

Overview of Southern California Gas / San Diego Gas & Electric System Design & Operations

Beth Musich

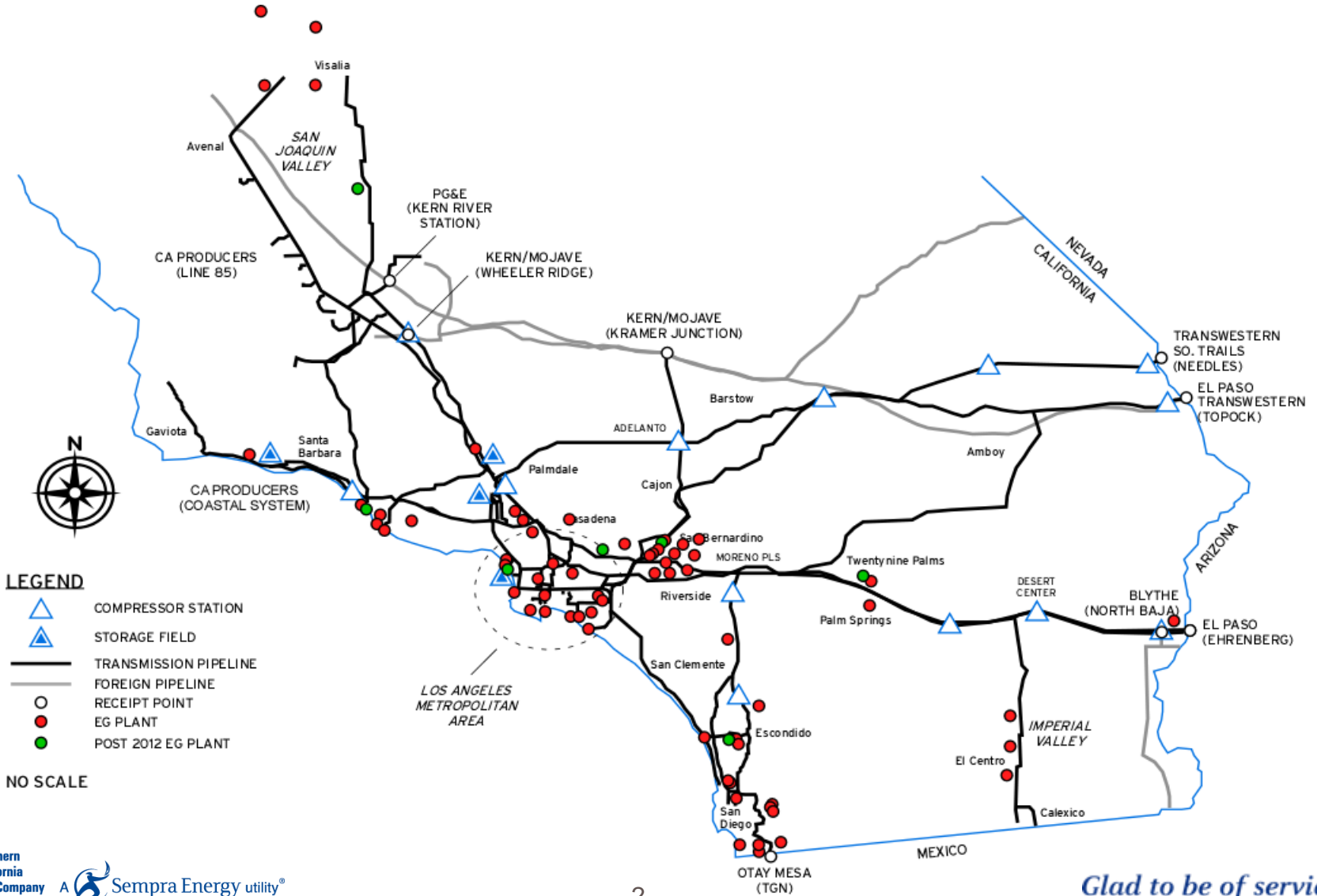
Director - Energy Markets & Capacity Products

