

Agenda

- The benefits of using Insulated Concrete Forms in construction, especially in regard to rural and Tribal projects.
- ICF's as a key component in our pursuit of Net Zero design.
- The country's first Tribal Net Zero school for the Four Winds School District on the Spirit Lake Sioux Reservation in Fort Totten, North Dakota.
- ICF project experience & lessons learned



- Principal at DSGW Architects
- President, Owner of First American Design Studio
- Enrolled member of the Turtle Mountain Band of Chippewa in North Dakota
- Reg. Architect-MN, ND, SD, IA, FL, WA, MT, WA
- Past-President of the American Indian Council of Architects & Engineers
- Board Member for American Indian Science & Engineering Society
- LEED Accredited Professional
- Past AIA ND Intern Architect of the Year



Why use Insulated Concrete Forms?

- ICF's are modular, easy to install.
- ICF's lend themselves to becoming community storm shelters
- Tribal members can be taught to install and not have to be union or experienced tradesman.
- Reduced trades in building envelope.
- Thermal mass reduces peak energy demand
- Continuous insulation (New MN Energy Code) and excellent air tightness
- LEED, Energy Star & Net Zero friendly product
- Baseline r28 @ 8" form

Benefits of ICF's



Why use Insulated Concrete Forms?

"ICF allowed us to start moving out of the ground quickly with basic structural requirements and reviews being met. Once foundation is established, and back filled the system can move 7 to 10 feet every three days so the openings (windows, doors, sleeves) need to be established" – Bryan Koenig, Shingobee Builders



Benefits of ICF's



CONSTRUCTION SEMINAR SERIES

INSULATED CONCRETE FORMS
 — FREE SEMINAR —
FRIDAY, FEBRUARY 24
 9:00 AM – 4:30 PM
LEECH LAKE TRIBAL COLLEGE

Join us for an exciting new learning opportunity geared toward specific construction methods - based on known design content of upcoming Leech Lake construction projects.

FOR INFORMATION/REGISTRATION, CONTACT:
 Mark Koenig - mkoenig@shingobee.com 218-232-2200
 Ryan Schaefer - rschaefer@shingobee.com 218-232-2200
 Greg Schaefer - gschaef@shingobee.com 218-232-2200

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ICF Training

For the Onigum Community Center, we took a proactive approach to the shortage of local native workforce by purposely designing the community center to be built with Insulated Concrete Forms (ICF) and providing training seminars on their installation. DSGW, Shingobee Builders and Concrete, Inc. partnered with the Leech Lake Tribal College to provide the two-part seminar. The first session was on ICF construction and the second was on job site safety. The goal of the seminars was to give the local workforce the skills required for not only working on the Onigum Community Center but known upcoming Leech Lake construction projects as well.

Benefits of ICF's



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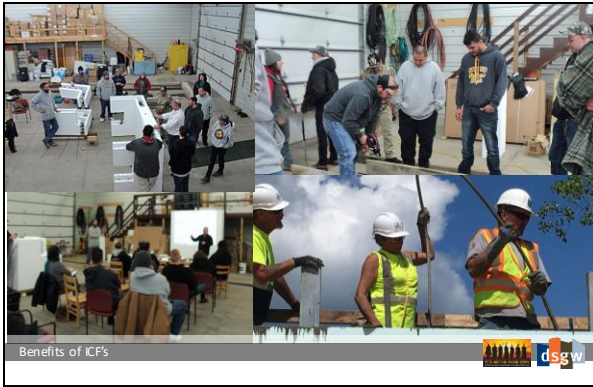
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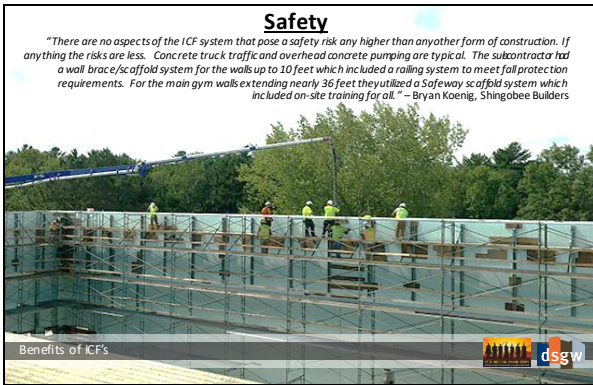
ICF Training

