

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND BUILDING PERMIT

This is to certify that

REMAGE-HEALEY ELIZABETH S & TODD S
REMAGE-HEALEY J/Revision Energy LLC

Located at

54 CENTRAL AVE- PEAKS ISLAND

PERMIT ID: 2013-00511 **ISSUE DATE:** 04/09/2013 **CBL:** 087 TT004001

has permission to **Install 2 solar panels for hot water tank.**

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise clsoed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be procured prior to occupancy.

Fire Prevention Officer

Code Enforcement Officer / Plan Reviewer

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
THERE IS A PENALTY FOR REMOVING THIS CARD**

BUILDING PERMIT INSPECTION PROCEDURES
Please call 874-8703 (ONLY)
or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

REQUIRED INSPECTIONS:

Final - Electric

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 2013-00511	Date Applied For: 03/15/2013	CBL: 087 TT004001
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Location of Construction: 54 CENTRAL AVE- PEAKS ISLA	Owner Name: REMAGE-HEALEY ELIZABETH	Owner Address: 54 CENTRAL AVE	Phone:
Business Name:	Contractor Name: Revision Energy LLC	Contractor Address: 142 Presumpscot street Portland	Phone (207) 323-1805
Lessee/Buyer's Name	Phone:	Permit Type: Alterations - Dwellings	

Proposed Use: Single Family	Proposed Project Description: Install 2 solar panels for hot water tank.
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Dept: Zoning **Status:** Approved **Reviewer:** Marge Schmuckal **Approval Date:** 03/20/2013
Note: **Ok to Issue:**

Dept: Building **Status:** Approved w/Conditions **Reviewer:** Tammy Munson **Approval Date:** 04/09/2013
Note: **Ok to Issue:**

- 1) Separate permits are required for any electrical, plumbing, sprinkler, fire alarm, HVAC systems, heating appliances, including pellet/wood stoves, commercial hood exhaust systems and fuel tanks. Separate plans may need to be submitted for approval as a part of this process.
- 2) Equipment shall be installed in compliance with the manufacturer's specifications and the UL listing.

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 2013-00511	Issue Date:	CBL: 087 TT004001
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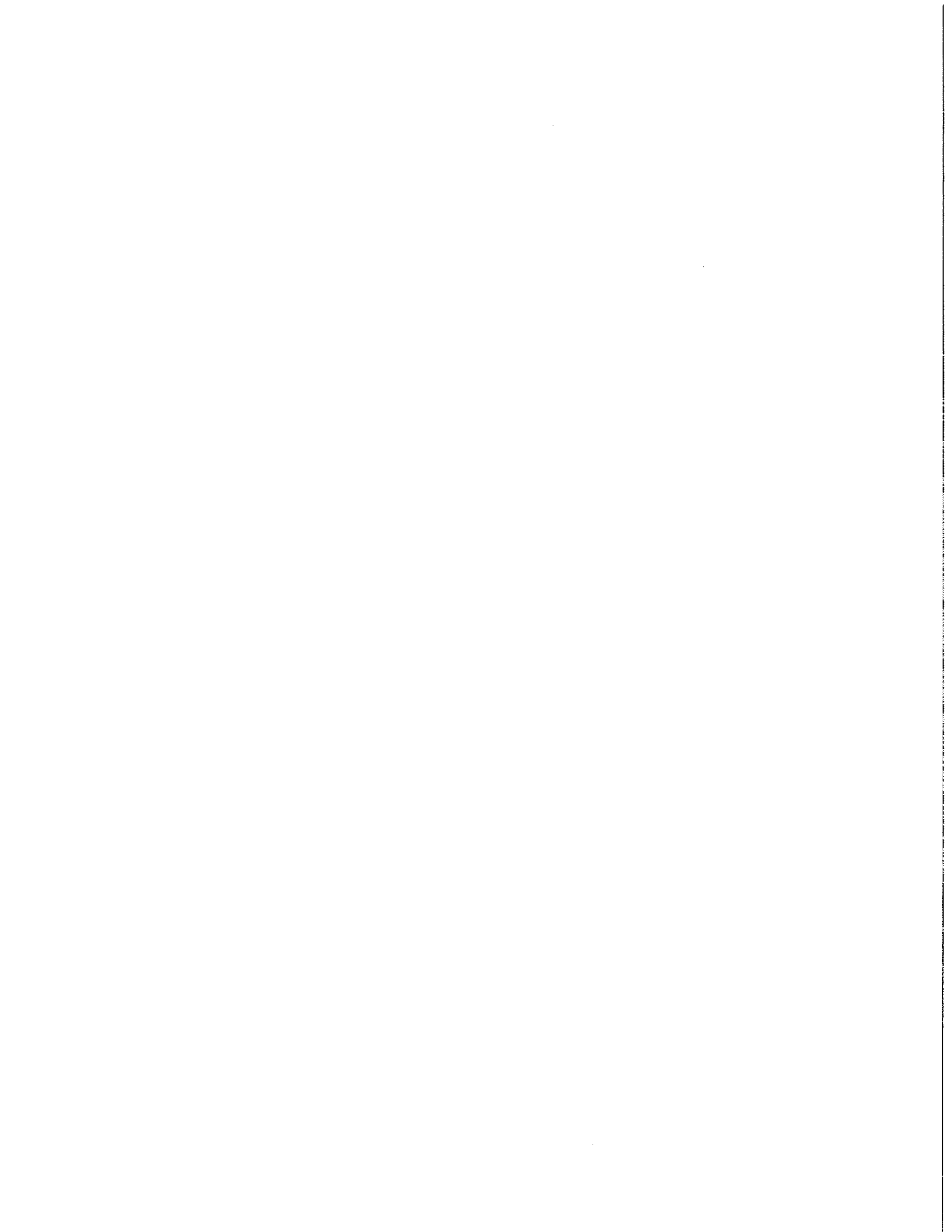
Location of Construction: 54 CENTRAL AVE	Owner Name: REMAGE-HEALEY ELIZABETH S & TODD S REMAGE HEALEY I	Owner Address: 54 CENTRAL AVE PEAKS ISLAND , ME 04108	Phone:
Business Name:	Contractor Name: Revision Energy LLC	Contractor Address: 142 Presumpscot street Portland ME 04101	Phone (207) 323-1805
Lessee/Buyer's Name	Phone:	Permit Type: Alterations - Dwellings	Zone: IR-2
Past Use: Single Family	Proposed Use: Single Family	Permit Fee: \$140.00	Cost of Work: \$12,000.00
Proposed Project Description: Install 2 solar panels for hot water tank.		FIRE DEPT: <input type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> N/A	INSPECTION: Use Group: Type:
		Signature:	Signature:
PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)			
Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied			
		Signature:	Date:

