2016 Membrane Technology
CONFERENCE & EXPOSITION

# Pre-Conference Workshop
## *"Back to Basics"*

# Membrane Procurement and Implementation

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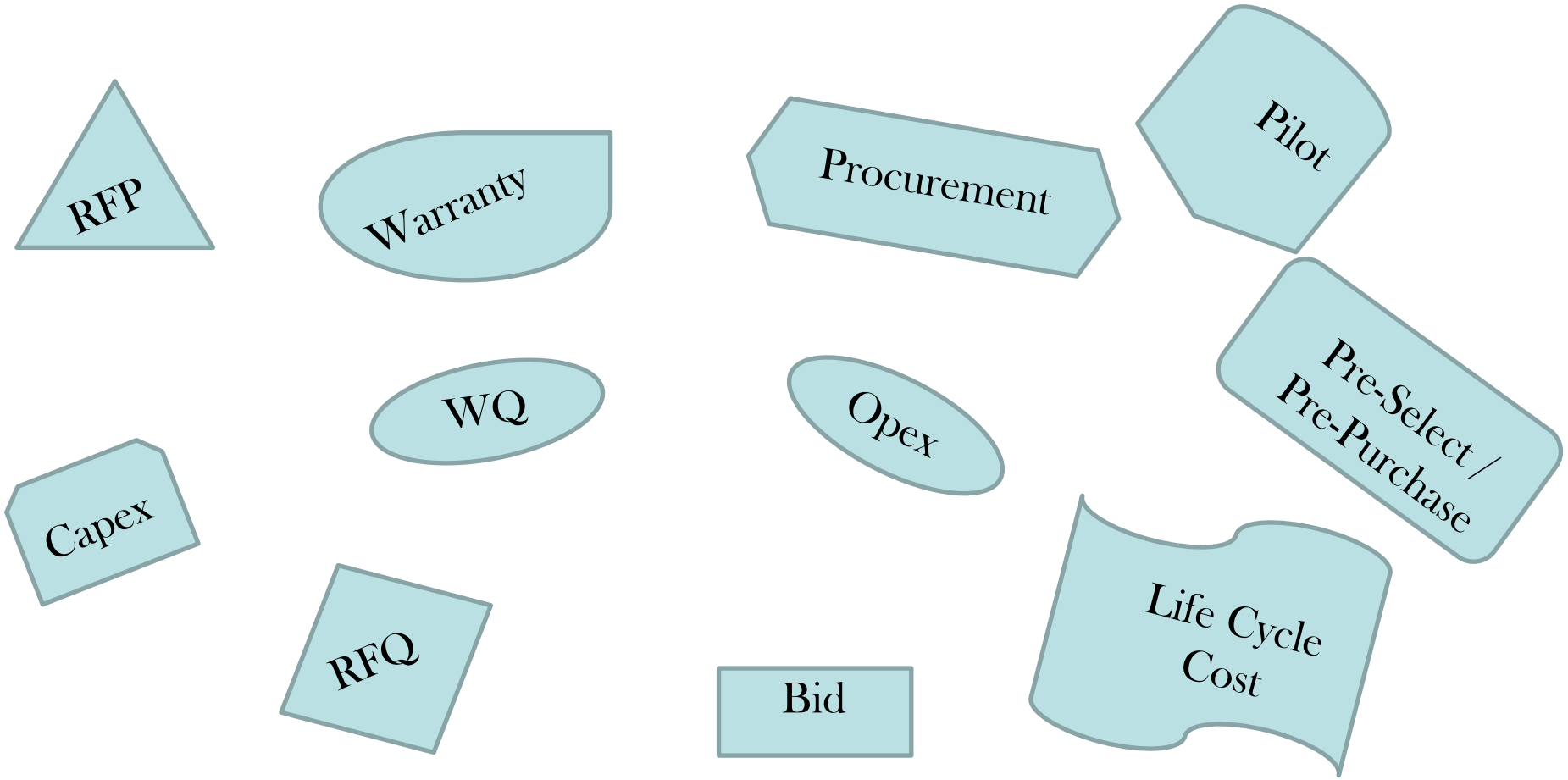
America's Authority in Membrane Treatment
AMTA
American Membrane Technology Association
Improving America's Waters Through Membrane Treatment and Desalting

American Water Works Association
*Dedicated to the World's Most Important Resource™*

