



Utilities Infrastructure

Utility Master Planning

APPA Institute for
Facilities Management






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Credit(s) earned on completion of this course will be reported to American Institute of Architects (AIA) Continuing Education Session (CES) for AIA members.

Certificates of Completion for both AIA members and non-AIA members are available upon request.


Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

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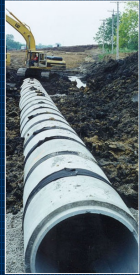


Course Description

While departments plan their work regularly and execute on planned timelines on a daily basis, due to the scope and costs of utility operations, the leadership needs to engage in a master planning exercise every 5-10 years. This allows the department an opportunity to take a holistic view of all production, distribution, capacity, system improvements etc. During this exercise an attempt is made to align the utility master plan with campus master plan and new building construction or demolition plans. This course will discuss the aspects of the operations that are explored during the utility master planning process.



Learning Objective



- To present a clear methodology that will aid Facility Officers in developing a long range strategic plan for all utility systems on campus

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Agenda

- Introduction
 - Purpose of a Utility Development Plan (UDP)
 - Why a UDP
 - Value of a UDP
- Foundation Work
 - Who can prepare a UDP
 - Identifying the utilities
 - Selling the need to administration
 - Identifying funding sources
- Utility Systems Background

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Agenda (cont.)

- Stage 1: Problem Definition
 - Collecting initial data
 - Prioritizing existing deficiencies
 - Identifying alternative strategies
- Stage 2: Development of Strategies
 - Performing interactive analysis
 - Performing economic analysis
 - Comparing strategies
- Stage 3: Finalization of the UDP
 - Refining the chosen strategy

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Purpose of a UDP

- A UDP is a comprehensive, long range, strategic plan encompassing all campus utilities. It is a companion to the Campus Master Plan
- Its purpose is to establish an effective methodology which identifies, prioritizes, and defines the cost for the current and future needs of all utilities to the year 2035

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Vision Statement

Develop a strategic utility infrastructure plan for the Facility that will support the growth objectives defined by the Campus Master Plan and correct existing deficiencies. The utility infrastructure renewal and system expansions are to be financed through reinvestment of utility operating funds generated by efficiency improvements and utility cost avoidance, and by direct capital investment of remote utility infrastructure fees associated with capital building construction and renovation.

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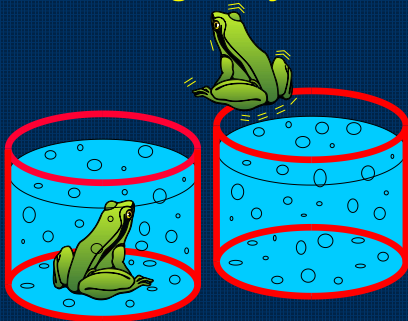
Why a UDP?

- Gets you organized
- Catalogs capacity of existing utility system
- Identifies deficiencies by systems
- Prioritizes needs in planning time frames
- Identifies cost of corrective actions
- Plans for the future
- Accommodates change
- Opens communication
 - slow change can...

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Frog Story



Slow Change Will Kill You!

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Value of a UDP

- Compels critical utility information to be compiled, organized, and accessible
- Provides corrective actions to support your master plan
- Documents a collaborative process
- Provides ready reference for funding
- Establishes a roadmap for reaching goals and objectives

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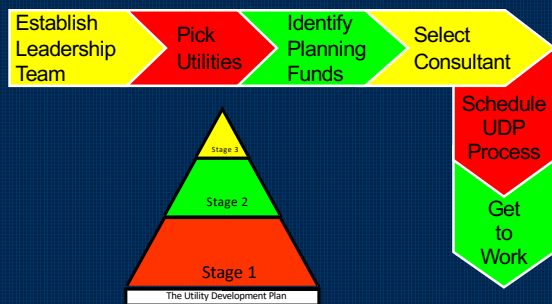
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How to Get Started



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Who Needs to Participate

Leadership Team:

- Physical plant and facility personnel
- Business office personnel
- Consultant - 50/50 - 80/20 - ?

