

1 Q. **Reference: Page 2.46.**

2 Re: Holyrood efficiency per page 2.46. Provide data in graphical and tabular form
3 showing actual operating efficiencies of each unit at Holyrood for the last 5 years,
4 as well as all activities undertaken in the last 5 years to improve the efficiency of
5 generation at Holyrood.

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8 A. The Holyrood operating efficiencies and conversion factors of each unit and
9 conversion factor of the overall plant, for the last five years are as follows:

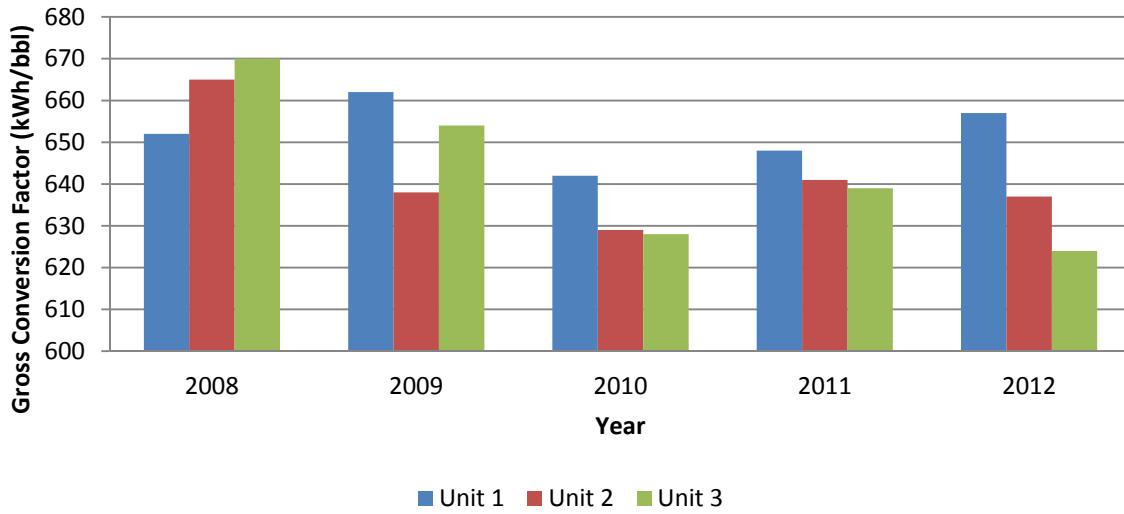
Efficiency (%) and Conversion Factor (kWh/bbl)							
Year	Unit 1		Unit 2		Unit 3		Plant
	Gross Efficiency	Gross Conversion Factor	Gross Efficiency	Gross Conversion Factor	Gross Efficiency	Gross Conversion Factor	Net Conversion Factor
2008	34.4%	652	35.0%	665	35.3%	670	625
2009	34.8%	662	33.5%	638	34.3%	654	612
2010	34.3%	642	33.6%	629	33.6%	628	589
2011	34.1%	648	33.8%	641	33.6%	639	603
2012	34.4%	657	33.4%	637	32.7%	624	599

10 Note that individual unit quantities shown above are gross (excluding the impact of
11 station service), as station service is measured and tracked on a plant basis. The
12 overall plant conversion factor is indicated on a net basis. The efficiency and
13 conversion factor of a unit and the overall plant are largely influenced by the level
14 of loading experienced by the units.

