Informing Emerging Technologies Efforts via Evaluation

Rafael Friedmann
PG&E

Emerging Technologies Summit
October 26, 2006
Long Beach, CA

Presentation Outline

What is ET's Role Within an EE Promotion Portfolio?

What are Key Roles for Evaluation vis-à-vis ET?

- For ET Programs
  - Evaluation of technologies
  - ET as part of a portfolio
  - Process Enhancements
- For social oversight of ET

CA Emerging Technologies Program

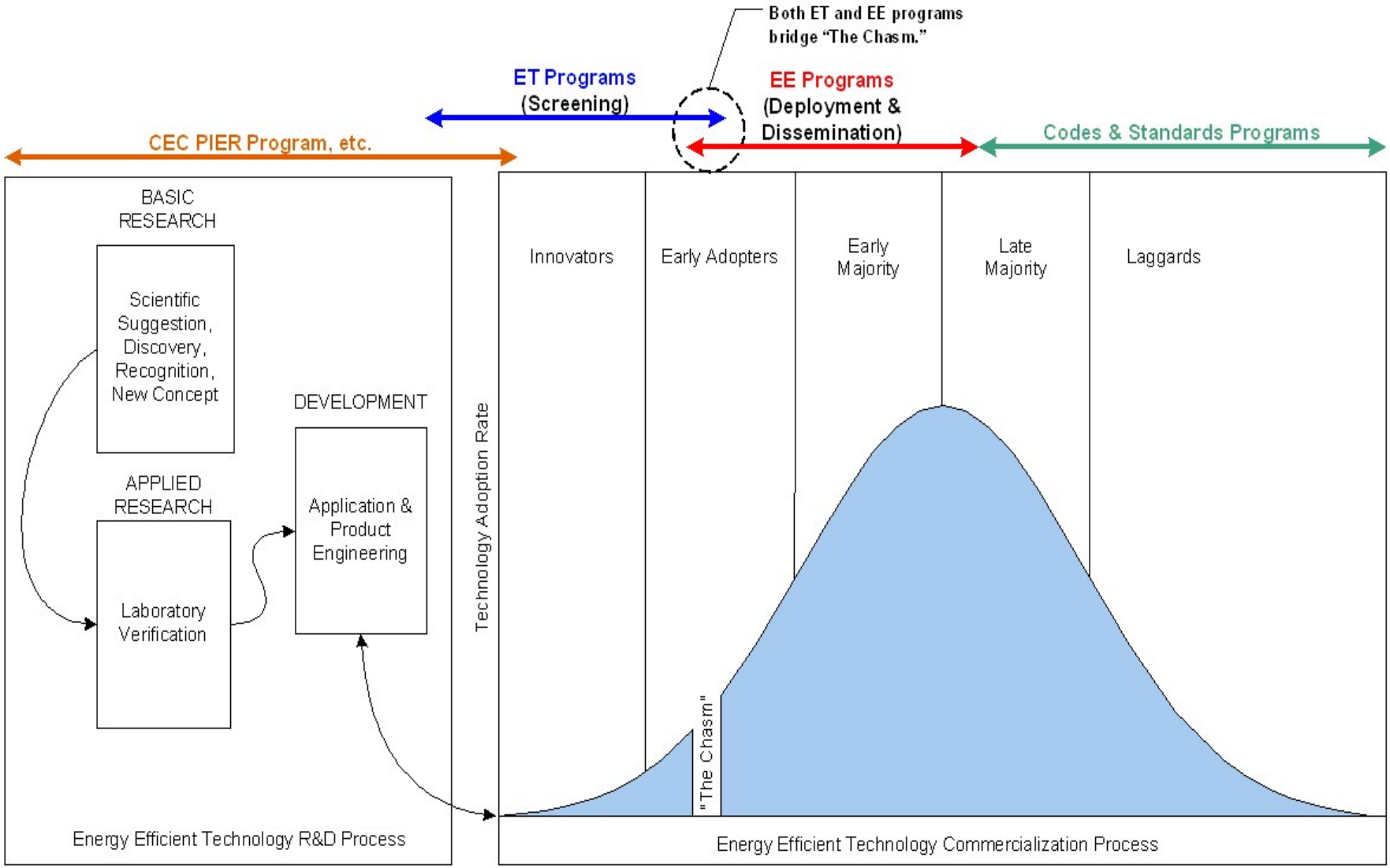
Seeks out and assesses emerging energy efficient technologies

