

I came to the 2022 NETL Carbon Management Projects Meeting  
because \_\_\_\_\_

because \_\_\_\_\_

because \_\_\_\_\_

because \_\_\_\_\_.

“I was a human first, and then I learned to be a scientist. If I forget the human part, then that’s a problem.’

This is what I heard when I interviewed 52 scientists recognized as exemplary by their peers for their scientific accomplishments and conduct.”

*Alison Antes, Organizational Psychologist, Nature 563, 601 (2018)*



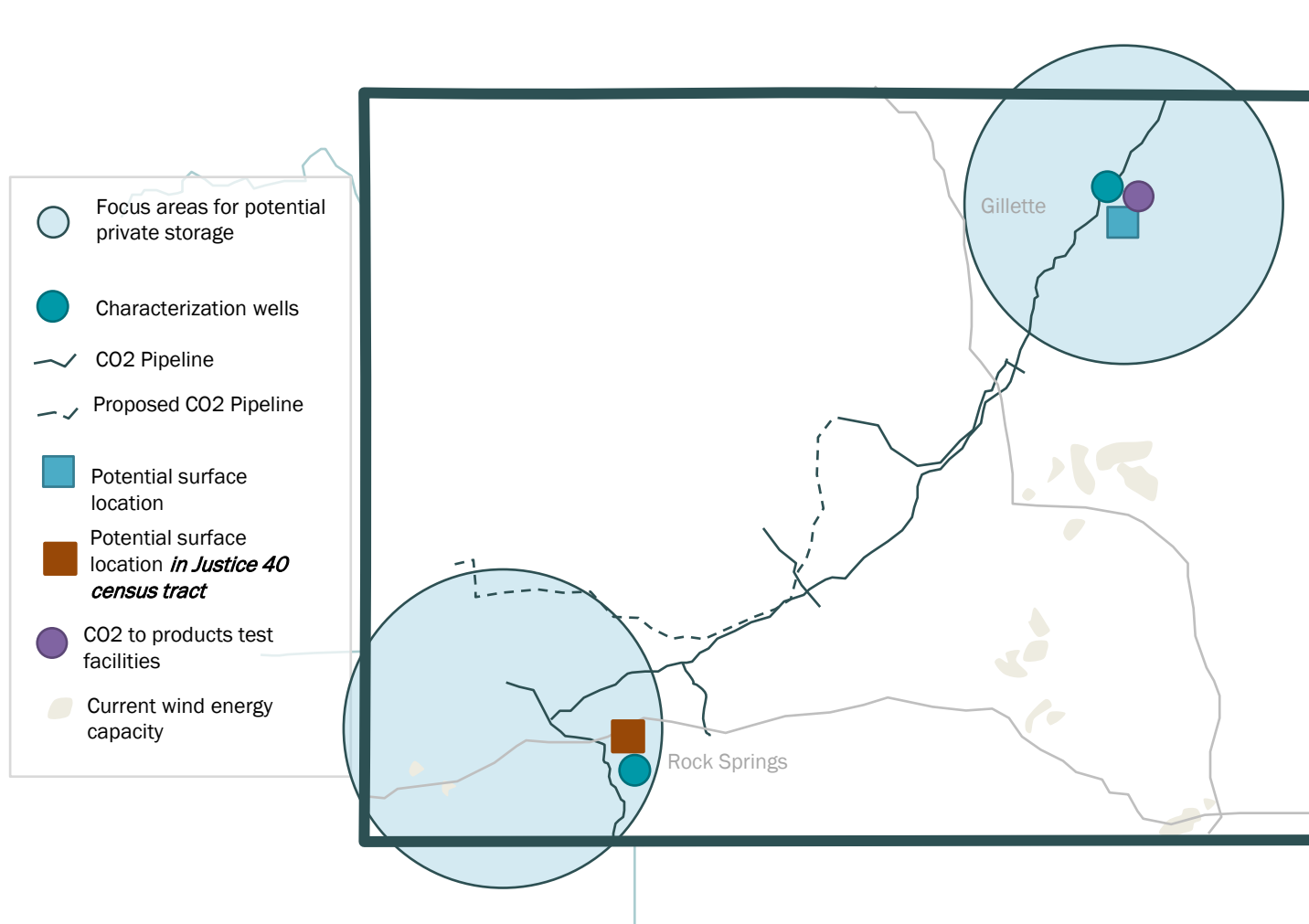


# INDUSTRY ENGAGEMENT IN DIRECT AIR CAPTURE

*Insights from talking to humans*

Sarah Fitz-Gerald | 2022 NETL Carbon Management Projects Meeting | 8/17/2022

# WYOMING IS CCUS READY



Singularly advantageous assets and infrastructure

Policy and policymakers that work

Experienced team

Close community connections

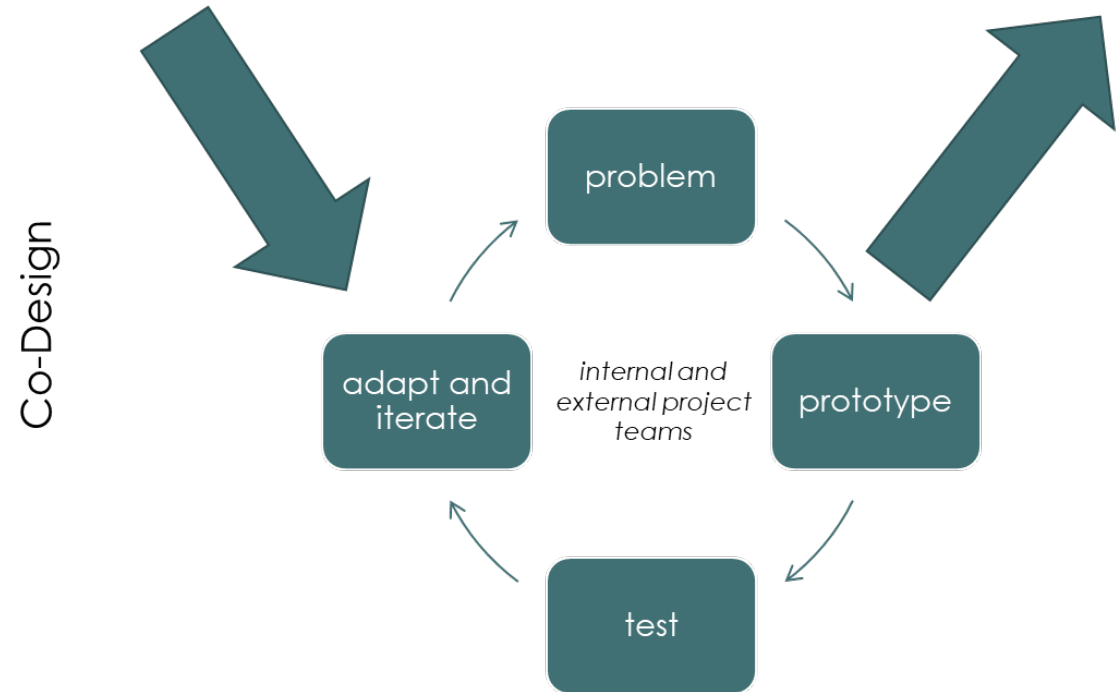
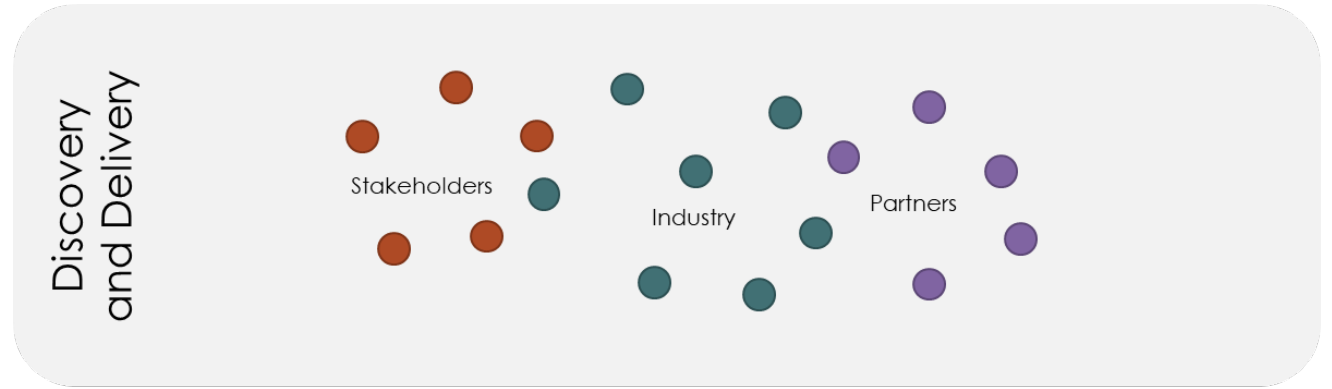
Committed to growing the carbon economy for decades

