AIA 2030 Commitment Initiative
Design Firms' Role, Tools and Processes for Transforming the Building Design and Construction Industry to a More Sustainable Model

Vuk Vujovic, LEED AP
Director of
Sustainable Design
Legat Architects
USA
vvujovic@legat.com

Summary

The AIA 2030 Commitment is an initiative set forth by the American Institute of Architects (AIA) to encourage its member firms to take a greater leadership role in reducing the effects of climate change through more energy efficient design. The initiative is focused on implementation of Architecture 2030 Challenge goals: elimination of fossil fuel use and significant reduction of energy consumption in the built environment. The initiative is to drive the issue of building energy performance to the front of all decisions made within each design firm. This includes both energy used by the firm in their daily business processes, and energy performance of the projects designed by the firm's architects and engineers. The act of collecting project energy data and submitting the annual report to AIA demonstrates an individual firm's progress towards the goals of the Architecture 2030 Challenge.

Keywords: architecture, building, sustainability, energy, performance, climate, challenge

1. Introduction

The architects within the design and construction industry are starting to address the fact that buildings they design are the largest single contributor to our greenhouse gas (GHG) emissions, both in the United States and globally. Architects have a unique opportunity to provide solutions and exercise stronger leadership in their design role. When creating a more sustainable built environment, designers have the ability to also change their profession's business model and encourage the entire building industry to join with them, change the course of developing climate change and reduce harmful effects of global warming.

American Institute of Architects challenges its member firms to take a greater leadership role in reducing the energy consumption and greenhouse gas created by the building design and operation. Current increase in building owners' interest in building energy efficiency creates an opportunity for architects and design professionals to emphasize the importance and value of energy conscious design.

This paper will review current national, as well as local efforts toward greater implementation of the AIA 2030 Commitment goals, and review the process of creation of reporting tools, using the example of the AIA Chicago 2030 Commitment Working Group, led by the AIAChicago Board and AIAChicago Committee on the Environment. The reporting tools developed by AIA Chicago 2030 Working Group simplify the reporting methods of the AIA 2030 Commitment, which is part of a national initiative to collect projected building energy use data from the member firms participating in the AIA 2030 Challenge and/or the AIA 2030 Commitment initiatives.

2. AIA 2030 Commitment: Tools for Transforming the Design Industry

2.1 Architecture 2030 Challenge Goals Implementation

The Architecture 2030 Challenge initiative was originally directed toward building owners, as well as design and construction professionals, who are willing to make a commitment to design and construct buildings that will be carbon neutral (i.e. buildings that will use no fossil fuel greenhouse gas emitting energy to operate) by 2030.

According to Ed Mazria and Architecture 2030, “buildings are both the problem and the solution”[1], being the major source of global demand for both energy and materials that produce greenhouse gases (GHG). The ability to slow the growth rate of greenhouse gas (GHG) emissions and then reverse it is the key to meaningfully address global climate change and keep global average temperatures below 2°C above pre-industrial levels. To help accomplish this, Architecture 2030 issued The 2030 Challenge, asking the global design community to adopt the following targets:

- All new buildings, developments and major renovations shall be designed to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 60% below the regional (or country) average for that building type.
- At a minimum, an equal amount of existing building area shall be renovated annually to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 60% of the regional (or country) average for that building type.
- The fossil fuel reduction standard for all new buildings and major renovations shall be increased as follows:

70% in 2015
80% in 2020
90% in 2025, and
carbon-neutral in 2030 (using no fossil fuel GHG emitting energy to operate).

These targets could be accomplished by implementing innovative sustainable design strategies, generating on-site renewable power and/or purchasing (20% maximum) renewable energy.

