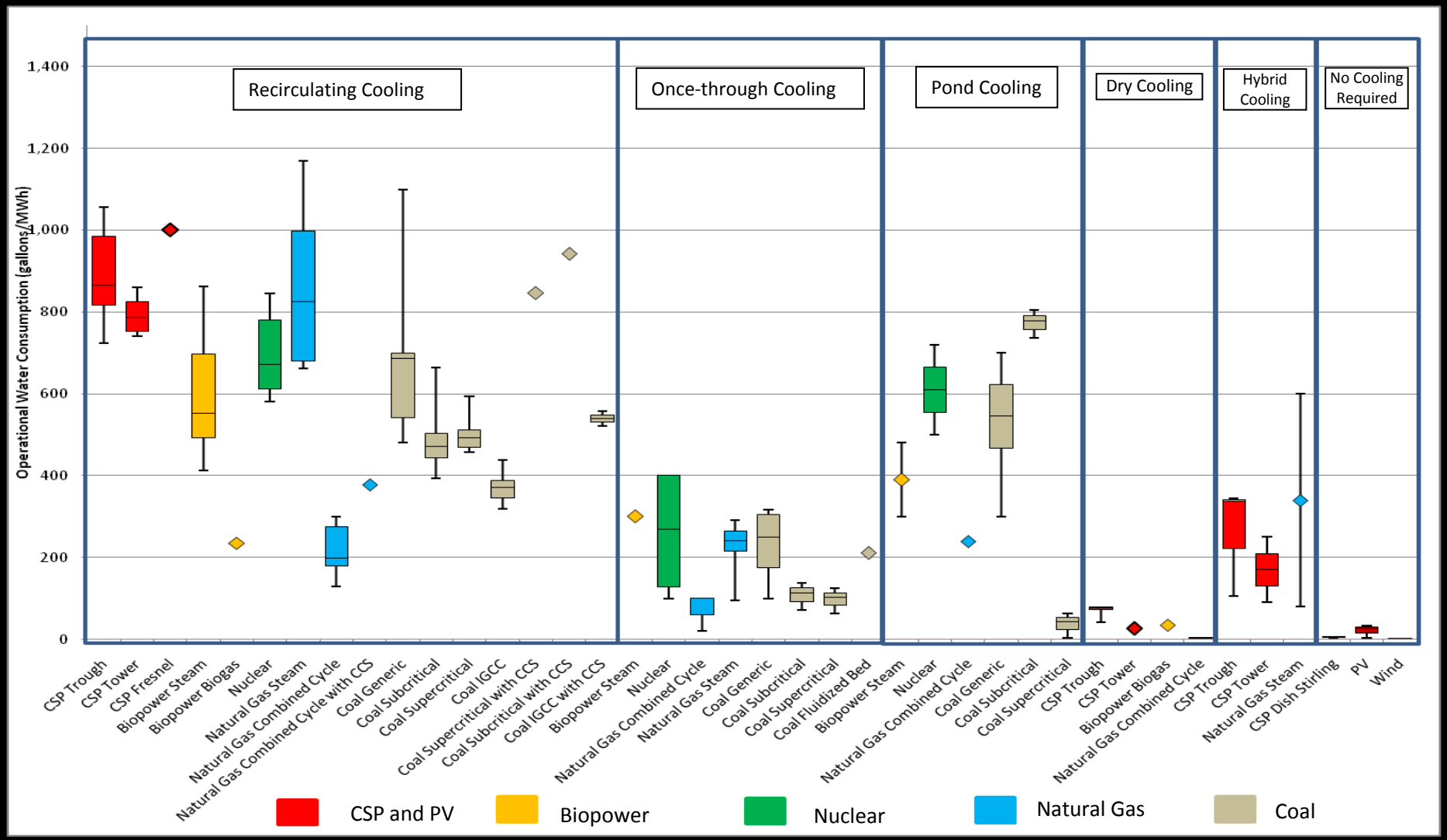
Freshwater Use by U.S. Power Plants:
Electricity's Thirst for a Precious Resource

