

# Existing Resources and Gap Analysis

Brad Albert

Director – Resource Planning

February 15, 2008

# Outline

- Existing Resource Review:
  - Capacity (Generation and Purchases)
  - Energy Picture
    - Current Energy Mix
    - Typical Dispatch Patterns
- Capacity Need Projections:
  - Annual and Monthly
- Energy Need Projections

# Existing Resource Review

# Summer 2008 - Long-Term Resources

<b>Company-Owned Generation:</b>	
Existing:	<u>Capacity (MWs)</u>
Nuclear	1,147
Coal	1,750
Gas Combined Cycles	1,862
Gas/Oil CTs and Steam	1,518
Renewable	6
<b>Total Company-Owned Generation</b>	<b>6,283</b>
<b>Purchased Power Contracts:</b>	
Conventional:	
Purchases/Exchanges/Tolling	1,864
Renewable:	
Wind (nameplate)	90
Geothermal	10
LFG/Biomass	14
<b>Total Purchased Power Contracts</b>	<b>1,978</b>
<b>Total Resources</b>	<b>8,261</b>

# APS – Owned Generating Capacity (Summer 2008)

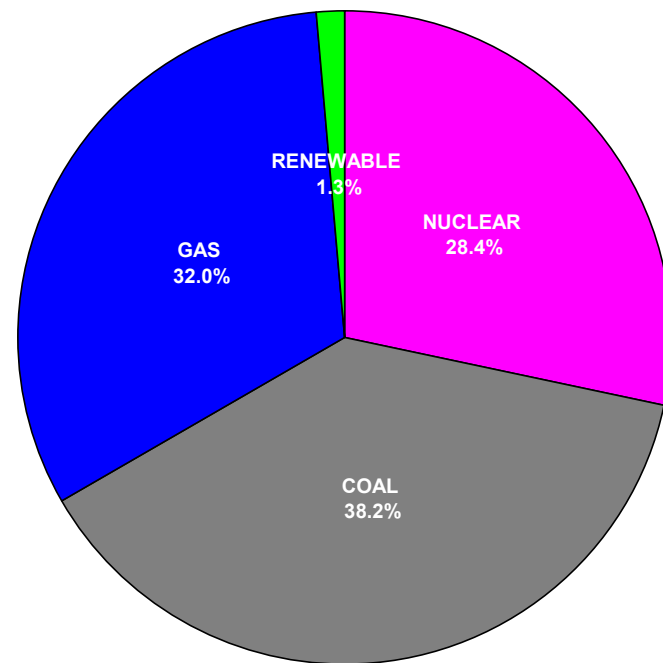
	FUEL TYPE	COMMENTS	Yr 2008 CAPACITY RATING (MWs)
1	PALO VERDE 1-2-3	Nuclear	1,147
2	FOUR CORNERS 1-2-3	Coal	560
3	FOUR CORNERS 4-5	Coal	228
4	CHOLLA 1-2-3	Coal	647
5	NAVAJO 1-2-3	Coal	315
6	COAL SUBTOTAL		1,750
7	WEST PHOENIX CC 1-2-3	Natural Gas	255
8	WEST PHOENIX CC 4	Natural Gas	117
9	WEST PHOENIX CC 5	Natural Gas	506
10	REDHAWK CC 1-2	Natural Gas	984
11	GAS COMBINED CYCLE SUBTOTAL		1,862
12	OCOTILLO STM 1-2	Natural Gas	220
13	SAGUARO STM 1-2	Natural Gas	210
14	GAS STEAM SUBTOTAL		430
15	OCOTILLO CT 1-2	Natural Gas	110
16	SAGUARO CT 1-2	Natural Gas	110
17	SAGUARO CT 3	Natural Gas	79
18	SUNDANCE CT 1-10	Natural Gas	420
19	WEST PHOENIX CT 1-2	Natural Gas	110
20	YUCCA CT 1-4	Nat. Gas/ Oil	147
21	YUCCA CT 5-6 (new)	Natural Gas	96
22	DOUGLAS CT	Oil	16
23	GAS/OIL COMBUSTION TURBINE SUBTOTAL		1,088
24	CONVENTIONAL GENERATION SUBTOTAL		6,277
25	TOTAL EXISTING RENEWABLES	Solar	6
		PV installations, Saguaro trough	
26	TOTAL APS GENERATION W/ RENEW.		6,283

