

Energy Efficiency in the Public Sector: K-12 School Districts

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New Hampshire High Performance Schools Summit

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Overview

- **Weatherization & Intergovernmental Programs (WIP)**
- **Partnerships and Technical Assistance Team**
- **Energy Impact**
- **Engagement with K-12 School Districts**
- **Energy Champions**
- **Tools & Resources**

WIP Mission & Structure

WIP Mission

- WIP is part of EERE's "all of the above" national energy strategy to create greater energy affordability, security and resiliency.
- WIP's mission is to enable strategic investments in energy efficiency and renewable energy technologies and innovative practices across the U.S. by a wide range of government, community and business stakeholders, in partnership with state and local organizations.
- WIP supports DOE's strategic objective to lower energy costs while expanding energy choices for all American communities. WIP's near-term activities produce almost immediate results, saving taxpayer dollars, making full use of domestic energy resources, boosting local economic development and job creation, cutting energy waste, improving energy independence and security, and furthering the development of energy infrastructure.

WIP Structure

State Energy Program



Weatherization Assistance Program



Partnerships and Technical Assistance



Strategic & Interagency Initiatives



Partnerships & Technical Assistance (P&TA) Team

The Partnerships and Technical Assistance (P&TA) Team cultivates diverse partnerships, provides technical assistance and assists state and local governments to help them:



Develop an Energy Plan

- Local Energy Planning
- State Energy Planning



Design and Implement Energy Programs

- Low-Income Communities
- Wastewater Infrastructure
- Outdoor Lighting
- Energy Efficiency for K-12 Schools
- Public-Private Partnerships



Pay for Energy Infrastructure

- EE Finance 101
- ESPCs, QECBs, PACE, RLFs



Access and Use Energy Data

- Benchmarking
- Data Disclosure & Transparency
- Evaluation, Measurement, & Verification (EM&V)

The P&TA Team serves as the nexus of state and local governments to catalyze lead-by-example programs by:

- Developing tools and solutions to barriers facing state and local government utilization of efficiency and renewable energy;
- Convening and creating peer exchanges to showcase public-sector leadership and effective public-private partnerships; and
- Providing information from leading technical experts.

Resulting Benefits: P&TA supports the energy priorities of state and local governments to save taxpayer dollars and make full use of domestic energy resources, boost economic development and job creation, cut energy waste, improve energy independence and security, and further develop energy infrastructure.

Better Buildings Challenge—Public Sector

The goal of the Better Buildings Challenge (BBC) is to improve the efficiency of American commercial, institutional, and multifamily buildings and industrial plants by 20% or more over 10 years. WIP's P&TA Team manages the BBC public sector (state, city and K-12) partners.

WHAT ARE THE RESULTS SO FAR?

Public Sector Better Buildings Challenge Partners
are having a tremendous impact!