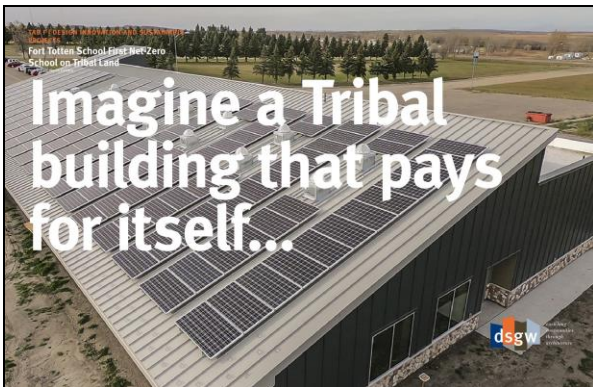
- Training is easy to implement
- Can train entry level laborers
- Lightweight install prior to concrete pour
- Many manufacturers are eager to assist in training
- Tribes like this as it is a learned skill and is able to be used on future builds
- Contractor has experienced lower EMR such as less pinch fingers, strained backs, cuts and bruises

Benefits of ICF's









Net Zero

A building which, while still connected to the grid, produces enough energy on site equal to the amount of energy used.

ICF's & Net Zero





<https://living-future.org/zero-energy/certification/>

- Certifies that the building is truly operating as claimed, harnessing energy from the sun, wind or earth to produce net annual energy demand through a third-party audit of actual performance data
- Provides a case study platform for your project to inform and accelerate other zero energy efforts throughout the world
- Celebrates a significant accomplishment, and differentiates both the building and those responsible for its success in this quickly evolving market

ICF's & Net Zero





<https://living-future.org/zero-energy/certification/>

- A lot cheaper than LEED Certification!
- LEED can cost a project additional design fees and construction costs
- Zero Energy Certification costs a couple thousand dollars
- Actual verifiable data in real time for clients / designers / contractors (solar monitoring and utility bills)

ICF's & Net Zero





- ENERGY STAR is a U.S. Environmental Protection Agency (EPA) voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency.
- Certified products for use in new construction
- Energy Star certification building / system wide based on a benchmark score of 75 or higher
- Can work in tandem with LEED certification

ICF's & Net Zero





- Tax Credit: 30% of cost with no upper limit
- Expires: December 31, 2021 Tax credits for Solar Energy Systems are available at 30% through December 31, 2019.
- The credit decreases to 26% for tax year 2020; drops to 22% for tax year 2021 then expires December 31, 2021)
- Details: Existing homes and new construction qualify.
- https://www.energystar.gov/about/federal_tax_credits

ICF's & Net Zero



Energy Use Intensity

- EUI is expressed as energy per square foot per year
- It's calculated by dividing the total energy consumed by the building in one year (measured in kBtu or GJ) by the total gross floor area of the building.
- Generally, a low EUI signifies good energy performance

