# GETTING TO Zero

## Zero Energy Schools Stakeholder Engagement and Messaging



#### Zero Energy Schools Stakeholder Engagement and Messaging

Effective communication is critical to successfully engage your audience and ultimately achieve your goal of designing, constructing, and operating a zero energy (ZE) school. This document will help you to address key questions around your communication effort and engage stakeholders in the integrated ZE process.

Effective communication revolves around understanding the drivers that motivate decisions made by each stakeholder. In the school market, student educational outcomes are the primary driver of stakeholders. Framing messages with this driver in mind is key to communicating with them on a level that they understand and that motivates them. In addition, most audiences are not very technical so focusing on outcomes rather than the technical way ZE will be achieved may be a more successful strategy.

#### How to Use This Document

Below is a list of overarching messages about ZE schools. The Stakeholders and Drivers table that follows identifies key market actors and their drivers. Finally, the Supporting Facts for Key Messages table outlines key messages and provides supporting research and facts that might appeal to the various audiences. This information is helpful when honing messages to gain support your overall ZE implementation plan, depending on drivers of particular stakeholders.

#### Six Key Messages for Communicating ZE

- 1. **ZERO ENERGY:** Zero energy (ZE) schools are low energy buildings coupled with renewables that provide a ready generation resource. A school achieves zero when the energy produced meets or exceeds the energy used over the course of a year. Schools are early leaders in ZE and serve as hubs to educate others.
- 2. LOWER OPERATING COSTS: K-12 schools spend \$8 billion on energy, more than is spent on computers and textbooks combined. Schools built to ZE performance have lower operating costs and over time, save money on energy bills that can be spent on educating students. ZE also reduces exposure of school budgets to the volatility of shifting energy prices.
- 3. **INCREASED STUDENT PERFORMANCE:** Occupants of ZE schools benefit from heightened student performance, increased average attendance, better occupant health and improved teacher satisfaction and retention.
- 4. EDUCATIONAL BENEFITS: ZE schools are living laboratories, stimulating learning and innovation. Occupant engagement in ZE schools can provide additional energy savings and serve as a teaching tool for students, STEM programs and the larger community. This greater understanding and deeper knowledge of concepts like science, math, and technology in relation to their surroundings give students the confidence to take leadership roles in their schools as advocates for environmental sustainability and their own learning needs.
- 5. **RESILIENCY:** ZE schools are also more resilient in severe weather events. They can create safe havens for the community during emergencies since the building energy generation systems can be islanded and remain functional continuing to provide light and space conditioning during an outage, they also use daylighting and natural ventilation.
- **6. GETTING TO ZERO:** While ZE is the end game for building sustainably, it is a process and can take time to accomplish. School districts can start now on this path to zero.

#### Stakeholders and Drivers

#### Stakeholder

#### Driver

#### **Priority 1**

#### **School Board**

Elected school board members are the primary decision maker for school districts and school facilities. They routinely seek input from the community, students, staff, and a wide-range of consultants in decision-making.

Mission: Excellence in education for every child at every level by focusing on quality instruction, educational outcomes, healthy school buildings, and sustaining a culture of excellence.

**Priorities:** education, 21st century skill development, cost effectiveness, sustainability, positive school culture, social equity, community engagement, on time project delivery, accountability, student growth.

Votes of school board members represent final decisions on many topics critical to school facilities.

#### Superintendent & Assistant Superintendent

A school superintendent & assistant superintendent are responsible for the overall functioning of the school district. They report directly to the school board, oversee the development of plans and budgets.

Mission: To inspire students to engage in meaningful learning in a safe and nurturing environment that embraces diversity. Challenge students to be ethical, productive members and leaders of the community.

Priorities: education, school and district budget, cost effectiveness, budgets, on time project delivery, positive school culture, social equity, community engagement & relations, positive school PR, school pride, student growth.

The superintendent oversees all development of plans and budgets and although they ultimately report to the school board, they make the big decisions for the district.

