

From Vision to Action: Bringing Low-GWP Heat Pump Technology to Market



“In God we trust,
all others bring data.”

—
W. Edwards Deming

Engineer, Statistician, Professor, Author, Lecturer, and Management Consultant

1980s

“This system could
change the world,
but until it’s in a
building somewhere,
we just can’t spec it.”

—
Anonymous Mechanical Engineer

Just trying to do the right thing.

Today

ANSWR

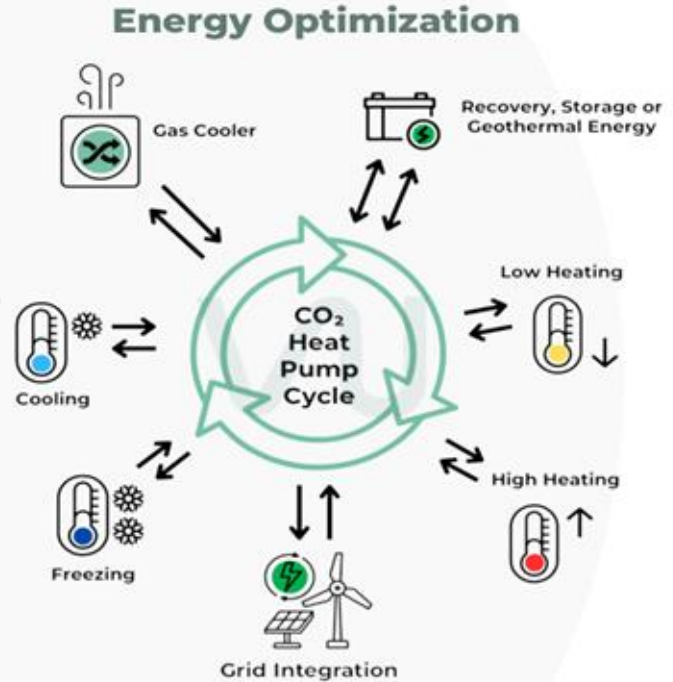
CO₂ Heat Pump



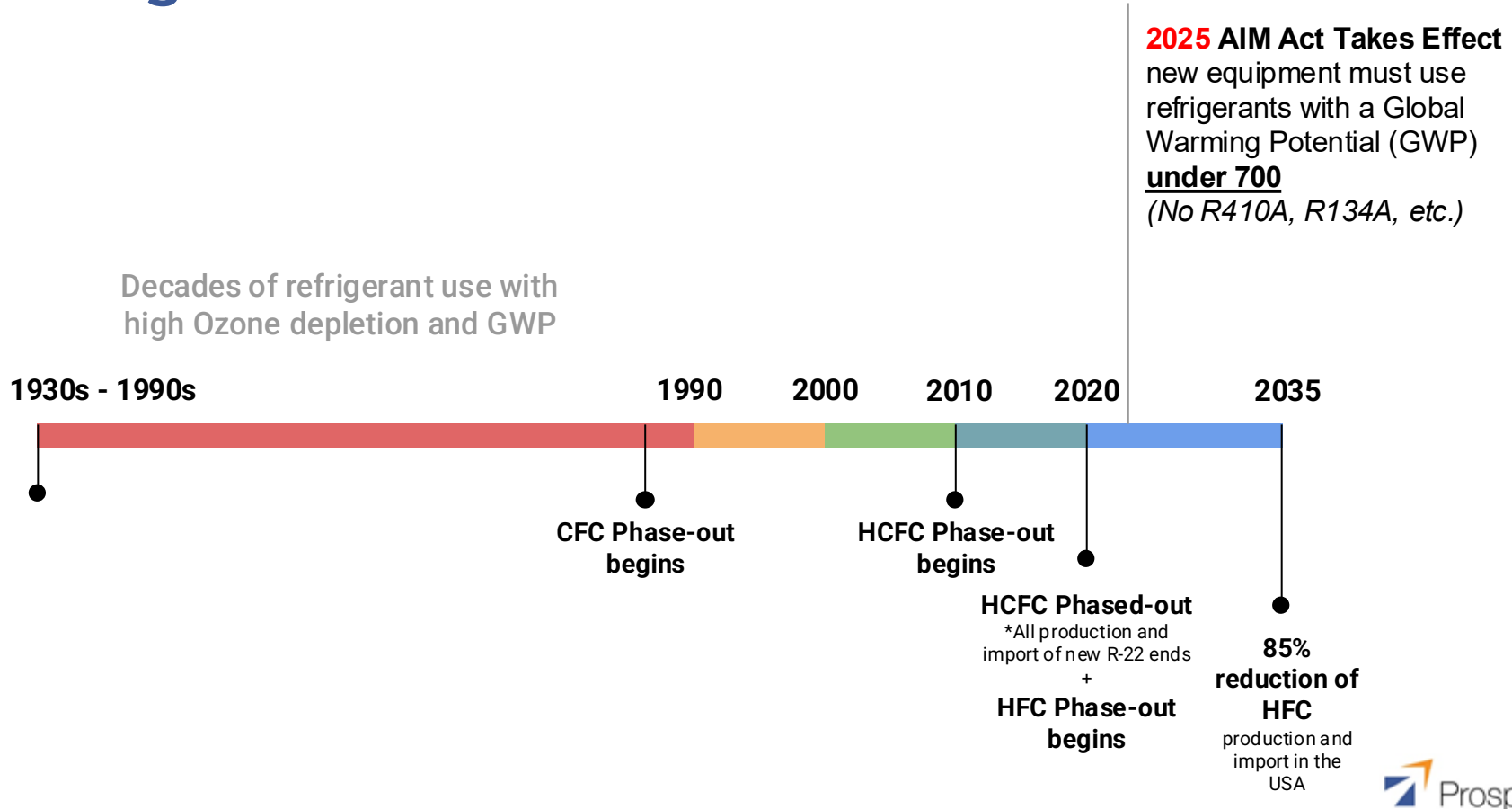
Why Flow Environmental Systems?

