



National Action Plan for *Educating for Sustainability*



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PUBLISHED BY:

Houghton Mifflin Harcourt®
222 Berkeley Street
Boston, Massachusetts 02116

The Center for Green Schools at the U.S. Green Building Council
2101 L Street, NW Suite 500
Washington, D.C. 20037

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The National Action Plan for Educating for Sustainability has been made possible through the efforts of many dedicated volunteers, staff members, and others in the Houghton Mifflin Harcourt and Center for Green Schools communities. Additional thanks to the many individuals who contributed comments, suggestions and ideas in a volunteer capacity to the development of each chapter, highlighted as "industry leaders" and "exemplars" for their vision and leadership. Thanks also to Debra Rowe and the U.S. Partnership for Education for Sustainable Development; to Rachel Gutter, Emily Neagle, Anisa Baldwin Metzger and David Tanner at the U.S. Green Building Council; and to Mary Cullinane, Jessica Hubbard, Emma Doherty, Annalisa Amicangelo, Linda Bruce, Jesse Campbell, Karen Temmel, and Martha Pfeiffer at Houghton Mifflin Harcourt.

Finally, thanks to Houghton Mifflin Harcourt for their generous support, without which this National Action Plan would not be possible.

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Welcome

Rachel Gutter Director, The Center for Green Schools at USGBC

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Rachel Gutter



Mary Cullinane



Adam Schultz / Clinton Global Initiative

USGBC CEO Rick Fedrizzi, President Bill Clinton and HMH CEO Linda Zecher at the Clinton Global Initiative 2012 Annual Meeting.

A partnership between Houghton Mifflin Harcourt (HMH)® and the Center for Green Schools (the Center) at the U.S. Green Building Council wasn't—at first glance—an obvious one. HMH, a global learning company that focuses on delivering best-in-class content to students and teachers, came to the 2012 Clinton Global Initiative (CGI) Annual Meeting to observe and learn from like-minded organizations that were pursuing innovative solutions to global challenges. The Center, a nonprofit with a mission to put every student in a green school within this generation, was at CGI cultivating partners to lead the movement toward healthy, safe, and resource-efficient schools. Our goals proved to be entirely complementary, and after just a year, our unconventional partnership has already been transformative in achieving our shared goal to educate all students so they graduate prepared for a more sustainable future.

The Center is a convener across sectors and within communities in pursuit of a common goal; HMH holds a long-standing commitment to sustainability and educates 50 million

students in over 150 countries annually. Both of our organizations had seen great evidence of excellent curricular content around sustainability themes, and yet, the vast majority of students in the U.S. do not graduate high school with a foundation in Education for Sustainability (EfS). For decades, dedicated and visionary educators have been creating EfS curriculum, but the community had yet to articulate a shared vision and a plan of action for achieving it.

In the summer of 2013, HMH and the Center co-hosted a convening with education content providers, EfS advocates, and teachers and school leaders from across the country. We felt strongly that a vision for EfS should be crafted jointly by the leaders in the field of EfS, practitioners working in schools and the corporations who produce the lion's share of materials in classrooms. We were thrilled that, by day's end, this diverse group agreed on a shared vision to graduate students educated for sustainability by 2040.

With the same dogged determination to collaborate across sectors, we facilitated the creation of this National Action Plan to achieve our shared vision to educate for sustainability. We believe this National Action Plan is ambitious but doable, backed by the sharpest minds in the field and informed by practices that are tried and tested, both within and outside of the education and sustainability fields. This process has been invigorating, inspiring and insightful. Together, we are more committed than ever to accelerate our shared vision.

We charge our current and future collaborators—many of whom we've yet to meet—to join us in striving toward success by:

- Speaking with one voice while diversifying participation and engagement around EfS
- Doing less rather than more, and doing it together
- Developing content locally, and scaling that content through increased distribution channels for global dissemination
- Advancing the recommendations within this plan through processes that are collaborative, innovative and coordinated.

We call on our colleagues to read this National Action Plan, consider your role in educating for sustainability, and join us to take action to ensure all students graduate empowered and enthusiastic about their future. We look forward to working with you.

Rachel Gutter

Mary

Foreword

Congressman John Sarbanes

D-Maryland 3rd District



The Office of Congressman
John Sarbanes

Robust environmental education is the best way to grow the next generation of scientists, promote environmental stewardship, and encourage Americans to live healthier lifestyles. In addition, research shows that hands-on environmental education has a measurably positive impact on student achievement not only in science but also in reading, math, and social studies, all of which directly contribute to our global competitiveness.

Educating for sustainability is critical for helping young Americans make the complex conceptual connections between economic prosperity, lifestyle choices, energy use, environmental health, and their own well-being. Across the globe, problems caused by climate change, pollution, and resource depletion are increasingly acute: they are issues that will soon confront today's young people.

That's why I've introduced legislation, the No Child Left Inside Act (NCLI), which seeks both to improve education in our nation's public schools and to protect our environment by supporting outdoor learning activities at schools and nonformal environmental education centers. It would also provide teacher training and facilitate the creation of state environmental literacy plans. There is a bipartisan, bicameral group of champions for this legislation, including Congressmen Mike Fitzpatrick (R-PA), U.S. Senators Jack Reed (D-RI) and Mark Kirk (R-IL), as well as over 50 million citizens from 2,200 local, regional, and national organizations in the No Child Left Inside Coalition.

I'm proud that the State of Maryland was the first in the country to pass graduation requirements for environmental literacy. Today, school districts can make significant improvements in academic achievement, fiscal responsibility, and student health by incorporating the principles of sustainability into

Today, school districts can make significant improvements in academic achievement, fiscal responsibility, and student health by incorporating the principles of sustainability into their culture.

their culture. As the experts in this action plan note, it will require the combined efforts of educators, parents, and students as well as advocates and policymakers at the local, state, and national levels to embed into our nation's K-12 education system the concepts and skills that will enable a thriving future for all. But the timing couldn't be better. As nearly every state in the country aligns with new instructional standards for English language arts, math, science, and soon, social studies, there is a tremendous opportunity to integrate critical-thinking skills around the intersection of equity, economics, and the environment that will better prepare our students for this changing world.

Education for sustainability must be a national priority and I hope more states will join Maryland in leading the way. I recommend the authors of this action plan for their longstanding efforts on behalf of environmental education and sustainability and recommend this action plan to anyone who cares about these issues. Educating our students for a world in which they can thrive is the best legacy we can leave.

“ ... It is, in fact, the children and young people who are educated for sustainability that are 'making the difference' right now. They are learning to learn, thinking about their thinking, and accelerating the shift toward the future we want. That just makes sense.”

—Jaimie P. Cloud
(referencing Gregory Bateson)

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National Action Plan for Educating for Sustainability

Executive Summary

Education for Sustainability (EfS) empowers students to make decisions that balance the need to preserve healthy ecosystems with the need to promote vibrant economies and equitable social systems for all generations to come. Through a variety of EfS approaches, schools across the country and at all grade levels are currently satisfying curricular and achievement requirements and providing learning experiences that prepare students for the world they will inherit. Studies have shown that students who learn in the context of EfS are found to be more motivated, better behaved, and more present in class (Hacking, 2010). Additionally, EfS has been proven to increase connections between students and their communities, and promote healthy lifestyles and school environments. Because of the enriched learning delivered through EfS approaches, combined with the additional benefits to educators, families and communities, all students deserve access to Education for Sustainability.

In June 2013, the Center for Green Schools at USGBC and Houghton Mifflin Harcourt brought together stakeholders from academic, corporate, and nonprofit sectors to envision a future where our schools support thriving, healthy, and regenerative communities. Participants agreed on a shared vision where *all students graduate educated for a sustainable future through the integration of the environment, economy, and equity, with the ability to apply systems thinking to problem solving and decision making by 2040*. Fifteen subject matter experts undertook the task of recommending key actions that, collectively, outline a pathway to achieve our ambitious goal. This National Action Plan for Educating for Sustainability intends to propel efforts to affect policies and practices through collaboration, alignment, and large-scale implementation.

To realize success will require the coordination of the existing EfS community: schools sharing their experiences, decision-makers asserting their leadership, and school support systems—parents, volunteers, nonprofits—investing in what works. It will also require a mammoth effort in recruiting new champions who also

value transformative learning, so that the term “Educating for Sustainability” becomes synonymous with excellent education for all. Here are some crucial roles for key audience members contained within this action plan:

Educators: Create, share and disseminate quality content for classrooms, professional development, professional learning communities and community partnerships; make the case with administrators and parents for EfS-aligned standards (curriculum, evaluation, assessment, etc.).

School decision-makers: Integrate EfS principles into curriculum, professional learning, evaluation and assessment systems. Demonstrate and advocate for state- and district-level leadership around sustainability including sustainability personnel.

Green schools & EfS advocates: Coordinate, speak, and act with one voice; serve as a conduit between schools and corporations and researchers.

Corporate leaders: Partner with EfS leaders and researchers to create scalable and replicable materials; articulate the value-add of sustainability education.

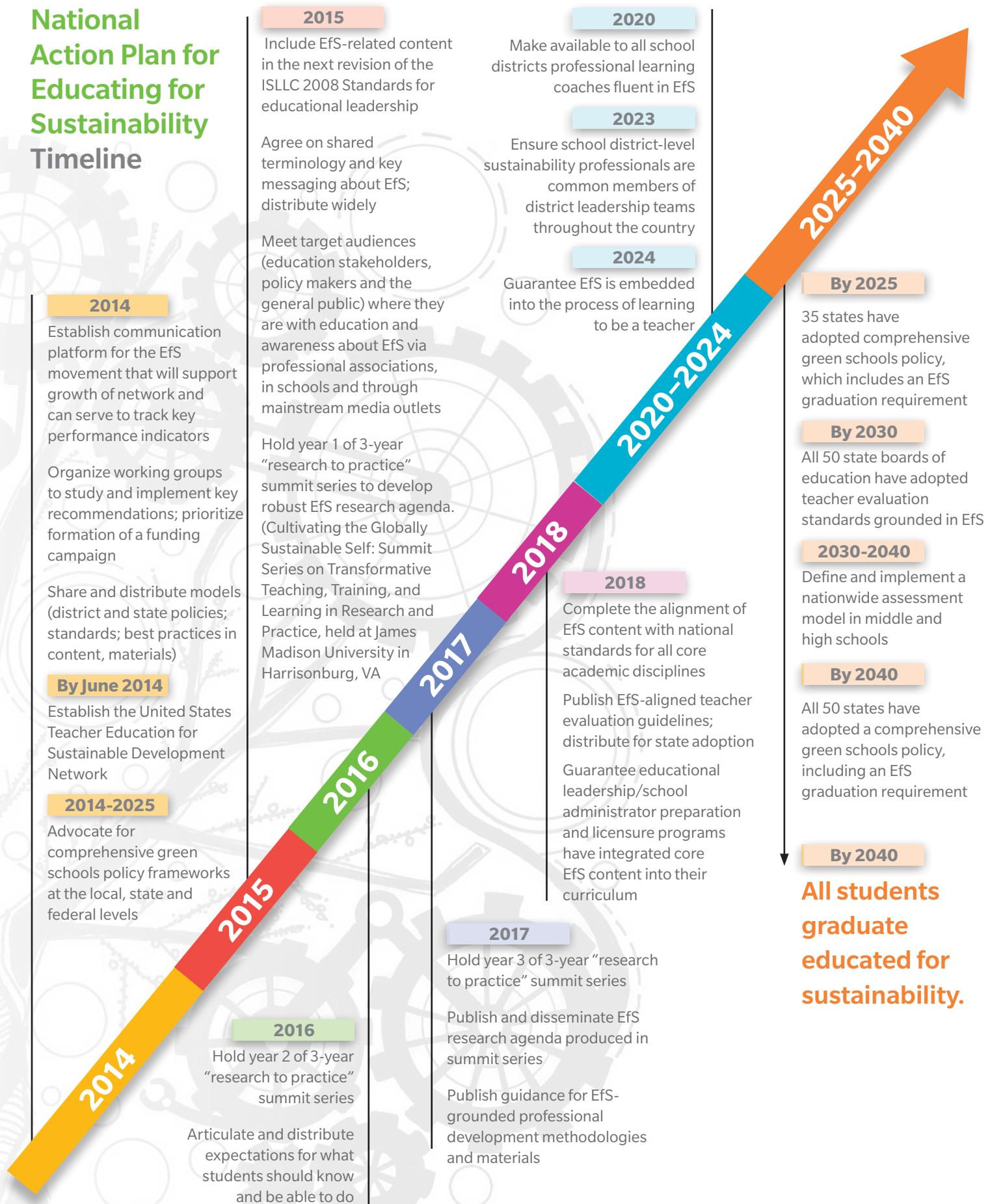
Policymakers: Identify and implement opportunities to institutionalize school-related environmental, health, and learning improvements at a local, state, and national level.

Parents & students: Create coordinated calls for education that prepare students for a changing world; support educators in aligning with EfS concepts and materials.

Faculty and students in higher education: Drive research around the impacts of EfS and green schools; adjust preparation programs for teachers and educational leaders to include EfS as core content.

**Read the full report online at
centerforgreenschools.org/nationalactionplan**

National Action Plan for Educating for Sustainability Timeline



Introduction

David Sobel, Senior Faculty, Education Department
Antioch University New England

Education for Sustainability. It's a tall order in our ever-changing world. Global interdependencies are greater than ever, sea levels are rising, the gap between rich and poor is getting wider, and population growth is causing a scarcity of food and water. It would be tempting to stick our heads in the sand and hope that someone else will take care of these problems. Instead, school principals, superintendents, teachers, and students are stepping up to the plate and taking responsibility for shaping a sustainable future. Listen to Principal Alison Suffet Diaz describe the changes at her school:

Today, Environmental Charter High School is a thriving green oasis in the concrete jungle of south Los Angeles County. When someone steps onto the campus, they know that this school is different. Students compost, make bio diesel, repair bicycles, harvest rain water, do field research, and teach local community members how to do all of this. While they start out as ninth graders more than two years below their grade level, by 11th grade, they have caught up to or surpassed their grade level. Last year, 92 percent of graduates were accepted to four-year colleges. Nearly all of our students come from households below the poverty line and from families who have never attended college (Suffet Diaz and Ruffalo, 2010).

