

# Energy Master Planning

7th Annual Statewide Energy Efficiency Forum

*Taking a Holistic Approach Toward a Sustainable Future*

June 15, 2016



# Policy Landscape

## ● **SB 350: 50% improvement in Building Energy Efficiency by 2030**

↳ Title 24, Part 11: increasingly tighter standards

↳ CalGreen Codes:

“The development of the CALGreen Code is intended to (1) reduce greenhouse gas emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the directives by the Governor.”

*Expect regulations to tighten every 3 years.*

# Market Landscape

## Energy Cost Inflation Drivers



### Supply/Demand Imbalance

-  Degrading hydro sources
-  No more nukes
-  Export of Gas
-  Domestic and International Growth



### Regulation

-  Greenhouse Gas and Other Emissions
-  State Increase in Renewable Portfolio Standards
-  Federal Clean Power Plan

# Energy Master Planning

- **One way Cities can get a head start on complying with the policy and market and policy direction is through the development of an Energy Master Plan.**
- **Energy Master Planning involves three major components:**
  1. Identify the most cost-effective energy efficiency, energy conservation, and clean energy measures from a master list of projects developed through Deferred Maintenance inventories and Facility Audits.
  2. Prepare energy cost savings projections for each measure and for entire buildings by performing building modeling. Prioritize projects based on cost/benefit analyses and other relevant criteria.
  3. Develop a strategy for Measurement and Verification (M&V) to track and manage energy usage, billing and savings.

# Stage Gate Planning Model

- **Preparing an Energy Master Plan involves a Four Stage Process**

- ↳ Stage A: Data Collection
- ↳ Stage B: Database Development
- ↳ Stage C: Planning & Project Recommendation
- ↳ Stage D: Continuous Monitoring

# Stage A: Data Collection

- **Develop a database of equipment that has two to five years of economic useful life (EUL) remaining. extracted from any available Facility Master Plans and/or Deferred Maintenance inventories**
- **Key Actions:**
  - Execute utility authorization forms (UAF) and request electricity and gas billing data from the local Utility(s).
  - Gather related/relevant data from: the deferred maintenance project list, equipment inventories (including year of installation), site maps, and facility and system operational schedules.
  - Perform site audits to collect missing information, as needed.
- **Key People**
  - Business Office/Accounts Payable
  - Maintenance and Operations

# Stage B: Database Development

- **Develop an intelligent database of equipment by building and the associated electricity and gas meters; including operations profiles and equipment specification data to build a baseline of energy use for each equipment type (e.g., lighting, HVAC, etc.).**
- **Prepare cost estimates for equipment replacement along with the anticipated retrofit date.**
- **Estimate electricity and gas savings per equipment replacement or retrofit.**
- **Key Actions:**
  - Create database entries per facility.
  - Populate each facility database with an equipment list, operational schedules per facility and equipment type, utility data, replacement or retrofit year target and replacement or retrofit cost (including demolition, procurement, installation, and commissioning).
- **Key People**
  - Finance
  - Maintenance and Operations

# Stage C: Planning & Project Recommendation

- **Query to determine the total cost and savings of various measures. Additionally, comprehensive multi-measure energy savings modeling (e.g., using EQuest).**
- **Key Actions:**
  - Identify client priorities.
  - Present plan options based on priorities and cost vs. benefit.
  - Perform energy savings modeling.
  - Prioritize schedule of construction/retrofit.
  - Prepare capital expenditure plan (including funding sources) to cover construction/retrofit costs.
- **Key People**
  - Finance
  - Maintenance and Operations
  - Planning

# Stage D: Continuous Monitoring

- **Establishing the annual energy budget and performing continuous monitoring of energy use at all facilities.**
  - 👉 Identify usage trend anomalies, which may lead to future retrofit and operational improvement opportunities.
  - 👉 Track and report electricity and gas billing (with weather adjustment analyses) to help clients track retrofit savings and compare their energy expenses against annual budget.
- **Key Actions:**
  - 👉 Develop annual energy budget.
  - 👉 Onboard each facility to the online monitoring platform.
  - 👉 Continuously monitor the building energy use and track costs against budget.
  - 👉 Respond to alerts and take action to meet annual budget goals.
  - 👉 Prepare quarterly and annual energy use reports and identify preventative and corrective maintenance actions.
  - 👉 Perform preventative and corrective maintenance actions.
- **Key People**
  - 👉 Finance
  - 👉 Maintenance and Operations

# Questions



# Contact Information

**Rick Brown, PhD, President**  
**Ali Chehrehbaz, Executive Vice President**

**TerraVerde Renewable Partners, LLC**

1100 Larkspur Landing, Suite 155

Larkspur, CA 94939

(707) 953-2885

[Rick.Brown@tvrpllc.com](mailto:Rick.Brown@tvrpllc.com)

[www.TVRPLLC.com](http://www.TVRPLLC.com)

