Nova Scotia Community Feed-in Tariffs
2010 NSUARB-BRD-E-R-10

Undertaking: U-5

Provide copies of the biomass CHP equipment estimates received from suppliers

Attached are the communications with equipment vendors on which we based the cost of the boiler, steam turbine, condenser and transformer in the biomass CHP analysis.

1. Estimate for transformer

----- Forwarded Message ----
From: Carolen Allen <callen@northerntransformer.com>
To: srshaw@rogers.com
Sent: Wed, February 23, 2011 8:31:23 AM
Subject: RE: Transformer budgetary price

Hello Susan

I have attached a typical transformer drawing for a station class transformer. Price would be in the range of $ 81,000.00.
This transformer is built to CSA C88 M90 standards, with standard losses.
Taxes freight extra.
FOB our plant

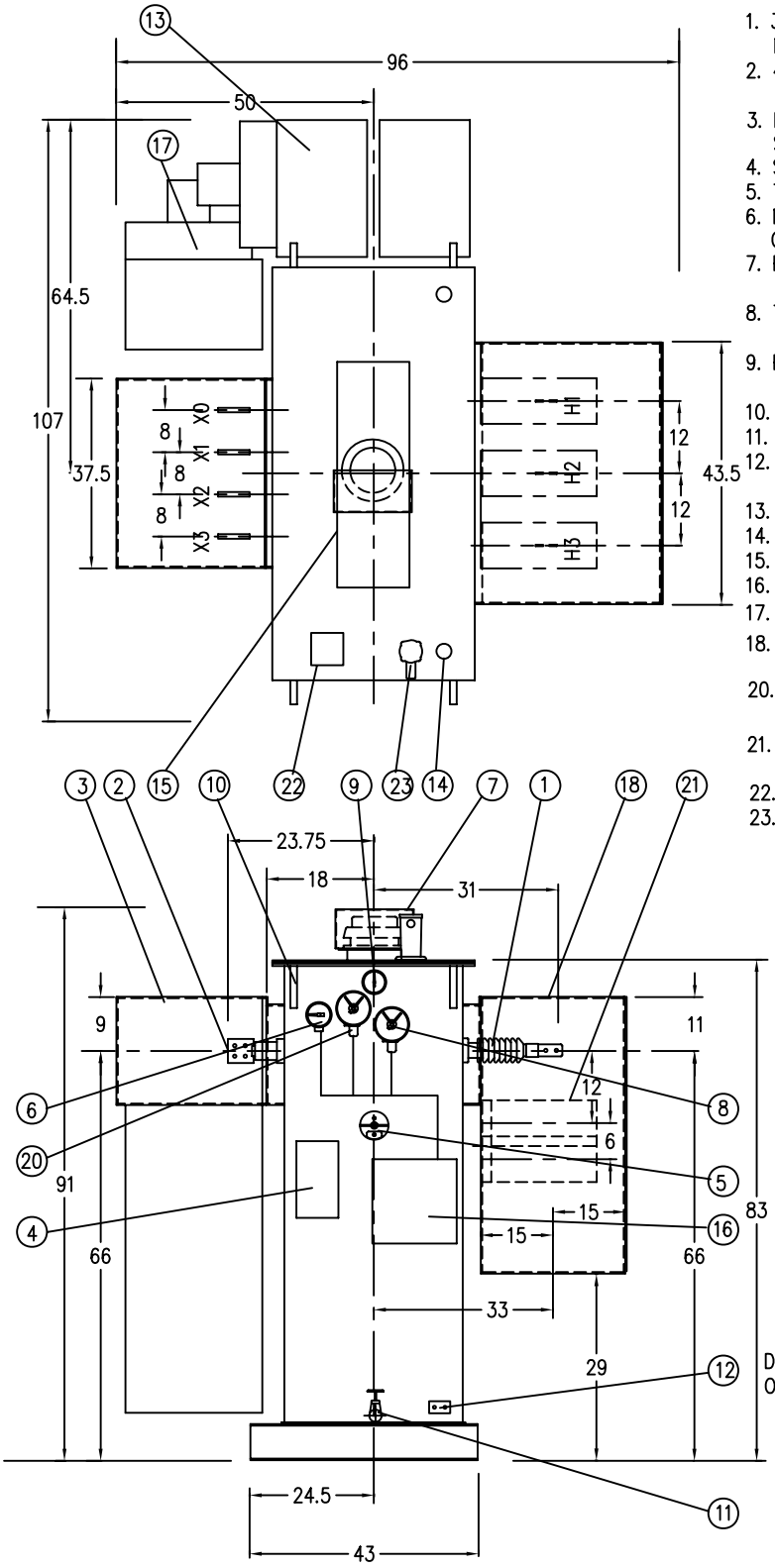
Garry Morley General Manager
NORTHERN TRANSFORMER INC.
163 Jardin Drive, Concord , Ontario. L4K 1X5
Tel: 905-669-1853 Fax: 905-669-9728
www.northerntransformer.com
garry@northerntransformer.com