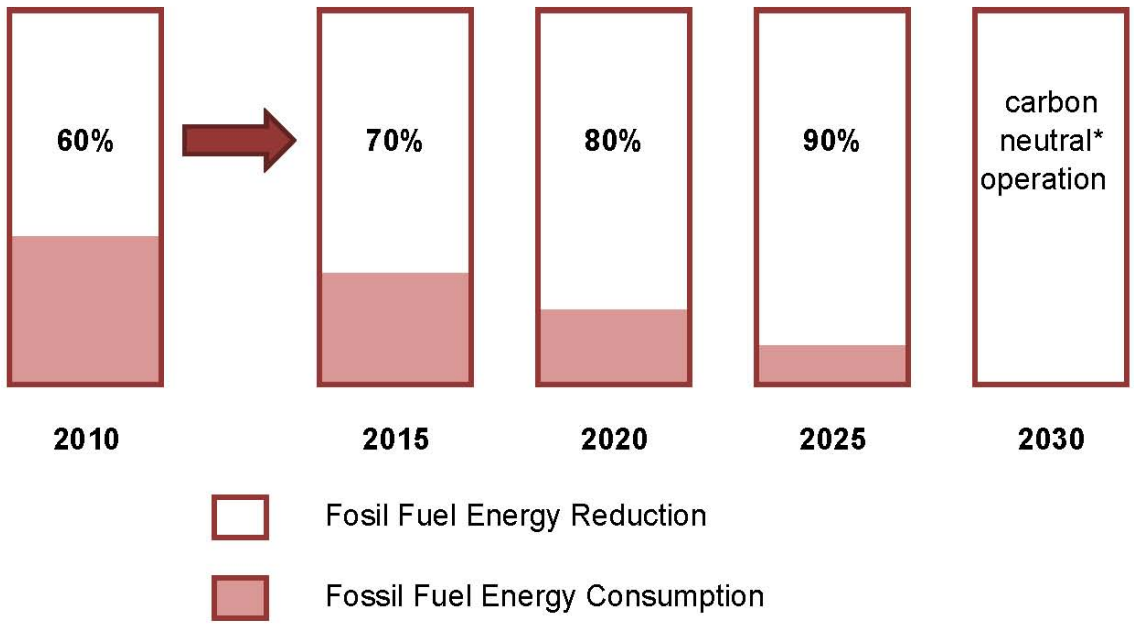


Fig. 1 Architecture 2030 Challenge goals aim at carbon neutral buildings by 2030.

2.2 Implementation of AIA 2030 Commitment Goals

While most design professionals in the United States are familiar with the Architecture 2030 Challenge, very few architectural design firms actively participate in the American Institute of Architects 2030 Commitment initiative. To date, only 162 US design firms have signed the Commitment[2]. The AIA 2030 Commitment has the same carbon reduction goals as the Architecture 2030 Challenge, however participating firms are required to go a step further by reporting their individual data on progress in reaching the 2030 goals, developing a firm-specific Sustainable Business Action Plan, detailing their approach to sustainable design and demonstrating how they plan to reduce the carbon emissions created by their individual business operations.

2.2.1 Increased Focus on More Sustainable Firm Operation

Although the participation in AIA 2030 Commitment is voluntary, it provides clear guidelines, some of which each participating firm has to implement immediately after signing the Commitment:

- Establish an in-house sustainability leadership structure to guide firm's practice transformation,
- Send a Commitment letter to AIA National, signed by the firm's highest executive officer,
- Select at least four immediate operational actions aimed to reduce the firm's own energy use.
- Incorporate energy-efficiency in their design based on the Architecture 2030 Challenge goals.
- Report percentage of predicted EUI reduction every year, AIA 2030 Commitment Reporting Tool.

2.3 Walking the Walk: Immediate Operational Actions Aimed at Reducing GHG Emissions

Within six months of signing the commitment, all participating firms are expected to implement at least four (4) operational action items from the list provided[2]. These actions are intended to be undertaken while the firm's long-term sustainability plan is in development. These actions are:

2.3.1 Office Energy Use

- Track and report energy use in the office,
- Install occupancy sensors in meeting rooms and other common spaces
- Procurement of Energy Star rated equipment and appliances
- Institute office-wide policy of shutting down computers when leaving the office
- Replace any existing CRT monitors with LCD monitors
- Replacement of incandescent lamps with fluorescent
- Establish a timeline for ultimately purchasing 100% green power

2.3.2 Waste Reduction and Supplies

- Reduce paper consumption by using electronic documents and forms
- Reduce paper consumption by implementing printing polices (i.e. double-sided printing)
- Institute a firm-wide recycling policy
- Implement policies for purchasing environmentally friendly supplies and/or office furniture

2.3.3 Transportation

- Incentives for employees who ride share, walk, or bike
- Establish a policy for fuel efficient rental cars for firm travel
- Establish a policy for offsetting firm travel
- Encourage telecommuting options for employees

2.3.4 Meeting Procedures

- Use of paperless technology for agendas, handouts, and presentations
- Encourage virtual meetings when possible.
- Establish an environmental policy to share with venues, vendors, and attendees for meetings.
- Encourage meeting participants to coordinate travel plans and share rides from the airport.