Energy Saved:
45 trillion Btus



Dollars Saved:
\$420 million



**Avoided carbon
emissions:**
2.9 million tons



Water Saved:
1.5 billion gallons

Cumulative results through 2016

K-12 School District Facilities



CHALLENGE

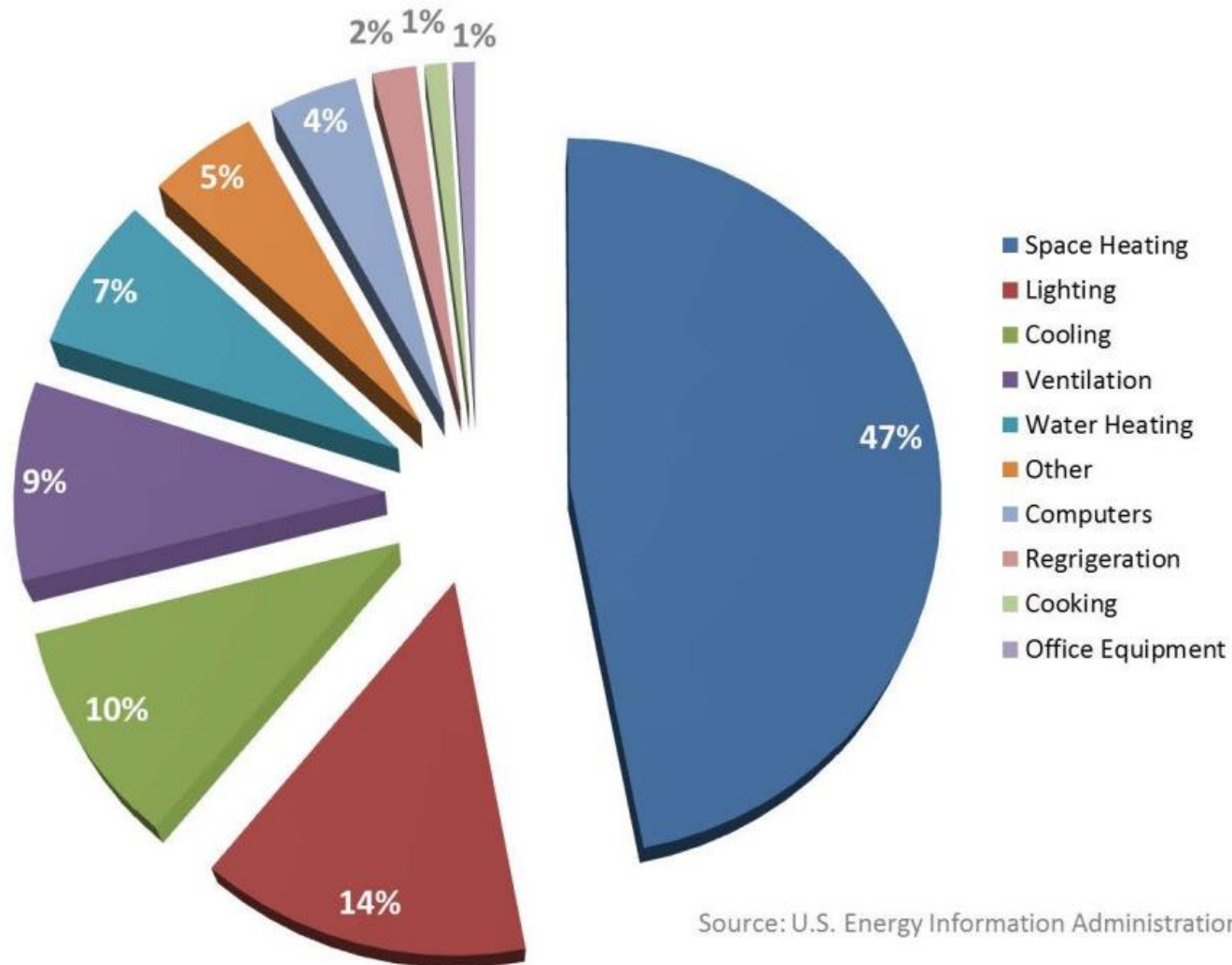
- > 50 million students
- ~ 130,000 school buildings
- 1,000 hours and 200 school days
- Utility expenditures ~ \$10 billion

OPPORTUNITY

- Manage energy costs and maintain healthy learning environments
- Leverage STEM academic requirements, learning labs
- Redirect utility expenditures back into the classrooms

Energy Uses in a Typical Building

Key Areas of Energy Consumption in Educational Facilities



McKinley Tech HS – Energy Data Profile

BUILDINGS



McKinley Technical School

151 T STREET NE

ENERGY STAR RATING **20**

McKinley Technology High School is one of five specialized secondary schools in the district. [Show More](#)

