

Managing Energy Information

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University of Nebraska-Lincoln

(way out west, at the end of the Big 10)

- 25,800 students
- 14.1 million GSF in 190 buildings
- 2 utility plants (480 meters)
 - steam (139)
 - electricity (201)
 - CHW (132)
 - CTW (8)

University of Nebraska-Lincoln

(way out west, at the end of the Big 10)

- 25,800 students
- 14.1 million GSF in 190 buildings
- 2 utility plants (480 meters)
- Direct utility customers (306 meters)
 - electricity (84)
 - natural gas (110)
 - water (112)

How NOT to manage your data

as recently as 2016...

- Multiple, overlapping data silos
- Responsibility spread across departments
- Non-standard (ad-hoc) reporting
- Reactive business processes

It used to look like...

auxiliary (chargeback) customers

- Manual reads recorded in spreadsheet
- Paper vendor bills added to spreadsheet
- Splits, deducts & special deals hard-coded
- 3-4 days/month to process

The Color-Coded Spreadsheet

(proof that you're a real university utility)

	A	B	C	D	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Meter Name	Rte #	Vendor	Building	Current	Last Month	Difference	Factor	Usage	Units	Rate	Cost	Billable	Current Billing	INV #	SAP #	Credit GL	Cost Object
2	GAUN STEAM COND EMCS	53	UNL Steam	@ Jackie Gaughan Multicultural Center					527.22	/1000 #s	5.3600	\$1,753.90	1	\$1,753.90	17-1365794	17024816	592940	2142150002
3	GAUN ELEC BLDG EMCS	54	UNL Electric	@ Jackie Gaughan Multicultural Center					22493.00	/kwh	0.0660	\$1,484.54	1	\$1,484.54	17-1365795	17024816	592950	2142150002
4	GAUN CHW BLDG EMCS	55	UNL Chilled Wa	@ Jackie Gaughan Multicultural Center					1881.00	/ton hr	0.0540	\$101.57	1	\$101.57	17-1365796	17024816	592960	2142150002
5	TELC STEAM BLDG EMCS	132	UNL Steam	@ NETV					750.30	/1000 #s	5.3600	\$4,024.93	1	\$4,024.93	17-1365797	17024816	592940	2227010001
6	TELC CHW BLDG EMCS	133	UNL Chilled Wa	@ NETV					21241.30	/ton hr	0.0540	\$1,309.21	1	\$1,309.21	17-1365798	17024816	592960	2227010001
7	FORL STEAM COND EMCS	129	UNL Steam	@ USDA Forage Research Lab					14000.00	#s	5.3600	\$4,024.93	1	\$4,024.93	17-1365799	17024816	592940	2333090003
8	FORL ELEC BLDG MANUAL	130	UNL Electric	@ USDA Forage Research Lab											17-1365800	17024816	592950	2333090003
9	FORL WATER.BLDG.MANUA	131	UNL Water	@ USDA Forage Research Lab											17-1365801	17024816	592930	2333090003
10	FMP ELEC B&C MANUAL	99	UNL Electric	@ Commonwealth-Panel B & C											17-1365802	17024816	592950	2333140007
11	FMP ELEC I.MANUAL	100	UNL Electric	@ Commonwealth-Panel I											17-1365803	17024816	592950	2333140007
12	FMP ELEC MDA .MANUAL	101	UNL Electric	@ Commonwealth-Panel MDA											17-1365804	17024816	592950	2333140007
13	FMP NGAS COM MANUAL	102	UNL Gas	@ Commonwealth	8308				12,160,794.00			580,800.00			17-1365805	17024816	592910	2333140007
14	FMP NGAS CUSTD MANUAL	103	UNL Gas	@ Commonwealth/Custodial	8153				12,417,376.00			605,300.00			17-1365806	17024816	592910	2333140007
15	UHC STEAM BLDG EMCS	92	UNL Steam	@ University Health Center					13,399,796.00			932,600.00			17-1365807	17024816	592940	2342120001
16	UHC ELEC BLDG MANUAL	93	UNL Electric	@ University Health Center					14,731,637.00			2,560,200.00			17-1365808	17024816	592950	2342120001
17	UHC CHW BLDG EMCS	94	UNL Chilled Wa	@ University Health Center					15,436,275.00			4,291,400.00			17-1365809	17024816	592960	2342120001
18	NU STEAM G EMCS	56	UNL Steam	@ Nebraska Union					15,908,435.00			5,048,600.00			17-1365810	17024816	592940	2342151211
19	NU ELEC BLDG MANUAL	57	UNL Electric	@ Nebraska Union					17,059,060.00			4,258,600.00			17-1365811	17024816	592950	2342151211
20	NU CHW BLDG EMCS	58	UNL Chilled Wa	@ Nebraska Union					17,350,573.00			3,349,626.00			17-1365812	17024816	592960	2342151211
21	NU ELEC KITCHEN MANUAL	60	UNL Electric	@ Nebraska Union Kitchen					17,444,648.00			4,113,277.00			17-1365813	17024816	592950	2342151211
22	NU ELEC IMPPAL MANUAL	62	UNL Electric	@ Imperial Palace					15,717,789.00			2,103,097.00			17-1365814	17024816	592950	2342151211
23	NU ELEC PLANET SUB MAN	63	UNL Electric	@ Subway					14,329,683.00			2,827,400.00			17-1365815	17024816	592950	2342151211
24	NU ELEC SBARRO MANUAL	64	UNL Electric	@ Subway Pizza					13,290,721.00			1,562,670.00			17-1365816	17024816	592950	2