Isn't it striking that schools with a social purpose also become schools where students are more academically successful? Making learning compelling and creating strong democracy go hand in hand in schools that are educating for sustainability. Let's be clear about what we mean by the term Education for Sustainability (EfS). Internationally, this movement is referred to as Education for Sustainable Development. The UN document [Report of the World Commission on Environment and Development: Our Common Future](#) offers this definition: "Sustainable development is development that meets the needs of the present generation without

compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

In North America, we've woven together the best intentions of environmental education, place-based learning, community-based education, and other progressive education reform initiatives to create **Education for Sustainability**, defined by the Cloud Institute as "a transformative learning process that equips students, teachers, and school systems with the new knowledge and ways of thinking we need to achieve economic prosperity and responsible citizenship while restoring the health of the living systems upon which our lives depend" (Cloud Institute website, n.d.).

What holds all these approaches together is the idea of intergenerational thinking, a commitment to thinking about the needs of seven generations down the line, not

Education for Sustainability aspires to educate students who have the ability, ambition, and knowhow to make decisions that balance the need to preserve healthy ecosystems with the need to maintain vibrant economies and equitable social systems in this generation and in all generations to come.

just the here and now. And it has been widely agreed that by needs, we mean the 3 Es—environment, economy, and equity. Therefore, Education for Sustainability aspires to educate students who have the ability, ambition, and knowhow to make decisions that balance the need to preserve healthy ecosystems with the need to maintain vibrant economies and equitable social systems in this generation and in all generations to come.

Mind you, EfS isn't just a new course at a few schools. It's a pedagogy that should undergird the curriculum and

facilities management systems of all our schools. When implemented comprehensively, EfS increases student achievement and delivers social, health, economic, and ecological benefits to the broader school community. In schools that practice EfS, teachers engage students in understanding issues and solving real problems that face citizens and community leaders. They address questions such as, how can we reduce the ecological footprint of our schools and communities? Can we connect local farms with our school lunch programs? How can the school serve as a place to celebrate the many diverse cultural traditions that exist within the school's neighborhood and communities? Is there anything we can do locally to help hurricane victims in Haiti? How do we harness the school curriculum to help local government officials improve the local river's water quality? And will community internships prepare students for careers more effectively than sitting behind the desk and copying sentences off the board?

John Dewey, American education reformer in the early 20th century, articulated the isolation of life from school and school from life, which wastes the learning opportunities rife in the community and wastes children's energy in not addressing community challenges and needs (Dewey, 1959). Following in Dewey's footsteps, in the midst of the Great Depression, another American educator, George Counts, asked the provocative question, Dare the School Build a New Social Order? (Counts, 1932). In other words, should schools play a role in making people's lives better, addressing social inequities, and building a new future? In the early 20th century, Dewey and Counts were united in their sense that the classroom and the school should be a laboratory for democracy. Classroom postal systems, student governments, and student-run school stores helped children understand the systems and responsibilities of participating in a democratic society.

This approach is even more relevant today, and the authors of this action plan articulate the steps we need to take in order for schools to play a leadership role in changing the social order. In the 21st century, the school should operate as a healthy ecosystem, serving as a model of American culture and global interdependence. Envision the school as a lighthouse and an exemplar, pointing the way toward community and global sustainability and setting a model for students to carry forth beyond the classroom and graduation. As one Environmental Charter High School student says, "We will not only be prepared

In the 21st century, the school should operate as a healthy ecosystem, serving as a model of American culture and global interdependence.

for college but also lifelong learners and activists that know how to make a difference in this world."

In this role, the school building will model energy conservation, toxins reduction, and healthy food production. The school lives of students and teachers will represent a balance of physical exercise and creative thinking. The quality of relationships between administration, teachers, and parents will illustrate respect and collaborative decision making. The school, especially at the middle and high school levels, will be an incubator for business innovation. The school grounds will be managed for energy production, play and recreation, wildlife habitat, and community interaction. In sum, the school aspires to be a model healthy community and a thriving ecology.

EfS was officially "born" as a new field of inquiry in 1992, and thought leaders have been asking what students need to know, to be able to do, and to be like if we are to increase the possibility that humans and other life can flourish on Earth indefinitely. The rich collection of answers and subsequent field work has propelled the movement to a place where, today, elements of EfS exist to some degree in schools across the country and around the world. We don't yet know the total number of schools that have engaged in any of the EfS approaches such as environmental education, place-based learning, or expeditionary learning; nor do we have a firm grasp on how many have placed a sustainability lens on instructional attributes such as systems thinking, lateral thinking, metacognition, or creativity. We do have a sense of the EfS support community, based on the activities of this action plan's contributing authors alone:

- 80 NGOs contributed to the creation of the [U.S. Department of Education's Green Ribbon Schools](#) program.
- Dozens of existing federal programs, grants, and initiatives related to healthy, high-performing schools are connected through the U.S. Department of Education's Green Ribbon Schools program.

(continued)

- 2,080 organizational members have joined the [No Child Left Inside Coalition](#).
- 25 organizational members participate in the [Coalition for Green Schools](#), representing over 14 million school support professionals, including both national teachers' unions, the National PTA, and school administrator associations.
- 12 states and dozens of school districts with policies that promote and support EfS are cited as models in this action plan.
- 10s of millions of students have been reached by EfS resources produced by organizations referenced in this publication.

The educators, students, and supporters who constitute

Denver Green School

While on paper the [Denver Green School](#) appears to be a typical neighborhood Denver public school, it has above-average aspirations for its students and community. The school partners with Denver Urban Gardens to create thriving vegetable and flower gardens on its school grounds. In the Denver Green School gardens, teachers implement literacy, math, and science curricula lessons—lessons that fulfill Colorado state standards. Students collaborate with community members to grow corn, beans, squash, and dozens of other food products and to develop a deeper understanding of the environmental, economic, and equity elements (and the interplay between them)—making this so much more than just a school project. Consider the ways in which the school lives out the “3 Es:”

CREATING A HEALTHY ENVIRONMENT

Converting abandoned lots into plant production means that some of the carbon dioxide from car exhaust is captured in green leaves, thereby lowering the amount of greenhouse gases in the air.

SUSTAINING A VIBRANT ECONOMY

The food grown in the garden gets used in school lunch programs, reducing school expenses and therefore conserving taxpayer dollars.

IMPROVING ACCESS TO HEALTHY LIVING ACROSS THE SOCIOECONOMIC SPECTRUM

Some of the garden production goes into the Denver Youth Farmers’ Markets and so makes healthy, inexpensive food available to low-income families, who are statistically inclined to be malnourished and overweight.

the EfS community in the United States are dedicated, and their numbers are growing. Research tells us that EfS improves student learning and standards achievement; produces better behavior and attendance; develops in students a greater awareness of community and a greater appreciation of the democratic process; and has meaningful effects on teacher attitudes, health, resource efficiency, and taxpayer dollars (Becker-Klein et al., 2008; Duffin, 2006; AED, 2007; Sobel, 2008; Department for Children, Schools and Families, 2010; Ofsted, 2009; Gayford, 2009; Barratt-Hacking et al., 2010; PEER Associates, 2010). There is emergent agreement about the best instructional and assessment methodologies and about the urgency of learning and practicing sustainable mindset behaviors. The burgeoning EfS movement is rich with opportunities to develop, approve, and implement standards, policies, and best practices.

Exemplary models of EfS exist in schools across the country. As we learn more about how to further understand and disseminate tools in support of widespread adoption of EfS practices, we look to exemplary models of EfS that exist in schools across the country. The [Denver Green School](#) is an example of a school community that is helping to create the sustainable future its students want.

Schools with similar initiatives are being recognized by the [U.S. Department of Education’s Green Ribbon Schools](#) program, established in 2011. This program honors schools and districts that have demonstrated exemplary progress toward three aspirational goals: zero environmental footprint (including energy, water, waste and carbon); a positive impact on occupant health and performance; and all graduates demonstrating environmental literacy. The three pillars—environmental impact, human health and ecoliteracy—act as a simple, elegant organizing principle for schools journeying toward whole-school sustainability.

Any number of the 142 schools and 14 districts across the country that have received the Green Ribbon award can attest to the virtues of creating mutually beneficial interactions amongst the three pillars in their school community. When done right, learning outcome improvements can be directly correlated to improvements in the health, safety, and efficiency of the school, and vice versa.

So, why is now the time to release a National Action Plan for Educating for Sustainability? Depending on the values you most cherish, the answer varies. For those who are concerned that our rate of resource consumption is outpacing the capacity of our planet to sustain life, the answer is that we need to begin our course correction today in order to meet a deadline in the future at which our planet can sustain us. For those concerned with our country's ability to compete in the global economy, the answer is that our education system should prepare graduates with the skills, competencies, and behaviors to access any career or education opportunity. For those who worry that our local, state, and federal agencies lack the fiscal ability to provide an equal education across class, race, gender, and religious and ethnic communities, the answer lies in the prospect of EfS as a strategy that improves budgets, learning, and attitudes. Perhaps most timely is the advent of the Common Core State Standards and the Next Generation Science Standards, which both emphasize problem solving, systems thinking, and deep understanding, just as EfS does.

This National Action Plan for EfS intends to translate a million wishes into a shared vision. As was witnessed during a convening of 32 K-12 school and education leaders in June 2013 who were asked to envision an ideal future state of education in our country, learning from history in order to invent our future is a key attribute of education for a sustainable future. Representing millions through the networks they reach, attendees agreed on a shared vision that *all students graduate educated for a sustainable future through the integration of the environment, economy, and equity, with the ability to apply systems thinking to problem solving and decision making by 2040.*

Based on this shared vision, the Center for Green Schools asked 15 experts in their respective fields to flesh out specific pathways and action items that will align and propel our efforts to realize our desired future state. The 15 authors of this action plan bring a collective 341 years of experience in the education sector as their credentials for asserting these key recommendations.

This EfS agenda requires new approaches to preservice and in-service teacher professional development, a targeted research agenda, revised conceptions of student assessment, updated school policies, and inspired leadership. The authors in this collection are in it for

the long haul, and together we've created a vision of bringing EfS into the fold of American schools by 2040. To introduce best practices from various sectors, each author has collaborated with an industry leader in framing their recommendations. Case studies illustrate lighthouse examples of schools and districts already taking the lead in implementation. This collaborative process in itself is illustrative of the ethos of partnership and systems thinking that will be required to bring constructive change to our schools and communities.

It is our hope that, upon reading the recommendations we set forth through this National Action Plan, you are compelled to take action to invent the future you wish to be a part of.



Integrated Content and Curriculum

Kimberly Corrigan, Executive Director, Facing the Future

Industry Leader: Dan Rogers, Lead Learning Architect; Language Arts, Math, and Science, Houghton Mifflin Harcourt

EDUCATION FOR SUSTAINABILITY— COMPELLING CONTEXT FOR INTEGRATED CONTENT AND CURRICULUM

Young people deserve an education that equips them to be successful students, accomplished professionals, effective parents, and productive leaders in our competitive, cooperative, and interconnected 21st-century world. To tackle today's complex challenges, they need the knowledge, skills, and stamina to work individually and collectively to solve current problems and to prevent new ones. They must learn to balance the often conflicting requirements of societies, economies, and the environment in order to contribute to sustainability—meeting our current needs without compromising the ability of future generations to meet their needs or compromising the living systems upon which we all depend. Education for Sustainability (EfS) offers a compelling framework within which to learn. EfS increases student engagement, a catalyst for both academic achievement (CCSRI, 2007) and dropout prevention (Bridgeland, Dilulio, and Morison, 2006) and provides a meaningful context in which to prepare students for work and life beyond school (OSPI, WA, 2009). EfS allows schools, districts, and states to focus simultaneously on preparation for college, career, and civic life by providing students with opportunities to explore and improve social, economic, and environmental conditions at home and abroad. The [UN Decade of Education for Sustainable Development](#) (2005–2014) and related efforts offer effective strategies and proven resources for the implementation of EfS across disciplines and grade levels. Additionally, recent national calls to prioritize STEM (science, technology, engineering, and math) education are deeply enriched by the interdisciplinary nature of EfS.

National curriculum expert Dan Rogers, Lead Learning Architect; Language Arts, Math, and Science, at Houghton Mifflin Harcourt says that to begin the process of wide-scale change in K-12 education, it's critical to make

the change practical for administrators and educators to implement. Initiatives perceived as "add-ons" that displace objectives upon which students and teachers are currently assessed generate resistance. It's our collective task to introduce a sustainability lens and global issues into required curricula and to institute best teaching practices in order to increase our students' affinities for learning and their ability to excel academically.

OVER THE NEXT DECADE, TO BEGIN FULFILLING THE VISION THAT ALL STUDENTS GRADUATE EDUCATED FOR A SUSTAINABLE FUTURE BY 2040, WE RECOMMEND:

1 ALIGNING STANDARDS AND ENGAGING DISCIPLINARY ASSOCIATIONS.

2014–2018 Where appropriate, align EfS content with national standards for all core academic disciplines, including the [Common Core Standards](#) for Math and Language Arts, the 3C Social Studies Standards, and the [Next Generation Science Standards](#). Explore the creation of new national EfS standards, referencing the current [National Education for Sustainability K–12 Student Learning Standards](#) (Version 3, 2009). Highlight EfS's organic ties to [21st Century Skills and Themes](#). Work intentionally with state boards of education, district curriculum coordinators, and school academic officers and engage leaders from key disciplinary associations (for example, National Science Teachers Association, National Council for the Social Studies). Share exemplar case studies and practices and create strategic plans for research on the efficacy of EfS materials and approaches.

2 BUILDING CURRICULAR ALLIANCES.

2014–2018 Formalize the connections between existing K-12 national programs, networks, and organizations that share sustainability goals and outcomes such as the U.S. Department of Education's

Green Ribbon Schools, the [No Child Left Inside Coalition](#), and the National Academy of Sciences [Sustainability Improves Student Learning](#) initiative. Cultivate partners in social and economic justice, democracy, nonviolence, and peace.