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Leadership Team

- **Facility Team Members**
 - Facilities design and maintenance personnel
 - Energy management personnel
 - Central plant director and lead operators

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Leadership Team (cont'd)

- **Administration Team Members**
 - Planning personnel
 - Campus Architect
 - Vice President of Finance

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Leadership Team (cont.)

- **Consultant Team Members**
 - Mechanical engineers (P.E.)
 - Energy management engineers (C.E.M.)
 - Electrical engineers (P.E.)
 - Economic analysts (M.B.A.)
 - Technical writer
 - LEED Design Professional

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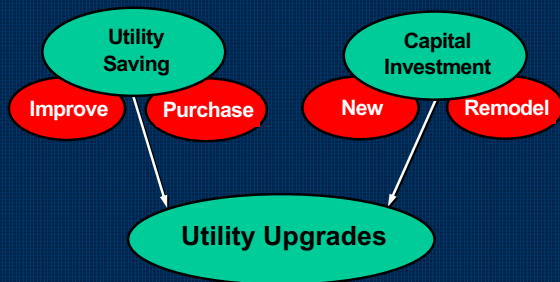
Selling the Need to Administration

- Use their language
- Tell a convincing story (write a good memo/letter)
- Indicate magnitude of overall utility investment
- Quantify annual operating costs
- Identify funding schemes
- Communicate your chosen process

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Implementing Funding



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What does a UDP Cost?

- Cost Considerations
 - Breakdown who is doing what - Facilities/Consultant
 - Which utilities included in plan
 - Level of documentation
 - Size of campus
- Cost Range
 - \$30,000 to \$350,000
 - \$.03/sf to \$.30/sf

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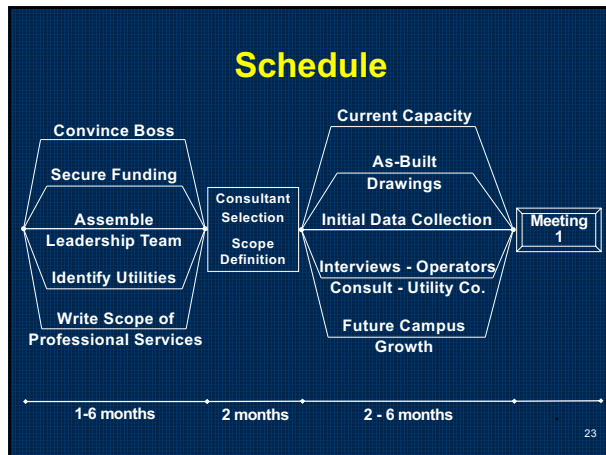
Select Consultants

- Qualification Based Selection
 - Past experience in UDP
 - Proven methodology
 - Team commitment
 - References--check them
 - Overall chemistry
 - Price

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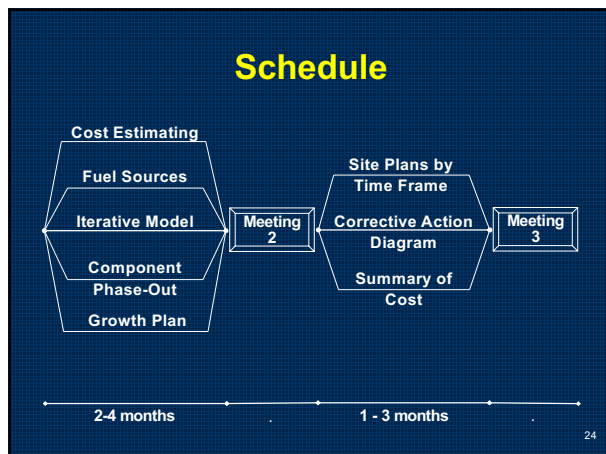
Schedule



