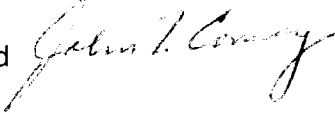


# MEMORANDUM

**TO:** City Council

**FROM:** Water & Light Advisory Board 

**DATE:** August 17, 2015

**SUBJECT:** 2014 Report to the People and Council

As part of the Water & Light Advisory Board's chartered duties, the board shall report at least annually its findings and recommendations to the people and to the council. At the May 4, 2015 City Council meeting the Water & Light Advisory Board submitted its annual report to City Council (REP 53-15).

The report included with this memo has been subsequently drafted by board member Tom O'Connor and approved by the board to be sent to the City Council as an additional report.

# Water & Light Advisory Board

2014 Report to the People and Council

## **2014 Report to the People and Council**

As an advisory board, we continuously strive to understand the complexities of modern water and electric utilities.

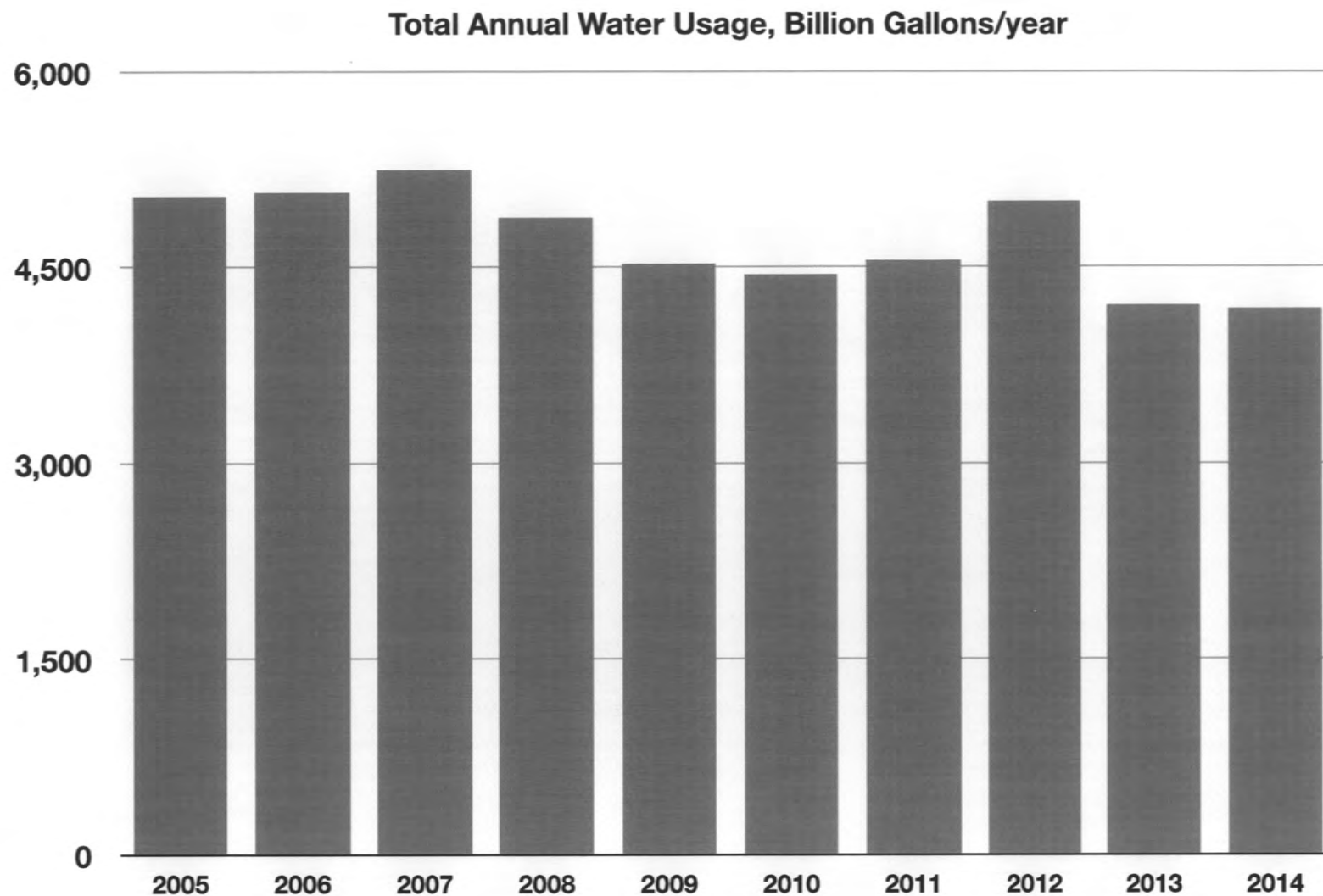
We hope that our efforts will help us to communicate our thoughts and findings clearly and effectively, and we hope that we can provide council and the people of Columbia with additional insights into and ways of thinking about our shared public utility.

