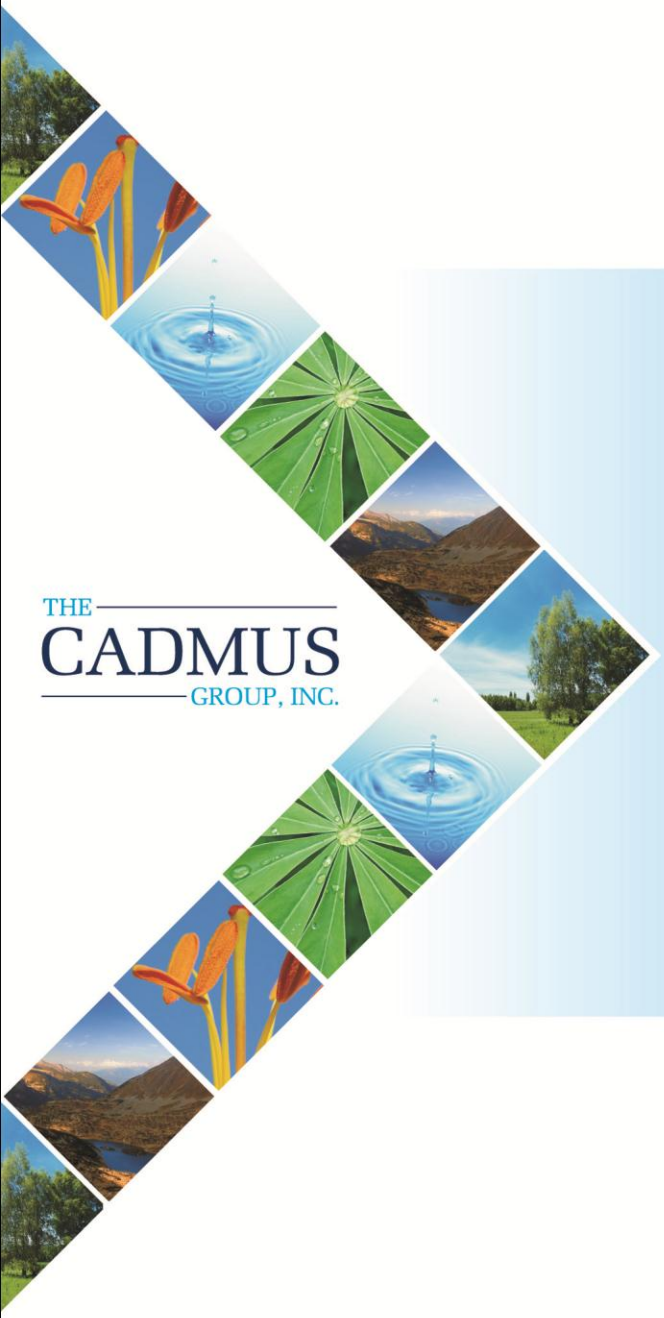


ARKANSAS
Economic Development Commission
ENERGY OFFICE

THE CADMUS GROUP, INC.

Arkansas Utility Baseline

Julio Rovi
Kudret Utebay
Shubhada Kambli

Agency Kick-off Meeting: December 14, 2010

AGENDA

- Project overview
- Introductions
- Cadmus team and expertise
- ENERGY STAR and benchmarking overview
- Status of Arkansas agency benchmarking
  - Objectives
  - Process and timeline
  - Data collection, what it involves for each agency
  - Benchmarking, what Cadmus will do and report
- Utility rate review
- Training & Support
- Questions and answers
- Closing thoughts
- Office hours

Cadmus Team and Expertise

- The Cadmus Group, Inc.
- Viridian
- PMC Group, LLC
- Ion Utilities, Inc.

What is ENERGY STAR?

