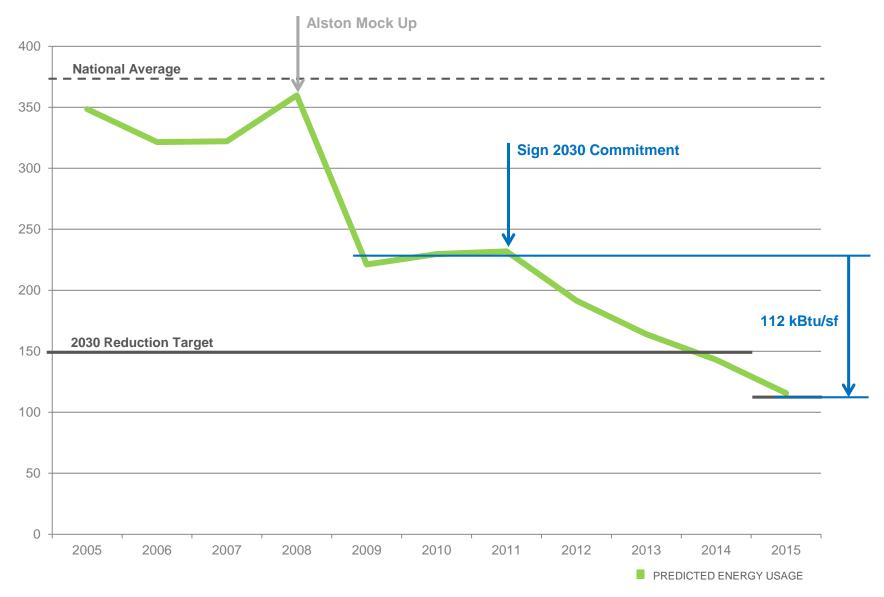
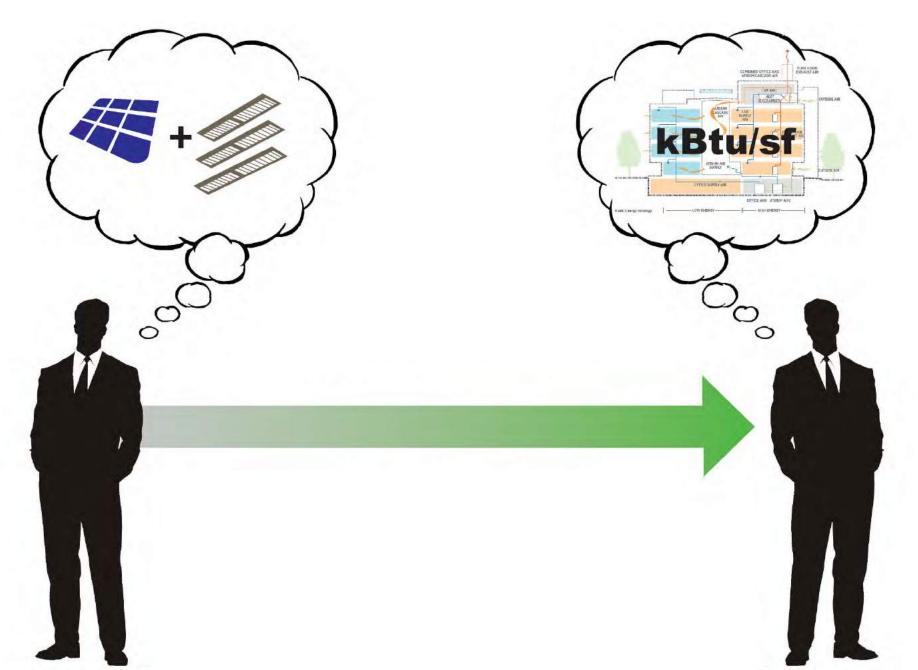
### **BY MARKET SECTOR - LABS**