Opportunities for traditional energy economies and Justice 40 communities



Scan this for more maps and information

# OUR **INDUSTRY** HUMAN- CENTERED DESIGN PROCESS



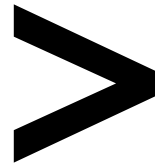
**SO, WHAT HAVE WE LEARNED\*?**

\*So far

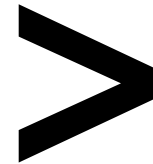
# THE CHALLENGE



Storage and other suppliers need **sufficient volumes**, **high enough return per ton**, and **short enough timelines** to break even in the near term



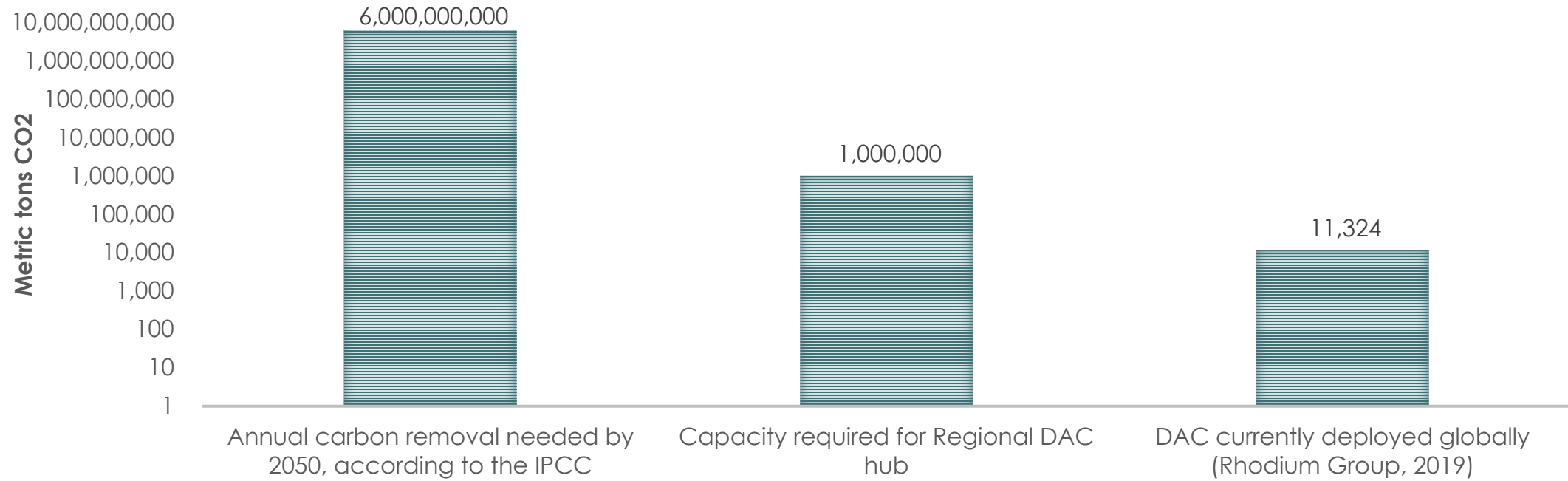
DAC operators need **low enough costs** and **high enough prices** to be profitable (or at least show a path to profitability)



Except for a few notable early adopters, CO2 credit buyers generally are willing to **pay prices that are lower** than costs for DAC and storage