- A government-backed, voluntary program that helps businesses and individuals protect the environment through superior energy performance by providing energy-efficient solutions for homes, businesses, and institutions.
- The national symbol for environmental protection through energy efficiency, recognized by more than 75% of all U.S. households.
- Known for products, homes and C&I facilities

Source: ENERGY STAR, www.energystar.gov

Benchmarking with Portfolio Manager

- Anything with a meter attached can be benchmarked
  - Compare facility energy use against its own baseline
  - Compare facilities of a similar type to each other
  - Compare facilities of a similar type to national metrics
  - Set priorities for use of limited staff time and/or investment capital
  - Prepare reports, assist with ASHRAE audits, more.
  - More detailed reports possible for select buildings using EPA Score

Source: ENERGY STAR, www.energystar.gov

Meeting Act 1494 of 2009

- Benchmark the energy use of all of your facilities
  - Site and source energy use intensity (EUI), GHG emissions.
  - Many buildings, including office buildings can receive energy performance ratings on a 1-100 scale.
- Monitor changes in energy and water use over time in single buildings, groups of buildings, or entire portfolios.
- Report cost savings and CO_2 emissions.
- Get federal recognition with ENERGY STAR.
- More at www.energystar.gov/benchmark

Source: ENERGY STAR, www.energystar.gov

Rating System for *Buildings*

Fuel Efficiency

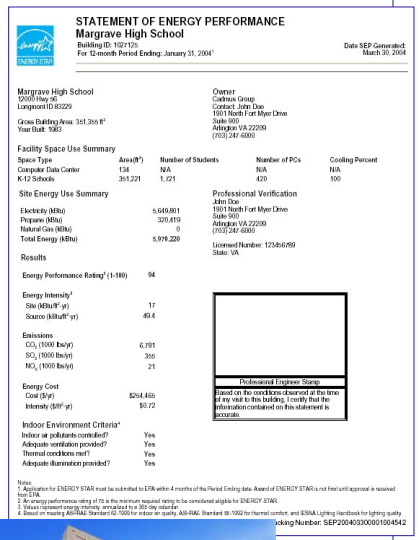
MPG

Is 60 MPG high or low for an automobile?

Is 80 kBtu/SF/YR high or low for a building?

Statement of Energy Performance

EPA Rating



STATEMENT OF ENERGY PERFORMANCE
Margrave High School
Building ID: 1027125
For 12-month Period Ending: January 31, 2004[1]
Date SEP Generated: March 30, 2004

Margrave High School
12000 Hwy 95
Longmont ID 83229

Gross Building Area: 351,356 ft²
Year Built: 1963

Owner
Cadmus Group
Contact: John Doe
1901 North Fort Myer Drive
Suite 900
Arlington VA 22209
(703) 247-6000

Facility Space Use Summary

Space Type	Area(ft²)	Number of Students	Number of PCs	Cooling Percent
Computer Data Center	134	N/A	N/A	N/A
K-12 Schools	351,221	1,121	420	100

Site Energy Use Summary

Electricity (kBtu)	5,649,801
Propane (kBtu)	320,419
Natural Gas (kBtu)	0
Total Energy (kBtu)	5,976,220

Professional Verification
John Doe
1901 North Fort Myer Drive
Suite 900
Arlington VA 22209
(703) 247-6000

Licensed Number: 1234b6789
State: VA

Results

Energy Performance Rating[2] (1-100)	94
Energy Intensity[3]	
Site (kBtu/ft²-yr)	17
Source (kBtu/ft²-yr)	49.4
Emissions	
CO_2 (1000 lbs/yr)	6,791
SO_2 (1000 lbs/yr)	355
NO_x (1000 lbs/yr)	21
Energy Cost	
Cost ($/yr)	$254,465
Intensity ($/ft²-yr)	$0.72
Indoor Environment Criteria[4]	
Indoor air pollutants controlled?	Yes
Adequate ventilation provided?	Yes
Thermal conditions met?	Yes
Adequate illumination provided?	Yes

Professional Engineer Stamp
Based on the conditions observed at the time of my visit to this building, I certify that the information contained on this statement is accurate.