Permit Taken By: bjs	Date Applied For: 03/15/2013	Zoning Approval		
<ol style="list-style-type: none"> This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules. Building permits do not include plumbing, septic or electrical work. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work.. 		Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/> Date:	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	Historic Preservation <input type="checkbox"/> Not in District or Landmark <input type="checkbox"/> Does Not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE





General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: <u>54 Central Ave</u>		
Total Square Footage of Proposed Structure/Area	Square Footage of Lot	Number of Stories
Tax Assessor's Chart, Block & Lot Chart# Block# Lot#	Applicant: (must be owner, lessee or buyer) Name <u>Revision Energy</u> Address <u>142 Presumpscot St</u> City, State & Zip <u>Portland, ME 04103</u>	Telephone: <u>221-6342</u> <u>12,000</u>
Lessee/DBA <u>RECEIVED</u> <u>MAR 15 2013</u> Dept. of Building Inspections City of Portland Maine	Owner: (if different from applicant) Name <u>Todd Renage-Healy</u> Address <u>54 Central Ave</u> City, State & Zip <u>Portland, ME 04108</u>	Cost of Work: <u>\$11856</u> C of O Fee: \$ _____ Historic Review: \$ _____ Planning Amin.: \$ _____ Total Fee: \$ <u>140</u>
Current legal use (i.e. single family) <u>single family</u> Number of Residential Units _____ If vacant, what was the previous use? _____ Proposed Specific use: _____ Is property part of a subdivision? _____ If yes, please name _____ Project description: <u>installing 2 solar panels to make hot water connected to hot water tank</u>		
Contractor's name: <u>Revision Energy</u>		Email: <u>jene@revisionenergy.com</u>
Address: <u>applicant</u>		Telephone: <u>221-6342</u>
City, State & Zip: _____		Telephone: _____
Who should we contact when the permit is ready: <u>Jen Hater</u>		Telephone: _____
Mailing address: _____		

Please submit all of the information outlined on the applicable checklist. Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at www.portlandmaine.gov, or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

and I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

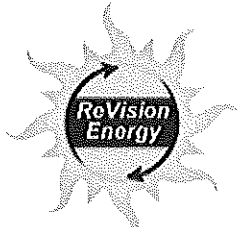
Signature: Jen Hater Date: 3/15/2013

This is not a permit; you may not commence ANY work until the permit is issued

RECEIVED

NOV 11 1966

U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C.



Professional design, installation and service of renewable energy systems

March 15, 2013

City of Portland
389 Congress Street
Portland, ME 04101

RE: ReVision Energy Solar Installation at 54 Central Ave, Peaks Island

Dear Code Enforcement,

ReVision Energy has been contracted to design and install a solar electric system at the above address in Portland. This letter is to confirm that all work will be performed by licensed and qualified installers, expert in the field and in compliance with both manufacturer's recommendations and all applicable local and state codes and standards. This also confirms that the roof structure can handle the weight of the panel load, in addition to snow load. The weight of the panels does not change the structural integrity of the building.

ReVision Energy employs licensed engineers, plumbers, and electricians and carries the solar industries highest certifications (NABCEP) in both solar thermal and photovoltaic installation. We're committed to high quality, code compliant work and look forward to working together with the city and the CEO to ensure that all your requirements and needs are met and that our customer ends up with a system that is beautiful, functional and safe.

Electrical and grounding:

All electrical work to be performed by a licensed ME electrician and will conform to NEC 2011 revision as well as NABCEP standards. Specifically, wiring and grounding of the photovoltaic system will be governed by manufacturer's recommendations and article 690. All installed metal components are grounded via the grounding electrode conductor.

If you have any questions or concerns, we'd like to address them as quickly and completely as possible. Please don't hesitate to call or e mail anytime.