2.4 Design Project Selection and Reporting Requirements

Participating firms are further required to prepare an annual report for each calendar year's design work. The reporting data is compiled during the first quarter in the following year. All individual firms' reports are submitted by the end of first quarter (March 31st), which enables AIA to compile them and analyze this information and review it in AIA's annual 2030 Commitment report.

2.4.1 Design Project Reporting Process

Architectural firms submit their data for all projects currently in the design phase. Applicable project phases include all phases where design is being performed; when architects, engineers and interior designers have significant impact on the building's future energy consumption. This includes projects in conceptual or preliminary design stages, as long as project use, building area (expressed in gross square feet of GSF) and a target energy reduction goals and/or lighting power density (LPD) targets have been established and tracked for the purpose of 2030 Commitment implementation and reporting.

Projects currently under construction could also be included if they were in a design phase during the same calendar year or if construction-phase modifications to building envelope design or building systems were substantial enough to warrant a revised building energy model.

2.4.2 Design Project Selection

Each firm's Annual 2030 Report is meant to provide a year-to-year snapshot of that firm's work. Since many projects' design work extends over multiple years, these projects should be included in each year's report as appropriate, each time with updated information. Projects which were not in a design phase during the calendar year should not be included. The preparation for reporting process requires initial selection of a firm's design projects which meet the following criteria:

- Project was in an active design phase (e.g. schematic design) during the report calendar year,
- Project scope included, at a minimum, substantial modifications of the building envelope and/or
- Project scope included significant HVAC system modifications that have reduced projected energy use intensity of the building, or
- Project was an Interiors-only project which included lighting design

2.5 Energy Data Collection Methodology

For each individual project, designed energy consumption values are calculated based on two key parameters: Projected Energy Use Intensity (PEUI) and Lighting Power Density (LPD), and compared to applicable codes and national and or/regional averages.

2.5.1 Projected Energy Use Intensity (PEUI)

Depending on a project design phases in given calendar year, the Predicted EUI for each project may be established simply as a design goal, in for example, a preliminary design phase, or it could be determined from actual building energy modelling data. A project's energy model will output predicted energy use from all available energy sources: electric, natural gas, utility provided steam, hot water, chilled water, geothermal, solar power, etc. Different energy use units are converted to kBtu/year which is then divided by gross square feet (GSF) of the building, to determine the Predicted EUI values in kBtu/sf/year. Predicted EUI values are then compared to 2030 Challenge targets for a particular year, which in turn defines success of applied sustainable design strategy. This number represents the firm's progress toward the 2030 goals