We also attempt to present the perspective of regular citizens. As such, we are not only concerned with financial issues, but also with the social, environmental, and moral implications of our operations.

The following slides are a few observations from our perspective—including where our energy comes from, how we charge ourselves for it, and where our money goes.

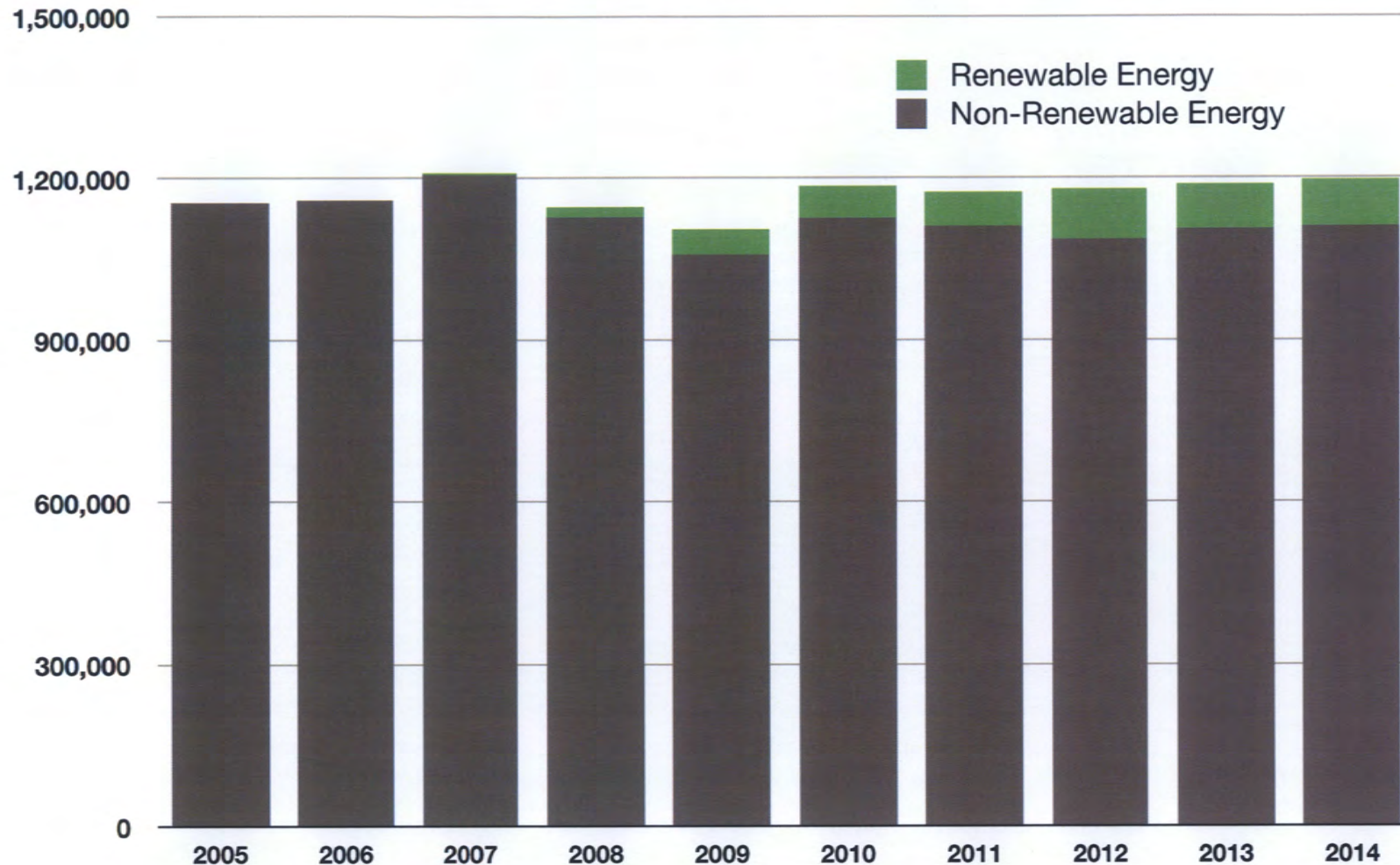
This is by no means complete, nor is it a particular recommendation or call to action.