Strong potential for impact...

- Low-GWP, natural refrigerant (CO₂)
- Performance factors
 - High delivery temp (up to 180F)
 - Cold climate performance (down to -40F)
 - Efficient - high COP, no defrost
- Strong retrofit option
 - Simplified system design + install



Refrigerant Drawdown





Two Heat Pump Demonstrations



HVAC in Large Commercial Buildings

FLEXLAB – Berkeley, CA

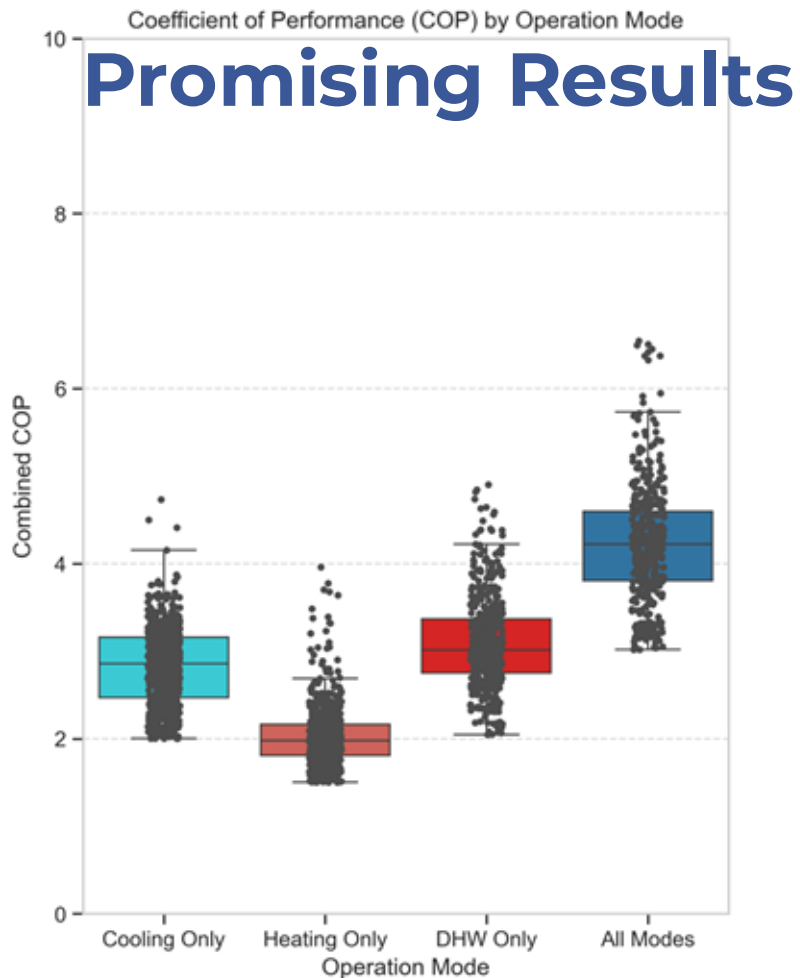
- *Simultaneous Heating/Cooling/DHW*
- *Advanced HVAC Controls*
- *Model Predictive Grid Response*



HVAC & DHW in Multifamily Housing

San Pablo Avenue at 34th St – Oakland, CA

- *Simultaneous Space Conditioning w/ Variable Load Profiles*
- *DHW Int w/ Central Water Heater*
- *Model Predictive Grid Response*