It used to look like...

most buildings, including most auxiliaries

- Automatic, hourly meter reads stored in BAS
- Batch process summed monthly totals
- Non-auxiliary manual reads entered
- Manual data validation
- Batch process applied splits & deducts
- 1-2 days per month to process

It used to look like...

ad-hoc reporting

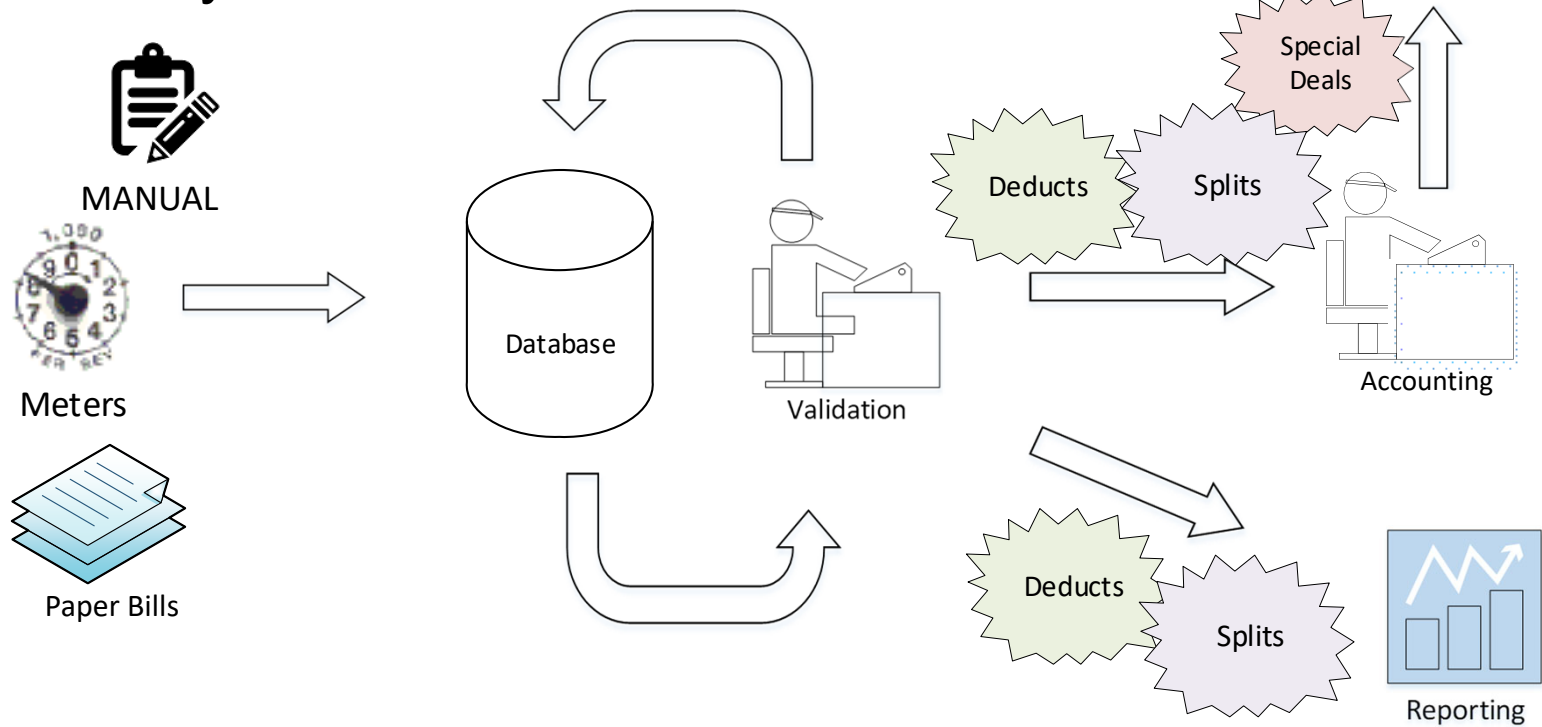
- Export data from BAS database into CSV
- Merge with accounting spreadsheets
- Manually remove duplicates
- Analyze data as requested
- 4 hours to 5 days per report