Our hope is that this helps provide a big-picture overview of our operation, while introducing something new and beneficial to an ongoing, productive discussion of how we own and operate the critical infrastructure that we all share.



In 2014, our water treatment plant supplied us with a 4,183,650,000 gallons of high-quality treated drinking water.

## Total Annual Electrical System Usage, MegaWatt-hours



In 2014, we used about 1,200 GigaWatt-hours of electricity.

Unlike our water, our energy doesn't come exclusively from our own plant. We get our electricity from about a dozen different places and methods.

2014 Energy Portfolio	MISO Market	CWL Business Loop Power Plant				Columbia Energy Center	Sikeston	Prairie St.	Iatan II	Crystal Lake	Bluegrass Ridge	Columbia Landfill Gas	Jeff City Landfill Gas	Free Power Company	Solar One	Net Metered Solar
Description	Energy and capacity from the grid purchased through the MISO market	CWL-owned and operated multi-fuel power plant on the Business Loop				Our natural gas power plant near the landfill (aka CEC)	Contract with coal-fired power plant in SE MO	Contract with coal-fired power plant in IL	Contract with coal-fired power plant in KC area	Contract with wind power plant in IA	Contract with wind power plant in NW MO	CWL-owned and operated LF gas generators	Landfill Gas from Jeff City, purchased by contract	Contract for solar power from FPC's panels on CWL property	PV systems on Quaker Oats, Birt City Lights, W. Ash pump str.	customer-owned and sited solar
Fuel Type	mostly coal	coal	biomass	natural gas	total	natural gas	coal (WY)	coal (IL)	coal (WY)	wind	wind	landfill gas	landfill gas	solar	solar	solar
Energy Supplied, MWh/yr	163,448		6,251		51,332	9,079	501,602	270,275	176,043	25,295	13,899	18,266	22,043	433	42	176
Total Expenditures*	\$ 5,467,336				\$ 7,499,629	\$ 8,409,894	\$ 23,385,698	\$ 22,143,237	\$ 10,138,069	\$1,409,943	\$ 942,491	\$ 895,399	\$1,169,160	\$ 23,785	\$ 0	\$ 2,816
All-In Cost, \$/MWh	\$33		\$146			see below	\$47	\$82	\$58	\$56	\$68	\$49	\$53	\$55	\$0	\$16
Capacity Credit, MW					78.1	144	64.9	38.4	20.8	0	0.4	3	3	0	0	0
Cap. Market Value \$/year					\$97,469	\$179,712	\$80,995	\$47,923	\$25,958	\$0	\$1,248	\$9,360	\$9,360	\$0	\$0	\$0
Capacity Fees, \$/kW/month	\$0.104					\$ 4.56	\$ 13.77	\$ 32.09	\$ 24.43							
CO2 emissions, tons	183,797		0			5,152	564,051	303,924	197,960	0	0	0	0	0	0	0
Most Money Goes To...		buying fuel (WY coal?); local staff; outside vendors				bondholders; local staff; vendors	City of Sikeston	Prairie State Generating Co.	KCP&L	NextEra Energy	Associated Electric	local staff; outside vendors	Ameresco	Free Power Company	N/A	local PV system owners
Cost Premium (vs MISO purch.)	\$ -		\$ (124,082)		\$ 5,685,105	\$ 7,926,489	\$ 6,526,115	\$ 13,054,614	\$ 4,223,472	\$ 964,245	\$ 468,535	\$ (160,558)	\$ (105,145)	\$ 1,070		
Notes						CEC is primarily a capacity resource that allows us to use inexpensive market energy and intermittent renewable energy										
Data is from the 2014 Renewable Energy Report and various CWL documents																
This spreadsheet attempts to clarify and compare the assets in our energy portfolio. It does not capture the full complexities of modern utilities with regard to operations, compliance, risk, energy, capacity, dispatchability, etc.																
*Includes: Energy, capacity, transmission, solar rebates, any other related expenses																
CO2 emissions, lbs per MWh**	Coal	Natural Gas					Green cells indicate a renewable energy resource									
	2249	1135					Yellow cells indicate an energy resource with significant capacity									
**http://www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html																

Here's where our electricity comes from and where our money goes. This spreadsheet attempts to clarify and compare the assets in our energy portfolio in order to inform discussion. It does not capture the full complexities of modern utilities with regard to operations, compliance, risk, energy, capacity, dispatchability, etc.