ICF's & Net Zero



ENERGY STAR Portfolio Manager Technical Reference

U.S. National Median Reference Values for All Portfolio Manager Property Types

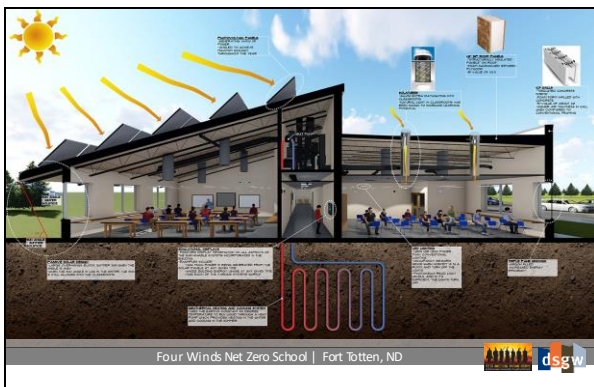
Broad Category	Primary Function	Further Breakdown (where applicable)	Source EUI (kBtu/ft ²)	Max EUI (kBtu/ft ²)	Reference Data Source - Peer Group Comparison	
Banking/Financial Service	Bank Branch		102.8	172.0	CBCEC - Bank/Financial	
	Financial Office*		148.1	173.3	CBCEC - Office & Bank/Financial	
Education	Adult Education		141.4	181.6	CBCEC - Education	
	College/University		292.9	307.7	CBCEC - College/University	
	K-12 School*		141.1	181.2	CBCEC - Elementary/Middle & High School	
	Preschool/Daycare		141.1	181.2	CBCEC - Preschool	
	Vocational School		141.1	181.2	CBCEC - Education	
	Other - Education		141.1	181.2	CBCEC - Education	
Entertainment/Public Assembly	Convention Center		69.9	65.3	CBCEC - Social/Meeting	
	Movie Theater		65.1	65.3	CBCEC - Public Assembly	
	Museum		65.1	65.3	CBCEC - Public Assembly	
	Performing Arts		65.1	65.3	CBCEC - Public Assembly	
	Recreation	Banking Area		65.1	65.3	CBCEC - Public Assembly
		Fitness Center/Health Club/Gym		65.1	65.3	CBCEC - Public Assembly
		Ice/Curling Rink		65.1	65.3	CBCEC - Public Assembly
	Social/Meeting Hall	Other - Recreation		65.1	65.3	CBCEC - Public Assembly
		Other - Recreation		65.1	65.3	CBCEC - Public Assembly
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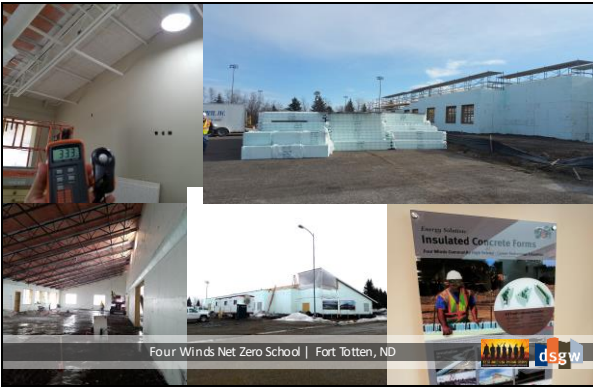
ICF's & Net Zero