### TRANSFORMATION FROM DISCRETE ICONS OF SUSTAINABILITY



### TO AN ENERGY LITERACY ABOUT SYSTEM PERFORMANCE



### **CONNECTING PERFORMANCE AND DESIGN STRATEGIES**

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## **CONNECTING PERFORMANCE AND DESIGN STRATEGIES**

9%	Triple Glazing
36%	High Performance Glazing
27%	ritted Glazir
9% EE0/	Double Skin Façade
02% 64%	Uperable Façade Hichhu Insulated
18%	Limit Glazing
18%	
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27%	Swea
27%	Increase Temp, Range
82%	Natural Ventilation
27% EE0/	No Mechanical Cooling
55% 73%	Lower Air Changes
9%	Higher Supply Air Temp.
45%	Eff. HVAC Eq
0%0 36%	Eliminate/Minimize Reheat
18%	Radiant Heating
9%	Evaporative Cooling
18%	High T Cool/Low T Heat
18%	Heat Recovery Chiller
64%	HR Enthalpy - Lab EX.
18%	HR Glycol/Heat Pipe - Labs
18%	HR Glycol/Heat Pipe - Other
18%	Geothermal
18%	Space Fan
27%	Decrease Fan Energy
18%	n Wall
9%0	Atrium Prevreneat Disnlarement Vent
0%0	d Control
0%0	conditioned St
1005	Energy - Lighting
55%	Task/Ambient
64%	1 Fixture : 2 Benches
55%	LEDS
55%	Devlicit Dimmind
	Energy - Other
91%	Low Flow Hoods
18%	on Sensol
9%	Combo Vent. Cab. & Hood
9%	Compact Massing
9%	I to FI
9%	Building Orientation Solar PV
0%0	Solar Thermal
0%0	ogen
9%	Decease Circuitry for Plug
10 /0	Energy Use NIOSK Evanced Thermal Mass

#### COMMON STRATEGIES FOR LOWEST EUI LABS

- Sunshading & High Performance Envelope •
- Minimize Ventilation Air .
- Heat Recovery ٠

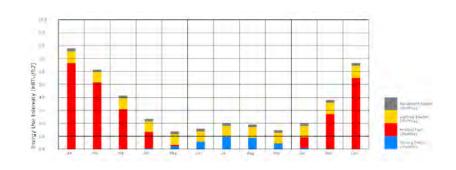
- High Performance LightingNatural Ventilation

