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POWER PANEL

RENEWABLE RESOURCES AND MANAGEMENT FOR THE BUILT ENVIRONMENT

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THE URBAN BUILT ENVIRONMENT

- Over 90% of our lives are spent in buildings, where we live, work, and play

- Buildings account for approximately 40% of total energy consumption (costing $400 billion annually in the US alone) and many other resources

- U.S. Environmental Protection Agency reports that some 30% of buildings' energy is simply wasted

PROJECT PLANNING

RESOURCES CONSUMED BY THE BUILT ENVIRONMENT TODAY

According to USGBC (LEED), in the US, buildings account for:

- 72% of electricity consumption
- 39% of energy use (US $400 Billion)
- 38% of all carbon dioxide (CO2) emissions
- 40% of raw materials use
- 30% of waste output (136 million tons annually)
- 14% of potable water consumption

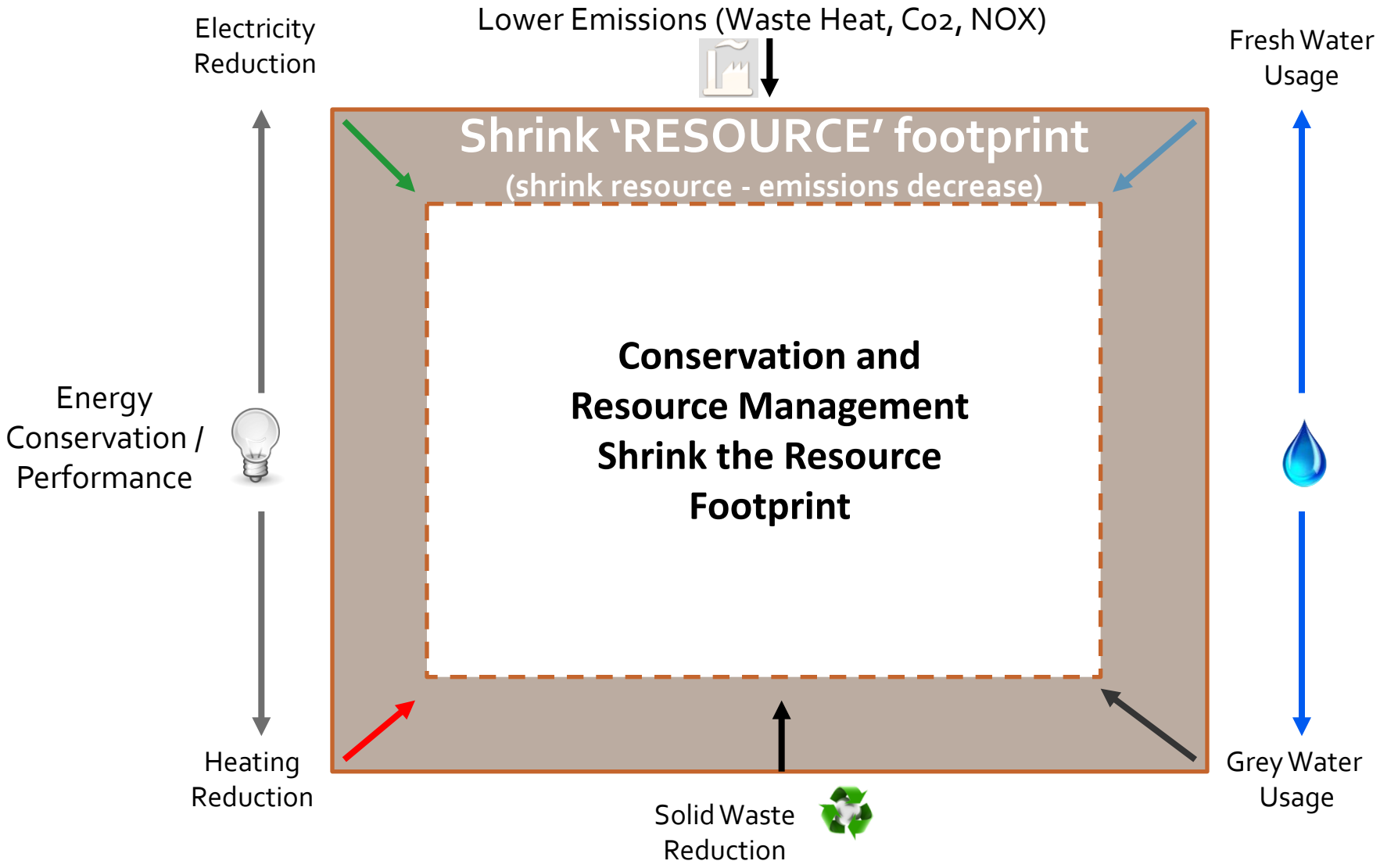
PLANNING FOR NET ZERO RESOURCE BUILDINGS

