

# Capstone C330 Microturbine Operation in Alberta's Oilfields

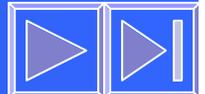


**Gridlink**

GRIDLINK POWER SYSTEMS LTD.  
an EnSource company

Presented by Dan Boonstra  
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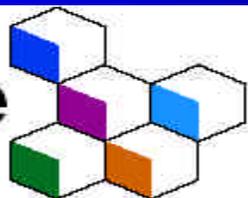


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# EnSource



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**GRIDLINK**



**SYNTECH**



**JIRO**



**SELECT**



**PRESSON**

- ❑ EnSource Energy Services created Gridlink Power Systems in January, 2001 to meet the expanding electrical market.
- ❑ We work interactively with the entire EnSource team to meet the needs of the Oil and Gas Industry.
- ❑ Gridlink provides alternative solutions to traditional energy production.
- ❑ Our vendor neutral product line will meet your 30kW to 10MW electricity requirements.





# Capstone Products

Click on logo to visit website.

- ❑ C330 30kW Microturbine
- ❑ C60 60kW Microturbine
- ❑ Co-generation





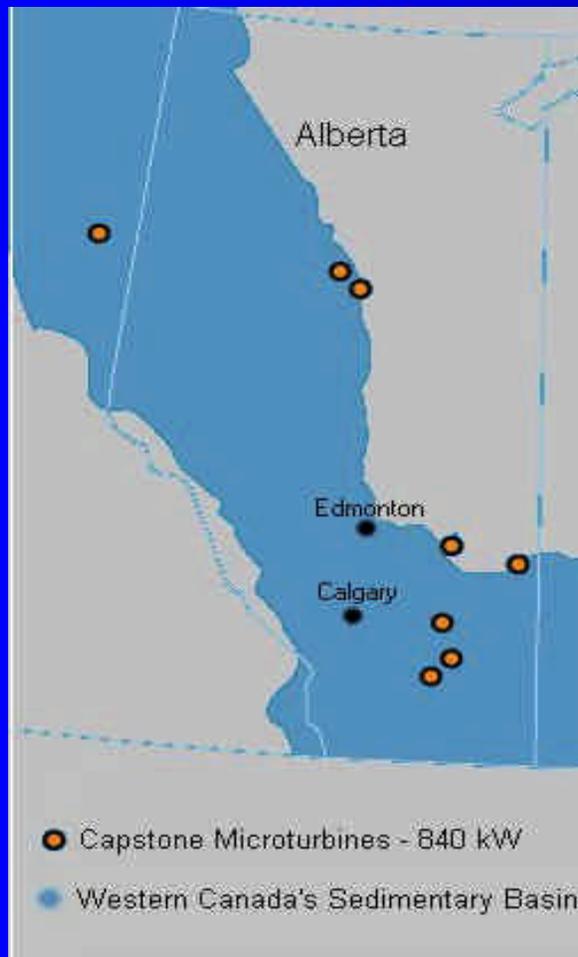
# Recommended Maintenance

## C330 & C60 Microturbines

Component	Hours
Combustion Air Filter	8000 & Preventative
Electronics Air filter	8000 & Preventative
Fuel Filters	16000 & Preventative
TET Temp Probe	16000 Or Failure
Igniters	16000 Or Failure
Injectors (3)	16000 Or Failure
Engine Overhaul	40000 Or Failure
Engine Core Exchange	40000 Or Failure
Fuel Valve Overhaul	40000 Or Failure
Power Board Overhaul	40000 & Preventative



# Maintenance in the Alberta Oilfields.



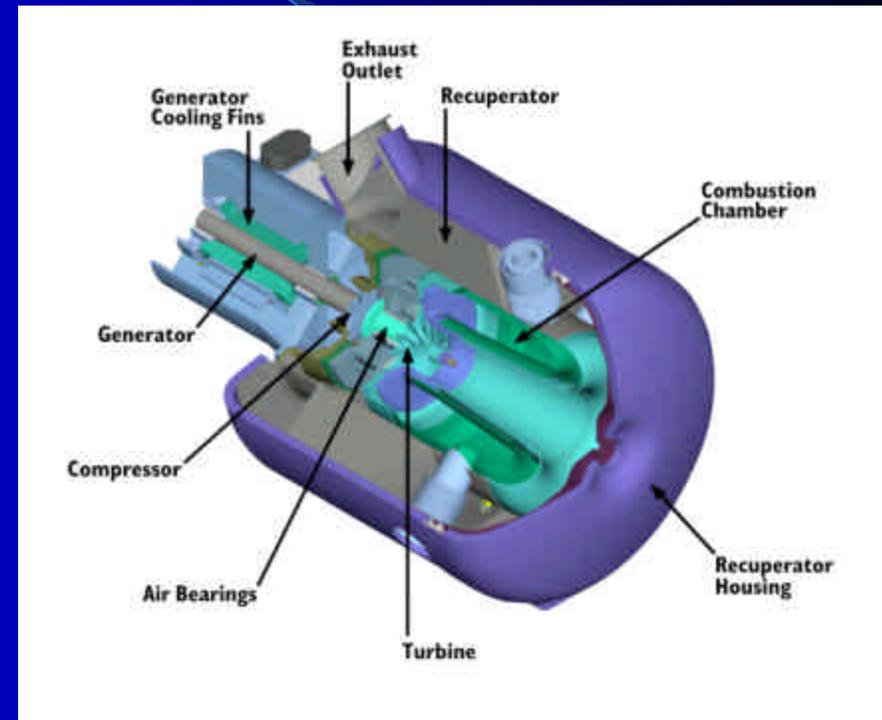
- There are currently **24 Capstone C330** Microturbines in Western Canada's Oil Fields.
- **19 Capstone C330's** run continuously **24/7**.
- They are running on **Sweet gas**, and **Sour gas up to 2%**.



