Austin Generation Resource Planning Task Force
Scenarios for:
9-23-09 Task Force Meeting

General Modeling Assumptions:

- DSM costs: $500 expected with a range of $350-$750
- Pace's capital costs (mid-years), levelized costs (2020), projected load (both at peak and annual energy demand) and capacity factor assumptions used. These assumptions are not used in the initial model provided to Task Force, but are similar.
- All other assumptions as defined by the Austin Energy Resource Portfolio Simulator user's guide

Staff Recommendation
(base model)

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)														CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Coal	607													71%	0.99
Nuclear	422													87%	0.00
Natural Gas Turbines - Sand Hill 1-4	189		100											18%	0.53
Natural Gas Combined Cycle - Sand Hill 5	312							200						70%	0.36
Natural Gas Steam Turbines - Decker 1 & 2	741													9%	0.56
Natural Gas Turbines - Decker	193													3%	0.79
Onshore Wind	274	165		123		150		100		74			115	41%	0.00
Offshore Wind	0													42%	0.00
Biomass	0				100				50					90%	0.00
FPP w/ biomass co-firing	0													90%	0.00
Landfill Gas	12													85%	0.00
Solar PV - Centralized	0		30				30		20	30	20	30	40	26%	0.00
Solar PV - Distributed	1													26%	0.00
Concentrated Solar	0													32%	0.00
IGCC w/ CCS	0													83%	0.13
IGCC w/o CCS	0													83%	0.87
Geothermal	0													95%	0.00
Storage	0													0%	0.00
Accelerated Conservation	0		5	8	9	9	10	11	10	10	9	10	9	0%	0.00
Purchased Power	0													100%	0.59

	Max CF (%)	Min CF (%)
	25%	10%
	70%	61%
	20%	1%
	10%	1%
Parabolic Trough		
Storage Type	0	Hours of St
Meet conservation demand?	Yes	

Scenario Output Summary

System Reliability in 2020		Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
% of Annual Electricity Demand Met	100%	Total Expected Capital Costs through 2020 ($ million)	2,700	2671	-
% of Peak Hourly Demand Met	100%	Annual Expected Fuel Costs in 2020 ($ million)	410	344	-
Carbon Impacts in 2020		Expected Increase in Cost of Electricity in 2020 (¢/kWh)	2.3	2.8	2
Carbon Emissions (metric tons)	4,495,900	4580			
% Generation from Renewables in 2020	34.3%	36			
% Capacity from Renewables in 2020	33.0%	33			
		Pace Screening Analysis Results			

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	4,495,870	1,673,138	27%
Sulfur Dioxide (metric tons)	889	12,630	93%
Nitrogen Oxides (metric tons)	2,643	83	3%
Carbon Monoxide (metric tons)	4,797	-99	-2%
Total Solid Particulates (metric tons)	823	303	27%
Volatile Organic Compounds (metric tons)	220	-76	-53%
Mercury (lbs)	147	59	29%
Water Requirements (gallons)	9,286,001,530	-37,981,359	0%
Water Intensity (gallons/kWh)	0.64	0.13	-

Renewables/DSM to replace FPP
(Submitted by Cyrus Reed – 9/23/09)

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)														CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Coal	607				-305		-302							83%	0.99
Nuclear	422													87%	0.00
Natural Gas Turbines - Sand Hill 1-4	189		100											25%	0.53
Natural Gas Combined Cycle - Sand Hill 5	312													70%	0.36
Natural Gas Steam Turbines - Decker 1 & 2	741													20%	0.56
Natural Gas Turbines - Decker	193													7%	0.79
Onshore Wind	274	165			400		300							41%	0.00
Offshore Wind	0				100		100							42%	0.00
Biomass	0				100									90%	0.00
FPP w/ biomass co-firing	0													90%	0.00
Landfill Gas	12						15							85%	0.00
Solar PV - Centralized	0		30											26%	0.00
Solar PV - Distributed	1		3	9	14	20	34	55	57	60	66	77	109	26%	0.00
Concentrated Solar	0													32%	0.00
IGCC w/ CCS	0													83%	0.13
IGCC w/o CCS	0													83%	0.87
Geothermal	0					25			25					95%	0.00
Storage	0													0%	0.00
Accelerated Conservation	0		10	20	30	30	30	30	30	30	30	30	30	0%	0.00
Purchased Power	0													100%	0.59

