Generating Resources Advisory Committee

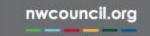
February 27, 2014
Steven Simmons and Gillian Charles
Northwest Power and Conservation Council

Combined Cycle Combustion Turbines, Simple Cycle Combustion Turbines, and Reciprocating Engines

Agenda

9:00 am	Welcome & Introductions	Review Agenda	Role of GRAC	Upcoming Symposium	
9:15 am	Natural Gas Peaking Technologies	Technology Trends	Proposed reference plant	Capital and O&M Cost Estimates	
10:15 am	Reciprocating Engine Technologies	John Robbins of Wartsila North America Inc			
11:15 am	Break				
11:30 am	Natural Gas Combined Cycle Technologies	Review	Capacity Factors	Costing, Economies of Scale, Normalizations	Reference Plants
12:30 pm	Discussion of Next GRAC Meetings	Follow up to Single Cycle Technologies and Reciprocating Engines	Preliminary Resource Evaluation - Wind	Upcoming Resources – Energy Storage, Modular Nuclear	





Role of GRAC

- Advisory committee established to assist in development of Council's Power Plans
- Two year charter, filed May 2012
- GRAC serves in advisory capacity
 - No votes are taken
 - Role is to review information, vet assumptions and information, and make recommendations to the Council
- Aim for active participation and exchange of ideas and information

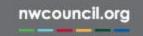




Charter – Update

- Council to make a decision to adopt new advisory committee charters in March, including GRAC charter
 - Two year charter
 - Similar to last charter, with added provision for membership changes
- → Time for GRAC to renew its membership





Gas-Fired Power Plant Characteristics 6th Power Plan

	Unit Size	Capital Cost	Heat Rate	Ramp Rate
	(MW)	(\$/kW)	(Btu/kWh)	(Minutes)
	Biggest	Most expensive	Least Efficient	Slowest
	CCCT	Recip	Frame SCCT	CCCT
	1x395	1,150	11,870	>>10
Fi	rame SCCT 1x85	CCCT 1,120	Aero SCCT 9,300	Frame SCCT >10
A	Aero SCCT	Aero SCCT	Recip	Aero SCCT
	2x47	1,050	8,800	<10
	Recip	Frame SCCT	CCCT	Recip
	12x8	610	6,790	<10
	Smallest	Least Expensive	Most Efficient	Fastest

