IDEA2021

Powering the Future: District Energy/CHP/Microgrids

Sept. 27-29 | Austin Convention Center | Austin, Texas

Utility Procurement Solutions From District Cooling

James Parker – Austin Energy
Seth Kraal, PE – Jacobs
Craig McCurley, PE – Jacobs

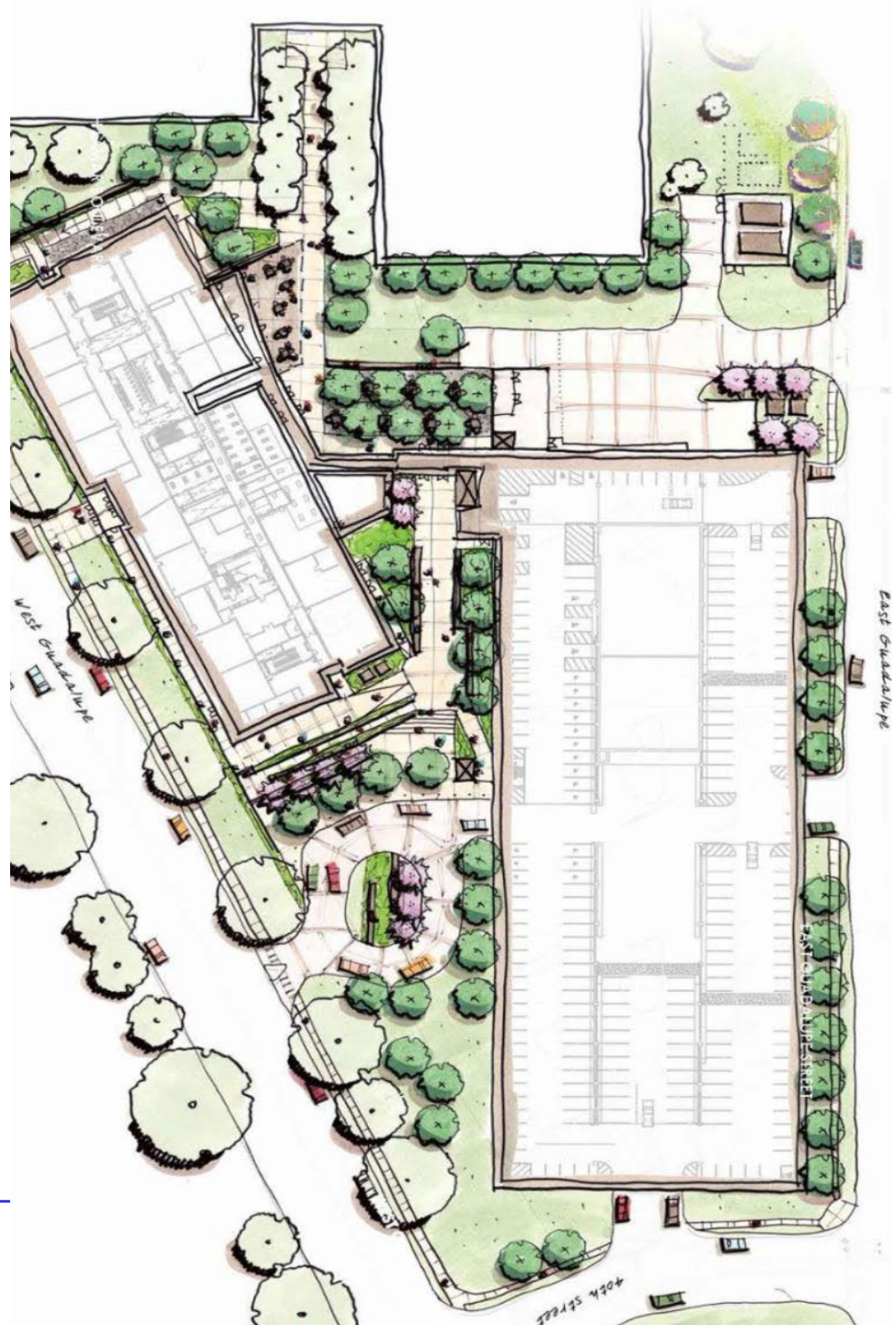
IDEA2021
Powering the Future: District Energy/CHP/Microgrids
Sept. 27-29 | Austin Convention Center | Austin, Texas