# Long-Term Purchased Power Agreements

	LOCATION	EXPIRATION DATE	CAPACITY RATING (MWs)	
1	SRP TERRITORIAL & CONTINGENT	June, 2010	234	
2	PACIFICORP SEASONAL EXCHANGE	Oct, 2020	480	
3	GAS CC TOLL	West of Phoenix	May, 2017	500
4	GAS CALL OPTION	Oct, 2016	150	
5	MARKET CALL OPTION	Sept, 2015	500	
6	GAS CC TOLL	West of Phoenix	Oct, 2019	560
7	TOTAL CONVENTIONAL PURCHASES		2,424	
8	ARAGONNE WIND	New Mexico	Dec, 2026	90
9	GEOTHERMAL	Salton Sea Area, CA	Dec, 2029	10
10	BIOMASS	Northeastern AZ	Dec, 2022	14
11	LANDFILL GAS	Metro Phoenix Area	Dec, 2028	3
12	TOTAL RENEWABLE (NAMEPLATE)		117	

# Energy Sources for 2008

	<u>GWH</u>	<u>Mix %</u>
<b>TOTAL NUCLEAR</b>	9,036	28.4
Cholla	3,944	
FC	5,823	
Navajo	2,401	
<b>TOTAL COAL</b>	12,167	38.2
Gas CC (Owned + Tolled)	9,494	
Gas Steam	202	
Gas Peaking	498	
<b>TOTAL GAS</b>	10,194	32.0
<b>RENEWABLE</b>	420	1.3
<b>TOTAL ENERGY</b>	31,817	100.0