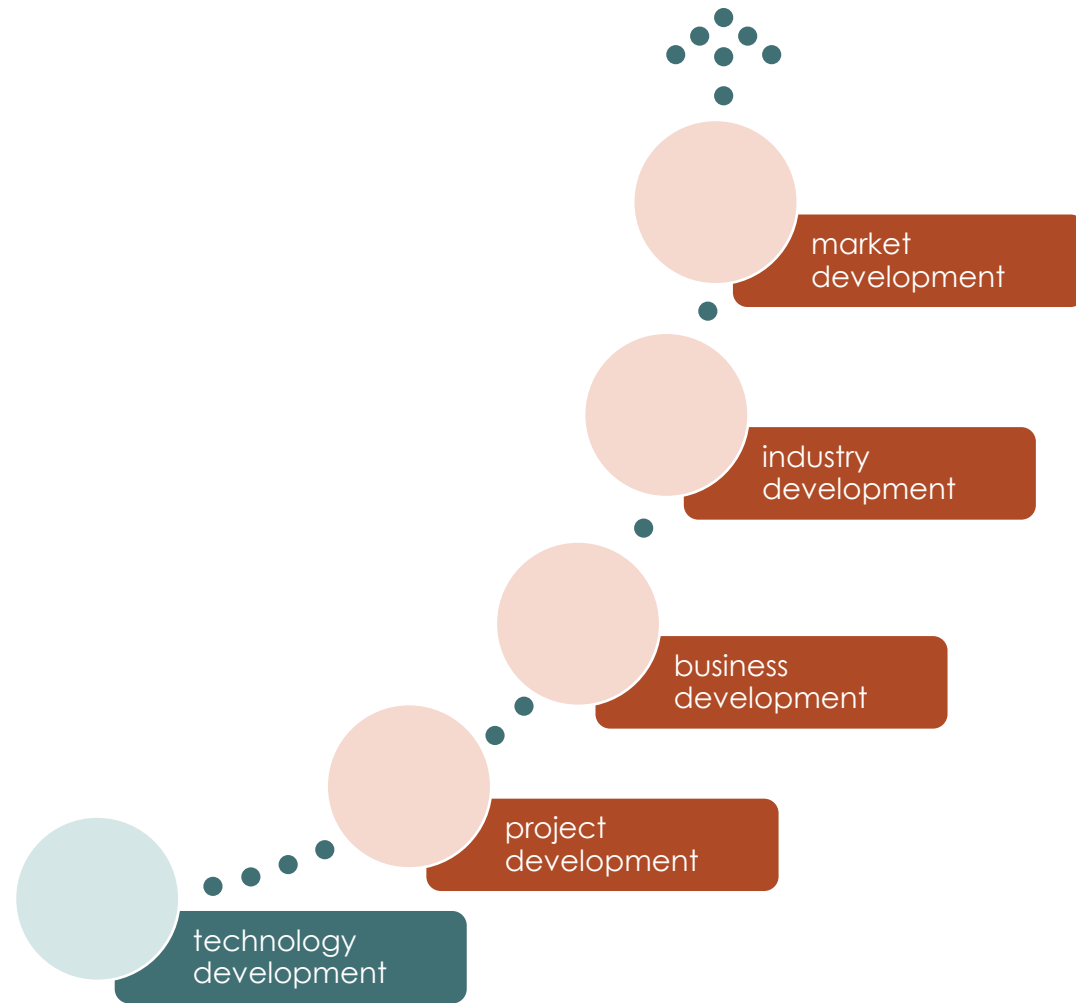
**WHY?**





# 1. IT'S ALL ABOUT SCALE.

## 2. NEW CHALLENGES REQUIRE NEW CAPABILITIES.



## Pace of Market Evolution

slow

fast

Pace of Tech Evolution

slow

Calm Waters  
*Scotch Tape*

The Market Leads  
*Sewing Machines*

fast

The Technology  
Leads  
*Digital Cameras*

Rough Waters  
*Personal Computers*

**3. WE ARE IN  
ROUGH  
WATERS.**

# WE CAN DO THIS!

Long-term market confidence for companies is key

Shared and scalable infrastructure (physical and philosophical) benefits all

Encouraging diverse opportunities could help de-risk industry investment

States can help test ideas that might be applicable on a bigger scale

Sarah Fitz-Gerald | Wyoming Business Council  
sarah.fitz-gerald@wyo.gov

Backup

A scenic landscape at sunset. The foreground is dominated by large, rounded, grey-brown boulders. A few evergreen trees are scattered across the scene, with a larger one on the left. The middle ground shows rolling hills and valleys covered in green vegetation. The sun is low on the horizon, creating a bright orange glow and a lens flare effect. The sky is a mix of blue and orange, with some light clouds.