# Presentation Outline

- Introduction
- Roles in the Procurement Process
- Historical Approaches
- Current Procurement Options
- 5 Key Questions to Ask
- Avoiding Inevitable Pitfalls
- Closing Remarks

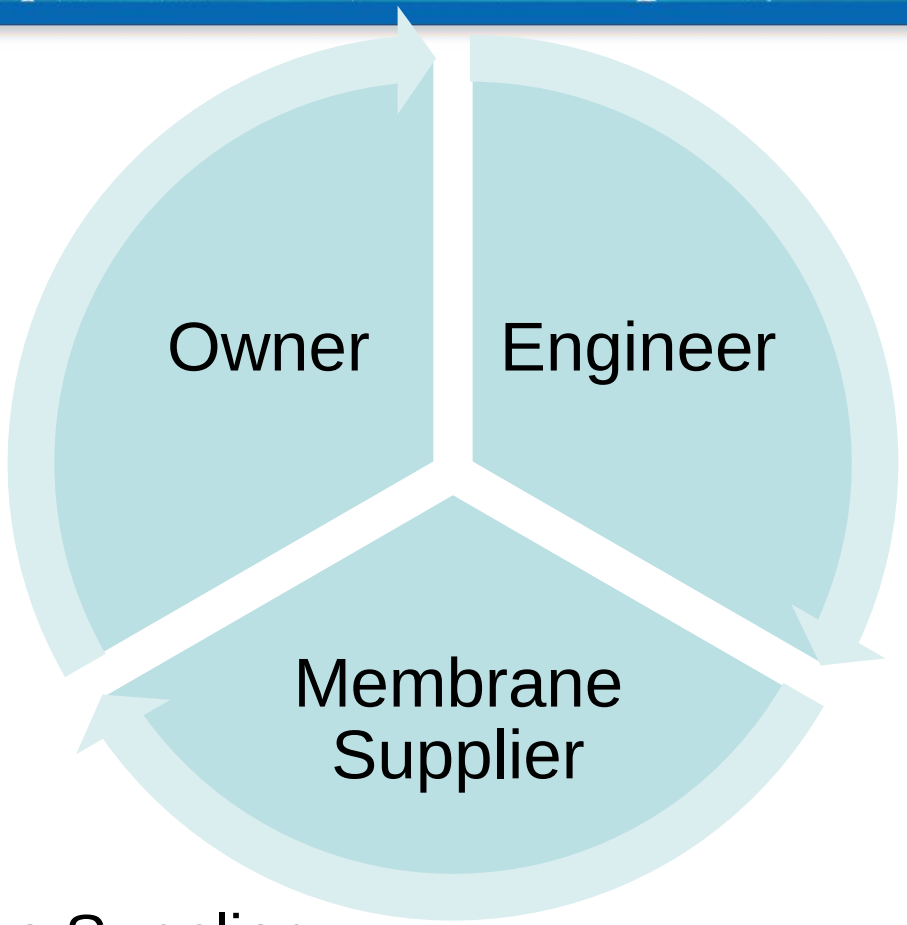
# Introduction



# Roles in the Procurement Process

## Owner

- Works with Engineer on wants and needs
- Provides operational input




## Engineer

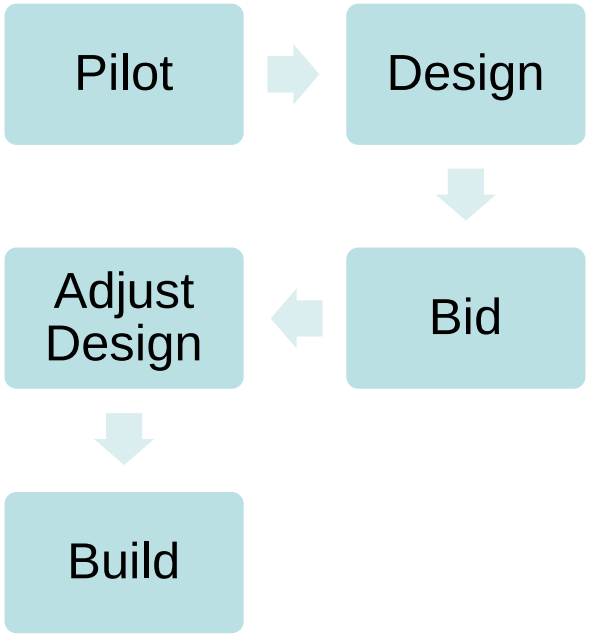
- Works with Owner on wants and needs
- Works with Membrane Supplier to develop design that meets project goals