From: srshaw@rogers.com [mailto:srshaw@rogers.com]
Sent: Monday, February 21, 2011 9:30 PM
To: callen
Cc: Geoff Keith
Subject: Transformer budgetary price

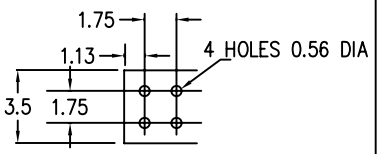
I am looking for a budgetary price for a transformer for a small electric generation project in Nova Scotia . The generator is sized at 2.05 MW, with a voltage out put of 480V, and it will need to connect to the distribution system at 25 kV. Something mid-range, price-wise, is what I would be looking for. Can you help?

If you have any questions, please phone me.

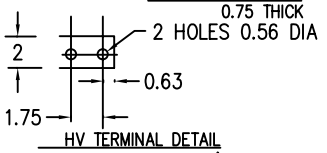
Thanks and regards,
Susan Shaw



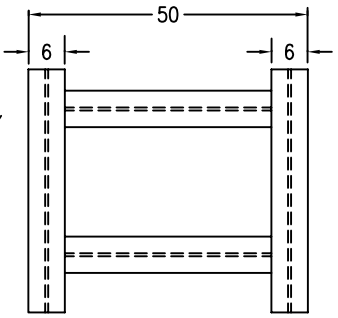
1. 3 HV BUSHINGS 27.5 KV 400 A.
   N.T.# 11325 SEE DETAIL
2. 4 LV BUSHINGS 1.2 KV 4000 A.
   N.T.# 1011 SEE DETAIL
3. LV THROAT 37.5 x 18 x 28" LG
   SEE DWG TA-4861 FOR DRILLING
4. S.S. RATING PLATE DWG. NO. TB-5633
5. TAP CHANGER HANDLE
6. MAGNETIC OIL GAUGE c/w CONTACTS
   QUALITROL 035-039-01
7. PRESSURE RELIEF DEVICE
   QUALITROL 208-60U C/W SHROUD & CONTACTS
8. TOP OIL THERMO. C/W 2 CONTACTS
   QUALITROL 167-224-01
9. PRESSURE-VACUUM GAUGE c/w BLEEDER &
   SWITCH QUALITROL 70-35E & 147-012
10. TRANSFORMER LIFTING LUGS
11. 1" DRAIN VALVE C/W 3/8" SAMPLER
12. 2 S.S. GROUND PADS c/w CONNECTOR
    FOR UP TO 4/0 CABLE
13. COOLING RADIATORS
14. 1" TOP FILTER PRESS CONNECTION, CAPPED
15. HANDHOLE C/W BOLTED COVER
16. FAN CONTROL BOX SEE DWG TB-5634
17. COOLING FANS(2) 1/3 HP 120/240 V.
18. HVBOX 43.5 x 36 x 24 DP. c/w FRONT
    ACCESS & ALUM BOTTOM ENTRY PLATES
20. WINDING TEMP INDICATOR c/w 2 CONTACTS
    QUALITROL 105-221-01
21. SURGE ARRESTER 27 KV 22 KV MCOV
    OB# PVI300022
22. C.T.OUTLET BOX
23. RAPID RISE PRESSURE RELAY c/w CONTACTS
    & SEAL-IN RELAY QUALITROL 910-010-01 &
    909-200-01