# Dependability

□ Currently there is over **150,000** cumulative hours on the **Capstone C330's** in the province of Alberta.

□ One Capstone Unit in the **Consort** field has accumulated over **20,297** hours of continuous run time with minimal maintenance.



# Maintenance Considerations

## Pros

- ❑ Operator friendly.
- ❑ Very low maintenance requirements.
- ❑ One moving part that is suspended in air while rotating – No expenses for oil changes.
- ❑ Quick component change outs – Resulting in less downtime.
- ❑ CRMS Software allows remote operation and diagnostics.



# Maintenance Considerations

## Cons

- ❑ Software compatibility requires improvement.
- ❑ Parts availability and shipping needs improvement.
- ❑ Maintenance issues are Quality Control related and not Technology related.
- ❑ Recommend budgeting maintenance costs slightly higher than Capstone recommendations.
- ❑ Make provisions for Operator training.



# Preventative Maintenance

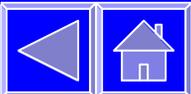
- ❑ In H<sub>2</sub>S (sour gas) applications clean the Fuel Injectors on a regular basis.
- ❑ Clean and inspect Combustion Air Filters regularly. Provided with K&N air filters which are relatively easy to maintain.
- ❑ Incorporate a yearly inspection into your maintenance program.



# Alberta's Maintenance History

Customer	Unit	Date	BCT	Power Board	DPC	UCB	SPV	BATT	IPM	Precharge	IGN	EXC	Engine	Comment
Apache	54	July 17/01			x				x				x	16141 hours on unit 0.2 % sour
CNRL	153	May 1/01										X		
CNRL	157	May 1/01										X		
CNRL	856	May 1/01										X		
CNRL	857	May 1/01					X			X		X		
CNRL	858	May 1/01										X		
CNRL	1081	Apr 22/01			Repair									
CNRL	1081	Aug 4/01										X		
CNRL	1081	June 19/01	X		X			X	X	X				
CNRL	1179	Aug 4/01												Battery charge
CNRL	1181	Apr 22/01		X										
CNRL	1181	Aug 4/01	X								X			
CNRL	1181	July 20/01	X											
CNRL	1182	Aug. 4/01												Battery charge
CNRL	1182	June 19/01							X					
CNRL	1187	Aug 4/01												Battery charge
CNRL	1187	July 25/01		X										
PAN CAN	1080	Aug 17/01												Relay UCB
PAN CAN	1080	June 19/01	X											
PAN CAN	1173	Aug 20/01			X									
PAN CAN	1180	June 19/01				X								
PAN CAN	1180	May 12/01	X											
PAN CAN	1183	June 5/01					X							
Trailer	61	July 16/01	X											
PAN CAN	1183	August30/01												fuel pressure too high
PAN CAN	78	Dec26/01												trouble shoot seized engine

2001



# Power from Landfill

- ❑ Gridlink Power Systems is currently packaging a portable landfill unit that can hold up to Six C60 Microturbines.
  - ❑ Portability.
  - ❑ Use landfill refuse to provide power.
  - ❑ Environmentally Friendly.
  - ❑ Easy to Operate.



# CANMET Landfill Unit

- ❑ Up to **Six C60** Microturbines.
- ❑ **Siloxane filtration** is incorporated.
- ❑ Contains a **fuel gas dryer**.
- ❑ Uses **coalescing filters** for the fuel gas.
- ❑ **Hydrovane Compressors** are used to boost fuel pressure.

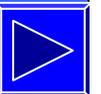




# C330 2-Pack



Verger South Field



# C60 Stand Alone Unit



Verger South Field



# Contacts

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