## Membrane Supplier

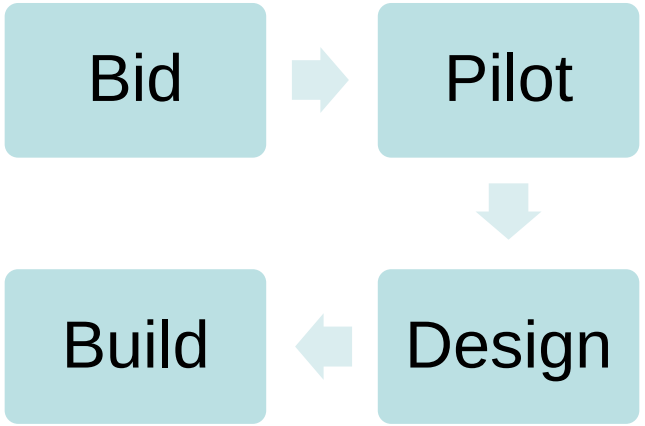
- Provides direction on system operating capabilities
- Works with Owner and Engineer to provide compliant system

# Historical Approaches

## Traditional
## **Design**-Bid-Build




## Traditional
## **Bid**-Design-Build



# Historical Approaches

- Pilot…I thought we were talking about procurement?
  - TCEQ and EPA require pilot-scale testing of MF and UF technologies prior to construction
  - Exceptions to the rule:
    - NF and RO systems in Texas may be approved for construction using NF/RO model projections (confirmed via full-scale testing) – via the TCEQ's Step 1 / Step 2 approval process
    - MBR systems in Texas can be approved via compliance with standard Chapter 217 criteria for hollow fiber or flat sheet MBR (piloting is required to utilize operating criteria more aggressive than 217 criteria)

# Current Procurement Options

- Traditional Options
  - Design-Bid-Build
  - Bid-Design-Build
- Newer Options
  - Pre-Purchase?
  - Pre-Select?

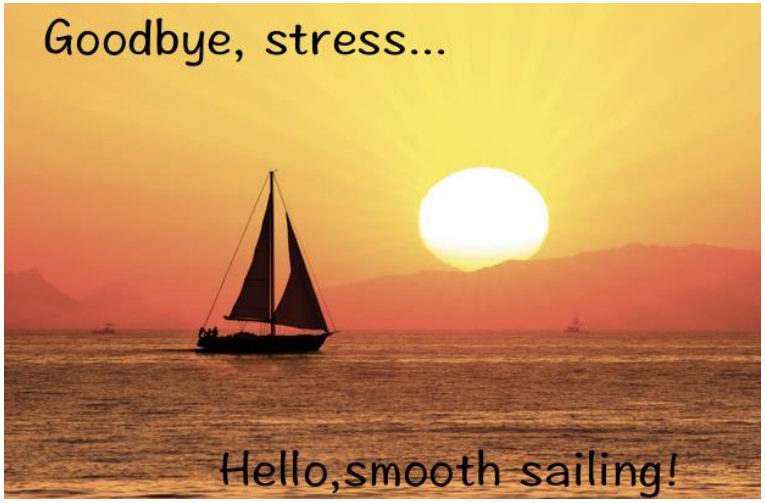
# Current Procurement Options

- Pre-Purchase?
  - Owner selects and purchases the membrane and/or system
  - Treatment facility is designed
  - Contractor is selected and begins construction
  - Owner manages membrane and/or system contract
    - Owner acts as intermediary between supplier and contractor, or may assign contract
  - Owner manages warranty issues with supplier directly

**or**

# Current Procurement Options

- Pre-Select?
  - Owner selects the membrane and/or system
  - Treatment facility design is centered around selected membrane and/or system
  - Contractor is selected and begins construction
  - Owner assigns equipment contract to Contractor to manage
  - Contractor coordinates warranty issues



# 5 Questions to Ask

- Who's Footing the Bill?
  - Federal or State funding agencies typically require some form of competitive bidding (potentially including HUB participation)
    - This requirement may be met via a Request for Proposals (RFP) process instead of hard bidding
  - Even with private funding, municipal utilities are bound by state requirements for competitive bidding
    - Caveat – How you build the project can further affect this…