Conducts field tests and demonstration projects of emerging technologies

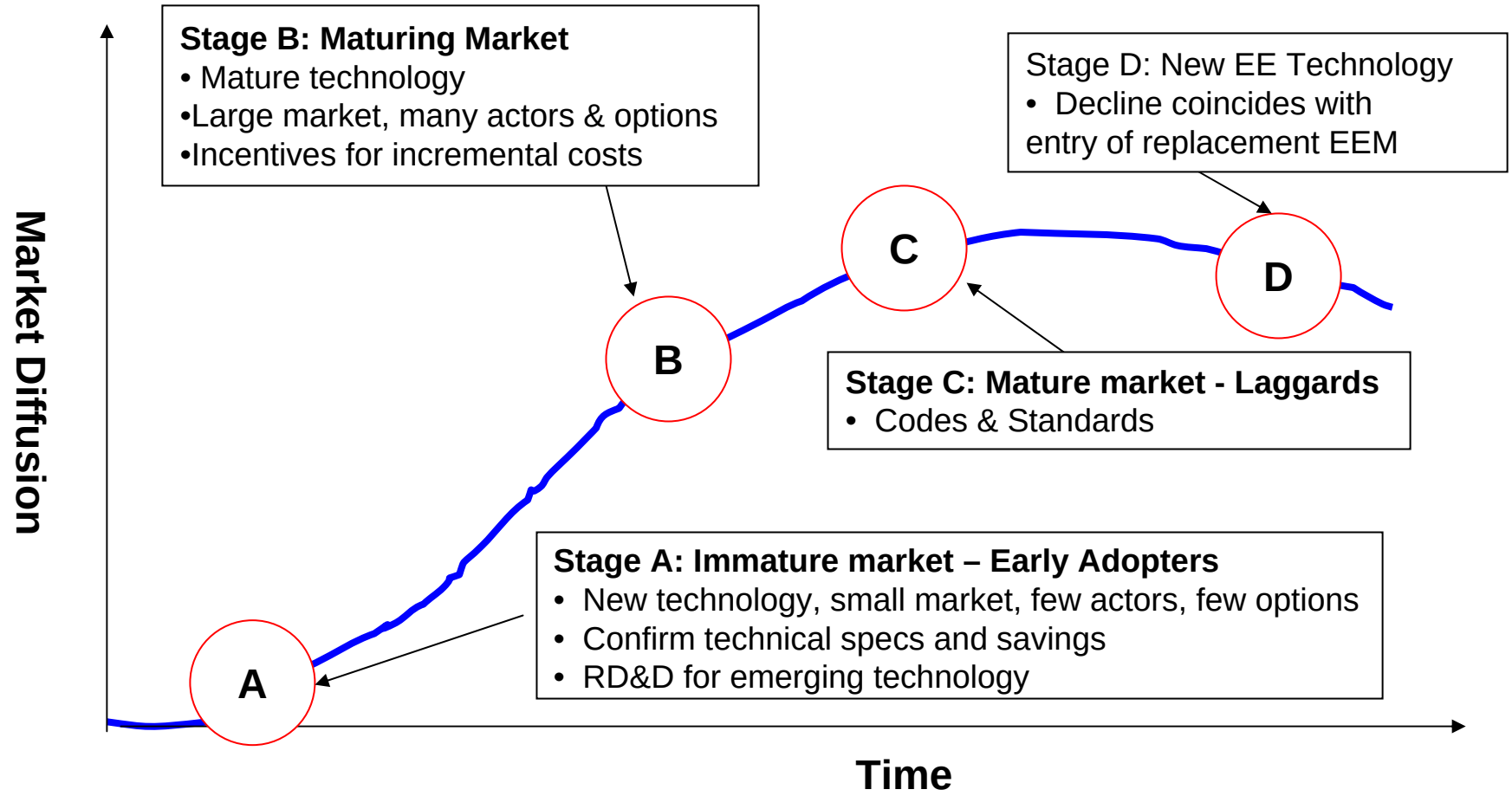
Helps remove information and performance uncertainty