There were some good things

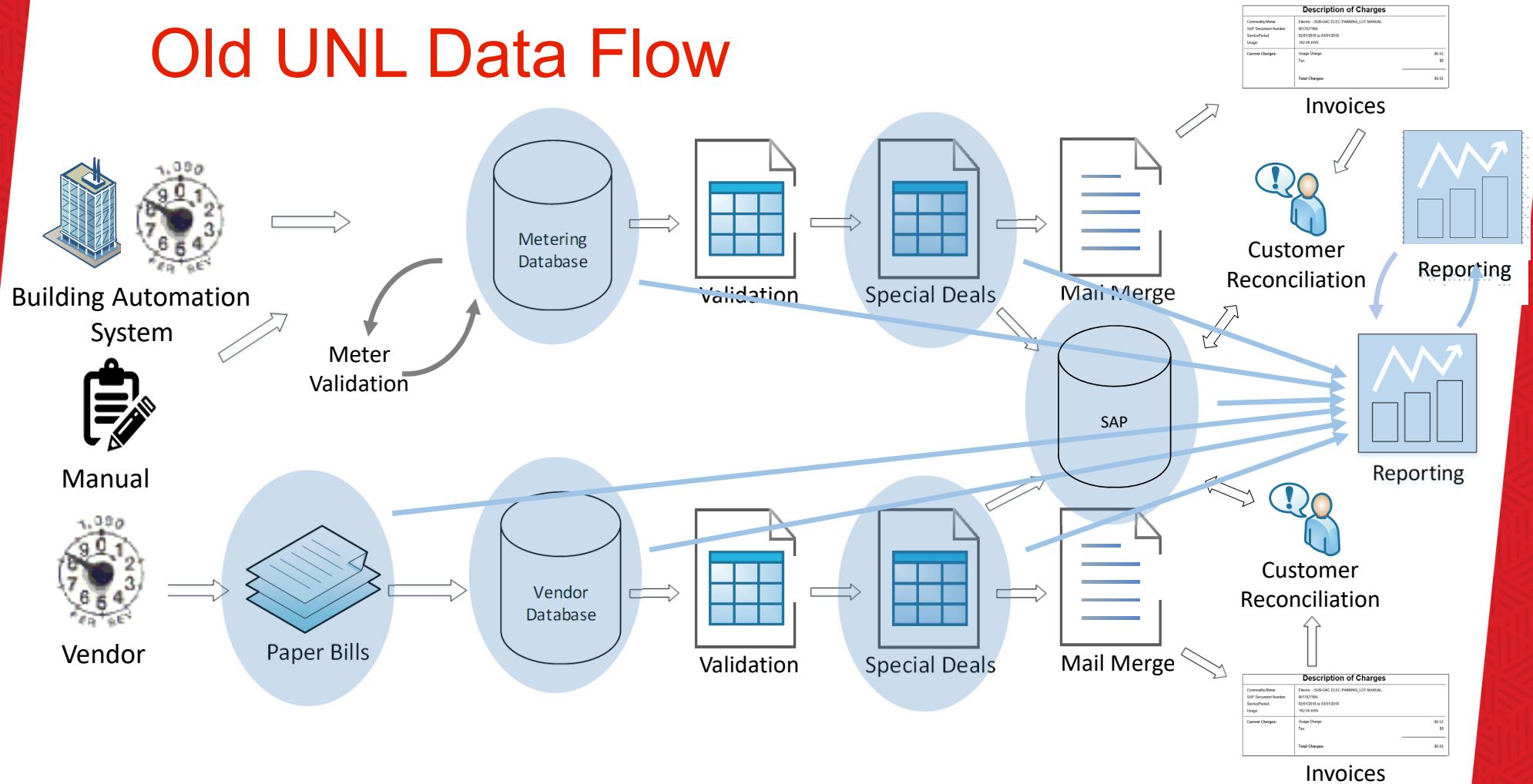
- Almost all meters connected to our BAS
- 6-10 years of historical data available
- Splits and deducts were well documented
- BAS had good data visualization tools
- LUCID dashboards for dorm competitions

