



Saudi Aramco Water Treatment Technology Mapping

Ahmed Saleh Al-Rammah
Saudi Aramco

February 6, 2013

Outline

- Introduction to Water Treatment Technology Focus Team
- Vision, Mission, and Strategies
- Technology Mapping
- List of Completed, Ongoing, and Planned Technologies
- Challenges and Conclusion

Introduction to Water Treatment TFT

- The inception was in year 2000
- The technology work is streamlined and improved
- 11 Technology focus teams and specialty areas
- Each team is represented by central engineering and operating facilities

Technology Focus Teams

- Water Treatment Technology Focus Team
- Corrosion and Materials Technology Focus Team
- Electrical Engineering Technology Focus Team
- Mechanical Engineering Technology Focus Team
- Environmental Protection Technology Focus Team
- NDT Technology Focus Team

Technology Focus Teams (Continued)

- Rotating Equipment Technology Focus Team
- Civil Engineering Technology Focus Team
- Process Automation Technology Focus Team
- Process Engineering Technology Focus Team
- R&DC Technology Focus Team

Vision

Inspire innovative water treatment technologies that will enhance productivity, grow revenue and conserve water

Mission

Steer, guide and follow up on the study and implementation of cost-effective, state-of-the-art technologies for water systems.

Inspiring Goal

WTTFT will initiate at least one patent per year and create a new business to Saudi Aramco

Criteria for Selecting Technologies

Any technology item should meet one or more of the following:

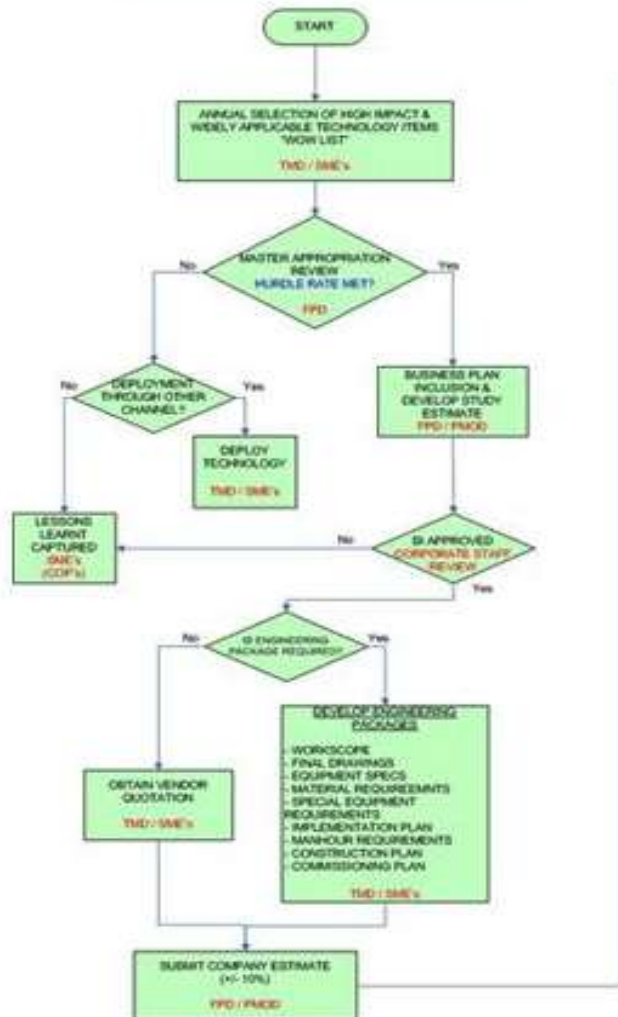
- Promote water reuse
- Reduce operational cost
- Enhance safety
- Ensure reliability
- Creates a new business to Saudi Aramco
- Introduces innovation