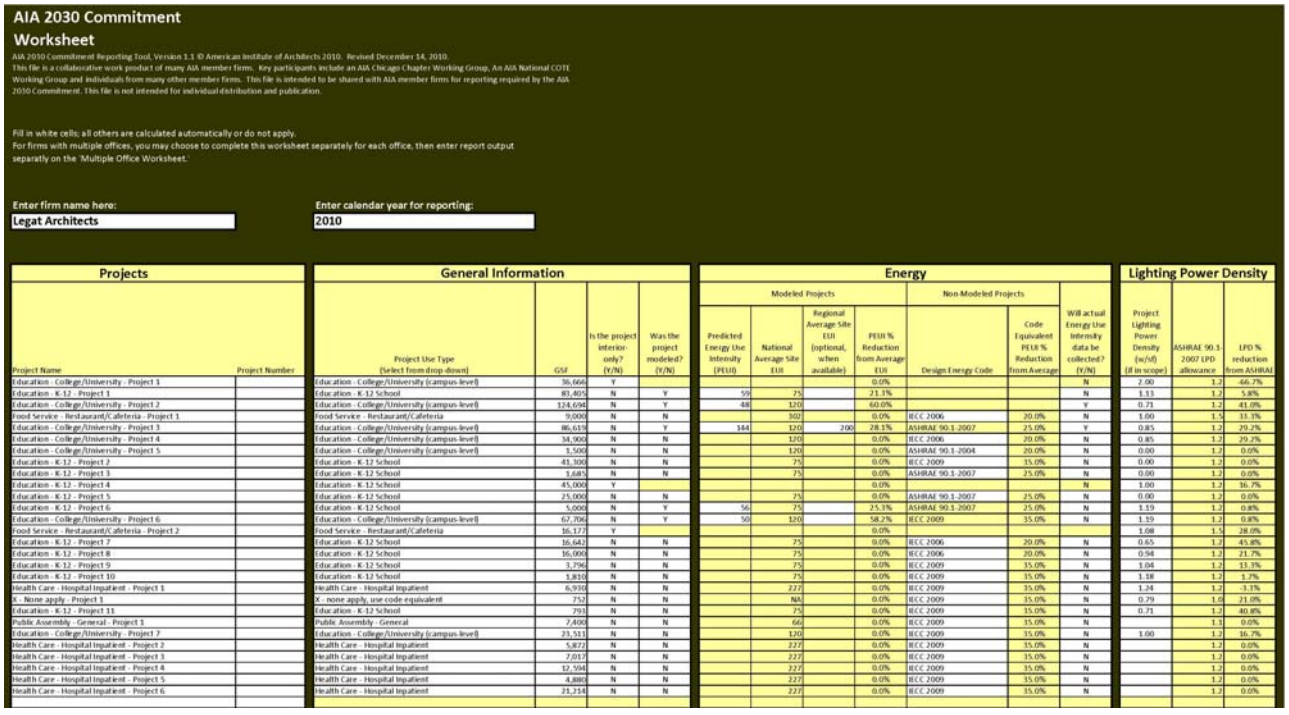
While this is an important measure of embodied energy, and an important part of calculating a carbon footprint, the focus of this reporting is to analyze the energy performance of each firm's design work. It is not necessary to obtain a regional average site EUI number but regional data. However when available, regional data is more applicable to a given climate or a project type and as such is always preferable to national data. The formula used to generate a report will assign preference to an entered Regional Average number over the automatic National Average number.

Sources which may be referenced for regional data by project type and location include combination of US EPA Energy Star Target Finder[3], 2030 Challenge target tables[2] including U.S. Residential Regional Averages, Canadian Commercial Regional Averages, and Canadian Residential Regional Averages, Commercial Building Energy Consumption Survey (CBECS) 2003 consumption and gross energy intensity data by climate zone.

2.5.2 Lighting Power Density (LPD)

Lighting Power Density values were included in the calculation because, generally, the ability of an interior design project to affect building EUI is mostly limited to lighting design. Since interiors projects tend to not include HVAC system or envelope modifications, lighting power density is the criterion which is most applicable to traditional interiors work. While Lighting Use Intensity (LUI) is a more meaningful prediction of how lighting contributes to overall energy use in a building, LUI can only be derived from energy modelling, which is seldom employed for interiors-only projects.

The LPD reduction goal is 25% reduction from ASHRAE 90.1 2007 requirements. This seems to be just as good a goal as any, and fairly easily attainable. In some instances a lighting power density will not be available, either because the project is in preliminary stages, has no LPD reduction goal, or because lighting design was not in the project's scope of work. In these cases, the project will be excluded on the LPD section of the 'Report' tab.



AIA 2030 Commitment

Worksheet

AIA 2030 Commitment Reporting Tool, Version 1.1 © American Institute of Architects 2010. Revised December 14, 2010.
This file is a collaborative work product of many AIA member firms. Key participants include an AIA Chicago Chapter Working Group, An AIA National COTE Working Group and individuals from many other member firms. This file is intended to be shared with AIA member firms for reporting required by the AIA 2030 Commitment. This file is not intended for individual distribution and publication.

Fill in white cells; all others are calculated automatically or do not apply.
For firms with multiple offices, you may choose to complete this worksheet separately for each office, then enter report output separately on the 'Multiple Office Worksheet.'

