

ENERGY MASTER PLANNING

RENEWED COMMITTEE CHARTERS

- **Central Power Plant Steam and Electric Generation**
- **Chilled Water Generation and Distribution**
- **Electrical Distribution**
- **Energy Economics**
- **Mechanical Piping Distribution Systems**

Utilities & Plant Engineering
July 16, 2007

1. Name

**CENTRAL POWER PLANT STEAM AND ELECTRIC GENERATION
ENERGY MASTER PLANNING**

2. Context

- Lowest Possible Fuel Cost
- Efficient Equipment and Units
- Technology Enhancements to Metering and Controls
- Replace or Rebuild Aging Boilers
- Renewable Fuel Technology – Solar
- Reliability of Systems (Internal and External).
- Location of plant or satellite plants.
- Hot Water Distribution medium.
- Increase on site electrical generation.
- Ability to distribute electrical load growth
- Alternate Fuel

3. Objective

Components of the plan will include:

- Master Plan study of Boiler configuration and future thermal load.
- Power Preservation
- Explore Solar PV Technology for Roof
- Integrate advanced control loops and technology.
- Modernize Steam Generation Units with replacement or rebuild.
- Enhance Black Start Capability.
- Integrate CPP DCS controls with BAS.

4. Process Scope

Input Boundary:

- None

Output Boundary:

- Central and Medical Campus

5. Customer Expectations

- Lowest possible energy rates.
- No loss of service.

6. Constraints

- Fuel Supply
- Cost of Technology
- Customer Base Equipment

7. Chartering Body

UPE

8. Champion

Richard Wickboldt

9. Resources

Reserve Fund Capital Project program

10. Milestones

- Power Preservation installation
- New Boilers
- Integrated BAS-CPP load response

11. Team Members

Richard Wickboldt

Yoshiko Hill

Bill Weakley

1. Name:

**CHILLED WATER GENERATION AND DISTRIBUTION ENERGY
MASTER PLANNING**

2. Context

-
- Master plan for the University.
 - Campus electric and steam master plans
 - Future chilled water (CHW) load from growth and renovation
 - Chiller replacement schedule

3. Objective

Update chilled water master plan for central and north campuses, in line with university planning efforts, in order to promote efficient and reliable production and distribution of chilled water.

Components of the plan will include:

- Updated regional CHW plans for central and north campus, considering load growth, reliability, and efficiency.
- Special focus on the Medical School region.
- Review and update chiller replacement model.
- Determine financing needs & funding resources.
- Integration with University master plan and Utilities master plans.

4. Process Scope

Input Boundary:

- Based on existing campus master plan and utilities master plans.
- Existing information from operations data.

Output Boundary:

- North Campus, Central Campus, Dorms, Athletics
- Excludes Hospital
- Conceptual design only – no details

5. Customer Expectations

-
- Efficient, maintainable, and reliable CHW systems
 - Master CHW Plan for guidance and use by university planners
 - Chiller Replacement planning as a decision tool for Operations strategies for other Plant Operations units.

6. Constraints

-
- Staffing availability
 - Quality of information for forecasting
 - Consultant funding
 - Time, completion deadline

7. Chartering Body

-
- Utilities & Plant Engineering

8. Champion

- Mark Mau

9. Resources

- UPE units (UBS, staff in Mechanical and Electrical Engineering)
- Plant Operations units (Facilities Maintenance)
- Consultant
- F&O units (AEC, OSEH, Office of the University Planner)

10. Milestones

- Information gathering
- Define scope, study schedule and statement of intent
- Preliminary conceptual regional plans
- Integration with other master plans
- Final master plan updates

11. Team Members

- M.Mau, E.Albert, and J.Russell
- Other temporary or optional members:
T.Girard, Gary Ernst, David Karle and other members of the cross-department CHW Committee.

