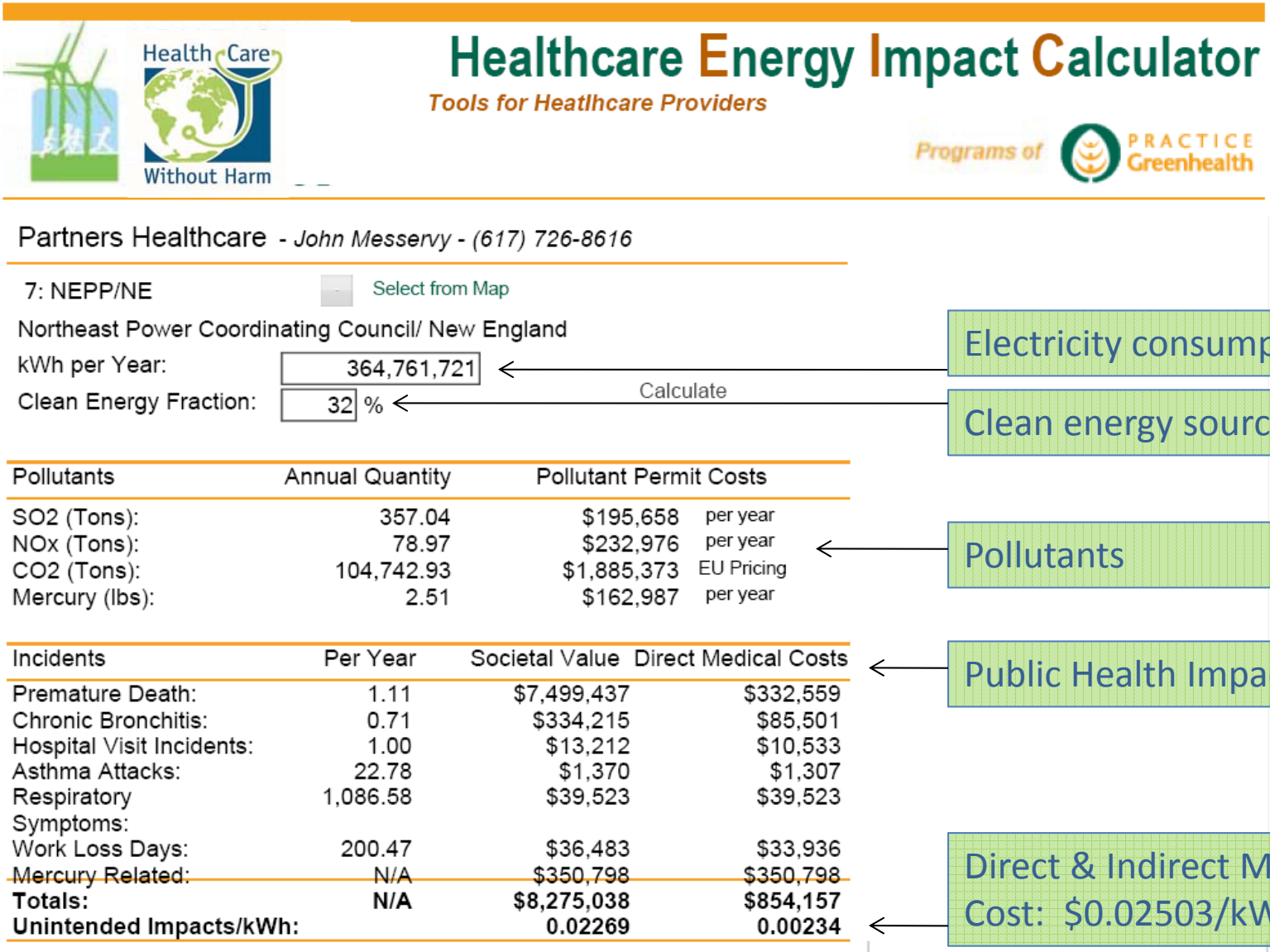
*Based on Energy Cost Escalation 4% Per Year
*Based on Energy Consumption increase 1.5% per year

