

Generating Clean Power from Waste Heat

**PROJECT INTEGRATION
PARTNERSHIP FOR SUCCESS**

OUR TEAM



- Success through dedication and credibility
- An Engineering Team that strives to make a positive impact on the worlds energy
- Leader in Low Temperature Waste Heat Market

B: POWER System Integration

- A Europe based engineering company delivering turnkey solutions for the generation of renewable energy.
- Experienced ORC System Integrator
- Partner with ElectraTherm delivering projects Power+Generator/Diesel & Gas Engines.

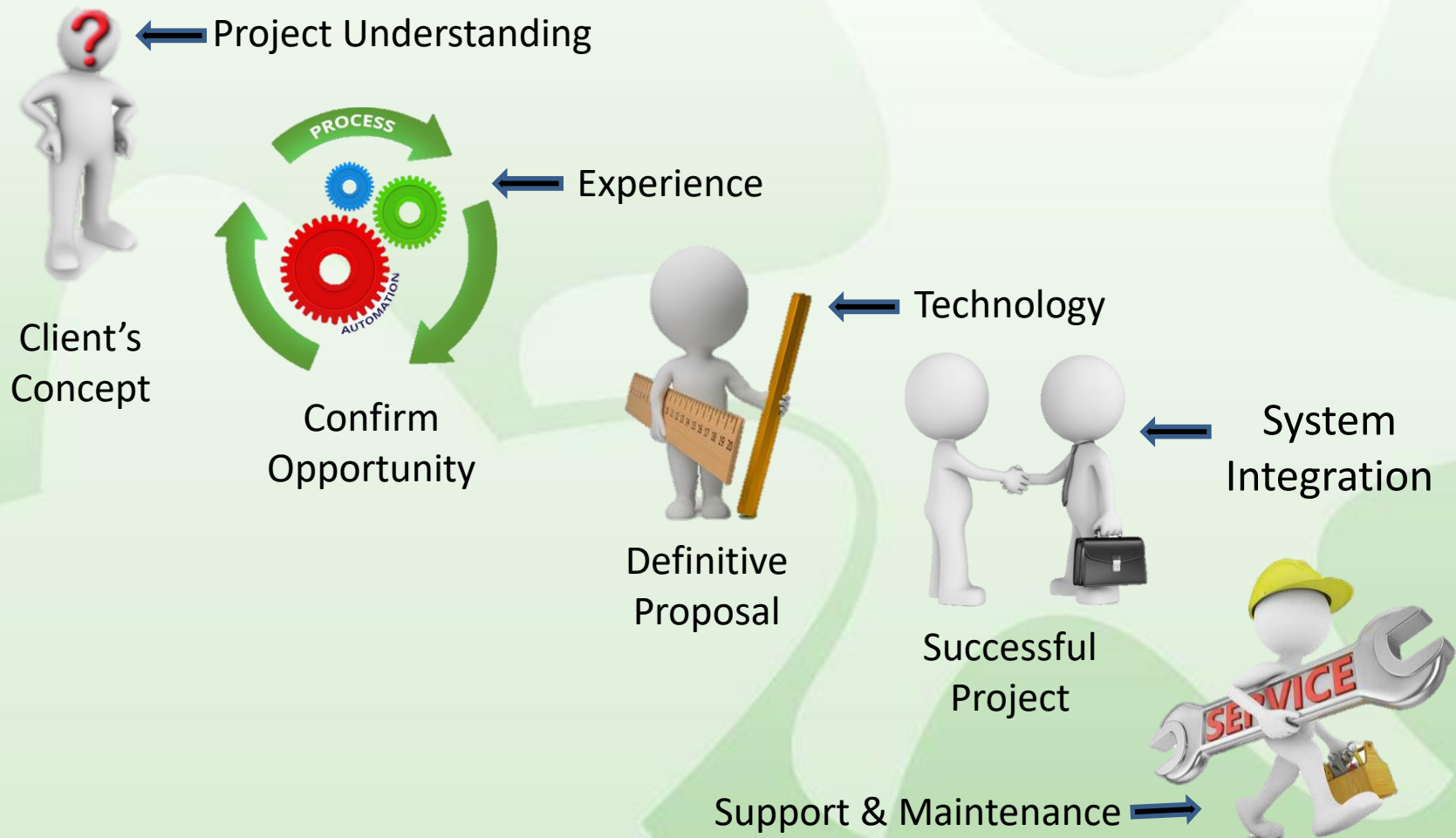
FIVE ELEMENTS OF SUCCESS

- Project Understanding
 - Experience
 - Technology



- System Integration
 - Support and Maintenance

TYPICAL PROJECT TIMELINE



STAGE ONE – CLIENT CONCEPT



Preliminary Assessment/ Budget Proposal

Our Actions

1. Understanding Your Goals and Aspirations
2. Provide Assessment of Potential Outputs
3. Prepare Basic Layout & Budget Estimate
4. Submit Written Preliminary Proposal