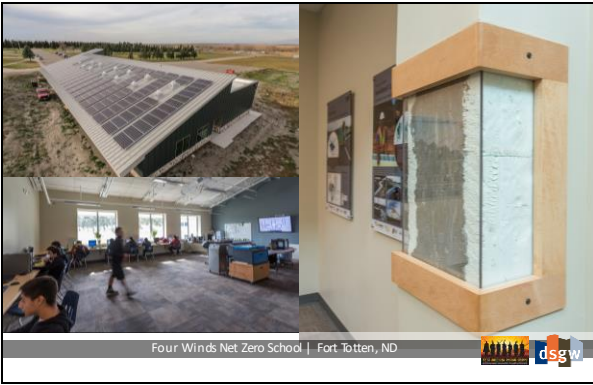
Reducing EUI

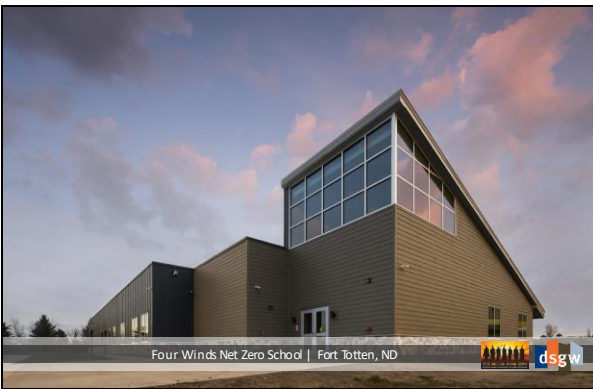
- Ensuring proper maintenance of equipment to improve efficiency
- Installing motion activated lights (occupancy sensors)
- Incorporate the use of natural sunlight into the design of occupied spaces
- Provide a means for passive heating and cooling of interior spaces
- Develop on-site renewable energy generation
- Heating, air conditioning, and lighting in building spaces together comprise the majority of energy use and obtaining efficiencies in these two areas can result in a significant amount of cost savings, as well as gains in compliance with the 2030 energy reduction goals.