Flow's heat pump performed within the target ranges for COP and % modulation

COP (Cooling only)	2.0 - 4.2 (mean: 2.82)
COP (Heating only)	1.6 - 2.7 (mean: 2.01)
COP (DHW only)	2.0 - 4.2 (mean: 3.09)
COP (Simultaneously Heating, Cooling, DHW)	3.0 - 5.8 (mean: 4.30)
Part Load Ratio	0% - 60%

The Big Problem



First Cost



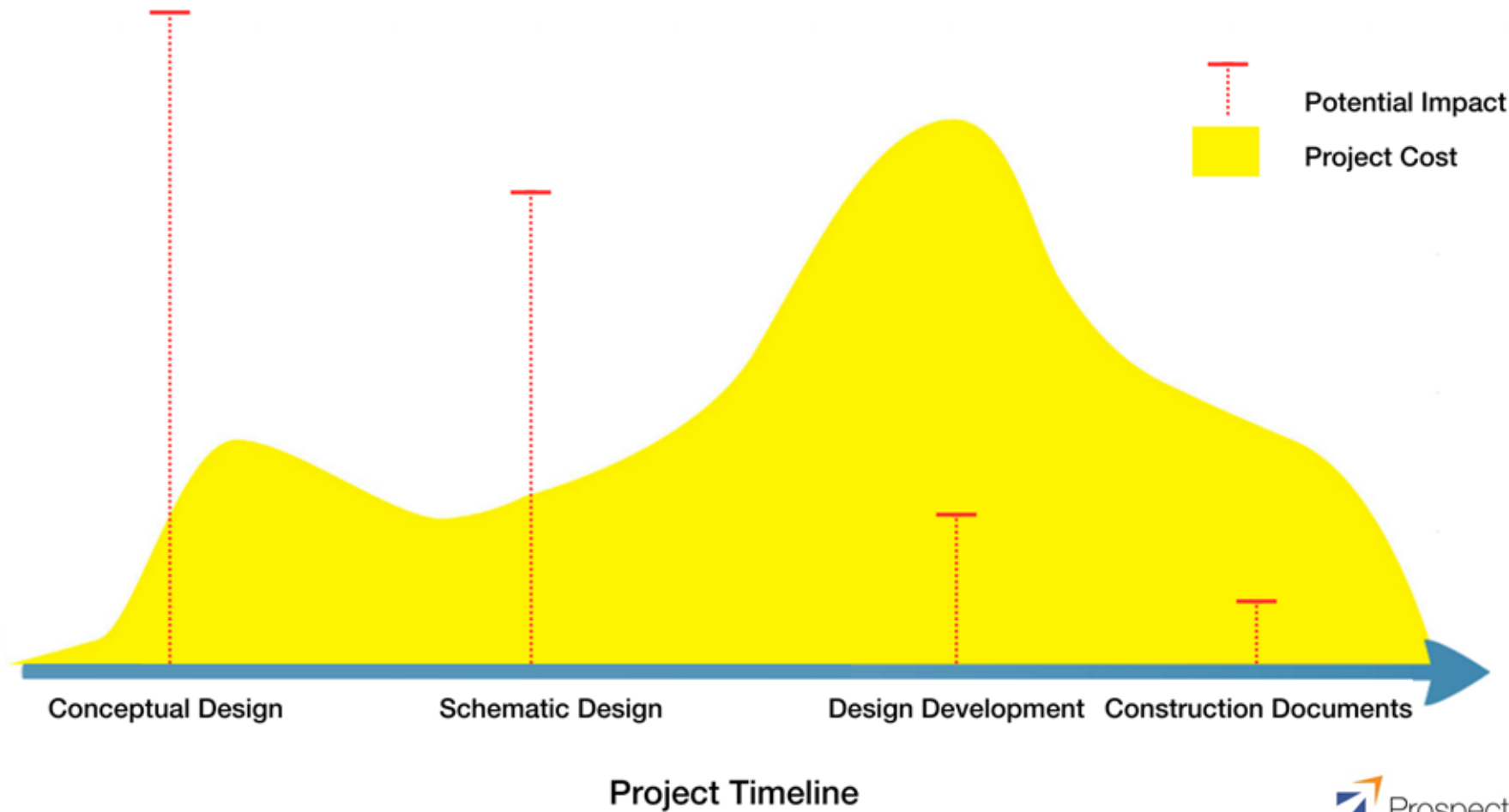
**Project
Delivery**



**Performance
Questions**



**Operational
Questions**





250 Contractors

100 Engineers

**3 National
Conferences**

**12 Project
Deployments**

**4 Commercial
Pilots**

Resources

CO₂ Heat Pumps for Large Commercial Buildings



Industry Guidance Package

Performance data, technical specifications, design resources, and communication tools to help you evaluate and incorporate CO₂ heat pump technology into your next project.