Enter firm name here: Legat Architects

Enter calendar year for reporting: 2010

Projects		General Information				Energy							Lighting Power Density		
						Modeled Projects				Non-Modeled Projects					
Project Name	Project Number	Project Use Type (Select from drop-down)	GSF	Is the project interior-only? (Y/N)	Was the project modeled? (Y/N)	Predicted Energy Use Intensity (PEUI)	National Average Site EUI	Regional Average Site EUI (optional, when available)	PEUI % Reduction from Average EUI	Design Energy Code	Code Equivalent PEUI % Reduction from Average	Will actual Energy Use Intensity data be collected? (Y/N)	Project Lighting Power Density (w/sf) (if in scope)	ASHRAE 90.1 2007 LPD allowance	LPD % reduction from ASHRAE
Education - College/University - Project 1		Education - College/University (campus-level)	36,666	Y					0.0%			N	2.00	1.2	-66.7%
Education - K-12 - Project 3		Education - K-12 School	83,405	N	Y	59	75		21.3%			N	1.11	1.2	5.8%
Education - College/University - Project 2		Education - College/University (campus-level)	124,694	N	Y	48	120		60.0%			Y	0.71	1.2	41.0%
Food Service - Restaurant/Cafeteria - Project 1		Food Service - Restaurant/Cafeteria	9,000	N	N		302		0.0%	IECC 2006	20.0%	N	1.00	1.5	33.3%
Education - College/University - Project 3		Education - College/University (campus-level)	86,619	N	Y	144	120	200	28.1%	ASHRAE 90.1-2007	25.0%	Y	0.85	1.2	29.2%
Education - College/University - Project 4		Education - College/University (campus-level)	34,900	N	N		120		0.0%	IECC 2006	20.0%	N	0.85	1.2	29.2%
Education - College/University - Project 5		Education - College/University (campus-level)	1,500	N	N		120		0.0%	ASHRAE 90.1-2004	20.0%	N	0.00	1.2	0.0%
Education - K-12 - Project 2		Education - K-12 School	43,300	N	N		75		0.0%	IECC 2009	35.0%	N	0.00	1.2	0.0%
Education - K-12 - Project 3		Education - K-12 School	3,687	N	N		75		0.0%	ASHRAE 90.1-2007	25.0%	N	0.00	1.2	0.0%
Education - K-12 - Project 4		Education - K-12 School	45,000	Y					0.0%			N	1.00	1.2	16.7%
Education - K-12 - Project 5		Education - K-12 School	25,000	N	N		75		0.0%	ASHRAE 90.1-2007	25.0%	N	0.00	1.2	0.0%
Education - K-12 - Project 6		Education - K-12 School	5,000	N	Y	56	75		25.3%	ASHRAE 90.1-2007	25.0%	N	1.19	1.2	0.8%
Education - College/University - Project 6		Education - College/University (campus-level)	67,706	N	Y	50	120		58.2%	IECC 2009	35.0%	N	1.19	1.2	0.8%
Food Service - Restaurant/Cafeteria - Project 2		Food Service - Restaurant/Cafeteria	16,177	Y					0.0%				1.08	1.5	28.0%
Education - K-12 - Project 7		Education - K-12 School	16,642	N	N		75		0.0%	IECC 2006	20.0%	N	0.65	1.2	45.8%
Education - K-12 - Project 8		Education - K-12 School	16,000	N	N		75		0.0%	IECC 2006	20.0%	N	0.94	1.2	21.7%
Education - K-12 - Project 9		Education - K-12 School	3,796	N	N		75		0.0%	IECC 2009	35.0%	N	1.04	1.2	13.3%
Education - K-12 - Project 10		Education - K-12 School	1,810	N	N		75		0.0%	IECC 2009	35.0%	N	1.18	1.2	1.7%
Health Care - Hospital Inpatient - Project 1		Health Care - Hospital Inpatient	6,930	N	N		227		0.0%	IECC 2009	35.0%	N	1.24	1.2	-3.3%
X - None apply - Project 1		X - none apply, use code equivalent	752	N	N		NA		0.0%	IECC 2009	35.0%	N	0.79	1.0	21.0%
Education - K-12 - Project 11		Education - K-12 School	793	N	N		75		0.0%	IECC 2009	35.0%	N	0.71	1.2	40.8%
Public Assembly - General - Project 1		Public Assembly - General	7,400	N	N		66		0.0%	IECC 2009	35.0%	N		1.1	0.0%
Education - College/University - Project 7		Education - College/University (campus-level)	23,511	N	N		120		0.0%	IECC 2009	35.0%	N	1.00	1.2	16.7%
Health Care - Hospital Inpatient - Project 2		Health Care - Hospital Inpatient	5,872	N	N		227		0.0%	IECC 2009	35.0%	N		1.2	0.0%
Health Care - Hospital Inpatient - Project 3		Health Care - Hospital Inpatient	7,017	N	N		227		0.0%	IECC 2009	35.0%	N		1.2	0.0%
Health Care - Hospital Inpatient - Project 4		Health Care - Hospital Inpatient	12,594	N	N		227		0.0%	IECC 2009	35.0%	N		1.2	0.0%
Health Care - Hospital Inpatient - Project 5		Health Care - Hospital Inpatient	4,880	N	N		227		0.0%	IECC 2009	35.0%	N		1.2	0.0%
Health Care - Hospital Inpatient - Project 6		Health Care - Hospital Inpatient	23,214	N	N		227		0.0%	IECC 2009	35.0%	N		1.2	0.0%

