Boosting CHP Through State Portfolio Standards in the US

International District Energy Association Annual Conference 2014

Mark Spurr

President, FVB Energy USA

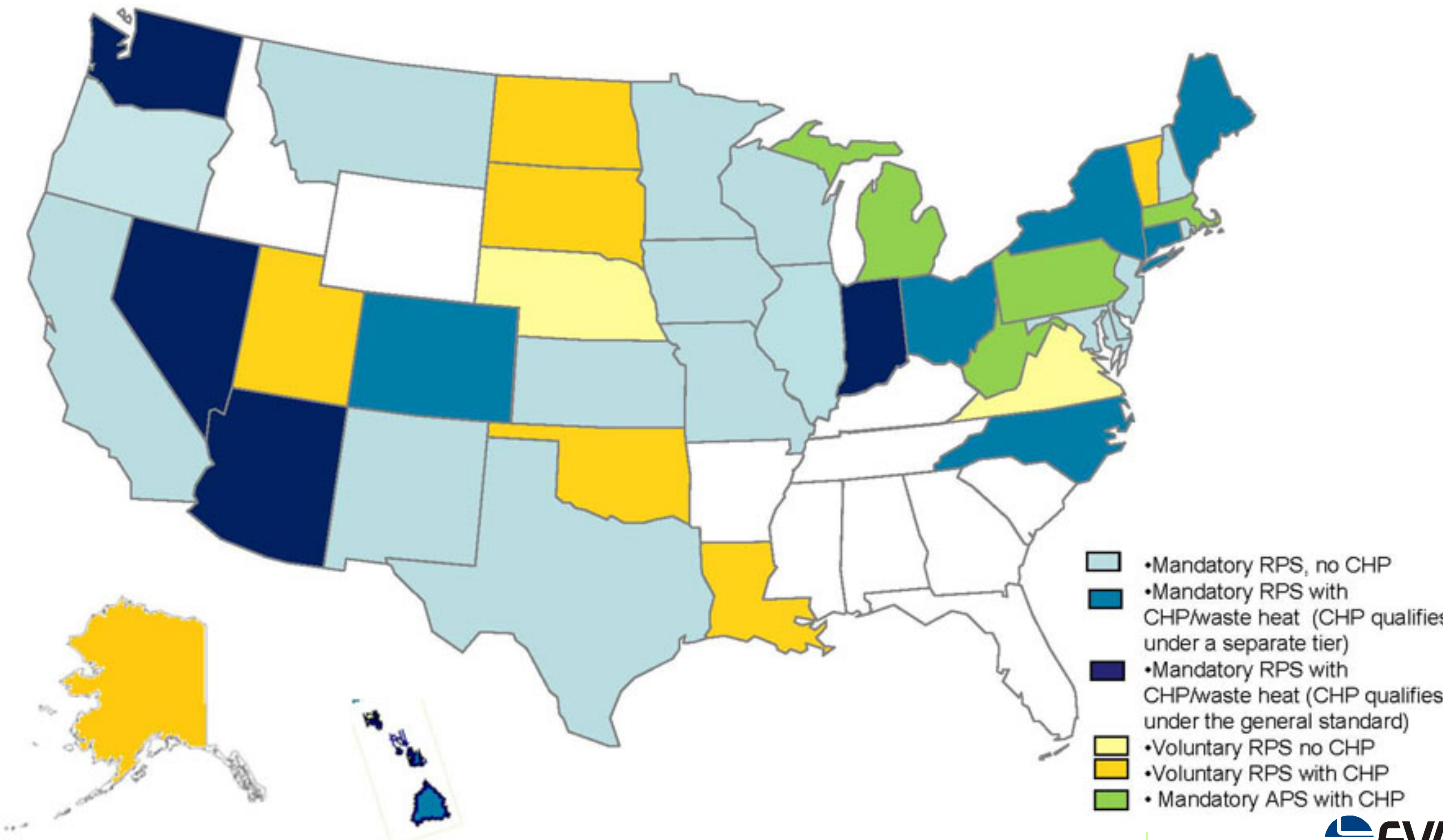
Legislative Director, IDEA

June 9, 2014

Agenda

- State portfolio standards today
- CHP economic equation
- How can portfolio standards most effectively drive CHP?
- Key issues in integrating CHP into portfolio standards
- CHP as strategy for meeting EPA power plant CO2 emission rules