Respectfully,

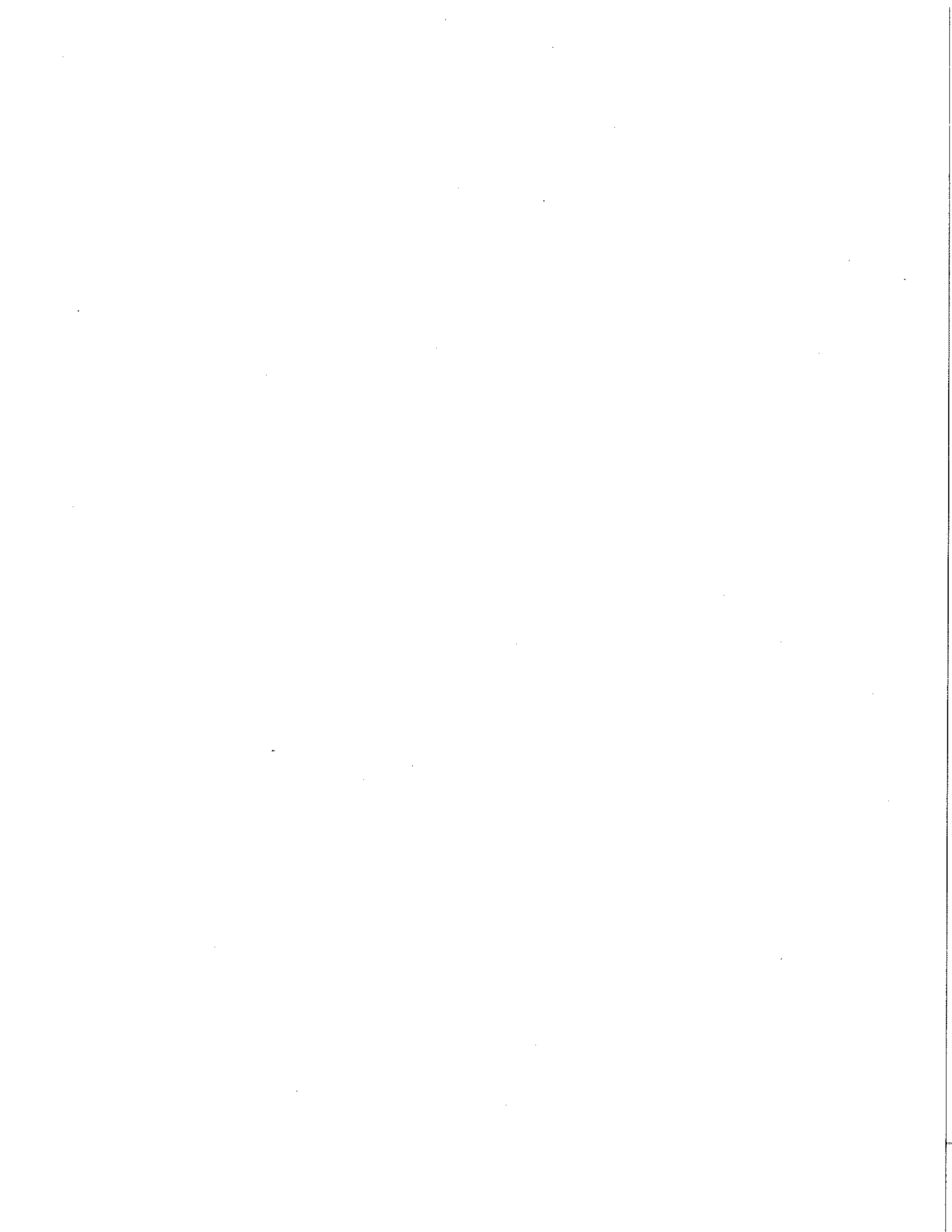
Fortunat Mueller, P.E.
Co-owner
ReVision Energy
(207) 752-6358
fortunat@revisionenergy.com

Bangor
207-570-4222

Liberty
207-589-4171

Portland
207-221-6342

Portsmouth
603-486-7170





ARRAY ORIENTATION:
155° (True)

