MEMORANDUM

TO: Members of the Electric Utility Commission

CC: Marc A. Ott, City Manager

FROM: Cheryl Mele, Deputy General Manager

DATE: October 11, 2012

SUBJECT: Response to EUC request for update on national trends in coal replacement

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On September 17, 2012, Austin Energy (AE) staff provided the Austin Electric Utility Commission (EUC) a report entitled "2012 Generation Plan Update – Addressing FPP" for discussion and recommendations. Subsequently, the EUC requested that AE staff provide a report on what is happening nationally with regard to utilities retiring and/or replacing their coal units and requested to post an item for discussion at the EUC October 2012 meeting. The following report provides the most current status of coal retirement plans across the nation and to the extent available, the expected replacement strategy some electric utilities have announced.

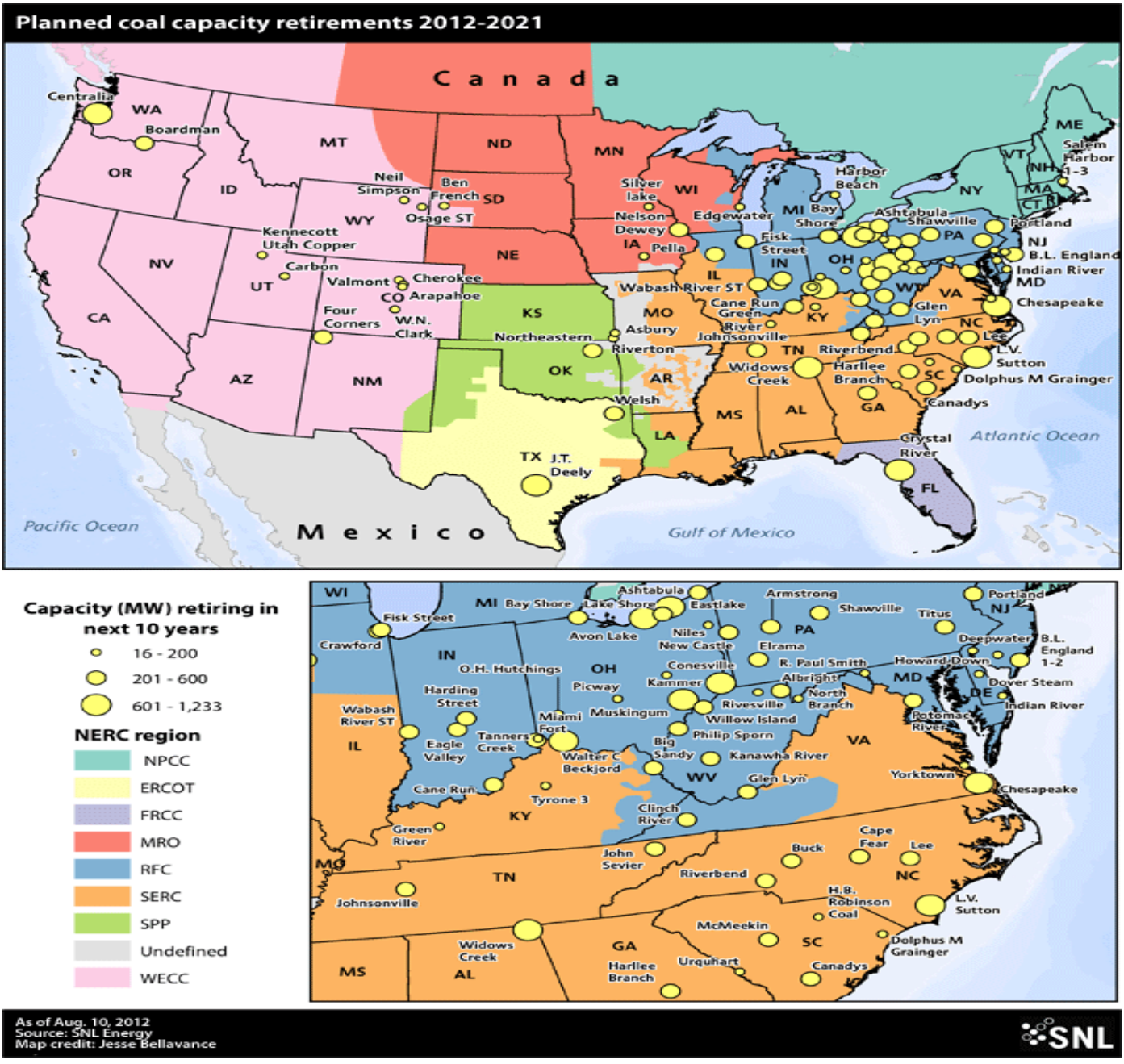
Background and Summary

Over the past several years coal retirement announcements across the nation began to increase on the expectation that environmental regulations would increase and natural gas prices would continue to remain low. Announcements increased dramatically in 2011 after the U.S. EPA finalized its Cross-State Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Standards (MATS). In early 2012 the announcements slowed down as CSAPR/MATS were challenged in court and