Communicates findings to others to enhance market uptake of new energy efficient technologies

ET in the California Context



Emerging Technologies Program Role



ET bridge between early R&D and information and incentive programs
ET sometimes R&D; mostly a Demonstration Program

Key Roles Evaluation Can Play

- Identify where new Emerging Technologies are needed in a portfolio
- Clarify, inform, and enhance ET Program delivery
- Verify ET Program impacts

Key Roles for Evaluation vis-à-vis ET

Guide ET Activity As Part of Larger Portfolio

- Analyze Portfolio needs
  - Where running out of savings impacts
  - Provide information on key untapped opportunities
- Assess market opportunities
  - Identify barriers for customer &/or trade ally involvement
  - Identify trade allies and how to engage them
  - Clarify customer outreach/messaging for uptake
- Link ET via evaluation information to upstream (RD&D & PIER), and to downstream (to other EE programs)

Key Roles for Evaluation vis-à-vis ET

Evaluate Emerging Technologies

- Confirm/assess market size
- Confirm manufacturer/vendor technical claims
- Identify unforseen issues
- Identify solutions

Improve Implementation of ET Program

- Process evaluation
- Market Assessment
- Risk Assessment

Uncertainty Minimization for Emerging Technologies Impacts

Example: Savings Potential Estimate & Uncertainty

Total Square Feet	x	Base Case Equipment EUI (kWh/ft)	×	Applicability Factor	×	Not Complete Factor	×	Feasibility Factor	×	Savings Factor	x	Probability Factor	=	Technical Potential of Emerging Technology

Source: “Forecasting Emerging Technologies for Resource Planning”, Emerging Technologies in Energy Efficiency Summit, 2004

Evaluation & ET At Societal Level

- In California, CPUC represents Society
- CPUC Protocols establish Evaluation for ET
  - ET is an information-only program in CA
  - Verify # of assessments/demonstrations done
  - Updates to ET database
  - ETCC meetings
  - Knowledge created & disseminated
    - Performance & markets data
    - Tech reports, presentations, fact sheets/brochures/www
  - ETs introduced to the market

Summary

Huge need to identify ETs for CA to keep garnering cost-effective, marketable savings