ARRAY PITCH:
38° angle

2 Wagner flat plate solar hot water collectors to be mounted to south-facing roof to optimize solar performance

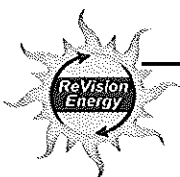
Project Summary

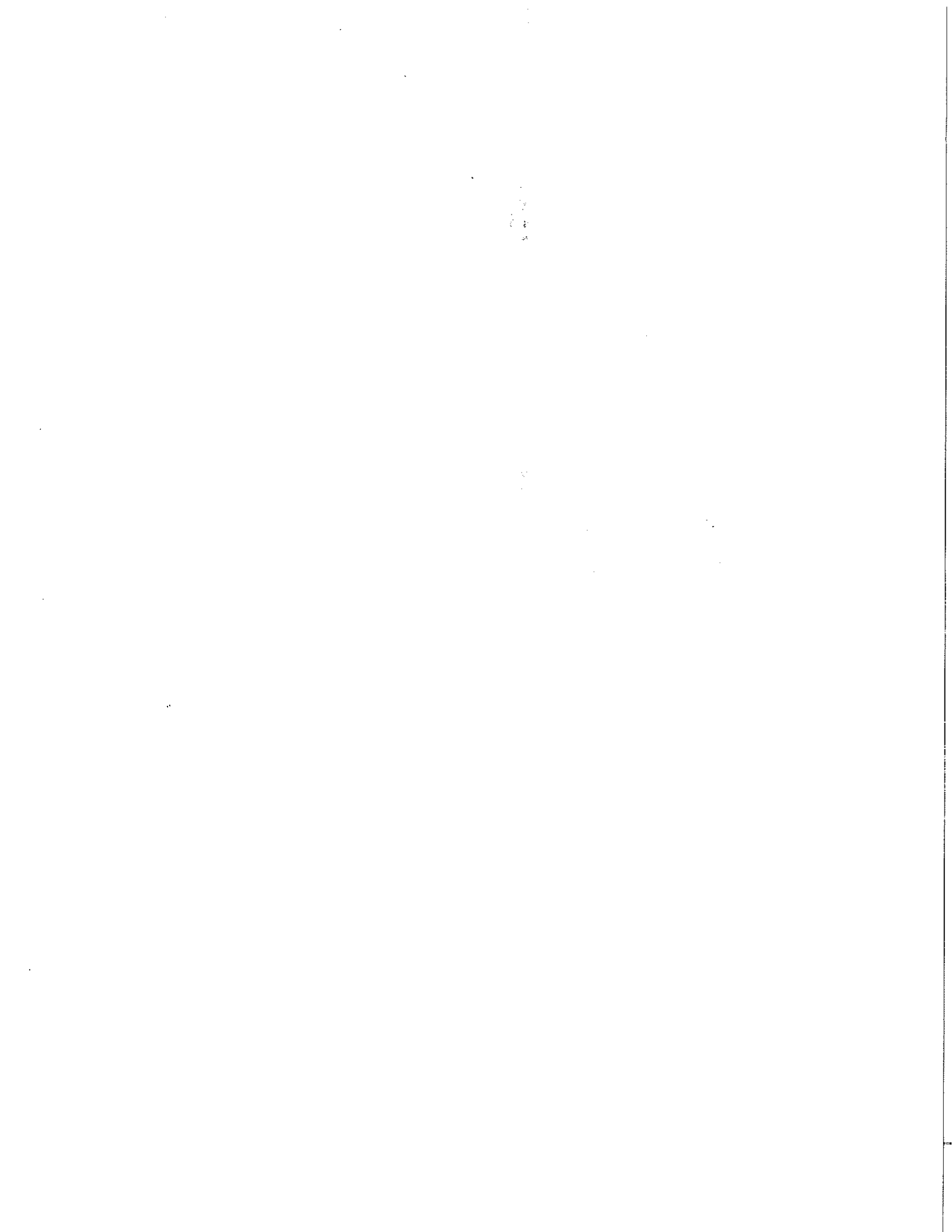
System	Performance	Cost	Incentives	Net Cost
Two Wagner Eco C20 flat plate solar hot water collectors with solar storage tank for heating domestic hot water supply	<ul style="list-style-type: none"> Produce roughly 10,999,800 Btu's of clean, renewable energy annually. Offset roughly 2,947 lbs. of CO2 emissions annually. 	\$11,856 Installed	-(\$3,557) 30% Federal Tax Credit -(\$1,600) Rebate from Efficiency Maine	\$6,699

Economic & Environmental Return on Investment

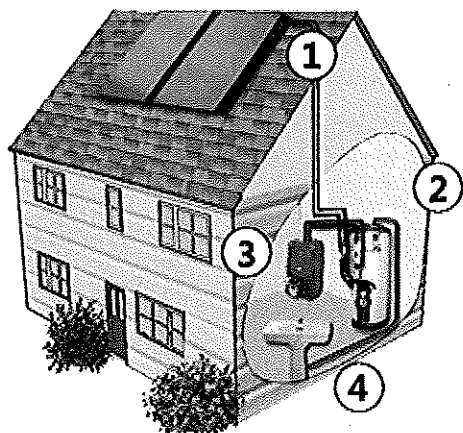
The system we are proposing is guaranteed to pay for itself by harvesting abundant solar energy to replace finite, polluting and increasingly costly fossil fuels. Once you get 100% of your initial investment returned through government financial incentives and energy savings, the system will continue to deliver a revenue stream for decades to come. Plus, the system will eliminate thousands of pounds of CO2 emissions each year, delivering a powerful environmental benefit.

ReVision Energy's mission is to eliminate over-reliance on fossil fuels and the associated emissions. We are succeeding in this mission by installing solar energy systems that are as robust and reliable as traditional mechanical systems. To ensure maximum performance and longevity in a harsh climate, each system is designed by our in-house engineers (Brown, Dartmouth, MIT, UNH) and installed by our experienced team of certified solar professionals. Please join us in the mission to create a clean energy future--we promise to deliver the peace of mind that comes from knowing you have made one of the best investments of your life.





General System Diagram



1. Solar collectors convert sunshine into thermal energy.

2. Sun-heated antifreeze is pumped down from the collectors and through the solar tank's heat exchange coil in a closed loop. Heating continues as long as the temperature of the collector is 10 degrees warmer than the temperature in the tank.

3. For stretches of cloudy weather, or when hot water demand is high, seamless backup heating is provided by the boiler or by electric element.

4. Comfortable domestic hot water is tempered by a solar-grade mixing valve, and supplied to your faucets, showers, and appliances.