Managed **‘conservation’** and renewable resource **‘generation’** combined with sustainable building design and construction

enable

Net Zero **‘Resource’** Buildings

RESOURCE CONSUMPTION - CONSERVATION & RESOURCE MGT.



GENERATION - GROW BUILDING RESOURCE 'SELF SUPPLY'

PV Electricity
Production

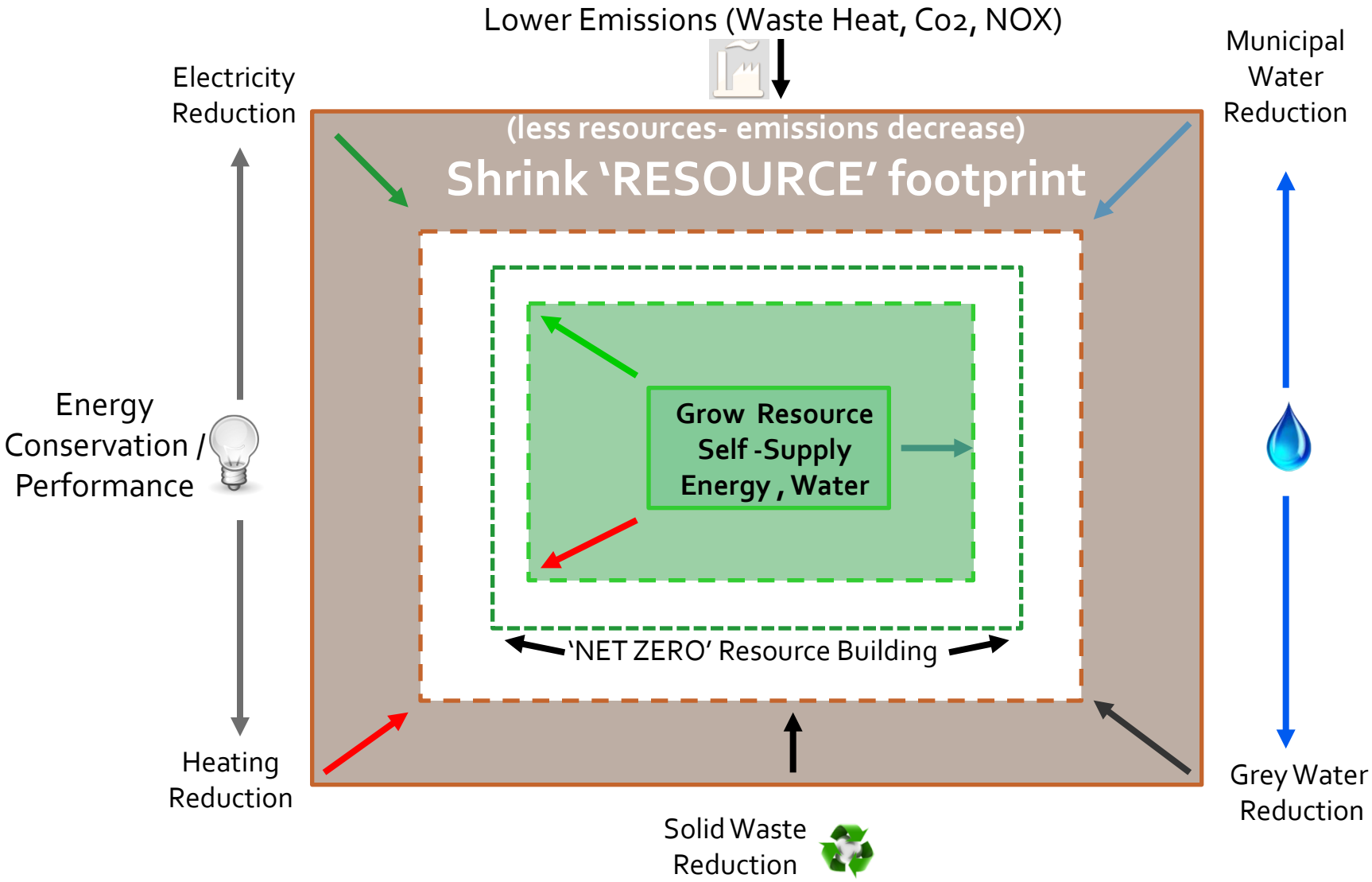
Solar Thermal
Heat Production

Increase Resource
Self -Supply
Energy , Water

Water
Rain Water
Capture

Relationship of Energy ← → Water

CONSERVATION & SELF GENERATION - 'NET ZERO'



TECHNOLOGY SELECTION

AVERAGE ENERGY USAGE
NORTH AMERICAN RESIDENTIAL BUILDINGS

70% or more THERMAL ENERGY

Water Heating	20%
Space Heating	35%
Space Cooling	20%
Appliances	10%
Lighting	15%

Cooling % increases as latitude decreases

CO-GENERATION, THERMAL STORAGE & SOLAR CHILLING

