



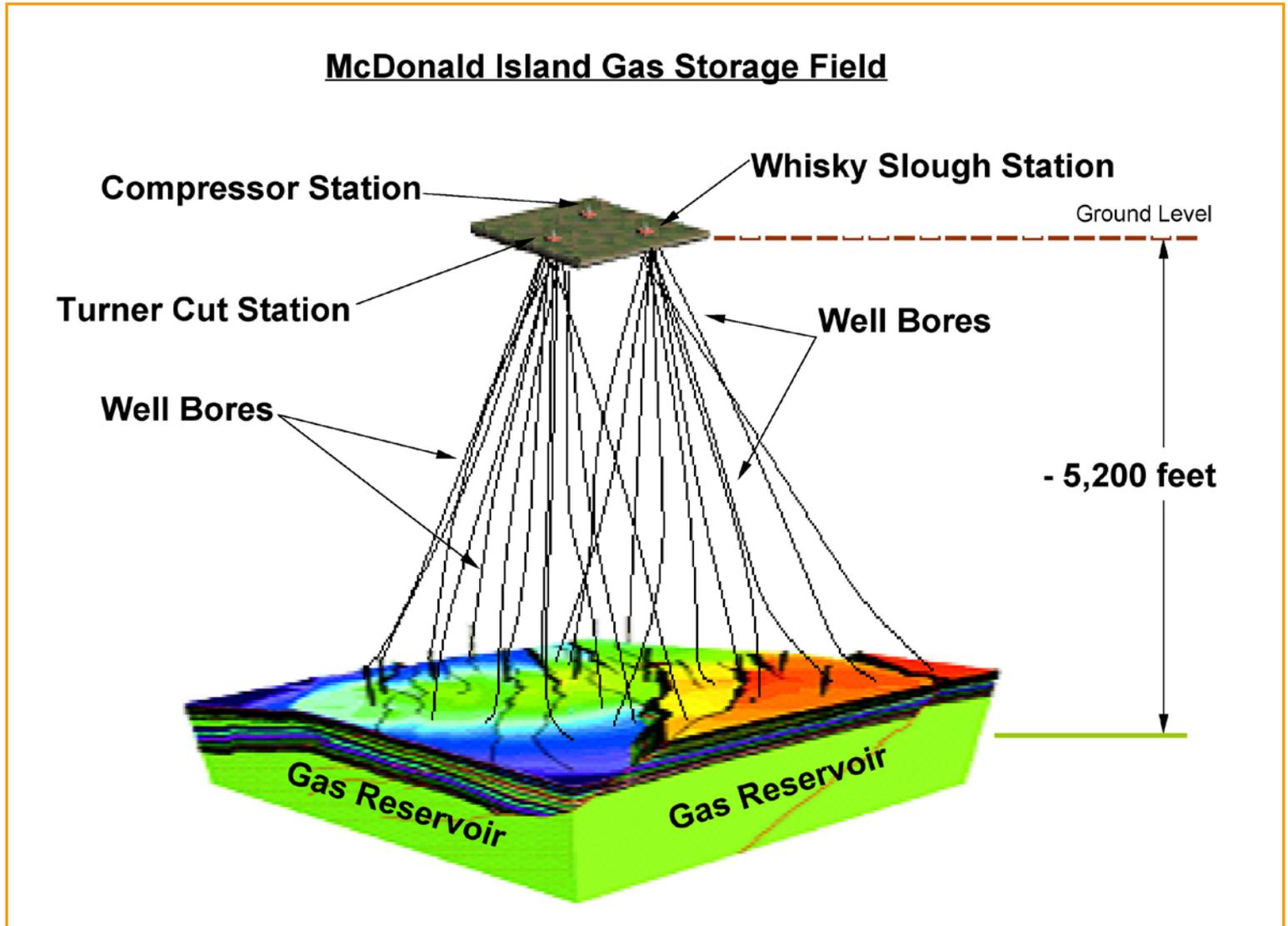
# PG&E Gas Storage

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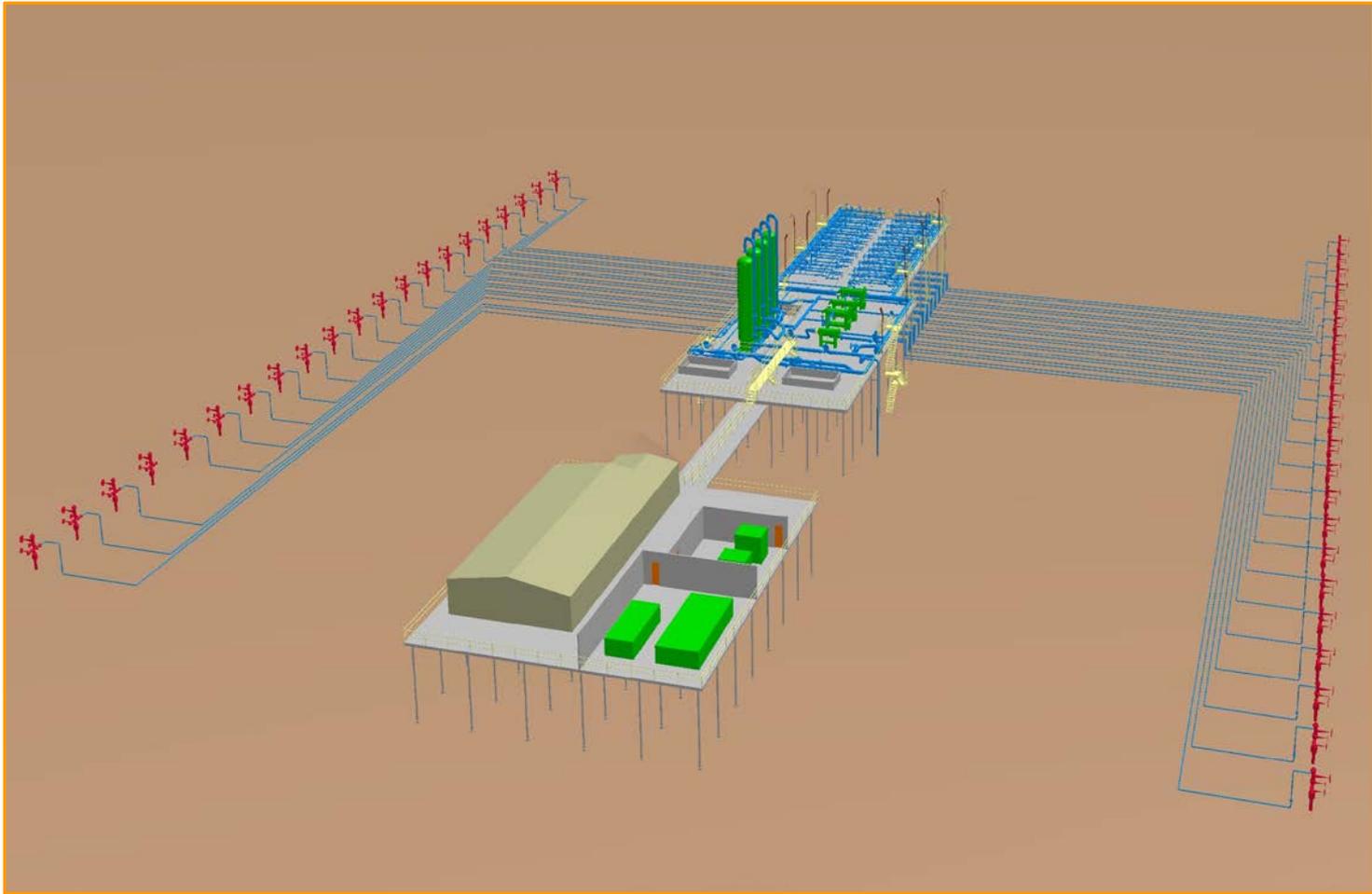
## Overview for California Energy Commission

April 24, 2013

# Overview of a Gas Storage Facility



# Production Platform & Well Placement





# Gas Storage Assets in Northern California

## ➤ PG&E – Facilities and Capacities

- McDonald Island, Los Medanos, Pleasant Creek and Gill Ranch
- Working Gas - 105 Bcf
- Injections – 635 MMcf/d
- Withdrawal – 2,180 MMcf/d

## ➤ Independent Storage Providers

- Wild Goose, Lodi, Gill Ranch and Central Valley
- Working Gas – 105 Bcf
- Injections – 1,840 MMcf/d
- Withdrawal – 2,740 MMcf/d



# Gas Storage is used for three basic functions

## 1. Meet utility's obligation to all customers

- Residential and small commercial (Core)
- Electric generation (EG)
- Large commercial and industrial (Noncore)