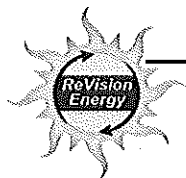
Similar Project Example

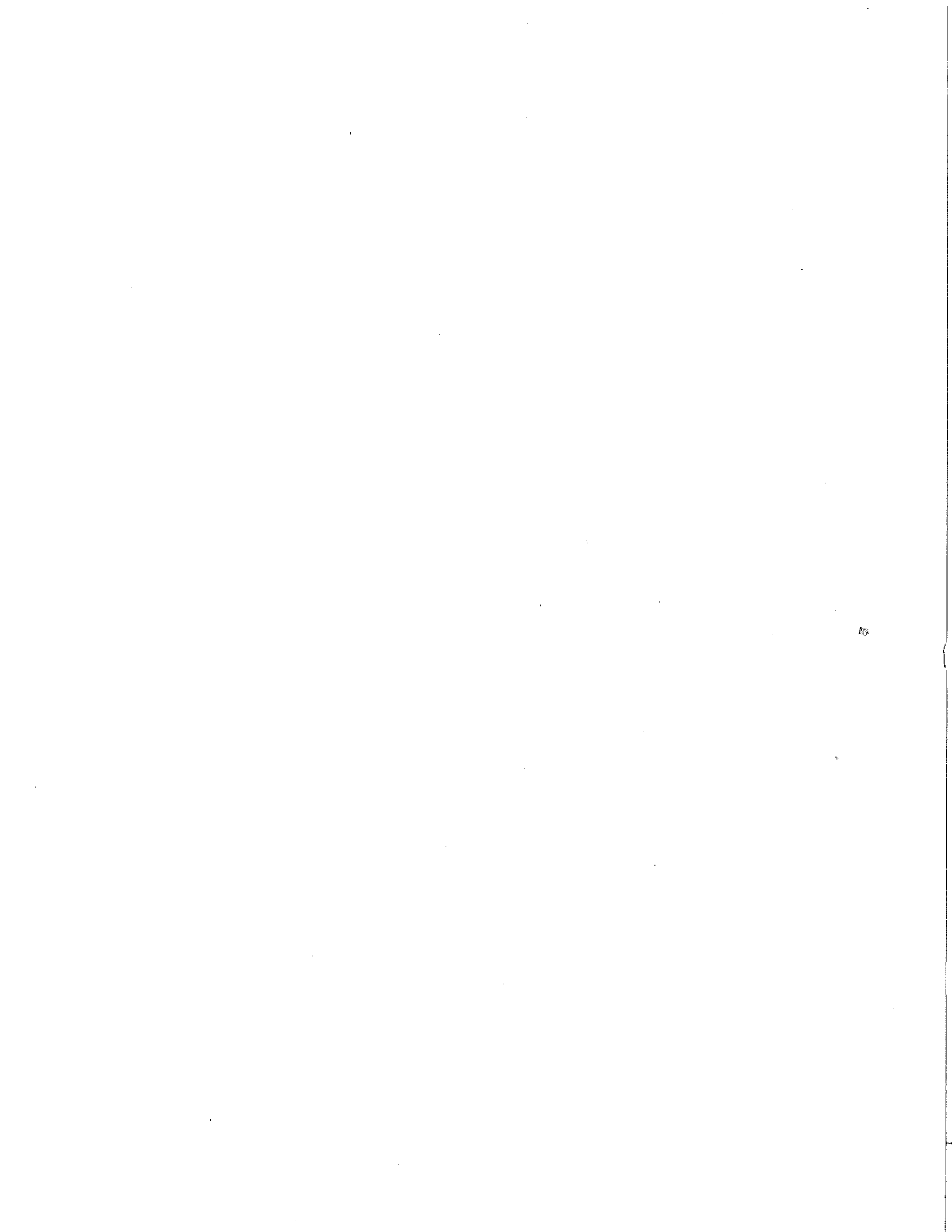


Above are two flat plate solar hot water collectors installed by ReVision Energy. This is the type of flush mount installation we are proposing for your home.

Flush Mount Roof Mounting

Based on an analysis of your roof material and pitch, we propose flush-mounting the solar hot water collectors to the south-facing side of your roof for ideal solar gain year-round.