# Energy Sources for 2008

GWH

4,000

3,500

3,000

2,500

2,000

1,500

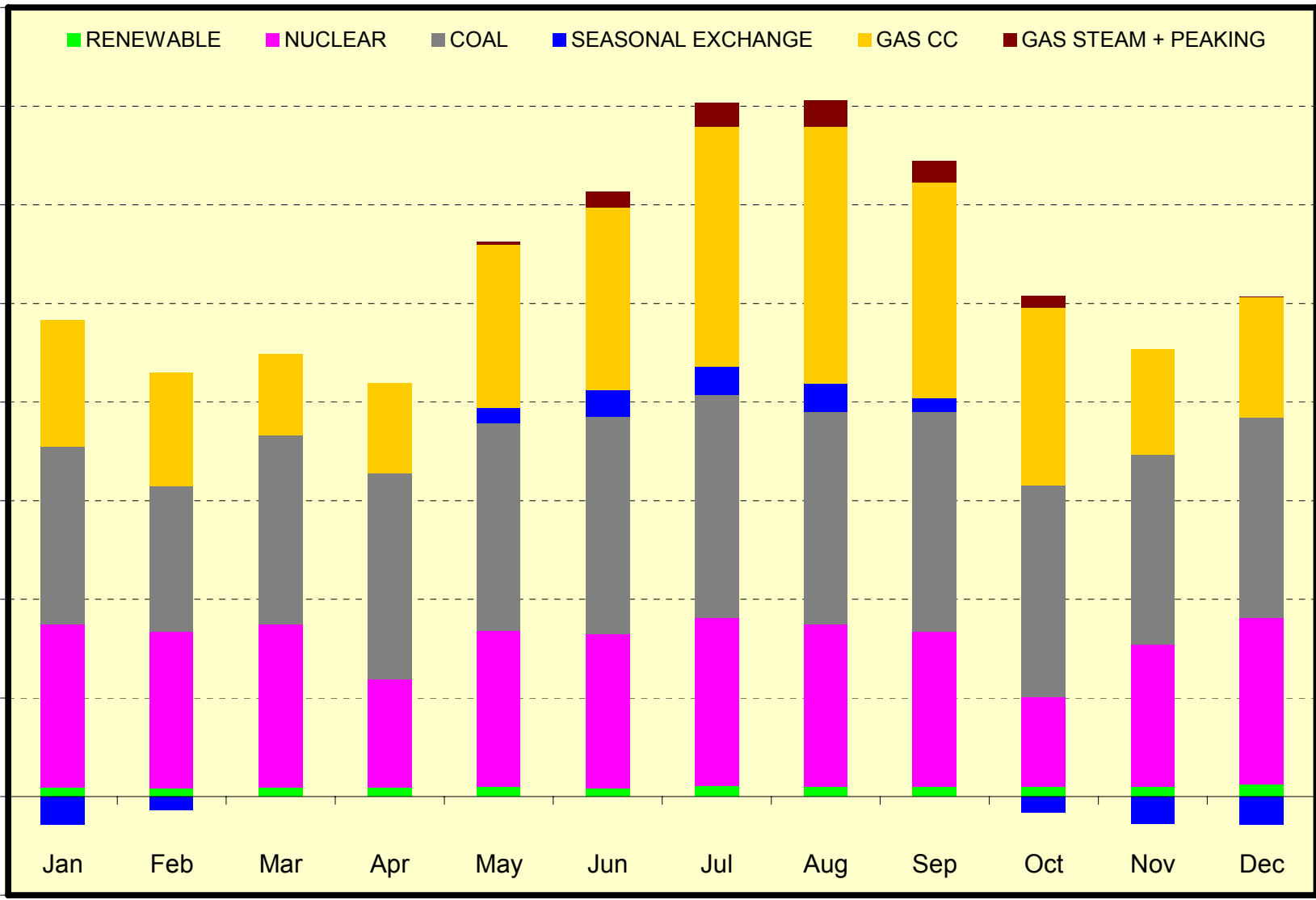
1,000

500

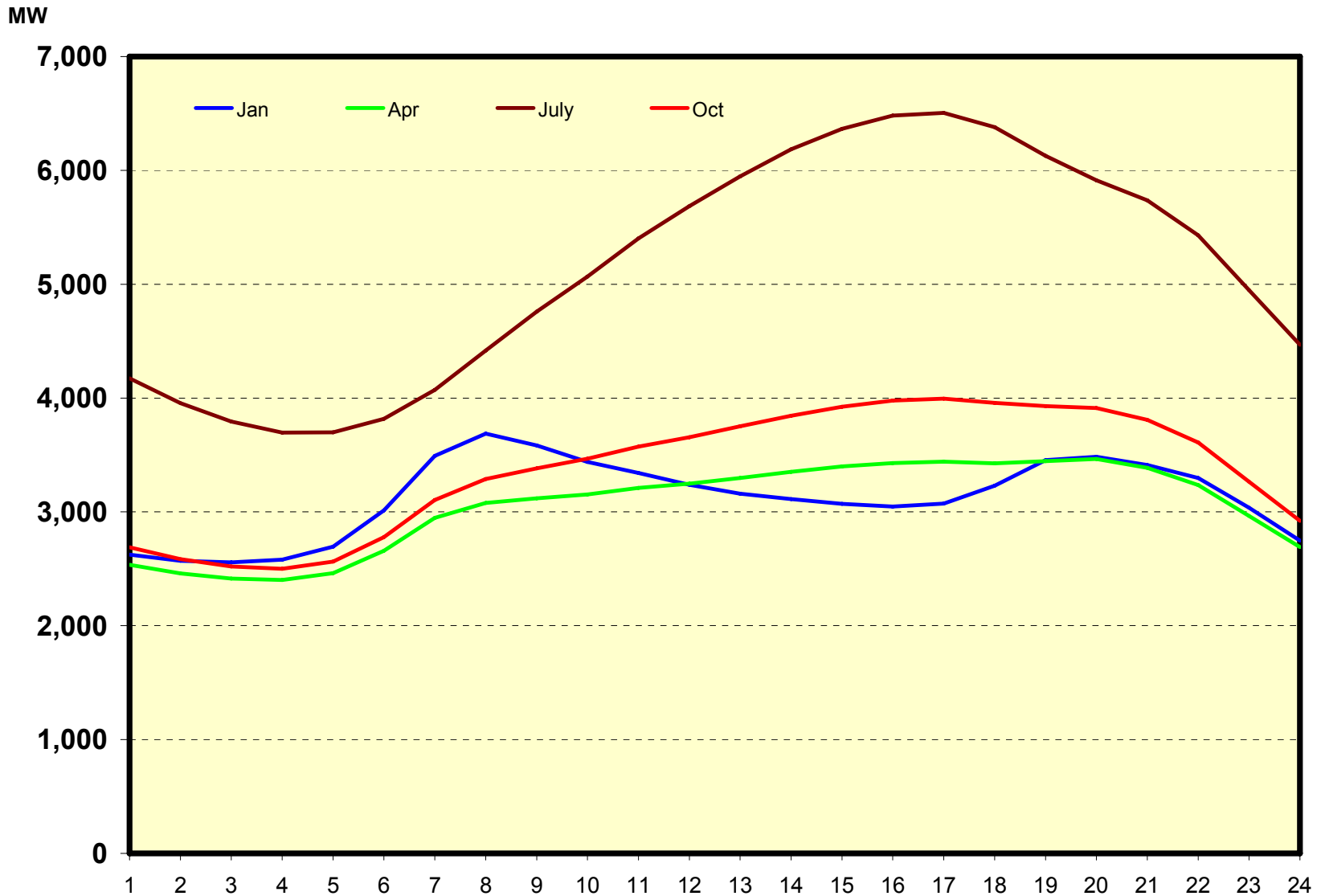
0

(500)