7/25/2014



Glad to be of service.®

SoCalGas/SDG&E Gas Transmission System with Electric Generation Plants



SoCalGas/SDG&E Gas Transmission System

- » 24,100 square mile service territory
- » 24.3 million consumers, 6.6 million meters
- » 3500 miles of transmission pipeline
- » Designed to transport supply from fringes of service territory to primary load centers in Los Angeles and San Diego
- » SoCalGas has provided service for more than 140 years
 - Approximately 5% of total US market for natural gas
 - Throughput averages 1 trillion cubic feet per year
- » SDG&E has provided service for more than 125 years
 - Throughput averages 130 billion cubic feet per year

System Capacity Design

- » Designed to CPUC-mandated standards:
 - 1-in-35 year peak day for core service
 - 1-in-10 year peak day for firm noncore service
- » Design capacity of 6.0 BCFD
 - Highest recorded demand: 5.3 BCFD in Dec. 1990

Sources of Supply and Receipt Points

Zone	Receipt Points	Supply Source	Capacity (MMCFD)
Northern	North Needles, Topock, Kramer Junction	San Juan Basin, Rocky Mountain	1590
Southern	Ehrenberg, Blythe, Otay Mesa	Permian Basin, LNG	1210
Wheeler	Wheeler Ridge, Kern River Sta.	San Juan Basin, Rocky Mountain, Western Canada	765
California	San Joaquin Valley, Coastal	Local	310

3875 million cubic feet per day of firm receipt capacity

Storage Fields

- » Four storage fields, located in southwest quadrant of service territory:
 - 137.1 BCF of storage capacity
 - 850 MMcfd of firm injection capacity
 - 3195 MMcfd of firm withdrawal capacity

- » Storage rights are allocated and sold on a system-wide basis
 - Rights are not tied to a specific storage field

- » Gas Control Department operates to maximize system-wide capacities

Mainline Compressor Stations

- » SoCalGas/SDG&E own and operate 13 mainline compressor stations with a combined total of 142,000 horsepower
- » Compressor stations are operated as necessary to maintain system integrity
 - Move supplies to changing load centers
 - Increase system pressures
 - Balance gas entering and leaving the system

