CampusEnergy2016

Designing a Campus Utility Measurement System

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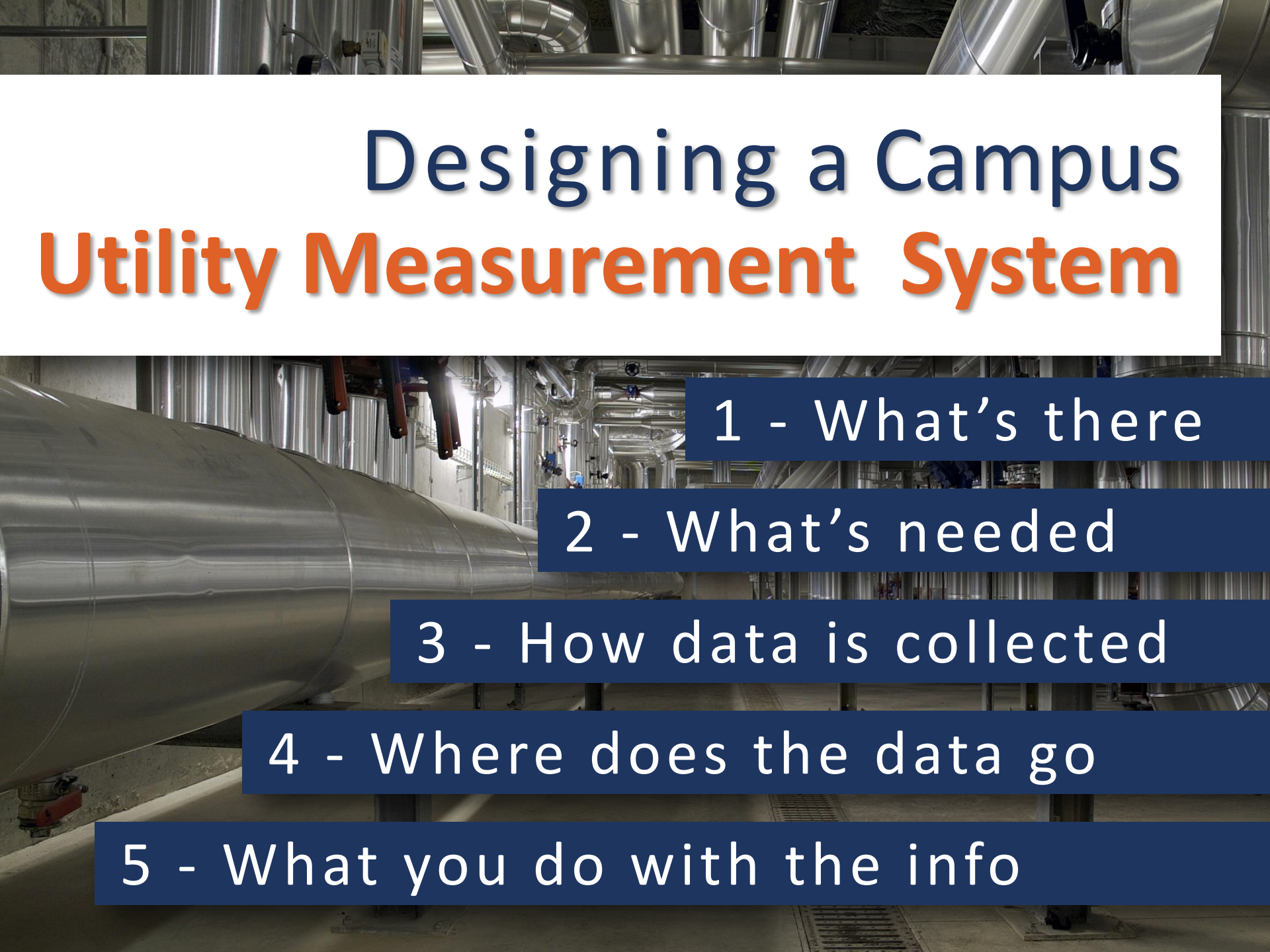
Campus Sustainability
NOT
Easy
Cheap
Fast
Reach Sustainability Targets
Reduce CapEx



