



Task Force Portfolios

October 7, 2009






Comparison to Strawman and Staff Recommendation (Without Sales)

Description		Units	Strawman	New Staff Recommendation	Task Force Scenario #1	Task Force Scenario #1 Solar as Off-System	Task Force Scenario #2
Capacity Additions (MW)	Early (09-12)	MW	525	590	985	985	585
	Middle (13-16)	MW	420	550	830	830	490
	Late (17-20)	MW	350	435	940	940	470
Replacements		MW	0	0	600 (Coal)	600 (Coal)	0
Levelized NPV of Portfolio Costs		2007 \$/MWh	57.97	58.15	62.59	64.15	59.25
Real Increase from 2009 to 2020		%	29%	28%	46%	59%	31%
Nominal Increase from 2009 to 2020		%	69%	69%	92%	108%	72%
CO2 Emissions 2020		Tonnes (000s)	5,238	4,580	2,170	2,170	4,970
2020 CO2 Percent Reduction from 2005		%	-6%	-18%	-61%	-61%	-11%
Renewable Percentage in 2020		%	30%	36%	52%	48%	28%
Total Capital Expenditures		\$MM	1,796	2,671	3,301	3,301	1,725
Incremental Capacity Additions		Share					

*Solar as “off-system” refers to the condition where distributed solar is considered similar to DSM, excluding generation from total energy served

■ Gas ■ Wind ■ Solar ■ Bio ■ DSM

Comparison to Strawman and Staff Recommendation (With Sales)

Description		Units	Strawman	New Staff Recommendation	Task Force Scenario #1	Task Force Scenario #1 Solar as Off-System	Task Force Scenario #2
Capacity Additions (MW)	Early (09-12)	MW	525	590	985	985	585
	Middle (13-16)	MW	420	550	830	830	490
	Late (17-20)	MW	350	435	940	940	470
Replacements		MW	0	0	600 (Coal)	600 (Coal)	0
Levelized NPV of Portfolio Costs		2007 \$/MWh	55.18	54.41	60.68	62.17	56.02
Real Increase from 2009 to 2020		%	20%	15%	39%	51%	20%
Nominal Increase from 2009 to 2020		%	58%	51%	83%	98%	57%
CO2 Emissions 2020		Tonnes (000s)	5,238	4,580	2,170	2,170	4,970
2020 CO2 Percent Reduction from 2005		%	-6%	-18%	-61%	-61%	-11%
Renewable Percentage in 2020		%	30%	36%	52%	48%	28%
Total Capital Expenditures		\$MM	1,796	2,671	3,301	3,301	1,725
Incremental Capacity Additions		Share					

*Solar as “off-system” refers to the condition where distributed solar is considered similar to DSM, excluding generation from total energy served

■ Gas ■ Wind ■ Solar ■ Bio ■ DSM

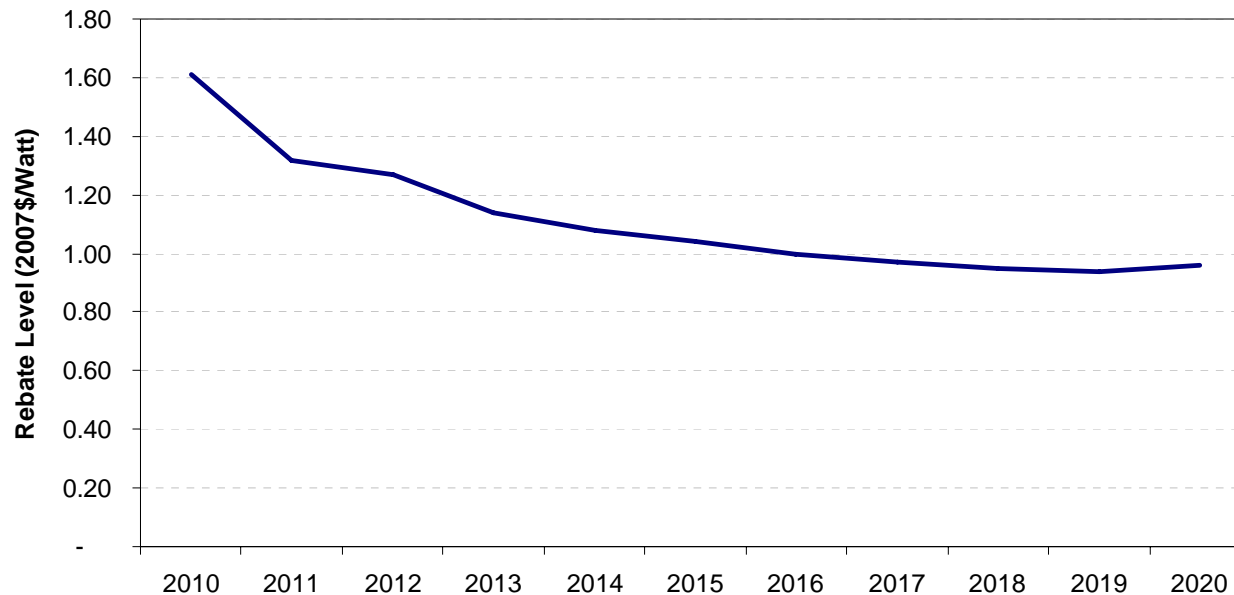
***Task Force Scenario #1
(Renewables/DSM to
Replace FPP)***

Scenario #1 Key Assumptions and Changes

- FPP Replacement is earlier than other scenarios
 - 300 MW in 2012 and 300 MW in 2014
- Total DSM increased to 1,000 MW by 2020
 - Beyond 700 MW in base load forecast, first incremental 100 MW costs \$500/kW, with each incremental 100 MW being 25% higher
- 750 MW of distributed solar PV
 - Operational evidence indicates lower capacity factors than larger, centralized systems
 - AE would offer a rebate
 - Distributed solar will lower on-system energy demand and impact overall portfolio costs per MWh
- Additional coastal wind with higher cost and lower capacity factors than wind from West Texas
- As in other screening runs, base cost summaries exclude off-system sales revenues