	Max CF (%)	Min CF (%)
	25%	10%
	70%	61%
	20%	1%
	10%	1%

Parabolic Trough	
Storage Type	0 Hours of St
Meet conservation demand?	Yes

Scenario Output Summary

System Reliability in 2020		Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
% of Annual Electricity Demand Met	100%	Total Expected Capital Costs through 2020 ($ million)	3,830	2671	-
% of Peak Hourly Demand Met	100%	Annual Expected Fuel Costs in 2020 ($ million)	380	344	-
Carbon Impacts in 2020		Expected Increase in Cost of Electricity in 2020 (¢/kWh)	2.0	2.8	2
Carbon Emissions (metric tons)	1,698,900	4580			
% Generation from Renewables in 2020	50.3%	36			
% Capacity from Renewables in 2020	51.2%	33			
		Pace Screening Analysis Results			

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	1,698,882	4,515,600	73%
Sulfur Dioxide (metric tons)	266	13,535	98%
Nitrogen Oxides (metric tons)	1,332	1,404	51%
Carbon Monoxide (metric tons)	1,400	3,352	71%
Total Solid Particulates (metric tons)	87	1,063	92%
Volatile Organic Compounds (metric tons)	130	12	8%
Mercury (lbs)	0	208	100%
Water Requirements (gallons)	6,536,844,396	2,711,175,775	29%
Water Intensity (gallons/kWh)	0.48	0.30	-

Additional Assumptions:

- 504 MW of distributed solar PV modeled as customer-sited and owned at an average rebate of $1.25/watt
- "Offshore wind" is assumed to be coastal onshore

Based on the following calculations:

TOTAL MW Capacity of On-Site Solar Program

	Large Systems	Small Systems	Residential					
2010	1	1.0	0.5	$3.00	2			
2011	7	1	0.5	$2.85	$1.90	2.50		
2012	11	2	0.8	$2.71	$1.81	8.50		
2013	17	2	1.2	$2.57	$1.71	13.80		
2014	28	4	2.0	$2.44	$1.63	20.20		
2015	44	7	4	$2.32	$1.55	34.00		
2016	44	9	4	$2.21	$1.47	55.00	0.95	
2017	44	11	5	$2.10	$1.40	57.00		
2018	44	15	7	$1.99	$1.33	60.00		
2019	44	22	11	$1.89	$1.26	66.00		
2020	44	44	22	$1.80	$1.20	77.00		
Total	328	118	58	504		110.00		

Total Rebate Incentive Offered to Systems per watt

	Large Systems	Small Systems	Residential	
2010	$1.50	2	$3.00	$1.43
2011	$1.43	$1.90	$2.85	$1.35
2012	$1.35	$1.81	$2.71	$1.29
2013	$1.29	$1.71	$2.57	$1.22
2014	$1.22	$1.63	$2.44	$1.16
2015	$1.16	$1.55	$2.32	$1.10
2016	$1.10	$1.47	$2.21	$1.05
2017	$1.05	$1.40	$2.10	$1.00
2018	$1.00	$1.33	$1.99	$0.95
2019	$0.95	$1.26	$1.89	$0.90
2020	$0.90	$1.20	$1.80	

AVERAGE Rebate over time	
Residential	$2.00
Small Commercial	1.332254197
Industrial	1.076260033
Total	1.242285921

Total Cost to Austin Energy

	Large Systems	Small Systems	Residential	Total
2010	$1,500,000.00	$2,000,000.00	$1,500,000.00	$5,000,000.00
2011	$9,975,000.00	$1,900,000.00	$1,425,000.00	$13,300,000.00
2012	$14,891,250.00	$3,610,000.00	$2,166,000.00	$20,667,250.00
2013	$21,863,062.50	$3,429,500.00	$3,086,550.00	$28,379,112.50
2014	$34,209,262.50	$6,516,050.00	$4,887,037.50	$45,612,350.00
2015	$51,069,541.88	$10,832,933.13	$9,285,371.25	$71,187,846.25
2016	$48,516,064.78	$13,231,654.03	$8,821,102.69	$70,568,821.50
2017	$46,090,261.54	$15,363,420.51	$10,475,059.44	$71,928,741.50
2018	$43,785,748.47	$19,902,612.94	$13,931,829.06	$77,620,190.46
2019	$41,596,461.04	$27,730,974.03	$20,798,230.52	$90,125,665.59
2020	$39,516,637.99	$52,688,850.65	$39,516,637.99	$131,722,126.63
total	$353,013,290.70	$157,205,995.29	$115,892,818.45	$626,112,104.43