This Industry Guidance Package includes:

- Case Study and One-Pagers
- Technology Information
- Demonstrated and Modeled Performance
- Communication Tools
- Design and Operational Resources

Case Study

Technology Profiles

Models

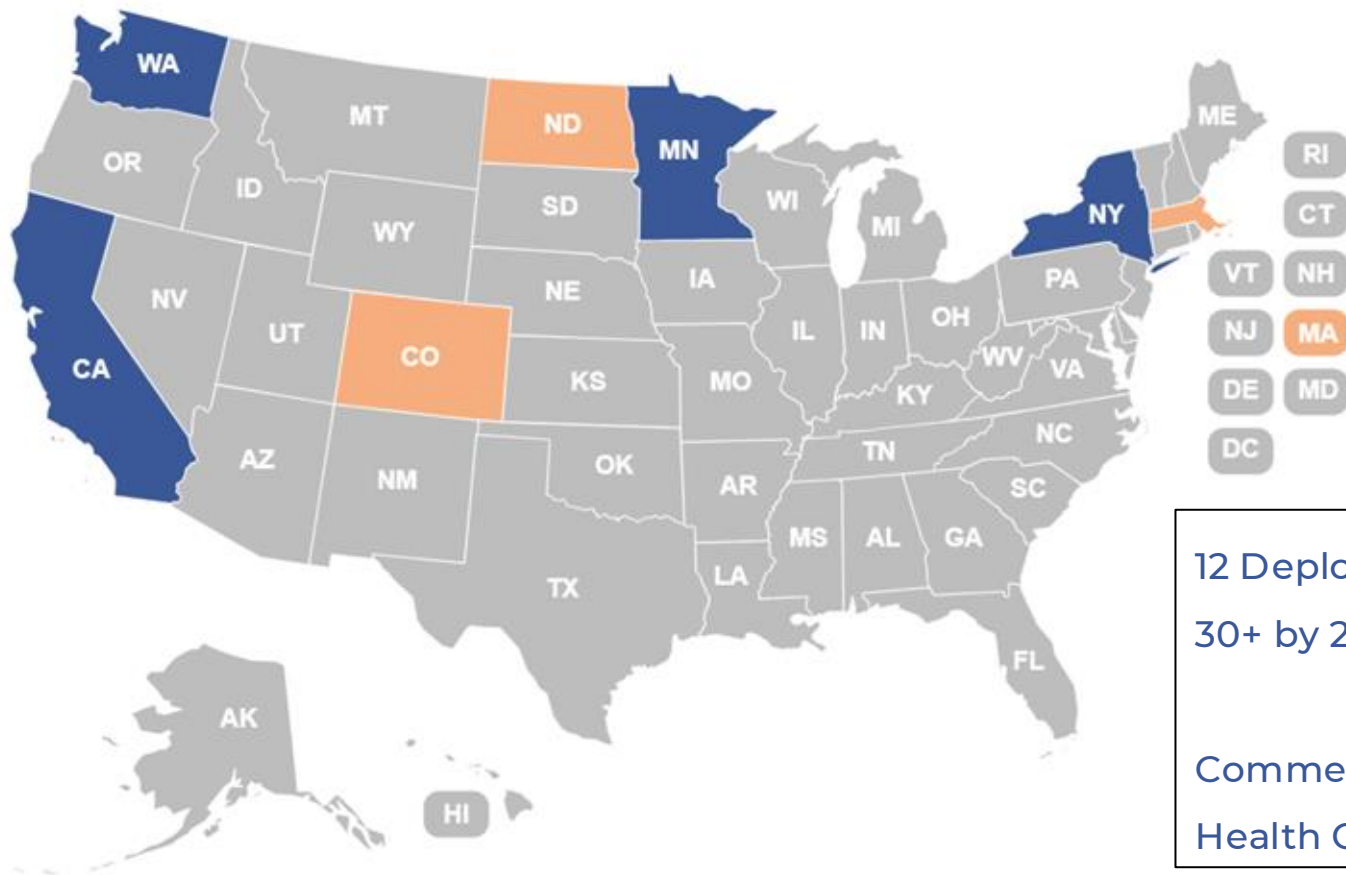
Design Guidelines

NPV Analysis

Talking Points

Training





12 Deployments in 2026
30+ by 2027

Commercial, Civic,
Health Care, University

What We've Learned

Data Isn't Enough

Inform, Engage, Support

Capacity → Opportunity

And... Disclaimer: results may vary (but still try)

Thanks!