Designing a Campus
Utility Measurement System

1 - What's there

2 - What's needed

3 - How data is collected

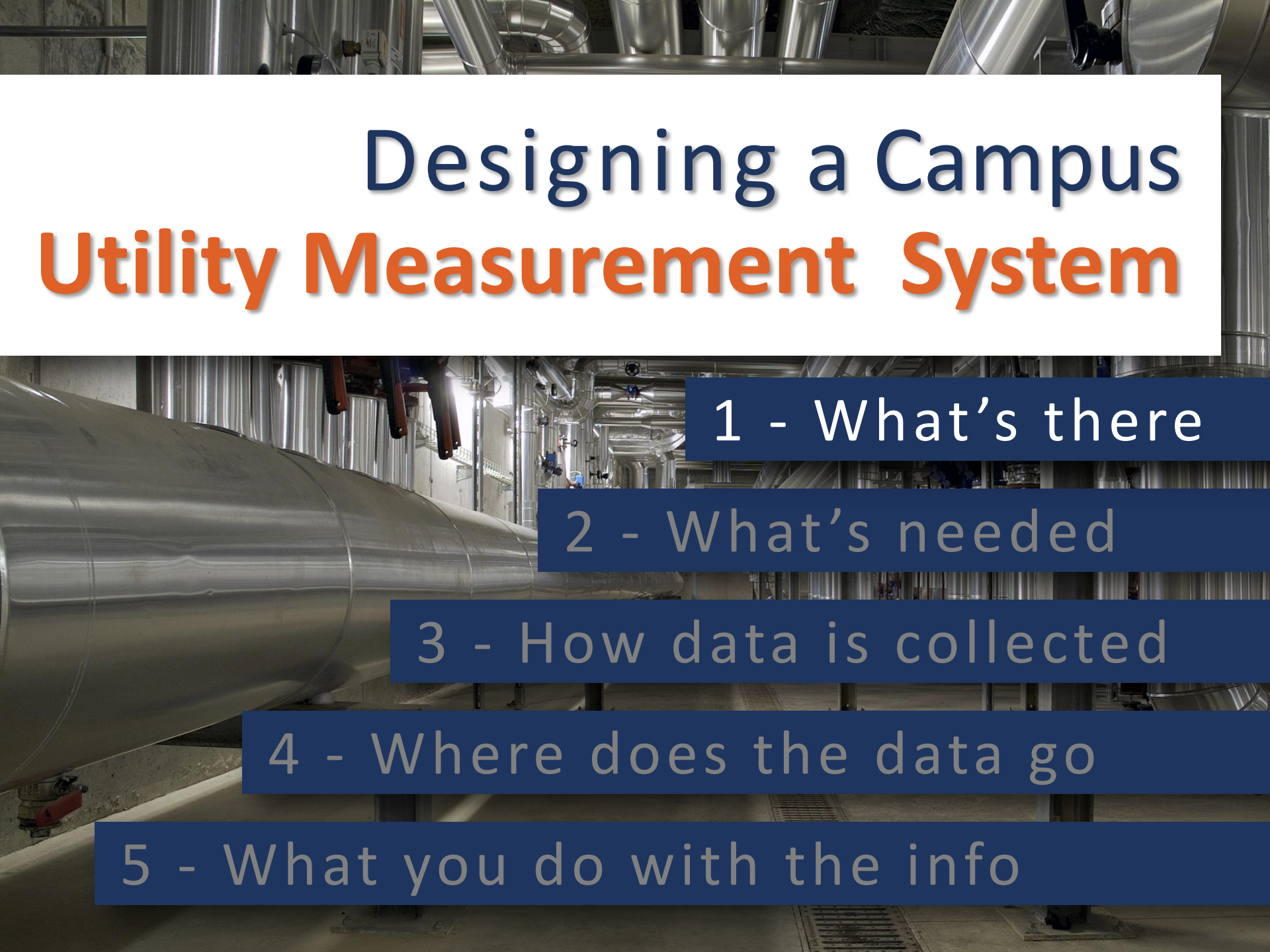
4 - Where does the data go

5 - What you do with the info


No One Size Fits All
Your Operational Goals