Distributed Solar and Coastal Wind Operational Characteristics

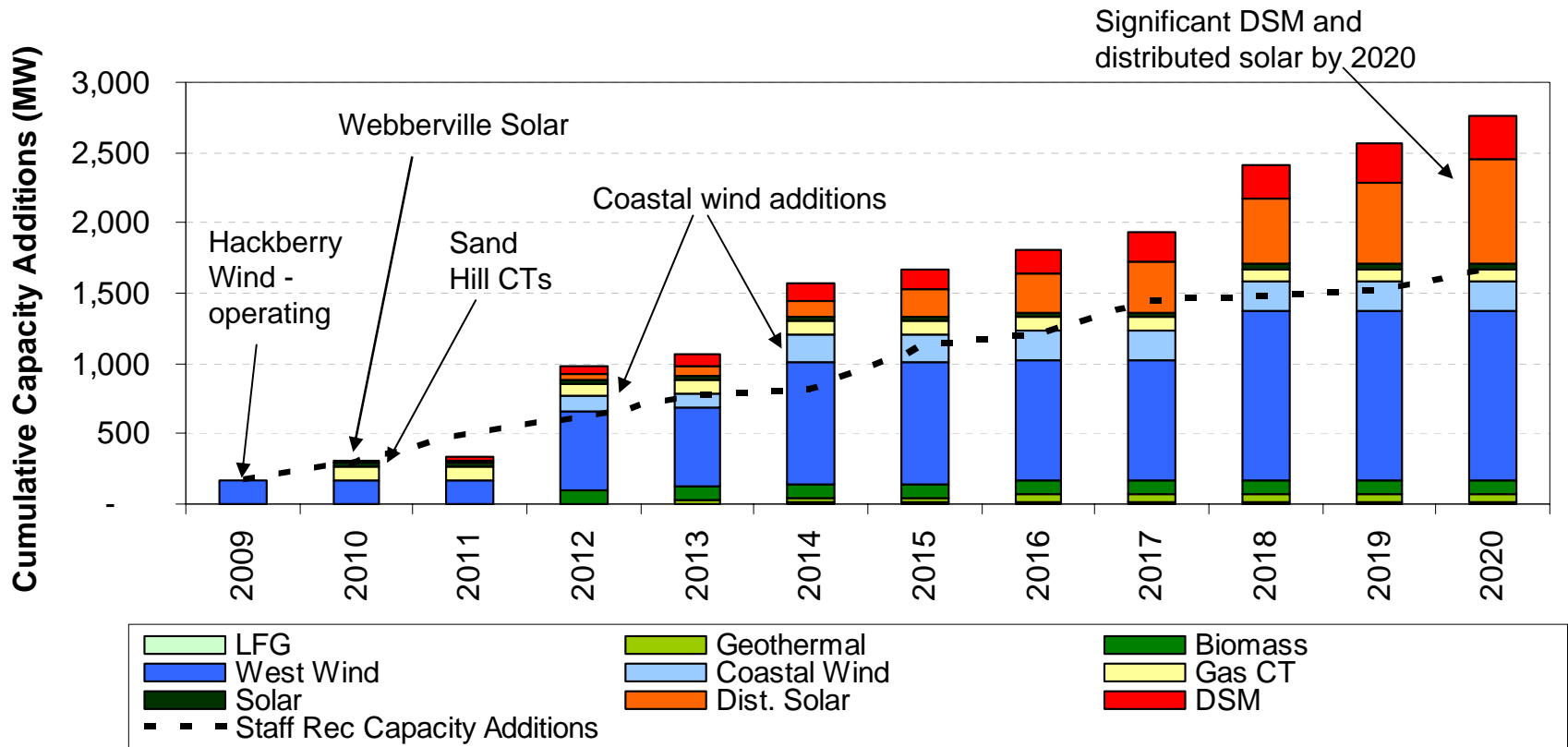
- Capacity factor for distributed solar reflects AE data on performance (16%)
- Rebate prices expected to decline over time, but be paid out in full during year of installation



- Coastal wind has a better hourly profile, but lower capacity factor expectations (32-33% vs. 40%+ for West wind)
- Based on AE market data, cost for coastal wind is priced 18% higher than wind from the West

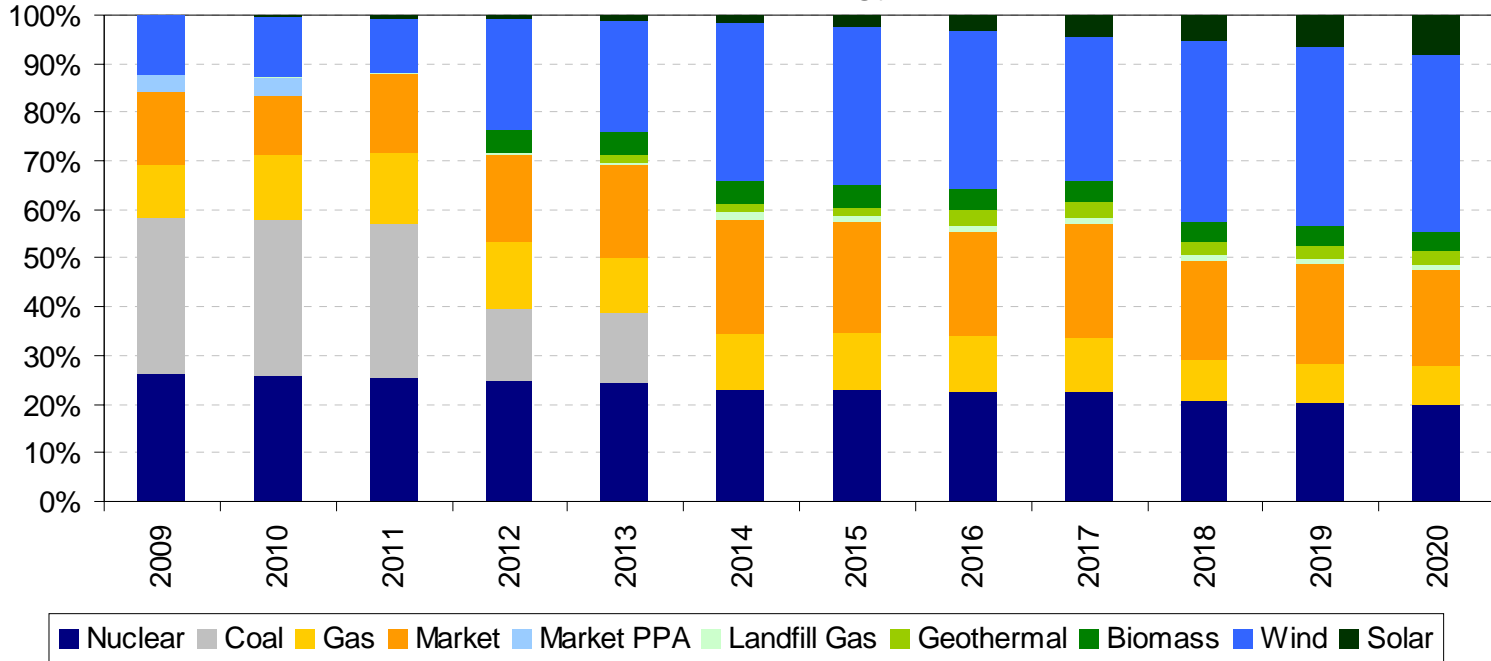
Task Force Scenario #1 Annual Capacity Expansion Plan