Yes, we realize that this is impossible to read. It's a visual aid. The actual spreadsheet is included as part of this report.



<b>2014 Energy Portfolio</b>	<b>TOTAL OVERALL PORTFOLIO</b>	<b>RENEWABLE Energy</b>	<b>Coal Contracts</b>	<b>MISO Market Energy</b>
<b>MWh</b>	<b>1,258,184</b>	<b>80,154</b>	<b>947,920</b>	<b>163,448</b>
<b>Total Cost</b>	<b>\$81,487,457</b>	<b>\$4,443,594</b>	<b>\$55,512,127</b>	<b>\$5,467,336</b>
<b>Cost / MWh</b>	<b>\$65</b>	<b>\$55</b>	<b>\$59</b>	<b>\$33</b>

In 2014, we spent over \$81 million on 1,258 GigaWatt-hours of electricity and 353 MW of capacity.

Capacity aside, that averages out to \$65/MWh.

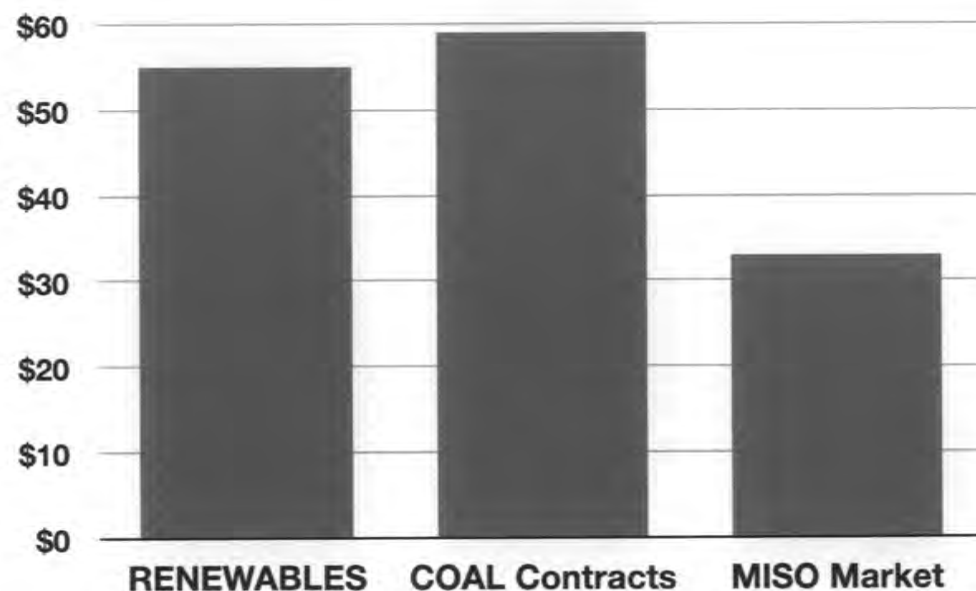
Our renewable energy averaged \$55/MWh, while our three contracts for coal-fired energy averaged \$59/MWh.

(It should be noted that our coal-fired energy contracts include significant capacity, while our renewables do not.)

These days, market energy is cheap, averaging \$33/MWh.