Your Sustainability Goals

Example

Ohio University
Kennesaw State



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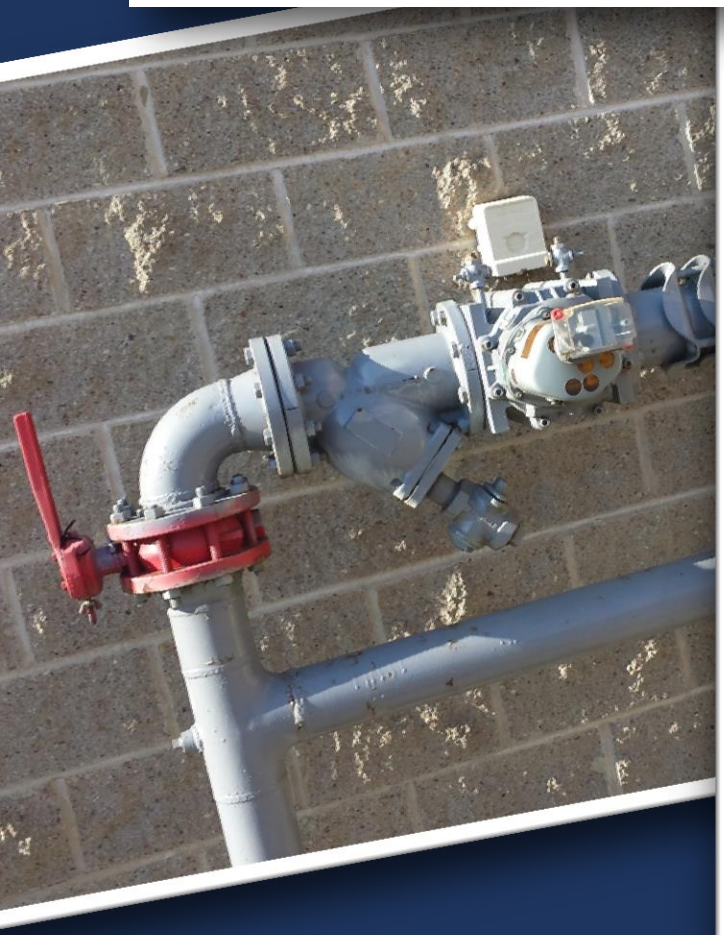
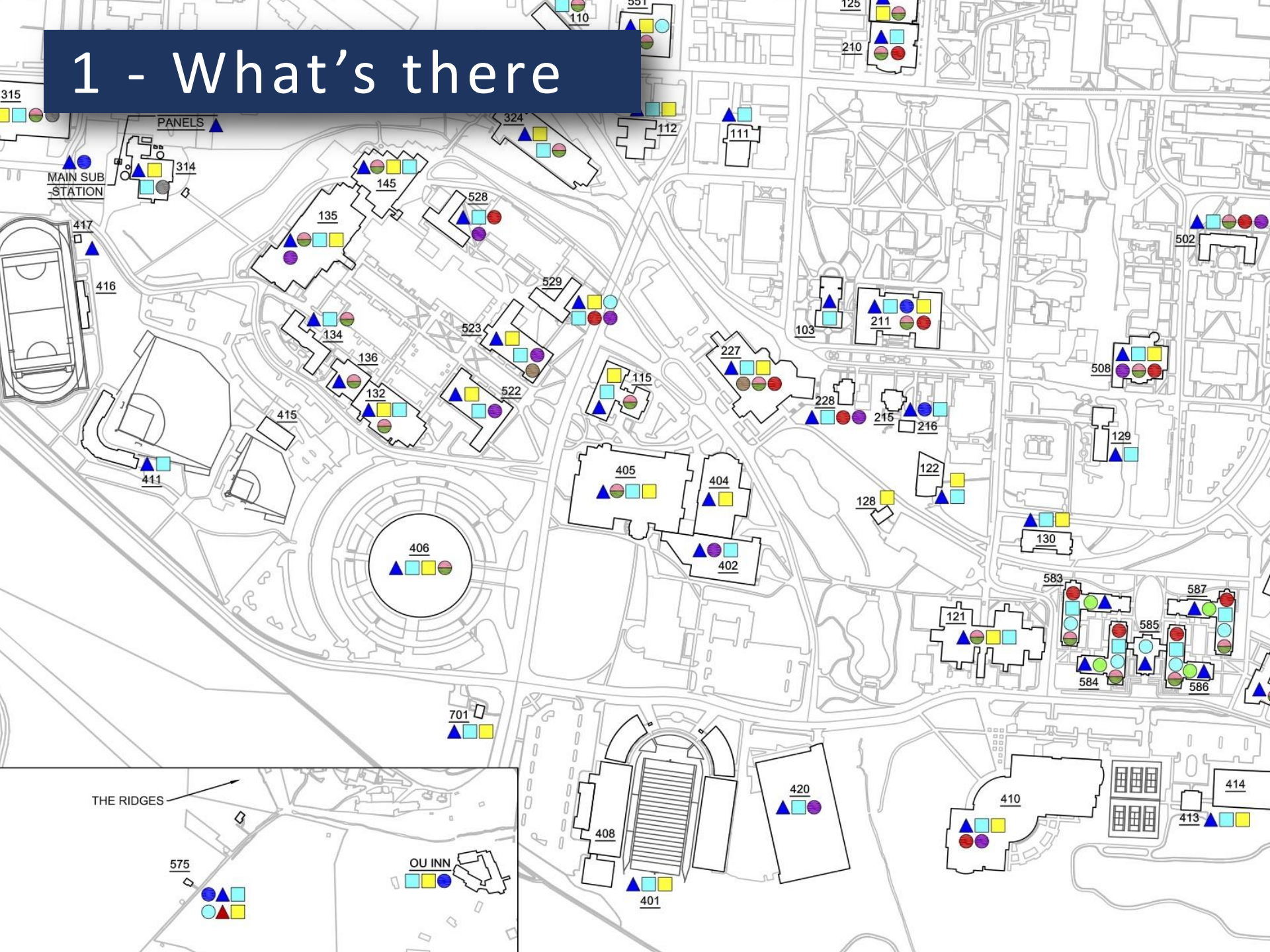
1 - What's there

What utilities do you have?



