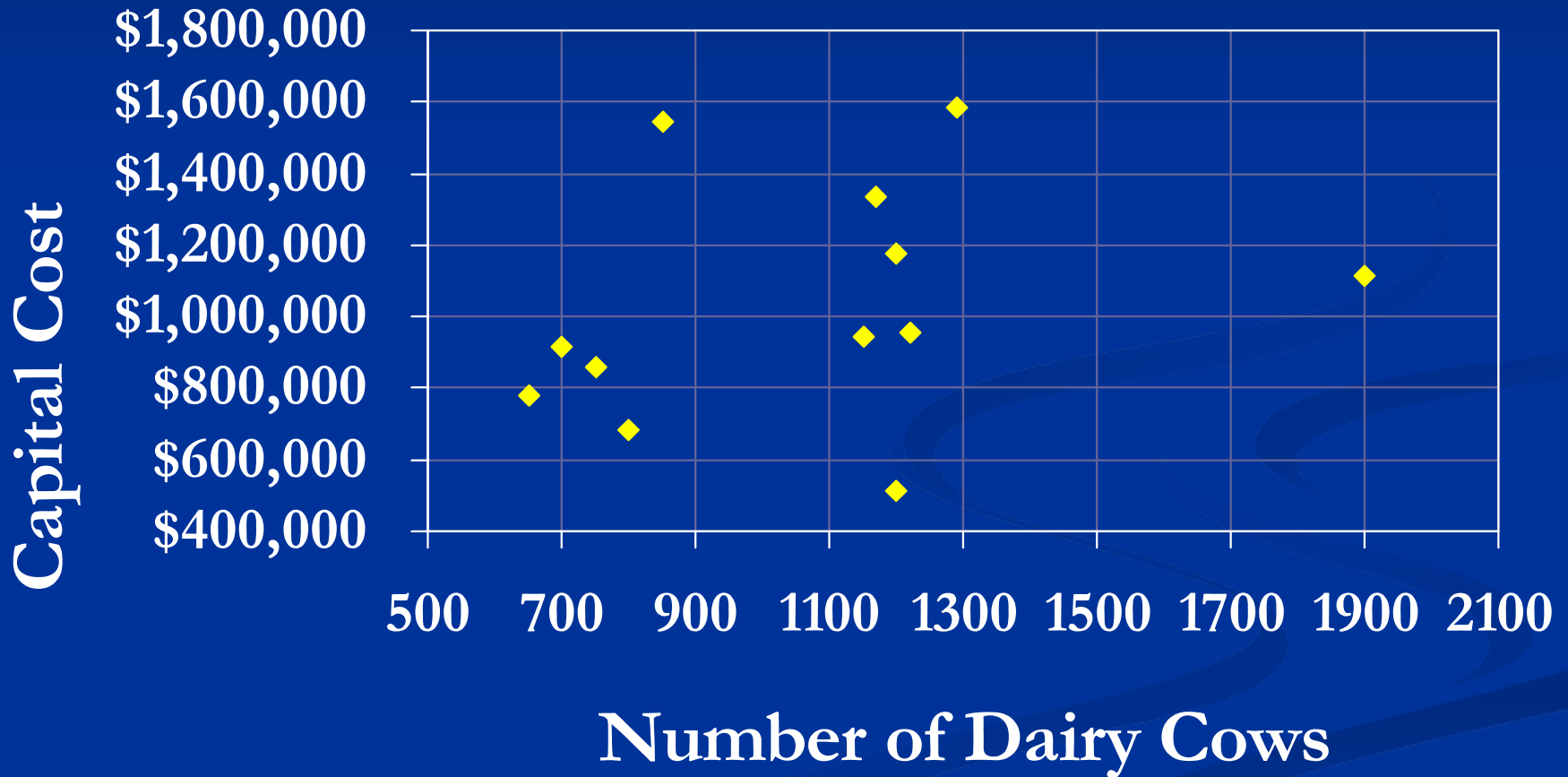


# Estimating Anaerobic Digestion Capital Costs for Dairy Farms



2009 AgSTAR National Conference  
February 24-25, 2009  
Baltimore, MD

# Plug Flow Digester Projects



# Example Project Cost Components

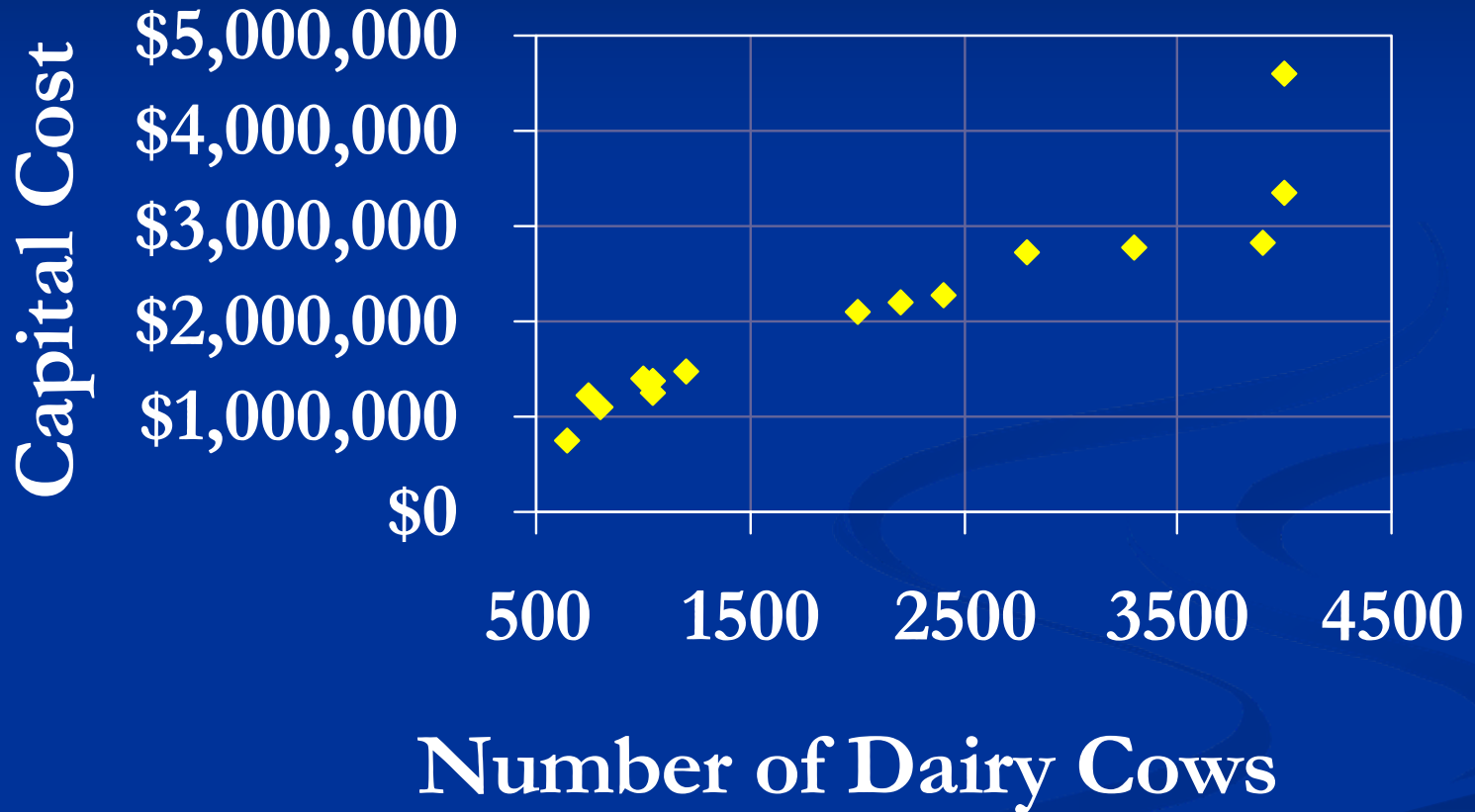
Complete Mix Digester, 1350 head, 200 kW

Mix Tank	\$27,079
Manure Pumping and Mixing Equipment	\$47,108
Piping	\$80,502
Digester	\$357,539
Digester Effluent System	\$23,970
Post-Digestion Solids Separation System	\$77,360
Engine-Generator Set and Building	\$355,637
Hydrogen Sulfide Treatment	\$25,000
Installation Labor	\$54,972
Estimated Utility Charges	\$30,000
Start-Up Fuel	\$18,212
Contingencies	\$53,359
Engineering and Site Assistance	\$88,039
<b>TOTAL PROJECT COST</b>	<b>\$1,208,759</b>