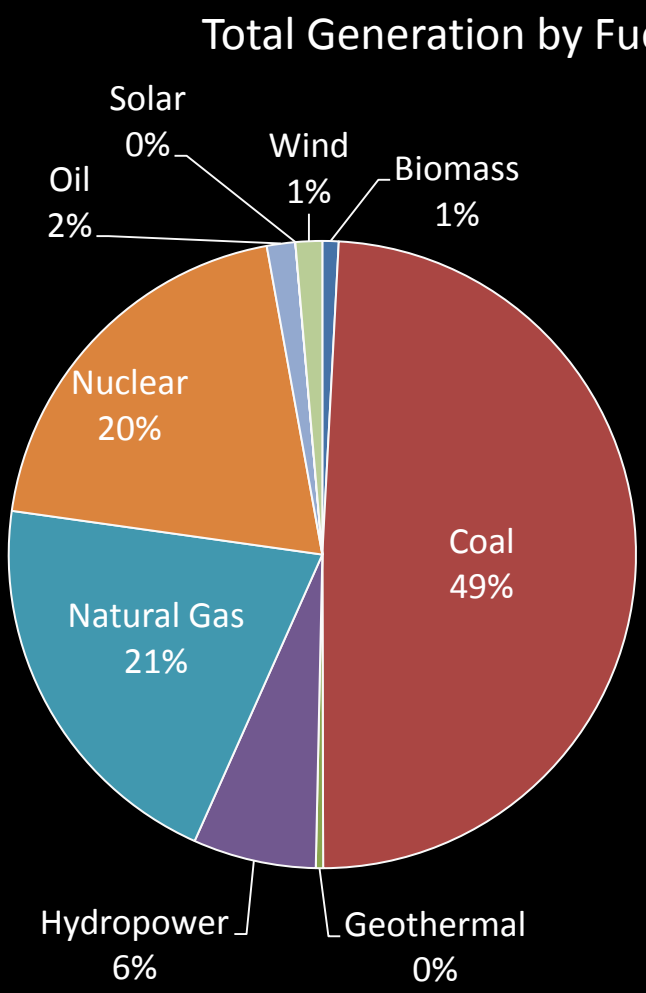
Appendix B: Graphics

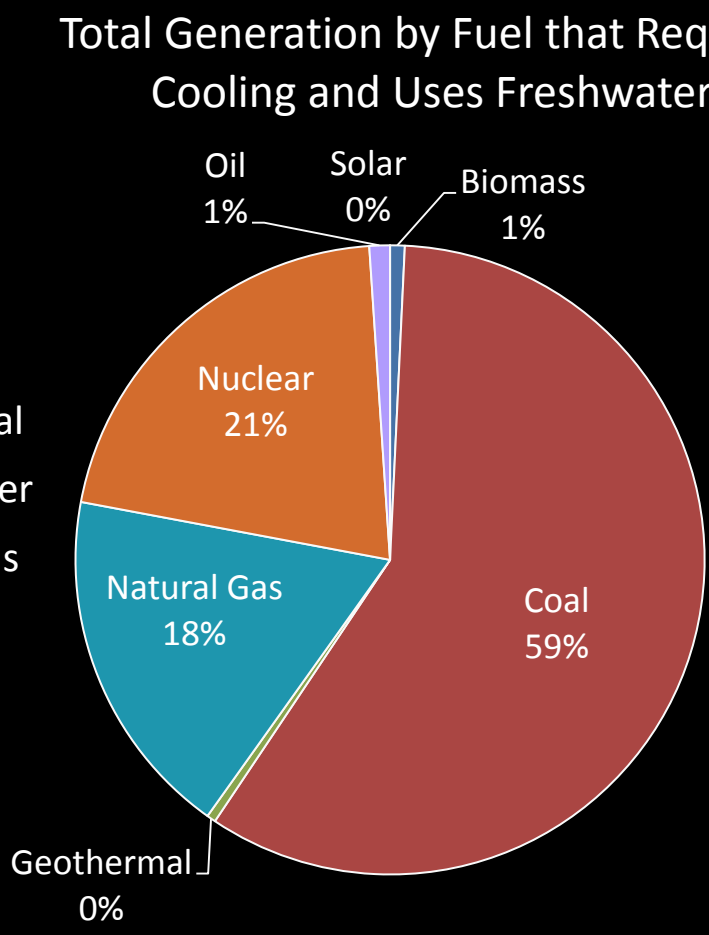
Figure 1: NREL water factors



(Macknick et al. 2011)