3 CREATING AND DISTRIBUTING HIGH-QUALITY CONTENT.

2014–2025 Solicit support from key formal and informal leaders in K-12 curriculum development to provide rigorous EfS materials and professional development to teach sustainability as its own topic, as a context for teaching core subjects, and as a unifying theme for school- and district-wide projects (Church and Skelton, 2013). Provide EfS curriculum to support project-based learning, service learning, and extracurricular activities as well as to connect the built environment, food services, and facilities operations to learning outcomes. Examine exemplary statewide EfS and EfS-related plans (for example, [Washington State Environmental and Sustainability Literacy Plan](#), 2011, and [Wisconsin's Plan to Advance Education for Environmental Literacy and Sustainability in PK-12 Schools](#), 2011).

4 DEVELOPING MATERIALS FOR DIGITAL DELIVERY.

2014–2025 Utilize new technologies and modes of delivery, such as Massive Open Online Courses and intelligent adaptive learning programs with assessment tools. Find partners to develop digital EfS content that positively impacts student outcomes; develops communication, collaboration, and critical-thinking skills; and is responsive to underserved and special-needs students. Current examples include systems thinking simulations, ecological footprints and audits, and community mapping software.

EfS provides a powerful vision for preparing youth to construct more equitable societies, flourishing economies, and healthy environments. EfS offers students multiple ways of acquiring and applying knowledge and skills and offers teachers multiple ways of providing differentiated instruction to narrow the achievement gap with attention to college and career readiness (Church and Skelton, 2013). Ultimately, our children's success in our interconnected 21st-century world is best nurtured in school communities that celebrate diversity, commit to academic excellence, develop global competencies, and provide the inspiration and capacities to shape a more just, sustainable, and peaceful future for all.

EXEMPLAR

Tahoma School District's Commitment to Students: "Community Contributors and Complex Thinkers"

If you're a fourth grader in Washington State's [Tahoma School District](#) (8 schools; 7,500 students; 16 percent free/reduced lunch; 11 percent special needs), chances are a Tahoma High senior will teach you about sustainability with lessons he or she has created. Tahoma High has solar roof panels, an organic garden, water bottle stations, student Green Teams, and curricular requirements for learning about social, economic, and environmental systems. Elementary schools offer stewardship lessons on water conservation, waste reduction, and healthy eating. At Sacajawea Elementary, students care for their native plant garden. Middle schoolers take informed actions on storm water runoff, global warming, deforestation, and energy efficiency.

Tahoma School District's staff and students led a 10-year grassroots campaign to integrate sustainability concepts throughout social studies and science across all grades and achieved school board and district commitments to sustainability in curriculum and operations. The district has received numerous awards, including Green Leader from the [Office of the Superintendent of Public Schools in Washington](#). Tahoma High School was honored in 2013 with the U.S. Department of Education's Green Ribbon School award. Another Washington Green Ribbon honoree for excellence in sustainability is the [Kent School District](#) (42 schools; 26,600 students; 52 percent free/reduced lunch; 12 percent special needs).

Student Assessment

Jennifer Seydel, PhD, COO/CFO, Green Schools National Network and

School Designer, Midwest Region, Expeditionary Learning

Industry Leaders: **Robert Lenz**, Co-Founder & Chief Executive Officer,

Envision Education, and

Justin Wells, Associate Research Director for Performance Assessment,

The Stanford Center for Assessment, Learning, and Equity (SCALE)

An assessment model for sustainability education requires us to think beyond the current models of high-stakes tests. We must consider how to assess problem solving, systems thinking, deep conceptual understanding, creativity, and innovation. Likewise, we must consider how attitudes and values related to diversity of life, conservation, and preservation help us to make decisions and set priorities that will affect our future. We need to rethink the notion that some students will succeed in school, while others will inevitably fail, and create an assessment system that empowers school leaders, teachers, and students to plan and prepare for a sustainable future.

LEADERS SHOULD CREATE AN ASSESSMENT MODEL FOR EFS THAT EVALUATES THE FOLLOWING:

1 ASSESSMENT OF HIGHER-ORDER THINKING SKILLS AND ALIGNMENT TO STANDARDS.

This dimension of achievement asks students to demonstrate understanding, proficiency, and application of a clearly defined body of knowledge and skills related to sustainability that can be synthesized from existing standards: Common Core State Standards, the Next Generation Science Standards, and emerging national social science standards. The new standards call for the development of more complex and transferable skills than what has been expected in the past. PARCC and Smarter Balanced—the two Department of Education-funded, state-led consortia developing assessments aligned to the Common Core—have attempted to respond with an increase in performance assessments, but much remains untouched in terms of documenting the deeper learning and skills that emerge when students undertake research, analysis, and problem solving to address real-world issues and concerns.

Assessments could include a combination of mixed-method approaches, open-ended response items, and in-depth performance tasks that require students to solve problems, think critically, apply their learning to authentic sustainability issues and topics, and communicate clearly about the interactions of social, political, economic, and biogeochemical systems. These performance tasks could include research, experimentation, and evaluation; or, they could focus on modeling, design, and problem solving.

2 GLOBAL AND ECOLOGICAL CITIZENSHIP SKILLS.

This dimension of student achievement relates to noncognitive skills that support global citizenship: working appropriately and productively with others, leveraging the collective knowledge of groups when appropriate, bridging cultural differences, and using differing perspectives to increase innovation and work quality. These skills also enable students to learn from and work collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts and encourage understanding of other nations and cultures, including the use of non-English languages. Skills that support global and ecological citizenship result in treating the natural world as an integral part of the community, as expressed through conservation and stewardship of natural resources and of other organisms.

Assessments could include collaborative, community-based projects that address social justice concerns in the community and are reported via an oral, written, graphic, and multimedia presentation and a graduation portfolio that demonstrates the student's ability to collaborate and engage in effective interpersonal, global, and ecological relationships.

EXEMPLAR

Expeditionary Learning

Expeditionary Learning (EL) (www.elschools.org) is a growing provider of curriculum and professional development services to teachers and school leaders across the country. The EL model combines an interdisciplinary instructional approach with ongoing training and coaching for teachers and school leaders. The EL curriculum uses an experiential project-based methodology in which students conduct research projects to share with outside audiences. Learning expeditions—case-studies of academic topics—often bring together teachers from different subjects to coordinate shared projects. EL's network includes a total of 161 schools in 29 states and Washington, DC, serving 46,000 students and 4,000 teachers and leaders.

Expeditionary Learning schools include an expanded view of student achievement that takes into account three distinct dimensions: Mastery of Knowledge and Skills, Character and Engagement, and High-Quality Student Work. Successful EL schools achieve exemplary results in each of these dimensions and build assessment systems and practices that treat the dimensions of achievement as an interconnected whole. These assessment practices require students to continually assess and improve the quality of their work through the use of models, reflection, critique, rubrics, and work with experts. Students maintain a portfolio of work and report regularly to their parents and mentors through Student-Led Conferences and Passage Presentations. During these formal presentations, students are required to talk directly about the development of knowledge, skills, habits of work and learning, and how the projects they have completed have helped them to grow as citizen-scholars. Staff and students also engage in ongoing data inquiry and analysis (examining everything from patterns in student work to results from formal assessments), disaggregating data with students to recognize and address gaps in achievement. Students in EL schools are also assessed using traditional summative assessments. In schools that implement the EL model with fidelity, achievement scores significantly exceed state and district averages.

3

Critical Skills for Innovation.

This dimension of student achievement is assessed when students transfer their knowledge and skills to authentic projects that address issues and concerns of the 21st century. Students use knowledge and skills to solve complex problems and create a body of work that demonstrates innovation and creative application. Students learn to prioritize, plan, and organize themselves and others efficiently to achieve the goals of a specific project or problem. Students learn to handle multiple goals, tasks, and inputs, while understanding and adhering to constraints of time, resources, and systems.

Assessments would include extended performance tasks that use scenarios that relate to sustaining the balance of life on earth and that contribute to a real-world audience to replicate the ways in which these abilities will be used in college and career contexts. These projects may require students to work with local professionals and could include internships, partnerships, or workplace mentors.

2014–2018

Building on existing EfS thought leadership, continue to engage stakeholders in a rich conversation to clearly articulate what we expect students to know and be able to do. Monitor and learn from initiatives that are supporting deeper learning and rich performance assessments; for example, the [State of New Hampshire](#), [High Tech High](#), [Expeditionary Learning](#), [Hewlett Packard Deeper Learning Network](#), and the [New York Performance Standards Consortium](#).

2014–2030

Develop a national network of leaders and researchers who define and lead the transformation of the current assessment models to incorporate higher-order thinking skills, EfS Standards, Global and Ecological Citizenship skills, and Critical Skills for Innovation.

2030–2040

Define and implement a nationwide assessment model in middle and high schools that requires all high school graduates to demonstrate proficiency in higher-order thinking skills, EfS Standards, Global and Ecological Citizenship Skills, and Critical Skills for Innovation.

Take Action

When schools are designed with EfS at the core, they will successfully prepare students for the 21st century. To support curriculum and teaching focused on EfS, schools will require assessment systems grounded in sustainability that include performance assessments, and they will need portfolio systems that require students to undertake projects and create products that affect their community in positive ways.

Preservice Teacher Preparation

Victor Nolet, PhD, Professor, Woodring College of Education,
Western Washington University

Industry Leader: Faye Snodgress, Executive Director, Kappa Delta Pi
International Honor Society in Education

The vision of a sustainability-literate teacher in every classroom is viable and attainable, and reorienting preservice teacher education is a core strategy for making this vision a reality. By the year 2020, 3.4 million new teachers will be hired to work in public and private school classrooms in the United States (Hussar & Bailey, 2011), and most of those positions will be filled by newly certified teachers. Teacher education institutions are the primary entities responsible for the preparation of new teachers. About 90 percent, or 3 million, of those new teachers will be prepared at one of the approximately 1400 teacher-education institutions in the United States (American Association of Colleges for Teacher Education, 2011). Reorienting teacher preparation to address Education for Sustainability (EfS) is a long-term project in the United States. While there is reason for optimism, the complexity and scale of the challenges that lie ahead cannot be underestimated. Today, EfS is almost completely absent from teacher education in the United States. A National Council for Science and the Environment survey of U.S. four-year colleges and universities (Vincent, Bunn & Stevens, 2013) identified 759 sustainability-oriented academic programs at 350 colleges and universities, but aside from a handful of exceptions, U.S. colleges of education do not offer programs that address sustainability.

REORIENTING PRESERVICE TEACHER EDUCATION/PREPAREDNESS WILL REQUIRE EMBRACING THE FOLLOWING CHALLENGES AND OPPORTUNITIES:

- Challenge: The teacher education curriculum is already overloaded as a result of state-mandated content and teacher assessment requirements. Many teacher education faculty view EfS as an add-on to the already overfull curriculum. Opportunity: demonstrate the ways in which EfS supports curriculum integration and renewal and new strategies for learner-centered instruction.
- Challenge: The economic recession of 2008–2009 took a

considerable toll on higher education, particularly public universities. Continued budgetary constraints limit the ability and willingness of teacher education programs to innovate or launch new initiatives focusing on EfS. Opportunity: show how EfS can help schools build on existing strengths and capacities to move learning forward for all children.

- Challenge: Few state approval or national accreditation standards address sustainability. Opportunity: partner with the accreditation bodies and professional organizations to integrate sustainability into the standards.
- Challenge: While there is a considerable body of evidence from the international community that supports the efficacy of education for sustainability (Tilbury, 2011), there is a paucity of credible research linking education for sustainability with student learning outcomes in the United States. Additional research evidence is needed that shows education for sustainability can address the needs of poor and minority students by closing achievement gaps, reducing drop-out rates, or improving post high school outcomes. Opportunity: develop a robust and meaningful research agenda around EfS in order to access funding and partner with higher education researchers and K-12 practitioners.

The work of reorienting teacher education to address education for sustainability will require a multi-pronged strategy that acknowledges the complex political, economic, and social context of teacher education in the United States (Nolet, 2013). The following recommendations outline that strategy:

1 ESTABLISH THE U.S. TEACHER EDUCATION FOR SUSTAINABLE DEVELOPMENT (USTESD) NETWORK.

By JUNE 2014 USTESD Network will serve as a national professional organization advocating for reorientation of teacher education to address sustainability in the U.S. Once

established, this national network will work with policymakers, teacher education member organizations, and individual teacher education programs to establish realistic goals and timelines to accomplish the remaining recommendations by 2024.

2 FOCUS ON IMPROVING EDUCATION OUTCOMES FOR ALL STUDENTS.

Education for sustainability must contribute to the ongoing mission of ensuring that all children have access to well-prepared teachers, adequate school facilities, and effective curriculum resources, including technology (Nolet, 2013). Approaches that support this mission have a greater likelihood of success.

3 EMBED EFS INTO THE PROCESS OF LEARNING TO BE A TEACHER.

Sustainability topics and big ideas must be an integral part of the curriculum. Preservice teachers should have opportunities to apply a sustainability lens, work with sustainability-related curriculum materials, and complete field experiences in settings where effective Efs practices are being implemented. Exemplary models and methods for such education and training should be developed, evaluated, and disseminated.

4 SUPPORT PRESERVICE TEACHER PREPARATION WITH EXISTING STRUCTURES AND RESOURCES.

Existing state licensure and national accreditation standards must include sustainability-related competencies and expectations for all teachers. Teacher education programs should develop partnerships with non-formal education and non-profit agencies to develop community-based opportunities for teachers to learn and practice education for sustainability-related knowledge and skills.

5 ENGAGE INDIVIDUALS WITH SUSTAINABILITY AT ALL LEVELS OF THE TEACHER EDUCATION ENTERPRISE.

Education deans must lead efforts to include sustainability language in mission/vision statements, conceptual frameworks, and tenure and promotion processes. Teacher education faculty should incorporate sustainability into assignments or course syllabi. Faculty also should be encouraged to address sustainability in research and scholarly writing.

EXEMPLAR

Kappa Delta Pi

"The ongoing collaboration of educational organizations benefits teachers, administrators, and teacher educators. When all of these groups work together to emphasize sustainability in preservice teacher preparation and induction, the end result of knowledgeable, effective teachers can be attained." Faye Snodgress, Executive Director, Kappa Delta Pi.