EURO Solar Collector Type C20/C22

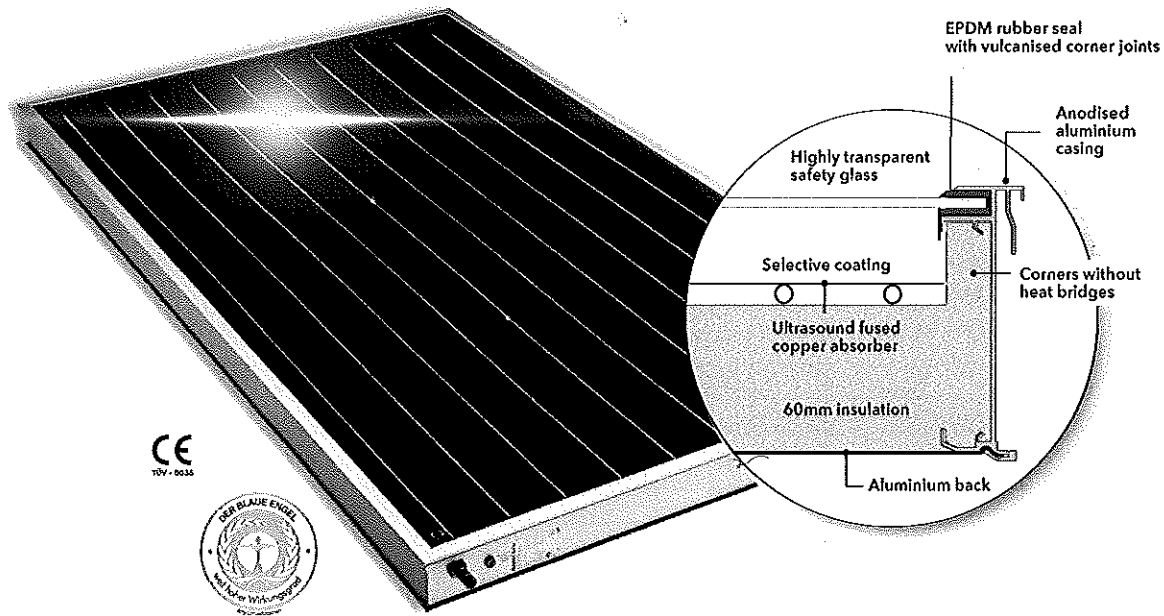


Figure 1 The EURO C20/C22 – powerful, versatile and rapidly installed

Advantages

High Efficiency through Perfect Details

Thanks to its highly selective vacuum coated flat plate absorber, a 60 mm back insulation and the seamless side insulation, the EURO solar collector is characterized by very low heat losses. In addition it is equipped with highly transparent solar glass. The EURO C20 AR variation additionally features sunarc® anti reflection glass increasing the solar yield by an additional 6-10% thanks to intelligent nano-technology based upon the moth-eye effect.

High-Quality Materials

Anodised aluminium profiles, aluminium back, high-transparency safety glass cover, weather resistant EPDM rubber seals with vulcanised corner joints and ultrasound-fused, heat-resistant copper absorber ensure safe operation for decades.

Excellent Price/Performance Ratio

Tested quality according to European norm EN 12975 and the CE label. Repeated awards from the Independent Institute for Consumer's Goods Testing "Stiftung Warentest".

Simple and Fast Installation

Tried and tested installation kits, photo-instructions and weldless connections to the solar circuit.

Adaptable Arrangements and Installations

☉ On-Roof Installation

The collectors can be installed above the roof surface with rafter brackets or mounting rails, either horizontally or vertically (horizontal preferred). Even during the installation, the roofing remains almost completely unharmed. We offer roof-anchors and rafter brackets for almost every roofing type. Up to 4 EURO collectors can be connected in series. The connection hoses with pre-assembled insulation also significantly simplify the on-roof pipeworks. Distribution pipes on the roof are not required.

☉ In-Roof Installation

The attractive in-roof installation is possible for roofs with a minimum pitch of 27% and any tile cover. In this case the collectors are installed vertically, with the connections pointing upwards. The aluminium and corrugated lead flashing can be joint without solder.

☉ Free Standing Installation

The free standing set up allows horizontal or vertical installation with adjustable inclination. Concrete slabs or gravel covered aluminium trays can be used as foundation.

1. Technical Data

Feature	EURO C20 AR	EURO C20 HTF	EURO C22 AR	EURO C22 HTF
Total area / aperture area	2.61 / 2.39 m ²		2.24 / 2.02 m ²	
Size W x H x D	2151 x 1215 x 110 mm		1930 x 1160 x 110 mm	
Efficiency (DIN 4757- 4)	$\eta_o = 85.4\%$ $k_1 = 3.37 \text{ W/m}^2\text{K}$ $k_2 = 0.0104 \text{ W/m}^2\text{K}^2$	$\eta_o = 81.8\%$ $k_1 = 3.47 \text{ W/m}^2\text{K}$ $k_2 = 0.0101 \text{ W/m}^2\text{K}^2$	$\eta_o = 85.4\%$ $k_1 = 3.37 \text{ W/m}^2\text{K}$ $k_2 = 0.0104 \text{ W/m}^2\text{K}^2$	$\eta_o = 81.8\%$ $k_1 = 3.47 \text{ W/m}^2\text{K}$ $k_2 = 0.0101 \text{ W/m}^2\text{K}^2$
Incident angle modifier	$k_{dir} = 97\%$ $k_{diff} = 94\%$	$k_{dir} = 94\%$ $k_{diff} = 88\%$	$k_{dir} = 97\%$ $k_{diff} = 94\%$	$k_{dir} = 94\%$ $k_{diff} = 88\%$
Annual collector yield (ITW 5 m ² *)	546 kWh/m ² a	509 kWh/m ² a	546 kWh/m ² a	509 kWh/m ² a
Collector housing	60mm back insulated and frame insulated aluminium casing; specific heat capacity 4.7 kJ/(m ² K)			
Glass cover	4 mm solar safety glass with sunarc®-antireflex-coating	4 mm solar safety glass	4 mm solar safety glass with sunarc®-antireflex-coating	4 mm solar safety glass
Transmission	$\tau = 96\%$	$\tau = 91\%$	$\tau = 96\%$	$\tau = 91\%$
Absorber	Heat conducting sheet and pipes made out of copper, max. pressure 10 bar			
Absorber coating	Highly selective vacuum coating, $\alpha = 95\%$, $\epsilon = 5\%$			
Absorber capacity	1.3 litre		1.1 litre	
Conductor fluid	DC20 (Propylenglycol with inhibitors), mixing ratio according to requirements			
Working pressure	Max. 10 bar			
Idle temperature (according to DIN 4757-3)	232°C	227°C	232°C	227°C
Sensor tube	6 mm internal diameter			
Connections	½" male			
CE lable	TÜV certificate 0036, EC type test (Module B) in accordance with EU direction 97/23/EC			
Max. allowed pressure/suction forces	2.25 kN/m ² (take wind and snow loads into account! Consider static capacity of roof!)			
Inclination range	10 - 85° for on-roof and free standing setup, 27 - 85° for roof integration			
Weight	48 kg		43 kg	

* Calculated for 4 person household at Würzburg/Germany with 300 l solar cylinder and 5 m² collector area.