- Base expansion plan (2009-2020) includes 100 MW Natural Gas, 1,215 MW of wind from West Texas, 200 MW of coastal wind, 30 MW of large solar, 750 MW of distributed solar, 50 MW of geothermal, 15 MW of LFG, 100 MW biomass, and 300 MW of additional DSM



Task Force Scenario #1 Annual Generation for Native Load

Energy Shares

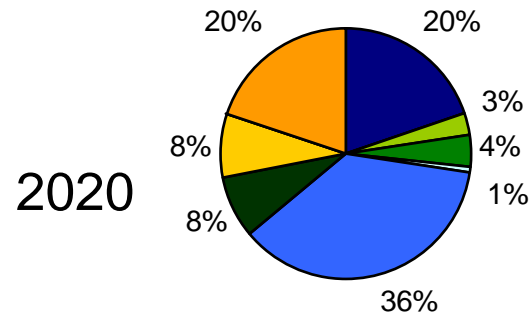
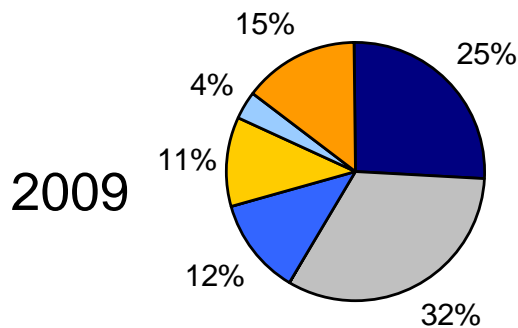