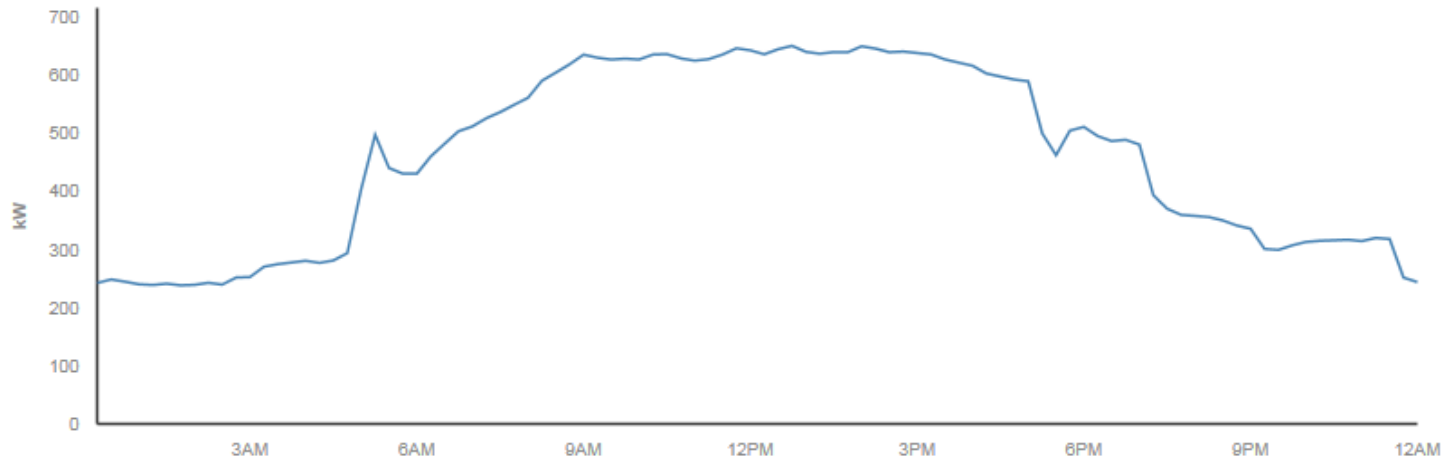
Last Recorded Day
10/06/2016

Last 10 Days
Electricity Demand

Monthly
Energy Usage

Downloads

McKinley Tech HS – Energy Benchmarks



BUILDING TYPE
High School

SIZE (FT²)
282,200

EUI (KBTU/SF/YR)
87

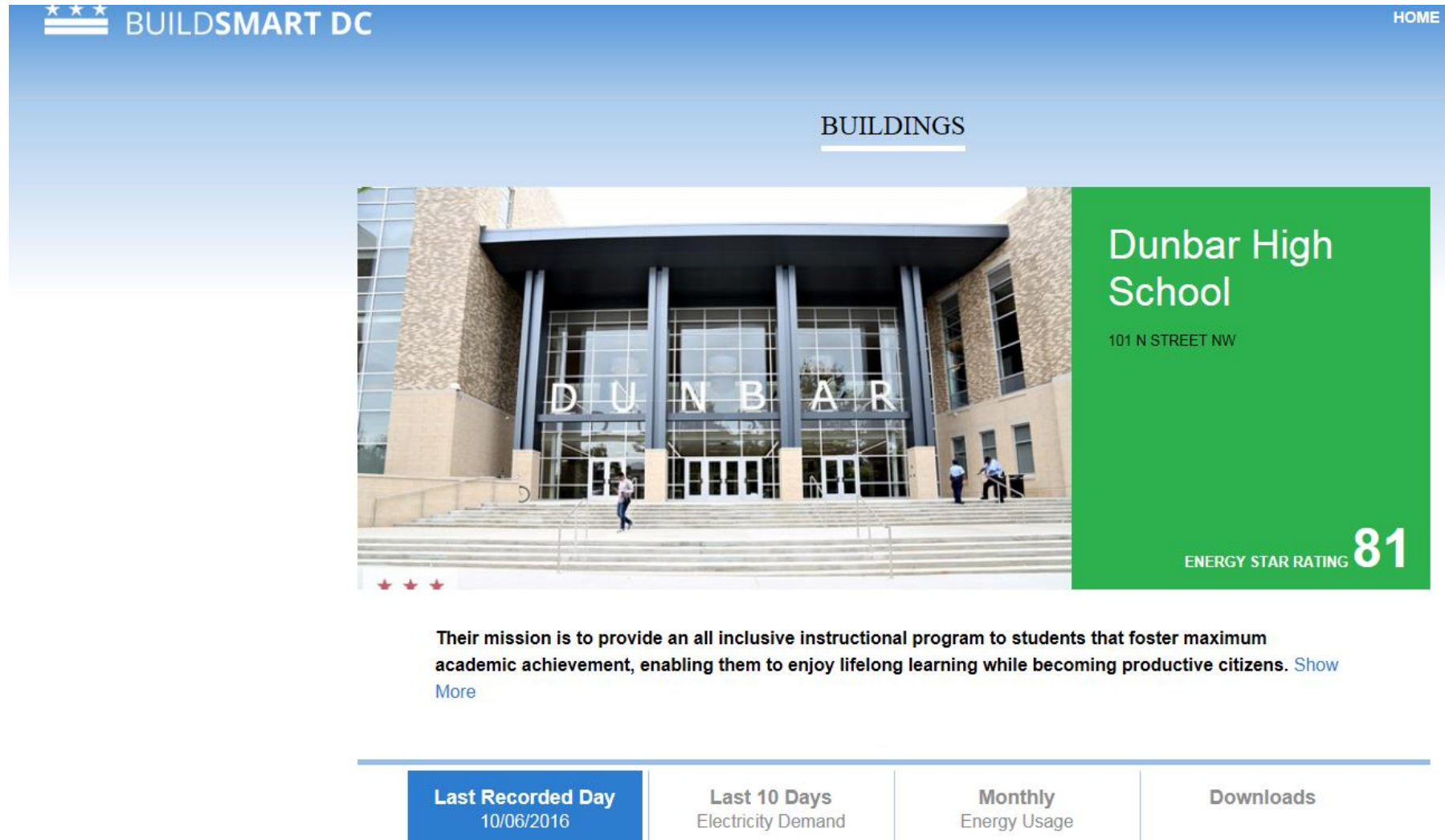
ANNUAL ENERGY COST
\$610,754.51