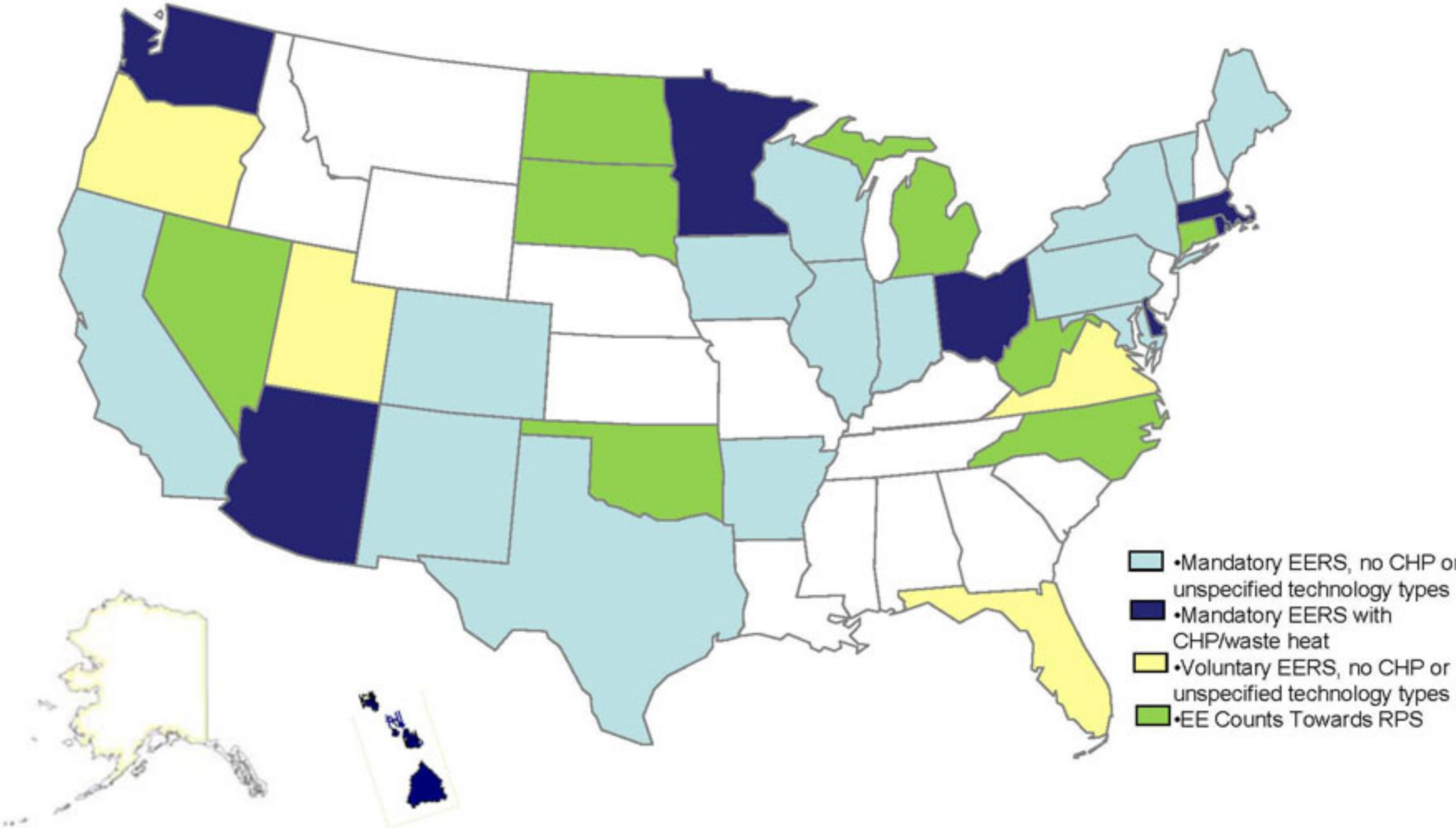
CHP in Renewable or Alternative Energy Portfolio Standards