•If all local solar is counted towards RPS, portfolio achieves 52% by 2020

•If distributed solar is considered to be off-system, RPS would be 48%

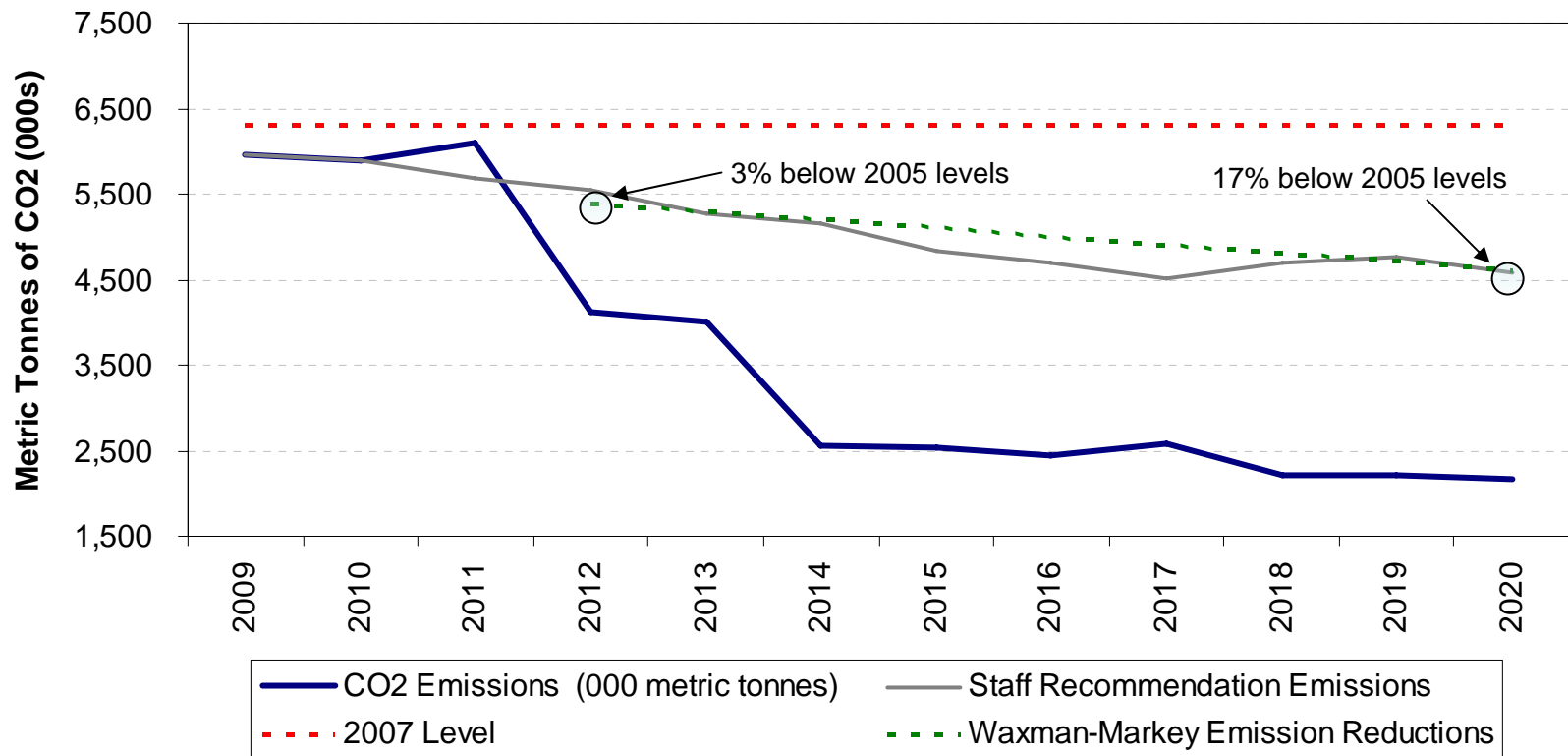
•Staff Recommendation achieves 36%

•Coal replacements occur in 2012 and 2014



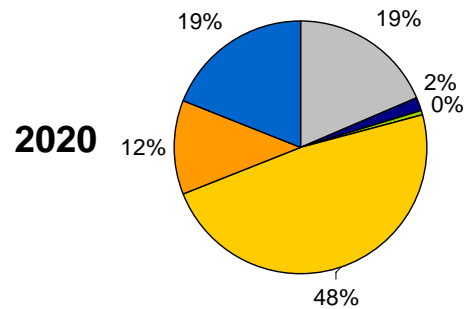
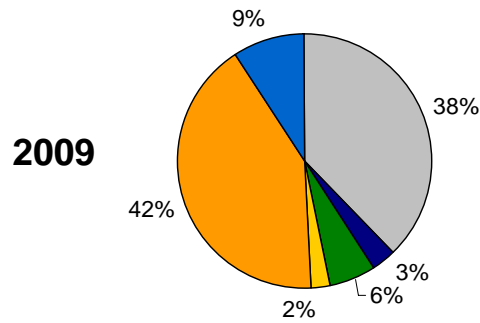
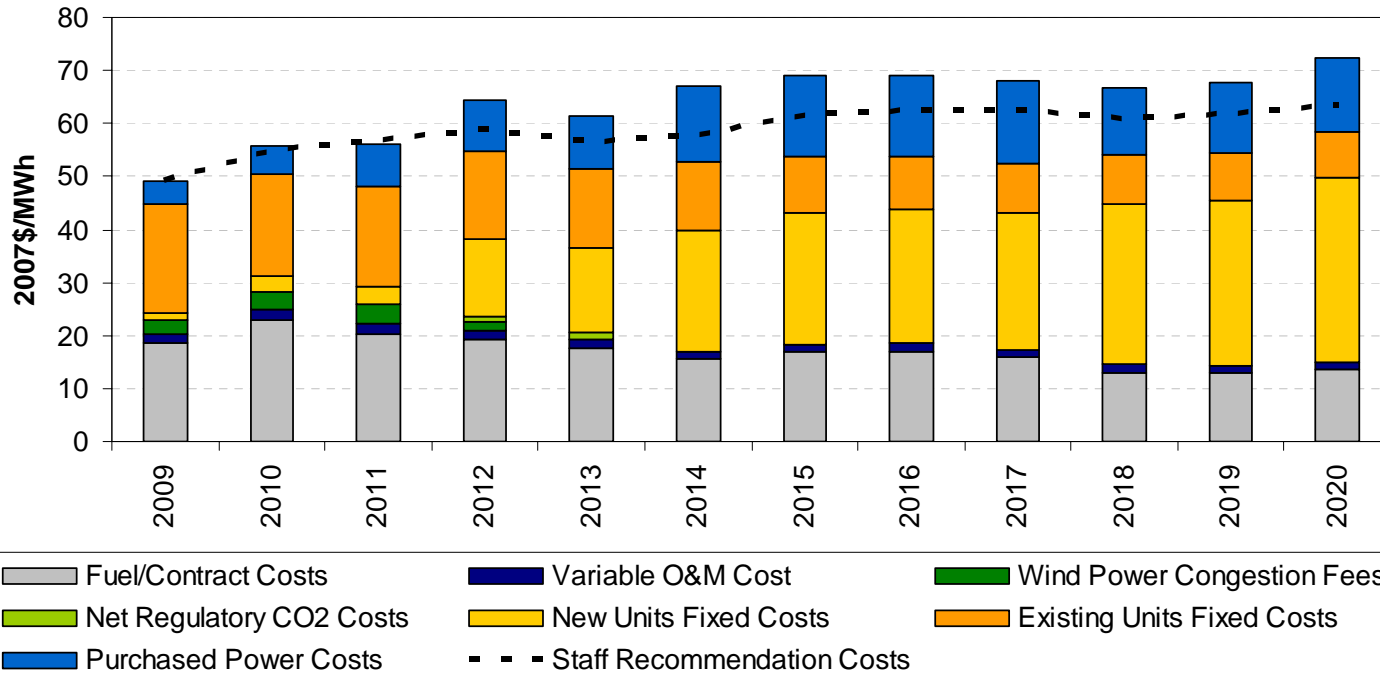
Task Force Scenario #1 CO₂ Emissions

- CO₂ emissions expected to decline steeply in 2012 and 2014 with replacement of FPP units to be significantly below potential federal targets
- Coal replacements result in significantly larger emission reductions than Staff Recommendation