## 2. Provide system balancing

- Matching supply and demand
- Operating imbalances
- Shrinkage imbalances

## 3. Provide market liquidity and seasonal price arbitrage

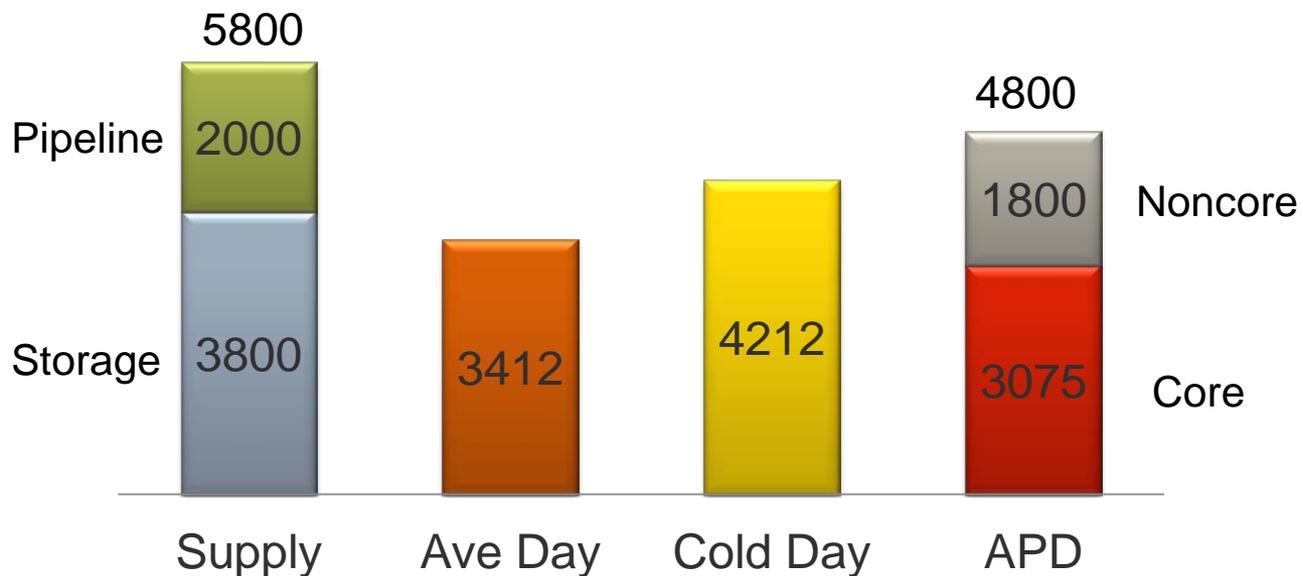
- Facilitate market transaction (parking/lending, firm storage)
- Summer vs. winter prices and daily vs. next month's prices

# Utility Obligation to Serve

## ➤ Utility Obligation to meet all customer demands

### ☐ System Demand

- Average winter demand (Jan 2013) - 3,412 MMcf/d
- Cold day demand (Jan 14, 2013) – 4,212 MMcf/d
- Abnormal Peak Demand – 4,800 MMcf/d