Notes:
1. Application for ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of ENERGY STAR is not final until approval is received from EPA.
2. An energy performance rating of 75 is the minimum required rating to be considered eligible for ENERGY STAR.
3. Where consistent energy intensity, annualized to a 365 day calendar.
4. Based on meeting ASHRAE Standard 62-1999 for indoor air quality, ASHRAE Standard 55-1992 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

Tracking Number: SEP20040330000100454 2

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Source: ENERGY STAR, www.energystar.gov

ENERGY STAR Score Eligible Building Types

Bank/Financial Institutions

Courthouses

Data Centers

Dormitories

Hospitals

Hotels

Houses of Worship

K-12 Schools

Medical Offices

Office Buildings

Retail Stores

Supermarkets

Warehouses

Wastewater Treatment Plants

THE CADMUS GROUP, INC.

Source: ENERGY STAR, www.energystar.gov

Possible Score Eligible Buildings in Arkansas State Government

Courthouses

Data Centers

Hospitals

Medical Offices

Office Buildings

Warehouses

Wastewater Treatment Plants

THE CADMUS GROUP, INC.

Source: ENERGY STAR, www.energystar.gov

Possible Score Eligible Buildings in AR State Government plus Education

Courthouses

Data Centers

Dormitories

Hospitals

Hotels

K-12 Schools

Medical Offices

Office Buildings

Retail Stores

Warehouses

Wastewater Treatment Plants

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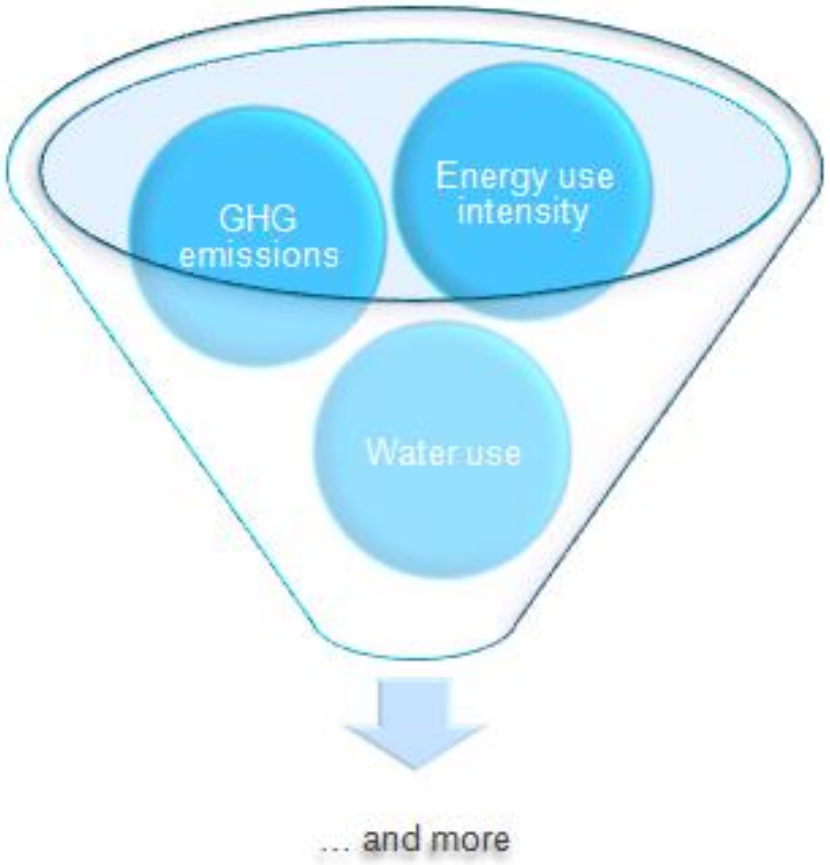
Source: ENERGY STAR, www.energystar.gov