1 - What's there



Meter Inventory?

“*It’s a **Nightmare***”

Eric Valentine
Energy Manager, Rice University

1 - What's there

The
Harry Potter
Door

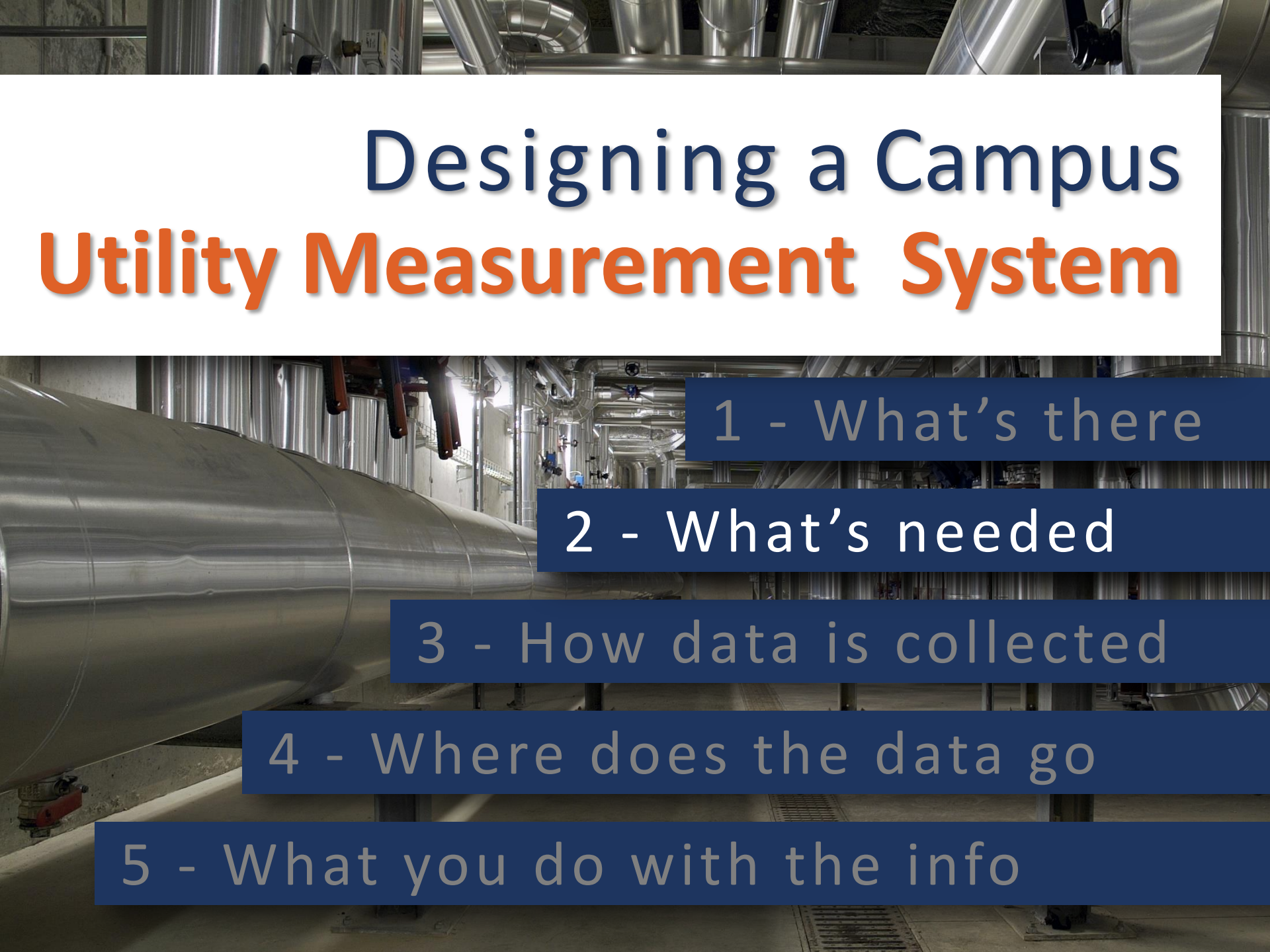
1 - What's there

Hidden
Meters

1 - What's there

Team Work!

1 - What's there



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2 - What's needed

Coordinated & Integrated

- Meters
- Submeters
- Meter Map
- Control/EMS/BAS
- Servers
- Control Hierarchy & Integration
- Dashboard?