Integrated solar appliances to address buildings real energy needs

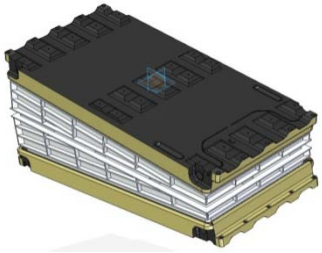
PV & Thermal energy
Captures 70%+ Solar Fraction

Rugged, Lightweight Panel
(Patented)

Thermal Storage Tanks (~R20)

Modular lightweight - Hot & Chilled Water
(Patented)

Solar Thermal Water Chilling



Use's solar heat to create cooling

Space Heating	35%
Water Heating	20%
Space Cooling	20%
Appliances	10%
Lighting	15%

Average North American Residential Building
70% or more THERMAL ENERGY

Generation – Utilize Building Rooftop Resource

Harvesting buildings roof top solar resource grows buildings energy 'Self Supply'

PV Electricity
Production

Solar Thermal
Heat Production

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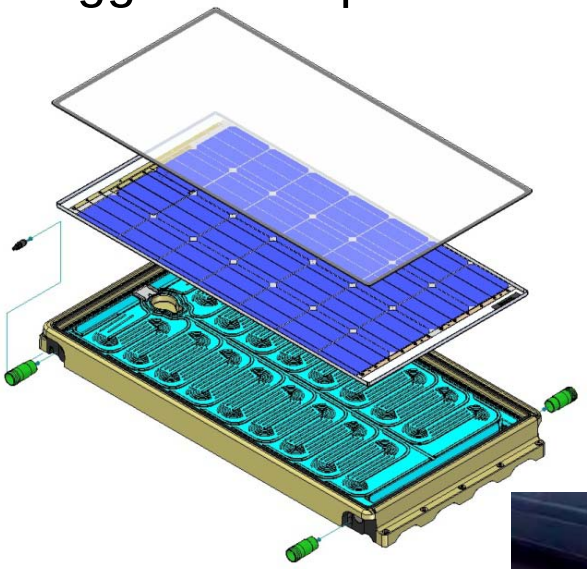
Power Panel PVT Panel