Professional associations play an active role in supporting the work and professional growth of preservice and practicing teachers. To advance the understanding and incorporation of sustainability content and pedagogy among its 40,000 members, Kappa Delta Pi (KDP) regularly publishes sustainability-related articles in its quarterly journals, offers webinars that are accessible to administrators and to both pre-service and practicing educators, and posts helpful resources and articles on its website. Through blogs and online discussions, preservice and practicing educators in this international honor society can help one another with the practical issues of teaching sustainability.

KDP looks for local and national opportunities to provide educators with access to sustainability-related topics and strategies. With education for sustainable development as a conference theme, KDP's 49th Biennial Convocation in 2013 featured a keynote address by a noted Efs scholar, multiple workshops addressing Efs, and exhibits by Efs-related organizations. Additionally, Efs programming was embedded in KDP's Literacy Alive! national service project for use by KDP students and practitioners in their local communities, with selected projects receiving financial support.

Additional Information

Readers seeking additional information about the state of education for sustainability in teacher education in the United States should refer to "Reorienting Teacher Education to Address Sustainability: The U.S. Context." This white paper can be downloaded from Kappa Delta Pi at kdp.org/initiatives/index.php.

Professional Development

Jennifer Cirillo, Director of Professional Development, Shelburne Farms

Industry Leader: Stephanie Hirsh, Executive Director, Learning Forward

As we work to change the status quo in schools, we must engage all stakeholders in transformative learning and realign the purpose of education toward a sustainable future. Educators are at the heart of this work, and professional learning in Education for Sustainability (EfS) is necessary in order to educate for a healthier and more just future. What does that learning look like, and how is it different from what most educators experience? Research suggests that while most teachers engage in professional learning, it is neither effective nor sufficient (Darling-Hammond et al. 2009). If we wish to graduate students with the skills, knowledge, and attitudes necessary to meet the challenges and opportunities of the future, professional learning must be designed toward this outcome. The goals of professional learning in EfS include holding high standards for all students, increasing student achievement and teacher effectiveness, and building competence in the habits of mind (i.e., characteristics displayed when an individual engages in developing understanding) of resilient and sustainability-focused thinkers. Learning Forward, a national leader in professional learning, has developed standards that define elements of professional learning, which could be aligned with EfS professional development strategies (Learning Forward, 2014). EfS professional development providers should utilize the Learning Forward standards to pursue the following recommendations for professional learning with a lens of sustainability.

1 LEARNING DESIGNS AND IMPLEMENTATION.

By 2017 Leaders in the field of professional development should create guidance for creating integrative, holistic professional learning methodologies and materials grounded in EfS. Transformative professional learning is necessary to help educators understand and implement the practices that are required for a sustainable future. Professional development providers, K-12 associations, and state education departments should take a whole-system approach, engaging stakeholders and

linking multiple educational initiatives under the umbrella of sustainability. This might include campus ecology and culture, curriculum development, cafeteria practices, and community relationships. Knowing where we want to go—a sustainable future—will help us better design professional learning experiences. These opportunities should model pedagogical approaches of EfS such as place-, project-, and problem-based learning and service learning. We want teachers to create relevant, focused, challenging, sustained, significant learning experiences for students; therefore, professional development providers should provide the same experiences for teachers. Research suggests that for professional learning to be effective, teachers need an average of 49 hours per year to ensure substantial impact on teaching practices (Wei, Darling-Hammond, and Adamson, 2010). More often than not, teachers engage in one-day workshops which have little to no effect on student learning (Pianta, 2011). Follow-up or embedded support and assessment of short- and long-term impact helps teachers move beyond what is often referred to as the “implementation dip” where they struggle with a new practice and don’t necessarily see immediate changes in student achievement (Center for Public Education, 2013).

2 PROFESSIONAL LEARNING COMMUNITIES (PLC).

By 2016 Teachers, principals, and district leaders should extend current PLCs that model reflective practice, support collaborative learning, and develop authentic communities of learning, inquiry, and practice in schools to include a sustainability-related lens. Such an orientation can expose teachers to pedagogical approaches and related research and support them as they begin to implement EfS strategies in their classrooms (Center for Public Education, 2013). Professional development associations and technical assistance providers should link their tools and resources to sustainability efforts and provide case studies of how sustainability-oriented PLCs function.

3

LEADERSHIP AND RESOURCES.

By 2020

The EfS community should work with school districts to provide educators with access to professional learning coaches fluent in EfS. EfS professional learning must be designed to allow for teacher voice, leadership, agency, and wellness. States and districts have a responsibility to create the conditions for teachers to inquire, take initiative, implement change, and reflect. Like most professional learning, the greatest and most needed resources are time and support. Well-prepared and supported professional learning coaches who possess deep understanding of EfS can help educators at all levels integrate EfS throughout the learning agenda.

4

OUTCOMES AND DATA.

By 2016

Define performance indicators for measuring the effectiveness of EfS-aligned professional learning. The effectiveness of professional learning is measured according to its impact on educator practice and student results. Potential EfS impact measures may include

- Educator practice profiles that indicate use of EfS pedagogies (for example, project based, service learning), integrative teaching, self-assessment strategies, and use of sustainability and community resources (for example, social, historical, environmental, places or organizations outside the classroom);
- Formative and summative assessments of students' understanding of "big ideas" of sustainability cross-cutting concepts in the Next Generation Science Standards that can provide a clear connection to sustainability habits of mind;
- School systems data such as campus sustainability and school culture practices, such as composting, energy use, student behavior, attendance, and student agency measures.

Take Action

1. Understand the purpose of professional learning and what makes it effective. Know that change takes time and support your schools through initial assessment efforts that may not reflect the learning that is truly happening.
2. Vote and support school budgets or school schedules that provide additional time for teacher collaboration and professional learning. In addition, support sustainability coaching and coordinator positions at the district or school level.

As we rethink the purposes of education, we can also think critically about the outcomes. Outcomes of an EfS approach are a healthier and more just world. How we achieve those outcomes is not always obvious, and understandings of appropriate methods are not always shared. In general, professional learning in EfS is oriented toward educator competencies in creating a sustainable future—the knowledge, skills, and attitudes required to produce the same competencies with students. Learning opportunities should build educators' conceptual understanding of sustainability and associated "big ideas," help educators master pedagogical approaches that are central to EfS, and build collegial inquiry, evaluation, and reflection.

EXEMPLAR

Children's Environmental Literacy Foundation

The Children's Environmental Literacy Foundation (CELF) is a 501c3 founded in 2003 to make EfS an integral part of every school's curricula and culture to prepare current and future students to be active and responsible citizens of a sustainable world. Based in New York, CELF has worked with 2,800 schools and 7,500 teachers to help integrate sustainability into the curriculum, practices, and culture. They exemplify the promising practices and standards in professional learning by building strategic relationships and providing ongoing coaching to transform schools. As a Clinton Global Initiative Commitment to Action, they are working with New York City public schools to realign schools' goals and initiatives with a lens of sustainability. CELF provides professional learning opportunities, mentoring from experts in the field of education and EfS, and close collaboration with teacher-leaders and principals. Founder and Director Katie Ginsberg says, "K-12 education is our single greatest opportunity to make the large-scale change necessary to address the complex issues of the future. We believe collaborative partnerships and learning with teachers at the center are essential to this work" (Ginsberg, 2013).

3. Advocate for EfS as a core competency for professionals in the school. Ensure that educators get the support they need to develop requisite skills and knowledge.
4. Consider offering your expertise in sustainability to schools. Do you keep bees, write grants, or facilitate meetings? Think about what skills you might contribute to your school to support sustainability efforts.

Teacher Evaluation

Paul Bocko, Adjunct Faculty and Program Director, Antioch University New England

Industry Leader: Linda Darling-Hammond, Charles Ducommun Professor of Education and Co-Director, School Redesign Network, Stanford University Graduate School of Education

LEVERAGE POINT: THE SHIFTING LANDSCAPE OF TEACHER EVALUATION

Teacher evaluation is transforming across the country. Since 2009, the number of states requiring annual teacher evaluations has risen from 15 to 27 plus the District of Columbia (National Council for Teacher Quality, 2013). The number of states requiring evaluations (not all of which are annual) to include objective measures of student achievement has skyrocketed from 15 to 40 plus the District of Columbia (National Council for Teacher Quality, 2013). While 20 of these states weigh student achievement in the form of standardized test scores as the “preponderant criterion” (National Council for Teacher Quality, 2013), there are states that utilize a much more comprehensive picture of a teacher to determine an evaluative rating. Heavily weighting evaluation on a high-stakes test in a particular area and at a particular time, while neglecting to account for other variables, leads to a narrow representation of teacher skill. Effective teaching goes far beyond a singular focus on academics or test scores (Killion and Hirsh, 2011; Darling-Hammond et al., 2012). Massachusetts’s rubric describing effective teaching, for example, consists of four standards: (1) Curriculum, Planning, and Assessment; (2) Teaching All Students; (3) Family and Community Engagement; and (4) Professional Culture. To judge teacher performance, a constellation of evidence is collected and submitted: development of and follow-through on measurable goals, frequent unannounced classroom observations, submission of artifacts as evidence of high-quality teaching, and collection of a student impact rating based on multiple years of multiple assessments for individual teachers.

The ongoing transformation of teacher evaluation presents an opportunity to integrate a focus on Education for Sustainability (EfS). Reaching basic

understanding of EfS can be a complex endeavor for teachers and students alike. There are a number of pathways to attend to how we educate for sustainability using existing standards of effective teaching. Here’s an EfS-aligned example that follows Massachusetts’s four standards for evaluating educators: (1) instructional performance toward existing EfS and EfS-related curriculum standards; (2) guidance for all students to understand and apply these concepts; (3) effective communication with families about EfS and partnering with community organizations to complete sustainability projects while addressing learning standards; and (4) participation in an equitable and collaborative professional culture. The aspect of teacher performance that stands out as the most important evaluative criterion is: teachers must be evaluated for their ability to guide students to solve complex problems and integrate the 3 Es of sustainability.

Current educational literature is replete with references to the importance of guiding students through problem solving. For example, Dr. Mike Schmoker, author and former teacher and administrator, calls for going “back to the future” and, in part, promoting what he calls “intellectual thinking skills.” He encourages engaging students in “argument, problem solving, reconciling opposing views, and drawing one’s own conclusions” (Schmoker, 2011). Learning should be redirected toward encouraging students to recognize and solve problems (Wiggins and McTighe 2007). Solving problems with no obvious answers is inherent to integrating EfS with classroom instruction; this is the key leverage point to teacher evaluation and EfS. We can capitalize on the shifting landscape of educator evaluation and, if we continue to develop, promote, and adopt EfS learning standards in all states and strongly emphasize evaluation of teachers as guides and coaches for problem solving, EfS can be central to these efforts.

What are the key steps to evaluating teachers on their ability to guide students to solve complex problems and balance the intersection of the 3 Es of sustainability?

- 1** **2014** Publicly recognize states that have adopted EfS learning standards, underscoring how they evaluate teachers according to those standards. Currently, those states are Oregon, Washington, and Vermont.
- 2** **Beginning Now** Administrators should begin immediately establishing a method for assessing teachers' ability to guide students in developing the skill of solving complex problems with no obvious answer.
- 3** **By 2016** A working group should complete a comprehensive inventory and dissemination of existing EfS-related standards within the Common Core State Standards and Next Generation Science Standards.
- 4** **By 2018** A working group should propose EfS-aligned teacher evaluation guidelines for states to consider and adopt.
- 5** **By 2030** All state boards of education should adopt EfS curriculum standards on which teachers will be evaluated and integrate EfS standards in teacher performance rubrics. Teacher standards already exist to make this goal viable. Massachusetts's description of a proficient teacher in the category of Rigorous Standards-Based Unit Design reads, "Designs units of instruction with measurable outcomes and challenging tasks requiring higher-order thinking skills that enable students to learn the knowledge and skills defined in state standards/local curricula" (Massachusetts Department of Elementary and Secondary Education, 2012).
- 6** **By 2040** As noted in other sections of this action plan, EfS should be integrated as core content in teacher and school leader preparation and certification programs.



EXEMPLAR

The Cloud Institute

The Cloud Institute, with its mission "to ensure the viability of sustainable communities by leveraging changes in PreK-12 school systems," supports the development and evaluation of EfS teachers. Institute consultants work with school administrators and teachers to plan, implement, and assess EfS units. They observe instruction, look at student work, and provide targeted feedback to teachers in support of EfS. The Institute works with Cherry Hill Public Schools in New Jersey, a district that approved a resolution in November 2012 to educate for sustainability. Recently, Institute consultants collaborated with eighth grade teachers on a unit of study built around the book *Empty* by Suzanne Weyn, a story about the end of oil and how people navigate what comes next. Students learned about mental models (ways of thinking that drive behavior) that limit our thinking and looked for examples of these models in the book's characters. Upon completion of the unit, the teachers received feedback from the consultants. Specific advice included removing one of the mental models from the lesson in favor of others more aligned to the text and grouping students to discuss answers before taking a performance assessment. These are common pieces of feedback for teachers and, in this case, the type needed to deepen understanding of mental models. If students understand limiting mental models, they can avoid them as pitfalls while engaging in problem solving now and in the future. "If students understand limiting mental models, they can avoid them as pitfalls while engaging in problem solving now and in the future," says Jaimie Cloud, Founder and President of The Cloud Institute. (Cloud, Jaimie. Telephone interview, 8 Nov, 2013)

Leadership

Lisa A. W. Kensler, EdD, Associate Professor, Auburn University

Cynthia L. Uline, PhD, Professor, San Diego State University, and Director, National Center for the 21st Century Schoolhouse

Industry Leader: ***Michelle Young**, Executive Director, University Council of Educational Administration (UCEA)*

GATEKEEPERS OF CHANGE

Educational leadership is critical to realizing our shared vision that all students graduate educated for a sustainable future by 2040. The Education for Sustainability (EfS) vision demands significant change throughout our educational system. Both formal and informal leaders must join forces to achieve such a transformation. Formal school leaders, including school district superintendents, school principals, and other district-level administrators, play especially important roles because they serve as gatekeepers of change: they can either facilitate or impede change efforts. Trailblazing school administrators such as Superintendent Jonathan Raymond of Sacramento City Unified School District (featured as an exemplar in this chapter) are leading the way. However, the general lack of awareness about EfS among school administrators presents a major barrier to expanding EfS initiatives. Currently, there are very few opportunities for aspiring or practicing school leaders to learn about EfS and its capacity to improve teaching and learning for the 21st century. Thus, the key recommendations in this chapter focus on two primary strategies for (1) raising awareness of EfS among aspiring and practicing school administrators, and (2) continuing to develop and expand the leadership capacity for EfS throughout schools and districts.