Table 1 Technical Data EURO C20 / C22

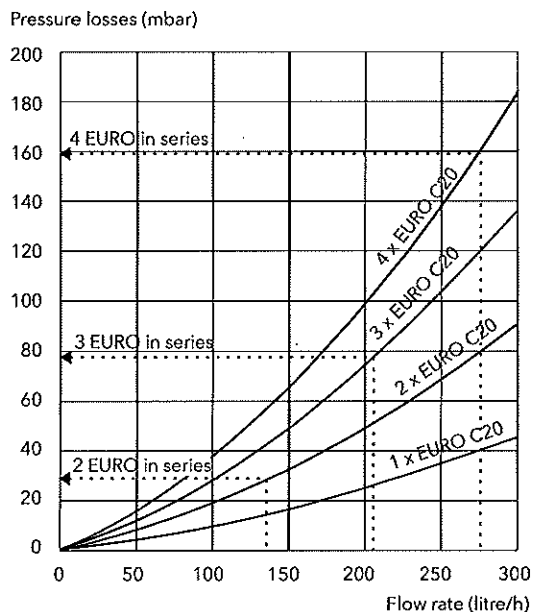


Figure 2 Pressure loss EURO C20 in relation to the volume flow and the number of collectors connected in-row; Volume flow $v=30 \text{ l/m}^2\text{h}$; heat transfer medium: 40% glycol, 60% Water at 30 °C; examples with $v=30 \text{ l/m}^2\text{h}$; pressure losses do not account for connections and connection pipes

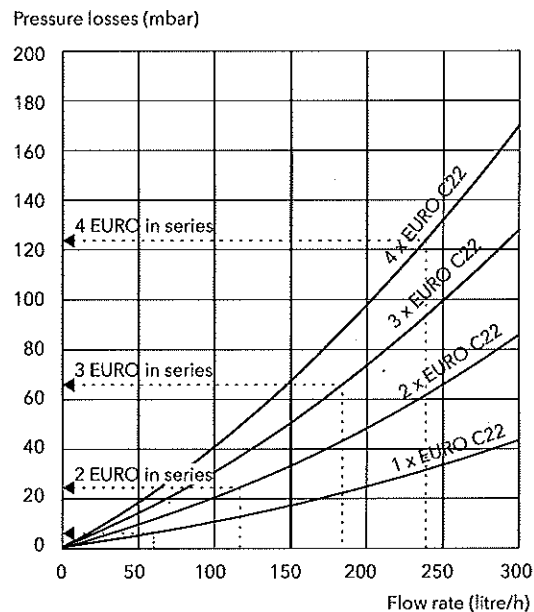
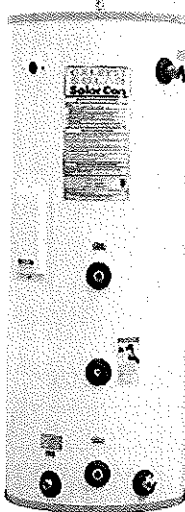


Figure 3 Pressure loss EURO C22 in relation to the volume flow and the number of collectors connected in-row; Volume flow $v=30 \text{ l/m}^2\text{h}$; heat transfer medium: 40% glycol, 60% Water at 30 °C; examples with $v=30 \text{ l/m}^2\text{h}$; pressure losses do not account for connections and connection pipes

SolarCon solar water heater tank

series NAS200



Meets and exceeds CSA C309 requirements

Function

The solar water heater has either one or two internal coils and a backup electric heating element in the single coil units. A heating medium is passed through the solar panels and internal coil as long as there is an adequate temperature difference between the heating medium and stored water in the tank. The internal coil is located as close to the bottom to facilitate the transfer of heat even at lower solar panel temperatures.

During periods of water flow through the water heater, hot water is drawn from the top of the heater and cold water comes into the bottom of the tank (by a dip tube or bottom inlet). On single coil tanks, if the hot water demand should exceed the solar heat input or there is an insufficient temperature difference between the heating medium and stored water, the heating element thermostat will activate the electrical heating element for backup heat. On double coil tanks, the upper tank is connected to the boiler for backup heat.

Solar heat output from the internal coil will vary depending on outside conditions and the temperature of the stored water.