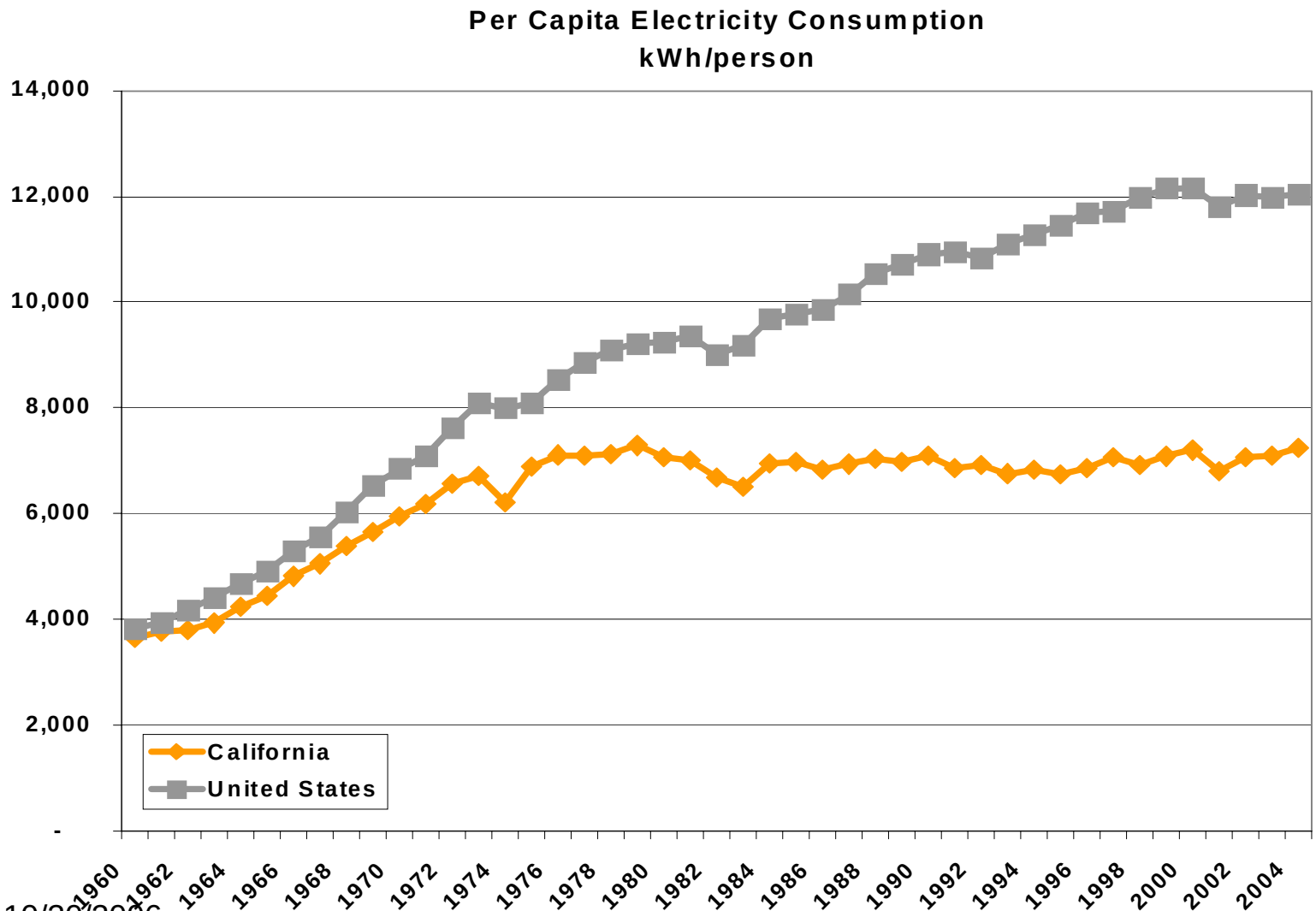
- EAP calls for saving 6 GW over 10 years
- This is about 3x faster savings uptake than what PGC programs used to achieve
- Large savings options via widgets are getting harder to find
- Integrated options of technologies, systems, and markets offer more potential