Courtesy USEPA Combined Heat & Power Partnership

FVB ENERGY INC

CHP in Energy Efficiency Portfolio Standards



Courtesy USEPA Combined Heat & Power Partnership

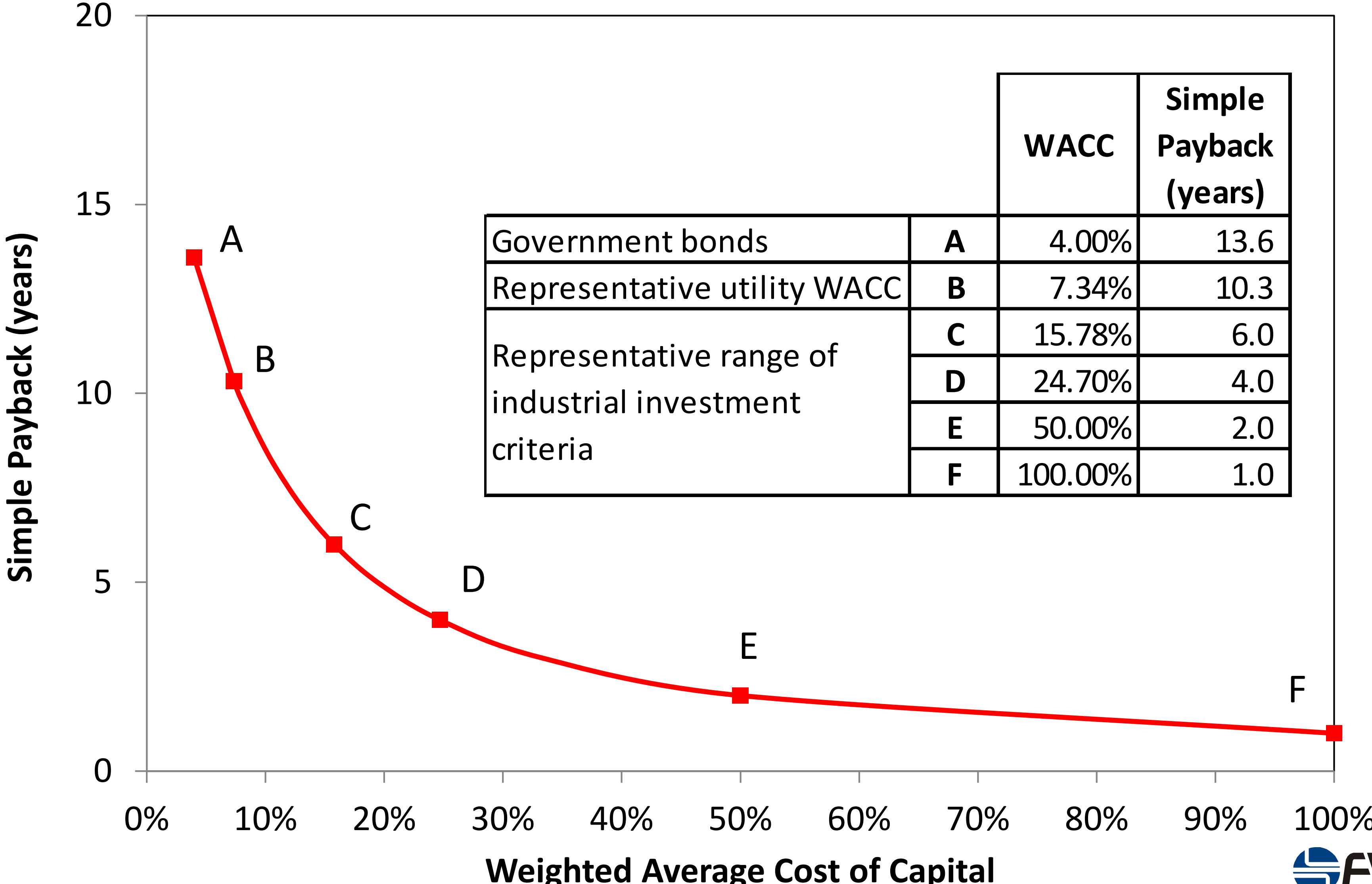
FVB ENERGY INC

CHP Economic Equation

- **Costs**
  - Capital recovery (capital cost, WACC)
  - Fuel (heat rate, power production)
  - O&M (fixed and variable)
- **Savings**
  - Offset boiler fuel (thermal production, fuel price)
  - Offset electricity purchases (power production, power tariff, standby rates)
  - Revenue from power exports (power production vs. consumption, export sales price)

