

# **Practical Wastewater Recycling Project Implementation**

**Presented to the Public Forum of the  
Connecticut Department of Energy and Environmental Protection's  
Hazardous Waste Advisory Committee**

**November 29, 2018**

# Agenda

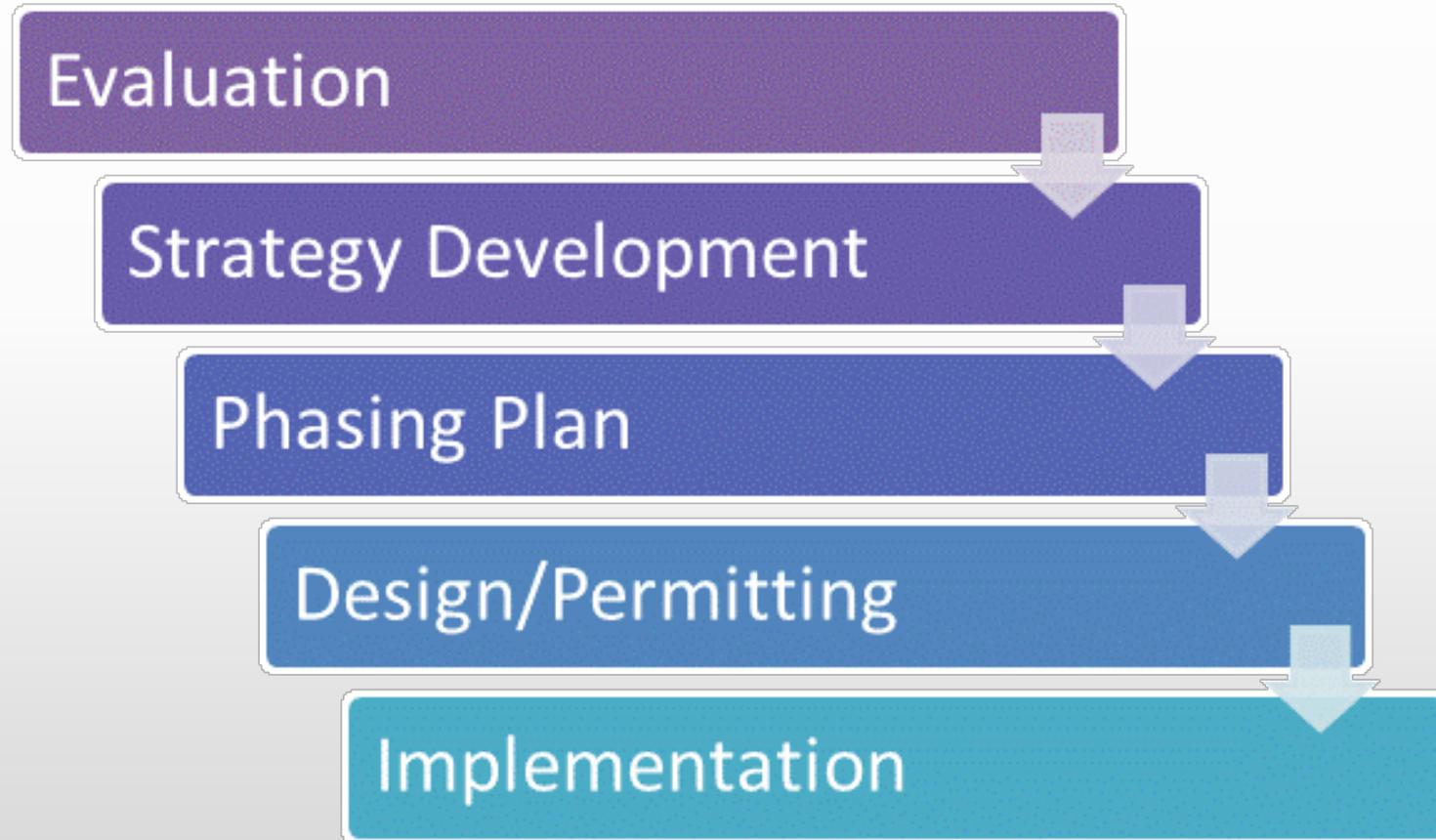
- **Define Objectives**
- **Strategy Development and Planning**
- **Successful Implementation**
- **Installation Examples**

# Define Objectives

- **What are your goals?**
  - **Water conservation?**
    - **Cost**
    - **Corporate sustainability goal**
- **Waste minimization?**
  - **Cost**
  - **RCRA generator status category**
  - **Corporate reduction initiative**
- **Compliance assurance?**
  - **Recycle more concentrated wastewaters**
  - **Complete zero discharge**

# Strategy Development and Planning

## Typical Wastewater Recycling Project Stages



# Strategy Development and Planning

- **Comprehensive engineering evaluation is a critical first step**
  - Confirmation of sources / flow rates
  - Laboratory analysis of chemicals of concern
- **Development of feasible recycling alternatives**
  - Centralized vs. modular systems
  - Technology
  - Estimated capital and O&M costs for all feasible alternatives
  - Level of expertise required for O&M