ANNUAL GHG EMISSIONS (TONS)
3,127.24

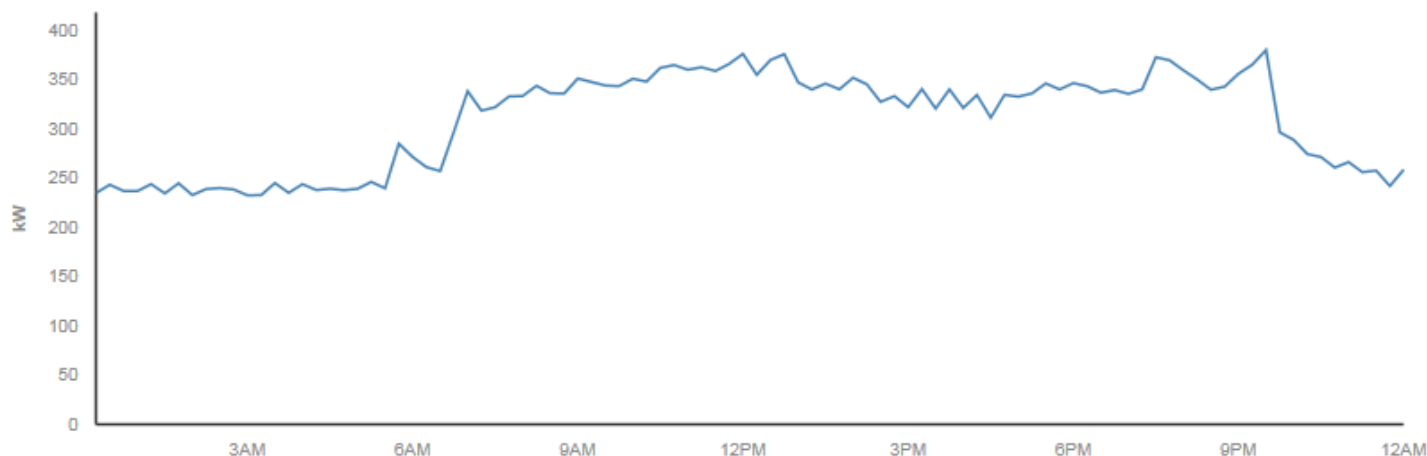
GAS AS % OF BTUS
37.96%

GAS AS % OF ENERGY COST
14.81%

Dunbar High School– Energy Data Profile



Dunbar High School – Energy Benchmarks



BUILDING TYPE
High School

SIZE (FT²)
283,000

EUI (KBTU/SF/YR)
44

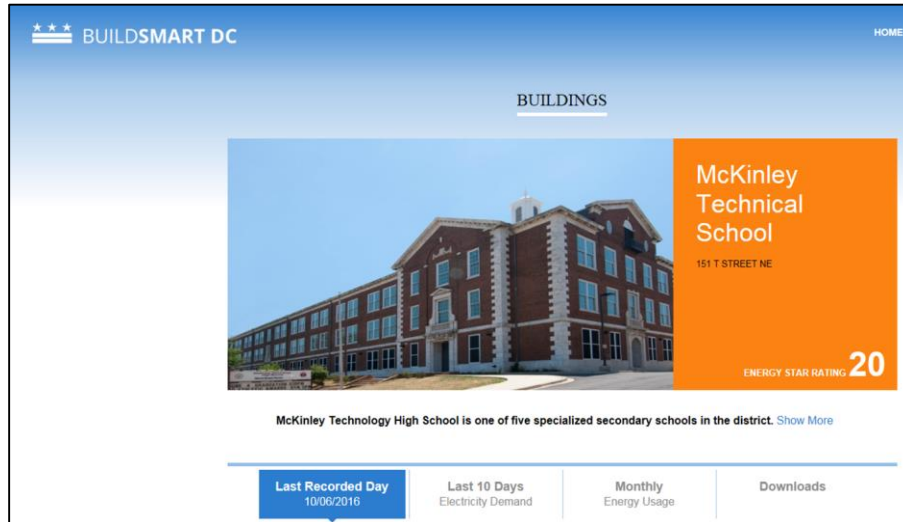