CULTIVATING EFS AWARENESS AND LEADERSHIP CAPACITY

Aspiring and practicing school leaders need to hear the EfS message from all angles. There are many opportunities for bringing EfS to the forefront of school leadership preparation and practice. The following recommendations ask each stakeholder group to influence educational leaders by raising awareness about and building leadership capacity for EfS. Every member of the larger school community is encouraged to take action to promote EfS among aspiring and practicing school leaders.

1

STATE-LEVEL EDUCATION POLICY LEADERS.

By 2015

State-level education policy leaders should include EfS in the standards and expectations for school and district leaders. A systemic approach to supporting green initiatives and EfS requires alignment among key policy levers, including leadership standards, licensure requirements, preparation, program approval, and leadership evaluation systems. A UCEA working group, led by Dr. Michelle Young, should draft recommended EfS-related content for inclusion in the next revision of the Council of Chief State School Officers' (CCSSO) Educational Leadership Policy Standards, or ISLLC 2008 standards, by 2015. The ISLLC standards drive the content taught in most licensure programs for school administrators and inform the work of this important stakeholder group.

2

EDUCATIONAL LEADERSHIP/SCHOOL ADMINISTRATOR PREPARATION AND LICENSURE PROGRAM PROVIDERS.

2015-2018

Educational leadership/school administrator preparation and licensure program providers must begin integrating core content related to EfS and green school practices into their curricula so that the next generations of school and district administrators are able to lead with deep awareness and understanding of the powerful educational opportunities presented by EfS. Prompted by revised ISLLC standards, emerging research (Kensler, 2012), and a forthcoming book by the authors of this chapter, programs could be offering this content by 2018.

3

SCHOOL BOARD MEMBERS.

Beginning Now

School board members should review and revise school district policy for alignment with a vision and goals for EfS, green school practices, and emerging state policies. NJ Learns, a statewide program developed by The Cloud Institute in New Jersey, should serve as a model.

4

SCHOOL DISTRICT SUPERINTENDENTS.

2015-2023 School district superintendents should hire at least one sustainability professional to lead, manage, and/or coordinate whole school/district sustainability and EfS initiatives. Following the emerging trend, we predict that school district-level sustainability professionals will be common members of district leadership teams throughout the United States by 2023.

5

DISTRICT AND SCHOOL ADMINISTRATORS.

By 2015 District and school administrators should engage and empower student, teacher, staff, and community representatives on EfS-focused district- and school-level leadership teams. The leadership teams should facilitate the development of a shared vision for EfS, engaging community partnerships for EfS and related goals.

6

SUSTAINABILITY PROFESSIONALS/ CHAMPIONS.

2015 Sustainability professionals/champions should take the EfS message—via conference presentations, publications, and online content—to the professional organizations associated with school administration (National School Boards Association, American Association of School Administrators, National Association of Secondary School Principals, National Association of Elementary School Principals, Council of Chief State School Officers, and others). We propose that online course content and/or certification/badge programs be made available to school administrators. The U.S. Green Building Council's Center for Green Schools' Green Classroom Professional Certificate program provides a model for an introductory program.



EXEMPLAR

Leading for 21st-Century Innovation: Jonathan P. Raymond, Sacramento City Unified School District Superintendent (2009-2013)

Superintendent Jonathan Raymond did not come to Sacramento with plans to "green" the district. Raymond came to increase student performance, close achievement gaps, and ensure that students graduate prepared for college and careers in the 21st century. He began his tenure by visiting schools and classrooms across the district. He listened, observed, and asked questions. Beyond achievement in core academic content areas, he looked for opportunities to address students' health and wellness, as well as their social and emotional learning. He was interested in building students' sense of individual and social responsibility.

Raymond engaged internal and community stakeholders in developing a strategic plan, tying his own evaluation to relevant performance metrics that would assess progress. He created policy from the top at the same time he was rallying excitement from the bottom. Under Superintendent Raymond's leadership, SCUSD created and implemented green policies and practices, resulting in reductions in energy and resource consumption, adoption of healthier cafeteria menu options and green cleaning practices, and integration of the district's sustainability initiatives into active learning opportunities that teach students to think critically, solve real-world problems, and become eco-leaders. Along the way, Superintendent Raymond has empowered school and district staff, parents, and community partners in the work of edu-cating the whole child.

In Superintendent Raymond's words, "At Sacramento City Unified School District, we are committed to providing a quality, well-rounded education for every student in every classroom so they can meet the challenges of our rapidly evolving 21st-century world. To get there, we are rethinking our practices, policies, and programs. We are innovating in accordance with the latest research. We are asking ourselves how we can accelerate learning and ignite a lifelong passion for the same. At the heart of our work is a single, simple promise to our community: We will make every decision based on the best interests of our children. We will put children first, providing them the knowledge, habits, and skills that can only come from a rigorous, relevant, and well-rounded education."

Policy

Allen Cooper, Director of State and Local Education Advocacy,

National Wildlife Federation

James Elder, Director, Campaign for Environmental Literacy

Perhaps more than any other factor, existing school, district, and state education policies hinder the adoption of EfS into the classroom, and policy change is one of the few ways to effectively address the problem of scale faced by so many EfS programs and initiatives. The rules of a system are often based on policy, and changing the rules of a system—for example, by integrating EfS into the rules related to graduation requirements, learning standards and curriculum, building standards, and budgets—is a major leverage point in changing how a system operates.

An EfS policy framework offers the opportunity to supplement and integrate at least three existing K-12 initiatives. Environmental education/environmental literacy currently have widespread recognition within K-12 education, an articulated policy framework, existing campaigns, and, to some extent, support through existing state and national legislation (see examples below). Healthy schools policy—with goals of promoting physical activity, good nutrition, and zero exposure to toxics—is another existing body of policy that should be embraced by EfS stakeholders. The third relevant category of existing policy relates to green school facility design, construction, operations, and finance. The EfS community has the opportunity to embrace these policy frameworks, as outlined in the [U.S. Department of Education's Green Ribbon Schools](#) awards program, while adding additional content related to economy and equity. K-12 EfS stakeholders also can learn from the postsecondary realm, which leads the way in sustainability-related policies (see the [Higher Education Sustainability Act](#) and the [American College and University Presidents' Climate Commitment](#) as examples), and can trailblaze a more comprehensive, whole-system approach to sustainability policy.

Governance of public education institutions is complex, and relevant stakeholders and policy opportunities are numerous. State legislatures and boards of education control a greater number of policy levers than does the

federal government through their ownership of learning standards, curricula guidelines, teacher preparation standards, building standards, and funding levels. In recent years, there has been a higher level of voluntary coordination among states on education policy through state-driven learning standards initiatives such as the [Common Core](#) and the [Next Generation Science Standards](#) than ever before. The federal government wields some influence over local public education policy by attaching conditions to funding sources such as the Elementary and Secondary Education Act and the Race to the Top contest, as well as through the Department of Education's ability to call attention to exemplary programs through initiatives such as Green Ribbon Schools. EfS stakeholders will need to take a systems approach to policy advocacy efforts by pursuing advocacy campaigns at a level that is both significant and achievable.

We suggest that the following recommendations be undertaken in the next five years, with the goal that 35 states have adopted an EfS graduation requirement, comprehensive healthy schools policy, and green school facility building and renovation requirements by 2025.

1 ADVOCATE FOR AND BUILD ON EXISTING POLICY FRAMEWORKS.

Integrate existing environmental education and literacy, healthy schools, and green school facility policies into a comprehensive EfS policy agenda. Key policy frameworks and models include the federal [No Child Left Inside Act](#) (NCLI) and the [Ocean, Coastal, and Watershed Education Act](#); [Maryland's Environmental Literacy graduation requirement](#); [Washington's, California's, and Wisconsin's](#) environmental education and sustainability learning standards and curricula; [Washington, DC's Healthy Schools Act](#); [green school construction and renovation requirements](#); [green school financing mechanisms](#), [energy performance and water use benchmarks](#); and green transportation policies and programs such as [EPA's School Siting Guidelines](#).

2 SECURE ADEQUATE IMPLEMENTATION FUNDING.

Unfunded plans, curricula, and building standards are seldom implemented, so adequate funding must be a measure of success for any policy advocacy campaign. Funding can be secured at the district, state, and federal levels, either by securing new funding or by capturing or redirecting existing funding streams—for instance, by securing adoption of an EfS graduation requirement which then becomes a goal of existing curriculum development, in-service, and other funding streams, or by securing a green school construction requirement, which then harnesses all existing school construction funds.

3 PURSUE POLICY CHANGES AT MULTIPLE LEVELS, TAKING ADVANTAGE OF THE BEST OPPORTUNITIES.

A whole-systems approach to policy advocacy recommends pursuing policy changes at the district level for model programming (the Washington, DC, Healthy Schools Act); at the federal level for exemplary-program recognition (Green Ribbon Schools) and to incentivize EfS (NCLI); and at the state level to establish graduation requirements, teacher training, curriculum and learning standards, and green building standards and funding mechanisms. An effective advocacy strategy will consider all of these arenas for policy change and pursue the ones that are timely, significant, and achievable.

Key players in seeing these recommendations are implemented are the U.S. Department of Education, U.S. Congress, and governors; state departments

of education, state legislators, mainstream education professional associations and unions; parent and community advocates; and business leaders.



The Office of Congressman John Sarbanes

Take Action

Contact your governor, state legislators, school district superintendent, and board members to ask them to support

- a sustainability/environmental literacy graduation requirement
- zero-toxics policy and indoor air-quality standards for schools
- green building requirements for new and renovated schools
- a goal of “net zero” environmental impact for schools

EXEMPLAR

California’s Education and Environment Initiative

One of the more promising systemic change efforts is California’s Education and Environment Initiative (EEI), a \$15+ million partnership between the California Environmental Protection Agency, State Board of Education, State Department of Education, and the Office of the Governor’s Secretary for Education initiated by the NGO community. The [EEI curriculum](#), comprising 85 instructional units that teach science and history social science academic standards, is expected to bring environmental education to 6 million students in the classrooms of 1,000 California school districts by using the environment as a context for standards-based instruction.

While sustainability is not in the title of the initiative, most, if not all, of the core concepts of sustainability are embedded in the model curriculum itself. Gerald Lieberman, the principal consultant who designed the model curriculum, notes: “The primary key to the success of EEI was that the EEI team paid close attention to the needs of all of the different stakeholder groups, but especially to the needs of the formal education system. It took some time, but we eventually convinced the state Department of Education and state Board of Education that we understood their needs and goals. We spoke to them in their language about how EEI would help address their ongoing issues such as academic achievement, student engagement and retention, and promoting STEM education. As a result, we were able to truly partner, rather than battle, with the California education system.” (G. Lieberman, e-mail interview, September 16, 2013)

Economic Drivers

Todd Cohen, Director, The SEED Center, an initiative of the American Association of Community Colleges

Industry Leader: John Mandyck, chief sustainability officer, UTC Building & Industrial Systems

Recent signs indicate that the clean economy, and the green jobs that would stem from it, is emerging. Between 2000 and 2011, venture capital investments and green goods became significantly cheaper. In addition, 37 states have mobilized through renewable portfolio standards, and consumers are growing increasingly concerned about a changing climate. As these factors converge, a viable clean economy—with significant job growth—will be within reach. This macroeconomic shift toward “green” will likely have an impact on nearly every profession, requiring all workers to obtain some new set of skills. More skilled workers will be needed, for example, to design, manufacture, install, and repair technologies such as alternative-fueled vehicles and geothermal energy systems. Workers in fields such as healthcare, accounting, IT, and more will need to think and perform tasks differently as their industries become more mindful of their impact on the environment.

At United Technologies Corp. (UTC), a diversified company that provides a broad range of high-tech products and services to the global building and aerospace industries and employs 218,000 people globally, “sustainability is not only part of our culture but also drives business decisions from product design to material selection to factory operations,” says John Mandyck, chief sustainability officer, UTC Building & Industrial Systems. “Hiring candidates who possess competitive technical job skills and values aligned with UTC’s company culture of sustainability proves beneficial for the company’s goals, as well as our employees’ satisfaction and commitment” (J. Mandyck, telephone interview, October 25, 2013).

A strong clean economy will depend on an educated and skilled workforce, and that begins at the K-12 level.

An EFS approach will graduate more students from high school who are prepared for college and for careers that contribute to sustainable systems.

To maximize the alignment of formal education with our country’s labor market needs and with students’ career and education goals, U.S. K-12 school systems can begin immediately implementing the following strategies:

1 ENGAGE INDUSTRY.

Strengthen the connection between employers and schools to provide students with exposure to a variety of real-world opportunities in clean economy-related fields. Work-based learning opportunities such as internships, apprenticeships, field trips, and job shadowing should be core instructional strategies within EFS, especially in secondary schools. Since 2011, more than 3,000 UTC employee volunteers have imparted sustainability lessons in schools globally; in 2013, employees reached over 450 children on Green Apple Day of Service alone, leaving a lasting mark on the schools they reached. Another industry engagement strategy, teacher externship programs, provides instructors with direct experience in clean-economy fields and thereby enriches teaching and makes the curriculum more relevant to what industry desires. As schools pursue these strategies, they should start with alliances with their local chambers of commerce and workforce investment boards to ensure more impactful and expansive industry engagement.

2 EXPOSE STUDENTS TO RELEVANT CLEAN ECONOMY CAREER AND PATHWAY INFORMATION.

Encourage career and technical programs and schools to adopt sustainability curriculum guidance already developed nationally for their target industry career clusters. This guidance includes knowledge and skills statements, performance elements, and sample indicators for six career pathways, including STEM. Work with organizations such as the Association for Career

and Technical Education to facilitate alignment of these skills statements with nationally accepted EfS learning standards.

All schools should take advantage of a growing number of federal government, state (for example, Minnesota, Oregon), and industry online resources that allow students to explore clean economy careers and review earning potential and education requirements. The U.S. Department of Energy's Solar Career Map highlights pathways within the solar industry, for example. Students can use the tool to see how a STEM education at a K–12 level, for instance, might prepare them for a variety of solar energy systems designer and engineering careers. These tools should be integrated into instruction and student counseling, thus serving as a foundation for individualized student career planning.