Technology Journey

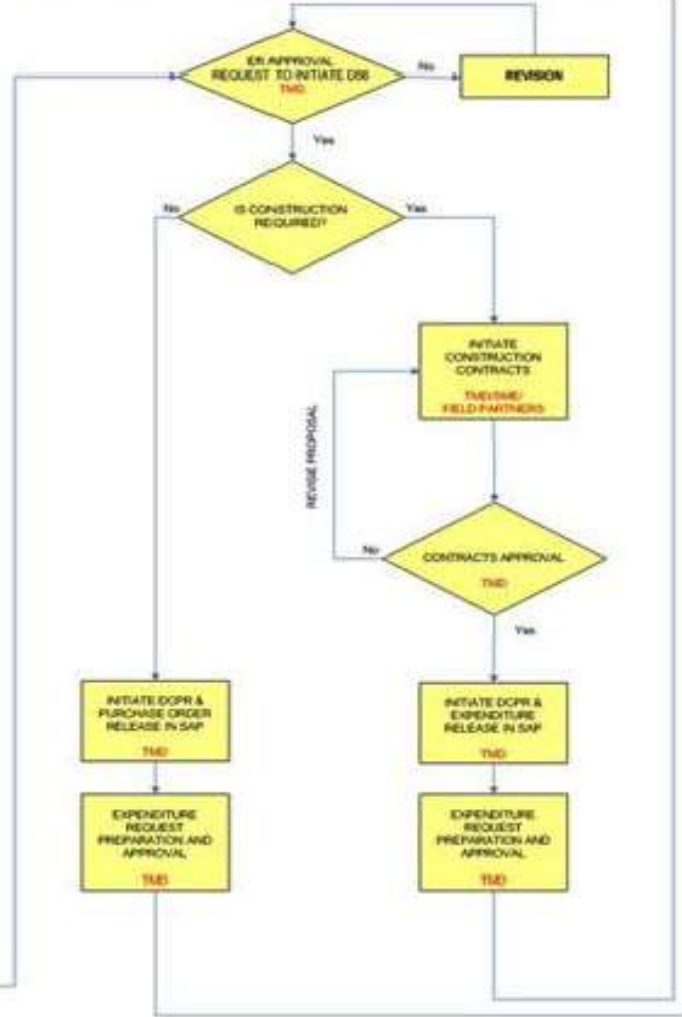
- Each technology item takes at least 2 years
- Steps includes the following:
 - Peer review
 - Processing proposal
 - Developing a contract
 - Purchasing an equipment
 - Pilot testing
 - ClosureDeployment