# THANK YOU

Sarah Fitz-Gerald | Wyoming Business Council  
[sarah.fitz-gerald@wyo.gov](mailto:sarah.fitz-gerald@wyo.gov)

Key Partners



Key Activities



Key Resources



Value Propositions



Customer Relationships



Channels



Customer Segments



Cost Structure



Revenue Streams



# Wyoming's CCUS Regulatory Framework

- Provides title and release of title, custody and liability 20 yrs. post closure (Wyo. Stat. § 35-11-318 & 319 (2022))
- WYDEQ has primacy of Class VI UIC wells for the injection of CO<sub>2</sub> (2022)
- Specifies who owns the pore space (Wyo. Stat. § 34-1-152 (2017))
- Establishes permitting procedures and requirements for CCS sites, including permits for time-limited research (Wyo. Stat. § 35-11-313 (2017))
- Provides a mechanism for post-closure MRV via a trust fund approach (Wyo. Stat. § 35-11-318 (2017))
- Provides a mechanism for unitization of storage interests (Wyo. Stat. § 35-11-315 (2017))
- Specifies that the injector, not the owner of pore space, is generally liable (Wyo. Stat. § 34-1-513 (2017))
- Clarifies that vis-à-vis storage rights, production rights are dominant but cannot interfere with storage (Wyo. Stat. § 30-5-501 (2017))
- Provides a certification procedure for CO<sub>2</sub> incidentally stored during EOR (Wyo. Stat. § 30-5-502 (2017))



# A Wyoming DAC Hub Concept



## **Collocation of DAC facilities with storage, use, and connecting infrastructure**

Increases volumes per well  
Brings costs per ton down



## **Cost share and guaranteed demand**

Encourages short term decreased cost, increased prices, and increased certainty in the short term  
Encourages long term industry scale, bringing down costs in the long term



## **Test facilities and other support for technology development and commercialization**

Encourages a pipeline of DAC technologies, customers for storage partners  
Reduces cost through innovation



## **Workforce training, events, housing, and other “connective tissue”**

Leverages collective knowledge to accelerate scale and advancement of industry  
Leads to more ubiquity and lower costs



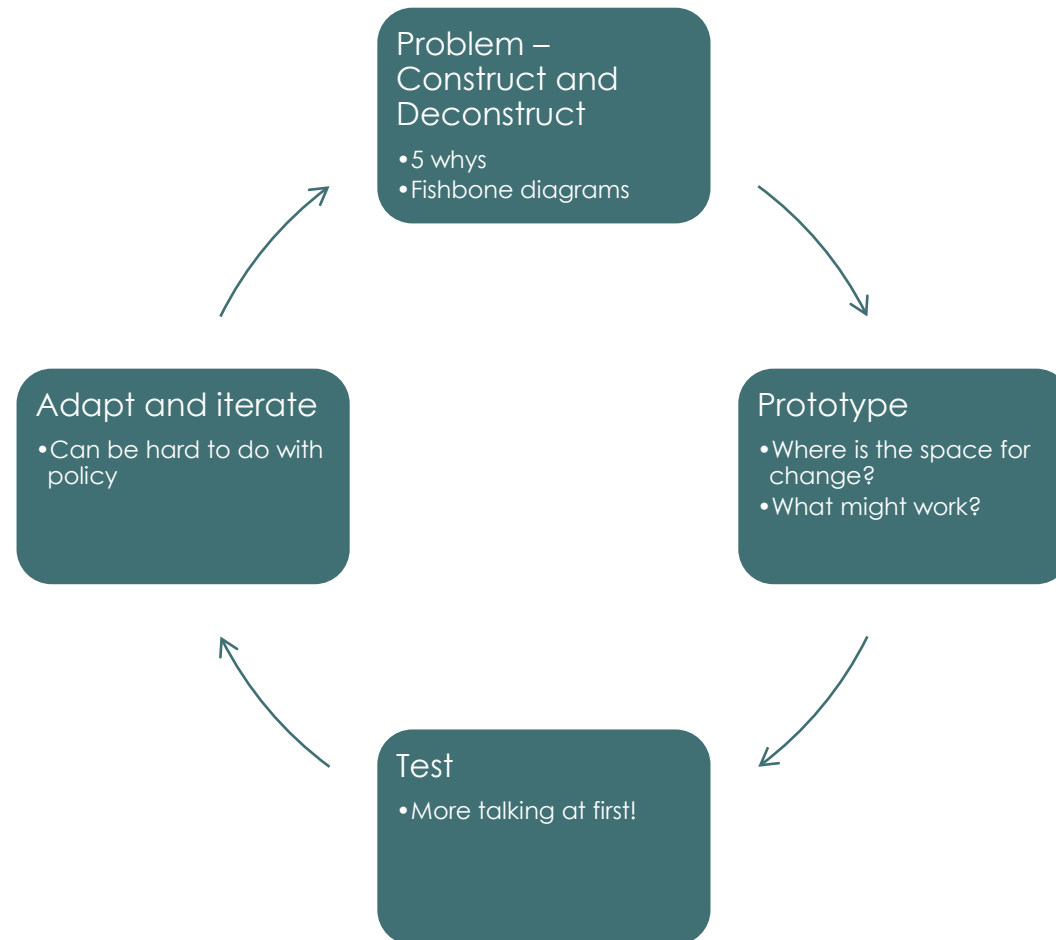
## **Market infrastructure and/or technical assistance for accessing existing markets**