Examples of Other Space Types

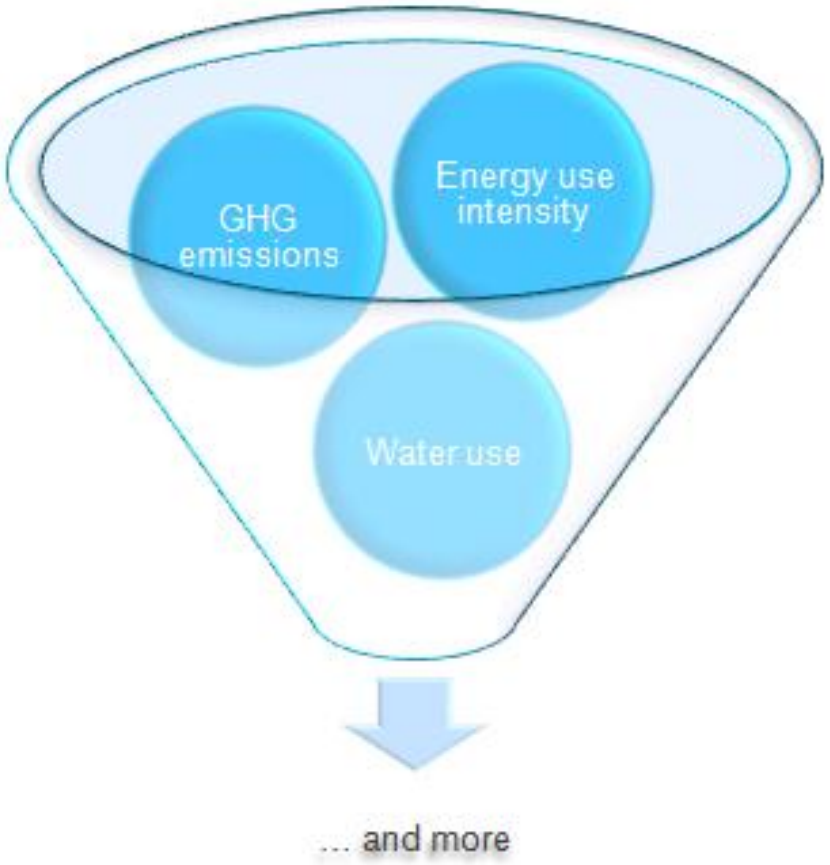
- Police Stations
- Fire Stations
- Assisted Living Facilities
- Convention Centers
- Laboratories
- Libraries
- Malls
- Movie Theatres
- Restaurants
- Stadiums and Arenas



Source: ENERGY STAR, www.energystar.gov

Other Space Types Anticipated in AR

- Police Stations
- Fire Stations
- Assisted Living Facilities
- Convention Centers
- Laboratories
- Libraries
- Malls
- Movie Theatres
- Restaurants
- Stadiums and Arenas



Source: ENERGY STAR, www.energystar.gov

Benchmarking with Portfolio Manager

- Anything with a meter attached can be benchmarked
  - Single building, single electricity, heating fuel and water meters
  - Single building, multiple meters for each utility
  - Multiple buildings, single meters (campus type)
  - Multiple buildings, multiple meters (campus type)
  - A-typical uses include: pumps, antennas, traffic signal contollers, and other non-facility applications.