As the Assistant Superintendent is more "on the ground" than a Superintendent of a larger district may be, they hold a large amount of influence over big planning decisions.

#### Capital Projects & **Planning Department**

The Capital Projects and Planning Department manages planning, design, construction and renovation of all facilities.

**Mission:** To support the School District mission, Facilities Planning provides professional expertise to the Board, the Administration and to other departments within the District. The goal is to provide each student, faculty, staff and patron with a safe, comfortable and functional campus environment.

Priorities: Deferred maintenance, ease of maintenance & operations, education, safe schools, healthy schools, on time project delivery, budgets, cost effectiveness, staff availability and allocation.

The planning department participates on the Long Range Planning/Facilities Master Plan development and may make the ultimate decisions on contracting and design team members.

#### **Director of Facilities &** Grounds

The operation and maintenance of safe, healthy and functioning schools is the responsibility of the Facilities Director. The Facilities Director may manage a group of staff that generally includes a team of Facilities Managers who are deployed across the district to various facilities to address specific maintenance issues and custodians.

**Mission:** The employees of the Facilities Management Department are committed to providing exceptional customer service to the students, administrators, and community to facilitate student achievement and success by providing exceptional facilities conducive to quality learning.

Priorities: Ease of maintenance & operations, deferred maintenance, budgets, education, safe schools, healthy schools, staff availability and allocation.

Typically, the Facilities Director participates on the Long Range Planning/Facilities Master Plan development as part of the Leadership Team, alongside other district stakeholders. Facility Directors and staff are committed to student educational outcomes and how the building impacts students. While they are interested in energy, they are more interested in maintaining healthy and safe schools. Their buy-in on new systems is critical to a ZE result because ZE buildings must be operated correctly to maintain ZE status.

#### Stakeholder

#### Sustainability & Energy Managers

Sustainability staff often work in association with teachers and students on a variety of "green" projects such as waste, energy and water reduction. Some districts additionally have an energy manager that may work to tie the sustainability department to the facilities department through energy management and analysis.

#### Driver

**Mission:** Sustainability Managers are committed to being responsible stewards of natural resources and believe that public education institutions should lead the way in developing an ethic of sustainability in all of their practices. Energy Managers focus heavily on energy conservation practices and policies which upholds the district's continuing dedication and commitment to saving energy and natural resources.

**Priorities:** energy/waste/water conservation, healthy schools, education, upgrading facilities, reducing utility bills, social equity, community engagement, school pride, accountability, student growth.

Sustainability managers and energy managers hold critical information to understanding savings that come from conservation practices. They are very important to bring into the conversation early.

#### Design Team: Architects, Engineers, Construction Management, Contractors, Commissioning Agents & Other Consultants

Designers work directly for the school district and remain engaged with each school project based on educational and facility related needs. They understand the challenges facing school facilities and know how to manage a public input process typical in school design.

**Mission:** To examine and understand the individual set of challenges, goals and needs of each school and to bring open mind and active engagement. By undertaking a robust process of information gathering, stakeholder dialogue and consensus building all members of the design team incorporate advanced design techniques towards specified energy targets and high educational expectations.

**Priorities:** energy/waste/water conservation, healthy schools, education, upgrading facilities, reducing utility bills, community engagement, school pride, project deadlines, budgets, cost effectiveness, technologies, client satisfaction, designing/constructing to target, operating to target.

These consultants are critical to the design process and ensuring designs are built to the energy targets set during initial discussions and that fine tuning of the ZE building is ongoing.

#### Building Occupants: Teachers, School Staff & Students

As the main occupants of schools, teachers, staff and students provide insight into day to day operations and any issues that may be missed by stakeholders at the district level. They are champions for their own health and well-being in the design, construction and operation of a ZE school.

**Mission:** To motivate, inspire, encourage, and support students by providing a safe and secure environment to educate them socially, emotionally, and cognitively so they can continue to build a foundation for life-long learning.

**Priorities:** education, 21st century skill development, sustainability, positive school culture, social equity, community engagement, accountability, social responsibility, healthy school buildings, positive classroom experiences, student growth.