Model Result Concerns:

- Ability to achieve investment in solar PV for different customer classes given assumed rebate amounts
- May be difficult to achieve solar PV numbers at assumed rebate amount (less than current rebate), accelerated DSM amount, coastal wind amount, landfill gas amount, and geothermal amount
- Much greater reliance on natural gas (demonstrated by fuel costs in 2020 being greater similar to modeling of Staff Recommendation despite no coal fuel costs) suggests greater potential exposure to high natural gas prices and power market prices

1000 MW DSM Replacement at Least Cost
(Submitted by Roger Wood)

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)														CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Coal	607													71%	0.99
Nuclear	422													87%	0.00
Natural Gas Turbines - Sand Hill 1-4	189		100											22%	0.53
Natural Gas Combined Cycle - Sand Hill 5	312							100						70%	0.36
Natural Gas Steam Turbines - Decker 1 & 2	741													9%	0.56
Natural Gas Turbines - Decker	193													3%	0.79
Onshore Wind	274	165		123		150		100		74			115	41%	0.00
Offshore Wind	0													42%	0.00
Biomass	0				100				50					90%	0.00
FPP w/ biomass co-firing	0													90%	0.00
Landfill Gas	12													85%	0.00
Solar PV - Centralized	0		30									30	40	26%	0.00
Solar PV - Distributed	1													26%	0.00
Concentrated Solar	0													32%	0.00
IGCC w/ CCS	0													83%	0.13
IGCC w/o CCS	0													83%	0.87
Geothermal	0													95%	0.00
Storage	0													0%	0.00
Accelerated Conservation	0		15	24	27	27	30	33	30	30	27	30	27	0%	0.00
Purchased Power	0													100%	0.59

	Max CF (%)	Min CF (%)
	25%	10%
	70%	61%
	20%	1%
	10%	1%

Parabolic Trough	
Storage Type	0 Hours of St
Meet conservation demand?	Yes

Scenario Output Summary

System Reliability in 2020		Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
% of Annual Electricity Demand Met	100%	Total Expected Capital Costs through 2020 ($ million)	2,490	2671	-
% of Peak Hourly Demand Met	100%	Annual Expected Fuel Costs in 2020 ($ million)	380	344	-
Carbon Impacts in 2020		Expected Increase in Cost of Electricity in 2020 (¢/kWh)	1.9	2.8	2
Carbon Emissions (metric tons)	4,335,100	4580			
% Generation from Renewables in 2020	34.5%	36			
% Capacity from Renewables in 2020	32.2%	33			
		Pace Screening Analysis Results			

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	4,335,123	1,833,885	30%
Sulfur Dioxide (metric tons)	888	12,631	93%
Nitrogen Oxides (metric tons)	2,635	91	3%
Carbon Monoxide (metric tons)	4,822	-123	-3%
Total Solid Particulates (metric tons)	829	297	26%
Volatile Organic Compounds (metric tons)	219	-76	-53%
Mercury (lbs)	147	59	29%
Water Requirements (gallons)	8,897,621,674	350,398,497	4%
Water Intensity (gallons/kWh)	0.65	0.13	-

Additional Assumptions:

- Only change to model is addition of 200 MW of additional DSM (from Staff Recommendation) to replace similar amount of generation at least cost and still meeting Council goals; assume least cost substitution that would still meet Council goals would be earliest 100 MW of solar investment (other than Webberville) and 100 MW less addition of natural gas combined cycle investment

Model Result Concerns / Issues to Consider:

- Average cost of additional 200 MW of DSM may be greater than $500.
- May be difficult to achieve accelerated DSM amount.
- Unclear what load impact profiles will be demonstrated by accelerated DSM amount.
- Least cost substitutions may not be ideal depending on the type of DSM impacts achieved and the cost of that source at that time.
- The value of carbon reductions and fuel price hedging achieved by the natural gas combined cycle unit and solar investments not factored into least-cost consideration.