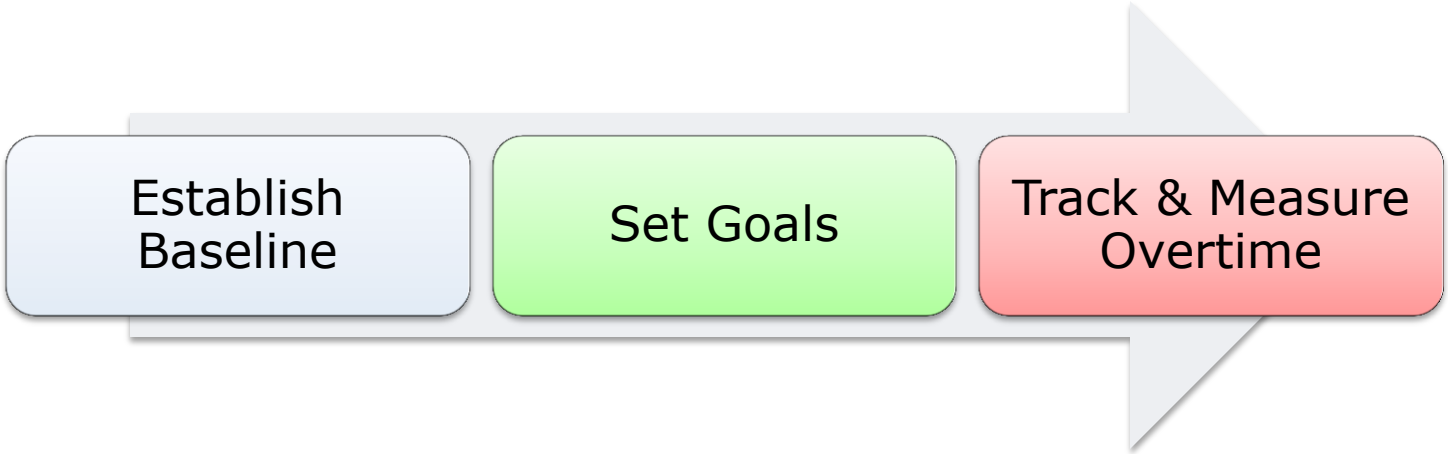
Source: ENERGY STAR, www.energystar.gov

Required Information for Benchmarking in Portfolio Manager

- **Building Identifiers**
  Name, street address, zip code for weather normalization
- **Space Type Data (depends on building type)**
  - Example for Offices: Square footage, hours of operation, Number of workers on main shift , # of PC's, Percent of gross floor area that is air conditioned, heated
- **Utility Use (Energy and water)**
  - Bldg specific invoice information from all purchased energy. Begin with at least 11 consecutive months for each source and update with monthly usage data.

Source: ENERGY STAR, www.energystar.gov

Assess Performance for Smart Energy Management



- Verify gains from upgrade efforts
- Require specific rating gains from service providers in select building types such as office or warehouse

Source: ENERGY STAR, www.energystar.gov

Arkansas Utility Baseline

- Objectives
- Process and timeline
- Data collection, what it involves for each agency
- Benchmarking and QA

Understanding the Project

- Advance AR EE programs, lead by example
- Protect financial & environmental resources
- Comply with Act 1494 of 2009
  - Reduce water, electricity, and natural gas usage
    - 20% by 2014
    - 30% by 2017

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Objectives

- Task 1
  - Establish ESPM accounts,
  - Verify account data in ESPM
  - Review rate tariffs;
- Task 2
  - Keep it Going! Train trainers!
  - Provide technical support
    - Arkansas@cadmusgroup.com
    - 1-855- 266-9773
    - Web portal where you can find documentation, instructions, FAQs, etc.

Kickoff

- Startup: Initial analysis (Nov-Dec)
- Work with agencies (Jan-onward)
- Coordination: Hold monthly or other regular meetings and training sessions with stakeholders (Jan-Jun)

Task 1

- Gather facility and utility data.
- Establish ESPM accounts.
  - Some need PM accounts: Group A
  - Others have PM accounts: Group B
- Proof all data, look for anomalies, and recommend corrective action.
- Review rate tariffs and recommend corrective action if necessary.
- Place data in AR ESPM accounts

Task 1 – Group A Process

- Objectives
  - Get all buildings not benchmarked yet accurately into into ESPM
  - QA data in ESPM
  - Fix inaccuracies
  - Determine billing rates inaccurate
  - Submit status reports on completion

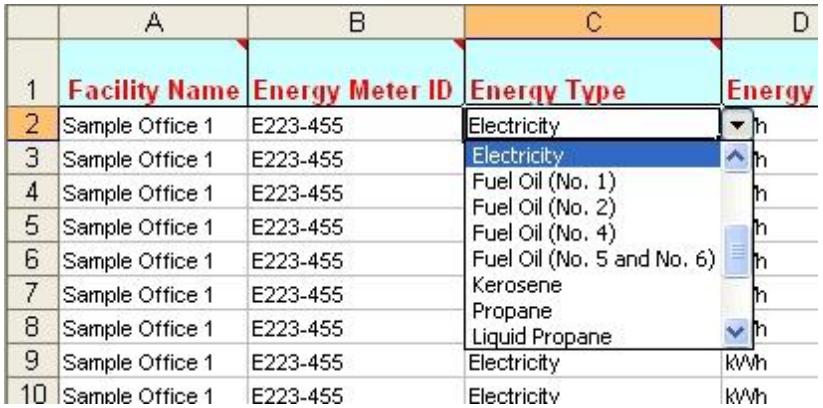
Task 1 - Benchmarking

- Group A: Buildings not benchmarked

Task 1 Timeline-Not Benchmarked	Dec	Jan	Feb	Mar	Apr	May	Jun
Meet with key contacts, get number and type of buildings							
Get a list of buildings, space types, and account numbers							
Explain data requirements to agency staff							
Ensure utility release forms are obtained/get utility data							
Assess available data held by agencies							
Share data anomalies with agencies, fix them							
Transfer data to import templates							
Review and upload import templates							
Final QA-Follow QA directions for Group B							
Submit final status report to AEO and agencies							