Uniquely designed to extract the greatest amount of the sun's energy – in excess of 70%+ compared to regular PV Panels 15% - by co-generating both PV and heat from a rugged solar panel



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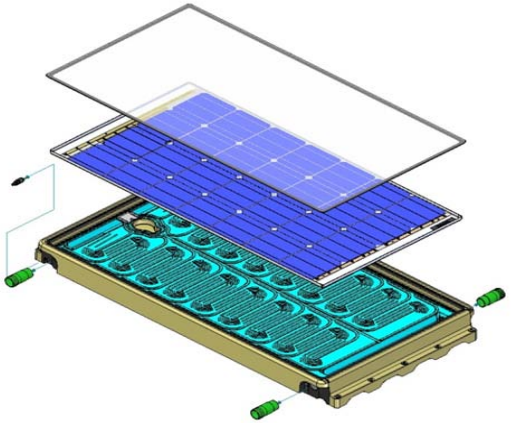
Plastic Panels & Modular Tanks - Complete System Solution



Captures ~70%+ solar fraction

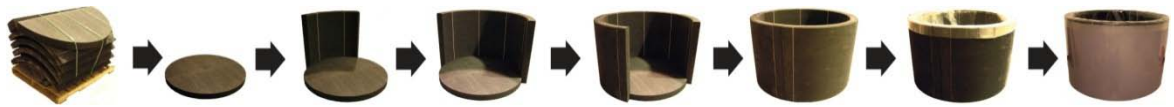
Recyclable materials

Complete System

Mounting & System Components

Rugged PVT + Thermal Panel

Monitoring & Controls



Thermal Storage Tanks - **40–60 80-120 300 Gallon Sizes**

LESS MATERIAL – LESS WEIGHT – LESS RESOURCES

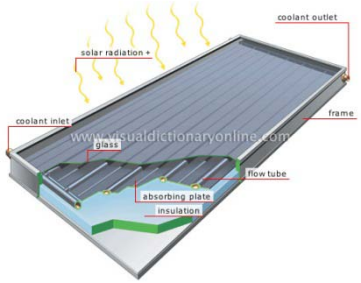
PVT Panel

~ 37 lbs each

650 Plastic panel installation, at 37 lbs each, use 24,500 lbs of material for Panels

-OR-

PV Panel + Thermal Panels



~ 99 lbs together for comparable output

Traditional installation, at 99 lbs each combined, use 64,350 lbs of material plus 40% more mounting materials

Steel storage tanks, plus insulation, can weigh over 20 times the weight of plastic

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Power Panel

PVT Panels = 1.2 kW PV + 5kW

112 Sq Ft area | 370 lbs

-OR-

Conventional Solar

6 PV & 6 Thermal panels = 1.2kW PV + 5.7kW

190 Sq Ft area | 990 lbs

- 40% less space
- 10% more PV output
- 300% less weight
- 20% less cost
- 50% less labor
- 50%+ better ROI's

Co-generation PVT Panel

Conventional PV Panels

Thermal Panels

New Build – LEED Solutions

Energy and Atmosphere (35)

1-19 Optimize Energy Performance *PVT panels can reduce energy up to 50% +*

1-7 On-site Renewable Energy *PVT panels + plastic thermal storage tanks*

2 Enhanced Commissioning

2 Enhanced Refrigerant Management *No refrigerant needed w/ Solar Thermal A/C*

3 Measurement and Verification *System monitoring, measurement and mgt*

2 Green Power *Above is all green but it is on-site so may not qualify*

Water Efficiency (10)

4 Water Efficient Landscaping

2 Innovative Wastewater Tech *Rain water can be collected and used*

2-4 Water Use Reduction *Water collected can be used for system*

Materials and Resources (7)

1-2 Materials Reuse

1-2 Recycled Content *EPP recycled (Min 20%)*

1-2 Regional Materials (1-2)