Partners HealthCare – Leaner Energy



17 MW solar field
PPA on hold

Partners HealthCare – Leaner Energy



Heywood Healthcare

Healthier Hospitals INITIATIVE

Heywood Hospital

153 beds, Gardner, MA

- Lighting
- VFD Drives
- Steam Trap Survey
- Fuel Conversion
- Kitchen Refit

Annual savings $376,000

1,728,726 KWH

Athol Hospital

25 beds, Athol, MA

- Lighting
- VFD Drives

Annual savings $30,000

245,870 KWH

Equivalent to $16,240,000 in additional revenue

Heywood Healthcare

Healthier Hospitals INITIATIVE

Additional Initiatives

- 100% of Athol Hospital power from Adam's Solar Farm
- 1 megawatt solar covered parking structures at Heywood will supply 30% of needed power
- 57 new distributed electrical meters monitored 24/7 give real time trending data for power consumption analysis and continuous commissioning/troubleshooting

Heywood Healthcare

Healthier Hospitals INITIATIVE

Healthy Food Pledge

- Elimination of deep fryer
- Daily vegetarian entrees
- Daily heart healthy entrees
- Meatless Monday's
- Farmer's Market
- Local food sourcing for staff and patient menu's
- 30% reduction in sweetened beverages

Waste

- 34% reduction in municipal solid waste
- Total tons generated - 571 tons
- Total tons recycled - 198 tons

Boston: Innovation clinically AND on sustainability

- First-ever hospital mercury take-back event in 1996, now a global UN treaty
- Initiated successful national campaign to eliminate medical waste incineration
- Piloted Green Guide for Health Care, now LEED-HC
- Leading sector in the Boston GRC…

BOSTON Green Ribbon COMMISSION

GRC HEALTHCARE WORKING GROUP

Beth Israel Deaconess Medical Center
Boston Medical Center
Brigham & Women's Hospital
Cambridge Health Alliance
Carney Hospital
Children's Hospital Boston
Covenant Health Care
Heywood Hospital
Dana Farber Cancer Institute
Harvard Medical Collaborative
Massachusetts General Hospital
Massachusetts Eye & Ear Infirmary
McLean Hospital
MetroWest Medical Center:
Framingham Union & Leonard Morse
Newton Wellesley Hospital
Partners HealthCare
Spaulding Rehabilitation Hospital
Saint Elizabeth's Medical Center
Steward Health Care
Tufts Medical Center