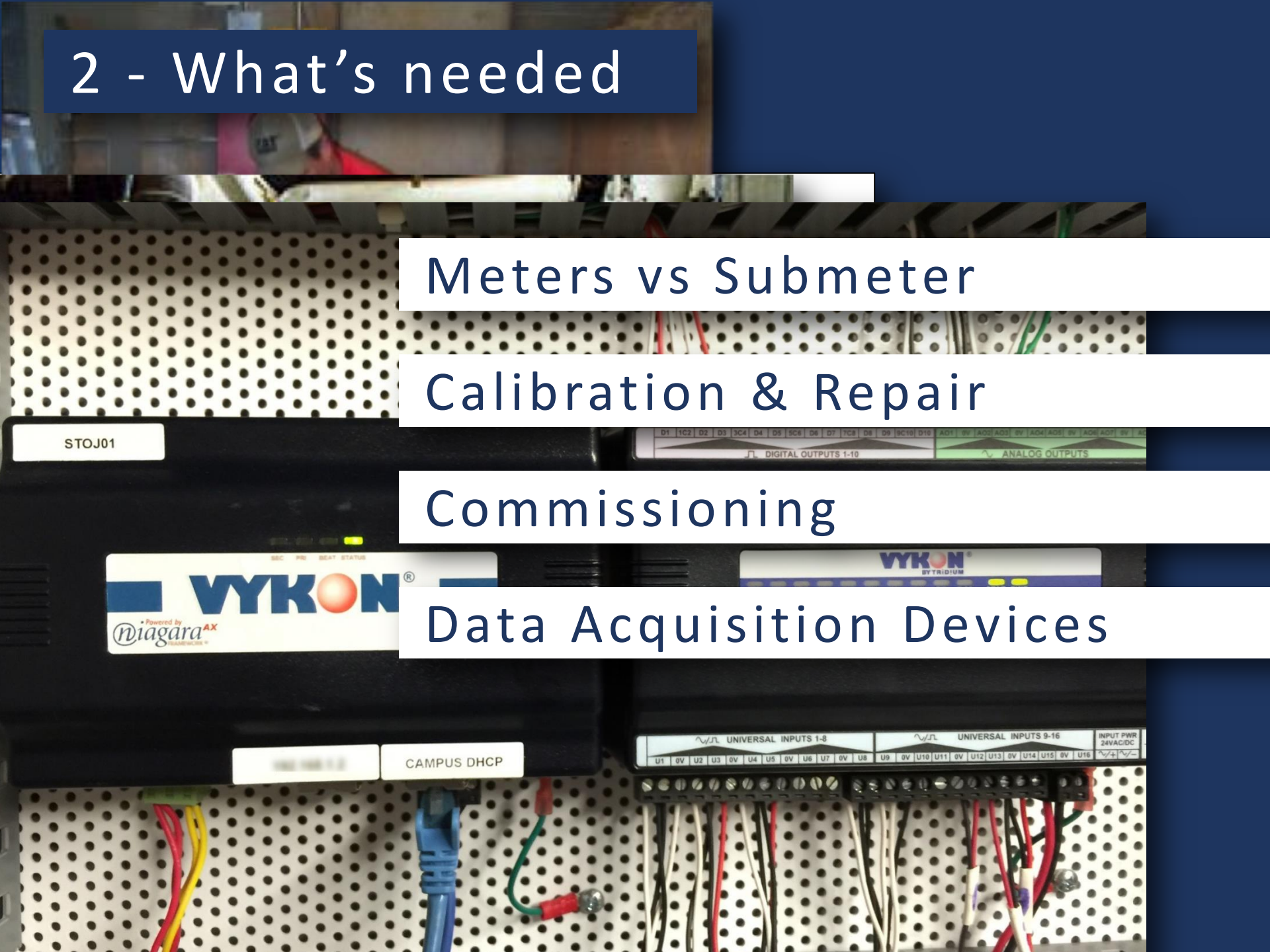
2 - What's needed

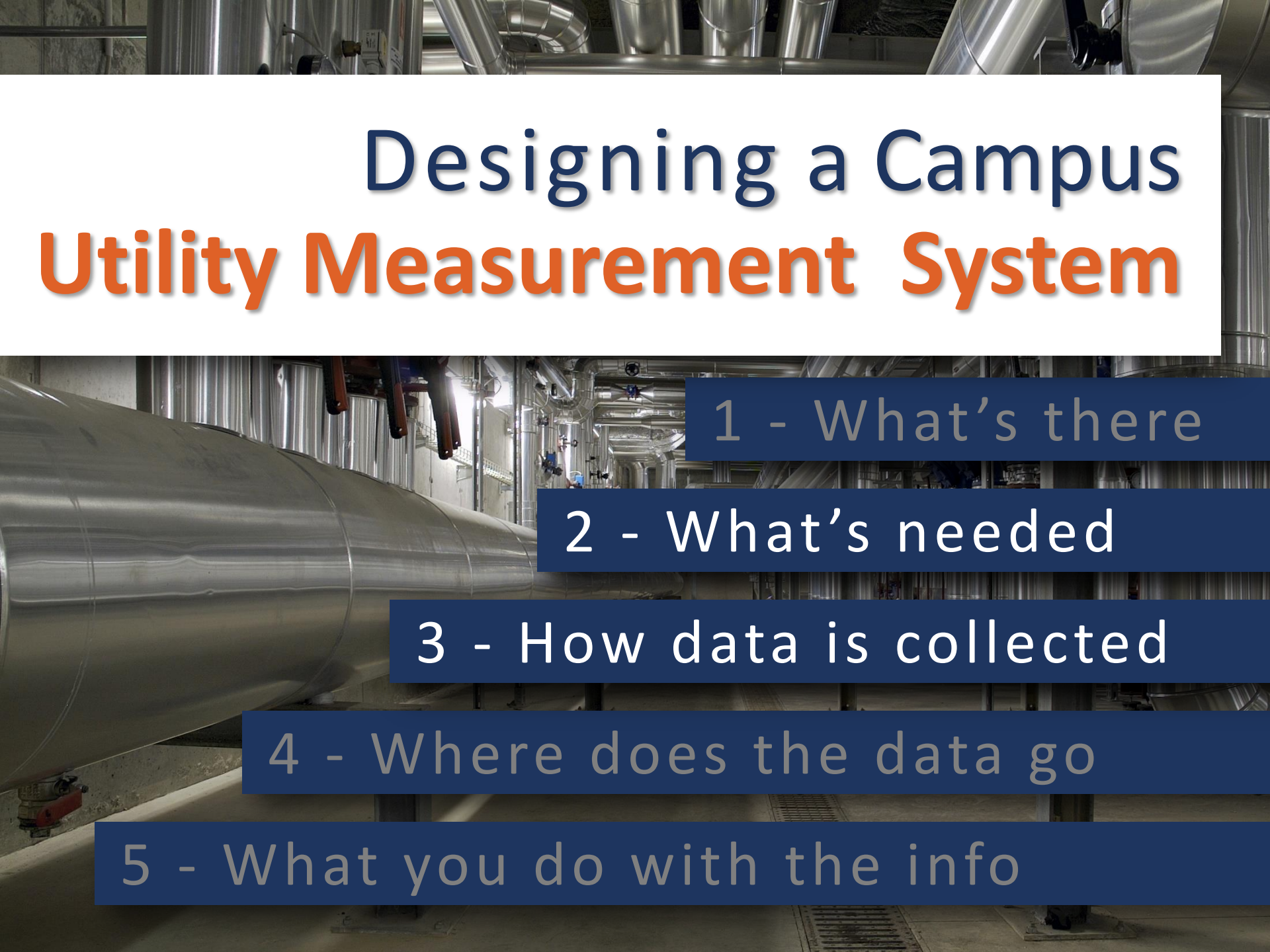
Meters vs Submeter

Calibration & Repair

Commissioning

Data Acquisition Devices





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3 - How data is collected

Utility Meters

No Data

Manual Spreadsheet Data

Electronic

Interval

3 - How data is collected

Data Integrity

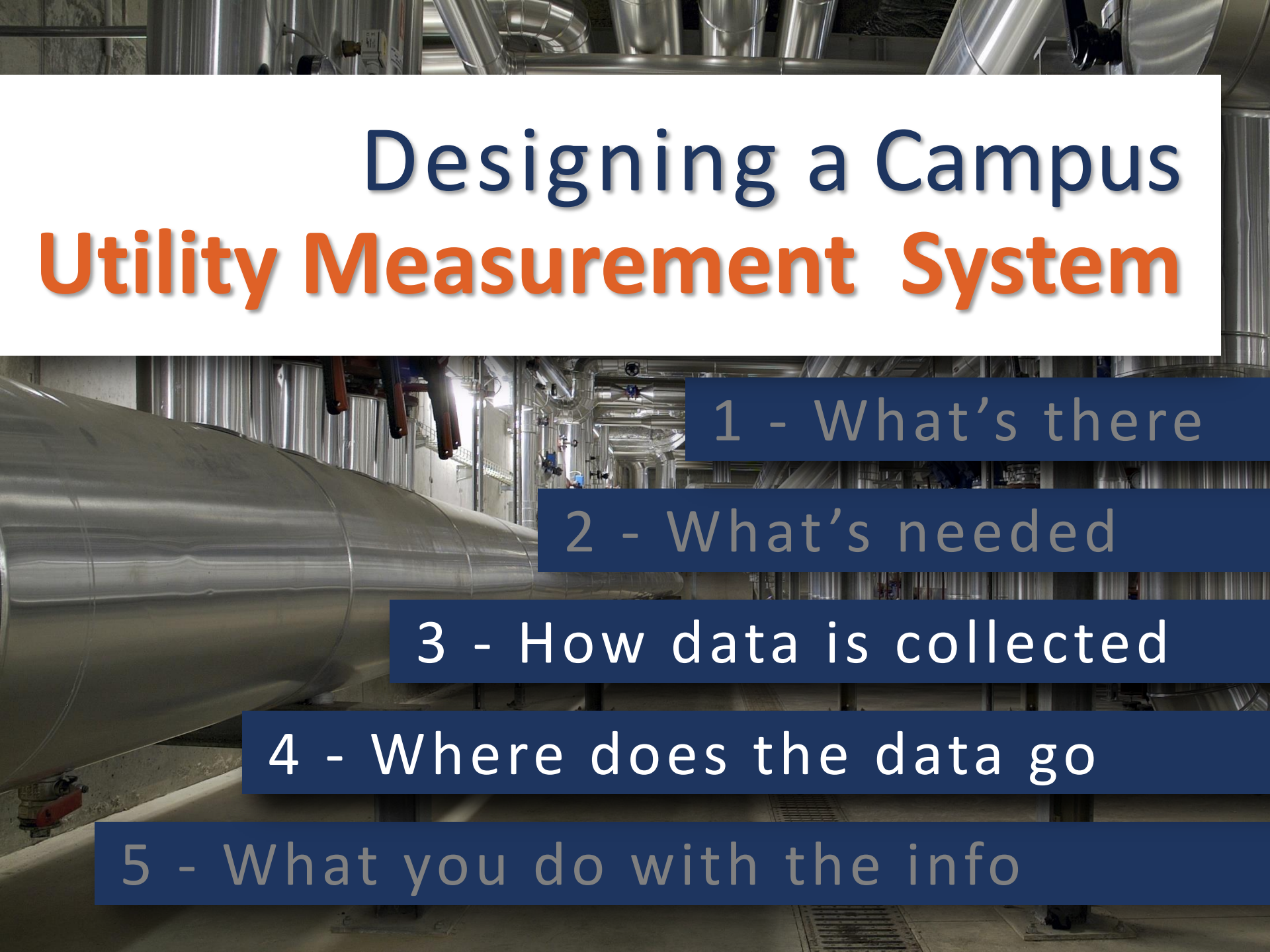
Metering Standards

- Communications Protocols
- Units of Measure
- Naming Conventions
- Communications Issues

3 - How data is collected

LEGEND			
	Appears to be good		Misc issues - units might be off, data looks wrong
	Bad/missing data, zero values, stopped collecting		Accumulating trend is rolling over to zero
	No data - no point or trend in database at all		Data is zero for periods of time

Meter Info	Histories at Server			
BUILDING NAME	kW Trend	kWh Trend	CHW BTU Trend	CHW BTU/hr Trend