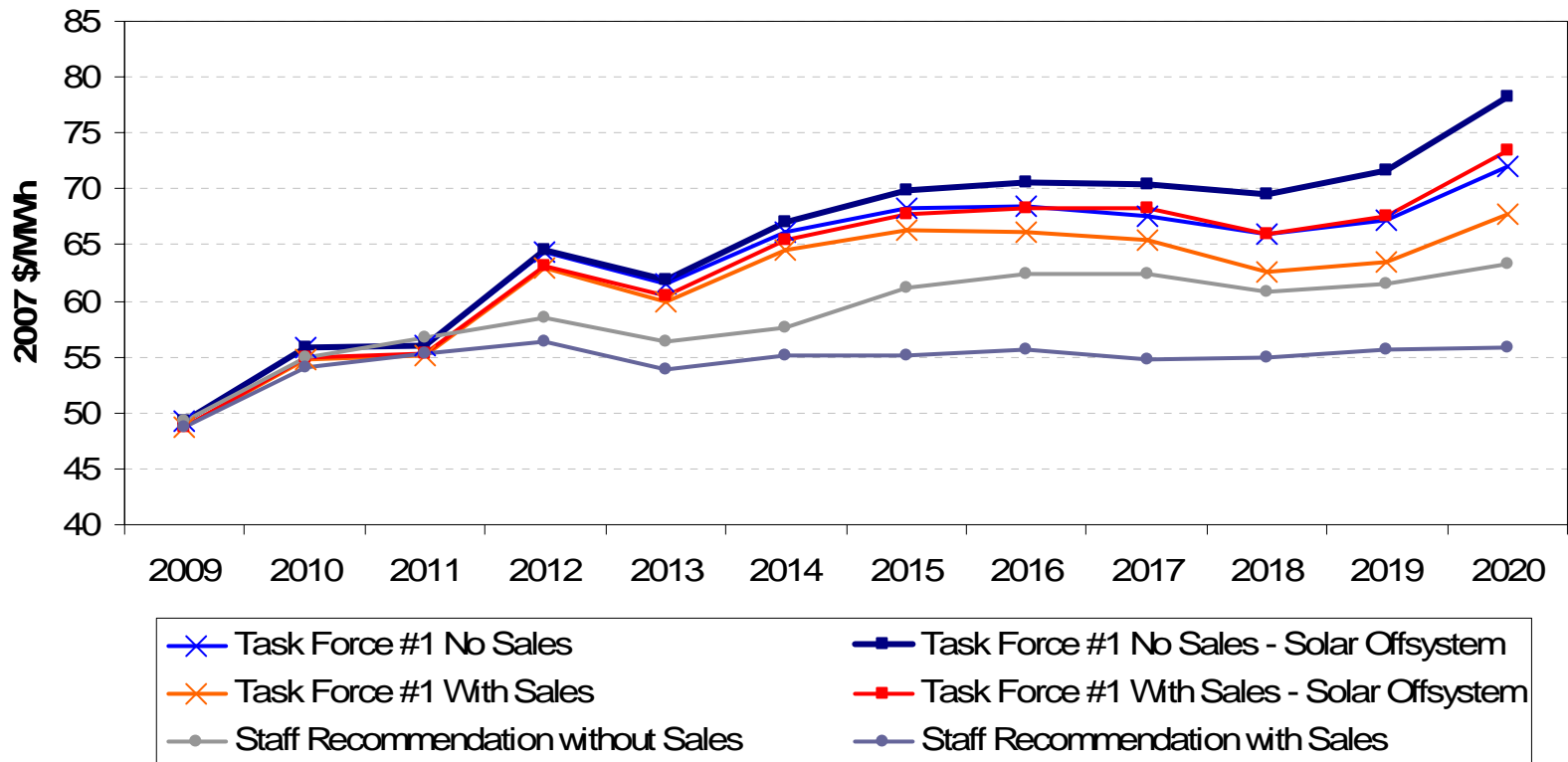
Cost Components for *Task Force Scenario #1*

- Higher costs than Staff Recommendation, driven by significant new fixed cost expenditures
- When solar is considered off-system, costs would be even higher



Sales and Off-System Sensitivities

- Treatment of off-system sales impacts overall portfolio costs
- When distributed solar is considered to be off-system, revenue requirements need to be spread across fewer MWh, increasing portfolio costs



*Solar as “off-system” refers to the condition where distributed solar is considered similar to DSM, excluding generation from total energy served

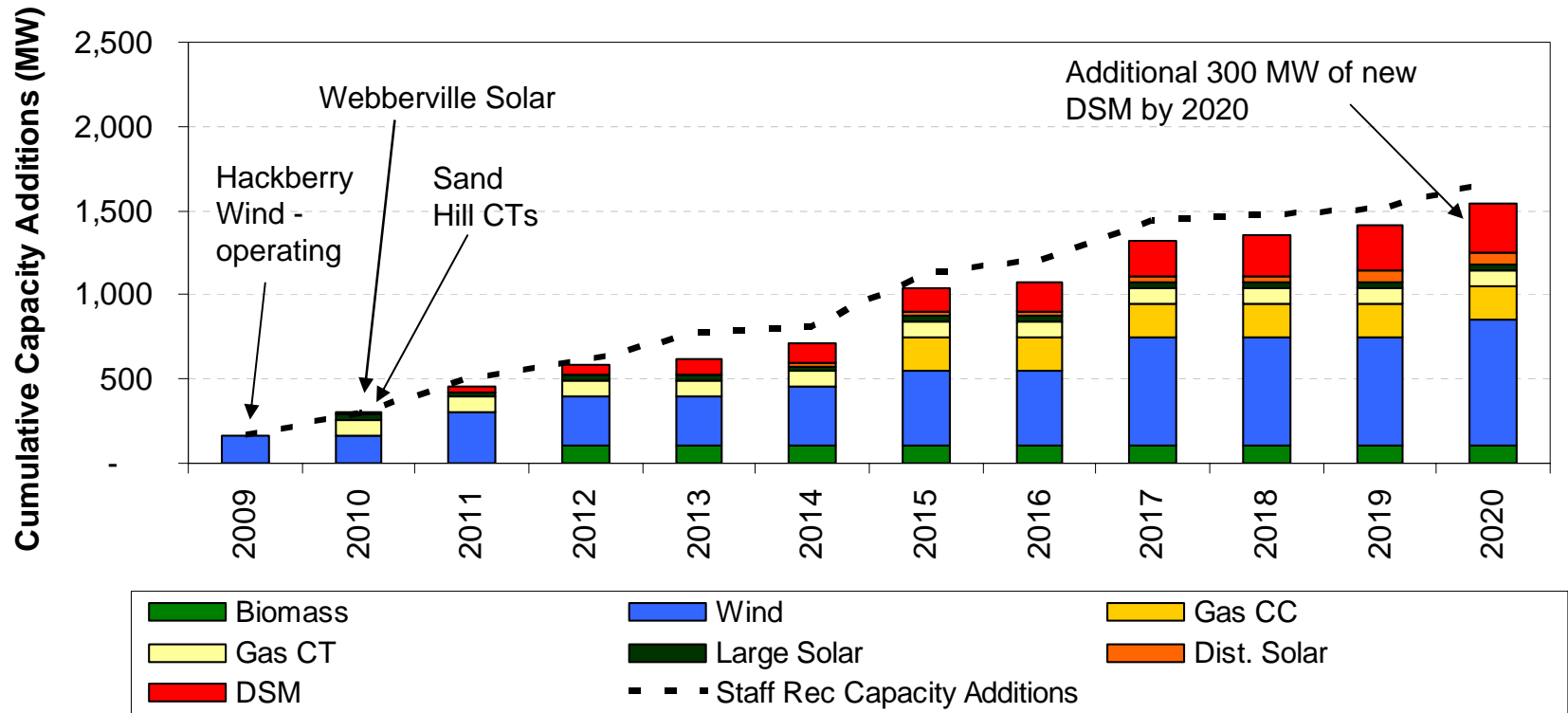
***Task Force Scenario #2
(1000 MW DSM
Replacement with
Strawman Base)***