Mike Sloan Scenario #1

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)																
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)	
Coal	607				-305		-302							71%	0.99	
Nuclear	422													87%	0.00	
Natural Gas Turbines - Sand Hill 1-4	189													24%	0.53	
Natural Gas Combined Cycle - Sand Hill 5	312													70%	0.36	
Natural Gas Steam Turbines - Decker 1 & 2	741													11%	0.56	
Natural Gas Turbines - Decker	193													2%	0.79	
Onshore Wind	274	165	300		270									41%	0.00	
Offshore Wind	0			300			200							42%	0.00	
Biomass	0													90%	0.00	
FPP w/ biomass co-firing	0													90%	0.00	
Landfill Gas	12						15							85%	0.00	
Solar PV - Centralized	0		30											26%	0.00	
Solar PV - Distributed	1		10	40	100	100	100	100	150	100	100	100	100	26%	0.00	
Concentrated Solar	0													32%	0.00	
IGCC w/ CCS	0													83%	0.13	
IGCC w/o CCS	0													83%	0.87	
Geothermal	0					25			25					95%	0.00	
Storage	0													0%	0.00	
Accelerated Conservation	0		30	30	30	30	30	30	30	30	30	30		0%	0.00	
Purchased Power	0													100%	0.59	

	Max CF (%)	Min CF (%)
	25%	10%
	70%	61%
	20%	1%
	10%	1%
Parabolic Trough		
Storage Type	0	Hours of St
Meet conservation demand?	Yes	

Scenario Output Summary

System Reliability in 2020	
% of Annual Electricity Demand Met	100%
% of Peak Hourly Demand Met	100%
Carbon Impacts in 2020	
Carbon Emissions (metric tons)	1,128,600
% Generation from Renewables in 2020	57.5%
% Capacity from Renewables in 2020	58.5%

Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
Total Expected Capital Costs through 2020 ($ million)	3,600	2671	-
Annual Expected Fuel Costs in 2020 ($ million)	280	344	-
Expected Increase in Cost of Electricity in 2020 (¢/kWh)	2.4	2.8	2

	4580
	36
	33
Pace Screening Analysis Results	

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	1,128,609	5,040,399	82%
Sulfur Dioxide (metric tons)	21	13,498	100%
Nitrogen Oxides (metric tons)	295	2,430	89%
Carbon Monoxide (metric tons)	210	4,489	96%
Total Solid Particulates (metric tons)	57	1,069	95%
Volatile Organic Compounds (metric tons)	13	131	91%
Mercury (lbs)	1	205	100%
Water Requirements (gallons)	4,893,706,885	4,354,313,286	47%
Water Intensity (gallons/kWh)	0.36	0.42	-

Additional Assumptions:

- 100% of distributed PV is customer sited with a $1/watt rebate cost share for AE
- AE can terminate its contracts for biomass and natural gas CT turbines w/o incurring any costs
- Onshore wind costs at $45 MWh and $1,700 kW; coastal wind costs at $55 MWh and $1,800/kW

Model Result Concerns:

- May be difficult to achieve solar PV numbers at assumed rebate amount (less than current rebate), accelerated DSM amount, landfill gas amount, and geothermal amount

Mike Sloan Scenario #2

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)															
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)
Coal	607												-607	83%	0.99
Nuclear	422													87%	0.00
Natural Gas Turbines - Sand Hill 1-4	189		100											19%	0.53
Natural Gas Combined Cycle - Sand Hill 5	312													61%	0.36
Natural Gas Steam Turbines - Decker 1 & 2	741													8%	0.56
Natural Gas Turbines - Decker	193													3%	0.79
Onshore Wind	274	165		-77			200		300	174	100	100	350	41%	0.00
Offshore Wind	0													42%	0.00
Biomass	0				100									90%	0.00
FPP w/ biomass co-firing	0													90%	0.00
Landfill Gas	12						15							85%	0.00
Solar PV - Centralized	0		30						50		50		50	26%	0.00
Solar PV - Distributed	1		15	35	50	50	50	50	50	50	50	50	50	26%	0.00
Concentrated Solar	0													32%	0.00
IGCC w/ CCS	0													83%	0.13
IGCC w/o CCS	0													83%	0.87
Geothermal	0					25			25					95%	0.00
Storage	0													0%	0.00
Accelerated Conservation	0		10	20	30	30	30	30	30	30	30	30	30	0%	0.00
Purchased Power	0													100%	0.59