ANNUAL ENERGY COST
\$393,023.29

ANNUAL GHG EMISSIONS (TONS)
1,996.13

GAS AS % OF BTUS
12.5%

GAS AS % OF ENERGY COST
3.9%

Energy Matters



McKinley

282,200

Size (Sq Ft)

87

Energy Use Intensity (KBtU/Sq Ft)

\$610,755

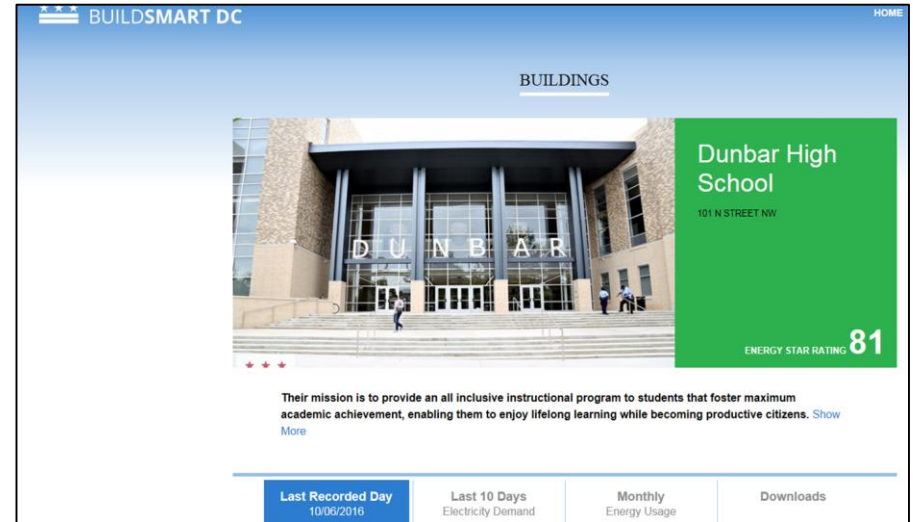
Annual Energy Cost

3,127.24

Annual GHG Emissions (Tons)