LLV TERMINAL DETAIL
0.75 THICK



HV TERMINAL DETAIL
0.375 TH'K



6"WF BEAM BASE - INVERTED VIEW

TRANSFORMER T3

REV.	REMARKS	BY	DATE

Northern Transformer
INCORPORATED

PLOT	1=20	DRAWN BY:	MS	DATE:	9/13/93	REV.	4
JOB:		CHECKED BY:	PT	DATE:	9/15/93	S.O. NO.	93-1006

TITLE: 2500/3333 KVA OIL FILLED TRANSFORMER ONAN/AF
25000 - 600Y/347 V. 3 PH. 60 HZ. 65°C RISE

Approximate Weights & Dimensions - Bill of Material
Example Only - DO NOT USE FOR MANUFACTURE

DRAWING NO. 1006-010Q

TANK SIZE : 28 x 69 x 76 H.
PAINT : ASA 61 GREY

ESTIMATED WTS	lb	kg
CORE & COILS	8300	3780
TANK & FITTINGS	4100	1860
OIL 378 G. 15451.	3400	1550
TOTAL	15800	7190

2. Estimate for boiler

----- Forwarded Message ----
From: Eric Rosen <ebrosen@kmwenergy.com>
To: srshaw@rogers.com
Sent: Mon, February 14, 2011 5:10:46 PM
Subject: RE: Boiler budgetary price

Susan,
I have ash handling and fuel handling included. 24-hr live bottom for storage area plus 50 feet of conveyors.

Regards,
Eric

- - -
Eric B. Rosen, M.Sc.
CEO
KMW Energy Inc.
P: 519.686.1771
www.kmwenergy.com

From: srshaw@rogers.com [mailto:srshaw@rogers.com]
Sent: February 14, 2011 4:33 PM
To: Eric Rosen
Subject: Re: Boiler budgetary price

Eric:
I have been assuming that you didn't include any material handling or ash handling, but I thought that I should ask.
It isn't in there, is it?
Thanks,
Susan

From: Eric Rosen <ebrosen@kmwenergy.com>
To: srshaw@rogers.com
Sent: Wed, February 9, 2011 11:28:34 PM
Subject: RE: Boiler budgetary price

Hi Susan,

I would think a ballpark figure for such a system installed Greenfield would be approximately $2.5M including building.

I hope this would be of help.

Regards,
Eric

- - -
Eric B. Rosen, M.Sc.

CEO
KMW Energy Inc.
P: 519.686.1771
www.kmwenergy.com

From: srshaw@rogers.com [mailto:srshaw@rogers.com]
Sent: February 9, 2011 2:05 PM
To: Eric Rosen
Subject: Re: Boiler budgetary price

Eric:
I should have mentioned that this isn't saturated steam - I need 50 degrees F of superheat.
Susan

From: "srshaw@rogers.com" <srshaw@rogers.com>
To: Eric Rosen <ebrosen@kmwenergy.com>
Sent: Wed, February 9, 2011 9:01:15 AM
Subject: Boiler budgetary price

Hi Eric:
I'm happy to see that you are accepting a re-appointment to MSEC, and hope to see you at the meeting on March 3rd.

I am doing some consulting work to assess feasibility of a small wood-fired district energy system on the east coast. They have a guesstimate for the boiler system, but I'm not entirely comfortable with it, even though it's been a few years since I've looked at these prices. Would you be able to give me a ballpark installed cost for the combustion cell, boiler and controls for a 20,000 pph system at 600 psi? The fuel is hogged whole trees at 50% moisture.

Let me know if you have any questions.

Thanks,
Susan

3. Cost estimate for steam turbine

Following is the design information

Turbine Design Inlet: 600 psig, 540F
Turbine Inlet Flow: 30,000 lbs/hr
Estimated Power (at full extraction):1,550 kWe
Estimated Power (at no extraction): 2,050 kWe
Estimated Equipment Cost: $1,840,000 USD
Extraction Stage
Extraction Flow: 20,000 lbs/hr
Turbine Exhaust: 40 psig
Condensing Stage
Condensing Flow: 10,000 lbs/hr
Turbine Exhaust: 4" HgAbs

-----Original Message-----
From: Geoff Keith [mailto:gkeith@synapse-energy.com]
Sent: Monday, February 14, 2011 11:02 AM
To: Bill Bullock
Cc: srshaw@rogers.com
Subject: Re: Boiler rating

Bill,

Can you give us a sense of when you might be able to get the data on condensing production? We're trying to decide whether to send some materials out now or wait for that data.