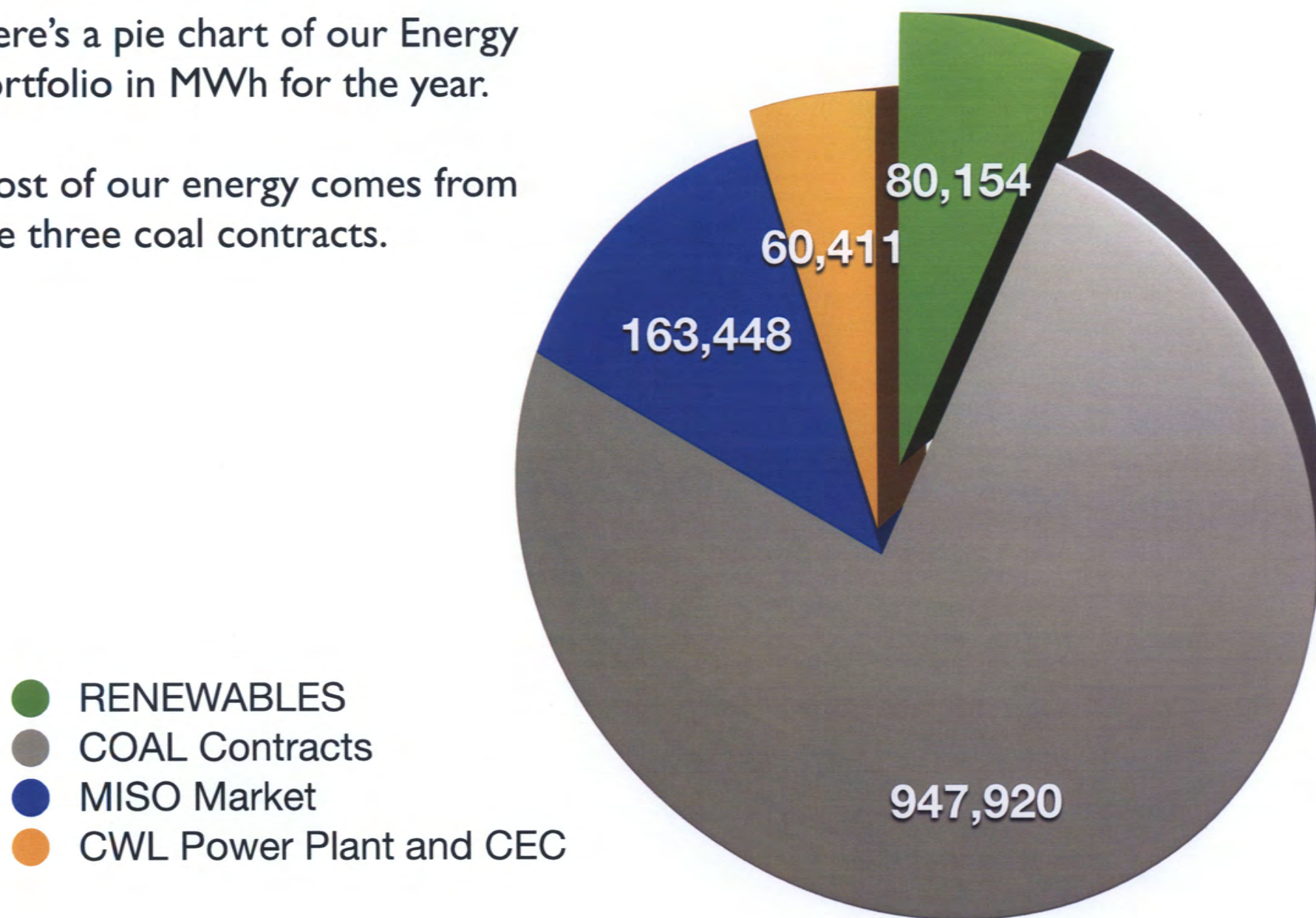
In 2014, all of our energy supply contracts were significantly more expensive than market energy.

**Total Cost per MWh**



Here's a pie chart of our Energy Portfolio in MWh for the year.

Most of our energy comes from the three coal contracts.