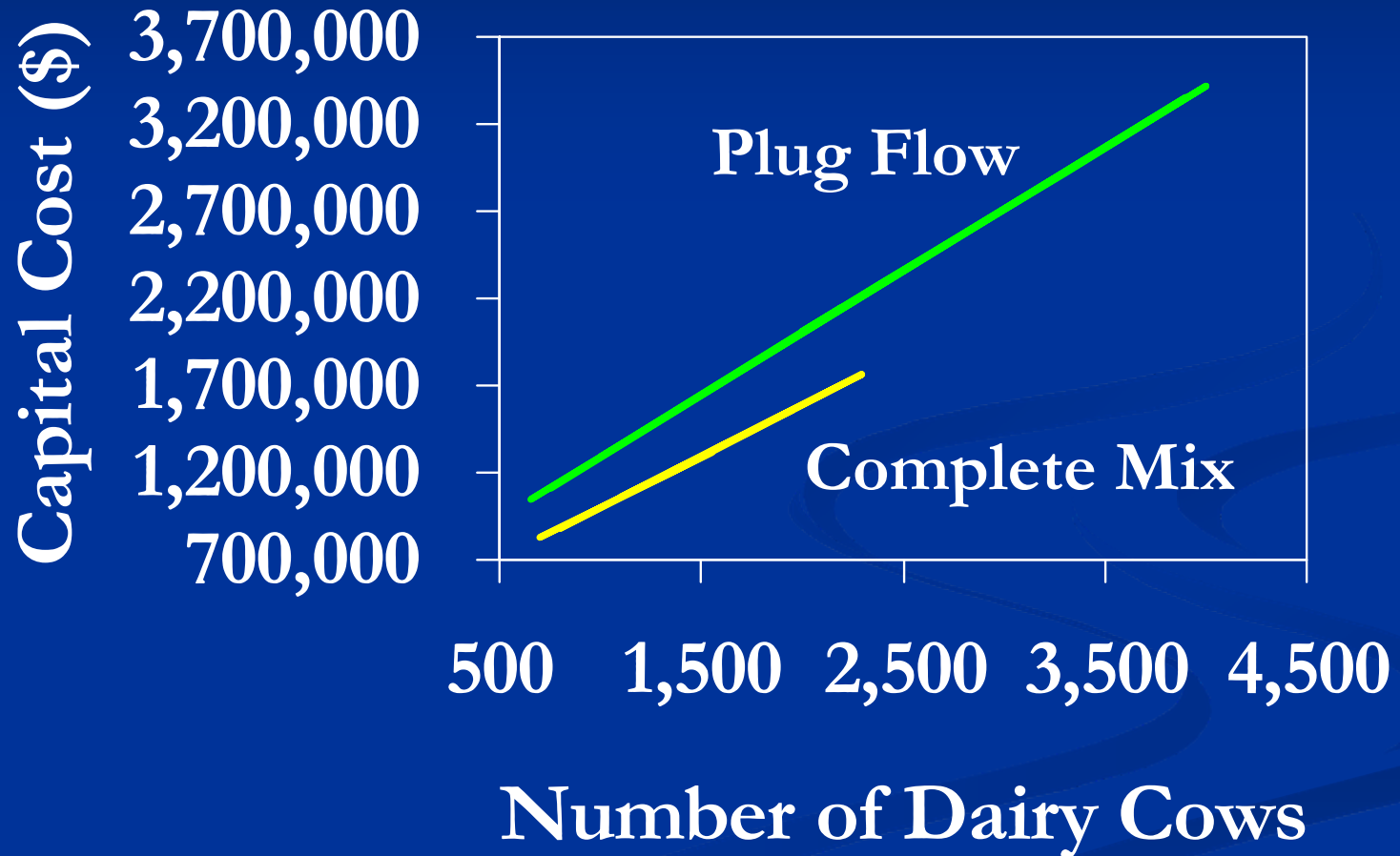
# Methodology

- Analyzed vendor quotes for 28 dairy farms
- Vendor quotes from 2005 through 2008
- To analyze costs on a common basis, costs were excluded for:
  - Post-digestion solids separation systems
  - Hydrogen sulfide treatment systems
  - Utility charges
  - Systems designed for co-digestion
- Costs scaled to August 2008 dollars
- SAS 9.1, regression analyses