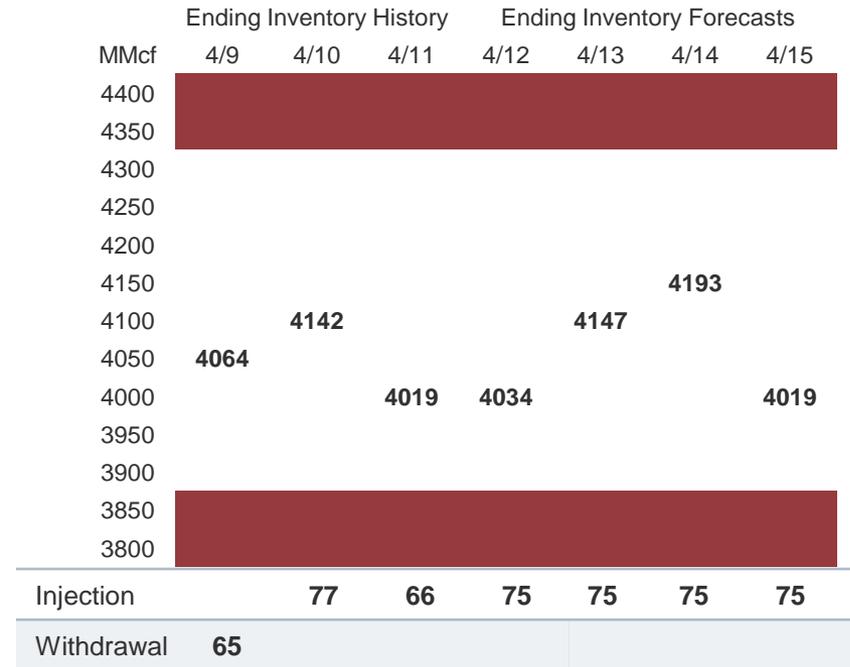




# System Balancing

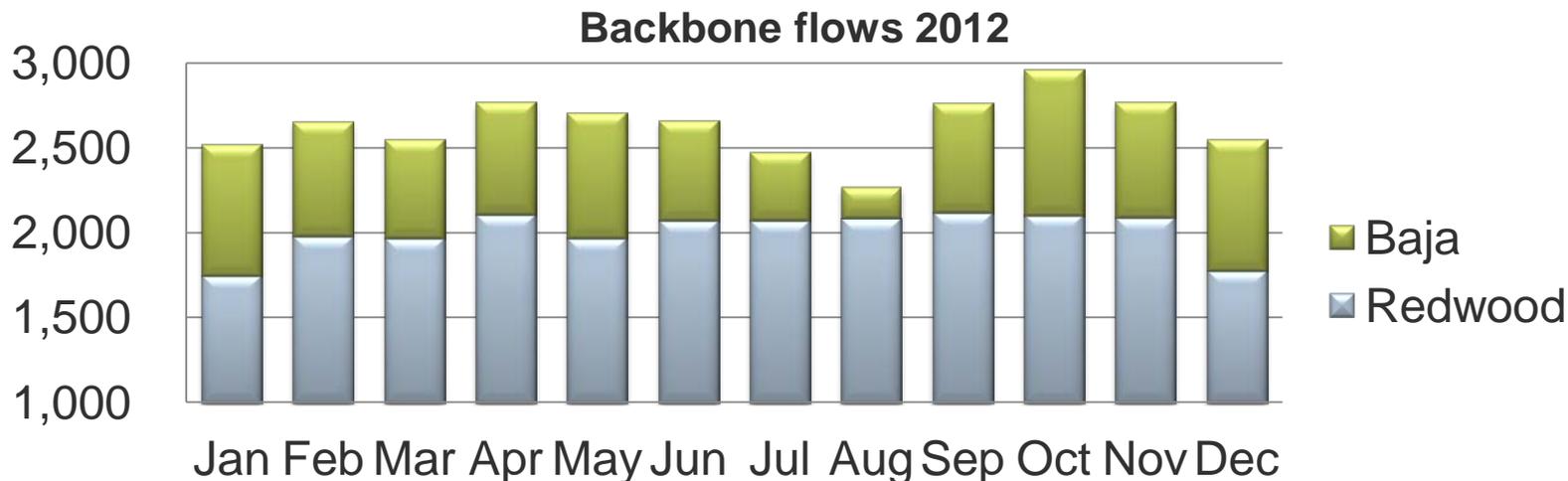
## ➤ System Balancing

- ❑ Matching supply and demand within the day
- ❑ Matching supply and demand over the gas day
- ❑ Monthly balancing
- ❑ System balancing needs likely to increase with additional renewable electric generation
- ❑ PG&E uses pipeline inventory swing and gas storage
  - Inventory swing 400 MMcf total
  - Storage 75 MMcf/d injection and withdrawal, 4 Bcf of inventory
  - Actual injection and withdrawal can go over 200 MMcf/d



## ➤ Market liquidity and seasonal price arbitrage

- ❑ PG&E and ISP gas storage is connected to PG&E Citygate
  - PG&E Citygate is a very liquid trading point – 621 MMcf/d (Gas Daily 4/12/2013)
  - Liquid markets allow the trading of supplies between various sectors (Core, EG, Noncore) and between customers
  - Liquidity fosters gas-on-gas competition
  - Reduces price spikes during system maintenance, outages and other constraints
- ❑ PG&E backbone system has become a spring and fall peaking pipeline allowing for overall lower commodity prices





# Conclusions

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- **There is ample storage capacity in Northern California**
- **Gas storage provides essential operation and market functions**
  1. Meet utility's obligation to all customers
  2. Provide system balancing
  3. Provide market liquidity and seasonal price arbitrage