Information Required

- A. Details of Engine – Data Sheet
- B. Layout of Area – Drawing/Sketch
- C. Preferred Cooling System
- D. Value of Electricity Generated

OUTPUT ESTIMATION

Heat Input

Estimated
Outputs

ELECTRA THERM
BY BITZER GROUP

6500 Evaluation

Inputs ☒ Metric Units ☐ Imperial Units

Please type "F" or "C" for your temperature scale.

122.0 C	Hot Water Inlet Temperature
22.00 l/s	Hot Water Flow Rate
1500.0 kWth	Thermal Power Available
13.0 C	Cold Water Inlet Temperature
50 Hz	Electrical Grid Frequency*

*There is a significant difference in performance due to frequency.

6500

Average Estimated Outputs**

110 kWe	Gross Power Output
-11 kWe	Internal Parasitic Load
99 kWe	Net Power Output

Thermal Balance

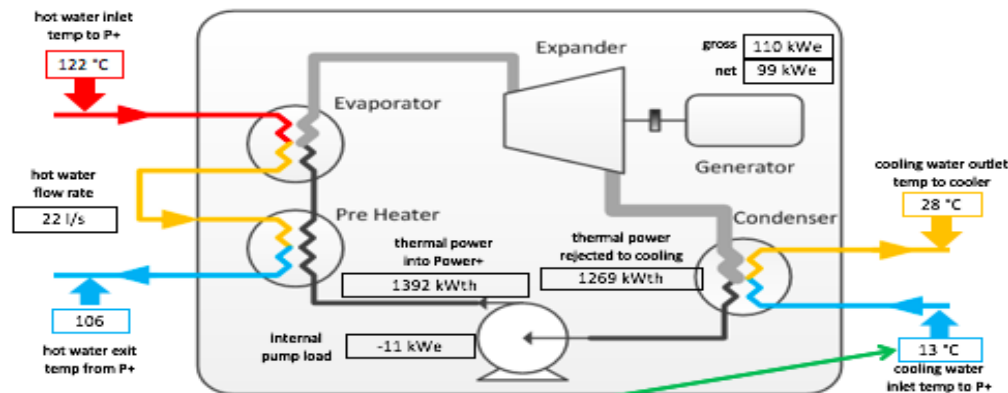
1392 kWth	Thermal Power into P+
108 kWth	Remaining Thermal Power
1269 kWth	Thermal Power Rejected to Cooler
106 °C	Hot Water Exit Temperature
	Cold Water Exit Temperature†

Click Here to Calculate

> Release Notes <

Cooling water flow rate is 20.5 l/s (325 GPM)

Condensing
Temperature



The temperature at this point is the "Cooling Water Inlet Temperature". This is **NOT** the ambient air temperature. It will typically be higher than the ambient air temp. If estimating output for a Turnkey Power+ Generator from ElectraTherm, assume the water temperature to be 23°F (12.8°C) higher than ambient air temperature for ambient air temps less than 85°F (30°C).

FINANCIAL RETURN ESTIMATION



Budget Estimate Power Value/Output Est Payback Calc Cost per kWh/ IRR

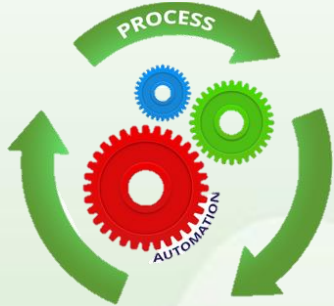
ELECTRA THERM		\$	Single Currency	Expand Null Values	Collapse Null Values
		\$ x 1 = \$	CONFIDENTIAL		
		1.00	Payback Estimator		
Series 6000 Power+ Generator	\$	603,000	Power Generator sell price from distributor		
Estimated Total Capital Expenditure (CapEx)	\$	603,000	Estimated Total CapEx for this Project		
CapEx including Incentives	\$	603,000	CapEx including Incentives		
Total value of power per kWh	\$	0.38	Average value of kWh produced		
Percentage of uptime hours (100% max/8760hrs)		97%	97% uptime is equal to 8497 hrs.		
Estimated net power output in kWe		78.5	P+ net output in kWe		
Average Total Net Power Output in kWe		78.5	Average Total Net Annual Power Output in kWe		
Annual value of power produced by P+	\$	253,471	1st year annual revenue from P+ Generator [\$21123 Gross per month]		
AVG annual P+ O&M expense based on \$0.013 per kWh	\$	8,482	Operation and maintenance expenses based on projected lifetime		
Simple Payback in Years		2.43	Years (this does account for 0% increase \$/kWh for electricity)		
Projected lifetime		20	Years		
Estimated % annual increase in \$/kWh		0.00%	Estimated percentage per year in increased power costs		
Projected Lifetime Net Revenue	\$	4,296,792	Based on 0.00% increase in power costs per year		
Total cost per kWh over lifetime	\$	0.0579	Total cost over lifetime including O&M costs of \$0.013 per kWh		
IRR for projected lifetime		40.94%	Internal Rate of Return for 20.0 years		
Net Present Value of Investment over 20 Years	\$	4,296,792	Based on inflation rate of 0.00%		

