Iowa Climate Change Advisory Council

Energy Efficiency and Conservation Subcommittee Meeting #13

Aug 6, 2008

Iowa Department of Natural Resources
The Center for Climate Strategies

Welcome and Introductions

Agenda

1. Introductions and Roll Call
2. Approval of Summary of Call/Meeting #12 [Decision Item]
3. Discussion of Revised POD
4. Assumptions PPT
5. Agenda, Date and Time for Next Meetings [Decision Item]
6. Public Comments
7. Announcements

Review and Approval of Call Summary 12

- Review draft meeting summary for EEC SC call #12
- Consider any corrections or additions to meeting summary
- Move to approve meeting summary with agreed upon changes

Stepwise Planning Process

- Develop inventory and forecast of emissions
- Identify a full range of possible actions
- Identify initial priorities for analysis
- Develop straw proposals
- ***Quantify GHG reductions and costs/savings***
- ***Evaluate externalities, feasibility issues***
- Develop alternatives to address barriers
- Aggregate results
- Iterate to final agreements
- Finalize and report recommendations

- Discussion of Revised POD

Assumptions for EEC SC

- Load growth estimates
- T&D
- Fixed costs of efficiency
- Levelized costs
- Avoided costs
- Avoided CO_2
- Calculations
- Existing Actions
- Buildings
- Data Lacunae

Quantification Process

- Currently developing stand-alone cost estimates for each quantifiable option
- Once completed, the stand alone options will be adjusted to reflect existing actions (eg EE Plans)
- Options will be also be modified to reflect overlaps within EEC options and between other subcommittee options

Draft Load Growth

- Weighted average of 1.9% statewide over the planning period
- Early periods higher
- To be used to update I&F
- Question: Do these include latest EE plan?

	Interstate P & L	MidAmerican	Rural Electric Cooperatives	Municipal Utilities	Weighted Average
Source:	Bob Holmes 7/22/08 email	MEC Electric Forecast.xls sent by Cathy Woolums July 31, 2008	Roxanne Carisch 7/21/08 email	MAPP Load and Capability Report	
Year	Date: 3/2006 forecast for 4/23/08 EE plan filing with IUB Table 2.1.3.	2007 Forecast	Date: 2008?	1-May-07	Iowa
2006	1.36%	1.36%	1.36%	1.36%	1.36%
2007	1.93%	2.41%	1.93%	1.93%	2.13%
2008	0.60%	4.56%	3.23%	3.30%	2.96%
2009	0.72%	4.65%	8.10%	3.13%	3.58%
2010	0.62%	2.63%	1.60%	2.39%	1.82%
2011	1.69%	1.48%	1.70%	2.65%	1.72%
2012	1.65%	1.22%	1.80%	2.07%	1.53%
2013	1.70%	1.30%	1.60%	2.33%	1.59%
2014	1.73%	1.37%	1.50%	1.96%	1.57%
2015	1.79%	1.41%	1.60%	2.00%	1.62%
2016	1.79%	1.41%	1.60%	5.94%	2.12%
2017	1.76%	1.44%	1.60%	2.86%	1.74%
2018	1.77%	1.53%	1.60%	2.82%	1.78%
2019	1.80%	1.61%	1.60%	2.78%	1.82%
2020	1.74%	1.46%	1.60%	2.82%	1.74%
2021	1.78%	1.53%	1.60%	2.84%	1.78%
2022	1.79%	1.39%	1.60%	2.93%	1.73%
2023	1.77%	1.31%	1.60%	3.00%	1.70%
2024	1.84%	1.32%	1.60%	3.11%	1.74%
2025	1.83%	1.31%	1.60%	3.23%	1.75%
2026	1.83%	1.31%	1.60%	2.93%	1.71%
2027	1.83%	1.28%	1.60%	2.94%	1.70%
2028	1.83%	1.28%	1.60%	2.95%	1.71%
2029	1.83%	1.28%	1.60%	2.97%	1.71%
2030	1.83%	1.28%	1.60%	2.99%	1.71%
NOTES				Period Average	1.9%

T&D Assumptions

- Transmission and distribution losses are 7%.
  - From IA_ES_Forecast.xls assumptions tab. Net average T&D losses 2005-2030.
- Used to estimate sales by fuel type and for energy efficiency deployment

Fixed Costs of Efficiency

Table 3
Estimated Budgets by Function ($000)