Data QA Process-Group A

- Critical step in maximizing accuracy
- Improves analysis and decision making
- Includes checking for the following:
  - Gaps in utility bills
  - Overlapping dates
  - Double-billing
  - Consistency in building names



	A	B	C	D
1	Facility Name	Energy Meter ID	Energy Type	Energy
2	Sample Office 1	E223-455	Electricity	h
3	Sample Office 1	E223-455	Electricity	h
4	Sample Office 1	E223-455	Fuel Oil (No. 1)	h
5	Sample Office 1	E223-455	Fuel Oil (No. 2)	h
6	Sample Office 1	E223-455	Fuel Oil (No. 4)	h
7	Sample Office 1	E223-455	Fuel Oil (No. 5 and No. 6)	h
8	Sample Office 1	E223-455	Kerosene	h
9	Sample Office 1	E223-455	Propane	kWh
10	Sample Office 1	E223-455	Liquid Propane	kWh

  - Dynamic checklist in place

Task 1 - Benchmarking

- Group B: Buildings benchmarked

Task 1 Timeline-Benchmarked	Dec	Jan	Feb	Mar	Apr	May	Jun
Meet with key contacts, get number and type of buildings							
Get a list of buildings, space types, and account numbers							
Explain data requirements to agency staff							
Ensure utility release forms are obtained/get utility data							
Assess available data held by agencies							
Compare data obtained with data in ESPM							
Share data anomalies with agencies, fix them							
Final QA							
Submit final status report to AEO and agencies							

Data QA Process-Group B

- Very similar to Group A process except QA of data & spreadsheets in advance
- Critical step in maximizing accuracy
- Includes checking for the following:
  - Gaps in utility bills, overlapping dates
  - Double-billing
  - Consistency in building names
  - Make sure calculations make sense
- Dynamic checklist in place

Task 1-Utility Rate Analysis

- For ALL buildings
  - Gather additional information for analysis including detailed billing data, kWh, kW, rate schedules, rate codes per account, etc.
  - Determine anomalies in billing data, if any, and prepare a report to be submitted to each agency and AEO.

Task 1 – Utility Rate Analysis

- For ALL accounts

Task 1 Timeline-Utility Rate Analysis	Dec	Jan	Feb	Mar	Apr	May	Jun
Meet with key contacts (agencies and utilities)							
Get a list of buildings, space types, and account numbers							
Explain data requirements to agency staff and utilities							
Ensure utility release forms are obtained/get utility data							
Assess data held by agencies (Advantage IQ, bills, etc.)							
Determine billing determinants (Electric, Gas, Water)							
Verify a sample of bill calculations							
Review potential tariffs to minimize utility cost							
Verify appropriate tariff							
Final QA							
Submit final status report to AEO and agencies							

Process: Utility Rate Analysis

- Determine billing determinants
  - Electric: Demand (kW or kVa); Energy (kWh)
  - Gas: Capacity Demand "CD" (MMBtu); Peak daily use; Annual volume limits; consumption (MMBtu)
  - Water: Consumption (1000 gallons)
- Verify appropriate tariff
- Verify a sample of bill calculations
- Review potential tariffs to minimize utility cost

Billing Determinants - Electric

- Customer charge ($/month)
  - May include a monthly minimum
- Demand charge ($/kW)
- Energy charge ($/kWh)
- Seasonality
- Time of Use
- Tariff riders
  - Generally $/kWh
  - Used to fund specifically identified items such as franchise taxes

Billing Determinants - Gas

- Customer charge ($/month)
- Distribution Demand charge ($/CD/Month)
- Distribution rate ($/MMBtu)
- Supply ($/MMBtu)
- Tariff riders
  - Generally $/MMBtu
  - Used to fund specifically identified items such as franchise taxes