Fig. 2 AIA 2030 Commitment Reporting Tool: Firm-wide Project Energy Data Collection Sheet

2.6 Annual 2030 Commitment Reporting Process

Once the individual project energy data is entered into the AIA 2030 Reporting Tool, (see Fig. 2 above) the spreadsheet will generate a Report's summary page. The Report summary includes information on all projects designed by a given firm in a single calendar year. This is the final reporting mechanism for the AIA 2030 Commitment by which an individual firm's data is being transferred to AIA National. The participating firm will print the information and post it on the AIA website to complete its reporting period for the given year.

2.6.1 Report Summary Page

The Report summary page (see Fig. 3 below) consists of four report cards: firms' cumulative data for all eligible projects, separated into four categories: PEUI percent reduction from current target (60% for five-year period 2010-2014), a percent ratio of a firm's projects where building energy modelling was part of the design process, ratio of projects where data will not be collected during post occupancy and finally, lighting power density (LPD).

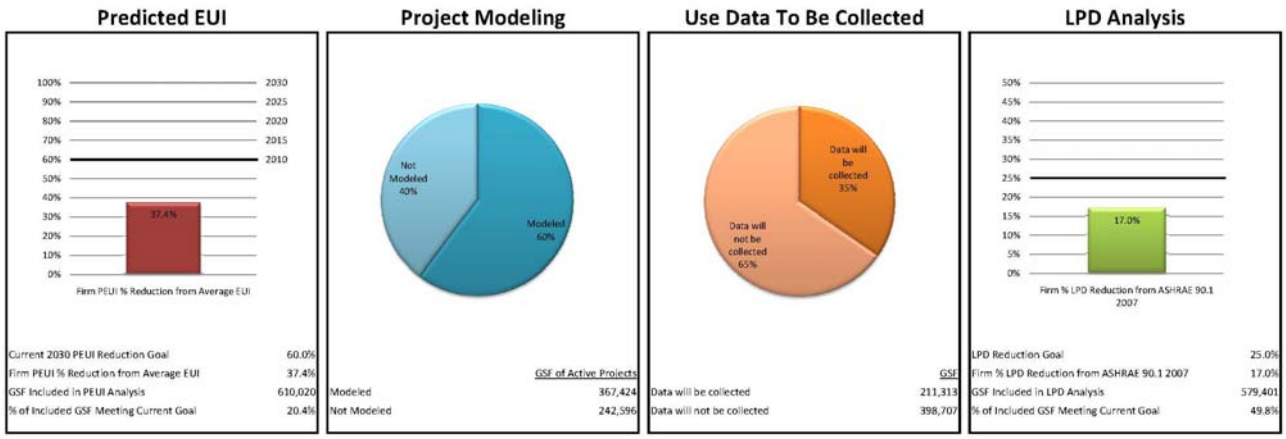


Fig. 3 Design Firm 2010 Annual Report data: PEUI, % Energy Modelled, Use Data and LPD

2.6.2 Using 2030 Commitment to Improve Firm's Design and Project Delivery Process

A few design firms will reach their set PEUI targets during the initial reporting period. Actual PEUI and LPD values may suggest there is a room for improvement (see Fig. 4 and 5 below). Firms can also calculate their PEUI and LPD levels for individual projects, and "reverse" the process to determine which design strategies are more effective than others.