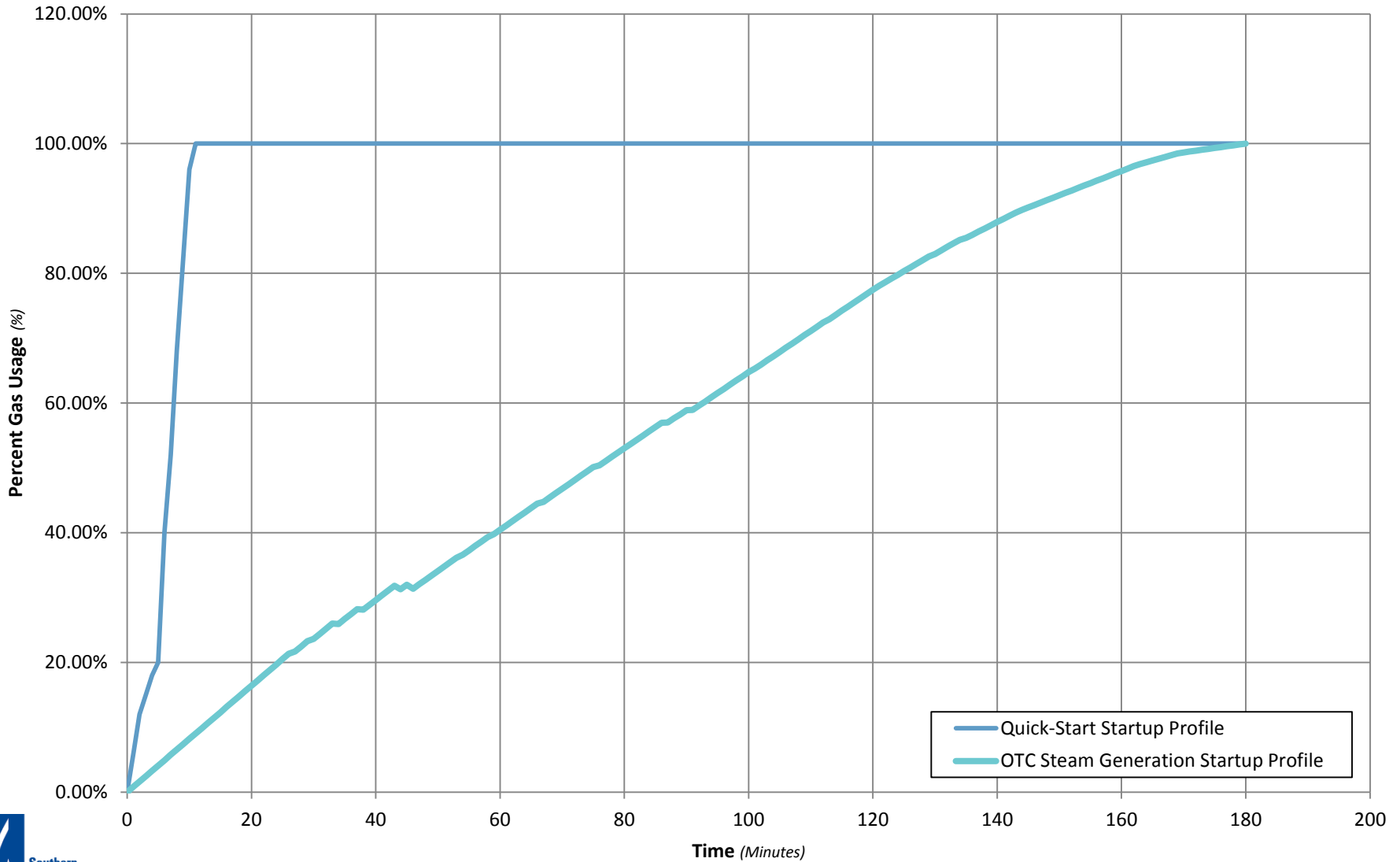
Electric Generation in Southern California

- » The SoCalGas/SDG&E system serves 20,000 MW of electric generation from 79 individual power plants
 - 246 BCF of average EG demand
 - Winter maximum of 1000 MMcfd (11/13/2013)
 - Summer maximum of 1835 MMcfd (8/13/2012)
- » Power plants are primarily concentrated in the Los Angeles and San Diego load centers
 - Newer power plants have also sited outside of the LA basin

Quick-Start Power Plants

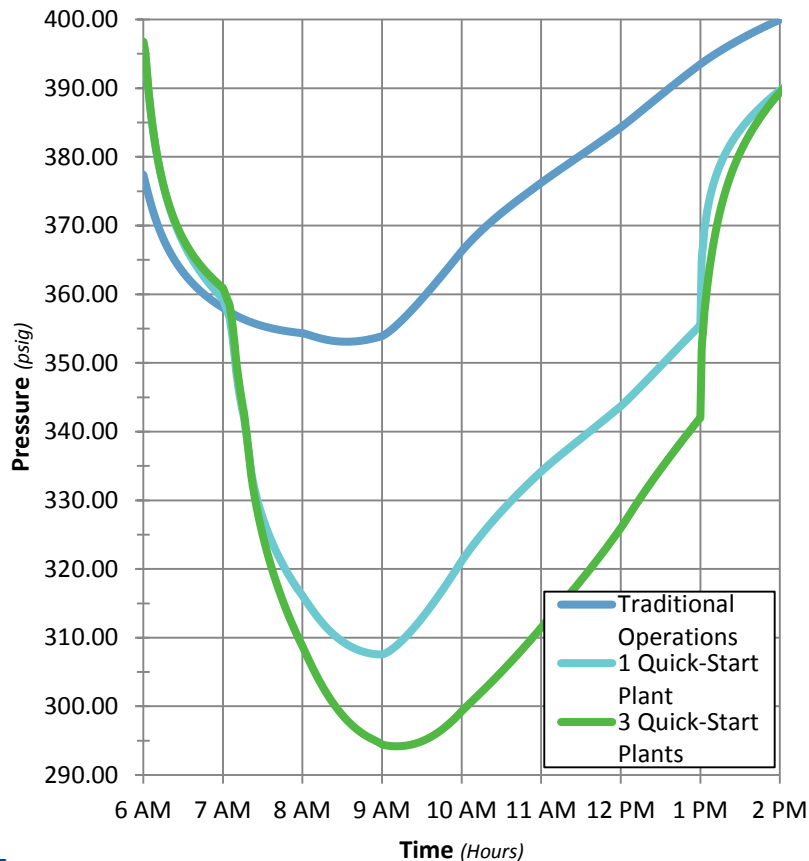
- » Recent requests for service to new natural gas power plants have included quick-start technology
 - 0-100% demand in 10 min
 - 0-50% demand in 9 min, 50-100% in 1 min
- » If a power plant is on the end of the system, linepack in vicinity of the plant is more limited
- » Sudden and rapid pipeline pressure loss can occur on quick-start units
 - 40 psig drop over quick-start ramp not uncommon
 - Up to 70 psig drop in extreme situations