Billing Determinants - Water

- Customer charge ($/month)
- Consumption charge ($/1000 gallons)
- Tariff riders
  - Not as prevalent as in electric and gas

Verify Tariff

- Identify building type and size
- Identify customer usage information
- Compare usage information and building characteristics to tariff applicability criteria
- Flag for follow-up if building does not appear to qualify for service under the tariff

Verify Sample Calculations

- It is unlikely that automated billing systems produce mathematically incorrect bills…however
- Select an appropriate sample of bills and verify the calculations.
  - Flag any bills that appear to be incorrect for follow-up
  - Bills may be incorrect due to:
    - Systematic errors
    - Adjustments
    - Mechanical errors (addressing)

Verify Optimal Tariff Schedule

- Many utilities offer multiple tariffs
  - Standard
  - Time of Use
  - Interruptible
- Based on building usage and characteristics
  - Calculate annual bill under all applicable tariffs
  - Review cost differential to assure building is served under lowest cost option considering
    - Risk (economic, physical)
    - Service upgrades

Task 1-Accounts Completed

- Expected completion of 60% of accounts: 6/30/11 or about 3,600 accounts
- A completed account will require AEO approval.
- Cadmus prepared a "completed accounts checklist" including steps that indicate progress towards completing each account.
- Agency prioritization to be determined with work with agencies and AEO, if needed

Accounts Completed Checklist

ACCOUNTS COMPLETED CHECKLIST

Agency Name (from PM)	Building Name (from PM)	Account Name	Fuel Type	Percent Completed	Utility Data	Building Attributes	Operating Attributes	Utility Rates Analyzed	Pre-upload Review	Data Uploaded	Post Upload Review	Errors Corrected
			Implication on percent complete >>>	100%	20%	10%	10%	10%	10%	5%	15%	15
AR0350_BUILDING_AUTHORITY	100-04 - Justice Building East Wing	1231213	Electricity - Grid P	65%	x	x	x	x	x	x		
AR0350_BUILDING_AUTHORITY	100-04 - Justice Building East Wing	Ngas Meter ID	Natural Gas	20%		x	x					
AR0350_BUILDING_AUTHORITY	100-04 - Justice Building East Wing	Cwater ID #	District Chilled Wa	33%	x			x				
AR0350_BUILDING_AUTHORITY	100-05 - Df&a Admin Building			0%								
AR0350_BUILDING_AUTHORITY	100-06 - 1515 Building			0%								
AR0350_BUILDING_AUTHORITY	100-09 - Multi Agency Complex/Big Mac			0%								
AR0350_BUILDING_AUTHORITY	100-10 - Natural Resources Building			0%								
AR0350_BUILDING_AUTHORITY	100-11 - Public Service Commission			0%								
AR0350_BUILDING_AUTHORITY	100-12 - State Crime Lab Building			0%								
AR0350_BUILDING_AUTHORITY	100-14 - Office Building (Fort Smith)			0%								
AR0350_BUILDING_AUTHORITY	100-17 - Main St Mall			0%								
AR0350_BUILDING_AUTHORITY	100-19 - Office - 410 Battery			0%								
AR0350_BUILDING_AUTHORITY	100-21 - Shop			0%								
AR0350_BUILDING_AUTHORITY	100-22- 1400 W 7th St			0%								
AR0350_BUILDING_AUTHORITY	100-24 501 Building			0%								
CAMPROBI	114th Aviation 50/50			0%								
CAMPROBI	AASF Fire Station			0%								

Input Value
Enter "x" if step completed.

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Task 2 - Training

- Sustainability is the goal!