Technology Development Process

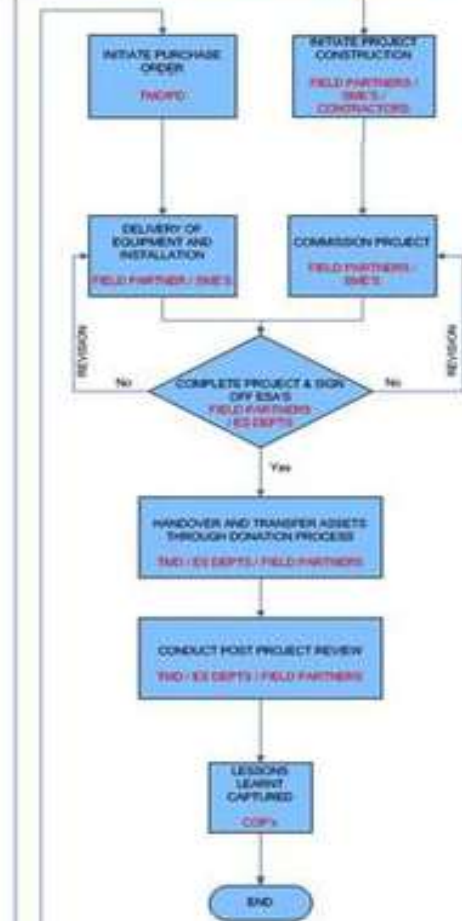
PREPARATION PHASE



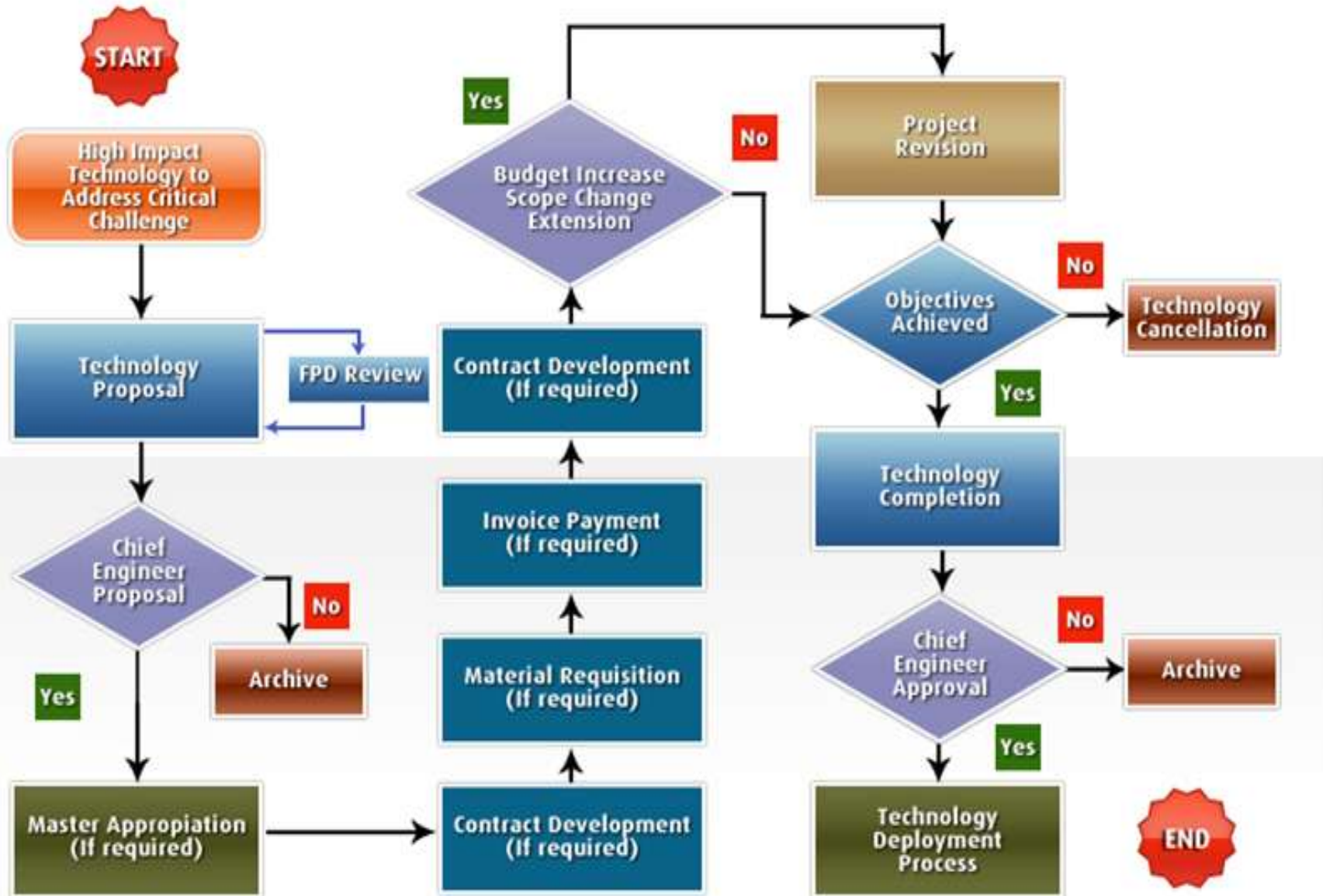
PROCUREMENT & CONSTRUCTION PHASE



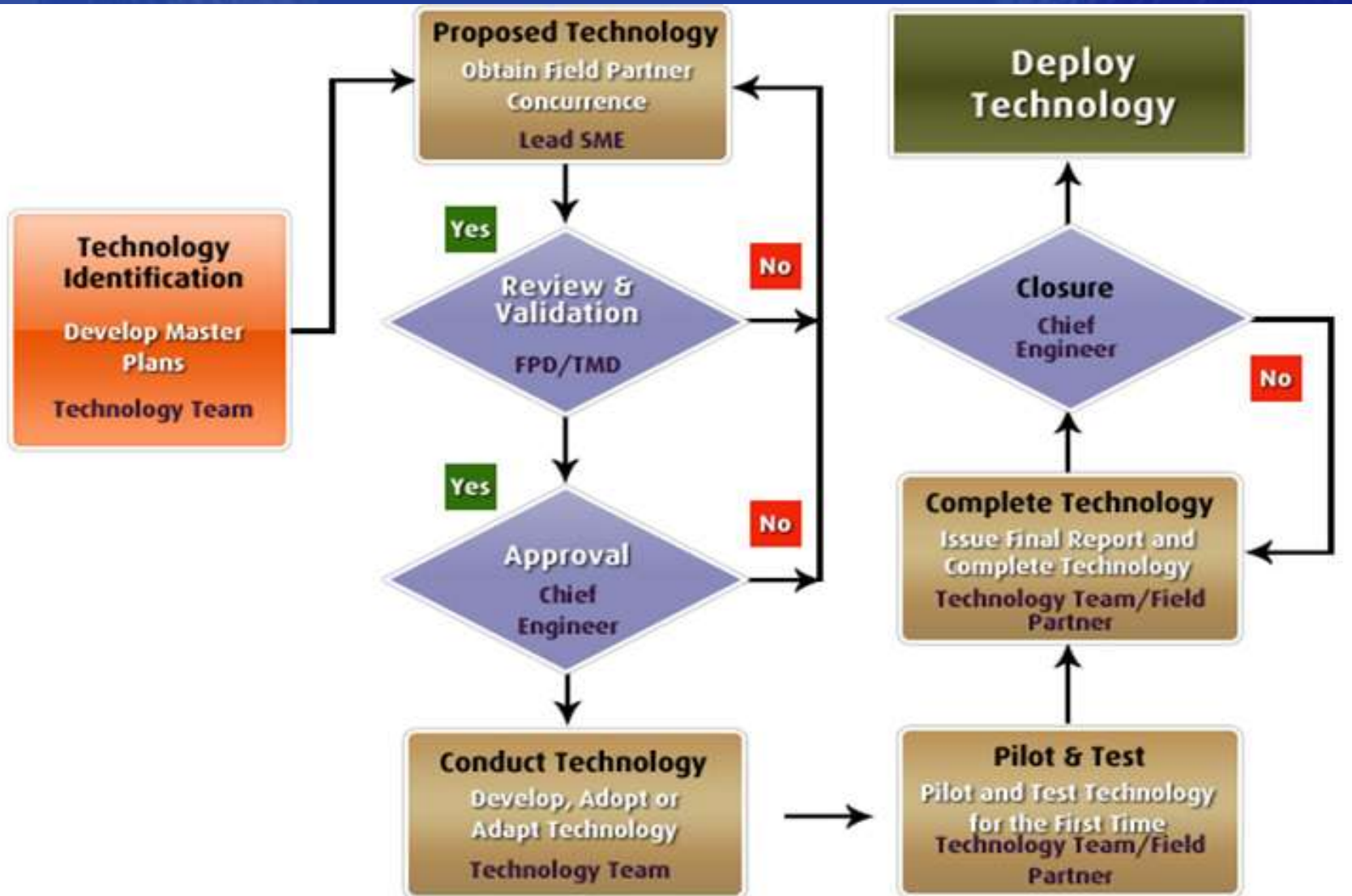
COMPLETION PHASE



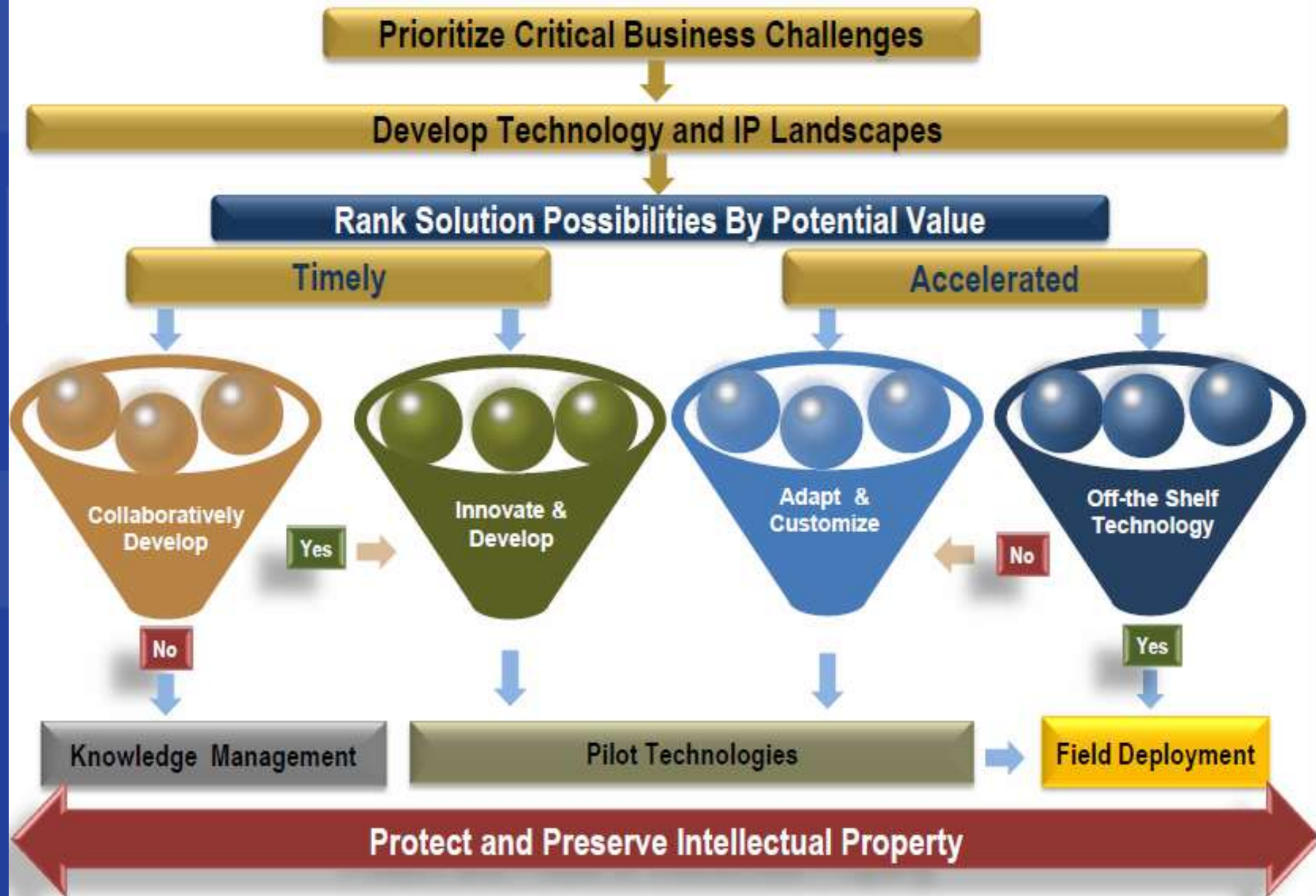
Technology Development Process



Technology Development Process



Technology Development Process



Technology Mapping

In this exercise, all water treatment and desalination related technologies should be evaluated and subjected to corporate and team strategies

Completed Technologies