Utility Data Flow

in theory



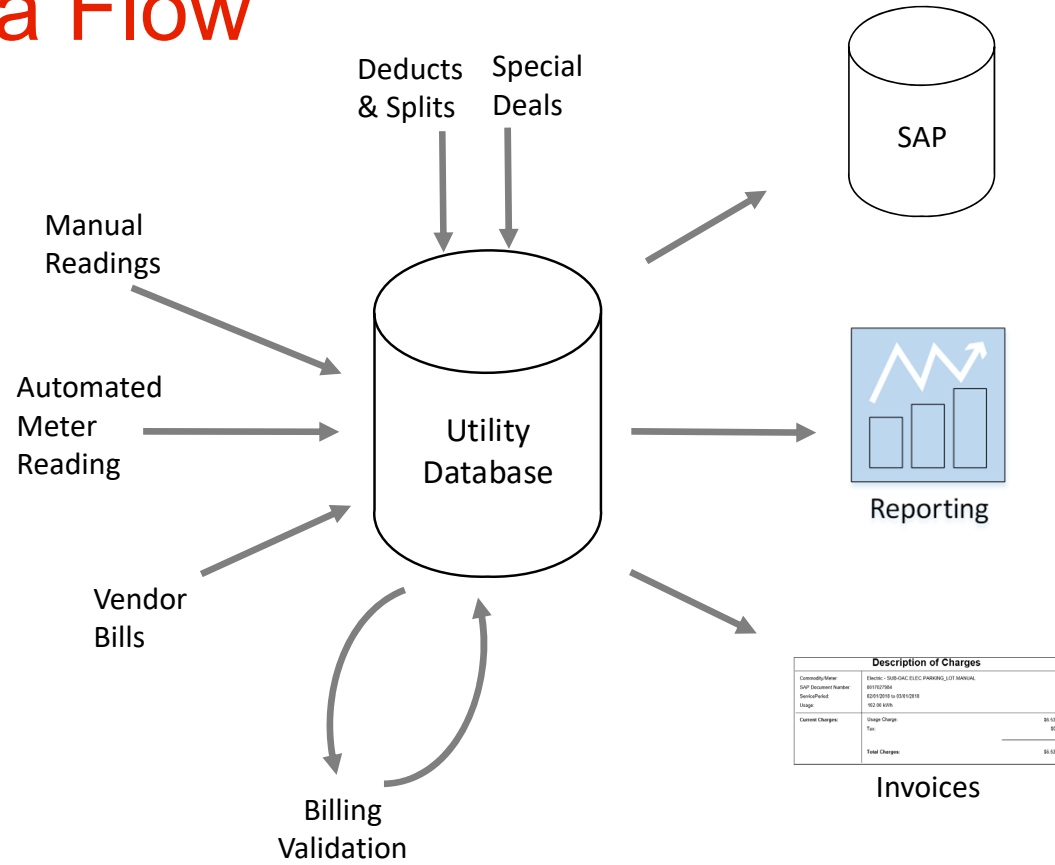
Old UNL Data Flow



Goals for Good Energy Data

- Single, accessible system-of-record
- Efficient means to
 - maintain data
 - invoice customers
 - prepare standard & special reports
- Visibility to campus
- CONFIDENCE

Ideal Data Flow



Who uses this data?