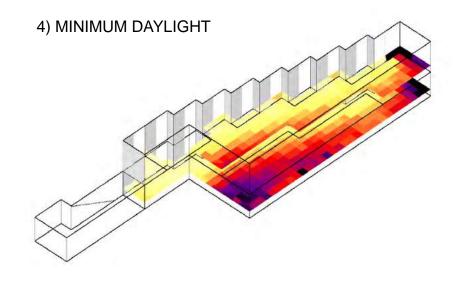
### **INTEGRATING EARLY MODELING**

1) GLARE + THERMAL COMFORT

2) VIEWS TO HILLTOP

#### 3) PEAK COOLING + THERMAL ENERGY



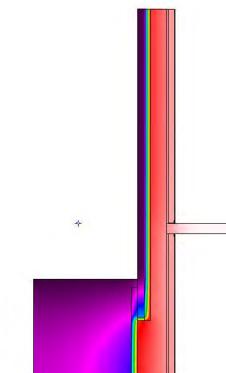


### **INTEGRATING RESEARCH**



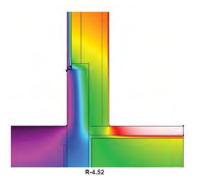




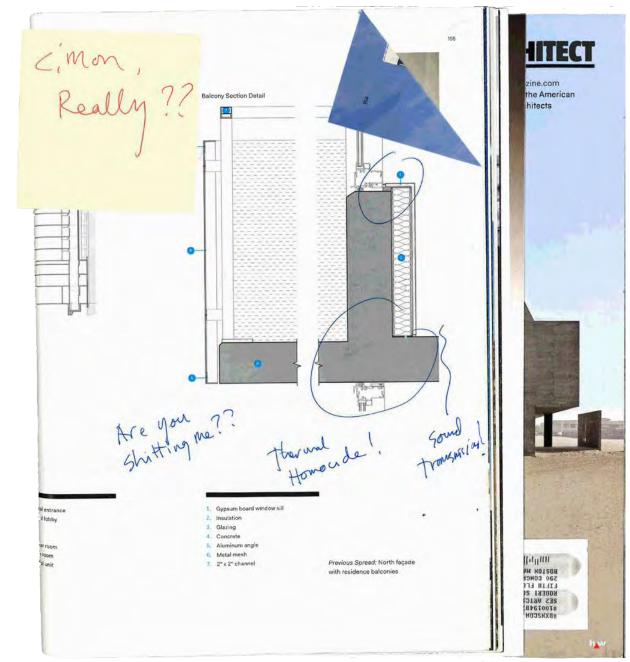


# Project Detail R-23.5

**Typical Detail R-4.1** 

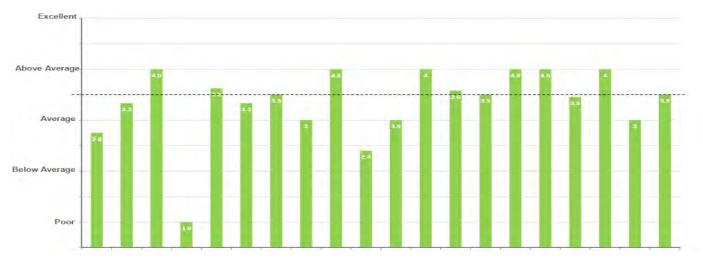


### **CHANGING MINDS AS WELL AS PROJECTS**



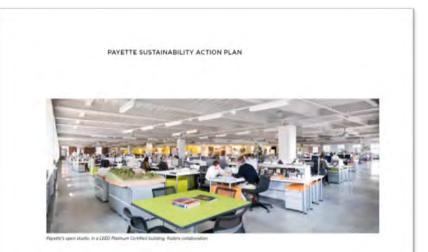
#### **CONNECTING PERFORMANCE AND CONSULTANTS**





# SUSTAINABILITY ACTION PLAN

- Design Principles
  - Reduce Excess Capacity
  - Study Building Operation
  - First Principle Engineering
  - Harnessing Available Resources
  - Adoption of Technological Solutions
- Integrated Design Charrettes
- Energy Benchmarks & Targets
- Basis of Designs
- Shadow Studies
- Site Analysis
- Energy & Performance Modeling
- Life Cycle Cost Analysis
- Embodied Energy
- POEs