3 INTEGRATE ENTREPRENEURSHIP EDUCATION.

Because the clean economy itself is still in its infancy, EfS integration offers students the opportunity to shape this burgeoning field, discovering new technologies and even creating new jobs themselves. Entrepreneurship education—opportunity-oriented thinking, stories, and materials—must be a component of EfS, as it serves to motivate and prepare students to drive innovation in this field. As an example, Hilltop Elementary in West Virginia has a nationally recognized plastics recycling program and donates food scraps to local chicken and pig farmers. A group of students won a national award for a business plan that facilitates profit-sharing among schools, solid waste companies, and recycling centers.

4 FOCUS ON PUBLIC AND CONSUMER BEHAVIOR CHANGE TO DRIVE MARKET DEMAND.

One of the most impactful ways we can continue to grow the clean economy is fostering greater demand in the marketplace through consumer behavior change. When more homeowners, business owners, investors, and policymakers embrace sustainable choices, we will see green job growth expand. Investing in the development of critical thinking skills, as EfS does, supports the development of students as change agents. EfS develops competencies such as mediating, challenging the status quo (Svanström, 2008), framing an issue, and speaking persuasively, while also developing content knowledge around topics students care about, such as resource conservation, global markets, and social equity. School district/community partnerships can utilize resources, such as communications toolkits from ICLEI, and adapt practices from exemplar initiatives such as those of CT Green Schools.

EXEMPLAR

Virginia Beach City Public Schools

In Virginia Beach City Public Schools' (VBCPS) Career and Technical Education (CTE) program, sustainability offers a unique context in which to promote the kind of learning that will prepare students for life and work in the 21st century. Sustainability issues are deemed very important in virtually all career pathways, from construction to business management courses, and the district has developed initiatives and partnerships to embed sustainable thinking across its CTE program.

VBCPS is the first school division in the country to offer a sustainability certification for CTE students. Developed in partnership with the Green Education Foundation, the self-paced, 15-hour online course was designed with a strong balance between environmental, social, and economic systems, and culminates with a third-party certification exam. To date, over 130 CTE students have earned the credential.

"It is imperative that today's students have a deep working knowledge of sustainability systems thinking as they prepare for careers and lives in the 21st century," says Dr. Patrick Konopnicki, Director of CTE at VBCPS (P. Konopnicki, email interview, December 14, 2013). As such, VBCPS CTE partnered with the Virginia Economic Development Department to include sustainability as a certified skill. New for 2014, the CTE-driven STEM Robotics Challenge, which involves 60 VBCPS schools and dozens of companies, will feature a sustainability theme.

Research

Craig Shealy, PhD, Professor of Graduate Psychology, James Madison University, and Executive Director, International Beliefs and Values Institute

Industry Leader: Thomas Doherty, PsyD, President, American Psychological Association, Division 34: Society for Environmental, Population, and Conservation Psychology

EFS RESEARCH: WHY IT MATTERS

Evidence suggests that Education for Sustainability (EfS) may enhance the effectiveness of teaching, training, and learning in some cases (for example, Ardoin, Clark, & Kelsey, 2013; Davis, 2009; EfS Research and Results, 2013; Kelly, Holt, Patel, & Nolet, *in press*). However, to demonstrate the full potential and differential impact of EfS in a comprehensive manner, a robust research-to-practice agenda must be developed and pursued over the short and long term. Why? Because without rigorous models and methods of research and assessment, there simply is no way to (1) substantiate claims about the degree to which EfS is effective in terms of enhancing teaching, training, and learning; (2) ascertain which approaches to EfS are the most and least effective, for whom, and under what circumstances; (3) demonstrate the differential impact of EfS relative to other approaches or techniques for improving educational outcomes; (4) understand whether and how interactions between trainers, teachers, and learners may better explain learning outcome differences versus EfS alone; and (5) determine how the data we obtain may help us refine EfS programs or approaches in order to improve teaching, training, and learning outcomes and to contribute to more sustainable communities over the long term. Only through high-quality research and results will we be able to make a convincing case to faculty, students, parents, funders, administrators, policymakers, and the public at large that EfS is truly worthy of our time, effort, and resources (for example, Almerico et al., 2011; Baltensperger et al., 2013; Coffman, Hopkins and Ali, 2009; Jung and Rhodes, 2008; Kelly et al., *in press*; McKeown and Nolet, 2013; Mezirow and Taylor, 2009; Shealy, *in press*; Welch et al., 2010).

As Dr. Thomas Doherty, President of the American Psychological Association's Division 34 (Environmental, Population, and Conservation Psychology) observes:

The idea of Education for Sustainability holds within it the opportunity to link the personal—in terms of identity, values, and empowerment—with the planetary in order to establish a more ecologically sound and just world. A comprehensive EfS research and assessment program would link theory, data, and application to help us understand these complex and interacting processes while translating our findings into research models and assessment methods that are accessible to all education stakeholders, both locally and globally.

EFS QUESTIONS TO ASK AND ANSWER: IMPLICATIONS FOR TEACHING, TRAINING, AND LEARNING

Along with the above rationale for EfS research, extant education and training standards contend that specific knowledge, skills, and dispositions are integral to quality teachers and teaching (for example, Ellis, Lee, and Wiley, 2009; In TASC Model Core Teaching Standards, 2011; NCATE, 2006; Ros-Voseles and Moss, 2007; Thornton, 2006; Usher, 2003; Welch, Pitts, Tenini, Kuenlen, and Wood, 2010). Such standards suggest a number of research questions that could be productively pursued, including but not limited to the following:

- 1** How do we ask research questions, develop designs, and implement methods to address the complexity of Education for Sustainability?
- 2** Which theoretical models and assessment methods are demonstrably well-suited to the investigation and promotion of EfS across settings and contexts?
- 3** How are teacher education standards (for example, InTASC) best reconciled with the principles of EfS, and how do we evaluate the degree to which such a linkage ultimately is value-added in terms of teacher training processes and student learning outcomes?

4 How do we develop and assess methods for helping teachers develop their full potential to become transformative educators?

5 Finally, and perhaps most important, how do answers to such questions inform our approach to EfS education, evaluation, outreach, research, policy, practice, and training?

TRANSLATING EFS RESEARCH INTO REAL-WORLD PRACTICE: CULTIVATING THE GLOBALLY SUSTAINABLE SELF

2015-2017 In pursuit of questions such as these, an in-depth, three-year “research-to-practice” summit series will bring together representatives from EfS and allied educational reform movements (for example, Conflict Resolution Education; Interfaith Education; and International Education) in order to (1) consider models and methods that are designed to promote learning, growth, and change in a manner that is measurable and (2) transform such understanding into programs of research that are designed to pursue questions such as those listed above. Specifically, Cultivating the Globally Sustainable Self: Summit Series on Transformative Teaching, Training, and Learning in Research and Practice will be held at James Madison University in Harrisonburg, Virginia, beginning March 2015. Among other goals, this summit series seeks to clarify the relationship between content (for example, what we attempt to convey through EfS and related transformative movements) and process (for example, the complex affective, attributional, and developmental interactions that influence educational processes and outcomes). Ultimately, through this systematic and inclusive approach, it will become possible to develop theoretically robust and empirically grounded studies that credibly inform EfS teaching, training, and learning in the real world over the short and long terms.



EXEMPLAR

Janet K. Swim, PhD, Professor of Psychology, The Pennsylvania State University

As chair of the American Psychological Association’s Task Force on the Interface Between Psychology and Global Climate Change and past president of the APA’s Society for Environmental, Population, and Conservation Psychology, Dr. Janet Swim’s research illustrates why, whether, how, for whom, and under what circumstances large-scale movements such as EfS actually have an impact on teaching, training, and learning as well as how to translate such findings into concrete methods for improving EfS education and practice in the real world. Specifically, Dr. Swim examines social sources (such as social networks and culturally prescribed gender roles) of beliefs about climate change, beliefs about other people’s beliefs about climate change, and support for proenvironmental behaviors.

Among many other findings related to teaching, training, and learning, she and colleagues found that students are “less willing to talk about climate change if they have lower self-efficacy about their contribution to the upcoming discussion” (J. Swim, telephone interview, 16 Sept. 2013). Moreover, educators often limit discussion of climate change because of their belief that the public is disinterested and because they lack confidence in their knowledge about how to talk about climate change. Thus, she and her colleagues are training educators about climate science knowledge and communication techniques “in order to encourage the public’s engagement in and knowledge about climate change” (J. Swim, telephone interview, 16 Sept. 2013). Dr. Swim’s exemplary research underscores the importance of teacher training and confidence in order to effectively impart knowledge about complex—and often misunderstood and politicized—topics such as climate change.

Collaboration

Cynthia Thomashow, Director of Urban Learning, IslandWood

Industry Leader: Pam Pedler, National Account Manager, Office Depot
and **Molly Ray**, Environmental Solutions Manager, Office Depot

Why collaborate when it seems so much easier to go it alone—no agendas to consolidate, no fighting over distribution of resources, no compromises? Collaboration builds broad-based social capital by collectively creating a common agenda. A democratic society depends on it. True collaboration transforms civic culture so that everyone begins considering the “other” when making important and life-impacting decisions. For the purposes of a national action plan to embed sustainability in our national education system, collaboration is the keystone for supporting all recommended initiatives—without an unflinching commitment to partnering, we will never reach our vision. The leaders and implementers of this national action plan strive to cultivate a shared vision that will increase change agency by considering challenges in new, innovative, and collaborative ways.

What might educational change look like if funders, nonprofits, government officials, civic leaders, and businesses embraced a collective vision for Education for Sustainability (EfS)? Social innovation researchers assert that building collective impact rather than isolated intervention is essential to making large-scale social change such as empowering our educational system to catalyze sustainable communities. Collaboration between communities, students, and schools drives systemic changes that improve student performance by creating safe, healthy, and sustainable learning environments for all students. An example at the [New York Harbor School](#) in New York City brings government, private corporations, and public schools together to manage climate resilience through curriculum and service projects. Another model in New York City, the [Eagle Street Rooftop Farm](#), brings community members together with chefs, school cafeteria directors, and corporate sponsors to combat hunger, nutrition, and obesity issues by growing food on urban rooftops. An example from the corporate world, [Office Depot's Greener Office](#) program, leverages sustainability

as common ground for often disparate school district departments that often work under separate leadership and have different priorities. As Office Depot’s Pam Pedler says, “when we connect the purchasing team with other departments such as sustainability, finance, or facilities, we can build greater consensus for the district to move toward environmentally sustainable purchasing” (P. Pedler and M. Ray, telephone interview, October, 2013).

In order to achieve collective impact, we must have the patience and ability to listen to the range of different perspectives, contested ideas, and multiple interests and values comprising social, environmental, political, and economic issues and their solutions. In developing shared visions and messages, we must seek answers to such questions as, what is the common concern among the diverse collaborators? And, what agenda unites the group enough to align resources for the common good? Collaboration only works if we take down the walls, blending the operational silos and sealing fractures between for-profit, nonprofit and political sectors. Utilize an integrative approach from the beginning to foster shared ownership of resources, problems, vision, and policies, and allow participants to learn from and contribute to disciplinary perspectives different from their own. We must be open to new ways of resolving conflicts and generating solutions by intentionally orchestrating all the different “instruments” into a cohesive whole, continually acting, reacting, and adapting strategies to meet a common agenda. Collaborative problem solving will require practicing engagement across the private, public, and nonprofit sectors for achieving organizational goals and social change.

Complex problems are not just more complicated than other problems—they are different in kind and in the way their solutions are generated. A “problem” such as educating nearly 60 million K–12 students to course-correct for a more sustainable future will require new ways of thinking and will require from leaders the same cognitive skills that EfS itself

intends to impart to students. New attitudes and practices enable a wide range of participants, each involved with different parts of the problem, to continuously adjust and readjust how they affect one another through the decisions and actions that they take. In order to achieve our ambitious vision through true collaboration, we recommend the following:

1 CREATE A COMMON AGENDA.

Beginning Now Stakeholders in the implementation of an EfS national action plan should identify and communicate with a diversity of representatives in a multitude of sectors to identify perspectives, interests, and values necessary to create a common agenda around EfS.

2 LISTEN TO AND ENLIST PARTNERS.

By 2016 Survey, research, and convene public and private organizations cultivating new and innovative processes to learn from, enroll, and secure commitments from diverse constituencies in designing strategies to support EfS.

3 CONTINUALLY REFINE NATIONAL ACTION PLAN.

By 2020 Secure funding for and implement regular convenings with diverse audiences to define a common agenda for sustainability education.



EXEMPLAR

The University of New Hampshire (UNH) and Food Solutions New England

An example of successful, yet mighty complex, collaboration is the work occurring at [Food Solutions New England](#) (formerly the Center for a Food Secure Future) in Durham, New Hampshire. Building vibrant local and regional food economies is essential to enhancing community food security, nutrition, and public health; as such, it is a core sustainability issue that impacts K-12 students. The key players in this collaborative effort include private and public school teachers and administrators, institutions of higher education, nonprofit and for-profit stakeholders, government policy agencies, architects, and designers.

The [University of New Hampshire, UNH Cooperative Extension](#), external partners from government and nonprofit agencies, the New Hampshire Food Bank, and the New Hampshire Department of Agriculture established a common goal to develop Food Solutions New England. This cooperative now coordinates and integrates diverse resources that support multiple societal sectors to improve the integrity of the entire food system.

This group of stakeholders built a common agenda around the very complex issue of connecting farms to communities and households throughout the state, including processing, distributing, warehousing, marketing, sales, and access, as well as values, attitudes, and choices about food. Looking at the issue through a systems lens, each step in the food cycle is considered as having a consequence on the final availability, cost, and quality of food, impacting household food security as well as community sustainability. Tom Kelly at UNH's Office of Sustainability addressed the issue in a complex collaboration designed for collective impact.