Staff Support: Paul Lipke & Bill Ravanesi, Health Care Without Harm

BOSTON Green Ribbon COMMISSION

ASSEMBLING A BOSTON HEALTH CARE SECTOR ENERGY GHG OVERVIEW

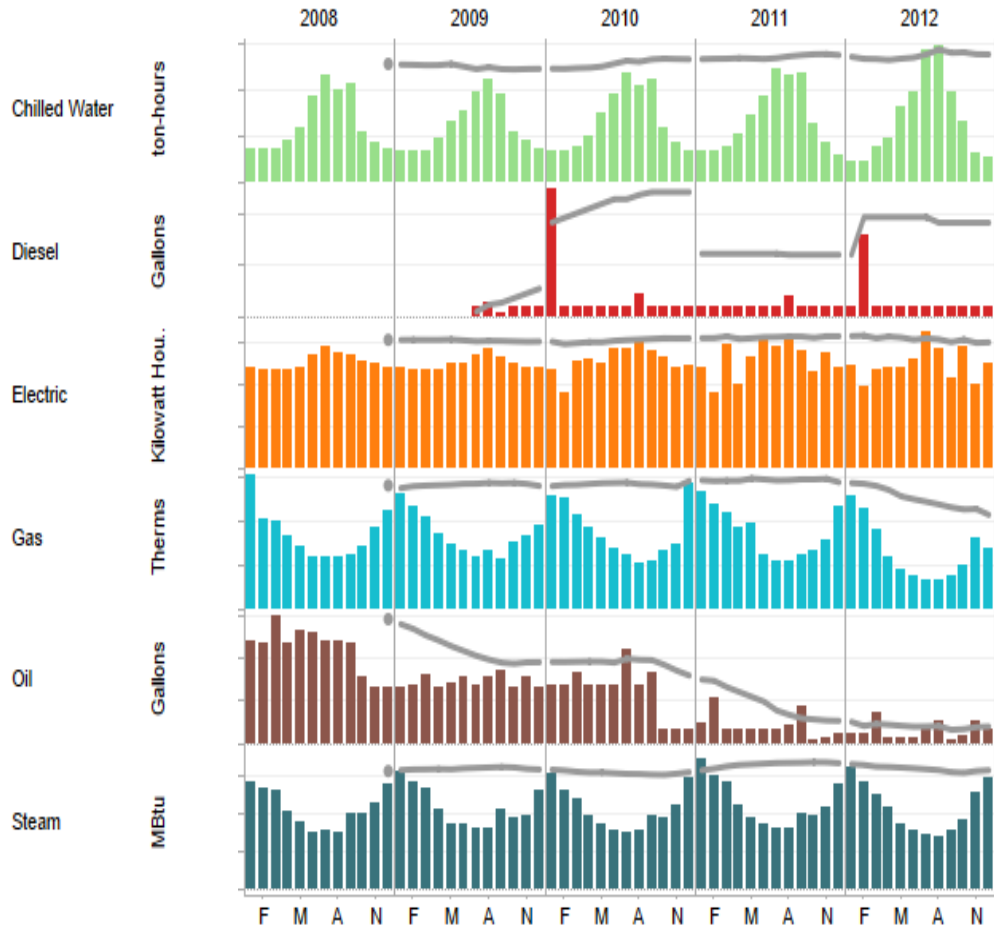
- Boston GRC-HC has assembled energy and GHG data for 22 hospitals, 56 facilities, 20 M sq ft of owned space
- Data scrubbing to be completed Q1, 2014
- Will document use and emissions for approximately
    - 600 million kWh/year (68 MW)
    - 4 trillion BTUs of gas, steam, and fuel oil
    - 3 million ton hours of chilled water
- First in nation, metro-wide health care energy/GHG profile, from 2009-present
- Estimated +/-12% of City's C&I emissions
- Enables compliance with Boston's Energy Disclosure Ordinance

Data courtesy of GRC-Health Care Working group, coordinated by Health Care Without Harm

Health Care Without Harm

BOSTON Green Ribbon COMMISSION

USE TRENDS BY FUEL IN NATIVE UNITS



Data <u>still to be corrected and omissions filled in for Q1 2014</u>, but GRC sector-wide energy use pretty flat, despite significant facility & service growth, which historically have driven 1.5-3% load growth.

Web interface images copyright 2013 Peregrine Energy Group. All rights reserved.

OPPORTUNITIES GOING FORWARD

- ***EE custom project standardization/replication:*** Find multiple re-applications for custom measures developed with early adopters
- ***Best practice research:*** provide input into the PA's Q1, 2014 research, provide feedback on and adopt resulting PA roadmap…help spread to HHI hospitals across state and nationwide
- ***Engineering/facility labor constraints:*** Deal with lack of staff time to do the EE project analysis, evaluation, design, and EE project management. **Essential to deeper savings**
- ***CHP for EE and resilience:*** reduce infrastructure & other barriers. Aggregation in a statewide health care program?
- ***Green Labs Symposium*****:** with utility partners Feb/March 2014 to make Boston an innovation hub for reductions in lab energy use/emissions
- ***New EE technology pilots***
- ***Learning from analysis of health care sub-sector energy/GHG data:*** *compare our data with PAs'?*
- ***Clinical equipment plug loads:*** *link our dialog with OEM's to PA Fraunhofer study*
- ***Better valuation of the public health benefits of energy efficiency***
- ***Aligning utility program and health care capital expenditure planning cycles to increase EE program uptake***
- ***Joint or aggregated procurement for key services or products***

Thank You

John Messervy
Director of Capital and
Facilities Planning
617-726-8616
JMesservy@Partners.org

Michael Grimmer
VP Support Services and
Chief Administrative Officer
978 630-6250
Mike.Grimmer@Heywood.org