20

EnergyStar Score



Dunbar

283,000

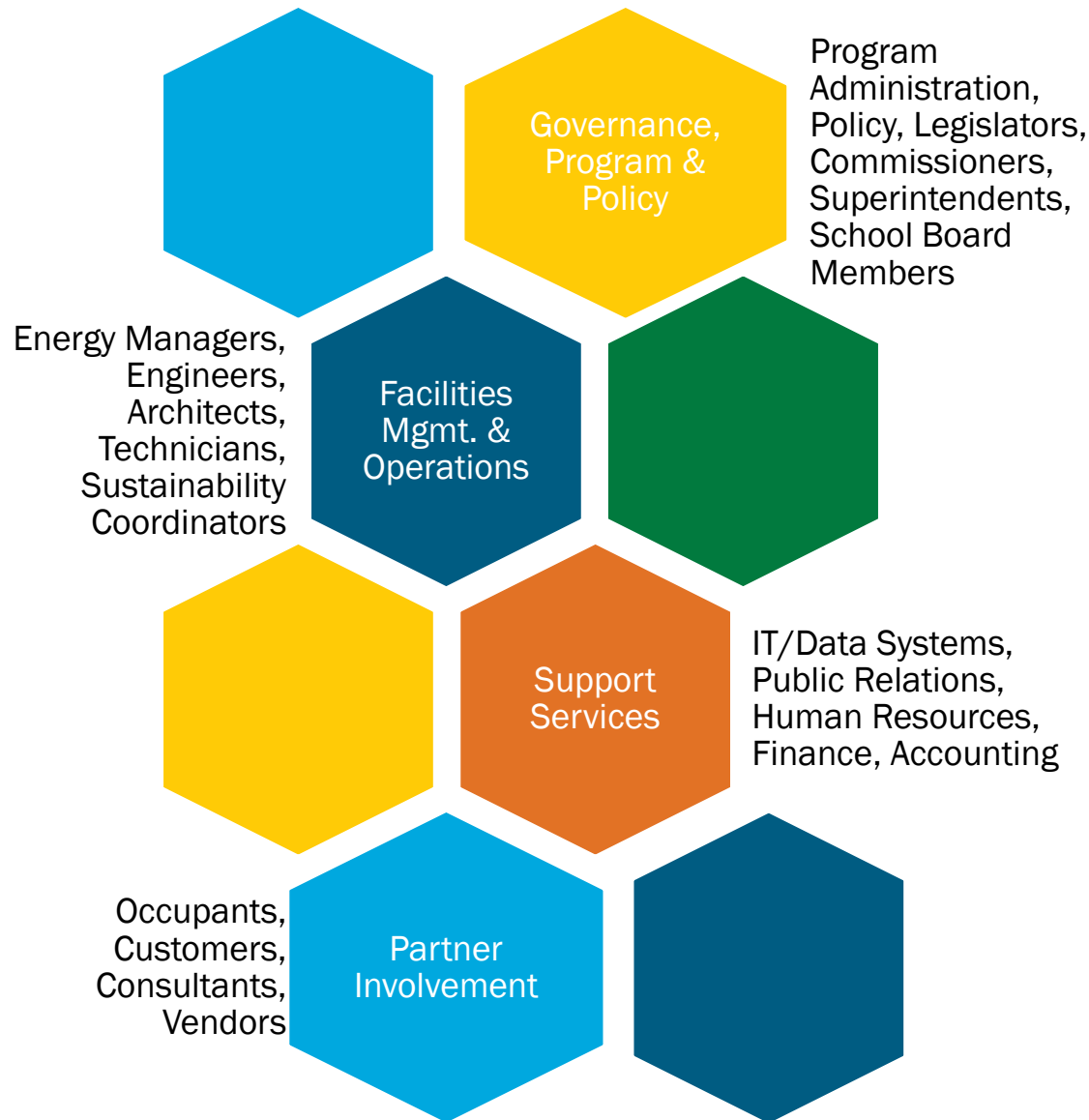
44

\$393,023

1,966.13

81

Energy Champions



Contact

Crystal McDonald

Better Buildings Challenge

K-12 Sector Lead

202-287-1799

Crystal.McDonald@ee.doe.gov

APPENDIX: Tools & Resources

DOE Contacts for Education Resources

- Better Buildings Crystal McDonald, Crystal.Mcdonald@ee.doe.gov – Better Buildings Challenge, K-12 Sector Lead
- Fuel Cells/Vehicles James Kast, James.Kast@EE.DOE.Gov , Fuel Cells Technologies Office
- Geothermal Arlene Anderson, Arlene.Anderson@ee.doe.gov, Geothermal Technologies Office
- Science Bowl Jan Tyler, Jan.tyler@science.doe.gov – National Science Bowl National Coordinator
- Solar Decathlon Linda Silverman, Linda.Silverman@ee.doe.gov, Solar Decathlon Director
- SunShot Initiative Dave Rench-McCauley, Dave.Rench-McCauley@ee.doe.gov, Solar Energy Technologies Office
- Wind Amber Passmore, Amber.Passmore@EE.Doe.Gov, Wind Energy Technologies Office Education Program
- Zero Energy Schools Nathaniel Allen, Nathaniel.Allen@ee.doe.gov – Zero Energy Buildings for Schools Accelerator Lead



Follow Solar Decathlon!