FVB ENERGY INC

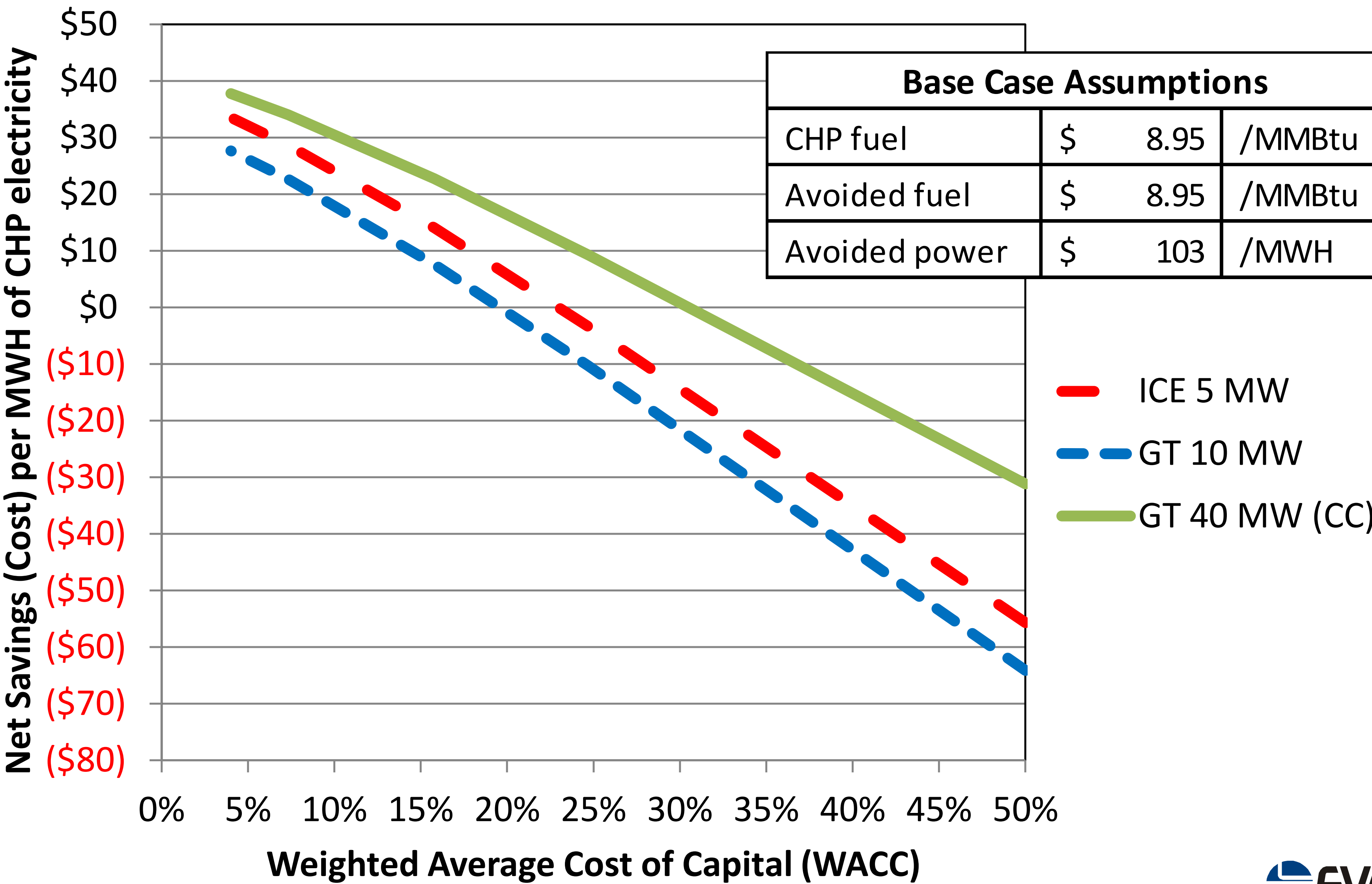
Weighted Average Cost of Capital (WACC)



		WACC	Simple Payback (years)
Government bonds	A	4.00%	13.6
Representative utility WACC	B	7.34%	10.3
Representative range of industrial investment criteria	C	15.78%	6.0
	D	24.70%	4.0
	E	50.00%	2.0
	F	100.00%	1.0