1 Rapidly Renewable Materials *EPP maybe considered*

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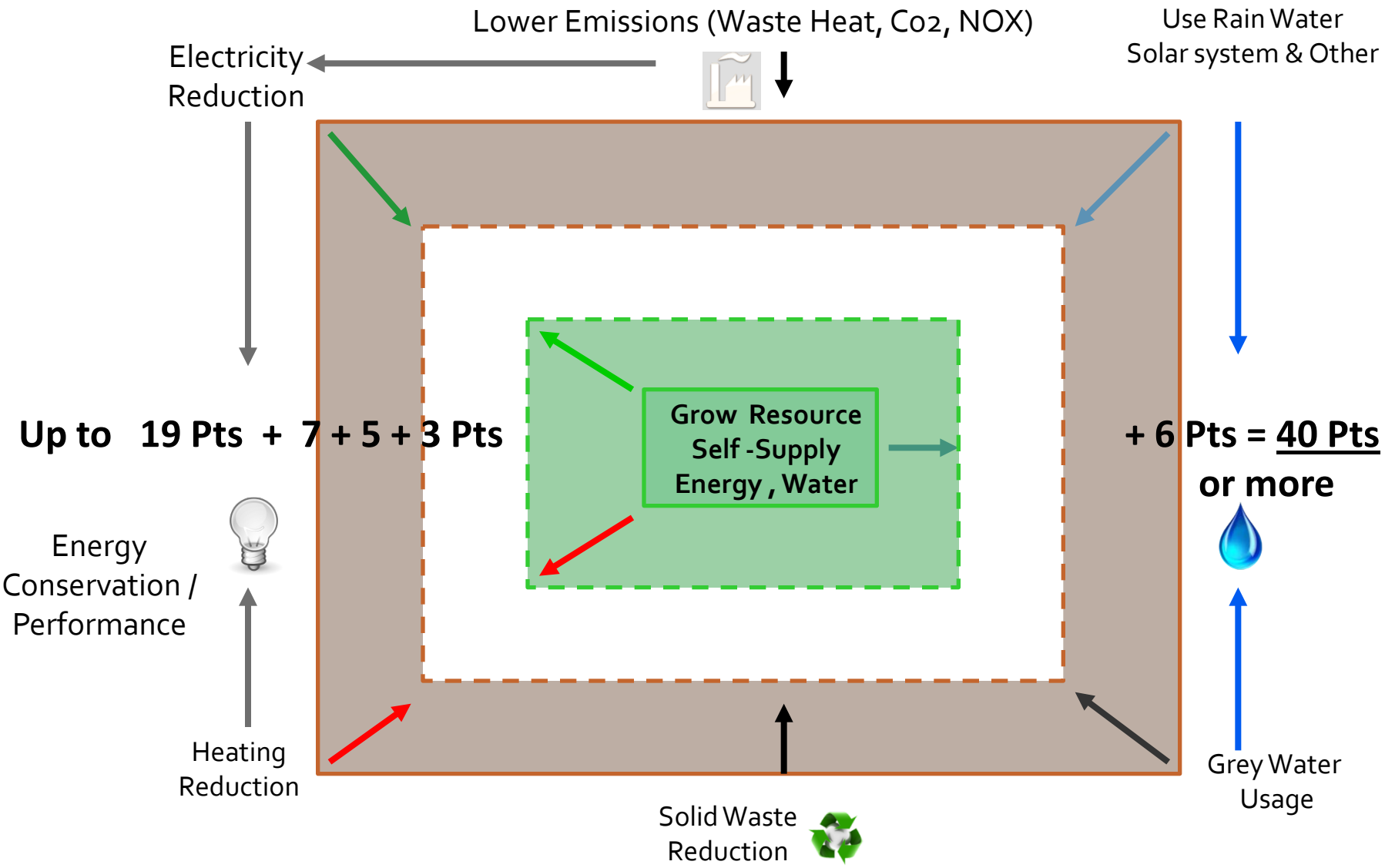
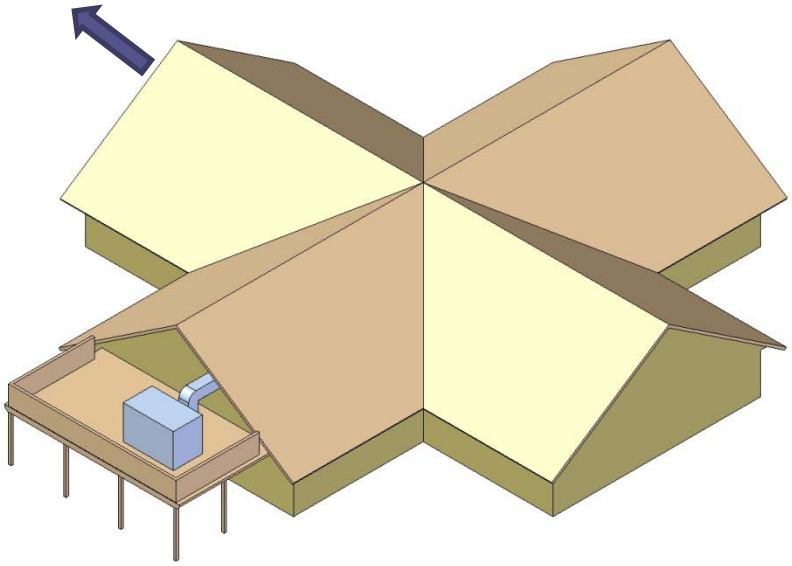
NEW BUILD LEED POINTS USING POWER PANEL SYSTEMS