	Max CF (%)	Min CF (%)
	25%	10%
	70%	61%
	20%	1%
	10%	1%
Parabolic Trough		
Storage Type	0	Hours of St
Meet conservation demand?	Yes	

Scenario Output Summary

System Reliability in 2020	
% of Annual Electricity Demand Met	100%
% of Peak Hourly Demand Met	100%
Carbon Impacts in 2020	
Carbon Emissions (metric tons)	1,049,000
% Generation from Renewables in 2020	58.5%
% Capacity from Renewables in 2020	55.5%

Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
Total Expected Capital Costs through 2020 ($ million)	5,890	2671	-
Annual Expected Fuel Costs in 2020 ($ million)	300	344	-
Expected Increase in Cost of Electricity in 2020 (¢/kWh)	4.0	2.8	2

	4580
	36
	33
Pace Screening Analysis Results	

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	1,048,981	5,165,501	83%
Sulfur Dioxide (metric tons)	263	13,538	98%
Nitrogen Oxides (metric tons)	906	1,830	67%
Carbon Monoxide (metric tons)	1,388	3,364	71%
Total Solid Particulates (metric tons)	67	1,082	94%
Volatile Organic Compounds (metric tons)	113	29	20%
Mercury (lbs)	0	208	100%
Water Requirements (gallons)	5,656,135,747	3,591,884,423	39%
Water Intensity (gallons/kWh)	0.41	0.36	-

Additional Assumptions:

- Same as Replace FPP scenario with 150 MW biomass subtracted, 500 MW of solar and 300 MW of DSM over 700 MW goal

Model Result Concerns:

- May be difficult to achieve solar PV numbers, accelerated DSM amount, landfill gas amount, and geothermal amount
- Relatively high capital costs (double the costs) may result in much higher impacts on the cost of electricity

Mike Sloan Scenario #3

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)															
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)
Coal	607												-607	83%	0.99
Nuclear	422													87%	0.00
Natural Gas Turbines - Sand Hill 1-4	189		100											17%	0.53
Natural Gas Combined Cycle - Sand Hill 5	312													64%	0.36
Natural Gas Steam Turbines - Decker 1 & 2	741													8%	0.56
Natural Gas Turbines - Decker	193													3%	0.79
Onshore Wind	274	165		-77			200		300	174	100	100	100	41%	0.00
Offshore Wind	0													42%	0.00
Biomass	0				100									90%	0.00
FPP w/ biomass co-firing	0													90%	0.00
Landfill Gas	12						15							85%	0.00
Solar PV - Centralized	0		30						50		50		50	26%	0.00
Solar PV - Distributed	1		15	35	50	75	110	120	120	120	120	120	120	26%	0.00
Concentrated Solar	0													32%	0.00
IGCC w/ CCS	0													83%	0.13
IGCC w/o CCS	0													83%	0.87
Geothermal	0					25			25					95%	0.00
Storage	0													0%	0.00
Accelerated Conservation	0		10	20	30	30	30	30	30	30	30	30	30	0%	0.00
Purchased Power	0													100%	0.59

	Max CF (%)	Min CF (%)	
	25%	10%	
	70%	61%	
	20%	1%	
	10%	1%	
Parabolic Trough			
Storage Type	0		Hours of St
Meet conservation demand?	Yes		

Scenario Output Summary

System Reliability in 2020		Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
% of Annual Electricity Demand Met	100%	Total Expected Capital Costs through 2020 ($ million)	7,200	2671	-
% of Peak Hourly Demand Met	100%	Annual Expected Fuel Costs in 2020 ($ million)	270	344	-
Carbon Impacts in 2020		Expected Increase in Cost of Electricity in 2020 (¢/kWh)	4.7	2.8	2
Carbon Emissions (metric tons)	878,900	4580			
% Generation from Renewables in 2020	60.5%	36			
% Capacity from Renewables in 2020	58.0%	33			
		Pace Screening Analysis Results			