Quick-Start vs Traditional Start-up Profile

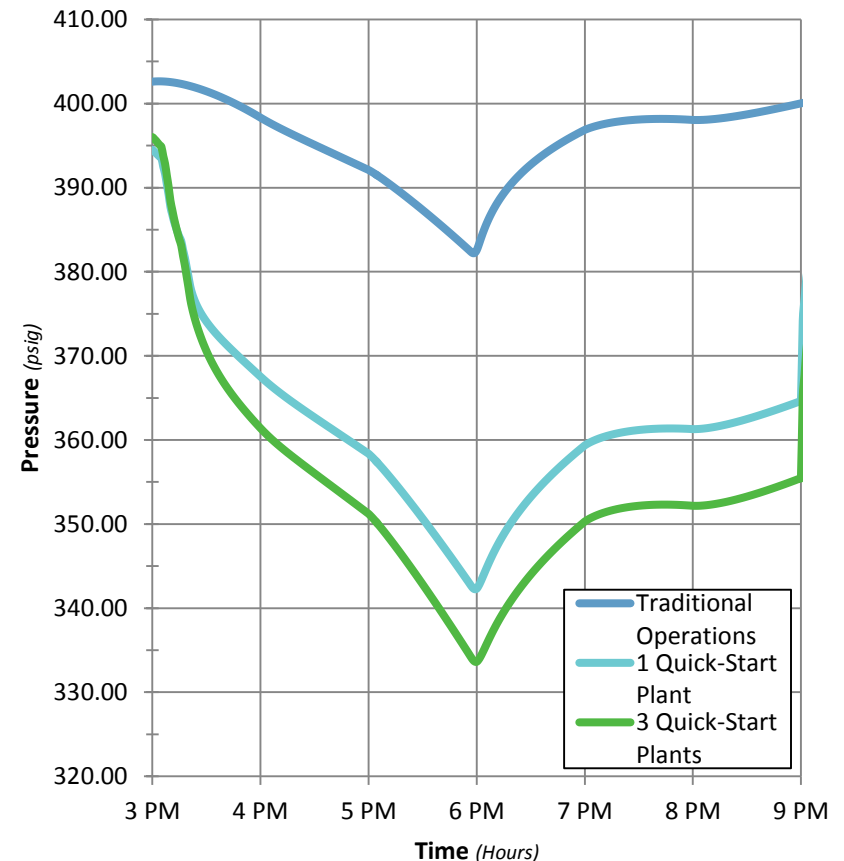


Pressure Drops from Quick-Start Plants Can Be Much Greater than Traditional Facilities

Pressure Surrounding Facility
Morning Start



Pressure Surrounding Facility
Afternoon Start



Summary

- » The SoCalGas and SDG&E transmission system is designed to handle up to 6 BCFD of natural gas load
- » The system provides flexibility for our customers, however some level of pipeline supply is always needed – we cannot operate solely from storage supplies
- » Quick start EG plants are changing the nature of gas use on our system