Task 2 Timeline - Training	Dec	Jan	Feb	Mar	Apr	May	Jun
Meet with key contacts, assess training needs							
Scheduled/conduct Level 101 sessions (6 onsite)*		2	2	1	1		
Scheduled/conduct Level 102 sessions (6 onsite)*		2	2	1	1		
Scheduled/conduct level 101 Q&A sessions (3 online)		1	1	1			
Scheduled/conduct Level 102 Q&A sessions (3 online)					1	1	1
Distribute slides and supporting materials							
Submit final status report to AEO and agencies							

* Train-the-trainer sessions

Task 2 – Technical Support

- Create support lines for agencies to contact when they have questions
  - Toll-free support line - **1-855- 266-9773 (open line 8 am – 5 pm Central time weekdays)**
- Added value: **Arkansas@cadmusgroup.com** Cadmus also created this e-mail hotline to answer questions to keep a written record of communications which will be used for factsheets, instructions, FAQs, etc.
- Added value: Cadmus will discuss with AEO the possibility of creating a Web portal where we can post documentation, instructions, FAQs, etc. for agencies

Task 2 – Technical Support

- Technical Support available now!

Task 1 Timeline – Technical Support	Dec	Jan	Feb	Mar	Apr	May	Jun
Create a toll-free support line : 1-855- 266-9773							
Create an e-mail hotline: Arkansas@cadmusgroup.com							
Provide continuous technical support							
Prepare documentation (FAQs, factsheets, etc.)							
Submit status report to AEO							

Revised Plan

- **December 17:** Draft detailed timeline revision due. Timeline will be dynamic and will be updated to benefit the State of Arkansas.
- Final plan to be completed **5 business days** after comments and feedback received from AEO. This timeline will also be dynamic and will be updated per direction from AEO
- In addition to what is presented here, revised plan will include:
  - Final metrics to be used for energy performance besides source EUI;
  - Strategy for approaching agencies and utilities (to be determined by AEO)

Pilot (December and January)

- Meet with agency key staff
- Work with ABA or other lead agency to:
  - improve processes and find out what works best for AR
  - Perform utility rate analysis
  - Review space characteristic, energy and water data for inaccuracies and missing information.
  - Collect missing information and fix errors in ESPM, if needed.
  - Revise overarching "completed account checklist" used for the project, if applicable.
- Check data transfer algorithms with select agencies
  - Connect to data management software such as Advantage IQ, Avista or UM Pro
- Ensure coordination with utilities
  - Harmonize data process, release forms or other procedures
  - Complete hand shake on utility tariffs

Reporting

- Monthly Reporting
  - Complete ARRA template plus any additional AEO data required to assess progress.
- Quarterly Reporting
  - All reports will provide AEO with data required to assess progress.
  - AEO to provide Cadmus with report templates (December 2010).

Reporting

- Reporting to ensure
  - Project plan is followed
  - Goals met

Reporting Timeline	Dec	Jan	Feb	Mar	Apr	May	Jun
Monthly Reporting							
Quarterly Reporting							
Other reports as needed							

Contacts & Support

Toll-free support line: 1-855-266-9773
(9 am – 6 pm weekdays)

Arkansas@cadmusgroup.com
(24 hour turn around time)

Ed Ellis, CEM,
Arkansas Energy Office
(501) 682-7694
eellis@arkansasedc.com

Julio Rovi
The Cadmus Group, Inc.
703-247-6128
Julio.Rovi@cadmusgroup.com

Kudret Utebay
The Cadmus Group, Inc.
703-247-6138
Kudret.Utebay@cadmusgroup.com

Shubhada Kambli
The Cadmus Group, Inc.
Shubhada.Kambli@cadmusgroup.com

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We are looking forward to start working with you!

Thank you!

Select Cadmus Tech Support Team

Name, Role, Phone, email@cadmusgroup.com

Kudret Utebay, Project Manager, 703-247-6138, kudret.utebay
Shubhada Kambli, Deputy PM, (203) 770-3714, shubhada.kambli

Colin Dunn, (703) 247-6121, Data QA Lead, colin.dunn
Jake Demann, Data entry, 503-575-4575, jake.demann
John Burningham, Utilities Lead, (801) 641-3915, john.burningham
Matthew Tenney, (703) 247-6164, Rate Analysis, matthew.tenney
Rik Banerjee, Upload template specialist, 703-247-6142, rik.banerjee
Brian Hedman, Utility Rate Advisor, (503) 467-7125, brian.hedman

Julio Rovi, Practice Leader, 703-247-6128, julio.rovi