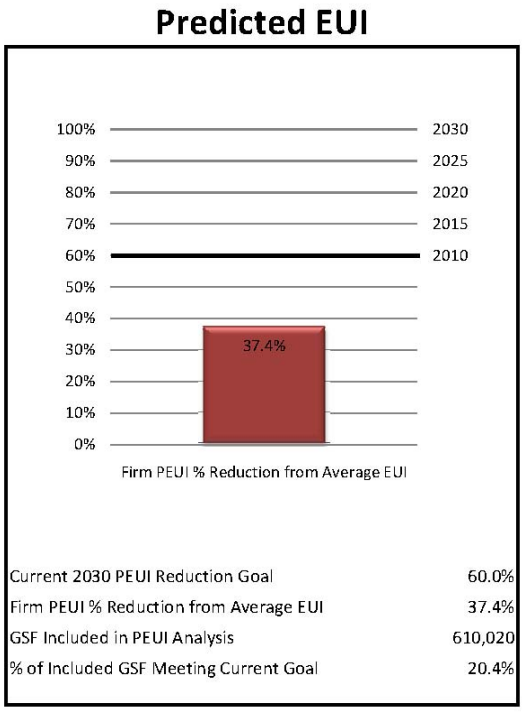


Fig. 4 Report Detail, PEUI Values

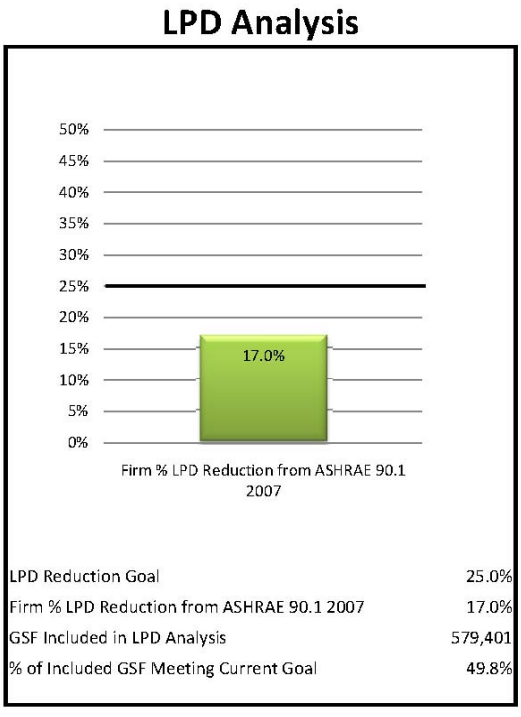


Fig. 5 Annual Report Detail, LPD Values

2.7 AIA Chicago 2030 Working Group

The AIA 2030 Commitment Reporting Tool[4] (Fig 2.) was created by a panel of Chicago-based sustainable-minded practitioners, lead by AIA Chicago Board and AIA Chicago Committee on the Environment (COTE). The goal was to create a tool that would facilitate reporting and equalize data collection methods between the Chicago firms participating in the AIA 2030 Commitment. Once tested in Chicago, the AIA 2030 Reporting Tool was used as part of a national initiative to collect data from firms participating in the 2030 Challenge and the AIA 2030 Commitment.

The Reporting Tool includes information on what type of data is required to complete the report, a step-by-step list of instructions, a Frequently Asked Questions (FAQ) guide, a worksheet to compile the firm's data, and a printable graphic summary page to demonstrate the level of reduction achieved by the Firm for the reporting year.

AIAChicago COTE, in conjunction with National AIA, plans to collect this data for Chicago firms to show how Midwest Region could lead in sustainable design, utilizing goals of the AIA 2030 Commitment. Demonstrating our reductions as a region will show how Chicago design professionals are leading the way toward a more sustainable built environment.

2.7.1 Outreach, Reporting and Education

Early in the process, AIA Chicago Working Group focused on expanding the base of participating firms and design professionals among Chicago area-based firms. As a result, approximately 30% of the 162 national firms participating are firms either based or having design studios located in Chicago.

Unlike annual reporting to AIA which is done by individual firms who are not identified in the AIA's annual report on 2030 Commitment, participating AIA Chicago Working Group firms have early on decided for an open sharing of data and energy performance strategies.

The benefits of this approach appear to have improved the overall performance of individual architectural design firms participating in the process (a 10 percent increase in overall energy performance - see Fig. 6 below). This model can become a useful template for organizing design work in other AIA Chapters.