AUSTIN ENERGY

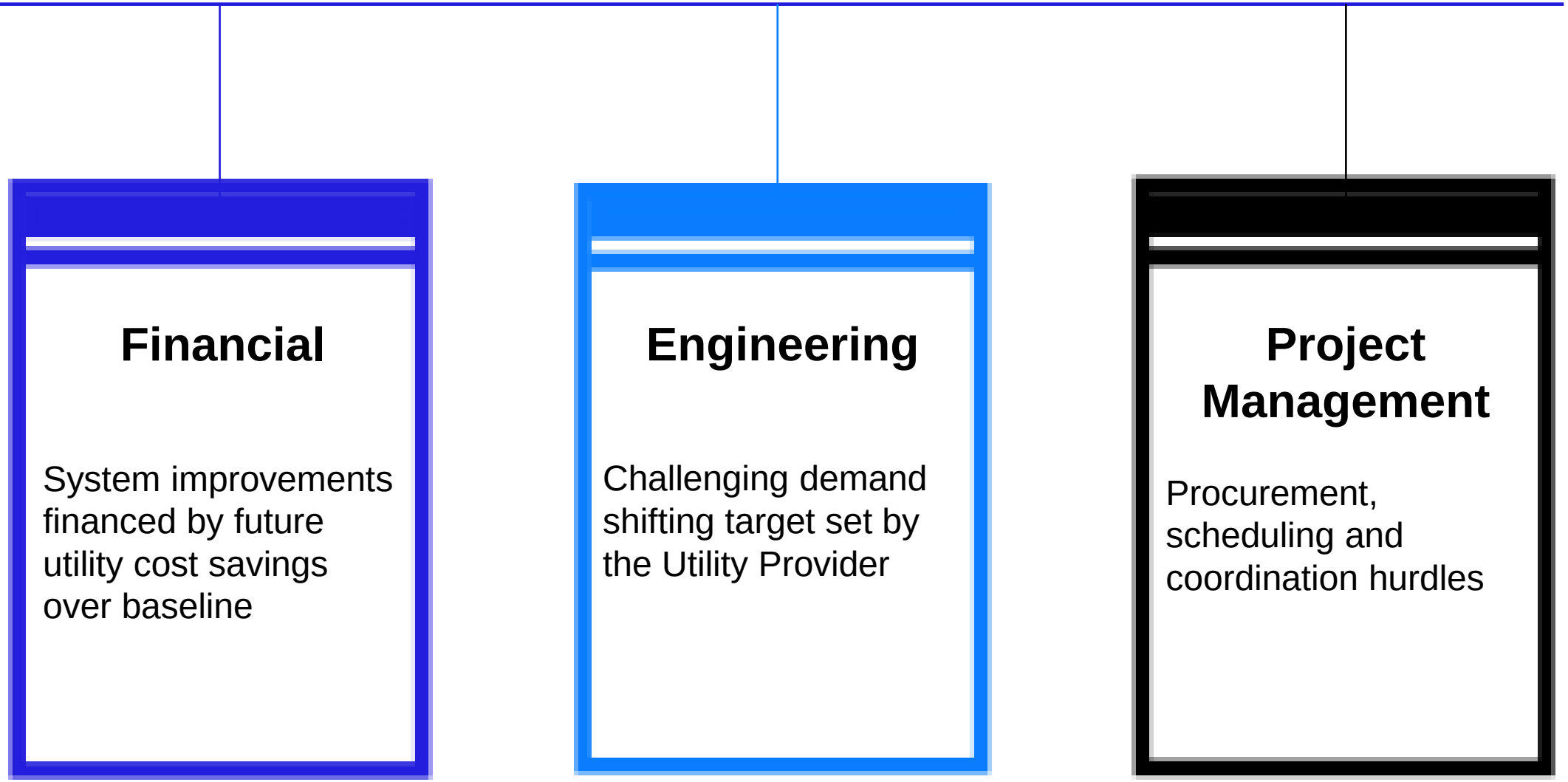
Jacobs
Challenging today.
Reinventing tomorrow.

Project Background

- 1.1M SF of office, mixed use and parking
- Situated in North Central Austin
- Construction in three phases
- 3,000-ton (firm) chilled water plant
- Electrical provider is Austin Energy



Challenges Implementing This Campus Utility Procurement Plan



NAC Financial Challenges: System Alternatives Financed by Savings

- Texas Facilities Commission (TFC) directed that all improvements should generate an RIO of 0.10
- TFC also directed that each incremental portion of the improvement proposal should generate an ROI of 0.10

- Austin Energy rebates $350 per kW for load shifting and $450 for efficient chiller systems
- TES Analysis Rebate
- Austin Energy provides a TOU rate and load shifting rider
- Medium voltage service discounts (over LV rates)

Financial Solutions

Maximize load shift **Incentive** by phasing install of TES

Total energy rebates for construction project capped at $300k

Installing the TES system in 50/50 phases allowed the TFC to capture the TES rebate twice

TES total rebate was increased by over $150k

STUMBLING BLOCK: discharge of tanks installed in phases can present control issues

Financial Solutions

Maximize medium voltage **Rate Savings**

Serve the entire campus from one MV meter

Quick payback: ROI of 0.28

Rate savings multiplied by entire campus demand

STUMBLING BLOCK:
Too large a peak demand would have caused the TES system to shift to little demand to meet the “load shifting rate” criteria.