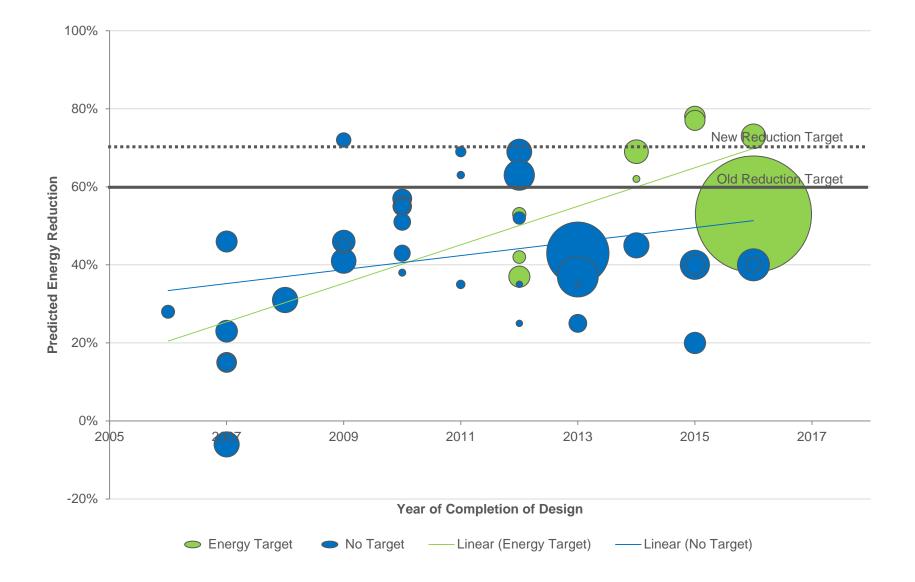
#### listory

Three generations, many voices, one practice. In 1932, Fred Markus and Paul Nocks started a small design frm in Bioton. Using pioneering time-andmotion studies, they heiged hospitals throughout New England take apart and retool complex, misiton-critical processes including nursing units, litchens and pharmacise. In 1960, Tom Payette joined the firm, adding a modern design philosophy to the firm's innovative process. Tom led the firm in designing a series of New England hospitals that were centered on the experience of the patient, manifested by an intimate connection to the landscape, abundant use of color and natural light to belis oneint patients and vintors. Through the promotion of this same humanistic values and fundamental design acproach, the firm broadened to focus in the following decades to include high technology buildings, bringing deep technical expertse, commitment to rigorous research and dedication to beauty to a new class of projects. Today, the practice his advanced as an intermational leader by providing planning and design services to leading institutions across the country and abroad.

We approach design as a process that combines problem-solving, research and invention. The architecture we practice is inherently multidisciplinary. Our definition of architecture embraces planning, norgamming, landscape architecture and interior design as being intimately infertivined in producing our work.

PAYETTE

### **IMPACT OF SETTING ENEGRY TARGET**



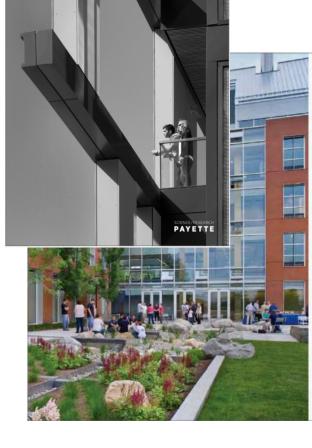
### PERFORMANCE IS PART OF OUR WORKFLOW







#### PERFORMANCE IS HOW WE TALK ABOUT OUR WORK



# Commitment to the Environment

Committing to the future of the environment means rigorously designing our buildings through the lens of sustainability. Building science is the data-driven investigation of building systems, materials, envelope and operational energy usage in order to optimize a building's performance and minimize a building's performance and minimize its environmental impact. As stewards of our olients' resources, and with conviction in our responsibility to lead, we embrace the challenge of delivering the highest-performing buildings for our inherently demanding market sector. Take a look at how our academic science projects perform on average:

64%

42%

91% average building area with access to displayit

Our practice specializes in technologyrich and energy-intensive buildings, which are typically the highest consumers of energy on an academic campus. These specialized environments are challenging to reduce their energy usage, but because of their substantial environmental impact, the imperative is that much greater. Take a look at the energy use intensity (EUD in kBtu/1y/max of a sample of our projects and how they stack up against the neticoral average of similar buildings in the same climate zone:

Archest College, New Science Center 94 kBtu/SF 75% EUI REDUCTION

Northwastern University, Intendicophilary: Science and Engineering Complex

103 kBtu/SF 75% EUI REDUCTION

National University of Instand, Galuage Biocencies Research Building 143 kBtu/SF 71% EUI REDUCTION



# HISTORY AT BERGMEYER

- Bergmeyer is a 72-person **Boston-based** general commercial firm
- Joined AIA 2030 Commitment in June 2011
- First year of reporting was due March 31, 2012
- **First Sustainability Action Plan** published Fall 2012
- Follow-up Sustainability Report published Summer 2014