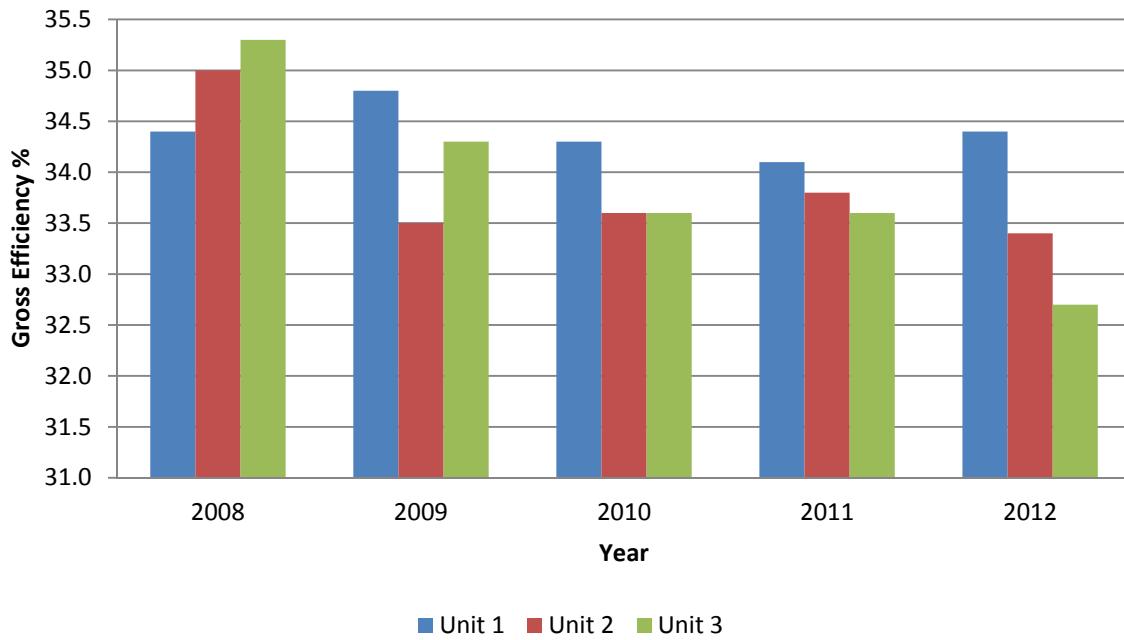
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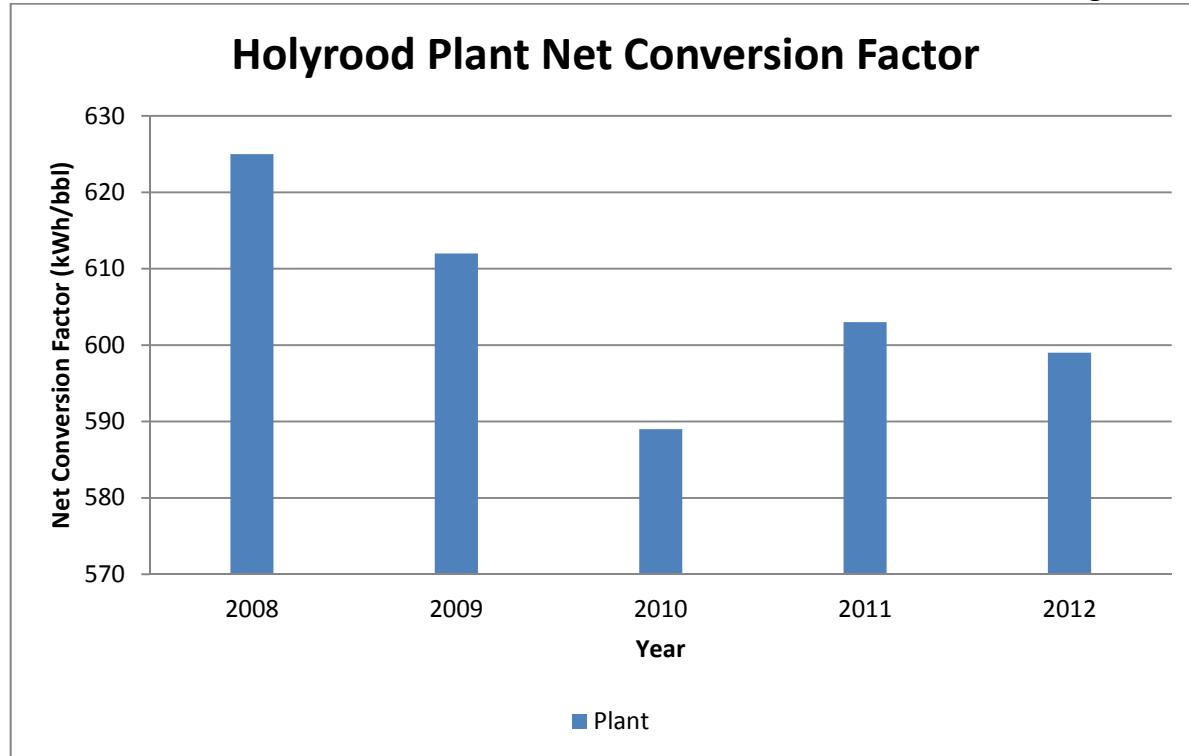
16 The following charts summarize the operating efficiency and conversion factor data
17 provided above.

Holyrood Unit Gross Conversion Factor



Holyrood Unit Gross Efficiencies





1 The following activities are performed on a routine or annual basis, and are
2 designed to maintain efficiencies.
3
4 • Environmental management programs – efficiency driven initiatives for
5 emissions reduction.
6 • Heat exchanger maintenance and cleaning.
7 • Equipment overhaul programs (e.g. annual boiler overhauls).
8 • Maintaining major equipment efficiencies (e.g. boiler feed pumps).
9 • Routine furnace and air heater cleaning.
10 • EtaPRO performance monitoring and efficient use of plant systems.
11 • Non-destructive examination program enhancements.

1 The activities and initiatives undertaken in the last five years to improve unit and
2 overall plant efficiency are:

3 **2008**

4 • Installation of a variable speed drive air compressor to reduce auxiliary power
5 consumption.

6 **2009**

7 • A study of the feasibility of installing an intelligent soot-blowing system to only
8 use steam to clean boiler components when fouling reaches inefficient levels.

9 **2010**

10 • A study of the feasibility of installing variable speed drives on boiler feed pumps
11 and forced draft fans.

12 • Submission of a capital budget proposal to upgrade forced draft fan ductwork to
13 reduce air flow restriction, hence reducing electrical load on the fans.

14 **2011**

15 • A review of turbine condenser operation and maintenance activities with a view
16 to increasing unit efficiency for all three units.

17 • The installation of a new forced draft fan ductwork.

18 **2012**

19 • Performance of a gap analysis on condenser operation and maintenance.

20 • Submission of a capital budget proposal to install variable speed drives on the
21 six 1500 hp forced draft fan motors.

22 • Implementation of an improved and more timely method for conversion of Unit
23 3 to and from synchronous condenser operation thus reducing the time that
24 Units 1 and 2 have to be generating at low inefficient load levels for voltage
25 support.

26 • Installation of new energy efficient heat tracing on fuel oil lines.

1 • Performance of a lighting study to establish the cost of upgrading to energy
2 efficient lighting throughout the facility, including the use of photo cells and
3 motion sensors.

4 **2013**

5 • Currently performing design work to install variable speed drives on the six
6 forced draft fans.

7 • Implementing recommendations of the 2012 condenser gap analysis.

8 • Completed installation of new energy efficient heat tracing on fuel oil lines.