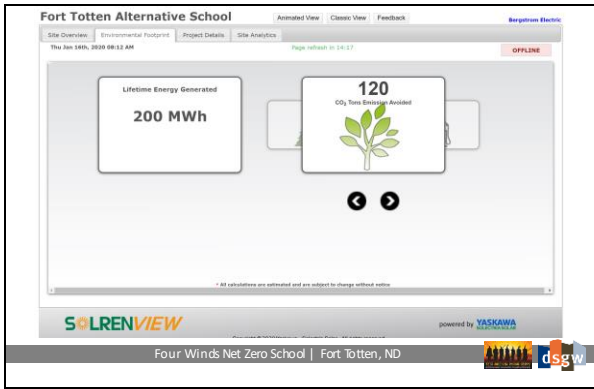
ICF's & Net Zero

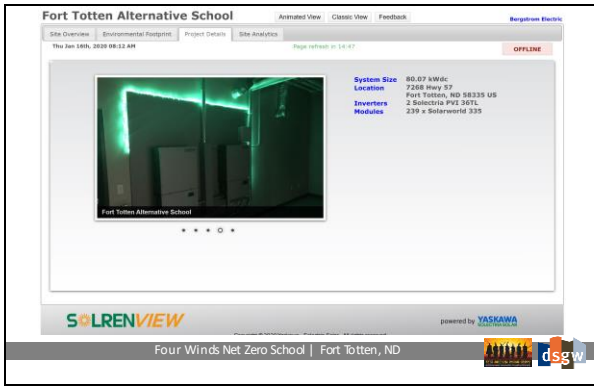


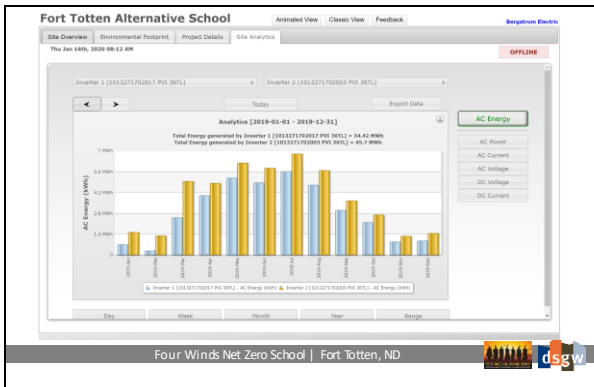


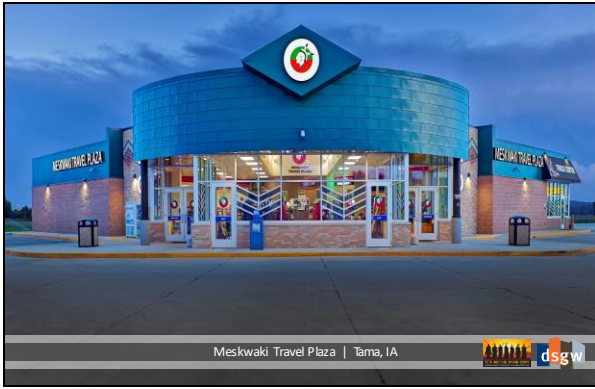


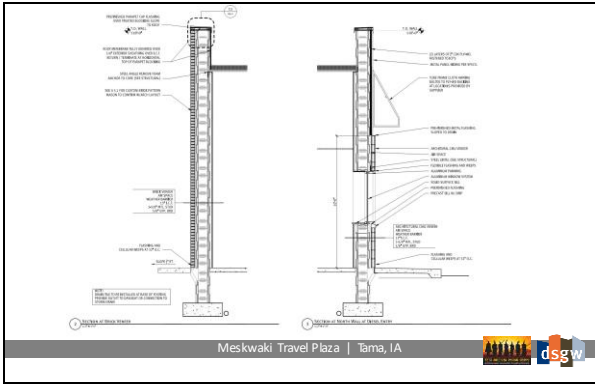








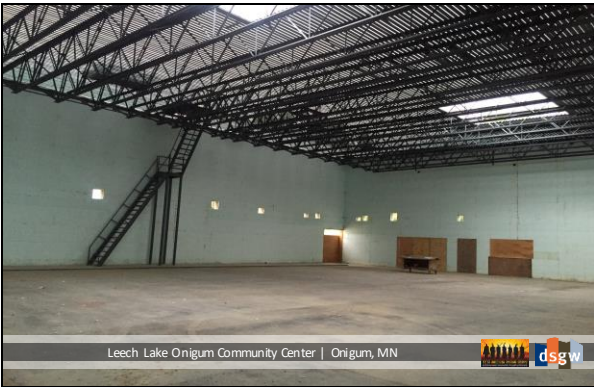


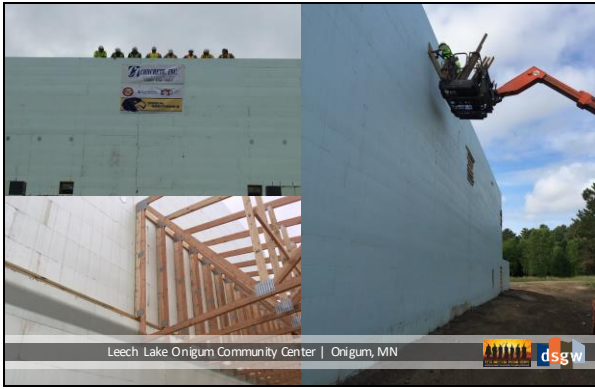




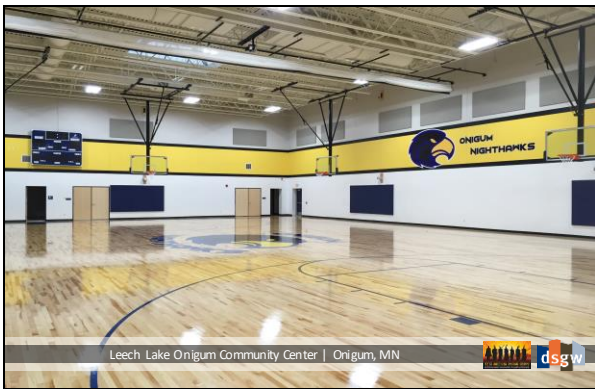


















Lessons Learned

- Simplifies the design process
- Reduces risk of failures at exterior envelopes
- Provides a long-life structure
- Pairs well with Energy Efficient design, esp. Net Zero
- Teaches a trade skill to local labor, especially with shortage of good masons
- No lead times, can start construction quickly, especially with fast track/bid pack scenarios



One last thought...

- Over \$8.0 billion dollars was distributed to Tribes with the CARES act, to be used in response to the current pandemic and to help prepare for the next one
- DSGW is currently contracted on several projects that have to be design AND built by December 31st, 2020
- DSGW chose ICF over traditional stick-framed, precast and pre-engineered metal buildings



Thanks!

Mike Laverdure, AIA

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