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Schedule



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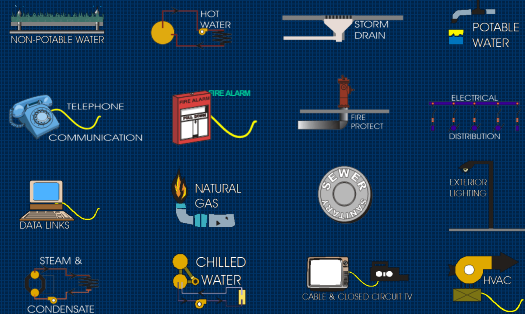
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Utility Background



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Utility Groupings

<u>Water</u>	<u>Drainage</u>	<u>Electrical</u>	<u>HVAC</u>	<u>Information</u>
Potable Water	Sanitary Sewer	Normal Power	Chilled Water	Telephone
DI Water	Storm Drain	Emergency Power	Steam	Fire Alarm
Non Potable Irrigation	Rain Water Collection	Exterior Lighting	High Temperature Hot Water	Security
Fire Protection			Natural Gas	Cable TV
			Instrument or Control Air	CCTV
				LAN or ENET
				EMCS

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Agenda (cont.)

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Collecting initial data
Prioritizing existing deficiencies
Identifying alternative strategies

Stage 2: Development of Strategies

Performing interactive analysis
Performing economic analysis
Comparing strategies

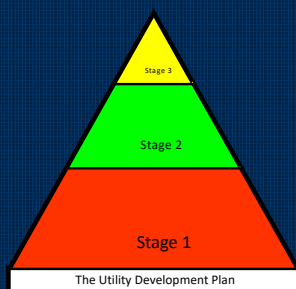
Stage 3: Finalization of the UDP

Refining strategy

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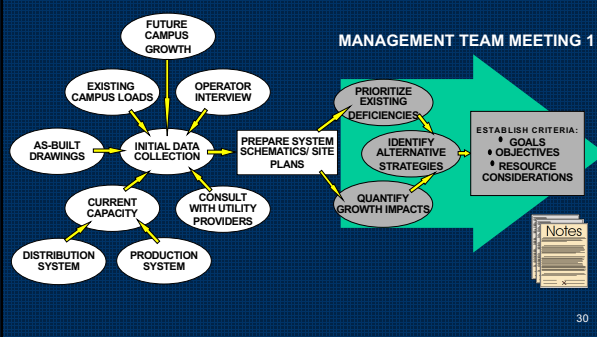
The UDP Process



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Stage One - Problem Definition



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Initial Data Collection

- Review of as-built drawings- site plans, diagrams
- Identify existing loads & capacity-metering
 - Distribution systems
 - On site production
- Clarify ownership of system components

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Initial Data Collection

- Utility rate schedule, past bills- E.U.P.
- Interview with operation and maintenance personnel
- Review facility master plan to 2030- identify future growth
- Prepare rudimentary system diagrams & site plans

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UDP: Stage One Management Team Meeting



One to two day meeting
Problem Definition Phase

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Management Team Meeting 1 Problem Definition

- Interactive Day Long Event
- For Each Utility System
 - Prioritize Existing Deficiencies
 - Quantify Growth Impact
 - Identify Alternative Target Strategies
 - Establish Rating Criteria
 - Purpose
 - Process Goals
 - Outcome Goals
 - Vision
 - Objectives
 - Resource Considerations