Scenario #2 Key Assumptions and Changes

- Total DSM increased to 1,000 MW by 2020
 - Beyond 700 MW in base load forecast, first incremental 100 MW costs \$500/kW, with each incremental 100 MW being 25% higher
- 70 MW of distributed solar PV
 - Operational evidence indicates lower capacity factors than larger, centralized systems
 - AE would offer a rebate
 - Distributed solar will lower on-system energy demand and impact overall portfolio costs per MWh
- No biomass beyond current contract
- As in other screening runs, base cost summaries exclude off-system sales revenues

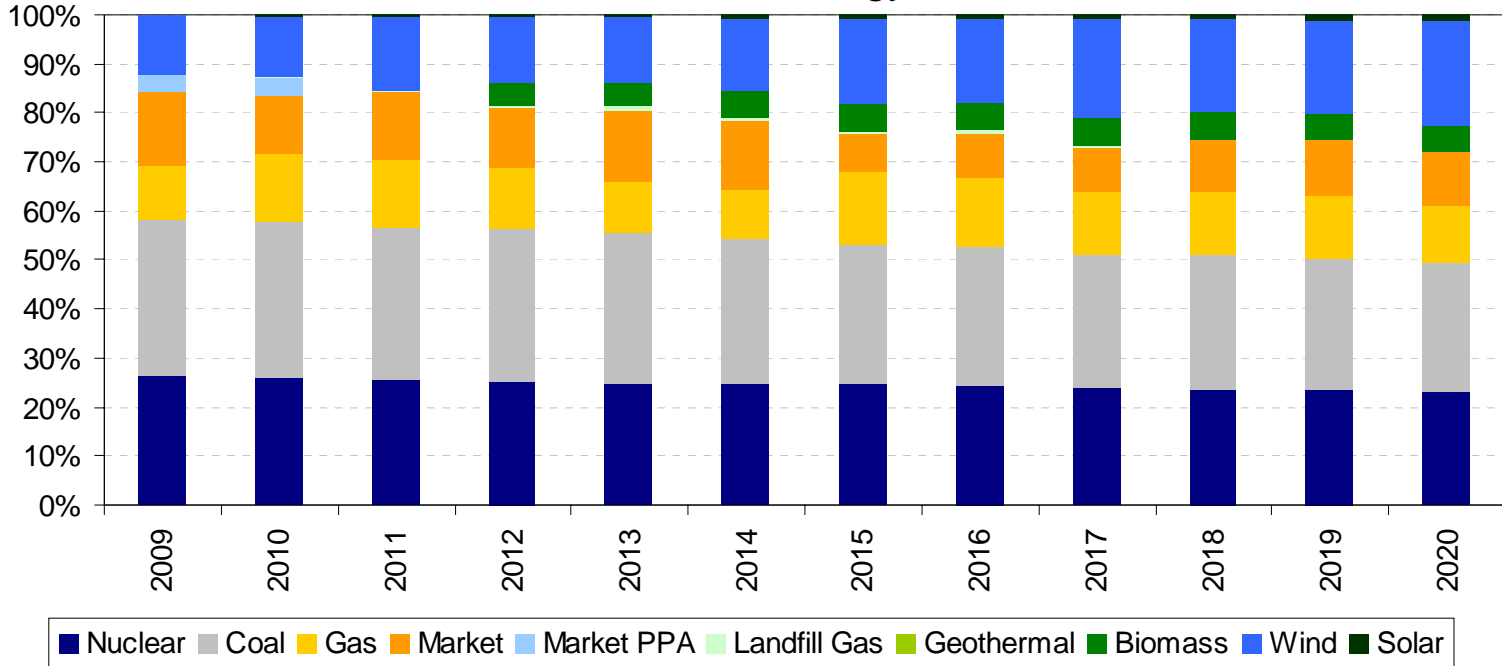
Task Force Scenario #2 Annual Capacity Expansion Plan

- Base expansion plan (2009-2020) includes 300 MW Natural Gas, 750 MW of wind, 30 MW of large solar, 70 MW of distributed solar, 100 MW biomass, and 300 MW of additional DSM

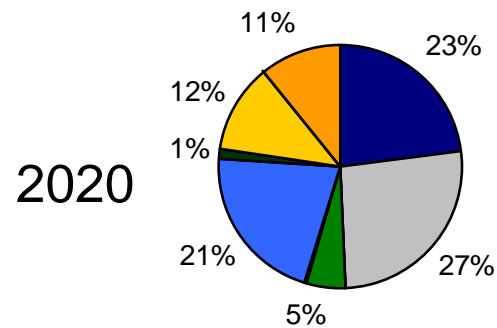
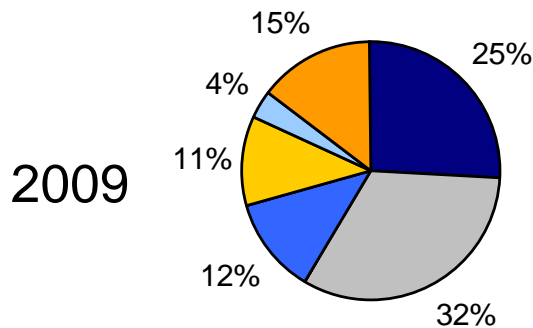