Completed 18 technologies. Some examples:

- Use of UV Radiation as an Alternative to Dechlorination for RO Systems
- Employing Chlorine Dioxide for Seawater Disinfection
- Utilization of Turbo Charging Technology for Reverse Osmosis Systems
- Optimization of Fuel Gas Consumption in Boilers

Completed Technologies (Continued)

- Reverse Osmosis Membrane Post Treatment for Improved Performance
- Utilization of Ultrafiltration Technology as a Pretreatment to Reverse Osmosis
- Development of an Integrated System for Monitoring Permeate Quality in Membrane Desalination Plants
- Online Cleaning of Boiler Using Tetraammonium EDTA

Ongoing Technologies

- Development of Monitoring System for Continuous Assessment of Scaling Potential in RO Membrane Plants
- Steam Generator Wet Chemistry Online Analyzer
- Non Conventional Sea Water Intake System
- VSEP Technology to Desalinate RO Reject Water

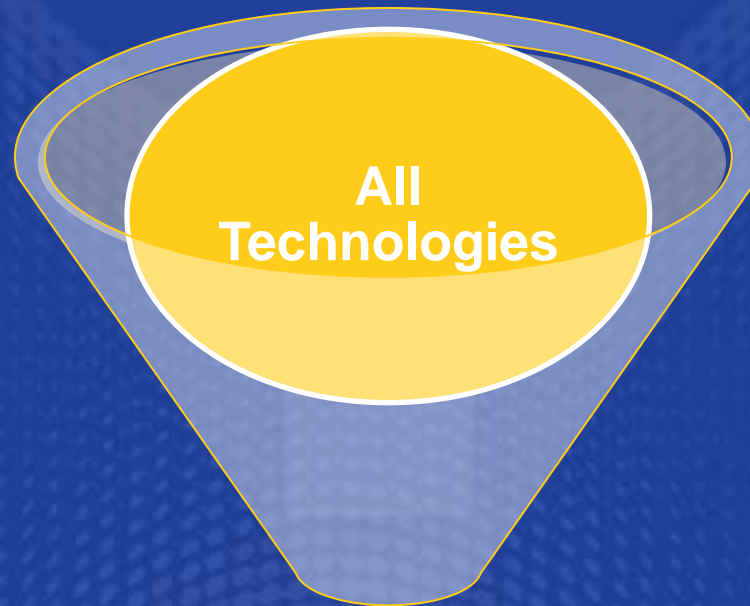
Ongoing Technologies (Continued)

- Novel Compound as Media Supplement for the Rapid Detection of Sulfate Reducing Bacteria in Oil Field
- Biochips as Tools for Rapid Detection and Enumeration of Oilfield Microorganisms