the reliability impacts of such retirements were questioned. However, while the CSAPR rule was stayed earlier this year and the MATS rules is still under challenge, coal retirement announcements have continued to increase with most retirements slated to occur in the next 10 years. In July 2012, Duke Energy Corp. announced that it will retire its H.B. Robinson coal plant in South Carolina and accelerate the closure of its Cape Fear station in North Carolina by October 2012. In addition, Duke filed plans to retire four units at its coal-fired Wabash River station in 2015. Within the ERCOT Region, San Antonio's CPS energy has formally announced its plan to retire the 871 MW J.T. Deely plant in 2018 and while not formally announcing retirement, Luminant Generation Company intends to mothball units 1 and

2 of its lignite/coal Monticello facility totaling about 1,200 MW. Table 1 shows the announced coal plant retirements by NERC region over the next 10 years. Of the 34,000 MW announced, over 80 percent will occur in the mid-Atlantic, Midwest, and Southern Regions which covers a Major portion of the PJM Market footprint.

Figure 1 provides a map of the United States showing the concentration of announced coal retirements by region. The mid-Atlantic, Midwest, and southern regions account for about 80 percent of the announcements.

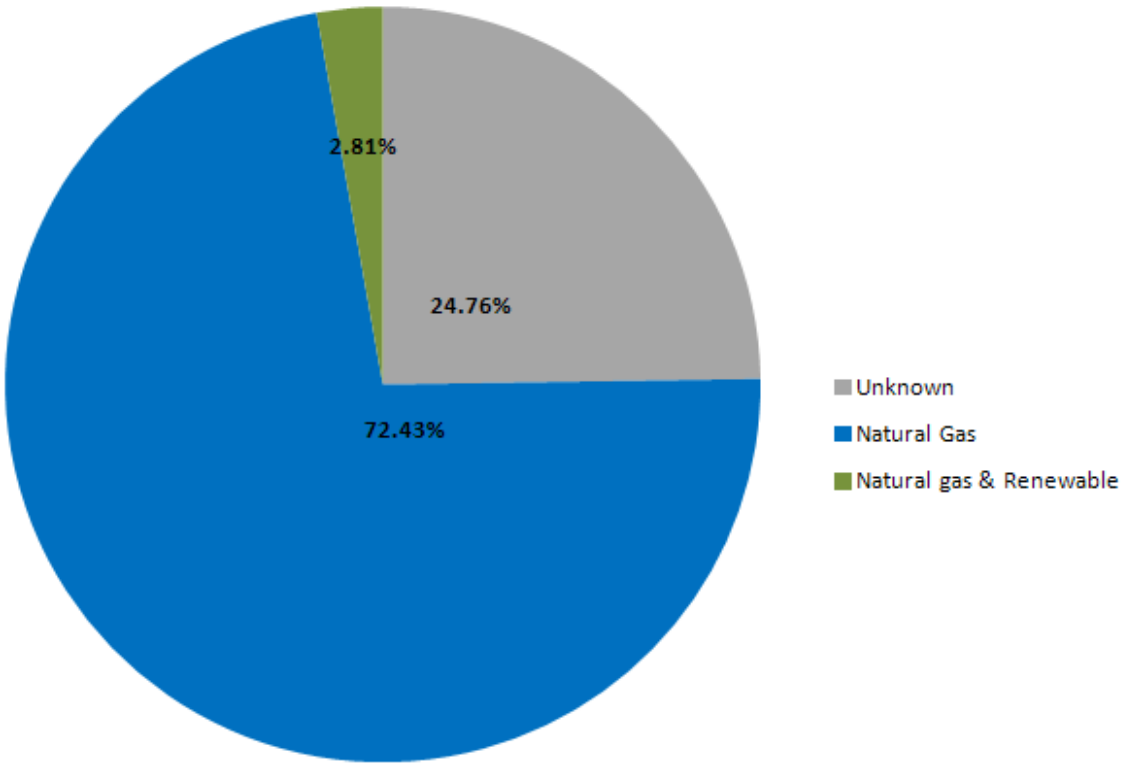
Figure 1: Announced Coal Plant Retirements around the Country (2012-2021)