Task Force Scenario #2 Annual Generation for Native Load

Energy Shares

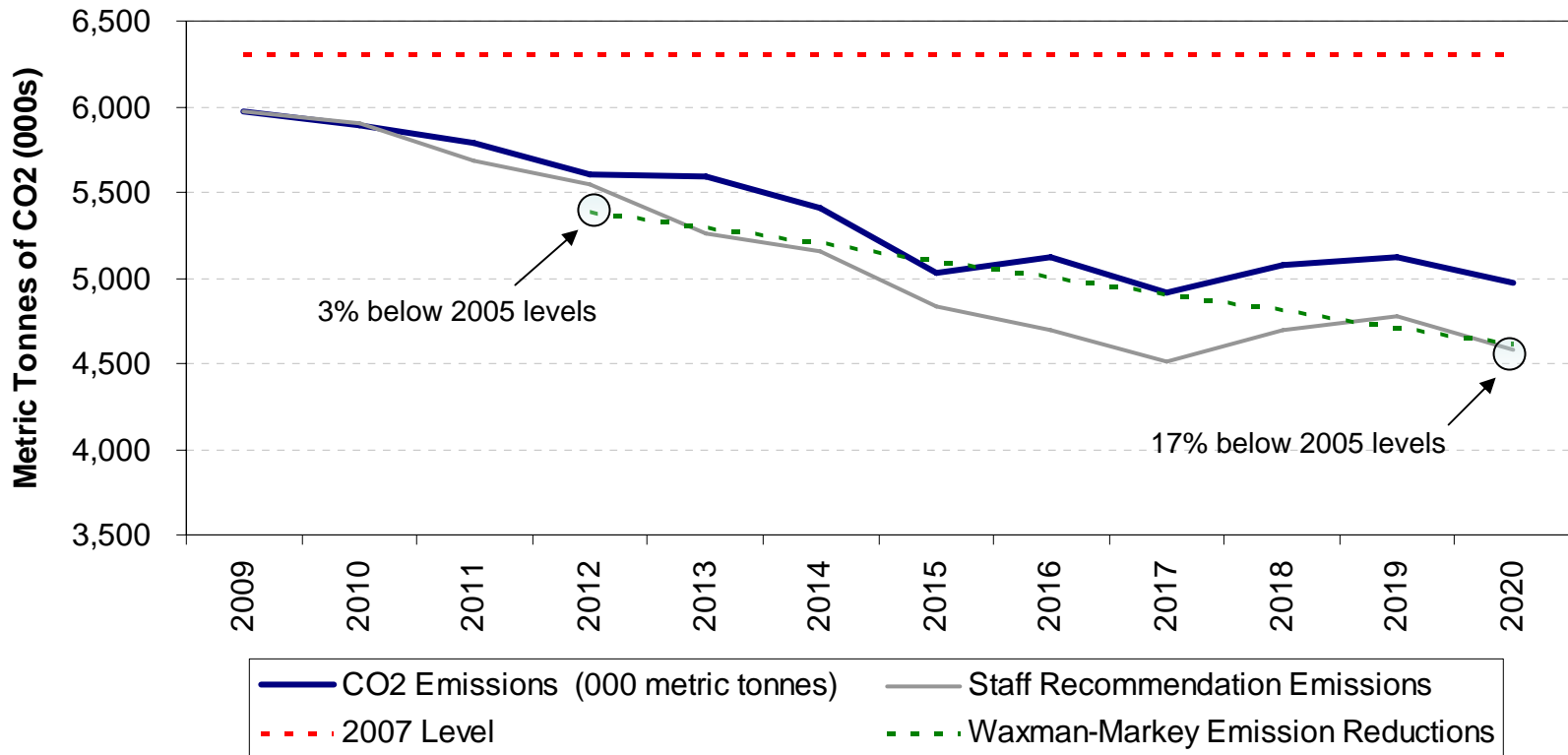


- With removal of additional biomass capacity, RPS is expected to only reach 28% in 2020
- Staff Recommendation achieves 36%



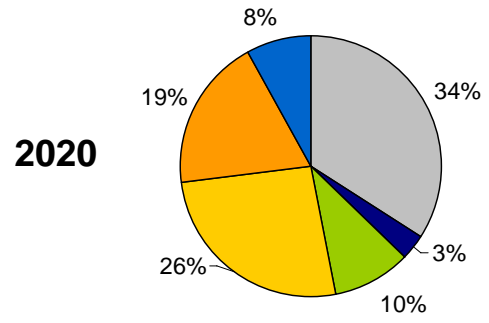
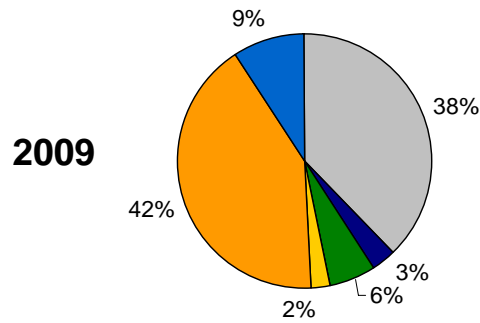
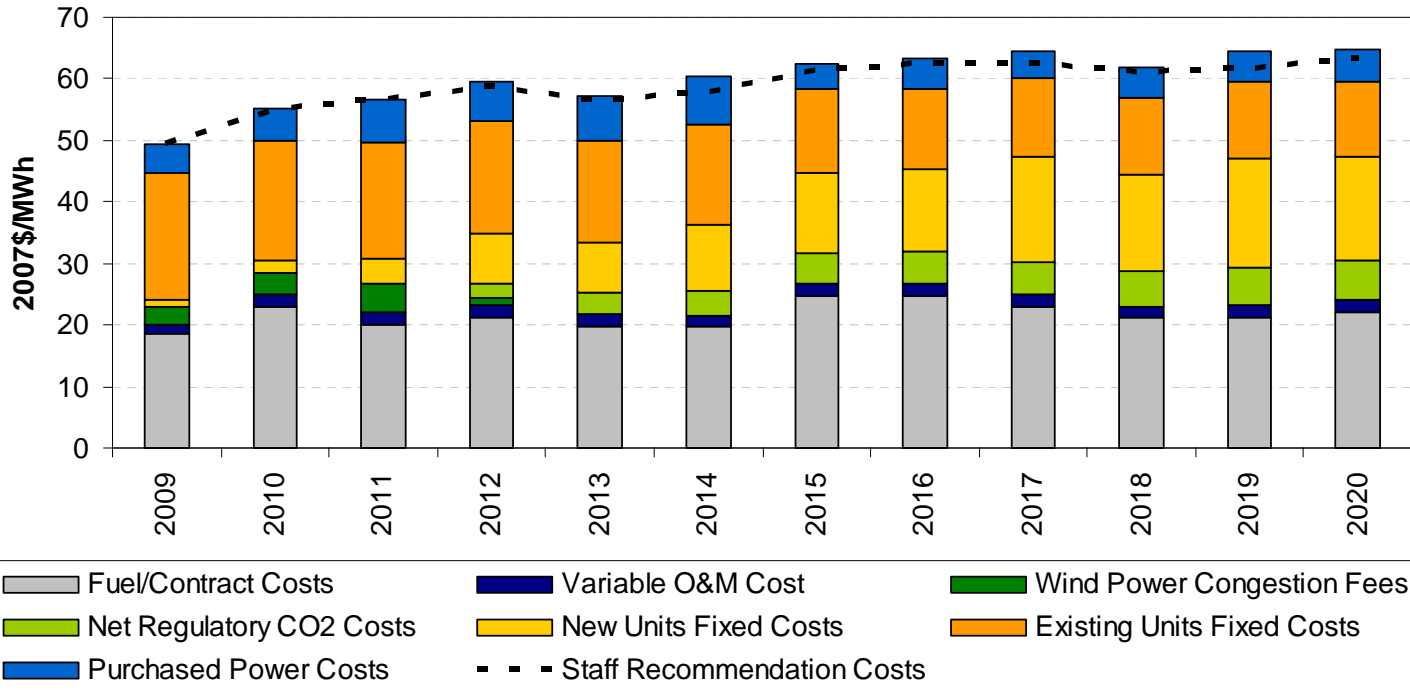
Task Force Scenario #2 CO₂ Emissions