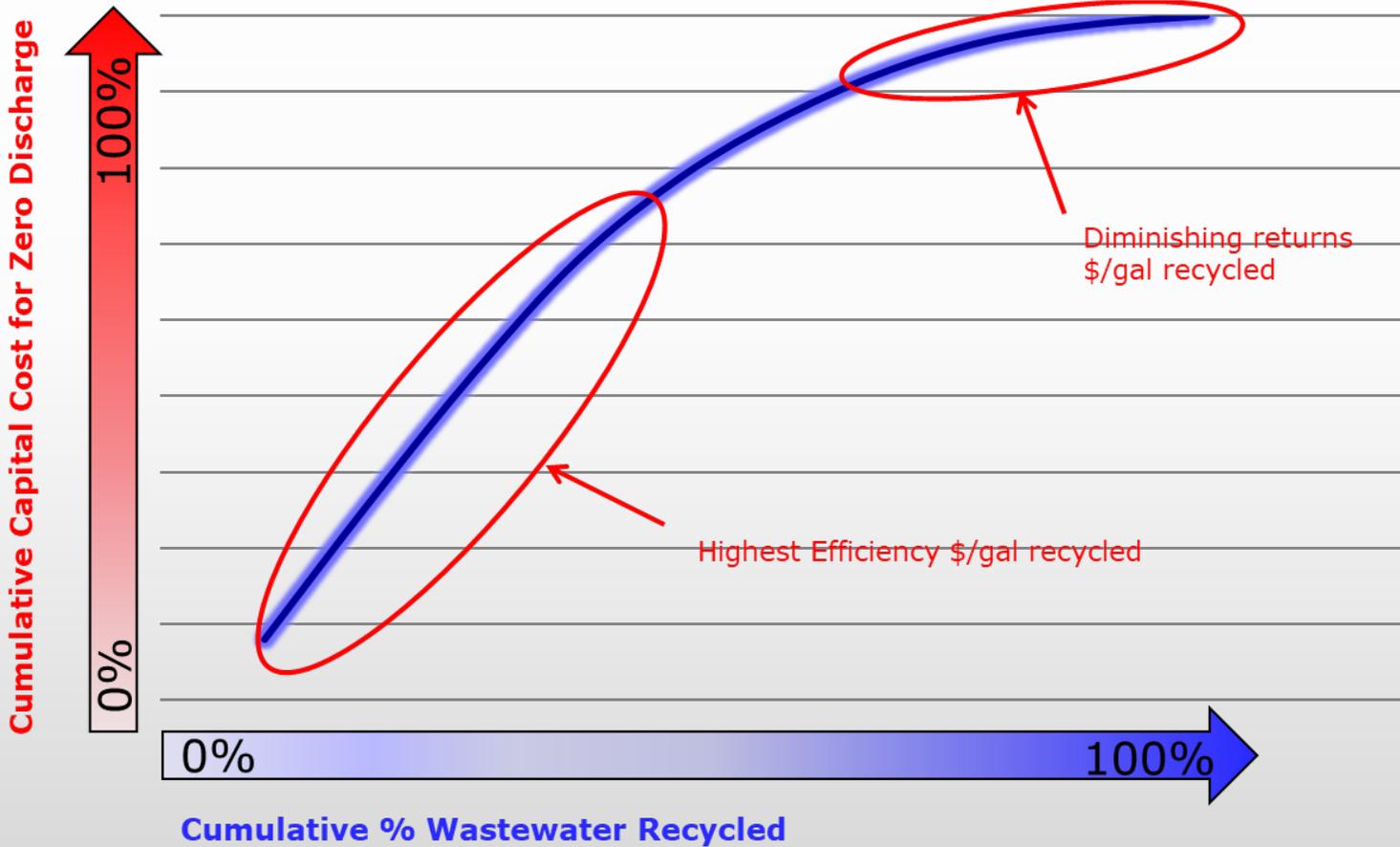
# Strategy Development and Planning

- **Consider water reduction initiatives as part of the strategy development**
  - **Installation of water flow meters – critical**
  - **Understanding of required water quality**
  - **Many industrial clients use much more water than is necessary, which lead to more expensive treatment / recycling systems**
- **Understand level of operational knowledge / skill required**

# Strategy Development and Planning

- **Zero discharge is an admirable goal, but need to understand long-term costs**
  - **Best option for compliance assurance, but...**
    - **Potentially increased waste generation**
    - **Potentially higher energy consumption**
  - **Need to account / plan for potential downtime for maintenance – *typically cannot afford to stop operations***
  - **Law of diminishing returns apply to wastewater recycling for complex facilities**

# Strategy Development and Planning



# Successful Implementation

- **Design**

- **Treatability studies – will the technology work?**
- **Onsite pilot studies – proof of concept**
- **Design of layout / infrastructure**
- **Controls – Automation cannot compensate for skilled operators**

- **Permitting**

- **Discharge permit modifications**
- **Air permit modifications**
- **Building permits**
- **Potential impact of RCRA**

# Successful Implementation

- **Installation**
  - **Interim wastewater management**
  - **Coordination with production**
  - **Start-Up / Commissioning**
  - **Training / Support**



# Installation Examples

## Customer Zero Discharge Wastewater Recycling System – Plating Operations



# Installation Examples

## Customer Zero Discharge Wastewater Recycling System - Etching, Cooling Tower/ Boiler Blowdown



# Installation Examples

## Customer Zero Discharge Wastewater Recycling System - Etching, Cooling Tower/ Boiler Blowdown



# Installation Examples

**Customer Batch WWTS – Use of spent acids / FeCl<sub>3</sub> in treatment chemistry**



# Questions?

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