Teachers and staff exist in these school buildings and spend their days supporting the mission of education and developing our future leaders. They may have a lot of input on the needs of the school building and the students themselves.

#### Stakeholder

#### Driver

#### **Priority 2**

#### **Bond Oversight** Committee

The Bond Oversight Committee is a small independent oversight panel that is established pursuant to the requirements of the school construction bond measures passed by the voters of a school district.

Mission: The mission of the Bond Oversight Committee (BOC) is to oversee the permissible and prudent expenditure of funds for the construction, repair, and modernization of schools. In order to effectively carry out that mission the BOC must remain strong and independent.

Priorities: cost effectiveness, budgets, education, on time project delivery, sustainability, upgrading facilities, accountability, student growth.

They hold accountable any bond funds that are passed by voters and are important in the recommendation stage of fund allocation.

#### **Principal**

Principals are critically important in setting the goals for sustainability within school. Their role is pivotal in the hand off and operations of a ZE school so their input and understanding is key to the design process

Mission: The school principal is dedicated to preparing students to meet with success in their future life experiences by providing a spectrum of exceptional, educational opportunities. High academic expectations, shared decision making and responsibility, and a nurturing atmosphere are vital components in achieving this mission.

Priorities: education, student growth, healthy school buildings, 21st century skills, budgets, positive school culture, social equity, community engagement, school pride.

Principals should always be part of the conversation because they are responsible for overseeing the day-to-day building use and operation.

#### **Education Planners**

Curriculum and education departments support researchbased and hands-on instructional practices and strategies for innovative and effective teaching and learning based on State-adopted standards.

Mission: The Curriculum Department exists to cause learning that is intellectually vital, generative of future self-directed learning, personally meaningful and productive, and socially valuable.

Priorities: education, social equity, 21st century skills, project based learning, student independence, positive school culture, school pride, educational standards, critical thinking, student growth, accountability.

Often times left out of the initial conversation - the educational department is critical for outlining how the building will function as an educational tool.

#### County or State Dept. of **Education**

Departments of Education oversee the public school system and hold schools accountable for enforcing education regulations and continuing to reform and improve public school programs.

Mission: To promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.

Priorities: education, social equity, 21st century skills, project based learning, student independence, positive school culture, school pride, educational standards, critical thinking, student growth, accountability.

These are important stakeholders at the larger level as they have a great impact on enforcing policy across the district.

#### Voters

Voters play a key role in passing school bonds and provide key support to rallying behind the needs of each school.

Mission: To participate in and encourage informed and active participation of citizens in government and influence public policy through education and advocacy.

Priorities: education, cost effectiveness, sustainability, positive school culture, social equity, community engagement, accountability.

Voters elect school board members and pass school bonds. Their buy in is key to school district progress.

## Stakeholder Driver Priority 3

#### **PTA**

A Parent Teacher Association (PTA) is a volunteer based organization of parents and teachers that work to help and improve a particular school.

**Mission:** To make every child's potential a reality by engaging and empowering families and communities to advocate for all children.

**Priorities:** education, 21st century skills, sustainability, positive school culture, social equity, community engagement, accountability, student growth.

Although PTA members may not have influence over actual decisions made at the facility level in a school or district – they are able to rally school community support over a common platform and may be helpful in gaining backing for your ZE vision. They can also be important in adopting school specific policies and practices.

## Community Organizations

Community members provide key support as members can rally behind the needs of each school and demand higher standards than what are in place. **Mission:** To secure a safer, healthier and wholesome education environment for our students and future leaders.

**Priorities:** education, 21st century skills, cost effectiveness, sustainability, positive school culture, social equity, community engagement, accountability.

Community organizations and nonprofits may be helpful as they may have experience in bringing all stakeholders to the table or they may assist in rallying support for your ZE vision.

### Other Public Interest Groups

These groups can include community business leaders, school public interest groups, and others **Mission:** To support the school community to foster education, student growth and potential and create healthier school environments for generations to come.