Summary

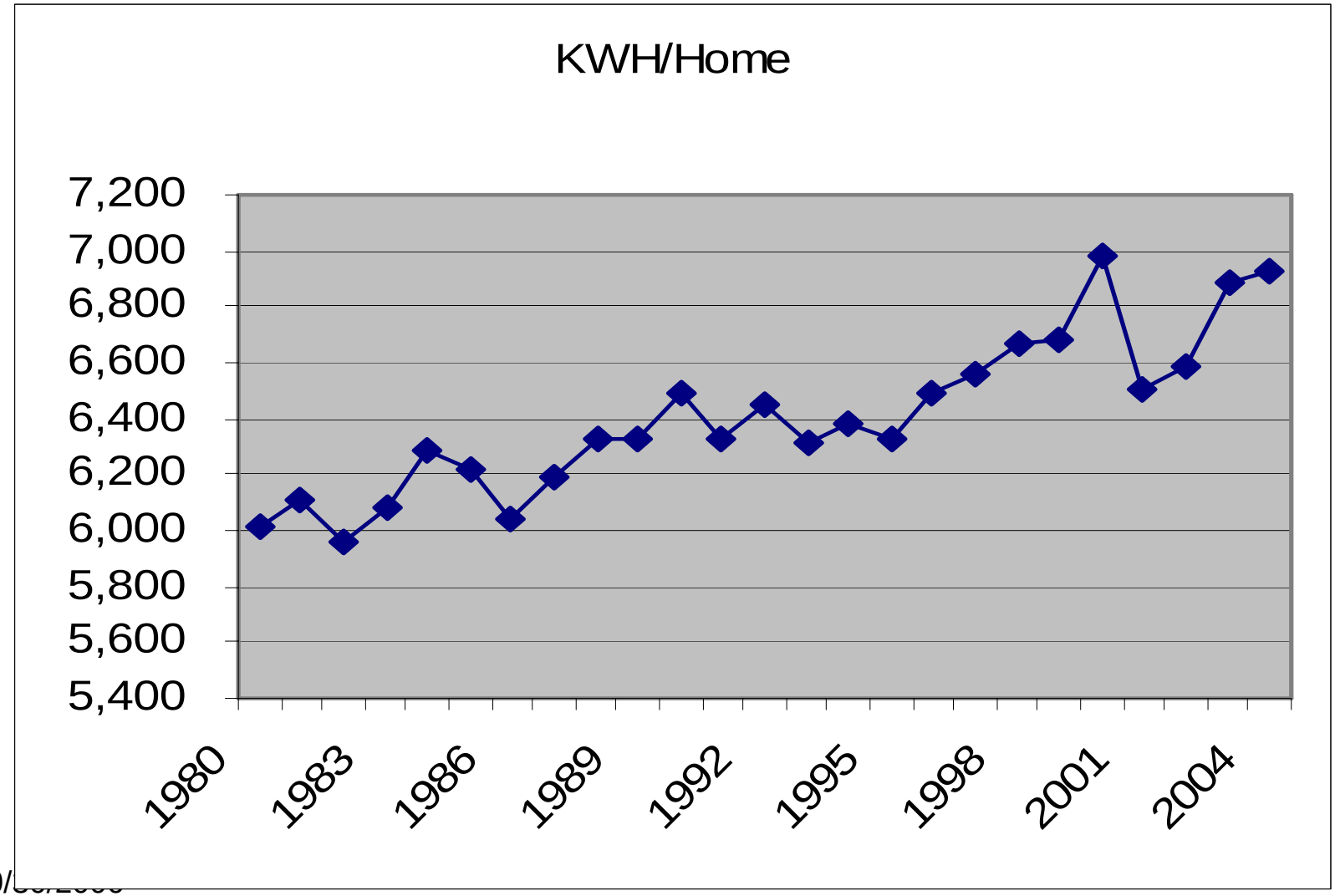
Evaluation Enhances ET Program:

- Clarifies opportunities to pursue via a portfolio needs assessment coupled with a market assessment
- Provides methods to verify technical and market claims of ET proponents
- Provides market research results to bolster the market viability of an ET
- Enhances ET links to upstream and downstream portfolio efforts
- Provides information for societal review of ET effort