	Natural Gas						Electric						Total					
	2009	2010	2011	2012	2013	Total	2009	2010	2011	2012	2013	Total	2009	2010	2011	2012	2013	Total
Planning & design	$207	$200	$205	$560	$391	$1,563	$395	$381	$392	$1,080	$751	$2,999	$602	$581	$597	$1,640	$1,142	$4,562
Administration	$2,014	$2,128	$2,175	$2,224	$2,277	$10,818	$3,032	$3,318	$3,388	$3,308	$3,378	$16,424	$5,046	$5,446	$5,563	$5,532	$5,655	$27,242
Advertising & promotion	$1,266	$1,646	$1,682	$1,719	$1,759	$8,072	$2,214	$2,778	$2,824	$2,886	$2,952	$13,654	$3,480	$4,424	$4,506	$4,605	$4,711	$21,726
Customer incentives	$14,287	$16,612	$18,229	$19,774	$20,476	$89,378	$29,424	$35,483	$38,376	$41,481	$43,368	$188,132	$43,711	$52,095	$56,605	$61,255	$63,844	$277,510
Monitoring & evaluation	$262	$817	$353	$451	$726	$2,609	$1,128	$2,139	$1,751	$1,850	$1,984	$8,852	$1,390	$2,956	$2,104	$2,301	$2,710	$11,461
Equipment	$203	$0	$0	$0	$0	$203	$1,516	$755	$773	$793	$504	$4,341	$1,719	$755	$773	$793	$504	$4,544
Installation	$0	$0	$0	$0	$0	$0	$597	$515	$528	$543	$385	$2,568	$597	$515	$528	$543	$385	$2,568
Miscellaneous	$743	$794	$781	$778	$776	$3,872	$1,244	$1,269	$1,288	$1,310	$1,331	$6,442	$1,987	$2,063	$2,069	$2,088	$2,107	$10,314
Total Budget	**$18,982**	**$22,197**	**$23,425**	**$25,506**	**$26,405**	**$116,515**	**$39,550**	**$46,638**	**$49,320**	**$53,251**	**$54,653**	**$243,412**	**$58,532**	**$68,835**	**$72,745**	**$78,757**	**$81,058**	**$359,927**

Category	2009-2013 Total	Note
Customer Incentives (Utility Capital Cost)	277510	
plus Participant Capital Costs	69377.5	25% of Incentives
Utility + Participant Capital Costs	346887.5	
Fixed Costs (All Utility Cost ex Cust Incentive	82417	
Fixed Costs as % of Total EE Spending	24%	

Source:
MidAmerican Energy Compa
Proceeding to adopt Docket
ENERGY EFFICIENCY PLA
MidAmerican Energy Compa
Volume II
Appendix A
Executive Summary
Program Descriptions
pA1-8

Levelized Costs--Electricity

Levelized Cost of Energy Efficiency--Capital Costs	**($/MWh)**	**$ 30.00**

Source: Quantec. (2008). Assessment of Energy and Capacity Savings Potential in Iowa. February Vol I.p. ES-3

Levelized Cost of Energy Efficiency--Fixed Costs (admin, mktg, etc)	(% of Capital	**24%**

24% of Capital Costs see EefixedCosts tab

Levelized Cost of Energy Efficiency--Total Costs	**($/MWh)**	**$ 37.13**

Sum of Capital and Fixed Costs above

Cost of EE measures includes program and participant cost as is typically used in Total Resource Cost test. Utility cost would be approx 25

Real escalation rate for cost of energy efficiency programs:	**2%**

Data to be determined by Iowa workgroup

Levelized Costs-Gas

Levelized Costs of Natural Gas EE Capital Costs (2005$/MBTU)	
Residential	**$ 4.40**
Commercial	**$ 4.40**
Industrial	**$ 4.40**

Levelized Cost of Energy Efficiency--Fixed Costs (admin, mktg, etc)	
All Sectors	**24%**

Levelized Costs of Natural Gas EE Total Costs (2005$/MBTU)	
Residential	**$ 5.45**
Commercial	**$ 5.45**
Industrial	**$ 5.45**

Real Escalation rate for Levelized costs of Natural Gas EE programs	
Residential	**2%**
Commercial	**2%**
Industrial	**2%**

Data to be determined by Iowa workgroup

Avoided Costs

- Electricity--Values base case without externality factor
- Source: IPL Filing for Docket # EEP-08-1

Electricity

$/MWh

2009	$72.00
2010	$65.00
2011	$68.00
2012	$68.00
2013	$53.00
2014	$58.00
2015	$57.00
2016	$62.00
2017	$69.00
2018	$72.00