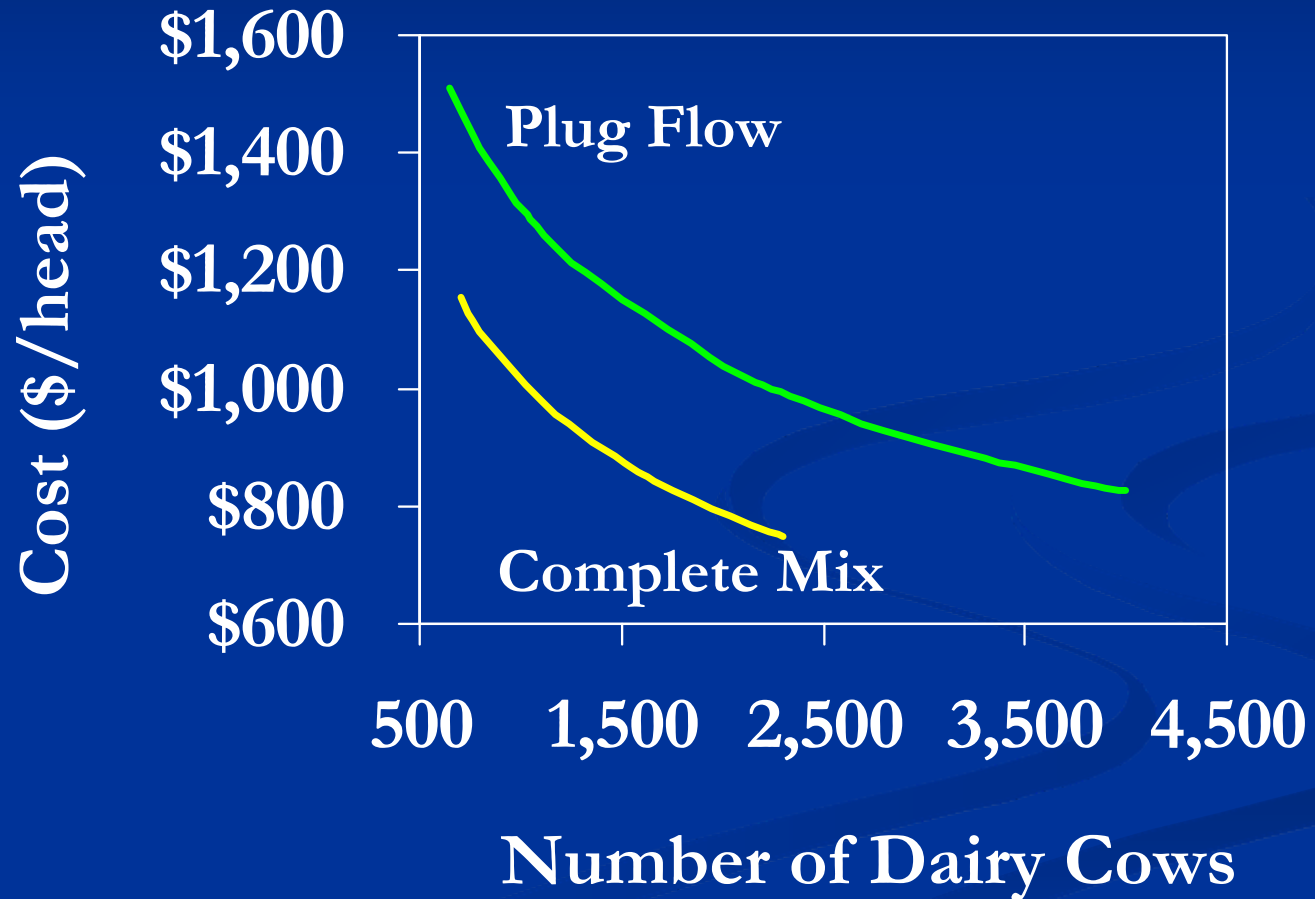
# Plug Flow Digester Projects



# Estimating Total Capital Costs



# Estimating Capital Costs Per Head



# Covered Lagoon Digester

<b>NUMBER OF DAIRY COWS</b>	<b>CAPITAL COST</b>	<b>CAPITAL COST PER DAIRY COW</b>
496	\$778,586	\$1,570
1,600	\$1,265,194	\$791

# Other Project Costs

COST COMPONENT	PERCENTAGE OF TOTAL COST	
	Average	Range
Post-Digestion Solids Separation	6.9%	1.6% - 12.0%
Hydrogen Sulfide Treatment	2.7%	0.25% - 4.5%
Utility Charges	7.9%	2.5% - 14%

# In Conclusion...

- Digester costs vary by type, size, and site-specific circumstances.
- These cost curves provide a preliminary (rough) tool for estimating costs.
- As-build costs for comparison are not available.

**Stop by the AgSTAR booth  
to pick up a fact sheet on estimating digester costs**

# Complete Mix Digester Projects