California and USA's per-capita energy use 1960-2004



California Household Electric Use 1980-2004

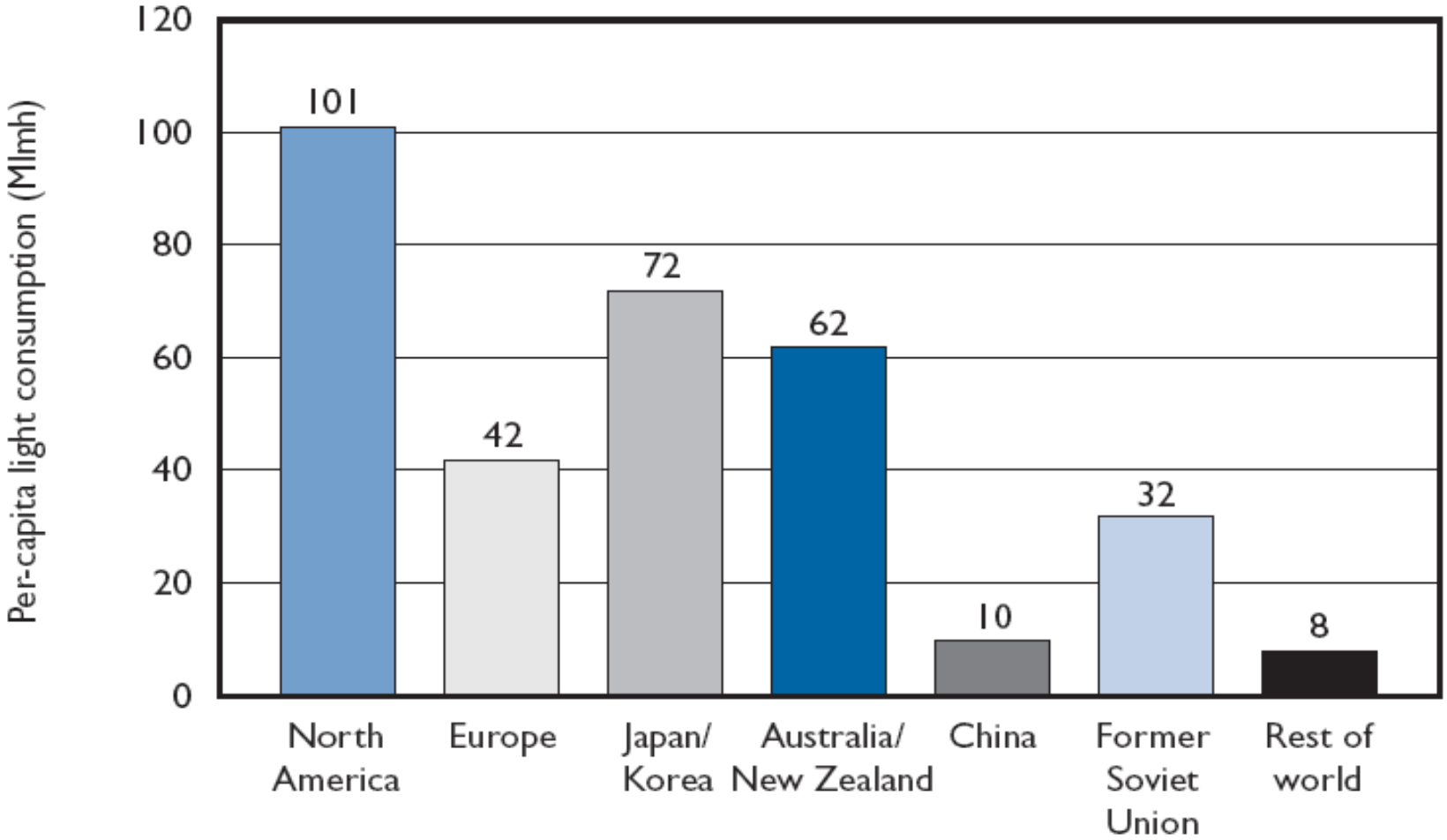


Comparison of Newer and Older California Homes Energy Use and Efficiency Measures Saturation

Item	Newer Homes (post 1996)	Older Homes	Percent Higher for New Homes vs. Older Homes
Annual Electric Household Use (kWh)	7,159	5,960	+20%
Dwelling Size (ft2)	2,039	1,434	+42%
Number of Residents	3.14	2.93	+7%
Average Yearly Income ($)	86,276	58,082	+49%
Percent Single Family	74%	58%	+28%
Owners	83%	62%	+35%
Saturation of Central AC (%)	78%	41%	+93%
Cooling Degree Days	962	900	+7%
Programmable Cooling Thermostat (%)	85%	47%	+83%
Pool Saturation (%)	13%	8%	+59%
Average Computers per Home	1.21	0.93	+30%
Exterior Wall Insulation Throughout	91%	51%	+77%
Attic Insulation	91%	66%	+38%
Double Pane Windows Throughout	79%	31%	+157%
Low Flow Showerheads Throughout	71%	54%	+32%
Average CFLs/Home	2.29	1.74	+32%
Horizontal Axis Washers	13%	9%	+43%

Source: KEMA Consulting. “California Residential Appliance Saturation Survey, 2005”.

World per-capita light use ~ 2004



* Source-lumens.
Abbreviation: Mlmh = megalumen-hours.