**Priorities:** education, social equity, 21st century skills, positive school culture, school pride, student growth, accountability, cost effectiveness on time project delivery, sustainability, upgrading facilities, community engagement.

These public interest groups or business can be very influential as community pushback can bolster progress in bringing ZE to the table for the school board and other stakeholders.

#### **Utility Companies**

School district's utilities are sometimes more complicated than one gas and one electricity provider. Many districts span multiple service territories therefore they have multiple utilities.

**Mission:** To be committed to providing the highest quality products, competitively priced, with services exceeding their customers' expectations. They will continue to invest in facilities, systems and highly trained technical personnel providing added-value to their business relationships.

**Priorities:** cost, utility rates, sustainability, community engagement, client satisfaction.

Utility companies may work with school districts and oversee energy efficiency programs that offset incremental costs associated with energy efficiency.

Supporting Facts for Key Messages  Page 19	School Board & Bond Oversite Committee	Superintendent & Assistant Superintendent	Capital Projects & Planning Department	Director of Facilities & Grounds	Sustainability & Energy Managers	Principal	Curriculum & Education Planners	Building Operators: Teachers, School Staff & Students	Design Team: Architects, Engineers & Other Consultants	PTA & School Community	County or State Dept. of Education	Voters & Community Organizations	Utility Companies	Other Public Interest Groups
1. Zero energy														
The ZE market is growing rapidly—nearly doubling every year in the numbers of verified and emerging projects.  Since 2015—the number of ZE verified, emerging and ultra-low schools has grown by almost 40%.	X	X	X	X	X	X	X	X	X	X	X	X	X	x
The education sector—particularly K-12 schools—are leading with 88 projects across the U.S. that are achieving ZE or have a stated goal of ZE performance. <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Those who have visited a ZE school came back and reported they were enthused and that this idea of a living breathing interactive school is a feasible and achievable reality.	X				X				X			X		X
2. LOWER OPERATING COSTS														
Annually in the U.S., K-12 schools spend \$8 billion on energy—more than is spent on computers and textbooks combined. <sup>2</sup>	X	X												
ZE is fiscally responsible with tax payer dollars - it puts more money back into the schools because of lower utility & building operating costs.	X									X		X		X
Given that the educational sector consumes over 2,000 trillion BTUs of energy for all types per year, savings across a district could mean hundreds of thousands of dollars that can go back into the classroom or building itself. <sup>3</sup>		x	x	x		x								
Owner occupied buildings (like schools) have the best payback over the long term.4	X	X							X			X		X

<sup>1.</sup> New Buildings Institute. (2016, October). 2016 List of Zero energy Buildings. http://newbuildings.org/resource/2016-list-of-ZE-buildings/
2. US Department of Energy, EnerySmart Schools Program. (2008) Guide to Financing EnergySmart Schools. https://www1.eere.energy.gov/buildings/publications/pdfs/energysmartschools/ess\_financeguide\_0708.pdf

<sup>3.</sup> Commercial Buildings Energy Consumption Survey (CBECS). (2016, May) Total enery consumption by major fuel, 2012. https://www.eia.gov/consumption/commercial/data/2012/c&e/cfm/c1.php 4. U.S. Green Building Council. (2015, February). The Business Case for Green Building. https://www.usgbc.org/articles/business-case-green-building