- CO₂ emissions expected to decline with DSM and renewable additions.
- However, emission reductions do not physically reach expected federal targets like in the Staff Recommendation



Cost Components for *Task Force Scenario #2*

- Additional DSM and distributed solar fixed costs result in slight portfolio cost increases above Staff Recommendation



Comparisons and Summary






Comparison to Strawman and Staff Recommendation (Without Sales)

Description		Units	Strawman	New Staff Recommendation	Task Force Scenario #1	Task Force Scenario #1 Solar as Off-System	Task Force Scenario #2
Capacity Additions (MW)	Early (09-12)	MW	525	590	985	985	585
	Middle (13-16)	MW	420	550	830	830	490
	Late (17-20)	MW	350	435	940	940	470
Replacements		MW	0	0	600 (Coal)	600 (Coal)	0
Levelized NPV of Portfolio Costs		2007 \$/MWh	57.97	58.15	62.59	64.15	59.25
Real Increase from 2009 to 2020		%	29%	28%	46%	59%	31%
Nominal Increase from 2009 to 2020		%	69%	69%	92%	108%	72%
CO2 Emissions 2020		Tonnes (000s)	5,238	4,580	2,170	2,170	4,970
2020 CO2 Percent Reduction from 2005		%	-6%	-18%	-61%	-61%	-11%
Renewable Percentage in 2020		%	30%	36%	52%	48%	28%
Total Capital Expenditures		\$MM	1,796	2,671	3,301	3,301	1,725
Incremental Capacity Additions		Share					

*Solar as “off-system” refers to the condition where distributed solar is considered similar to DSM, excluding generation from total energy served

■ Gas ■ Wind ■ Solar ■ Bio ■ DSM

Comparison to Strawman and Staff Recommendation (With Sales)

Description		Units	Strawman	New Staff Recommendation	Task Force Scenario #1	Task Force Scenario #1 Solar as Off-System	Task Force Scenario #2
Capacity Additions (MW)	Early (09-12)	MW	525	590	985	985	585
	Middle (13-16)	MW	420	550	830	830	490
	Late (17-20)	MW	350	435	940	940	470
Replacements		MW	0	0	600 (Coal)	600 (Coal)	0
Levelized NPV of Portfolio Costs		2007 \$/MWh	55.18	54.41	60.68	62.17	56.02
Real Increase from 2009 to 2020		%	20%	15%	39%	51%	20%
Nominal Increase from 2009 to 2020		%	58%	51%	83%	98%	57%
CO2 Emissions 2020		Tonnes (000s)	5,238	4,580	2,170	2,170	4,970
2020 CO2 Percent Reduction from 2005		%	-6%	-18%	-61%	-61%	-11%
Renewable Percentage in 2020		%	30%	36%	52%	48%	28%
Total Capital Expenditures		\$MM	1,796	2,671	3,301	3,301	1,725
Incremental Capacity Additions		Share					

*Solar as “off-system” refers to the condition where distributed solar is considered similar to DSM, excluding generation from total energy served

■ Gas ■ Wind ■ Solar ■ Bio ■ DSM

Summary

- Task Force Scenario #1 achieves significantly greater (~40%) emission reductions than Staff Recommendation
 - 61% below 2005 levels in 2020 vs. 18%
- However, this comes at the expense of significantly greater cost expectations in 2020 (\$78/MWh vs. \$63/MWh)
- Task Force Scenario #2 has only slightly greater cost expectations than the Staff Recommendation (\$65/MWh vs. \$63/MWh in 2020) due to more DSM and distributed solar
- Emission reductions and RPS are lower than Staff Recommendation due to less biomass and solar with a lower capacity factor

Risks and Uncertainties

- Acquiring 750 MW of new distributed solar PV between now and 2020 is highly uncertain
 - Customer adoption rates could vary or be lower than expected
 - Required rebate levels might be higher than anticipated in order to get such high participation
- The additional 300 MW of DSM also carries availability risks
 - Actual costs, amounts, and timing of DSM penetration are uncertain
- Power market exposure is very significant in Scenario #1 due to replacement of coal-fired generation with large amounts of variable resources
 - Power market prices are highly dependent on fuel prices and supply-demand balance in wider market area