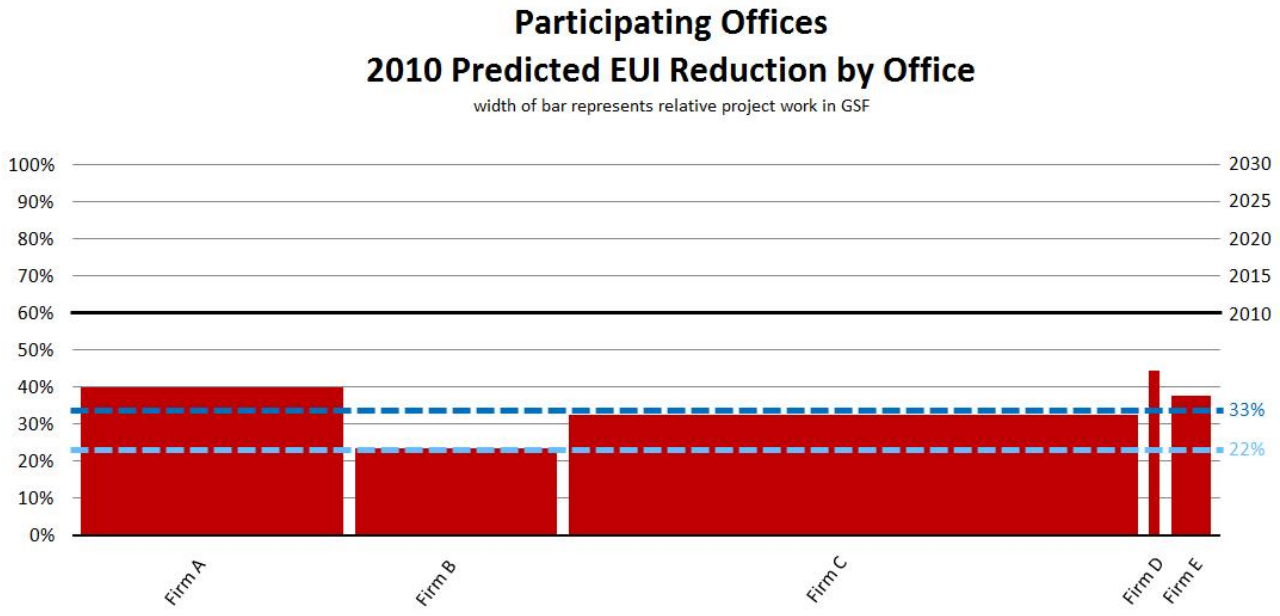


Fig. 6 AIA Chicago Participating Design Cumulative PEUI results showing improvement

3. Conclusion

3.1 Opportunities for Development

Annual AIA 2030 Commitment reporting, including tracking and collection of project-specific energy performance data offers several distinct advantages and can be used to improve overall sustainable design process in a relatively short period of time. Most importantly, it provides measurable results and an objective system which could be used to differentiate between available design strategies based on building energy performance. It is likely that in the future, many building owners will be able to select design professional services based on individual design firm's performance relative to AIA 2030 Commitment data.

3.2 Acknowledgements

The author would like to thank all colleagues and design professionals who contributed to development of AIA 2030 Reporting Tool, particularly members of the AIA Chicago 2030 Commitment Working Group: Brandon Biederman of University of Illinois in Chicago, Len Sciarra of Gensler, Travis Soberg of Goettsch Partners, Colin Rohlfing of HOK, Steven Kismohr of Midwest Energy Efficiency Alliance, Nate Kipnis of Nathan Kipnis Architects, Meghan Brown of Ooccupi Design, and Eileen Pedersen of Perkins + Will and others.

I am particularly grateful to Rand Ekman of Cannon Design who organized he AIA Chicago 2030 Commitment Working Group and was our liaison with AIA National, also Marya Graff of Cannon Design, for her work on compiling the final 2009 and 2010 AIA Chicago firm energy performance data.

Finally, I would like to express my sincere thanks to the AIA Chicago's Board of Directors, President Fred Brandstrader, former President Walter Street, Executive Vice President Zurich Esposito and other AIA Chicago staff who supported our efforts and participation in the SB11 Conference.

3.3 References

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