Future Technologies

- Online Fouling Monitor for membrane
- Novel spacers for Reverse Osmosis membranes
- Treating high temperature streams
- More water reuse technologies

Future Technologies Mapping

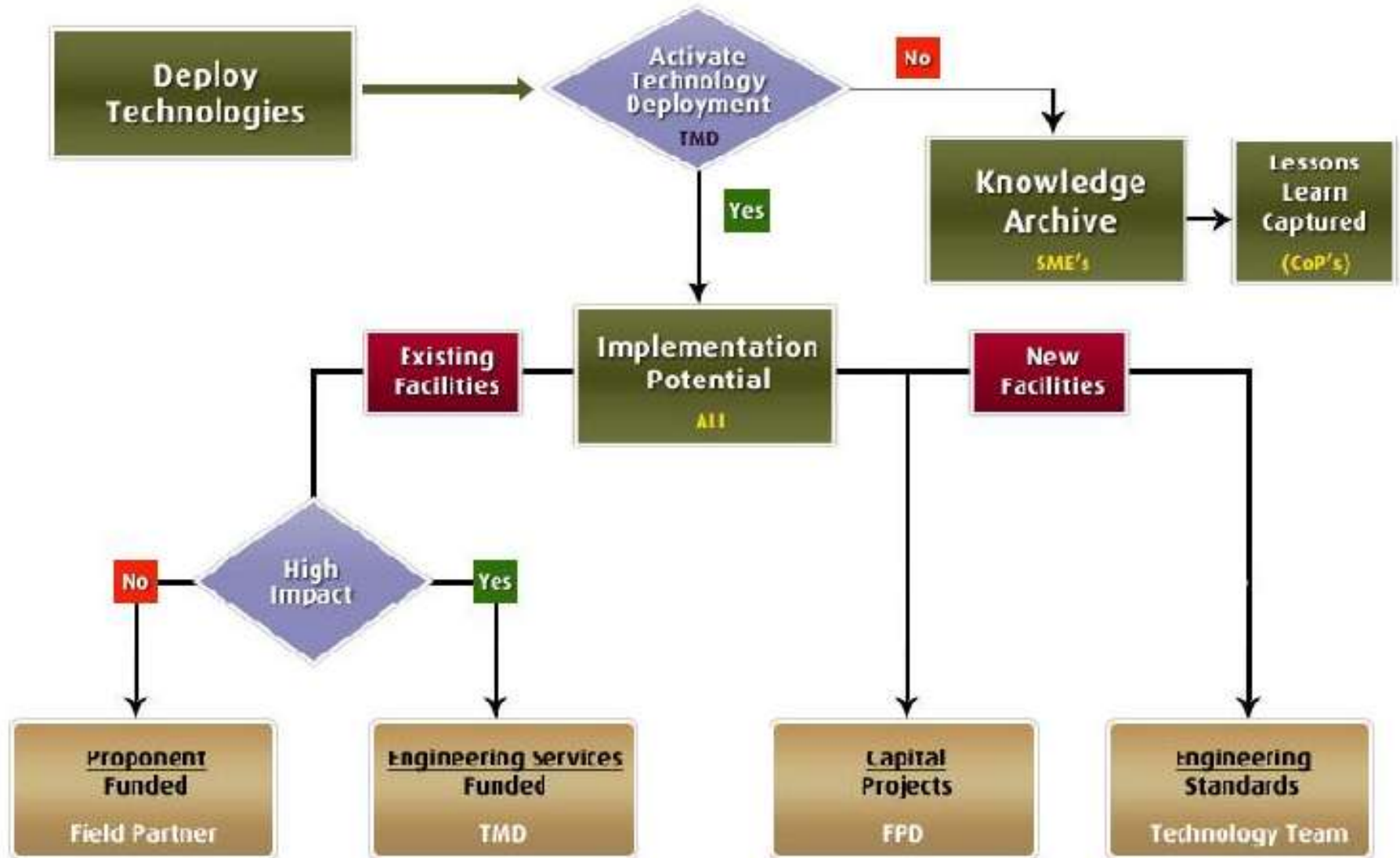


Water Reuse Applications

Technology Deployment

Technology deployment is the most important part of the technology journey

Technology Deployment Procedure



Challenges

- Need to map technologies to targeted strategies
- Lack of breakthrough technologies
- Procedural issues

Conclusion

- Technology mapping shows a great motive to water reuse applications
- Technology is a lengthy journey, but, rewarding
- All efforts will be made to comply with the strategic objectives



أرامكو السعودية
Saudi Aramco

Thank You