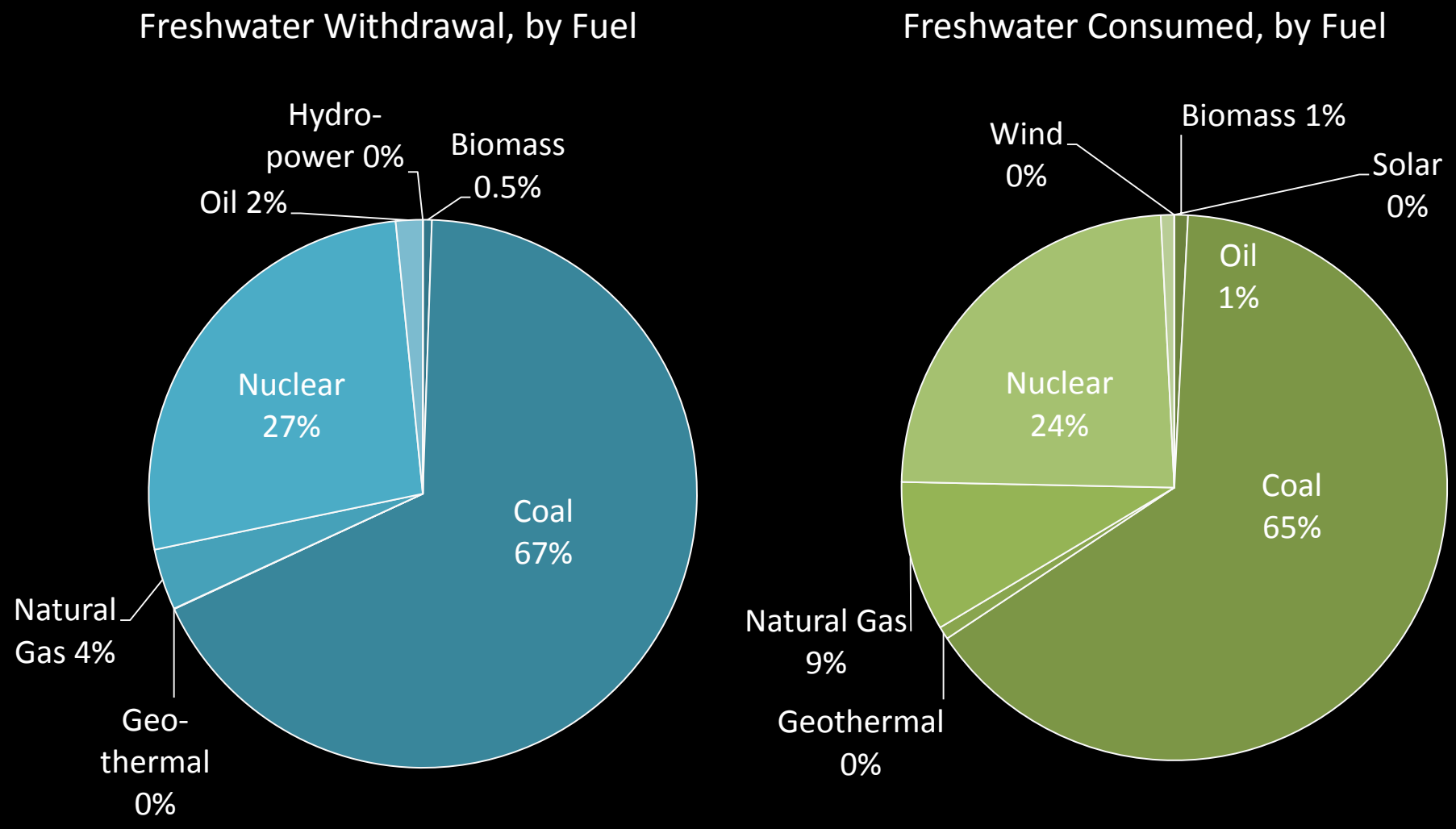
Figure 2: Power Generation by Fuel





(2008 data; calculated from EW3 database)