- **Website** www.SolarDecathlon.gov
 - **Facebook** <https://www.facebook.com/DOESolarDecathlon/>
 - **Twitter** https://twitter.com/Solar_Decathlon
 - **Flickr** https://www.flickr.com/photos/solar_decathlon/
 - **Instagram** <https://www.instagram.com/doesolardecathlon/>
 - **Gmail** DOESolarDecathlon@gmail.com
 - **YouTube** <https://www.youtube.com/user/DOESolarDecathlon>
 - **Google+** <https://plus.google.com/+DOESolarDecathlon/posts>
 - **Pinterest** <https://www.pinterest.com/energy/solar-decathlon-2017/>
<https://www.pinterest.com/energy/solar-decathlon/>
 - **Vimeo** <https://vimeo.com/channels/solardecathlon>
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Solar Resources for Green Ribbon Schools

- High school and more advanced students
 - ❖ Solar Training Network - <http://www.thesolarfoundation.org/workforce-development/solar-training-network/>
 - ❖ PV Online Training (electric code focused) - <http://www.pvonlinetraining.org/>
 - ❖ Solar Energy Education and Training Best Practices: The Series - <http://www.irecusa.org/workforce-education/training-resources/best-practices-the-series/>
 - ❖ Solar in Your Community Challenge – www.solarinyourcommunity.org
- College students and current professionals
 - ❖ GEARED - www.gearedusa.org
 - ❖ Solar Ready Vets - <http://www.solarreadyveterans.org/>
- Local-level solar resources
 - ❖ SunShot's Solar Energy Resources Center - <http://energy.gov/eere/sunshot/solar-energy-resource-center>
 - ❖ SolSmart - <http://www.gosparc.org/>

Stay updated: <http://www.energy.gov/eere/sunshot/sunshot-initiative>

WIND ENERGY TECHNOLOGIES

FUTURE OPPORTUNITIES FOR STUDENTS & RESOURCES

- See interactive animations of how a Wind Turbine Works at energy.gov (<http://energy.gov/eere/wind/animation-how-wind-turbine-works>)
- Visit the Open Energy Information (OpenEI) Wind for Schools Portal to access data from turbines at U.S. schools and find educational resources for all grade-levels (http://en.openei.org/wiki/Wind_for_Schools_Portal)
- Learn more about wind energy challenges and competitions for middle and high schools through Kid Wind (<http://www.kidwind.org/>)
- Collegiate Wind Competition: <http://energy.gov/eere/collegiatewindcompetition>
- See what future career opportunities may exist in wind energy by visiting the Wind Career Maps (<http://energy.gov/eere/wind/wind-career-map>)

GTO Initiatives & Education

- **GTO Reduce costs and risks of geothermal development**

- GTO Programs:

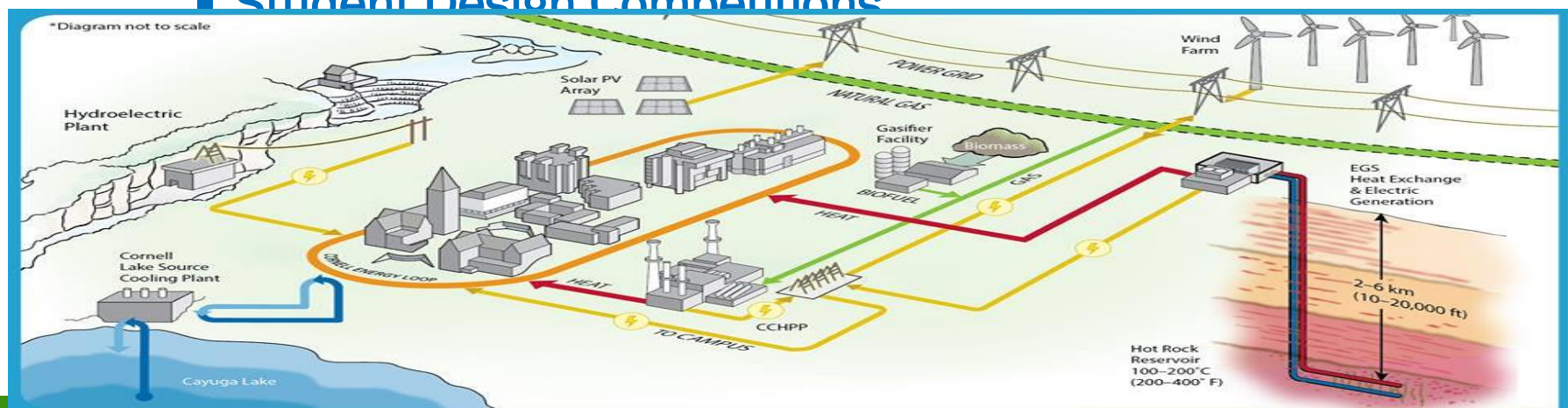
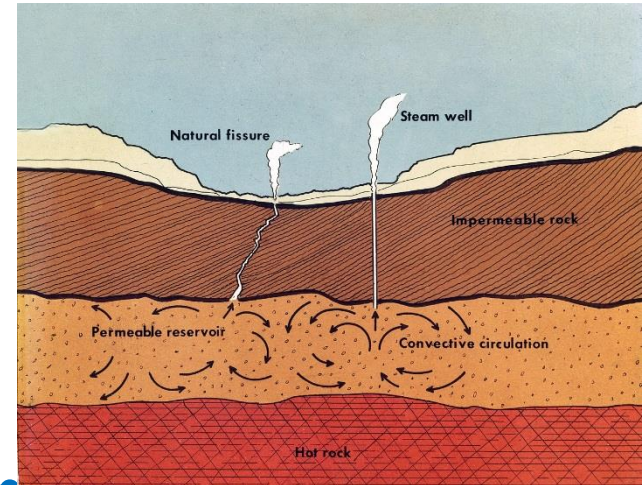
- Hydrothermal;
 - Enhanced Geothermal Systems;
 - Low-Temperature and Coproduced