Thanks,
--Geoff

----- Forwarded Message ----
From: "bbullock@turbosteam.com" <bbullock@turbosteam.com>
To: srshaw@rogers.com
Sent: Fri, February 11, 2011 11:46:03 PM
Subject: Re: Boiler rating

Susan:

Working on getting the off design information, where we would maximize condensing.

From: srshaw@rogers.com
Date: Fri, 11 Feb 2011 06:57:52 -0800 (PST)

To: Bill Bullock<BBullock@turbosteam.com>
Subject: Re: Boiler rating

Bill:
What would the electric production be at full extraction? Or if this is full extraction, what is it at full condensing?
Thanks!
Susan

From: Bill Bullock <BBullock@turbosteam.com>
To: srshaw@rogers.com
Sent: Fri, February 11, 2011 8:56:42 AM
Subject: RE: Boiler rating

The turbine with 30,000 pph inlet flow – 20,000 pph to extraction and minimum 10,000 pph to the condenser will generate ~1.5 MW and cost ~$2 MM.

4. Cost estimate for air-cooled condenser

----- Forwarded Message ----
From: "Rajesh.Gupta@spx.com" <Rajesh.Gupta@spx.com>
To: srshaw@rogers.com
Cc: Ralph.Wyndrum@spx.com
Sent: Fri, February 18, 2011 4:41:09 PM
Subject: Re: air-cooled condenser in Nova Scotia(11-1101)

Susan,

As per your below request, here is a selection for a HexaCool ACC, which likely best suited for your small ACC application.

We propose utilizing our proprietary **SRC^{R}, Single Row** Aluminized Carbon Steel Tube/Aluminum Fin Tube Bundle. This SRC is similar to units that we have supplied for over 20 years. Our SRC is a proven design with a well established operational history.

We generally propose our standard technical and commercial scope. Our proposed ACC scope would start at the ST exhaust connection and include the steam duct, the ACC, condensate tank, SJAE evacuation system and other lesser ancillary equipment and instrumentation. Bypass system and spargers, as may be required, shall be provided by others.

The proposed price is based only upon current conditions as they relate to aluminum and zinc costs, steel cost, transport cost, labor cost and international currency exchange. Please apply the escalation as deemed appropriate to meet your needs in anticipation of the actual ACC purchase date and project schedule. Prior to any ACC contract award based upon more detailed technical and commercial specifications, we will be pleased to provide up to date pricing.

HexaCool Design
Inlet Air Temperature: 75.2 / 71% RH
Elevation:164' above sea level
LP Turbine Exhaust Pressure: 4.0" HgA
LP Turbine Exhaust Flowrate: 30,000 lb/hr
LP Turbine Exhaust Enthalpy: 1,118 btu/lb

HexaCool Selection
http://spxcooling.com/en/library/detail/hexacool-air-cooled-condenser/

Number of Modules: 1
Length: 34' Width: 40' Height: 59'
Far Field Sound Pressure Level: 50 +/-2 dBa @ 400'
ACC Fan Power: 65 kW @ MIT (1 x 100 HP Motors)

HexaCool Price
Terms: SPX Terms & Conditions (Available upon request)
Price Basis: Budgetary (+/- 10% based upon current conditions)
Quotation Validity: 30 days
Material Delivery: Starting about 32 weeks from Approval of Basic Engineering Documents with sequential deliveries to meet typical erection sequence;
Ending about 14 weeks thereafter.
Warranty: 12 months from 1st use / 18 months from final delivery, whichever comes first
Payment: Down Payment and Progress Payments based on engineering and material

deliverables, net 30 days

Material Supply Price (FOB/DDP, Jobsite, Canada) :.....$1.1 MM US
Immediate Unloading Handling and Storage of Deliverables:..... By Others
ACC Mechanical Erection:..... By Others

Taxes, Duties & Fees
Outside Canada: ..... Included
Within Canada (Import Duties, Permits and Fees):.....Included
Within Canada (Local, State, Federal or Other Taxes, Fees, Etc).....Excluded

We trust that the provided information supports your immediate needs and we look forward to speaking with you to see if our design selection and price in line with expectations and to further assist your effort. Please feel free to call if you have any questions regarding our proposal.

Thanks
Rajesh Gupta
Dry Cooling- Sales Manager
SPX Cooling Technologies Inc.
7401 W 129th St. Overland Park, KS 66213
Office 913.664.7929
Cell 913.219.3911
Fax 913.693.9681
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