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	878,874	5,335,608	86%
Sulfur Dioxide (metric tons)	262	13,539	98%
Nitrogen Oxides (metric tons)	861	1,875	69%
Carbon Monoxide (metric tons)	1,307	3,445	72%
Total Solid Particulates (metric tons)	40	1,109	96%
Volatile Organic Compounds (metric tons)	112	29	21%
Mercury (lbs)	0	208	100%
Water Requirements (gallons)	5,413,040,053	3,834,980,117	41%
Water Intensity (gallons/kWh)	0.39	0.38	-

Additional Assumptions:

- Same as Replace FPP scenario with 150 MW biomass subtracted, 200 MW less of wind, 1000 MW of solar and 300 MW of DSM over 700 MW goal

Model Result Concerns:

- May be difficult to achieve solar PV numbers, accelerated DSM amount, landfill gas amount, and geothermal amount
- Relatively high capital costs (double the costs) may result in much higher impacts on the cost of electricity

Replace FPP Scenario
Run by Pace for Portfolio Analysis- Results in LBJ Model:

Choose Your Generation Mix

See "References" tab for 2008 CF and EF references

Schedule of power generation additions and subtractions (net MW)														CF (% avg. 2009-2020)	CO_2 EF (metric tons/MWh)
Power Source	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Coal	607												-607	83%	0.99
Nuclear	422													87%	0.00
Natural Gas Turbines - Sand Hill 1-4	189		100											18%	0.53
Natural Gas Combined Cycle - Sand Hill 5	312													61%	0.36
Natural Gas Steam Turbines - Decker 1 & 2	741													9%	0.56
Natural Gas Turbines - Decker	193													4%	0.79
Onshore Wind	274	165		-77			200		300	174	100	100	350	41%	0.00
Offshore Wind	0													42%	0.00
Biomass	0				100		150							90%	0.00
FPP w/ biomass co-firing	0													90%	0.00
Landfill Gas	12						15							85%	0.00
Solar PV - Centralized	0		30						50		50		50	26%	0.00
Solar PV - Distributed	1													26%	0.00
Concentrated Solar	0													32%	0.00
IGCC w/ CCS	0													83%	0.13
IGCC w/o CCS	0													83%	0.87
Geothermal	0					25			25					95%	0.00
Storage	0													0%	0.00
Accelerated Conservation	0						14	14	14	14	14	14	14	0%	0.00
Purchased Power	0													100%	0.59

Max CF (%)	Min CF (%)	
25%	10%	
70%	61%	
20%	1%	
10%	1%	
Parabolic Trough		
Storage Type	0	Hours of St
Meet conservation demand?	Yes	

Scenario Output Summary

System Reliability in 2020		Costs and Economic Impacts through 2020		Pace Screening Analysis Results	AE Rate Impact Analysis Results
% of Annual Electricity Demand Met	100%	Total Expected Capital Costs through 2020 ($ million)	4,390	2671	-
% of Peak Hourly Demand Met	94%	Annual Expected Fuel Costs in 2020 ($ million)	360	344	-
Carbon Impacts in 2020		Expected Increase in Cost of Electricity in 2020 (¢/kWh)	3.0	2.8	2
Carbon Emissions (metric tons)	1,285,300	4580			
% Generation from Renewables in 2020	57.0%	36			
% Capacity from Renewables in 2020	51.7%	33			
		Pace Screening Analysis Results			

Environmental Report

	2020 Levels	Total Reduction (from 2009)	% Reduction (from 2009)
Carbon Dioxide (metric tons)	1,285,281	4,929,200	79%
Sulfur Dioxide (metric tons)	651	13,151	95%
Nitrogen Oxides (metric tons)	2,105	631	23%
Carbon Monoxide (metric tons)	3,121	1,630	34%
Total Solid Particulates (metric tons)	76	1,073	93%
Volatile Organic Compounds (metric tons)	276	-135	-95%
Mercury (lbs)	0	208	100%
Water Requirements (gallons)	7,272,805,749	1,975,214,422	21%
Water Intensity (gallons/kWh)	0.52	0.26	-