Public Awareness

Jenny Wiedower, K12 Manager, the Center for Green Schools at the U.S. Green Building Council

Industry Leader: Mark Bishop, Vice President of Policy and Communications, *Healthy Schools Campaign*

Raising awareness of the imperatives of integrating sustainability concepts in U.S. K–12 public education lays the foundation for citizen goodwill, partner investment and adoption, and policy-level changes. A campaign to raise awareness about EfS among the general public should reflect the tenets of sustainability in its design and execution: inclusive, equitable, ethical, forward-looking, self-aware and whole-systems-oriented. Public awareness—specifically, public relations and advocacy—will prove to be the keystone in a successful national action plan for reaching our EfS vision. Every recommended action found in the pages of this publication, from the local parent engagement group advocating for EfS before their school board to the research collaborative seeking funding from a family foundation to the state legislator seeking technical support in drafting a green schools bill, will be enhanced with increasingly greater, deeper, and more positive awareness of EfS.

Public relations directs the spread of information to the general public. Advocacy provides reliable information and develops trusted relationships with those who have significant influence, such as public and private funders, elected officials, and policymakers. Grassroots efforts (that is, schools and communities working together) and organized media campaigns (press conferences, media alerts, social media campaigns) are both effective in improving name recognition and general public understanding of a topic; quite often, the former drives the latter. Because it will contend with the 3,000 marketing messages the average American is exposed to every day, an EfS communications strategy must be highly sophisticated. It should be targeted and inspiring and should touch people in a way that is personal and practical (UNEP, 2005). We have the benefit of a robust reference library featuring thousands of individuals whose positive experiences implementing sustainability education form a rich narrative. As Mark Bishop of *Healthy Schools Campaign* has found,

“focus on how we’re supporting our kids—that’s a message everyone can get behind” (M. Bishop, telephone interview, October 29, 2013).

1 By 2015 Develop shared terminology that communicates the definition and absolute essence of EfS. The concise lexicon should be easily digestible by nonscholars and informally adopted by the community. Utilize existing forums of the community, such as the *Green Schools National Conference* and the *NAAEE Annual Conference*, to facilitate consensus on non-proprietary terminology by early 2015.

2 By 2015 Utilizing existing data, research, and anecdotal evidence, develop a clear, understandable, and relatable message about the benefits of EfS. Underscore that EfS is pedagogy and worldview that enhances, deepens, and advances learning and teaching while simultaneously inspiring sustainable behaviors. This core message, also developed by early 2015 and tested through additional research and focus groups, should resonate with all audiences and concurrently define and compel to action.

3 By 2015 Identify and prioritize target audiences (those who have the capacity to “make or break” forward movement) and develop accompanying sub-messaging by year-end 2015. There are many movements, organizations, and initiatives that align directly with facets of EfS. Develop processes for the ongoing identification of and engagement with others in order to leverage the impact of our activities and create synergy for all involved. For example, if the core EfS message is educational excellence, develop sub-messages tied to values such as human health, resource conservation, and human rights. Matrix key values with audiences at the policymaker, key stakeholder, and general public levels, and craft calls to action for each.

4

Ongoing

Build meaningful partnerships with trusted, resourceful, committed organizations within and outside of the core EfS community. (See the list of target audiences from recommendation 3.) Expand an existing coalition or create a new one with the specific charge of implementing this national action plan for EfS. In addition to guidance provided in the Collaboration chapter of this action plan, best practices for building coalitions that affect change and inform a wide audience include developing members as messengers, utilizing a leadership structure (for example, executive committee) to facilitate organized decision making, and aligning with sponsors who can contribute networks, reputation, a public-relations engine, and influence to our cause. Finally, partner with groups already working on our behalf. With so many competing interests, funders, media, and decision makers will prioritize initiatives that are collaborative to maximize impact. Not only do well-respected and large coalitions garner attention, they inherently help to minimize background noise.

5

2015-2021

Leverage the coalition's varied perspectives to develop a plan and timeline for strategically educating and raising awareness among three main groups: key education stakeholders (2015–2017); policy-makers (2015–2018) and the general public (2015–2021). Consider how each strategy and campaign will position us for the next one.

6

2014-2030

Define indicators and track metrics to monitor efficacy of campaigns and inform subsequent efforts. Track name recognition through public polling or surveys, starting in 2014 and continuing every two years through 2030.

7

Ongoing

Make internal organization a priority from the beginning. Implement a communication tool and organizing platform so that the coalition stays in touch, informed and nimble enough to respond quickly when needed.

Take Action

School level: Talk to your school principal, superintendent, or school board about EfS; volunteer to raise visibility (for example, [Green Apple Day of Service](#)); connect with resources to engage the community in school sustainability.

State level: Ask your state education agency about existing sustainability-related programs, resources, or policies. Have they opted-in to the U.S. Department of Education's [Green Ribbon Schools](#) program? Is your state legislator engaged in the green schools state legislative network? Has your state adopted Common Core State Standards (including up to 15% state-specific standards), and Next Generation Science Standards, both of which provide opportunities for EfS alignment?

Educational professional level: Organize a professional learning community around EfS; take leadership within your union or professional association by organizing a working group or authoring a newsletter article

General public level: Engage in social media activism, "vote with dollars" by supporting schools, businesses, and nonprofits improving schools through EfS approaches.

EXEMPLAR

Chesapeake Bay Foundation

The [Chesapeake Bay Foundation](#) (CBF) has worked for nearly a decade to generate support for state-level environmental literacy plans and federal environmental education policy. CBF's success in affecting public awareness, education, and action is a result of coalition-building on a local and national scale. Partnering closely with schools and related organizations in Maryland, CBF has advanced critical policy changes, including the passage of the state's environmental literacy graduation requirement.

Tapping into an instinctive understanding that a child's connection to nature is something we all value, CBF engaged diverse stakeholders, from health advocates to sportsmen. With a broad and united coalition, CBF was better able to compel and empower decision makers by giving them public cover and serving in the role of honest broker. Sarah Bodor, Director of Education Outreach with CBF, holds up two best practices that have been key to strong national public-awareness efforts around environmental literacy. First, maintaining a clear message with a singular policy: seeking to embed the provisions of the No Child Left Inside bill (which provides funding to states with environmental literacy plans) within the Elementary and Secondary Education Act. Second, conveying a sense of momentum: highlighting progress at the federal level, supporting and tracking state-level models, and, in shining a light on both federal and state efforts, enabling each to bolster the other.

Conclusion

Susan Jane Gentile, Executive Director, Living Routes;
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We created this National Action Plan to demonstrate that fully integrating Education for Sustainability across our nation's education system is a vision that can be realized. What the National Action Plan also underscores is that actualizing EfS will be a complex and challenging endeavor. All the strategies and actions described in this plan are essential to truly educate for sustainability in the United States, and EfS is essential to creating a sustainable future. From research to teacher professional development to integrated curriculum to economic drivers, it is clear that significant shifts are required within our education system and in the systems in which it is embedded. What is required is no less than a sea change, and it is incumbent upon all of us to rise to the challenges before us by working together to implement the recommendations detailed in this document, an action plan to not only bring EfS to our schools but, by doing so, to contribute to sustainability in the U.S.

In order to educate our K-12 students so that they graduate from high school able to think differently about complex problems and make sustainable choices as engaged citizens, we must equip our teachers to educate for sustainability, both preservice and in-service. We must also educate policymakers and other government officials so that they understand EfS, know its benefits, and promote it through their work. And we must educate the public so that voters support education budgets that will advance EfS and parents are teachers' allies as they bring EfS to their students. In fact, every American has the ability to contribute to a more sustainable future, simply by supporting the integration of EfS into formal education structures.

Just as EfS requires systems thinking, we must apply a systems approach as we work toward our stated vision: all students graduate educated for a sustainable future through the integration of the 3 Es—Environment, Economy, and Equity—with the ability to apply systems

thinking to problem solving and decision making by 2040. If we perceive the complexity of the challenge before us through the lens of nested systems, in which students, parents, teachers, and administrators are nested within a school that is nested within a series of progressively larger systems, we will be able to address in an authentic context all the needs and objectives outlined in this document, making our transformation efforts most efficient and most effective.

Of course, communication and collaboration are essential to this process. All stakeholders must be made aware of the necessity for EfS, the time imperative we face, the need for collaboration for collective impact, and the promising prospect of a sustainable future. All stakeholders must also then engage in the process of being part of the solution, as collaborators working together to make EfS integral to K-12 education. Existing opportunities for the EfS community to gather in-person and further organize around the design and implementation of a national action plan include the annual Green Schools National Conference each spring, the North American Association for Environmental Education conference each fall, and a current initiative of the Journal of Sustainability Education to collect input on the essential elements of EfS.

American computer scientist Alan Kay once said: "The best way to predict the future is to invent it." As we all know, society is faced with significant challenges, and meeting these challenges will require significant change. EfS provides the tools to make that change by empowering people to invent their future. As the contributors to this action plan have indicated, we know what needs to be done and how to go about doing it. We even have the will to do it, and now we need to build the capacity to make EfS a reality in the education system in the United States. We have a sustainable future to create. The time is now; let's get started.

About the Convening

Our Shared Vision:

All students graduate educated for a sustainable future through the integration of the environment, economy, and equity, with the ability to apply systems thinking to problem solving and decision making by 2040.

On June 19, 2013, the Center for Green Schools at the U.S. Green Building Council gathered leaders, stakeholders, and advocates from 30 education-related organizations to envision a future in which students, educators, and the community that supports them are prepared for their role as global citizens. With support from Houghton Mifflin Harcourt, attendees collaborated to craft a shared vision for what success around sustainability education in the United States looks like and proposed hundreds of recommendations, organized within 11 strategic subsets, for the pathway to reach that desired future state. Those 11 subsets became the chapters found in this publication.

Representing school districts, curriculum developers, technology vendors, publishers, research institutes, and sustainability champions, the group reached consensus around the case for rapidly increasing the presence of sustainability themes in K-12 education. Inspired by a paradigm in which education builds and strengthens bridges between students, schools, and communities; where students and educators work together on authentic problem solving; and student performance is improved in the classroom and beyond, attendees set their sights on a future in which all K-12 students graduate literate and equipped to make decisions in the “3 Es:” environment, economy, and equity. Looking to past education and sustainability turning points for insight on the path forward, attendees agreed that in order to reach this vision, a cross-sector collaborative should lead the charge to build capacity and integration across the 11 categories outlined in this national action plan. Convening attendees, each of whom are leaders in affecting positive change in our country’s education system, wrapped up the day with commitments to increase sustainability education in their domain.

We thank these organizations for their contributions to the summer 2013 convening and subsequent input into the process of shaping a shared vision for graduating students educated for sustainability.

Alliance for Climate Education

American Federation of Teachers

American Institutes for Research

Antioch University New England

Auburn University

Baltimore City Public Schools

Boston Public Schools

The Cloud Institute for Sustainability Education

Council of Chief State School Officers

Detroit Public Schools

District of Columbia Public Schools

Emergent Learning LLC

Fairfax County Public Schools

Green Education Foundation

Green Schools National Network

Houghton Mifflin Harcourt

IslandWood

James Madison University

Microsoft

Montgomery County Public Schools

National Environmental Education Foundation

National Wildlife Federation

New Jersey School Boards Association

School District of Philadelphia

Solar One

St. Paul Public Schools

WorldLink

References

- AED (Academy for Educational Development). 2007. An evaluation of the Cloud Institute's "Business and Entrepreneurship Education for the 21st Century" and Inventing the Future curricula. Washington: AED.
- Almerico, G., P. Johnston, D. Henriott and M. Shapiro. 2011. "Disposition assessment in teacher education: Developing an assessment instrument for the college classroom and the field." *Research in Higher Education Journal* 11: 1–19.
- American Association of Colleges for Teacher Education (AACTE). 2011. *Transformations in Educator Preparation: Effectiveness and Accountability*. Washington, DC: AACTE.
- Ardoine, N. M., C. Clark and E. Kelsey. 2013. "An exploration of future trends in environmental education research." *Environmental Education Research* 19, no. 4: 499–520.
- Baltensperger, B., E. Gottlieb, C. Matherly, D. Pysarchik, C. Shealy, and E. Wandschneider. "The Forum BEVI Project Working Group: Findings, Applications, and Recommendations from Five Years of Research and Practice." Presentation at the annual meeting of the Forum on Education Abroad, Chicago, IL, April 2013.
- Barratt Hacking, E., W. Scott, and E. Lee. 2010. *Evidence of Impact of Sustainable Schools*. Nottingham, United Kingdom: Department for Children, Schools and Families. <http://publications.teachernet.gov.uk/eOrderingDownload/00344-2010BKT-EN.pdf>.
- BIE (Buck Institute for Education). Review of 21st Century Skills. http://www.bie.org/research/21st_century_skills.
- Bridgeland, J. M., J. J. Dilulio Jr., and K. B. Morison. 2006. *The Silent Epidemic: Perspectives of High School Dropouts*. Washington, DC: Civic Enterprises, http://www.civicenterprises.net/MediaLibrary/Docs/the_silent_epidemic.pdf.
- CCSRI (Center for Comprehensive School Reform and Improvement). 2007. *Using Positive Student Engagement to Increase Student Achievement*. Washington, DC: The Center for Comprehensive School Reform and Improvement. http://www.centerforcsri.org/files/TheCenter_NL_Apr07.pdf.
- Church, W., and L. Skelton. 2013. "Infusing Sustainability Across the Curriculum," in *Schooling for Sustainable Development*, edited by R. McKeown and V. Nolet. Dordrecht: Springer Science + Business Media.
- Coffman, J. E., C. Hopkins and I. A. Ali. 2009. "Education for Sustainable Development: Halfway through the Decade of ESD and a Long Way from Sustainability." *Beliefs and Values* 1, no. 2: 142–150.
- Costa, A. L. 2008. "Describing the Habits of Mind." In *Learning and Leading with Habits of Mind: 16 Essential Characteristics for Success*, edited by Arthur L. Costa and Bena Kallick, 15–41. Virginia: ASCD. <http://www.ascd.org/publications/books/108008/chapters/Describing-the-Habits-of-Mind.aspx>
- Counts, George. 1932. *Dare the School Build a New Social Order?* New York: John Day Company.
- Darling-Hammond, L., A. Amrein-Beardsley, E. Haertel, and J. Rothstein. 2012. "Evaluating Teacher Evaluation." *Phi Delta Kappa* 93, no. 6: 8–15.
- Darling-Hammond, L., J. Herman, J. Pellegrino, et al. 2013. *Criteria for High-Quality Assessment*. Stanford, CA: Stanford Center for Opportunity Policy in Education.
- Darling-Hammond, L., R. Chung Wei, A. Andree, N. Richardson, and S. Orphanos. 2009. *Professional Learning in the Learning Profession: A Status Report on Teacher Development in the United States and Abroad*. Dallas, TX: National Staff Development Council.
- Davis, J. 2009. "Revealing the research 'hole' of early childhood education for sustainability: a preliminary survey of the literature." *Environmental Education Research* 15, no. 2: 227–241.
- Dewey, J. 1959. "School and Society." In *Dewey on Education*, edited by M. Dworkin. New York: Teachers College Press.
- Duffin, M., M. Murphy, and B. Johnson. 2008. "Quantifying a relationship between place-based learning and environmental quality: Final report." Woodstock, VT: NPS Conservation Study Institute in cooperation with the Environmental Protection Agency and Shelburne Farms.
- Duffin, M., and PEER Associates, Inc. 2006. "Why use place-based education? Four answers that emerge from the findings of PEEC, the Place-Based Education Evaluation Collaborative." (Group presentation version). http://www.peecworks.org/PEEC/PEEC_Reports/S01798779-017989F9.
- Ellis, I. E., J. M. Lee and L. P. Wiley. 2009. "Educator dispositions: A survey of U.S. teacher education programs." *Southeastern Teacher Education Journal* 2, no. 3: 77–86.
- Expeditionary Learning. 2011. *Expeditionary Learning Core Practices: A Vision for Improving Schools*. New York: Expeditionary