- Deep Direct-Use

- Ground Source Heat Pump Systems

- Systems Analysis

- Student Design Competitions

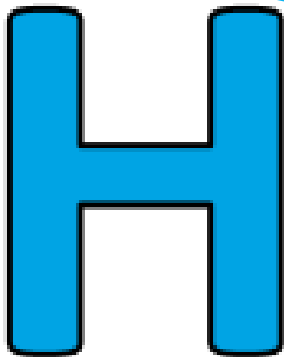




National **Hydrogen** &
Fuel Cell Day | 10·08

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1.008



Hydrogen

Celebrate
National
Hydrogen & Fuel
Cell Day on
10/8 (Held on its
very own atomic-
weight-day)

Learn more:
energy.gov/eere/fuelcells

About the National Science Bowl®

- The U.S. Department of Energy (DOE) National Science Bowl® (NSB) seeks to encourage middle and high school students to expand their knowledge of math and science, expose students to careers relevant to DOE's mission, and raise the visibility of academic achievement in the sciences through a nationally prestigious academic event.
- **Teams of four students each face off in a fast-paced question-and-answer format where contestants** are quizzed on their knowledge of math and a range of science disciplines including biology, chemistry, Earth and space science, physics and energy (including DOE-related questions.)
- Each year, the NSB attracts more than 14,000 students nationwide. At the high school level, the 2017 National Science Bowl involved more than 9,000 students and at the middle school level, more than 5,000 competitors.



Zero Energy Schools Accelerator



www.zeroenergy.org

Accelerator Goals

- **Identify** strategies to overcome barriers to building ZE K-12 schools and realizing the associated health, savings, and resiliency benefits
- **Share** solutions, resources, and technologies that help schools achieve ZE goals
- **Develop** replicable road maps to build ZE schools and achieve associated benefits
- **Increase** visibility and replication of best practice approaches and successful models

Implementing partners

State of Minnesota



State of California



State of Maryland



National partners





K-12 School Districts are Eligible

Known – Still large potential for industrial/commercial energy savings, historic improvement focus has been on ad hoc projects, low hanging fruit

We believe - Best way to achieve the fullest EE potential is to adopt programs & policies that improve energy performance on a continuing basis

Value of 50001 Ready Program – Positions your organization to achieve and sustain energy and cost savings through informed systematic decision making

What is 50001 Ready?

- ✓ *DOE program assisting and recognizing organizations for adopting a culture of continuous energy performance improvement*
- ✓ *Self-attesting, no certifications, no external audits, do-it-yourself with DOE free online resources*
- ✓ *Online energy management tools and guidance, can be rebranded/repurposed if desired*

Participants are eligible for technical assistance. Contact Crystal McDonald at crystal.mcdonald@ee.doe.gov for more information.