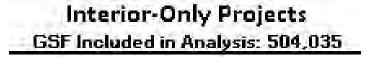


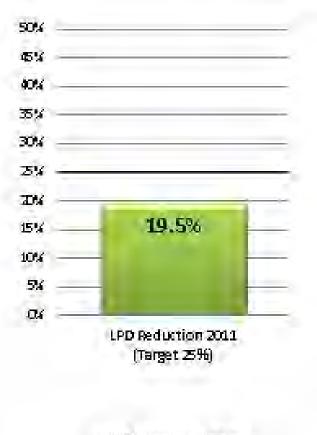


#### SUSTAINABILITY REPORT & ACTION PLAN

A summary of sustainable efforts and reporting for the AIA 2030 Commitment 2014

# SETTING A BASELINE - 2011 REPORTING - INTERIORS





GSF Meeting Target 307,758 = 61.1%

# SETTING A BASELINE - 2011 REPORTING FINDINGS

Overall observations/conclusions:

- 49 total projects reported with 38 interior-only projects
- None of the whole building projects and only 9 of the interior-only projects met or exceeded the 2030 targets
- All 3 interior-only workplace projects exceed the 25% LPD reduction target

Office – Boston, MA	0.67	1.0	33.0%
Office – Boston, MA	0.56	1.0	44.0%
Office – Providence, MA	0.67	1.0	33.0%

# SETTING A BASELINE - 2011 REPORTING FINDINGS

Overall observations/conclusions:

 Of the 19 total retail projects (all interior-only), the two that met the 25% LPD reduction threshold were located in institutions

University computer store	1.5	27.3%
Museum bookstore	1.5	33.3%

• The best performer was a university dining hall

University dining hall

0.59

1.5

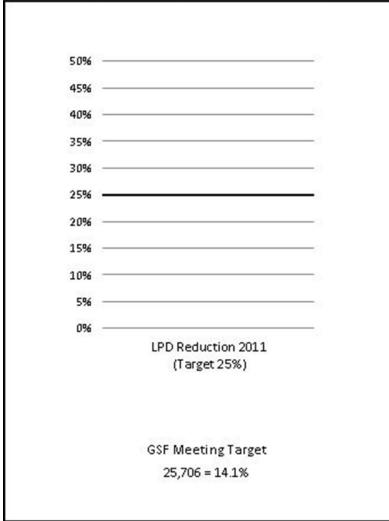
60.9%

1.80	1.5	-20.0%
2.60	1.5	-73.3%
0.96	1.5	36.0%
1.28	1.5	14.7%
1.77	1.5	-18.0%
1.50	1.5	0.0%
3.60	1.5	-140.0%
3.90	1.5	-160.0%
3.60	1.5	-140.0%
1.67	1.5	-11.3%
2.14	1.5	-42.7%
2.28	1.5	-52.0%
1.80	1.5	-20.0%
1.09	1.5	27.3%
1.50	1.5	0.0%
1.90	1.5	-26.7%
1.20	1.5	20.0%



# **Interior-Only Projects**

31 projects and 182,668 GSF included in analysis.



- Compared to Year 1 our LPD was off the chart (actually, it wasn't even on the chart)
- As reported, spaces that had passed COMcheck were far over the allowable code limits







# The AIA 2030 reporting form doesn't allow for the retail display space allowances that the code does

Additional Interior Lighting Power Allowance = 1000 watts + (Retail Area 1 × 1.0 W/ft<sup>2</sup>) + (Retail Area 2 × 1.7 W/ft<sup>2</sup>) + (Retail Area 3 × 2.6 W/ft<sup>2</sup>) + (Retail Area 4 × 4.2 W/ft<sup>2</sup>),

- Retail Area 1 = the floor area for all products not listed in Retail Areas 2, 3, or 4;
- Retail Area 2 = the floor area used for the sale of vehicles, sporting goods, and small electronics;
- Retail Area 3 = the floor area used for the sale of furniture, clothing, cosmetics, and artwork; and
- Retail Area 4 = the floor area used for the sale of jewelry, crystal, and china.