3. INCREASED STUDENT PERFORMAN	School Board & Bond Oversite Committee	Superintendent & Assistant Superintendent	Capital Projects & Planning Department	Director of Facilities & Grounds	Sustainability & Energy Managers	Principal	Curriculum & Education Planners	Building Operators: Teachers, School Staff & Students	Design Team: Architects, Engineers & Other Consultants	PTA & School Community	County or State Dept. of Education	Voters & Community Organizations	Utility Companies	Other Public Interest Groups
ZE buildings have significantly lower carbon emissions. Excess CO2 makes student cognitive function much slower so they are less attentive, with memory and concentration levels significantly lower. Additionally, studies have shown that students and staff in poorly ventilated spaces have 50 to 70% more respiratory illnesses. <sup>5</sup>	x	X			X	x		x		x		X	X	x
With students spending approximately 1,000 hours per year in a school <sup>6</sup> , transforming classrooms into healthy and productive spaces is of the utmost importance, especially when short-term and long-term health of students and staff is at risk. ZE buildings attract and retain students and faculty who want to spend every day in these schools.	x	x								X		X		X
A Harvard study showed that occupants in ventilated spaces with low CO2 and low volatile organic compounds (VOCs) had improved scores in crisis response, information usage, and strategy ranging from 100 to 300%. <sup>7</sup>	x	x	x					x		x		x		X
Students exposed to the noisiest HVAC systems underperformed on achievement tests relative to those utilizing quieter systems.8														

<sup>5.</sup> Lawrence Berkeley National Laboratory. (2013, May). Association of Classroom Ventilation with Reduced Illness Absence: A Prospective Study in California Elementary Schools. https://eta.lbl.gov/sites/ all/files/publications/lbnl-6259e-association\_of\_classroom\_ventilation.pdf"

<sup>6.</sup> Center for Public Education. (2011, December). Time in school: How does the U.S. compare? http://www.centerforpubliceducation.org/Main-Menu/Organizing-a-school/Time-in-school-How-does-the-

<sup>7.</sup> Bakó-Biró, Zs., Kochhar, N., Clements-Croome, D.J., Awbi, H.B. & Williams, M. (2007, January). Ventilation Rates in Schools and Learning Performance. https://www.researchgate.net/publication/242261403\_Ventilation\_Rates\_in\_Schools\_and\_Learning\_Performance
8. Jaramillo, A. M. (2013, March 22). The Link Between HVAC Type and Student Achievement. https://vtechworks.lib.vt.edu/bitstream/handle/10919/50565/Jaramillo\_AM\_D\_2013.pdf?sequence=1

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Children exposed to only moderate light levels earlier in the day exhibited increased body mass, whereas children who received the largest amount of light exposure were slimmer and had a more healthy body mass index (BMI). <sup>9</sup>									X	X				
Students exposed to daylight attended school 3.2 to 3.8 <sup>10</sup> more days per year	X	x				X		X						
<ul> <li>A study done by Heschong Mahone on the impact of daylighting in schools showed that students in daylit schools are more engaged, learn faster and at higher rates than a typical school.<sup>11</sup></li> <li>Students in daylit environments showed a 20-26% improvement on test scores compared to traditionally lit environments.</li> <li>Students with skylights that provided diffused light improved 19-20% better on test scores than those without a skylight.</li> <li>Students with operable windows progressed 7-8% faster than those without operable windows</li> <li>Students with the most daylighting performed 7-18% better in math and reading than those without.</li> </ul>	x	x			x	X	x	X	X	X	X	X		X

<sup>9.</sup> Pattinson, C. L., Allan, A. C., Staton, S. L., Thorpe, K. J., & Smith, S. S. (2016, January 6). Environmental Light Exposure Is Associated with Increased Body Mass in Children. http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0143578

<sup>10.</sup> Healthy Schools Network, Inc. (2012) Daylighting. http://www.healthyschools.org/downloads/Daylighting.pdf
11. Heshong Mahone Group. (1999, August 20). Daylighting in Schools: An Investigation into the Relationship Between Daylighting and Human Performance. http://h-m-g.com/downloads/Daylighting/schoolc.pdf "