Product range

NAS20053	Storage tank with lower coil and back up electric element	50 gallon
NAS20083	Storage tank with lower coil and back up electric element	80 gallon
NAS20123	Storage tank with lower coil and back up electric element	119 gallon
NAS20082	Storage tank with lower coil and top coil for boiler back up	80 gallon
NAS20122	Storage tank with lower coil and top coil for boiler back up	119 gallon
NAS20124	Storage tank with lower coil and top coil heat exchanger with back up electric element	119 gallon

Technical specifications

Tank materials: porcelain coated steel
 Tank insulation: 2" non-CFC foam
 Tank external cover: powder-coated steel (20-24 ga.)
 Insulation thermal conductivity: R16
 Anode rods: 2 each magnesium
 Internal heat exchanger coil (lower): 1-1/2" x 30' (50 gallon)
 1-1/2" x 36' (80, 119 gallon)
 Internal heat exchanger coil (top): 1-1/2" x 24' (80, 119 gallon)

Connections: 3/4" NPT (50 gal.), 1" NPT (80, 119 gal.)
 Maximum working pressure: 150 psi
 Testing pressure: 300 psi
 Temperature and pressure relief valve: 210°F/150 psi max
 Maximum tank temperature: 180°F
 Recommended maximum delivery hot water temperature: 120°F
 Power requirements (electric element): 240 VAC
 Power consumption (electric element): 4.5 KW
 Agency approval: UL listed

Capacity and performance

Model	Actual Tank Volume (gal)	Coil Volume Solar/Boiler (gal)	Coil Surface Area Solar/Boiler (ft ²)	Coil Friction Loss* Solar/Boiler (ft. of head)	First Hour Rating (gal)	Recovery Rate Solar & Backup* (gal/hr)	Standby Loss Rating (°F/hr)
NAS20053	45	2.30/ -	11.78/ -	0.50/ -	91	51	1.1
NAS20083	75	2.76/ -	14.14/ -	0.60/ -	126	56	0.8
NAS20123	110	2.76/ -	14.14/ -	0.60/ -	158	56	1.2
NAS20082	73	2.76/1.84	14.14/9.42	0.60/0.40	226	158	0.8
NAS20122	108	2.76/1.84	14.14/9.42	0.60/0.40	258	158	1.2
NAS20124	108	2.76/1.84	14.14/9.42	0.60/0.40	282	182	1.2

NOTES: * Based on 5 GPM flow rate.

Based on solar input of 140°F @ 2 GPM. Depending on model, backup heat recovery is calculated with either a 4500W heating element or a boiler with output of 180°F at 14 GPM. Potable water temperature rise is 77°F.

Dimensions

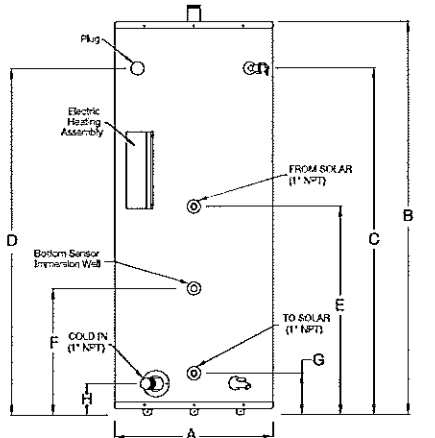
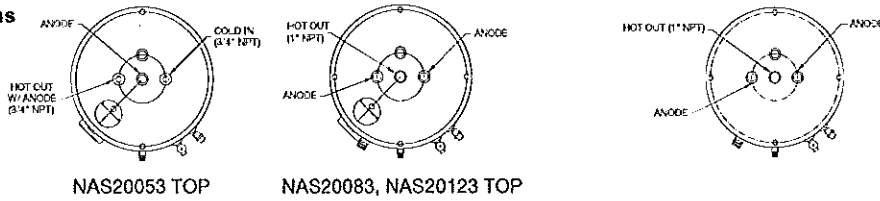


Figure 1: NAS20053, NAS20083, NAS20123

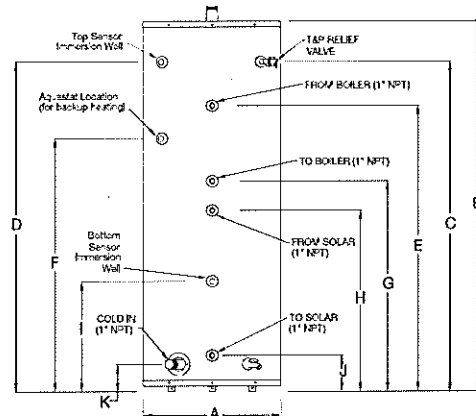


Figure 2: NAS20082, NAS20122, NAS20124

Model	A	B	C	D	E	F	G	H	I	J	K
NAS20053	22"	48 1/4"	39 3/4"	39 3/4"	31 1/2"	16 3/4"	6 1/2"	n/a	n/a	n/a	n/a
NAS20083	24"	64"	57 1/2"	57 1/2"	31 1/2"	19 1/4"	6 1/2"	5"	n/a	n/a	n/a
NAS20123	28"	65"	57 3/4"	57 3/4"	33 3/4"	16 1/4"	8 3/4"	6 1/2"	n/a	n/a	n/a
NAS20082	24"	64"	57 1/2"	57 1/2"	49 1/2"	46 1/2"	36 1/2"	31 1/2"	19 1/4"	6 1/2"	5"
NAS20122	28"	65"	57 3/4"	57 3/4"	51 1/4"	49 1/2"	38 3/4"	33 3/4"	16 1/4"	8 3/4"	6 1/2"
NAS20124	28"	65"	57 3/4"	57 3/4"	51 1/4"	49 1/2"	38 3/4"	33 3/4"	16 1/4"	8 3/4"	6 1/2"

Application diagrams