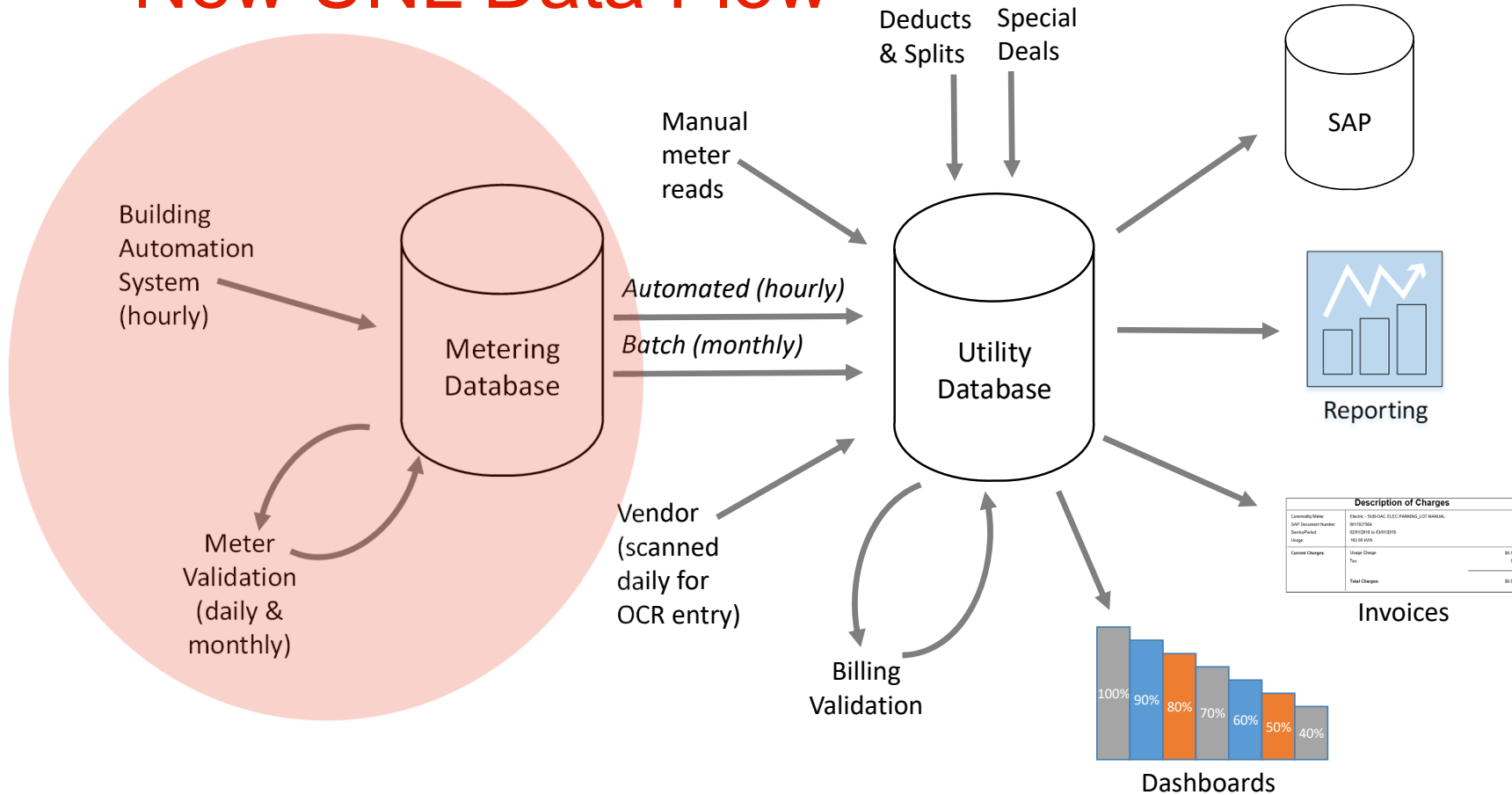
(or would, if it was reliable and they could find it)

- Administration
- Accounting
- Utility Plant
- Facilities
- Faculty
- Sustainability
- Students
- Public

Implementation

- Ten-month process
- Configure new system (many reviews)
- Import old meter definitions and data
- Verify correct meter configuration
- Validate against historical data
- Change & create SOPs

New UNL Data Flow



Conclusions

reduced staff overhead

- ½ day to process billing
- OCR BillCapture replaces manual entry
- reduced time to prepare reports
 - EnergyCAP standard reports
 - database structure makes SQL reports easier
- standard audit/correction procedures

Conclusions

improved data visibility & usability

- standard, clickable graphic display
- one-click copy data to clipboard
- simple meter selection (well-designed tree)
 - separate views for accountants and engineers
 - separate views for other NU campuses
- effortless weather data normalization
- dashboard widgets provide data to campus users

Conclusions

improved CONFIDENCE in our data

- single system-of-record
 - standard, repeatable reports
 - audit trail & consistent correction processes
 - secure, but widely available
- automatic billing audits improve validation steps
- improved collaboration between data users
- common language to describe our data