Question from Puller

Devise a profit-maximizing bid function into the "uniform-price" electricity auction, as described in "Instructions for the Electricity Strategy Game" at the very end of my course handouts. That handout includes the cost parameters of each firm in the market and a description of how the market uses bids to determine prices and production.

Assume that you own the portfolio that is called **"Big Gas"** *in the attached portfolio data* **(see the next page!!)** In addition, assume that the owners of the other six portfolios are submitting bids that correspond to their Marginal Cost marked up by 10%.

You will devise bids for a *single auction* where quantity demanded is given by Q = 18,341 – 5.69P. Note that this is a fairly high demand period, given the production capacities of each of the seven portfolios. Because you know (by assumption) the bids of the other six firms, you should be able to calculate your residual demand. And based on this residual demand function and the marginal cost of your own powerplants, you can calculate the profit-maximizing bids. (Hint: you should be proposing bid prices that are above your marginal cost).

Be as explicit as possible about the bid function that you propose (e.g. ideally, you will report a set of (price, quantity) pairs that characterize your profit-maximizing bid function). Show the work that goes into your calculations.

Cost of Capacities of Each Portfolio

UNIT NAME	Capacity MW	Marginal Cost $/MWH	Carbon tons/MWH	O&M/Day ($)	Fuel
Big Coal					
FOUR CORNERS	1900	36.50	1.10	$8,000	Coal
ALAMITOS 7	250	73.72	0.85	$0	Gas
HUNTINGTON BEACH 1&2	300	40.50	0.46	$2,000	Gas
HUNTINGTON BEACH 5	150	66.50	0.77	$2,000	Gas
REDONDO 5&6	350	41.94	0.48	$3,000	Gas
REDONDO 7&8	950	41.94	0.48	$5,000	Gas
Totals	***3900***				
Big Gas					
EL SEGUNDO 1&2	400	44.83	0.51	$1,000	Gas
EL SEGUNDO 3&4	650	41.22	0.47	$1,000	Gas
LONG BEACH	550	52.50	0.61	$2,000	Gas
NORTH ISLAND	150	65.50	0.77	$0	Gas
ENCINA	950	41.67	0.49	$2,000	Gas
KEARNY	200	90.06	1.06	$0	Gas
SOUTH BAY	700	43.83	0.51	$2,000	Gas
Totals	*3600*				
Bay Views					
MORRO BAY 1&2	335	38.78	0.45	$2,000	Gas
MORRO BAY 3&4	665	36.61	0.43	$4,000	Gas
MOSS LANDING 6	750	32.56	0.37	$8,000	Gas
MOSS LANDING 7	750	32.56	0.37	$8,000	Gas
OAKLAND	150	61.17	0.72	$0	Gas
Totals	***2650***				
Beachfront					
COOLWATER	650	42.39	0.49	$2,000	Gas
ETIWANDA 1-4	850	42.67	0.49	$8,000	Gas
ETIWANDA 5	150	62.89	0.72	$1,000	Gas
ELLWOOD	300	75.61	0.89	$0	Gas
MANDALAY 1&2	300	39.06	0.44	$1,000	Gas
MANDALAY 3	150	52.06	0.60	$1,000	Gas
ORMOND BEACH 1	700	38.06	0.44	$7,000	Gas
ORMOND BEACH 2	700	38.06	0.44	$7,000	Gas
Totals	***3800***				
East Bay					
PITTSBURGH 1-4	650	40.94	0.48	$2,500	Gas
PITTSBURGH 5&6	650	36.61	0.43	$2,500	Gas
PITTSBURGH 7	700	59.72	0.70	$4,000	Gas
CONTRA COSTA 4&5	150	58.28	0.68	$1,000	Gas
CONTRA COSTA 6&7	700	39.50	0.46	$6,000	Gas
POTRERO HILL	150	69.83	0.82	$0	Gas
Totals	***3000***				
Old Timers					
BIG CREEK	1000	0.00	0.00	$15,000	Hydro
MOHAVE 1	750	34.50	0.94	$15,000	Coal
MOHAVE 2	750	34.50	0.94	$15,000	Coal
HIGHGROVE	150	49.61	0.58	$0	Gas
SAN BERNADINO	100	53.94	0.63	$0	Gas
Totals	***2750***				
Fossil Light					
HUMBOLDT	150	47.44	0.55	$0	Gas
HELMS	800	0.50	0.00	$15,000	Hydro
HUNTERS POINT 1&2	150	49.17	0.56	$1,000	Gas
HUNTERS POINT 4	250	75.89	0.88	$1,000	Gas
DIABLO CANYON 1	1000	11.50	0.00	$20,000	Nuclear
Totals	***2350***				