RENEWABLE    NUCLEAR    COAL    SEASONAL EXCHANGE    GAS CC    GAS STEAM + PEAKING



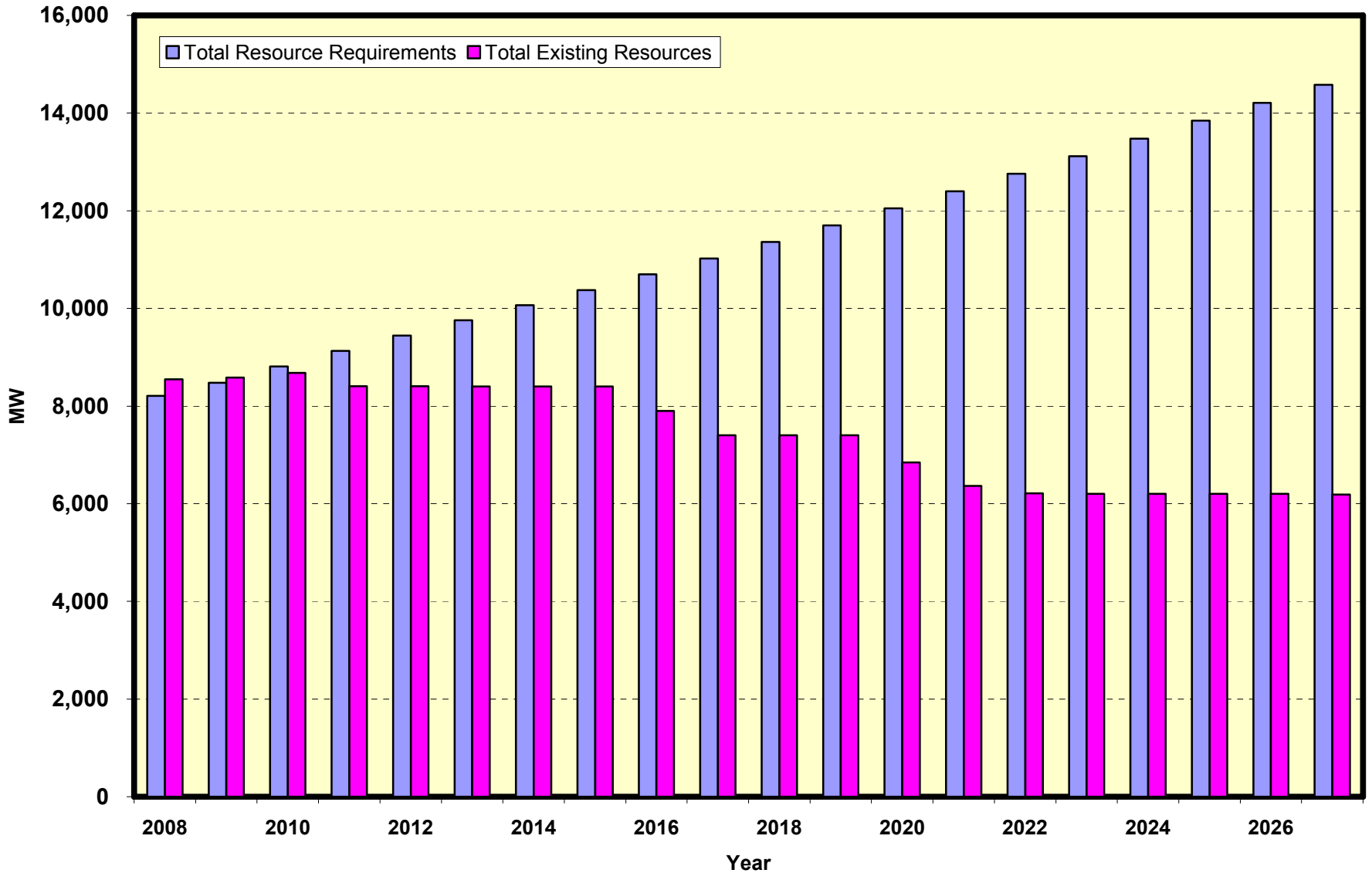
# Typical Weekday Load Shapes (2009)