FVB ENERGY INC

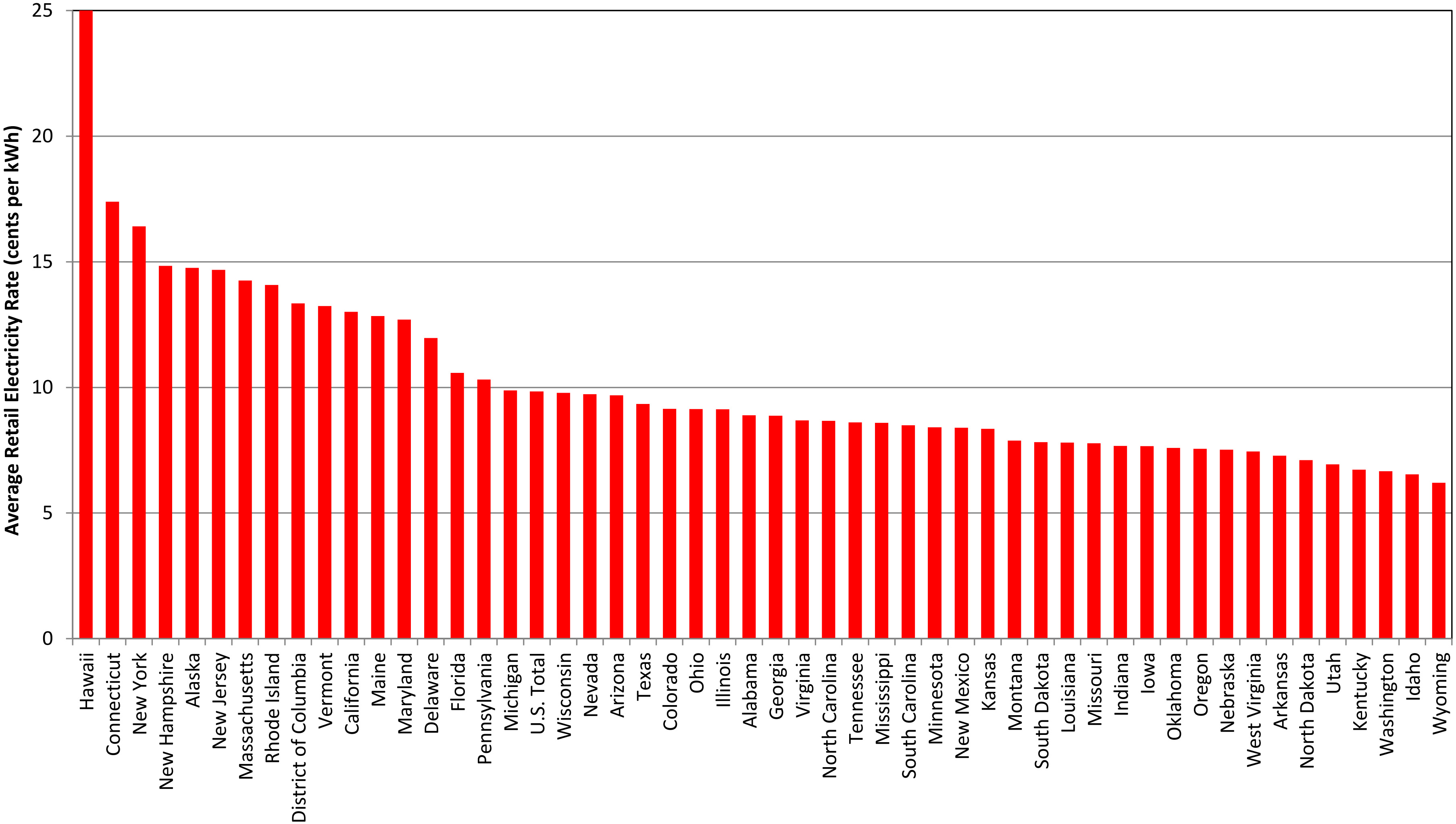
Impact of WACC



Base Case Assumptions			
CHP fuel	$	8.95	/MMBtu
Avoided fuel	$	8.95	/MMBtu
Avoided power	$	103	/MWH