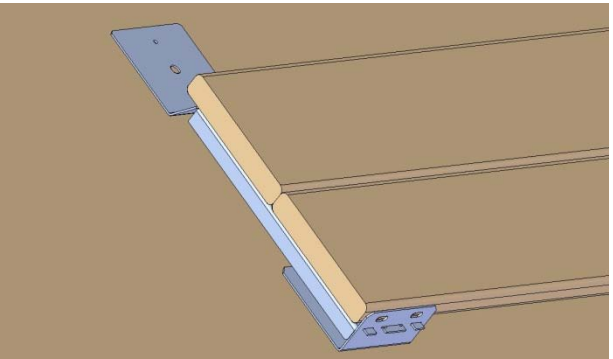
Background – Nottawaseppi Community Center

Site Survey of the Community Center showed that there is very good rooftop space at 34 deg inclination no trees shading access to accommodate the solar array.

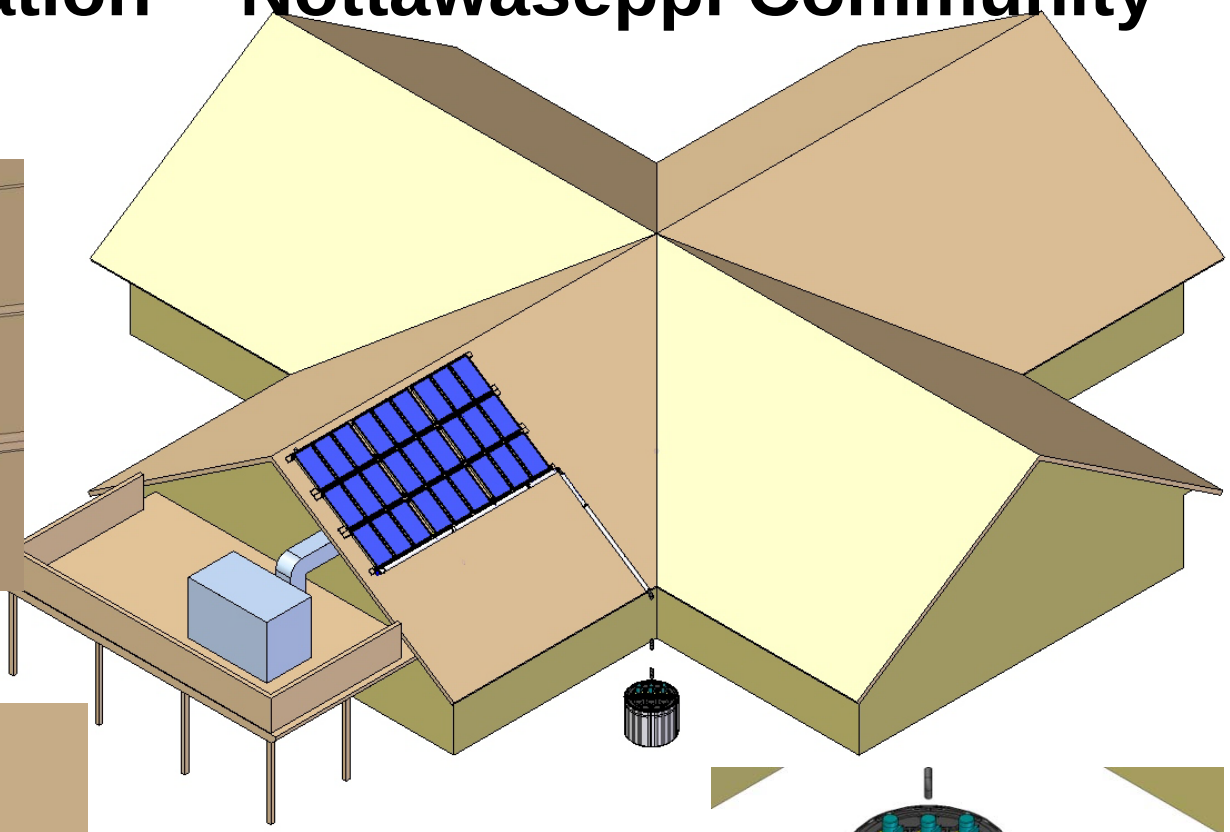
NORTH

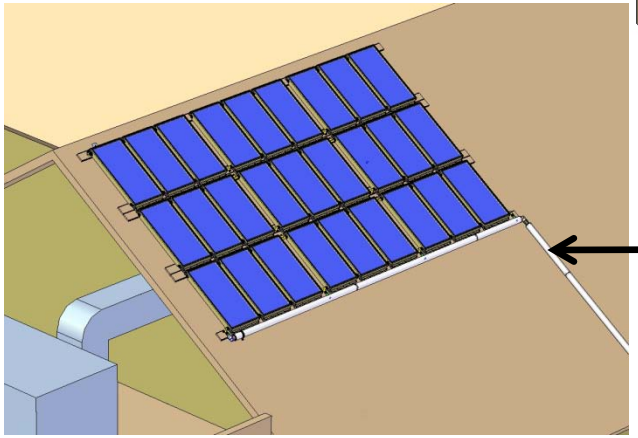


27 Panel Installation - Nottawaseppi Community Center

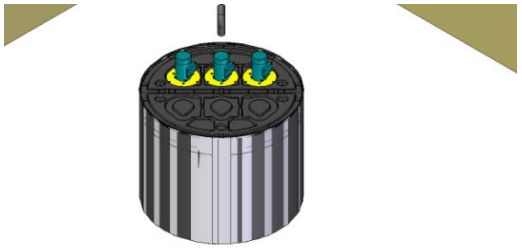


Shingle Roof Mount System



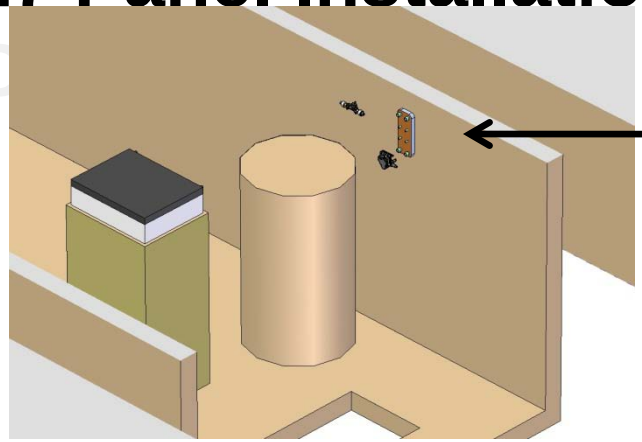


Drain Back Plumbing

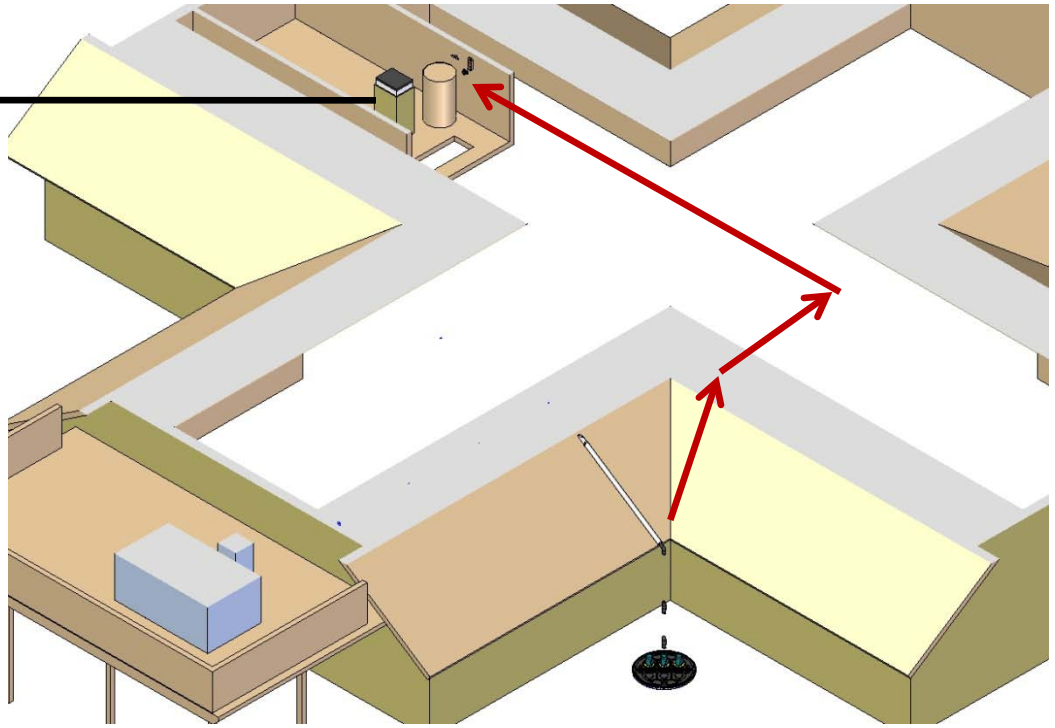


1250 Liter Storage Tank buried at