Coal Retirement Replacement

According to our review of news articles, coal retirement announcements suggest that most of this capacity and energy will be replaced with natural gas-fired combined cycle capacity and/or purchased power agreements (PPA). For example, CPS Energy announced and executed an agreement to replace its J.T. Deely coal capacity with a natural gas combined cycle asset acquisition - the 800-MW Rio Nogales Power Project in Guadalupe County, Texas. Public Service Company of Oklahoma (PSO), a subsidiary of American Electric Power Co. Inc. (AEP), is retiring unit 4 at its coal-fired Northeastern Station in Rogers County, Oklahoma in early 2016 and plans to replace most of its energy from a natural gas based PPA with Calpine Corporation. Xcel Energy Inc. announced the retirement of 593 MW of coal capacity between the period of 2012 to 2017 and will replace it with the construction of a $534 million combined-cycle natural gas-fired plant. Figure 1 summarizes the amount of coal retirement capacity over the next 10 years with the announced replacement options. To the extent the announcement was silent as to the replacement option it received an "Unknown". Nearly 25,000 MW out of 34,000 MW or 72% of the announced coal retirement will be replaced with natural gas based capacity made up of new and existing combined cycle, simple-cycle gas turbines, and market purchases.

Figure 2: Announced Coal Plant Replacement options

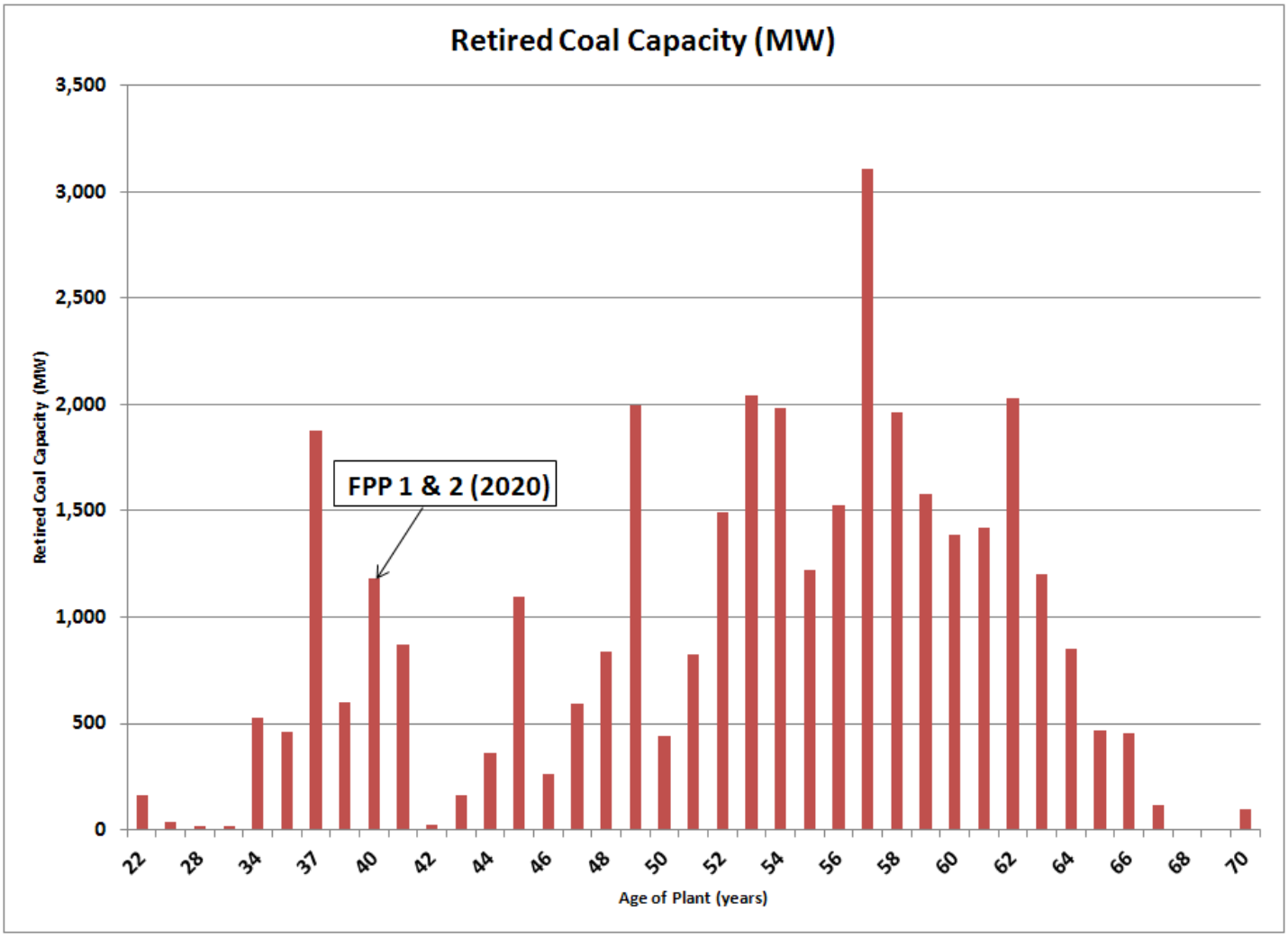


Coal Retirement Age

A large portion of the retirement announcements are due in part to the age of the plant. With the additional and more stringent environmental regulations lower natural gas prices, the economics of retrofitting older coal units with scrubbers and other emission controls does not justify the capital investment required for compliance. Figure 3 shows a breakdown of the coal retirement announcements by capacity and age of plant over the next 10 years. Of the 126 plants schedule for retirement, over 80 percent will exceed 50 years old by their retirement date. In addition, nearly 20,000 MW (60%) do not have flue gas desulphurization equipment installed commonly known as scrubbers to comply with SO2 emissions.