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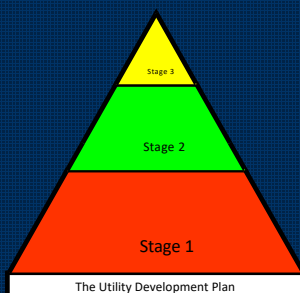
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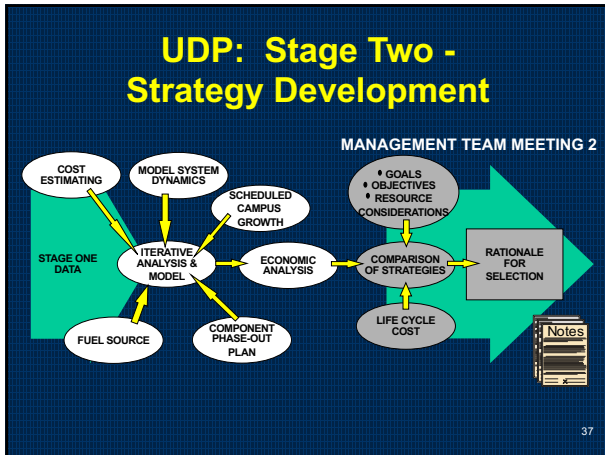
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Stage Two Development of Strategies



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Iterative Analysis

- Review stage 1- update:
 - Drawings and diagrams
 - Narrative descriptions of target strategies
- Verify annual operating & maintenance cost by utility system
- Create dynamic model or system matrices
- Identify available fuel sources

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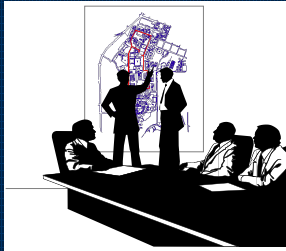
Iterative Analysis

- Develop growth plan
 - Establish planning horizons: within 5,10, & 20 years
- Devise component phase out plan - exit strategies
- Turn the crank
 - Technical analysis
 - Economic analysis
- Indicate viable strategies
- Create comparison matrices

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UDP: Stage Two - Development of Strategies



One day meeting
Strategy Comparison

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Management Team Meeting 2 Comparison of Strategies

- Revisit the overall vision for the infrastructure
- Compare each utility system strategy
 - Process goals
 - Outcome goals
 - Objectives
 - Resource consideration
 - People
 - Economic ranking NPV

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Management Team Meeting 2 Comparison of Strategies

- Rationale for final strategy selection
 - For each utility:
 - Documented and detailed narrative
 - Objective criteria
 - Subjective criteria

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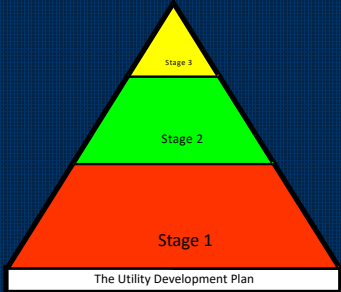
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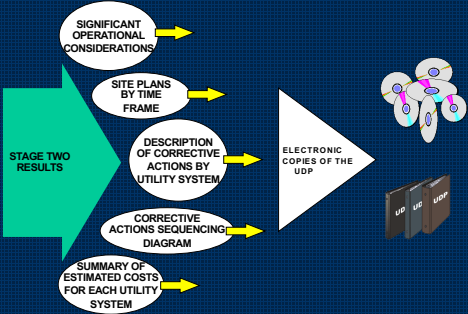
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Stage Three Strategy Refinement



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UDP: Stage Three - Final Utility Development Plan



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Strategy Refinement

- Review stage 2- update:
 - Selected strategies narratives
 - Drawings and site plans
- Recap selected strategies for each utility:
 - Significant operational considerations
 - Site plans by time frames
 - Description of corrective actions
 - Corrective actions sequencing diagrams
 - Summary of estimated costs
- Prepare Stage Three Draft Report

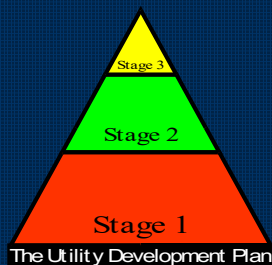
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UDP: Stage Three-- Final Presentation



Half day meeting
Final UDP



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Management Team Meeting 3 Final Utility Development Plan

- Present integrated cost summary matrix for all utilities by planning time frame
- Revisions to Draft Report
- Next steps
 - Follow-up with administration to identify funding sources
 - Programming

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Questions?



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