# 5 Questions to Ask

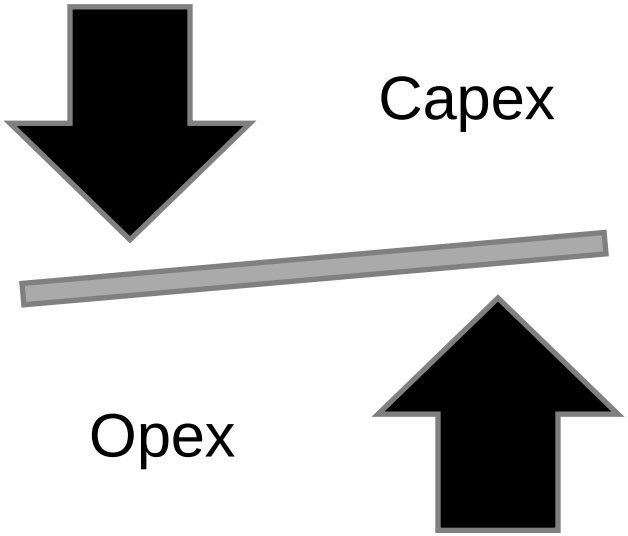
- How Will You Build It?
  - Traditional approaches require bidding either prior or following design
  - Design-build approach can support either pre-selection or pre-purchase
    - This approach may not be feasible depending on the project funding method
  - CMAR approach focuses on enhanced use of pre-selection to obtain “best value” for project
    - This approach may not be feasible depending on the project funding method

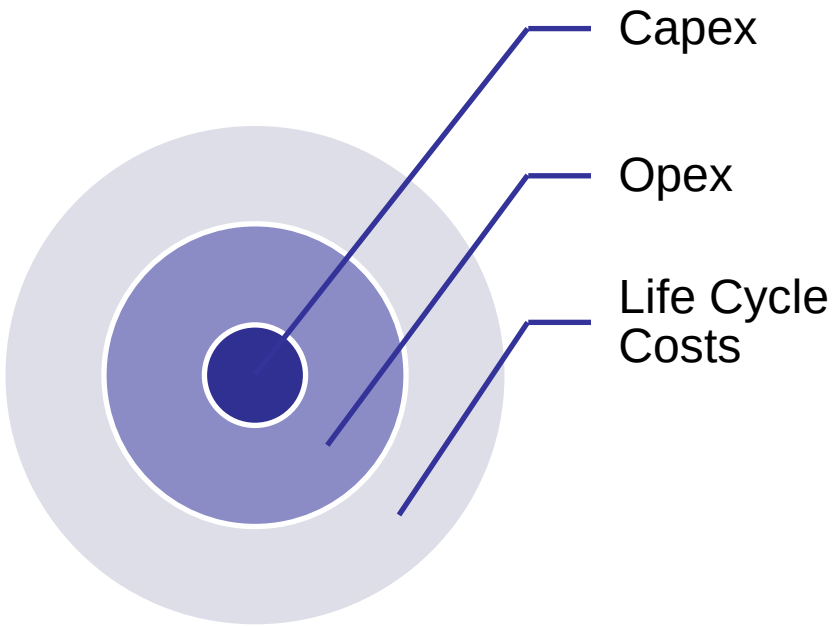
# 5 Questions to Ask

- Proprietary or Open Platform?
  - Proprietary
    - Integrated and proven system
    - Ongoing support after commissioning
    - Historically “chained at the hip”
  - Open Platform
    - Gaining ground in the market – highly competitive
    - Open approach supports change to different membranes in the future
      - This allows plants to take advantage of the “latest and greatest” membranes available
      - This approach also allows for transitions to major changes in technology, such as implementing ceramic membrane technologies

# 5 Questions to Ask

- Capex, Opex or Life Cycle?



# 5 Questions to Ask

- You're Going to Pilot When?
  - Approach most affected by funding and/or timeline
    - TCEQ allows use of "alternate site data" on a case-by-case basis, if a utility can show data from another site, with similar source water, that is more challenging to treat than the utility's source water – limited applicability though
  - Pilot then Procure?
    - May need to pilot 2-3 membranes/systems, which impacts project schedule and piloting costs
  - Select (based on RFQ or RFP) then Pilot?
    - Can reduce to 1 or more pilots, but risks unsuccessful performance

# Avoiding Pitfalls

- Pre-Qualification Do's and Don'ts
- Contractual Issues
- Defining the "best" manufacturer
- Performance Criteria
- Warranty Requirements
- Ongoing Support After Commissioning