COMcheck Software Version 3.9.1 Interior Lighting and Power Compliance Certificate

#### 90.1 (2007) Standard

#### Section 1: Project Information

Project Type: New Construction Project Title : SPANX

Construction Site: 8097A TYSONS CORNER CENTER SPACE J1AU(C) TYSONS, VA Owner/Agent:

Designer/Contractor: Don Penn Consulting Engineer 635 Westport Parkway, Suite 300 Grapevine, TX 76051

#### Section 2: Interior Lighting and Power Calculation

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B x C)
Retail:Sales Area	986	1.7	1676
Allowance: Furniture, clothing, cosmetics highlighting / Fix. ID: FA-58 LED	450(a)	2.6	1170(ь)
Allowance: Furniture, clothing, cosmetics highlighting / Fix. ID: FC LED	175(a)	2.6	455(b)
Allowance: Furniture, clothing, cosmetics highlighting / Fix. ID: FE	210(a)	2.6	546(b)
Allowance: Furniture, clothing, cosmetics highlighting / Fix. ID: FF-1	10(a)	2.6	26(b)
Warehouse:Fine Material Storage	185	1.4	259
Common Space Types Restrooms	58	0.9	52
	Supplemental	Allowed Watts(c) =	347
	To	tal Allowed Watts =	4531

We realized we needed to develop a process and then tell our engineers specifically how to do the calculations – or better yet, do them ourselves

# 1987 watts vs. 4531 watts

AIA 2030 Commitment Reporting Data Requirements As of February 25, 2013

Bergmeyer is committed to designing spaces that use substantially less energy, reduce greenhouse gas emissions and provide a healthy and comfortable environment. In 2011, the firm joined the AIA 2030 Commitment, thereby accepting the 2030 Challenge that all new buildings and major renovations Bergmeyer designs will be carbon neutral by 2030 and will not use fossil-fuel, greenhouse gas-emitting energy to operate. In order to reach this goal – and the interim reduction targets – a collaborative effort between architects and engineers is critical.

Currently, our projects must be designed to achieve a 60% reduction in site Predicted Energy Use Intensity (PEUI) as compared to either the 2003 Commercial Buildings Energy Consumption Survey (CBECS) or preferably, a regional average site PEUI obtained from ENERGY STAR Target Finder. For interior-only projects, a minimum 25% reduction in Lighting Power Density (LPD) from ASHRAE 90.1-2007 is targeted.

Bergmeyer collects this data annually on every project in design and reports it to the AIA for compilation into a national report.

As part of our reporting, our engineering partners are required to provide us with the following information (if applicable) at the end of both the schematic and document production phases of the project:

- PEUI in kBtu/sq. ft./yr. (for projects that perform energy modeling)
- Design energy code (for whole building or major renovation projects that don't perform energy modeling)
- LPD in W/sq. ft.(for interior-only projects)

We look forward to working with you to achieve our 2030 Commitment goals on this project.

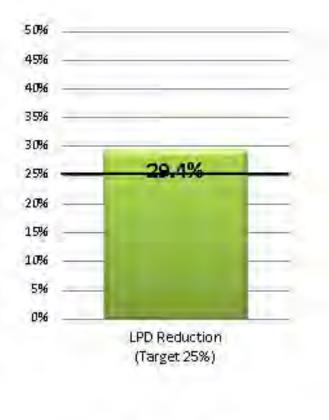
# 2013 AIA 2030 COMMITMENT RESULTS



- Only 8 of 30 retail projects met or exceeded the 25% reduction target
- Once again, commercial and institutional projects were able to get us over the 25% threshold

# Interior-Only Projects

39 projects and 205,735 GSF included in analysis.



GSF Meeting Target 112,675 = 54.8%