By comparison, FPP units 1 and 2, built in the late 1970's have been in service 33 and 32 years respectively and AE and LCRA have already made the investments in the scrubbers to address the SO_2 emissions and can add the required emission controls for mercury at a relatively incremental cost compared to an unscrubbed plant.

Figure 3: Announced Coal Plant Retirements by Age



Announced Coal Retirement Details

Table 1 and 2 provide additional details and expands the announced coal retirements to include the company and number of plants by state, electric market design, age of plant, coal source, and the announced replacement strategy.

Summary and Conclusions

According to recent public announcements, over 34,000 MW of coal capacity representing 126 plants and making up approximately 10% of US coal capacity is scheduled to retire within the 2012 to 2021 time period. Over 80 percent will exceed 50 years old and nearly 60% or 20,000 MW do not have scrubbers installed. The key reasons for retirement are:

- Environmental emission compliance for NOX, SO2, Mercury would require expensive retrofits including; installing scrubbers; upgrading environmental controls, and SCR;
- Compliance with current ash handling regulations requiring additional or upgraded ash handling equipment and storage;
- Lower gas price expectations do not support retrofitting older less efficient coal plants.

The retiring capacity will be replaced predominantly with natural gas based capacity including new combined cycle units, simple-cycle gas turbines, and market purchases.

Table 1: Announced Coal Plant Retirements by NERC Region (2012-2021)

Capacity (MW)	NERC Region Code								
Retired from Service (Yr)	RFC	SERC	WECC	MRO	NPCC	FRCC	SPP	ERCOT	Grand Total
2012	5,777	2,010	226	92					8,106
2013	397	1,207	152						1,756
2014	460	949	947		2,980		528		5,863
2015	9,888	2,511	152	405			17		12,973
2016		553					552		1,105
2017		747	186						933
2018		344						871	1,215
2020			1,273						1,273
2021						874			874
Grand Total	**16,522**	**8,321**	**2,935**	**497**	**2,980**	**874**	**1,097**	**871**	**34,097**

Source: SNL Finanicial - 9/29/2012

Table 2: Announced Coal Plant Retirements by NERC Region (2012-2021)