Figure 3: Water withdrawn and consumed, by fuels



(2008 data; calculated from EW3 database)

Table 1: Freshwater Cooling Systems

Cooling Type	Freshwater-cooled Generation (Million MWh)	Number of Generators	Percent of Total Freshwater-cooled Generation
East of the Mississippi	2,057	1,816	
Cooling Pond	244	113	12%
Dry Cooled	34	60	1%
Once-Through	811	777	24%
Recirculating	968	866	29%
West of the Mississippi	1,315	1,736	
Cooling Pond	207	115	6%
Dry Cooled	48	72	1%
Once-Through	198	201	6%
Recirculating	862	1,348	26%
Grand Total	**3,371**	**3,552**	**100%**

Note: Based on median NREL values, divided by freshwater non-hydro electricity generation.
(2008 data; calculated from EW3 database)

Table 2: Top 25 Watersheds by WaSSI Anomaly

State(s)	Sub-basin Name	Reported Plant Name	Reported Plant Fuel Type	Reported Plant Capacity (MW)	Reported Plant Cooling Type	Reported Plant Water Source	Sub-basin WaSSI	Sub-basin WaSSI Anomaly
WY	Bitter	Jim Bridger	Coal	2,318	Recirculating	Green River	2.18	0.85
		Simplot Phosphates	Oil	12	Recirculating	Municipality		
IA	Monona-Harrison Ditch	George Neal North	Coal	1,046	Once-through	Missouri River	0.78	0.72
		George Neal South	Coal	640	Once-through	Missouri River		
TX	Lake O' the Pines	Lone Star	Natural gas	40	Once-through	Ellison Creek Reserv	0.87	0.72
		Monticello	Coal	1,980	Once-through	Monticello Reservoir		
		Welsh	Coal	1,674	Recirculating	Swauano Creek Reserv		
		Wilkes	Natural gas	882	Recirculating	Johnson Creek Reserv		
NC/SC	Upper Catawba	Catawba	Nuclear	2,410	Once-through	Lake Wylie	0.75	0.69
		Marshall	Coal	1,996	Once-through	Lake Norman		
		McGuire	Nuclear	2,441	Once-through	Lake Norman		
		Riverbend	Coal	466	Once-through	Catawba River		
ND	Knife	Antelope Valley	Coal	870	Recirculating	Lake Sakakawea	0.84	0.68
		Coal Creek	Coal	1,210	Recirculating	River		
		Stanton	Coal	190	Once-through	River		
MI	Black-Macatawa	J H Campbell	Coal, oil	1,605	Once-through, none	Lake Michigan	0.79	0.67
		James De Young	Coal	63	Once-through	Lake Macatawa		
		New Covert Generating Facility	Natural gas	1,176	Recirculating	Lake Michigan		
		Palisades	Nuclear	812	Recirculating	Lake Michigan		
MO	Little Chariton	Thomas Hill	Coal	1,135	Once-through	Thomas Hill Lake	0.67	0.66
MI/OH	Ottawa-Stony	Fermi	Nuclear, oil	1,281	Recirculating, none	Lake Erie	0.89	0.60
		J R Whiting	Coal, oil	364	Once-through, none	Lake Erie		
		Monroe	Coal	3,280	Once-Though	Raisin River		
NC/SC	Seneca	Oconee	Nuclear	2,667	Once-through	Keowee River	0.71	0.60
NC/VA	Upper Dan	Belews Creek	Coal	2,160	Once-through	Belews Lake	0.63	0.59
		Dan River	Coal	290	Once-through	Dan River		
		Roxboro	Coal	2,558	Cooling pond	Hyco Lake (Hyco River)		
VA	Pamunkey	North Anna	Hydro, nuclear	1,960	None, once-through	North Anna River	0.59	0.56
		West Point Mill	Biomass	101	Recirculating	Wells		
TN	Emory	Kingston	Coal	1,700	Once-through	Clinch And Emory Rivers	0.55	0.54