Financial Solutions

Maximize load shifting **Discounts** thru educated system sizing

Hourly Analysis Program (HAP) predicted the campus peak electrical and coincident cooling demand

Analysis showed that a chiller could be selected to meet energy code while accounting for 30% of campus demand

STUMBLING BLOCK:
Too “good” chiller efficiency would have caused the TES system to shift to little demand to meet the “load shifting rate” criteria

Engineering Solutions: Chiller and TES Tank Specification

- **Tank spec designs current tank discharge for future load**
  - **SOLUTION:** Tanks designed to discharge in series, future tank sizing is flexible

- **Maximize chiller rebate within the limits of the procurement plan**
  - **Perspective** – Chiller rebate delta was only $3,500
  - **SOLUTION:** Effective load modeling of campus allowed the design to achieve maximum benefit from the rate and the chiller rebate
  - **SOLUTION:** Relaxed Spec language provided latitude to the vendor to design to the desired efficiency more accurately and cost effectively.

Project Management: Project Team

[**STUMBLING BLOCK**] long developing projects and changing project team members can cause the project to lose sight of some of its goals.

***IDEAL* SOLUTION:** Retain the project team to preserve the project knowledge

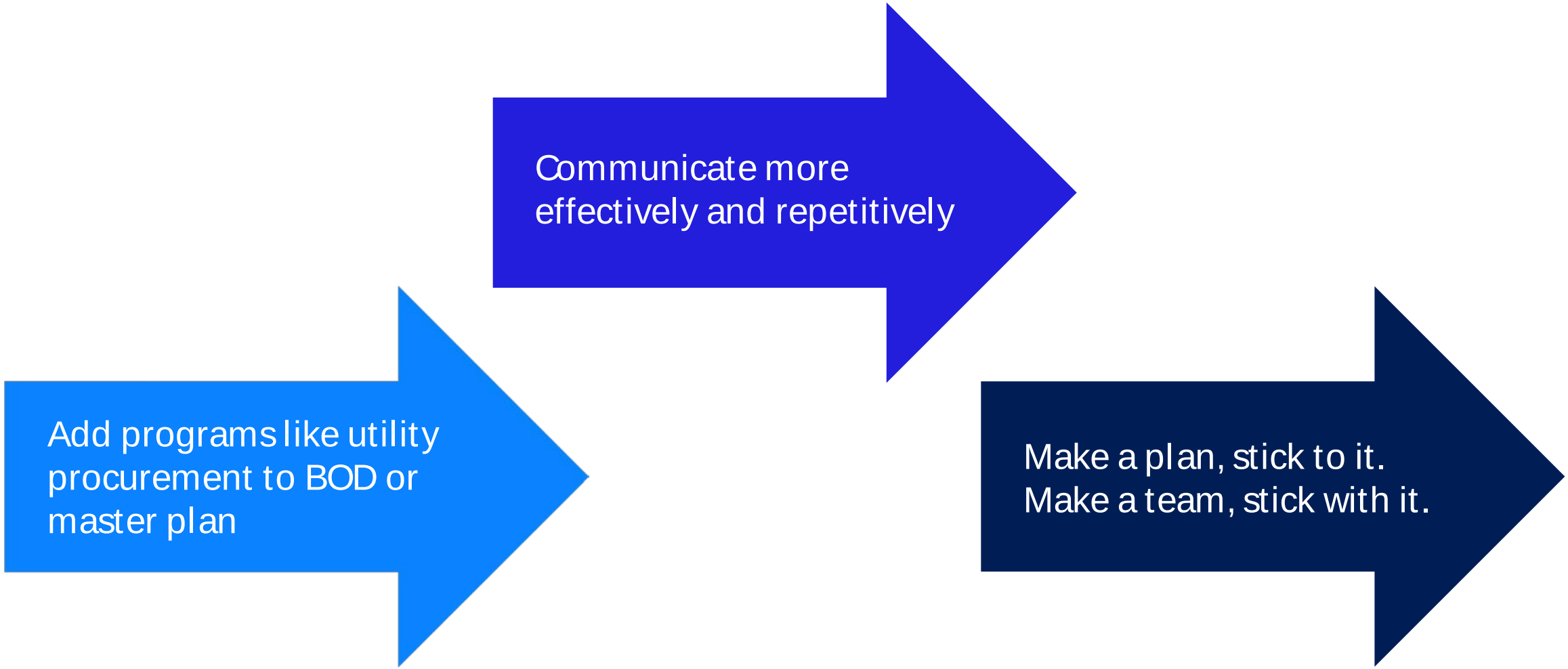
- TFC was owner PM from project inception and retained his understanding of the goal of the utility system
- Austin Energy guided the project team thru the AE rebate and rate application process.
- Jacobs confirmed the components of the utility system were designed, sized and installed to meet the goals of the TFC and Austin Energy

Project Solution

- 10 MW medium voltage electrical distribution system
- 3,000-ton (firm) chilling water cooled chilling plant
- 7,700 ton-hour TES system

- 11-year payback
- Reduces peak grid demand by 1.6 MW
- $419k of rebates to the Owner
- $153k per year utility savings

Lessons Learned



Questions?