This document contains confidential and proprietary information and is supplied purely to enable you to evaluate details concerning ElectraTherm products and services. No part of this document may be disclosed or transferred outside ElectraTherm or the current interested parties. No part of this document may be reproduced or transmitted in any form or by any means, including photography and recording, without the written permission of ElectraTherm, an application for which should be addressed to the organization. Such written permission must also be obtained before any part of this document is stored in a retrieval system of any nature.

Copyright © ElectraTherm, Inc. 2015. All Rights Reserved

ST-000001 Payback Estimator, Dual currency REV 12

STAGE TWO CONFIRMING OPPORTUNITY



Site Visit – Technical Measurements

Site Visit – Technician

1. Measure available waste heat energy – Mass Flow Measurement under normal operating conditions.
2. Assess Site Conditions/ Proposed Locations
3. Condensing Water Options

Why Is This Necessary?

- A. Each engine is different and behaves differently.
- B. The actual available energy in the waste stream will determine the actual output achieved.
- C. Success can only be Built on a Solid Foundation

SITE MEASUREMENT



STAGE THREE DEFINITIVE PROPOSAL



Technology/ Formal Quotation

Our Actions

1. Select Technology
2. Basic Engineering Design
3. Concept Layout and Estimate
4. Submit Technical and Commercial Proposal

How

- A. Our Experience
- B. Site Measurement Results
- C. Size Key Components
- D. Layout Drawings/ Site Assessment

Acceptance of Quotation – Contract Award

STAGE FOUR PROJECT REALISATION



Our Actions

1. Detail Design
2. Manufacture
3. Quality
4. Onsite Installation
5. Safety
6. Commissioning and Training



Ongoing Partnership for Success

- Designed for ease of maintenance
- Experienced Personnel
- Operationally Proven Planned Maintenance System
- Remote Monitoring Capability.
- Control software upgrades – to maintain optimized performance
- Offer for Long Term Maintenance Contact



REMOTE DIESEL FLAGSHIP SITE

Dutch Harbor, Unalaska



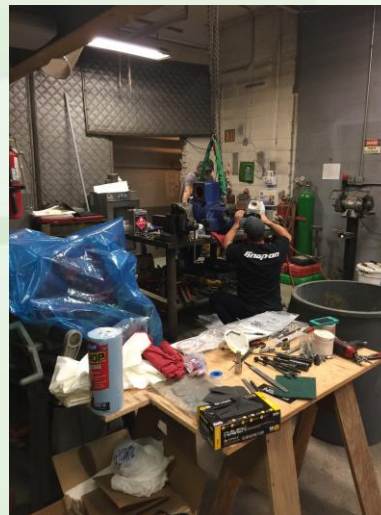
**25,000+ hours of run time
for each unit**



REMOTE ONSITE MAINTENANCE

20,000Hrs Major Maintenance undertaken onsite in Alaska.

Maintenance crew, tools and replacement parts were transported to site by air



Total duration for the major maintenance on all three units was 5 days.

WHY POWER+GENERATOR



1. Partnership Approach to Project Success
2. Proven Technology – 68 Operational Units
3. Experienced and Dedicated Team – ElectraTherm/B Power
4. Full Turnkey Project Delivery through B Power
Idea – Concept – Design/Install – Commissioning – Long Term Support
5. Opportunities for Project Financing

Power+Generator suitability to generate Base Load Renewable Energy using other potential Heat Sources available to Island Communities such as Biomass, Biogas and Micro Geothermal all of which provide power 24hrs per day at a fraction of the land area required for other technologies

THIS IS SMART POWER®

Questions

Thank you!

David Knight, ElectraTherm
sales@electratherm.com

ElectraTherm
www.electratherm.com