			NERC Region														
Unit Ultimate Parent	Retirement Year	Power Plant	RFC	SERC	WECC	MRO	NPCC	FRCC	SPP	ERCOT	Total	State	Market	Age	Coal Source	Scrubbers	Replace Option
AES Corporation	2015	Walter C Beckjord	211								211	OH	R	46	Bituminous Coal	No	Gas
		Eagle Valley	263								263	IN	R	62	Bituminous Coal	No	Gas
		Harding Street	218								218	IN	R	56	Bituminous Coal	Yes	Gas
		O.H. Hutchings	115								115	OH	R	67	Bituminous Coal	No	Gas
Alliant Energy Corporation	2015	Edgewater				71					71	WI	R	64	Subbituminous Coal	Yes	Gas
		Nelson Dewey				229					229	WI	R	55	Subbituminous Coal	Yes	Gas
American Electric Power Company, Inc.	2012	Conesville	165								165	OH	R	50	Bituminous Coal	Yes	Gas
		Philip Sporn	450								450	WV	R	52	Bituminous Coal	No	Gas
	2014	Welsh							528		528	TX	R	34	Subbituminous Coal	No	Gas
	2015	Big Sandy	260								260	KY	R	52	Bituminous Coal	Yes	N/A
		Clinch River	235								235	VA	R	54	Bituminous Coal	No	N/A
		Glen Lyn	335								335	VA	R	65	Bituminous Coal	No	N/A
		Kammer	630								630	WV	R	57	Bituminous Coal	No	N/A
		Kanawha River	400								400	WV	R	62	Bituminous Coal	No	N/A
		Muskingum River	840								840	OH	R	60	Bituminous Coal	Yes	N/A
		Philip Sporn	600								600	WV	R	64	Bituminous Coal	No	N/A
		Picway	100								100	OH	R	60	Bituminous Coal	No	N/A
		Tanners Creek	495								495	IN	R	63	Bituminous Coal	No	N/A
		Walter C Beckjord	53								53	OH	R	46	Bituminous Coal	No	N/A
	2016	Northeastern							460		460	OK	R	36	Subbituminous Coal	Yes	Gas
Bank of America Leasing LLC	2020	Boardman			88						88	OR	R	40	Subbituminous Coal	Yes	Gas
Black Hills Corporation	2013	W.N. Clark			43						43	CO	R	56	Bituminous Coal	No	Gas
	2014	Ben French			22						22	SD	R	53	Subbituminous Coal	No	Gas
		Neil Simpson			19						19	WY	R	45	Subbituminous Coal	No	Gas
		Osage ST			30						30	WY	R	64	Subbituminous Coal	No	Gas
BTU Solutions LLC	2012	State Line Energy	515								515	IN	M	54	Subbituminous Coal	Yes	Gas
Calpine Corporation	2015	Deepwater ST (NJ) 6	81								81	NJ	M	61	Bituminous Coal	No	Gas
CMS Energy Corporation	2015	J.R. Whiting	328								328	MI	R	63	Subbituminous Coal	No	Gas
CPS Energy	2018	J.T. Deely								871	871	TX	R	41	Subbituminous Coal	No	Gas
Dairyland Power Co-op	2012	Alma				58					58	WI	M	64	Bituminous Coal	No	Gas
Dominion Resources, Inc.	2014	North Branch		77							77	WV	R	22	Waste Coal	No	Gas
		Yorktown		162							162	VA	R	57	Bituminous Coal	Yes	Gas
	2015	Chesapeake		222							222	VA	R	62	Bituminous Coal	No	Gas
	2016	Chesapeake		388							388	VA	R	56	Bituminous Coal	No	Gas
DTE Energy Company	2013	Harbor Beach	103								103	MI	R	45	Bituminous Coal	No	Gas
Duke Energy Corporation	2012	Dan River		279							279	NC	R	61	Subbituminous Coal	Yes	Gas
		R. Gallagher	280								280	IN	R	53	Bituminous Coal	Yes	Gas
		Cape Fear		323							323	NC	M	55	Bituminous Coal	No	Gas
		Lee		417							417	NC	R	57	Subbituminous Coal	Yes	Gas
		H.B. Robinson Coal		179							179	SC	R	52	Subbituminous Coal	No	Gas
	2013	L.V. Sutton		616							616	NC	R	53	Bituminous Coal	No	Gas
	2014	Buck		256							256	NC	R	61	Bituminous Coal	No	Gas
		Riverbend		454							454	NC	R	61	Bituminous Coal	No	Gas
	2015	Miami Fort	163								163	OH	R	55	Bituminous Coal	Yes	Gas
		Walter C Beckjord	862								862	OH	R	57	Bituminous Coal	No	Gas
		Wabash River ST	350								350	IN	R	61	Bituminous Coal	No	Gas
	2021	Crystal River						874			874	FL	R	54	Bituminous Coal	Yes	Gas
Edison International	2012	Crawford	542								542	IL	R	53	Subbituminous Coal	Yes	Gas
		Fisk Street	326								326	IL	R	44	Subbituminous Coal	Yes	Gas
Empire District Electric Company	2015	Asbury							17		17	MO	R	29	Subbituminous Coal	No	Gas
	2016	Riverton							92		92	KS	R	64	Subbituminous Coal	No	Gas
Energy Investors Funds Group	2013	B.L. England 1-2	36								36	NJ	M	51	Bituminous Coal	Yes	Gas
	2015	B.L. England 1-2	49								49	NJ	M	51	Bituminous Coal	Yes	Gas
Exelon Corporation	2012	Eddystone 1-2	311								311	PA	R	52	Subbituminous Coal	No	Gas