Building #1	REAL_POWER_DEMAND	REAL_POWER_USAGE_DELTA Rollover	CHWEnergyMeterBTU Total_1Min Missing Data	CHWEnergyRateBTUperH
Building #2	REAL_POWER_KW	THREE_PHASE_REAL_ENERGY Rollover	On the loop but no data	No energy rate history
Building #3	EC_1_POWER_METER ENERGY_DEMAND Data to zero sometimes	ENERGY_USAGE_DELTA Rollover and to zero	On the loop but no data	No energy rate history
Building #4	CEP_ENERGY_DEMAND Data to zero sometimes	CEP_ENERGY_USAGE_DELTA	Plant_CHW_Meter_NetTotalizer	No energy rate history
Building #5	ElecMeter 1 WattsTotal3Phase ElecMeter 2 WattsTotal3Phase	No consumption history	No consumption history	Several different energy rates, which one is accurate?
Building #6	No demand history	No consumption history	No consumption history	No energy rate history
Building #7	No demand history	REAL_POWER_USAGE_DELTA	CHWEnergyMeterBTU Total_1Min 1 min interval missing data	CHWEnergyRateBTUperH
Building #8	EC_1_POWER_METER ENERGY_DEMAND Data to zero sometimes	ENERGY_USAGE_DELTA	CHW_EnergyMeter_PositiveTotalizer Possible facet/unit issue - are in MBTU, not BTU need to verify facet/unit in AX	CHW_EnergyRateBTUperH
Building #9	REAL_POWER_DEMAND	REAL_POWER_USAGE_DELTA Rollover	CHWEnergyMeterBTU Total_1Min 1 min history - should be 15 min Missing data and not accumulating (stale)	CHWEnergyRateBTUperH Data is not changing
Building #10	Points POWER_METER_INPUT_KW	POWER_BILLING_PERIOD_DELTA	CHW Energy Meter_NetTotalizer Possible facet/unit issue - are in MBTU, not BTU need to verify facet/unit in AX	Bldg_HW_EnergyRateBTUperH
Building #11	EC_1_POWER_METER ENERGY_DEMAND Data to zero sometimes	ENERGY_USAGE_DELTA	Overcash_CHW_EnergyMeter_NetTotalizer Data has stopped collecting	CHW_EnergyRateBTUperH Data has stopped collecting
Building #12	POWER_METER_ENERGY_DEMAND	ENERGY_USAGE_DELTA	CHW_EnergyMeter_NetTotalizer Possible facet/unit issue - are in MBTU, not BTU need to verify facet/unit in AX	CHW_EnergyRateBTUperH