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4. EDUCATIONAL BENEFITS  ZE schools are living laboratories that adapt students to														
a knowlegde-based technologically advanced society. With hands on project based learning opportunities they stimulate learning, innovating, 21st century skills and inspire future generations to consider issues of energy and sustainability.	X						X				x			
Students and staff take pride in their ZE building which teaches accountability for their own actions and environmental stewardship that leaves a positive legacy and set examples for future generations.	X	X			X	X	X	X		X	X	X		X
ZE schools provide a level of design, technology integration, and measurement and monitoring beyond what the average building affords. Teachers can leverage these tools to drive experiential learning about passive design, on-site energy generation and storage, cuttingedge technology, community integration, and the natural environment.		X			X	X	X	X			X			
ZE schools are highly visible examples to the community & serve to set a precedent of high standards in a school district. They are high performing learning environments that value student progress as a driver.	x	X				X		X	X	X	x	X	x	x
As successful demonstrations of the impact of ZE, schools can garner community support and use community pushback to drive ZE as a goal within the whole district or across the state.	x	X			X	X			X	X				X

Establish the district as a leader in ZE within the state (and nationally) to inspire others to set aggressive goals and advance learning from your successes, lessons and data.	School Board & Bond Oversite Committee	Superintendent & Assistant Superintendent	X Capital Projects & Planning Department	X Director of Facilities & Grounds	X Sustainability & Energy Managers	X Principal	<b>Curriculum &amp; Education Planners</b>	Building Operators: Teachers, School Staff & Students	Design Team: Architects, Engineers & Other Consultants	PTA & School Community	County or State Dept. of Education	Voters & Community Organizations	Utility Companies	Other Public Interest Groups
advance learning from your successes, lessons and data.														
5. RESILIENCY														
ZE schools are more resilient in severe weather events and can serve as places of refuge in emergencies.	X	X								X		X		
Building energy generation systems can be islanded and remain functional continuing to provide light and space conditioning during an outage, they also use daylighting and natural ventilation.	X	x								x		x		
Onsite renewables allows a building to have energy even when the infrastructure to deliver it fails. With onsite renewables, no space has to be dedicated to fuel storage or backup generators that are only going to be rarely used.	X	x								x		x		
6. GETTING TO ZERO														
The building form is also generally opportunistic. They have generally predetermined building occupancy patterns – building occupancy is generally planned or can be organized, they have sufficient land, and they are owner occupied, may have adequate roof area and layout for passive design.	X	x	X	X					x					

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Portfolio-wide analysis of district buildings helps to identify where limited resources could be best spent to achieve the most energy reduction. Review development pipeline to leverage opportunities already in being considered in the district master plan as they naturally occur.		X	X	X	x				x					
For existing buildings, benchmarking current energy consumption supports planning and targeting future opportunities, and engages in practices like Strategic Energy Management (SEM).				X	X									
ZE schools are easily replicable across the district. Focusing on one pilot school and then expanding on a larger scale over time via facilities master planning is an effective way to plan for ZE.			x	x	x				x					
Integrating ZE and energy targets into your RFP and other contract language can ensure ZE project delivery. Be explicit when defining your scopes of work!		X	x											
To reach energy goals, it's important that efficiency practices be considered before and during the design phase, as well as in the operating phase once the building is completed.	x		x		x				x					
Daylighting, which allows natural sunlight to permeate deep into interior spaces, reduce the need for electric lighting, and also provide better health effects resulting from views and connection to nature, reduced glare, and access to natural light.	x	x				x			x	x		x		
Facility managers and operators are the ones running this educational facility day in and day out, so making your building as simple as possible for them is key to seamless operations.		x	x						x					



Cover Image: Bishop O'Dowd High School | Oakland, CA Credit: David Wakely



623 SW Oak St., 3rd Floor Portland, OR 97205 503 761 7339 newbuildings.org New Buildings Institute (NBI) is a nonprofit organization driving better energy performance in commercial buildings. We work collaboratively with industry market players—governments, utilities, energy efficiency advocates and building professionals—to promote advanced design practices, innovative technologies, public policies and programs that improve energy efficiency. We also develop and offer guidance and tools to support the design and construction of energy efficient buildings.

Throughout its 20-year history, NBI has become a trusted and independent resource helping to drive buildings that are better for people and the environment. Our theory of change includes setting a vision and defining a path forward. We then set out to create the research that serves as the basis for tool and policy development necessary to create market change.