# Avoiding Pitfalls

- Pre-Qualification Do's and Don'ts
- DO
  - Check references – No better information than previous owner experience
  - Look at prospective systems yourself – Your needs will likely vary from other facilities

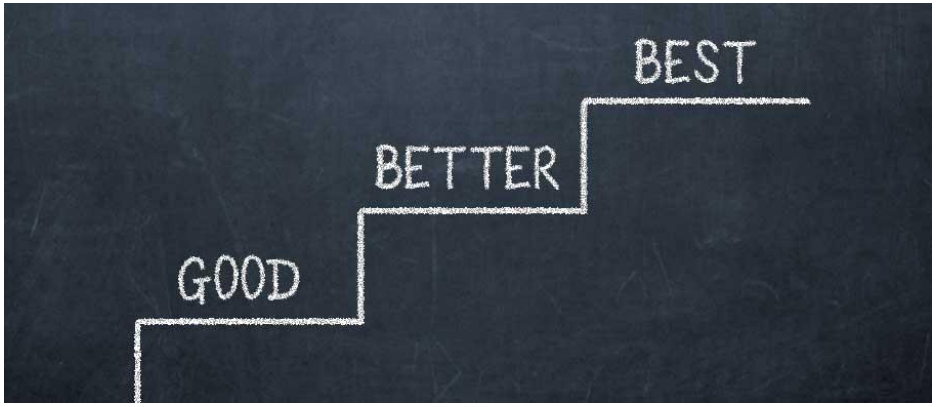
- DON'T
  - Assume that newer is better – New frequently translates to "still in R&D"
  - Assume that engineers and manufacturers have given you every piece of information – everyone has different priorities

# Avoiding Pitfalls

- Contractual Issues
  - Defining scope of supply – What's in the box?
  - Full-scale water quality parameters – "It's not my system, it's your water"
  - Support during startup – Beyond the O&M manual
  - Ongoing system support – Beyond just handing you the keys

# Avoiding Pitfalls

- Defining the “best” manufacturer
  - Quality vs. Capacity?
  - Capex vs. Opex vs. LC?
  - Capex vs. Membrane Replacement?
  - Number of installations overall vs. number of installations with proposed membrane?



# Avoiding Pitfalls

- Performance Criteria
  - Current and future product quality
  - Energy, water and chemical usage
  - Backwash and/or CIP frequency
  - Maximum number of broken fibers
  - Sustained recovery
  - Meeting log removal requirements
  - Prior regulatory approval for challenge testing and DIT requirements

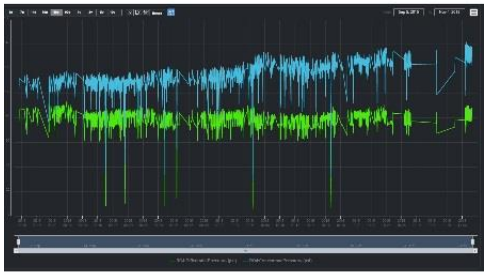
  - Challenges
    - How do we factor in variable feed water quality?
    - How do we account for differences between pilot-scale and full-scale?

# Avoiding Pitfalls

- Warranty Requirements
  - Full Warranty?
    - MF/UF/MBR - Typically 1-2 years, more can be added with increased Capex
    - Ceramic MF/UF – Typically 20-25 years
    - NF/RO - Typically none
  - Prorated Warranty?
    - MF/UF/MBR - Typically 4-8 years
      - Recommend total (full + prorated) at a minimum of 8 years to capture typical life of membranes
    - Ceramic MF/UF – Prorated warranty not required
    - NF/RO – Typically 3-5 years
      - Recommend total (prorated) at a minimum of 3 years to capture typical life of membranes

# Avoiding Pitfalls

- Ongoing Support After Commissioning
  - Online monitoring of system performance
  - Onsite visits to “check in” and offer re-optimization suggestions
  - Recommend
    - Minimum of 2 years of post-commissioning support should be included in contract up front to ensure staff successfully optimizes system through “honeymoon period”
    - After 2 years of support, most membrane plant operators can usually manage data on their own



# Closing Remarks

- Successful procurement is affected by many variables – try to identify the “deal breakers” as early as possible in the planning phase!
- There is no “silver bullet” – procurement approach should support your project goals, funding method and timeline.
- You need to spend adequate time to successfully procure what you need – remember, the only stupid question is the one you don’t ask!

- *For further questions:*

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