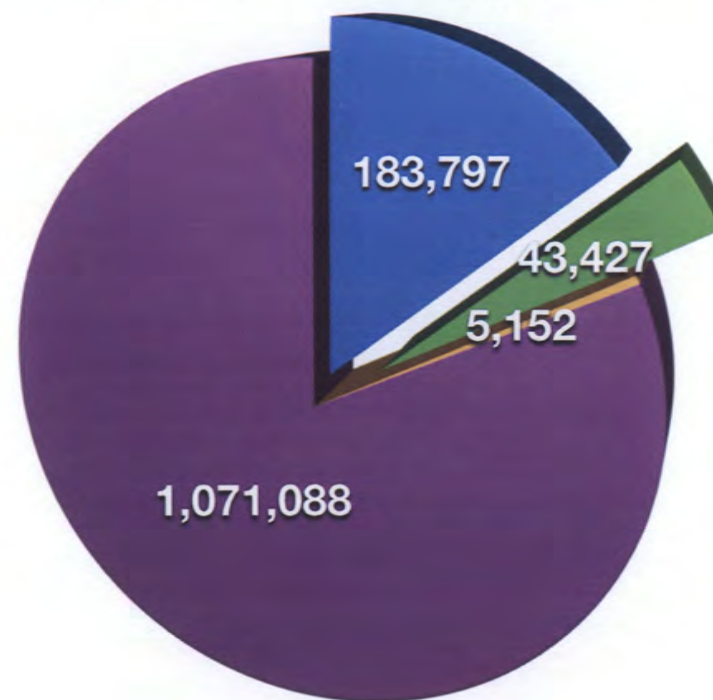
# 2014 Greenhouse Gas Emissions

## 1,298,313 tons

In the future, we hope to be monitoring our greenhouse gas emissions more precisely. For the time being, a rough estimate has been calculated, based on the carbon dioxide emissions associated with coal and natural gas.

(Data gap: we don't have exact numbers handy for amount of coal and natural gas burned in our power plant in 2014, so an estimate is provided.)

GHG Emissions by Energy Source



- MISO Market
- CWL Bus Loop Power Plant
- Columbia Energy Center
- RENEWABLE Energy Contracts
- NON-RENEWABLE Energy Contracts

# Capacity

2014 Capacity Portfolio	TOTAL OVERALL PORTFOLIO	Renewable Energy	Coal Contracts	CEC and Bus. Loop Power Plant
MW	353	6	124	224

In 2014, we maintained about 353 MW of capacity, which was well above the level required.  
(More on this later.)

Most of this is from our own facilities—the 144 MW, gas-powered Columbia Energy Center, and our 78 MW power plant on the business loop.

The bulk of the remainder of our capacity was provided by our three coal power contracts.

In 2014, market capacity in our area auctioned at \$16.75/MW-day.

In 2015, market capacity costs dropped to \$3.48/MW-day. (<http://www.rtoinsider.com/miso-auction-14412/>)

MISO Planning Resource Auction Clearing Prices  
(\$/MW-day)



(Source: MISO)

*We are in Local Resource Zone 5.  
Zone 4 covers most of Illinois.*

<b>CWL RATE SCHEDULE</b> (Effective June 2015)		Monthly Base Rate	Demand Charge	< 300 kWh; cents/kWh	301-750 kWh; cents/kWh	750-2,000kWh; cents/kWh	> 2,000kWh; cents/kWh
Residential Rate—Summer (June-Sept)		\$15.60		7.52	9.8	13.36	14.45
Residential Rate—Non-Summer		\$15.60		7.52	9.8	11.32	11.32
Residential Rate—Non-Summer with 5 kW electric heat		\$15.60		7.52	9.8	9.42	9.42
Residential—Non-Summer with Heat Pump		\$15.60		7.52	9.8	8.93	8.93
				< 500 kWh; cents/kWh	501-1,500kWh; cents/kWh	> 1,500kWh; cents/kWh	
Small General Service—Summer	\$15.60 (\$25.70 for 3 ph)			8.0	10.2	14.07	
Small General Service—Non-Summer	\$15.60 (\$25.70 for 3 ph)			8.0	10.2	10.2	
Small General Service—Non-Summer w/ 5 kW electric heat	\$15.60 (\$25.70 for 3 ph)			8.0	10.2	9.4	
Small General Service—Non-Summer w/ Heat Pump	\$15.60 (\$25.70 for 3 ph)			8.0	10.2	8.86	
SGS Alternative Option:				all kWh			
Summer (June-Sept)	\$45	\$15.60	5.63				
Non-Summer	\$45	\$12.50	4.9				
				all kWh			
Large General Service (25 - 750 kW peak)—Summer	\$150	\$360 plus \$15.60 per add'l kW	5.63				
Large General Service (25 - 750 kW peak)—Non-Summer	\$150	\$270 plus \$12.50 per add'l kW	4.9				
Industrial Service (> 750 kW peak)— Summer	\$150	\$15,525 plus \$20.70 per add'l kW	4.73 (3.78 at night)				
Industrial Service (> 750 kW peak)— Non-Summer	\$150	\$12,375 plus \$16.50 per add'l kW	4.04 (3.39 at night)				
Transmission Service			market price, no markup				