Table 2: Announced Coal Plant Retirements by NERC Region (2012-2021) (Cont')

Unit Ultimate Parent	Retirement Year	Power Plant	RFC	SERC	WECC	MRO	NPCC	FRCC	SPP	ERCOT	Total	State	Market	Age	Coal Source	Scrubbers	Replace Option
FirstEnergy Corp.	2012	Armstrong Power Station	356								356	PA	M	54	Bituminous Coal	Yes	N/A
		Bay Shore	495								495	OH	M	49	Petroleum Coke	Yes	N/A
		Eastlake	837								837	OH	M	48	Subbituminous Coal	No	N/A
		R. Paul Smith Power Station	116								116	MD	R	60	Bituminous Coal	Yes	N/A
		Albright	292								292	WV	M	59	Subbituminous Coal	No	N/A
		Rivesville	130								130	WV	M	65	Subbituminous Coal	Yes	N/A
		Willow Island	241								241	WV	R	58	Subbituminous Coal	No	N/A
	2015	Ashtabula	244								244	OH	M	57	Subbituminous Coal	No	N/A
		Eastlake	396								396	OH	M	62	Subbituminous Coal	No	N/A
		Lake Shore	245								245	OH	M	53	Subbituminous Coal	No	N/A
Footprint Power LLC	2014	Salem Harbor 1-3					150				150	MA	M	56	Bituminous Coal	No	Gas
GenOn Energy, Inc.	2012	Potomac River	482								482	VA	M	59	Bituminous Coal	No	Gas
		Niles	216								216	OH	M	58	Bituminous Coal	Yes	Gas
	2014	Elrama	460								460	PA	M	59	Bituminous Coal	Yes	Gas
	2015	Avon Lake	736								736	OH	M	56	Bituminous Coal	No	Gas
		New Castle	333								333	PA	M	57	Bituminous Coal	No	Gas
		Portland	401								401	PA	M	55	Bituminous Coal	No	Gas
		Titus	243								243	PA	M	63	Bituminous Coal	Yes	Gas
		Shawville	597								597	PA	M	58	Bituminous Coal	Yes	Gas
Harbert Management Corporation	2012	East Third Street			11						11	CA	R	22	Bituminous Coal	Yes	Gas
		Hanford LP			13						13	CA	R	22	Bituminous Coal	Yes	Gas
		Loveridge Road			9						9	CA	M	23	Black Liquor	No	Gas
		Nichols Road			9						9	CA	M	22	Bituminous Coal	No	Gas
		Wilbur East			9						9	CA	M	23	Bituminous Coal	Yes	Gas
		Wilbur West			9						9	CA	M	22	Bituminous Coal	Yes	Gas
IDACORP, Inc.	2020	Boardman			59						59	OR	R	40	Subbituminous Coal	Yes	Gas
J.E.M.B. Family LP	2013	B.L. England 1-2	36								36	NJ	M	51	Bituminous Coal	Yes	Gas
	2015	B.L. England 1-2	50								50	NJ	M	51	Bituminous Coal	Yes	Gas
MidAmerican Energy Holdings Company	2014	Carbon			172						172	UT	R	59	Bituminous Coal	No	Gas
NRG Energy, Inc.	2013	Dover Steam Energy Center	16								16	DE	M	28	Bituminous Coal	No	Gas
		Indian River	165								165	DE	M	43	Bituminous Coal	Yes	Gas
Ontario Power Generation, Inc.	2014	Lambton					950				950	Canada	R	45	Subbituminous Coal	Yes	Gas
		Nanticoke					1,880				1,880	Canada	M	37	Subbituminous Coal	No	Gas
Pella City of	2012	Pella				34					34	IA	R	44	Subbituminous Coal	No	Gas
Pinnacle West Capital Corporation	2014	Four Corners			560						560	NM	R	51	Bituminous Coal	Yes	Gas
Portland General Electric Company	2020	Boardman			380						380	OR	R	40	Subbituminous Coal	Yes	Gas