- Learning. http://elschools.org/sites/default/files/EL%20Core%20Practices%20Final_EL_120911.pdf
- . 2014. *Evidence of Success*. New York: Expeditionary Learning . <http://elschools.org/sites/default/files/Evidence%20of%20Success%20brochure.pdf>
- Gayford, Christopher. 2009. "Learning for Sustainability: From the Pupils' Perspective." Godalming, Surrey: World Wide Fund for Nature. http://assets.wwf.org.uk/downloads/wwf_report_final_web.pdf
- Gulamhussein, Allison. 2013. *Teaching the Teachers: Effective Professional Development in an Era of High Stakes Accountability*. Alexandria, VA: Center for Public Education.
- Houston, City of, Teacher Externship Program, <http://www.houstontx.gov/education/teacherexternship.html>
- Hussar, W. J., and T. M. Bailey. 2011. *Projections of Education Statistics to 2020*. (NCES 2011-026). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- InTASC (Interstate New Teacher Assessment and Support Consortium). 2011. "Model core teaching standards: A resource for state dialogue." Accessed February 5, 2013. http://www.ccsso.org/documents/2011/intasc_model_core_teaching_standards_2011.pdf.
- Jung, E. and D. M. Rhodes. 2008. "Revisiting disposition assessment in teacher education: Broadening the focus." *Assessment & Evaluation in Higher Education* 33, no. 6: 647–660.
- Kelly, J., J. Holt, R. Patel and V. Nolet. "Environmental beliefs and values: In search of models and methods." In *Making sense of beliefs and values*, edited by C. N. Shealy. New York: Springer Publishing Company, forthcoming.
- Kensler, L. A. 2012. "Ecology, Democracy, and Green Schools: An Integrated Framework." *Journal of School Leadership* 22, no. 4: 789–814.
- Killion, J. and S. Hirsh. 2011. "The Elements of Effective Teaching." *Journal of Staff Development* 32, no. 6: 10–16.
- Learning Forward. *Standards for Professional Learning*. <http://learningforward.org/standards-for-professional-learning>.
- Massachusetts Department of Elementary and Secondary Education. 2012. "Part III: Guide to Rubrics and Model Rubrics for Superintendent, Administrator, and Teacher." *Massachusetts Model System for Educator Evaluation*. Malden, MA: Massachusetts Department of Elementary and Secondary Education, pp. A-2, B-2.
- McKeown, R. and V. Nolet, eds. 2013. *Schooling for sustainable development in Canada and the United States*. Dordrecht, Germany: Springer.
- Mezirow, J. and E. Taylor, eds. 2009. *Transformative learning in practice: Insights from Community, Workplace, and Higher Education*. San Francisco: Jossey Bass.
- National Research Council. 2012. *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*. Washington, DC: National Research Council.
- NCATE (National Council for Accreditation of Teacher Education). 2006. *Standards, procedures and policies for the accreditation of professional accreditation units*. Washington, DC: NCATE.
- Nichols-Barrer, I., and J. Haimson. 2013. "Impacts of Five Expeditionary Learning Middle Schools on Academic Achievement." Cambridge, MA: Mathematica Policy Research. http://www.mathematica-mpr.com/publications/PDFs/education/EL_middle_schools.pdf
- Nolet, V. 2013. "Teacher-education and ESD in the United States: The vision, challenges, and implementation." In *Schooling for Education for Sustainable Development in Canada and the United States*, edited by McKeown, R. and V. Nolet. New York: Springer.
- Ofsted (The Office for Standards in Education, Children's Services and Skills). 2009. *Education for Sustainable Development: Improving Schools—Improving Lives*. Manchester, United Kingdom: Ofsted. <http://www.ofsted.gov.uk/resources/education-for-sustainable-development-improving-schools-improving-lives>
- OSPI (Office of Superintendent of Public Instruction). 2009. *Washington State K-12 Integrated Environmental and Sustainability Education Standards*. <http://www.k12.wa.us/EnvironmentSustainability/default.aspx>
- Pernick, Ron, Clint Wilder and Trevor Winnie, "Clean Energy Trends 2013" Clean Edge, 2013. <http://cleannedge.com/reports/Clean-Energy-Trends-2013>

References

- Pianta, R. C. 2011. *Teaching Children Well: New Evidence-Based Approaches to Teacher Professional Development and Training*. Washington, DC: Center for American Progress.
- Ros-Voseles, D. and L. Moss. 2007. "The role of dispositions in the education of future teachers." *Young Children* 62, no. 5: 90–98.
- Saad, Lydia, "Americans' Concerns About Global Warming on the Rise" Gallup Politics website, article published April 8, 2013. <http://www.gallup.com/poll/161645/americans-concerns-global-warming-rise.aspx>
- Schmoker, Mike. 2012. *Focus: Elevating the Essentials to Radically Improve Student Learning*. Alexandria, VA: Association for Supervision & Curriculum Development.
- Shealy, C. N., ed. *Making sense of beliefs and values*. New York: Springer Publishing Company, in press.
- Shinn, M., Schteingart, J. S., Williams, N. C., Carlin-Mathis, J., Bialo-Karagis, N., Becker-Klein, R., et al. (2008). Long-term associations of homelessness with children's well-being. *American Behavioral Scientist*, 51, 789–809.
- Sobel, D. 2008. *Childhood and Nature: Design Principles for Educators*. Portland, ME: Stenhouse Publishers.
- Suffet Diaz, A., and R. Ruffalo. 2010. "And the Silver Bullet is . . . Hard Work." *Huffington Post*, November 4. www.huffingtonpost.com/alison-suffet-diaz/and-the-silver-bullet-is-_b_779271.html
- Svanström, M., F. J. Lozano-García, and D. Rowe. 2008. "Learning outcomes for sustainable development in higher education." *International Journal of Sustainability in Higher Education* 9, no. 3: 339–351.
- The Cloud Institute for Sustainability. 2013. *EfS Research and Results*. Accessed December 12, 2013. <http://cloudinstitute.org/efs-research-results/>
- The Cloud Institute for Sustainability Education website. Accessed 18 December 2013. <http://cloudinstitute.org>.
- Thornton, H. 2006. "Dispositions in action: Do dispositions make a difference in practice?" *Teacher Education Quarterly* 33, no. 2: 53–68.
- Tilbury, D. 2011. *Education for Sustainable Development: An Expert Review of Processes and Learning*. Paris: UNESCO. <http://unesdoc.unesco.org/images/0019/001914/191442e.pdf>
- UNEP (United Nations Environment Programme). 2005. *Communicating Sustainability: How to produce effective public campaigns*. Nairobi, Kenya: United Nations Environment Programme. <http://www.unep.fr/shared/publications/pdf/DTIx0679xPA-CommunicatingEN.pdf>
- U.S. Department of Education. Green Ribbon Schools website, <http://www2.ed.gov/programs/green-ribbon-schools/index.html>.
- U.S. Energy Information Administration website. February 2012. "Most States Have Renewable Portfolio Standards." <http://www.eia.gov/todayinenergy/detail.cfm?id=4850>
- Usher, D. "Nurturing five dispositions of effective teachers." Presentation at the 2nd National Symposium on Educator Dispositions. Eastern Kentucky University, Richmond, KY, November 2003.
- Vincent, S., S. Bunn, and S. Stevens. 2013. *Sustainability Education: Results from the 2012 Census of U.S. Four Year Colleges and Universities*. Washington DC: National Council for Science and the Environment.
- Wei, R. C., L. Darling-Hammond, and F. Adamson. 2010. *Professional Development in the United States: Trends and Challenges*. Dallas, TX: National Staff Development Council.
- Welch, F. C., R. E. Pitts, K. J. Tenini, M. G. Kuenlen, and S. G. Wood. 2010. "Significant issues in defining and assessing teacher dispositions." *Teacher Educator* 45, no. 3: 179–201.
- Weyn, S. 2010. *Empty*. New York: Scholastic.
- Wiggins, G., and J. McTighe. 2007. *Schooling by Design: Mission, Action, and Achievement*. Alexandria, VA: Association for Supervision & Curriculum Development.
- Wise, D. 1982. "Experts Speculate on future electronic learning environment." *InfoWorld* 4, no. 16: 6.
- World Commission on Environment and Development. 1987. *Our Common Future*. Oxford: Oxford University Press.

ADDITIONAL WEBSITES REFERENCED

- Bureau of Labor Statistics Green Career Information: <http://www.bls.gov/green/greencareers.htm>
- Center for Energy Workforce Development's Get Into Energy website: <http://getintoenergy.com/>
- Connecticut Green Schools website: <http://www.ctgreenschools.org/category.htm?id=6gpox17c> Green/

Sustainability Knowledge & Skill Statements: <http://www.careertech.org/career-clusters/green/>

Green Education Foundation: <http://www.greeneducationfoundation.org/>

Hilltop Elementary, WV's Green Ribbon Schools entry: <http://www2.ed.gov/programs/green-ribbon-schools/2012-schools/wv-hilltop-elementary.pdf>

ICLEI Guidance on Education and Outreach: <http://www.icleiusa.org/action-center/learn-from-others/small-communities-toolkit/education-and-outreach>

Minnesota iSeek Green website: <http://www.iseek.org/industry/green/>

Oregon Green Career Pathways: <http://www.oregongreenpathways.org/>

U.S. Department of Energy's Solar Map: <http://www1.eere.energy.gov/solar/careermap/>

Virginia Beach City Public Schools Career and Technical Education Sustainability: <http://www.vbschools.com/tce/green/>

FOR FURTHER READING

Cloud, Jaimie, "EfS Standards and Performance Indicators," The Cloud Institute for Sustainability Education, <http://cloudinstitute.org/cloud-efs-standards/>

Dernbach, John C. *Acting as if Tomorrow Matters: Accelerating the Transition to Sustainability*. Island Press, 2012.

Federico, C., & Cloud, J. "Kindergarten through twelfth grade education: Fragmentary progress in equipping students to think and act in a challenging world." In J. Dornbusch (Ed.), *Agenda for a sustainable America* (pp. 109–127). Washington, DC: ELI Press, Environmental Law Institute, 2009.

Hayes Jacobs, Heidi, ed., *Curriculum 21 Essential Education for a Changing World*, ASCD, January 2010.

Orr, David, *Earth in Mind: On Education, Environment, and the Human Prospect*, Island Press, July 30, 2004.

Senge, Peter M., *Schools That Learn*, Crown Publishing Group, July 31, 2012.

Smith, Greg and David Sobel, *Place and Community Based Education in Schools*, Routledge, New York, 2010.

Sterling, Stephen, "Sustainable Education" in Gray, D., Colucci-

Gray, L. and Camino, E., *Science, Society and Sustainability: Education and Empowerment for an Uncertain World*, Routledge, New York and London, 2009.

The Cloud Institute for Sustainability Education Recommended Resources: <http://cloudinstitute.org/efs-media-resources/>

The Waters Foundation, WebEd Library of Systems Thinking in Schools Resources: <http://www.watersfoundation.org/webed/library/>

Education for Sustainable Development Toolkit References: <http://www.esdtoolkit.org/references.htm>

"Excellence in Environmental Education Guidelines for Learning (K-12) (revised 2010)," North American Association for Environmental Education http://eelinked.naaee.net/n/guidelines/posts/Excellence_in-Environmental-Education-Guidelines-for-Learning-K-12

"Standards for the Initial Preparation of Environmental Educators," North American Association for Environmental Education, November 2007 <http://www.ncate.org/LinkClick.aspx?fileticket=Fm%2FqA4uarLk%3D&tabid=676>

Thank you!

By reading this National Action Plan you've taken action in support of the nationwide effort to nurture ambitious, socially aware, environmentally conscious students.

Want to do more?

Encourage your school district to choose virtual sampling, and promote safe, healthy learning environments.

In support of our partnership with the Center for Green Schools, Houghton Mifflin Harcourt will make a donation to their Green Apple cause marketing initiative for every school or district that downloads a virtual sample of an HMH product and then makes a purchase from us or any solutions provider. See complete details at forms.hmhco.com/virtualsampling/features.php. Learn how you can make more sustainable choices and support the green schools movement.

**GO GREEN!
GET STARTED WITH VIRTUAL
SAMPLING TODAY.**

About the Publishers

Since its inception in 2010, the Center for Green Schools has been driving the transformation of all schools into sustainable and healthy places to live, learn, work and play. We pursue our mission by serving as a convener of influential and diverse stakeholders, as a solutions architect for comprehensive school district and campus sustainability, and as a provider of top-quality educational resources. We believe that everyone, from kindergartners and their teachers to Ph.D. candidates and their advisors, should have the ability to learn and teach in healthy, high performing and safe buildings.

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