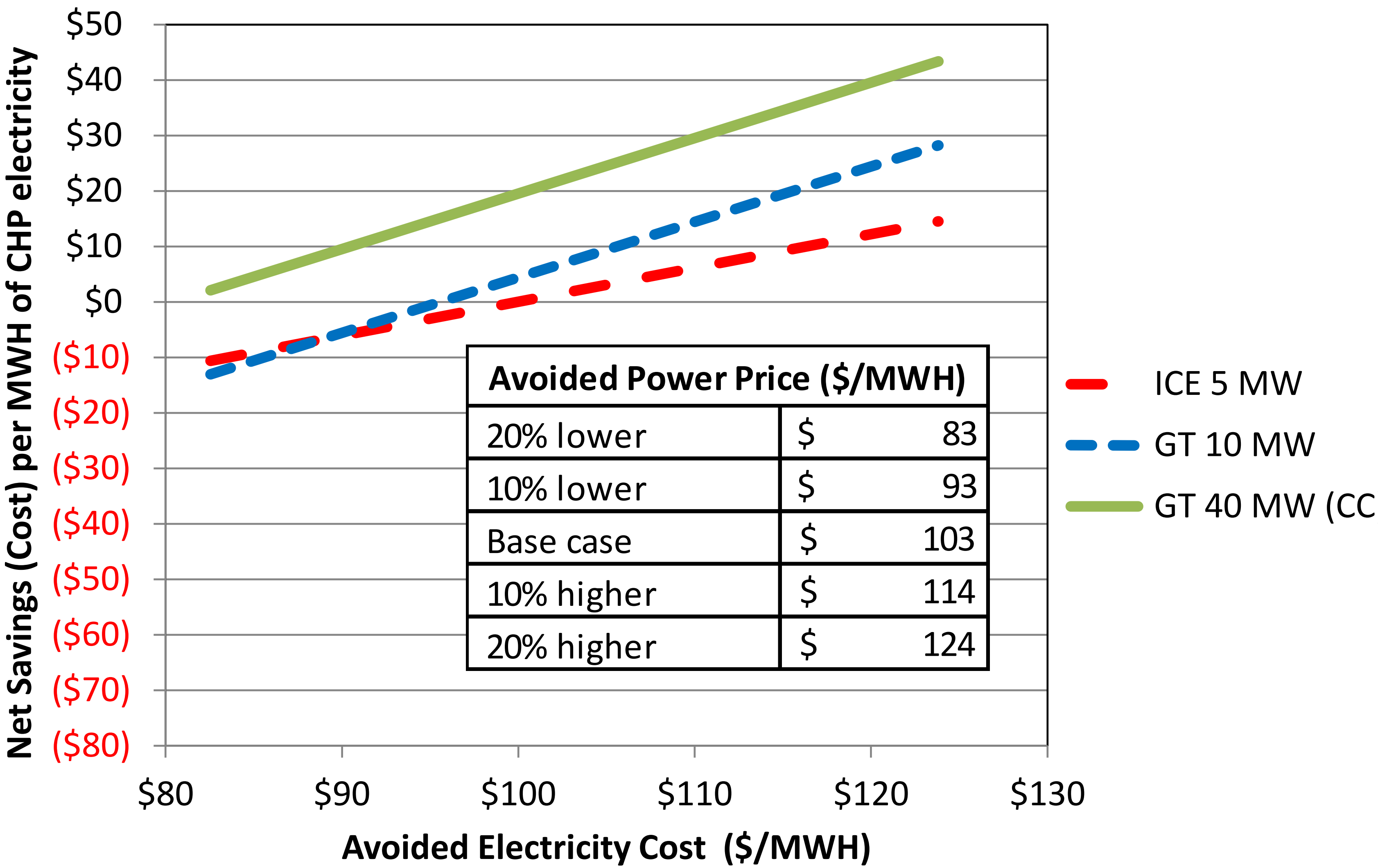
FVB ENERGY INC

Average Retail Power Prices by State



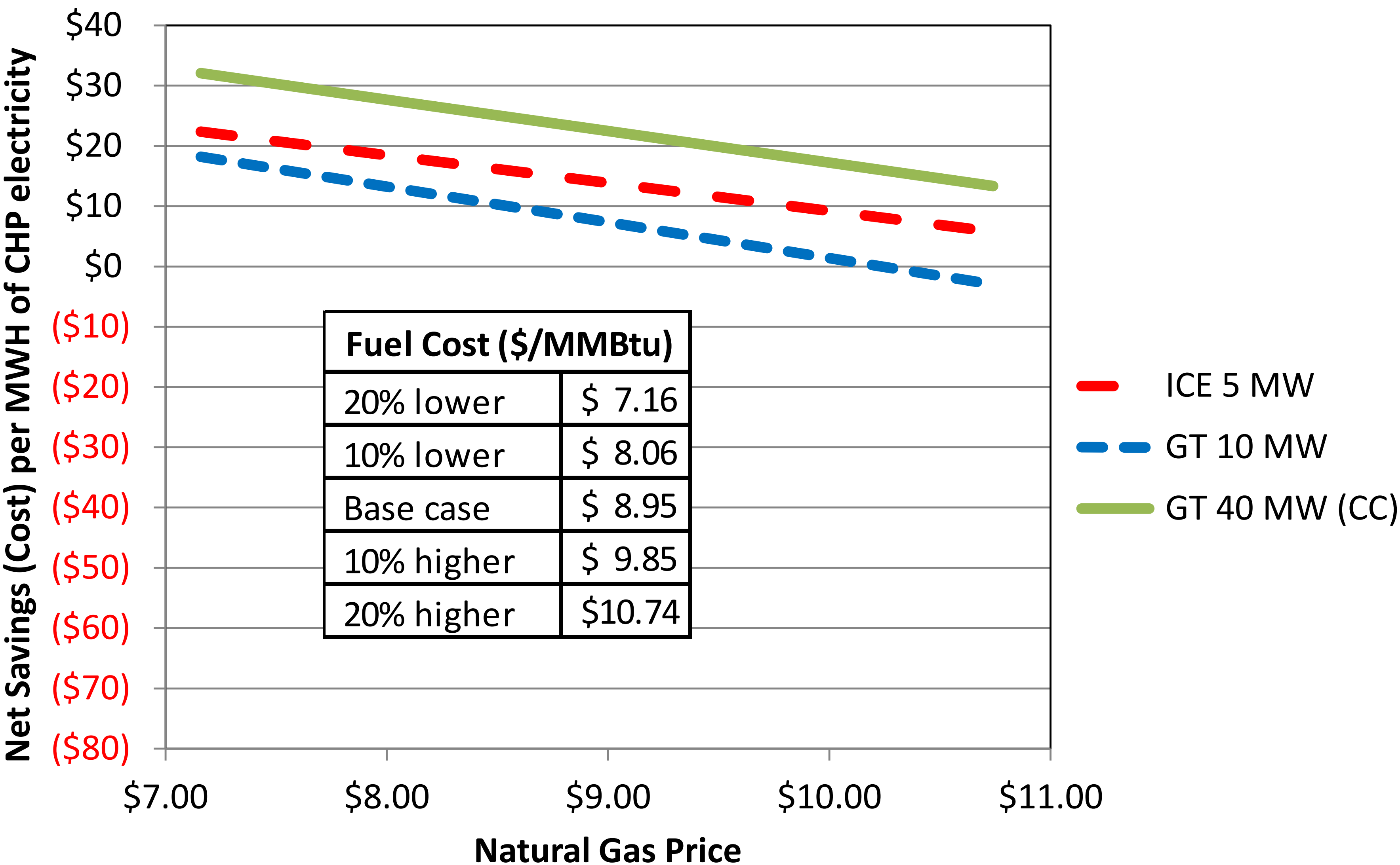
FVB ENERGY INC

Impact of Power Price



Avoided Power Price ($/MWH)		
20% lower	$	83
10% lower	$	93
Base case	$	103
10% higher	$	114
20% higher	$	124

Impact of Natural Gas Price



Fuel Cost ($/MMBtu)	
20% lower	$ 7.16
10% lower	$ 8.06
Base case	$ 8.95
10% higher	$ 9.85
20% higher	$10.74

Driving CHP through Portfolio Standards

- **Renewable Energy Standards**
  - **Implement/expand RES to include specific goals for bioenergy CHP**
  - **Provide credit for bioenergy thermal-only capacity**
- **Alternative Portfolio Standard (APS)**