Gas

$/MBTU

2009	$9.49
2010	$9.14
2011	$9.02
2012	$9.02
2013	$9.07
2014	$8.98
2015	$8.96
2016	$9.06
2017	$9.35
2018	$9.67

Avoided GHG methodology proposal (I)

- Ability to include large amounts of the marginal resource (gas) is constrained by small annual generation amounts

Table 2b: Estimated Sales according to fuel type (GWh) (Gen (2a) adjusted by T&D losses)

Fuel	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Coal	30,767	32,228	33,159	33,537	33,823	34,082	34,600	34,968
Nuclear	4,256	4,353	4,353	4,336	4,291	4,291	4,291	4,291
Natural Gas	2,320	1,020	1,009	1,853	927	928	921	933
Oil	134	98	112	114	116	113	115	119
MSW	25	33	36	36	36	36	36	36
Biomass	0	0	0	0	0	0	0	0
LFG	63	28	27	50	25	25	25	25
Wind	1,545	2,595	2,856	2,881	2,906	2,931	2,940	2,939
Hydro	900	1,194	1,284	1,378	1,467	1,555	1,555	1,555
Solar	0	0	0	0	0	0	0	0
Imports	2,046	2,062	890	730	2,596	3,010	3,186	3,437
Exports	0	0	0	0	0	0	0	0
Estimated Sales	42,055	43,610	43,726	44,915	46,186	46,970	47,669	48,303

Avoided GHG methodology proposal (II)

- Use marginal analysis ~47.5% coal, 47.5% gas, 5% imports
  - Gas generation runs out (~2012) at this rate
  - This is the about the time frame for Marshalltown, Elk Run coal plants to come online
  - Could use 70%, 20%, 5% for 2 years but risk negative gas generation in aggressive efficiency scenarios
    - New baseline in inventory and forecast will show lower generation
- Then use average mix
  - How should average mix be calculated?
    - Include all resources—coal, nuclear, renewables, etc or just thermal?

	2013	**2014**	**2015**	**2016**	**2017**	**2018**
Coal	79.3%	78.9%	71.3%	71.0%	85.4%	84.3%
Nuclear			8.5%	8.4%		
Natural Gas	2.5%	2.5%	2.4%	2.8%	3.9%	3.8%
Oil	0.3%	0.2%	0.2%	0.2%	0.2%	0.3%
MSW	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Biomass	0.0%	0.0%	0.0%	0.0%		
LFG	0.1%	0.1%	0.1%	0.1%		
Wind	6.6%	6.5%	5.8%	5.7%		
Hydro	3.5%	3.4%	3.1%	3.0%		
Solar	0.0%	0.0%	0.0%	0.0%		
Imports	7.7%	8.3%	8.6%	8.7%	9.4%	10.6%
Total:	100.0%	100.0%	100.0%	100.0%	99.1%	99.0%

No Nukes *All* *Thermal*

Annual Calculations

- Electricity savings: [annual cumulative EE goal * sales estimate from previous year with EE / (1-T&D losses)]
- Electricity by fuel type: Baseline electricity – (annual cumulative EE goal * reduction %)
  - From avoided CO_2 methodology
- CO_2: [electricity by fuel type * CO_2 intensity]
- Net costs: EE deployment * (Avoided costs – levelized costs)

Utility Shares in Assump tabs

- Elec: used for I&F, EE existing actions
- Gas: used for EE existing actions

% of Iowa Sales (Regulated). Includes both residential and nonresidential customers.

	Elec.
Aquila	**NA**
MEC	43%
IPL	33%
RECs	12%
Munis	13%
Total	100%

% of Iowa Sales (Regulated). Includes both residential and nonresidential customers.

	Gas				
Aquila	**17%**	Aquila Sales (2(	#####		Aquila Networks
MEC	42%	Adjusted to 200	#####	-0.03	Energy Efficiency Plar
IPL	32%	IA Sales 2006	#####		2009-2013
RECs	5%	Aquila %	17%		Prepared for:
Munis	5%				Iowa Utilities Board
Total	100%				Docket EEP-08-__