Represents the 16<sup>th</sup> day of each month

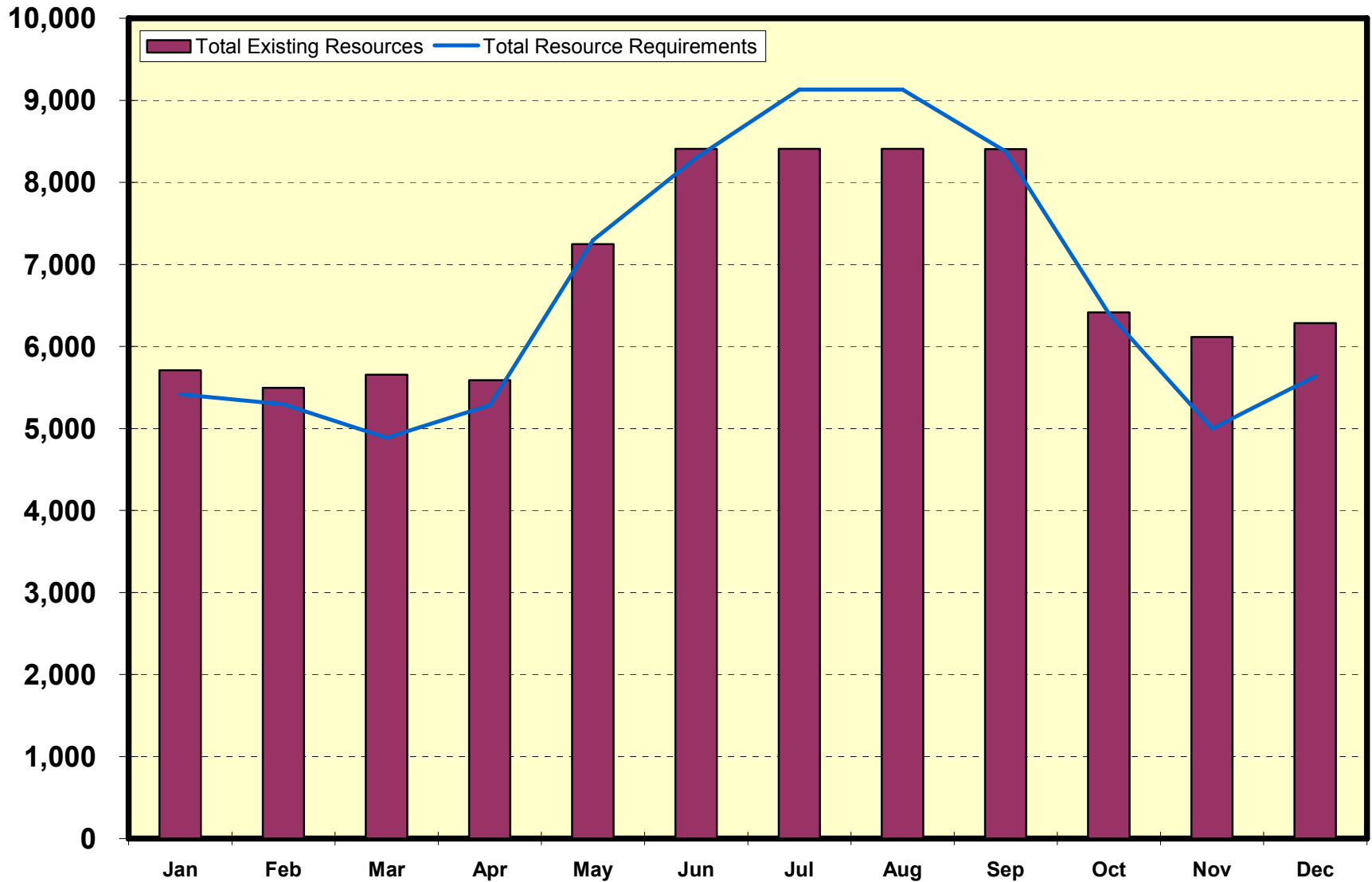
# Capacity Need Projections

# Future Capacity Needs



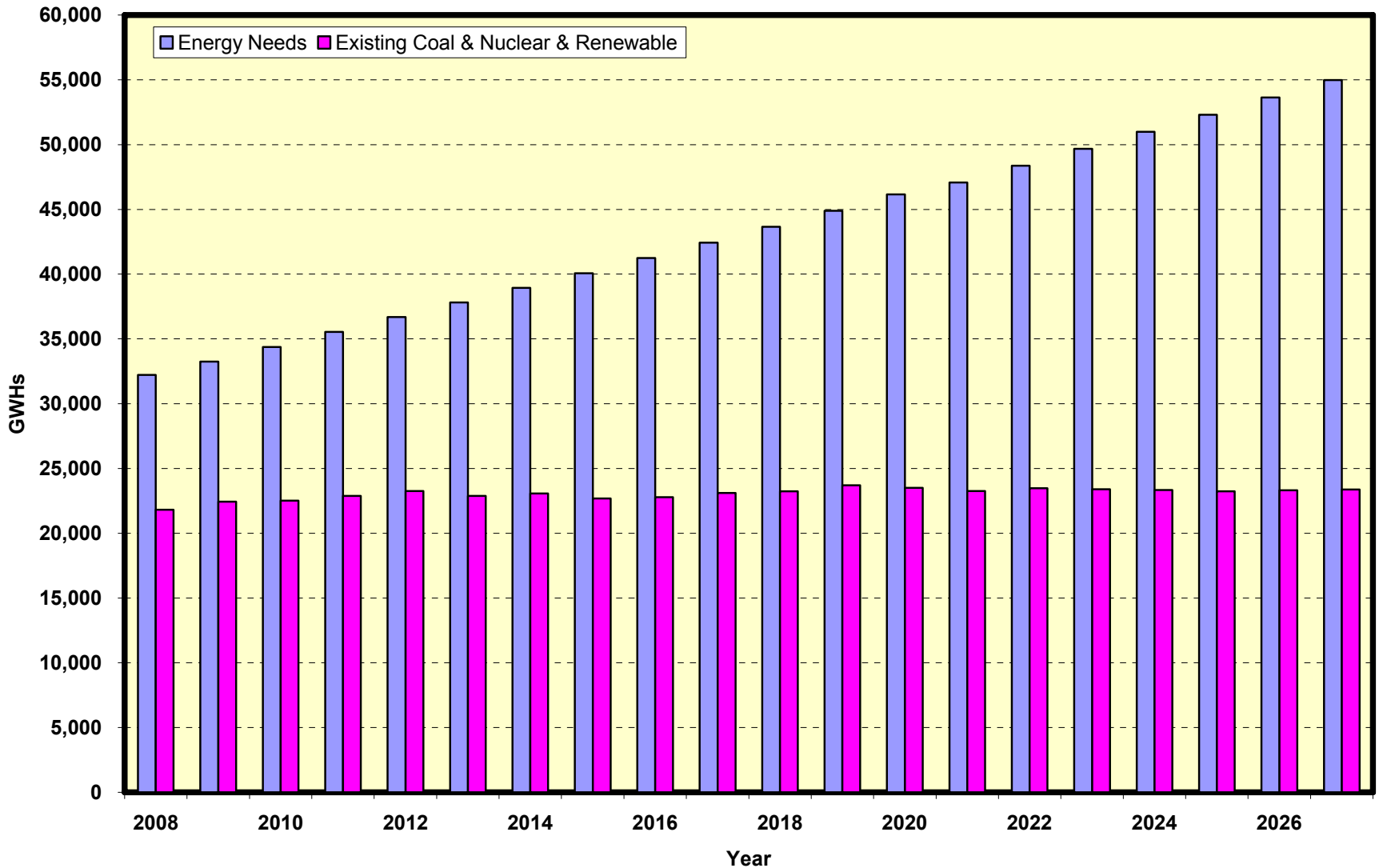
# Monthly Capacity Need (Year 2011)

(includes only existing LT resources)



# Energy Need Projections

# Future Energy Needs



Note: Total energy need is based upon BAU forecast (does not include future EE or DE)

# Conclusions

- **Future Resource Needs are Sizeable:**
  - **5,200 MWs of Capacity Resources Needed by 2020**
    - » Summer-season peaking resources is predominant need
    - » Expiration of existing PPAs is major factor (2,400 MW roll-off by 2021)
  - **14,000 GWHs of Energy Growth by 2020**
    - » Approximately 43% growth over 2008
    - » 20,000 GWHs of energy growth by 2025 (about 62%)