- **Energy Efficiency Portfolio Standards**
  - **Implement/expand electric & natural gas utility efficiency goals to add separate tiers for fossil fuel CHP**
  - **Encourage utility-owned CHP**
  - **Require incentives for customer- or third party-owned CHP**
- **Integrated Resource Planning**
  - **Require thorough assessment of CHP opportunities before power-only capacity is proposed**
  - **Include shadow prices for GHG emissions and grid benefits**

FVB ENERGY INC

Portfolio Standard Design Issues

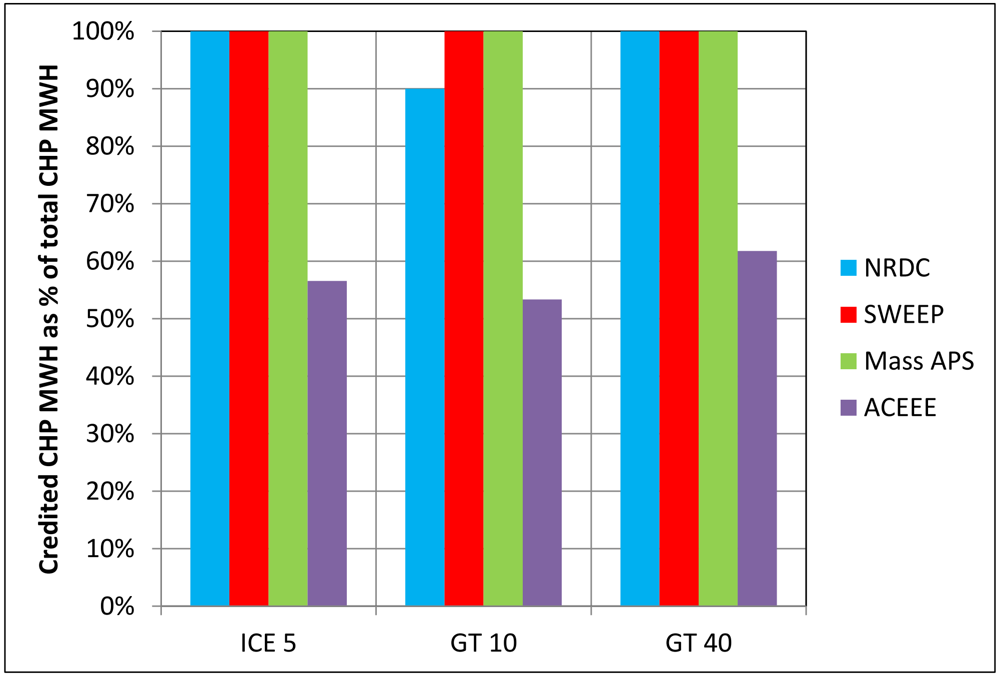
- **Crowding out**
  - **End-use efficiency (EERS)**
  - **Renewables (RES)**
- **Crediting CHP**
  - **Demand or supply side?**
  - **Electric utility**