Existing Actions

- 2006-2008 unchanged. 2014+ at 2013 levels. RECs, Munis at 50% of IOUs

Effects of Existing Energy Efficiency Actions										
Electricity	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
MEC		0.80%	0.80%	0.80%	1.09%	1.50%	1.54%	1.51%	1.50%	1.50%
IPL		0.80%	0.80%	0.80%	0.90%	0.90%	1.00%	1.20%	1.30%	1.30%
RECs		0.01%	0.01%	0.01%	0.16%	0.31%	0.45%	0.60%	0.60%	0.60%
Munis		0.15%	0.15%	0.15%	0.26%	0.38%	0.49%	0.60%	0.60%	0.60%
Wtd Avg		0.63%	0.63%	0.63%	0.81%	1.02%	1.10%	1.19%	1.22%	1.22%
Gas		**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Aquila		0.64%	0.64%	0.64%	0.80%	0.90%	0.95%	0.95%	0.95%	0.95%
MEC		0.64%	0.64%	0.64%	0.64%	0.76%	0.79%	0.84%	0.85%	0.85%
IPL		0.90%	0.90%	0.90%	0.90%	1.00%	1.10%	1.10%	1.20%	1.20%
RECs		0.01%	0.01%	0.01%	0.13%	0.25%	0.36%	0.48%	0.48%	0.48%
Munis		0.18%	0.18%	0.18%	0.26%	0.33%	0.41%	0.48%	0.48%	0.48%
Wtd Avg		0.67%	0.67%	0.67%	0.70%	0.81%	0.87%	0.90%	0.94%	0.94%

Sources:
2006 Estimates from IUB. 2008. The Status of Energy Efficiency Programs in Iowa. Various pages
2009-2013 from Energy Efficiency Plans filing provided by Bob Holmes and Cathy Woolums
2009-2013 Aquilafrom Aquila Networks EE Plan p. 74

Renewables Cost Assumptions

- For EEC-13 building fossil fuel reductions

Renewable Energy Costs $/MWh													
			2005		2006		2007		2008		2009		2010
Wind		$	36.3	$	38.8	$	42.3	$	46.2	$	49.7	$	53.5
Biomass (Energy Crops)		$	114.3	$	114.3	$	114.3	$	114.3	$	114.3	$	114.3
Wtd Avg Generation Costs		$	23.75	$	21.26	$	22.23	$	23.74	$	24.00	$	24.85

From Levelized Costs for IA v01.xls from CRE SC

IA Buildings

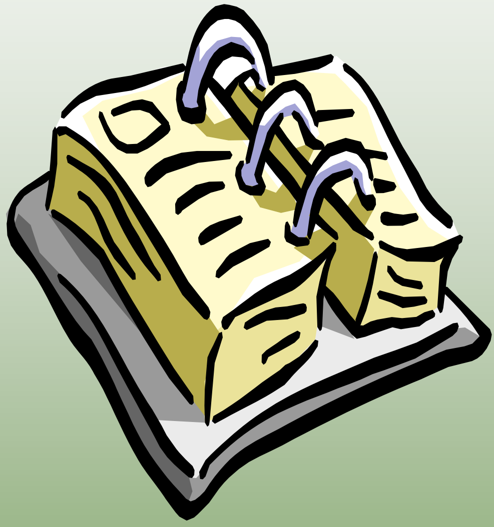
- Affects building options: EEC 4, EEC-6, EEC-8, EEC-13
- IA is in climate zone 2 which results in reduced residential electric heating and cooling loads relative to some other climate zones
  - assumption of 18.4 % of residential electricity use is attributable to codes (electric heating and cooling). Source RECS
- New commercial buildings in climate zone 2 have higher electric intensity relative to existing stock, so new buildings are adjusted upwards by 24%.
- 90% of new and retrofitted buildings comply with the policies.
- Code improvements result in differential efficiency gains for natural gas as for electricity.
  - Assumes code or efficiency improvement affects gas and electricity according to fuel usage
  - Residential: Electricity code improvement of x results in 2.23x gas improvement Source: RECS
  - Commercial: Electricity code improvement of x results in .63x gas improvement Source: CEBCS
- New residential and commercial space grows at 1.3% and 1.4% per year respectively.
  - In each year, the new building stock is “treated” at the new efficiency goal (less noncompliance) and then joins the existing stock in the next year

Data Lacunae

- EEC-11: Peak efficiency
  - Translating capacity savings to CO2 savings is difficult
  - Peak shifting from marginal unit (gas) to baseload (coal, nuclear, wind) could increase CO2
  - Real time pricing will increase price elasticity of demand, which will reduce usage
- Placeholder: 5% of electricity demand is peak and is treat like other efficiency measures.

Next Sub-Committee Meeting

- Agenda:
  - Continue to develop PODs and revise quantification of results
  - Evaluate externalities, feasibility issues
- Next Call
  - August 15, 2008 (Friday) 10:00-11:30 am



Public Input

Announcements