Calculated from EW3 database, see Appendix A

Table 2 (ctd): Top 25 Watersheds by WaSSI Anomaly

State(s)	Sub-basin Name	Reported Plant Name	Reported Plant Fuel Type	Reported Plant Capacity (MW)	Reported Plant Cooling Type	Reported Plant Water Source	Sub-basin WaSSI	Sub-basin WaSSI Anomaly
MS/TN	Horn Lake-Nonconnah	Allen Steam Plant	Coal	990	Once-through	Mississippi River	0.72	0.52
		TVA Southaven Combined Cycle	Natural gas	904	Recirculating	Wells		
NC/SC	South Fork Catawba	G G Allen	Coal	1,155	Once-through	Lake Wylie	0.61	0.52
SC	Cooper	Cogen South	Coal	99	Once-through	Edisto River	0.61	0.50
		Cross	Coal	2,390	Recirculating	Diversion Canal		
		Jefferies	Coal, hydro, oil	578	Recirculating, none, once-through	Lake Moultrie/Tail Race Canal		
		Williams	Coal, natural gas	687	Once-through, none	Back River Reservoir		
WI	Trempealeau	Alma	Coal	181	Once-through	Mississippi River	0.51	0.48
		John P Madgett	Coal	387	Once-through	Mississippi River		
MI	St. Clair	Belle River	Coal, nat. gas, oil	1,664	Once-through, none	St. Clair River	0.58	0.47
		Cargill Salt	Coal	2	Once-through	Saint Clair River		
		Greenwood	Natural gas	1,071	Cooling pond, none	Cooling Pond		
		St Clair	Coal	1,547	Once-through	St Clair River		
MO	Cuivre	Sioux	Coal	1,099	Once-through	Mississippi River	0.50	0.47
MO	Meramec	Labadie	Coal	2,389	Once-through	Missouri River	0.49	0.44
NY	Irondequoit-Ninemile	Oswego Harbor Power	Oil	1,804	Once-through	Lake Ontario	0.50	0.44
		R. E. Ginna Nuclear Power Plant	Nuclear	614	Once-through	Lake Ontario		
		Sithe Independence Station	Natural Gas	1,086	Recirculating	Municipality		
IN	Muscatatuck	Clifty Creek	Coal	1,303	Once-through	Ohio River	0.44	0.43
AZ/NM	Carrizo Wash	Coronado	Coal	822	Recirculating	Other	0.59	0.41
NY	Oak Orchard-Twelvemile	AES Somerset LLC	Coal	655	Once-through	Lake Ontario	0.54	0.41
		Lockport Energy Associates LP	Natural gas	221	Recirculating	Municipality		
		Rochester 7	Coal	253	Once-through	Lake Ontario		
OH	Cedar-Portage	Bay Shore	Coal, oil	639	Once-through	Lake Erie	0.46	0.37
		Davis Besse	Nuclear	925	Recirculating	Lake Erie		
GA	Upper Oconee	Harllee Branch	Coal	1,746	Once-through	Lake Sinclair	0.43	0.36

Calculated from EW3 database, see Appendix A

Notes: *2008 data, based on reporting to EIA, with some data corrected based on other sources. See Appendix A for methodology. Ranked by WaSSI anomaly. Chart includes only the power plants that require water for cooling, or whose cooling needs were unspecified. "Sub-basin name" is the name of the eight-digit Hydrologic Unit Code (HUC-8) used by the U.S Geological Survey. "Reported plant fuel type" and "reported plant cooling type" include multiple entries for plants reporting more than one fuel or cooling type. "WaSSI anomaly" is the difference between the WaSSI calculated with and without power plant water use included. The WaSSI is calculated using USGS water demand data in combination with our calculations of power plant water use based on reported generation for 2008, the median NREL coefficients (Macknick et al. 2011), and reported water source.*