    4 methods analyzed --->
  - **Natural gas utility**

    CHP fuel

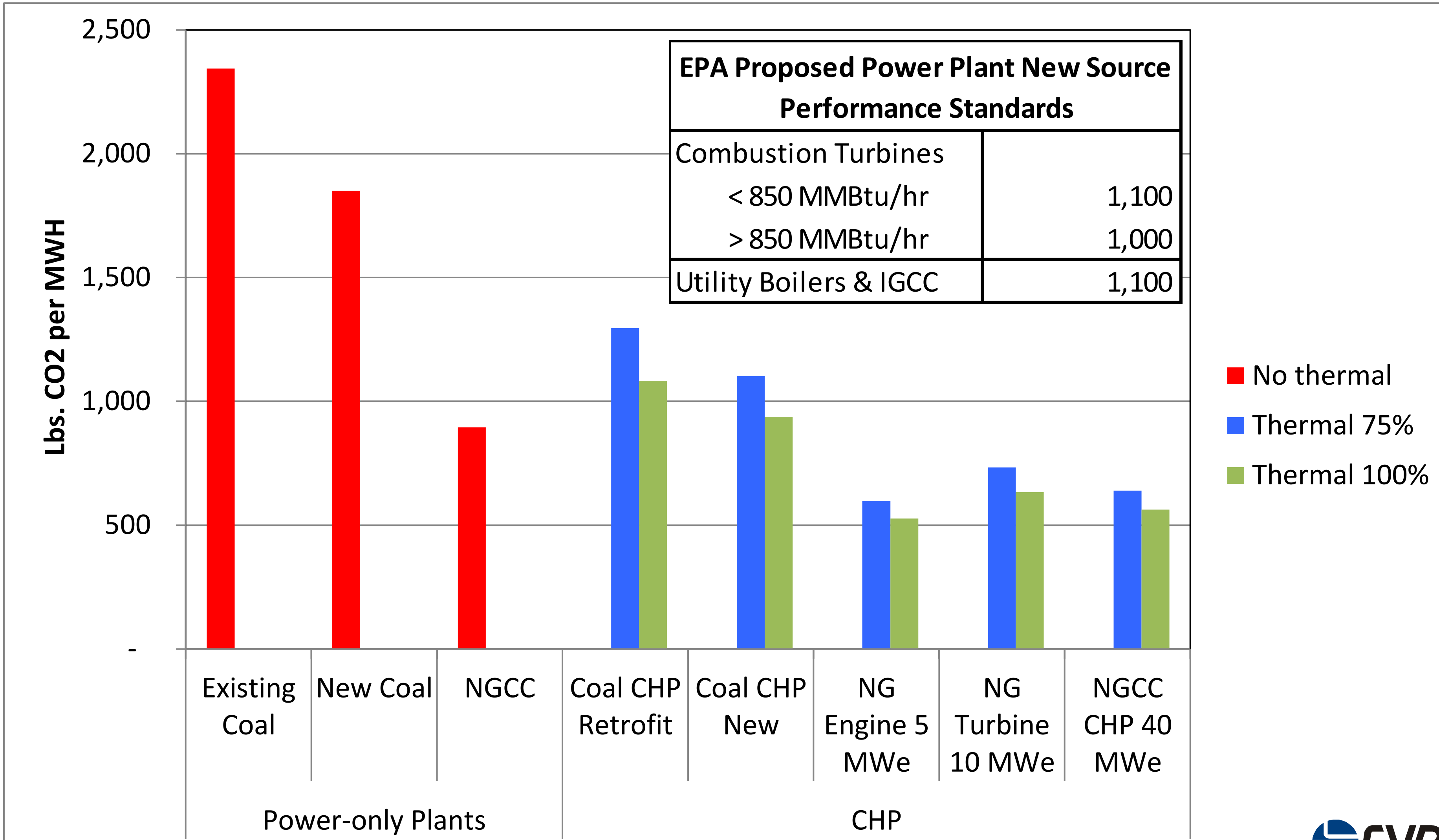
    Minus avoided boiler fuel

    Minus avoided power plant fuel
- **Fuel switching**
- **Credit trading**



FVB ENERGY INC

CHP Can Be a Powerful Element in State Plans for Reducing CO2 Emissions in New and Existing Power Plants



FVB ENERGY INC

Thanks for your attention!

Questions?

Mark Spurr

Phone: 612-607-4544

Email: mspurr@fvbenergy.com

FVB ENERGY INC

Global Presence
Local Solutions

40 Years of Experience in Sustainable District Energy Systems