27 Panel Installation - Nottawaseppi Community



Utility Room with furnace and Hot Water Heater



Utility Plumbing Supply and Return Lines from Thermal Storage Tank to Utility Room route through space in ceiling rafters

Energy Savings

Nottawaseppi Community Center	Revenue Summary
27 Power Panels - 3.3 kW dc PV + Thermal	
Value of Electricity ($/kWh)	$0.09
Electricity generated kWh AC/year	4,423
Electrical savings first year	**$398**
Cost of Propane ($/Gallon)	$2.00
Usable Thermal Energy Generated (kWh)	17,214
Thermal Energy Generated (BTUs)	58,750,779
Propane Saved per Year (Gallons)	827
Thermal Savings first year	**$1,655**
Total Savings First Year	**$2,053**
Total Lifetime Saving (25 yr – 3% esclation)	**$74,851**

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Estimated Price:	**$32,400**	
Utility Provided Rebate ($.229/kWh):	**$15,193**	**($1,013/yr x 15yrs)**
Amount Eligible for Tax Credit:	**$17,207**	
Federal ITC (30%):	**$ 5,162**	
Net Purchase Price:	**$12,045**	
Total Thermal Savings:	**$(60,340)**	
Total Electricity Savings:	**$(14,511)**	

Lifetime Total Net System Cost (Revenue): ($62,860)

Skasgé Power, LLC

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