1. Name

ELECTRIC DISTRIBUTION ENERGY MASTER PLANNING

2. Context

-
- Campus electric growth
 - Power Preservation
 - Maintenance (Both Preventative and Corrective)
 - Safety
 - Distribution System Configuration
 - Future Power Sources for the Campus
 - Operation of Equipment

3. Objective

To create and maintain an electrical distribution system that will provide reliable and safe electric power for current and future electric power demands.

Components of the plan will include:

- Review of current status
- Assessment of future needs
- Develop a plan to meet objectives
- Provide for maintenance and update of design

4. Process Scope

Input Boundary:

- The Committee will obtain electric load information from all pertinent sources (AEC, UMH, DTE, University administration, etc.).
- The committee will utilize the services of consultants as required.
- Current status of the electrical distribution system infrastructure.
- Safety of the current distribution system.
- Maintenance needs of the distribution system infrastructure.

Output Boundary:

- The committee will provide updates to UPE management, University administration, and other stakeholders (AEC, UMH, DTE, and others in the University) as necessary.
- The committee will provide support for the infrastructure maintenance program.
- The committee will participate in meetings as necessary to provide information and support for decisions impacting the infrastructure.
- The committee will provide reports and studies to support the committee's actions and recommendations.

5. Customer Expectations

-
- The committee will develop and maintain an electrical distribution system infrastructure that meets the needs of the University.
 - The committee will provide technical review and oversight of equipment to be added to electrical distribution system infrastructure.
 - The committee will be a resource for information regarding the University's distribution system.

6. Constraints

- Output of the committee in the form of designs, studies, and reports must be reviewed by the Associate Director of UPE before further distribution of the findings or taking any action.
- The committee may obligate the University financially only as members may have approval from the Associate Director of UPE and upper administration.

7. Chartering Body

Utilities and Plant Engineering

8. Champion

Yoshiko Hill

9. Resources

University personnel from UPE, Plant Operations, Plant Extension (AEC), etc.

- DTE personnel
- Historical data from DTE, UBS, etc.
- Consultants
- Vendors

10. Milestones

- Formation of the committee
- First meeting
- Evaluation of existing conditions
- Update the Electrical Master Planning documents
- Recommendations
- Update meetings

11. Team Members

- Yoshiko Hill
- Ed Hengesh
- Bill Verge
- Jim Harvey
- AEC?

1. Name

ENERGY ECONOMICS MASTER PLANNING

2. Context

- High fuel costs
- Changes in electric purchases
- Green power
- Alternative sources
- Central plant operation
- Aging equipment
- Campus growth

3. Objective

Provide the lowest cost energy possible within constraints of reliability and environmental sustainability.

Components of the plan will include:

- Analysis of present situation
- Review of alternatives for the future
- Plan and schedule for achieving objectives

4. Process Scope

Input Boundary:

- The committee will not address any issue that will be specifically addressed by the other Energy Master Planning committees: CPP, Steam Distribution, Electric Distribution, Chilled Water Plants & Distribution.
- The committee will access any and all available information sources, including other departments on campus, other universities, government agencies, trade organizations, etc.
- The committee will utilize consultants as necessary to achieve its goals.
- The committee will participate in forums, seminars, etc. inside and outside the University in order to gather information that can help achieve the stated objectives.

Output Boundary:

- The committee will provide information to UPE management and to higher levels as necessary.
- The committee will provide routine and special reports as necessary to fully inform management of findings.
- The committee will participate in forums, seminars, etc. inside and outside the University as required to inform and persuade participants and decision makers of the committee's actions and recommendations.

5. Customer Expectations

- The committee will provide leadership in planning future energy strategies to minimize costs.
- The committee will pursue its goals in an expeditious manner that will allow timely action.
- The committee will obtain and possess knowledge of the energy economics of the University that will assure that the committee will be the primary resource for this information on campus.

6. Constraints

- The committee is not authorized to take any action that will obligate the University financially or otherwise. Members of the committee may have authorization to take such actions as part of their assigned duties outside of the committee.
- All reports, recommendations or other official actions of the committee will be reviewed by the Associate Director of Utilities and Plant Engineering plus higher management as necessary.
- The committee has no budget and no spending authority.