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Controller

Server

EMS/BAS

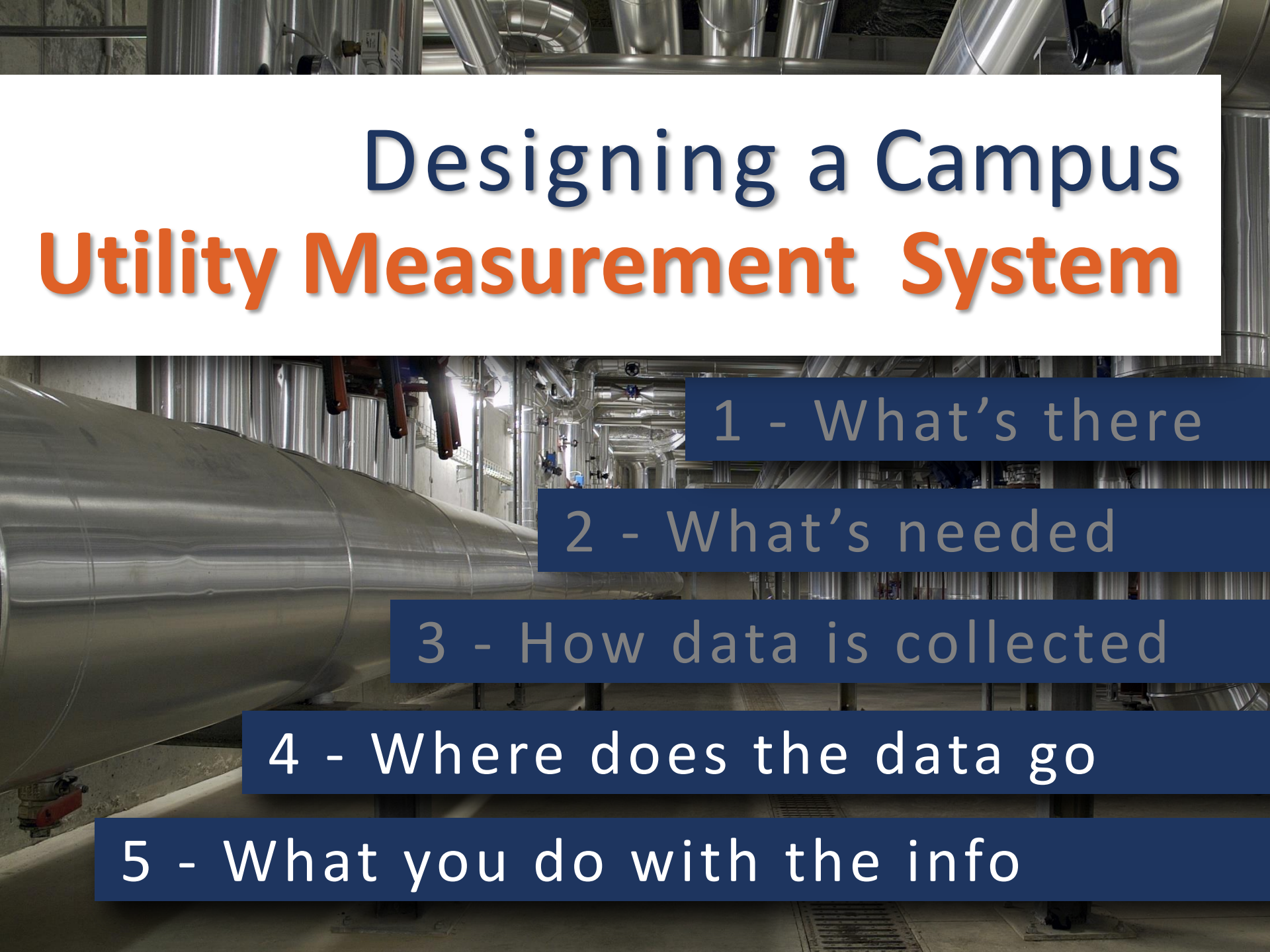
Dashboard

and…

4 - Where does the data go

nowhere

4 - Where does the data go



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What you do with the info

Kennesaw State
Control Peak Demand
8.294 → 8.0 MW

Control **Twelve**
30-Minute Periods
Save **$30,000**+/Yr

What you do with the info

Design Your Campus

Utility Measurement System

Achieve **Sustainability Goals** via **Data Driven Solutions**

Reduce **CapEx**

Stakeholder Buy-In

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