Power Resources Cooperative	2020	Boardman			59						59	OR	R	40	Subbituminous Coal	Yes	Gas
PPL Corporation	2015	Cane Run		563							563	KY	R	49	Bituminous Coal	Yes	Gas
		Green River		173							173	KY	R	59	Bituminous Coal	Yes	Gas
		Tyrone 3		73							73	KY	R	62	Bituminous Coal	No	Gas
Prairie Power, Inc.	2012	Pearl Station		22							22	IL	R	45	Subbituminous Coal	Yes	Gas
Public Service Enterprise Group Incorporated	2012	East Third Street			11						11	CA	R	22	Bituminous Coal	Yes	Gas
		Hanford LP			13						13	CA	R	22	Bituminous Coal	Yes	Gas
		Loveridge Road			9						9	CA	M	23	Black Liquor	No	Gas
		Nichols Road			9						9	CA	M	22	Bituminous Coal	No	Gas
		Wilbur East			9						9	CA	M	23	Bituminous Coal	Yes	Gas
		Wilbur West			9						9	CA	M	22	Bituminous Coal	Yes	Gas
Rio Tinto PLC	2014	Kennecott Utah Copper			100						100	UT	M	70	Bituminous Coal	No	Gas
Rochester Public Utilities	2015	Silver Lake				104					104	MN	R	57	Bituminous Coal	Yes	Gas
Rockland Capital Energy Investments, LLC	2013	B.L. England 1-2	6								6	NJ	M	51	Bituminous Coal	Yes	Gas
	2015	B.L. England 1-2	8								8	NJ	M	51	Bituminous Coal	Yes	Gas
SCANA Corporation	2012	Canadys		105							105	SC	R	50	Bituminous Coal	No	Gas
	2017	Canadys		295							295	SC	R	52	Bituminous Coal	No	Gas
	2018	Urquhart		94							94	SC	R	63	Bituminous Coal	No	Gas
		McMeekin		250							250	SC	R	60	Bituminous Coal	No	Gas
South Carolina Public Service Authority	2016	Dolphus McGrainger		170							170	SC	R	50	Bituminous Coal	No	Gas
Southern Company	2012	Jack McDonough		251							251	GA	R	49	Subbituminous Coal	No	Gas
	2013	Harllee Branch		591							591	GA	R	47	Bituminous Coal	Yes	Gas
Tennessee Valley Authority	2012	John Sevier		356							356	TN	M	57	Bituminous Coal	No	Gas
	2015	Johnsonville		802							802	TN	M	58	Subbituminous Coal	No	Gas
		Widows Creek		678							678	AL	M	62	Bituminous Coal	Yes	Gas
	2017	Johnsonville		452							452	TN	M	66	Subbituminous Coal	No	Gas
TransAlta Corporation	2020	Centralia			688						688	WA	M	49	Subbituminous Coal	Yes	Gas
U.S. Department of Energy	2012	USDOE Savannah River Site (D Area)		78							78	SC	R	60	Bituminous Coal	No	Gas
Vineland Municipal Electric Utility	2012	Howard Down	23								23	NJ	M	42	Black Liquor	No	Gas
WE Power Investors LLC	2013	B.L. England 1-2	36								36	NJ	M	51	Bituminous Coal	Yes	Gas
	2015	B.L. England 1-2	49								49	NJ	M	51	Bituminous Coal	Yes	Gas
Xcel Energy Inc.	2012	Cherokee			107						107	CO	R	55	Bituminous Coal	Yes	Gas
	2013	Arapahoe			109						109	CO	R	58	Subbituminous Coal	Yes	Gas
	2014	Arapahoe			44						44	CO	R	63	Subbituminous Coal	Yes	Gas
	2015	Cherokee			152						152	CO	R	53	Bituminous Coal	Yes	Gas
	2017	Valmont			186						186	CO	R	53	Bituminous Coal	Yes	Gas
Grand Total			16,522	8,321	2,935	497	2,980	874	1,097	871	34,097			54			