7. Chartering Body

UPE

8. Champion

Bill Weakley

9. Resources

- Other UPE, Plant Ops and University personnel
- Historical data from CPP historian, electric billing records, fuel purchase records, etc.
- Other universities, Big 10 & Friends, APPA
- Trade organizations, e.g. IDEA,
- Government agencies, e.g. EIA, EPA, DOE, states & municipalities
- Vendors & consultants

10. Milestones

- Formation and first meeting of committee
- Initial evaluation of present situation
- Development of immediate goals
- First committee status report
- First set of recommendations for future actions

11. Team Members

- Bill Weakley
- Mike Swanson
- Yoshiko Hill

Potential members:

- Richard Wickboldt
- Eric Abert
- Bill Verge

1. Name

MECHANICAL PIPING DISTRIBUTION SYSTEMS ENERGY MASTER PLANNING

2. Context

- Campus growth
- Limits on capacity
- Emergency Preparedness Planning
- Aging infrastructure
- Long term maintenance projects
- Upgrading system to handle 600 degrees F.
- North Campus opportunities

3. Objective

Ensure that the distribution systems remain viable by addressing issues that impact growth and reliability while addressing emergency preparedness.

Components of the plan will include:

- Review and update as necessary the LPS, MPS, and Condensate models and address any issues that affect their accuracy.
- Develop a study, plan and schedule for installing hard piped temporary connection points for truck mounted boiler in several strategic locations through out the tunnel system.
- Develop a plan and schedule for evaluating the piping systems within the distribution system to see where we are vulnerable during a 600 temperature excursion.
- Review alternatives for the future
- Plan and schedule for achieving objectives listed under the context.
- Develop a plan to address the limits in capacity.

4. Process Scope

Input Boundary:

- The committee will not address any issue that will be specifically addressed by the other Energy Master Planning committees: CPP, Steam Distribution, Electric Distribution, Chilled Water Plants & Distribution.
- The committee will access any and all available information sources, including other departments on campus, other universities, government agencies, trade organizations, etc.
- The committee will utilize consultants as necessary to achieve its goals.
- The committee will participate in forums, seminars, etc inside and outside the University in order to gather information that can help achieve the stated objectives.

Output Boundary:

- The committee will provide information to UPE management and to higher levels as necessary.
- The committee will provide routine and special reports as necessary to fully inform management of findings.
- The committee will participate in forums, seminars, etc. inside and outside the University as required to inform and persuade participants and decision makers of the committee's actions and recommendations.

5. Customer Expectations

- A reliable distribution system free of unplanned outages

- The committee will provide leadership and direction in planning future expansion and renovation projects that keeps the distribution services operational and available for future campus growth.
- The committee will pursue its goals in an expeditious manner that will allow timely action.
- This committee will plan in a manner that will minimize cost.

6. Constraints

- The committee is not authorized to take any action that will obligate the University financially or otherwise. Members of the committee may have authorization to take such actions as part of their assigned duties outside of the committee.
- All reports, recommendations or other official actions of the committee will be reviewed by the Associate Director of Utilities and Plant Engineering plus higher management as necessary.
- The committee has no budget and no spending authority but may make recommendations for spending.

7. Chartering Body

Utilities and Plant Engineering

8. Champion

Mike Swanson

9. Resources

- UPE, Plant Ops and University personnel
- Historical data, computer models, billing records
- Campus Master Plan
- Other universities, Big 10 & Friends, APPA
- Trade organizations, e.g. IDEA, ASME
- Vendors & consultants

10. Milestones

Formation and first meeting of committee

- Initial evaluation of present situation
- Development of immediate goals
- Updated computer models (HPS, MPS, condensate)
- First committee status report
- First set of recommendations for future actions

11. Team Members

- Mike Swanson
- Bill Fink
- Ven Manian
- Bill Verge
- Potential Members:
 - Eric Albert
 - UPE Engineer - TBN