Makes buying and selling more tangible and transparent, reducing transaction costs, increasing demand and supply, and encouraging equilibrium

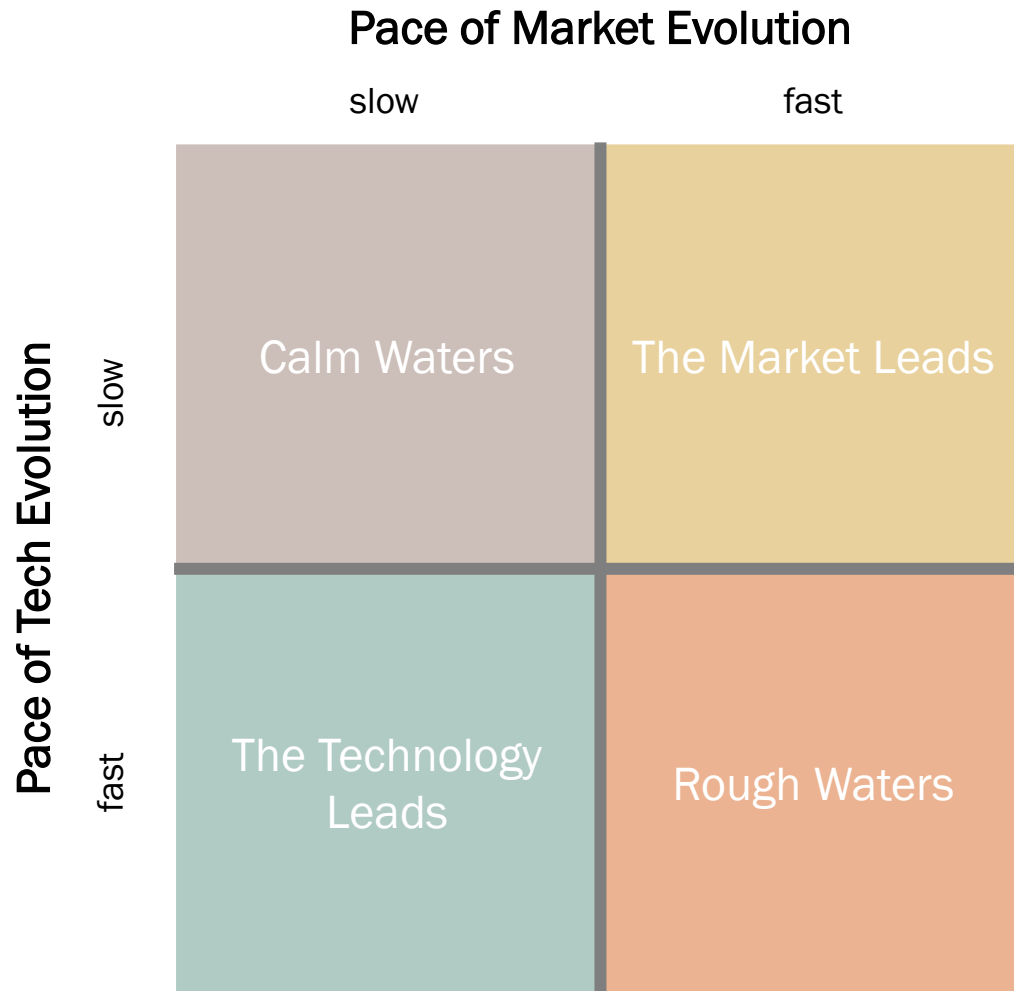
# CO-DESIGN

## Collaboration + Process

Take out?



# 3. We are in rough waters



Take out?

# DISCOVERY

## The Heart of Good Design



### Curiosity

Focus on what's there,  
not what you think  
should be there

Don't get stuck on  
solutions!



### Questions

Jobs, Pains and Gains  
Business Model  
Canvas



### Commitment

Relationships take  
time



### Authenticity

Good partnerships are  
built on shared values