



John W. Hickenlooper
Governor

Colorado Department of Corrections

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Update



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Executive Director

Energy Management Plan

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**COLORADO
DEPARTMENT OF CORRECTIONS**

Energy Management Plan

Mission	1
Management Support	1
Background	1
Facility Description	1
Figure 1 – Colorado Correctional Facility Locations	2
Table 1 – Colorado Correctional Facilities	3
Table 2 – Other CDOC Facilities	5
Table 3 – Colorado APCCY Offices	5
Measurable Goals	6
Plan Objectives	6
Organization – Corrections Energy Management Program	7
Authority and Enabling Legislation	10
Objective and Scope	13
Key Performance Indicators (KPIs)	13
Energy Management	14
Materials and Resource Management	15
Vehicle Petroleum Consumption	15
Strategy	15
Operations Performance Sectors	15
Energy Management	16
Energy and Water Conservation Measures	16
Energy Performance Contracting	17
EPC Strategy	18
EPC Energy and Water Conservation Measures	18
Energy-and-Water Management Plan Implementation	23
Roadmap to Achieve Plan Goals	23
Demand-Side Reductions	24
High Performance Buildings	24
Operations and Maintenance (O&M)	25
Commissioning (Cx)	25
Energy Service Provider Demand Side Management (DSM) Programs	25
Small Energy Efficiency and Water Conservation Projects	25
Supply-Side Alternatives	27
Change the Culture: Energy Awareness and Water Conservation	29
Philosophy	31
Benefits	31

**COLORADO
DEPARTMENT OF CORRECTIONS
Energy Management Plan**

Appendix A.....	32
CDOC Utility Baseline Data – FY 2005-2006	32
Appendix B.....	33
Table B-1 – Implemented & Anticipated Energy Conservation Measures (ECCPC).....	33
Table B-2 – Implemented and Anticipated Energy Conservation Measures	34
Appendix C.....	35
CDOC Water Conservation Plan – Executive Brief	35
I. Plan Inclusions.....	37
II. Water Reduction Elements	38
III. Cost of Implementation.....	40
IV. Schedule and Metered Potable Water Reductions.....	42

COLORADO DEPARTMENT OF CORRECTIONS

Energy Management Plan

Mission

The mission of the Colorado Department of Corrections (CDOC) is to protect the citizens of Colorado by holding offenders accountable and engaging them in opportunities to make positive behavioral changes and become law-abiding, productive citizens. Within the CDOC, Facility Management Services, which administers the Energy Management Program, is a high performance team that provides timely and cost effective solutions, supporting the operations, maintenance, and construction of Colorado correctional facilities.

Management Support

The Executive Director for the CDOC is ultimately responsible for the administration of and the success of the Energy Management and Water Conservation Plan (the Plan). The Utilities Subprogram, referred to as the Energy Management Program (EMP), is implemented and monitored through a team approach by Facility Management Services, under the supervision of Assistant Director Richard Weems.

Background

The CDOC, an executive agency of Colorado state government, operates and manages twenty (20) correctional facilities and two (2) repurposed or decommissioned correctional facilities, on complexes across the State of Colorado, comprising approximately 11,000 acres. CDOC maintains and uses 1226 fleet vehicles to support its state-wide activities. The agency operating budget is \$798.3 million for Fiscal Year July 1, 2014 – June 30, 2015 (FY 2014-2015). For FY 2014-2015, the Utilities budget is appropriated \$18,658,219 from the general fund and \$1,069,535 from cash funds received from sales revenues earned by Correctional Industries.

Over the last 100+ years, the Colorado Department of Corrections has experienced substantial advances in its building and energy technologies. However, many of its buildings are more than 50 years old and were designed and constructed prior to the more modern, energy efficient buildings of today. It is imperative that the CDOC examine its energy consuming portfolio of structures, systems, and vehicles, including new or planned construction, to identify and employ efficient and cost-effective solutions in design and operation.

Facility Description

The CDOC organizational structure includes State owned-and-operated facilities and leased spaces, including Adult Parole, Community Corrections, and Youthful Offender System (APCCY) offices. CDOC owned facilities are located throughout the State and include 595 buildings totaling more than 6.83 million square feet. Figure 1 shows the location of CDOC correctional facilities, APCCY offices, and private prisons. Tables 1 through 3 on the following pages include facility size and locations for State-owned or operated locations. The current Plan focuses on correctional facilities owned by the State of Colorado. All of the APCCY offices are currently located in leased space. For leased space, the CDOC focus is on energy awareness, reduced waste (recycling), water conservation, and energy efficient movable equipment and appliances. Colorado contracted private prisons operations are monitored by the CDOC; however, the CDOC Plan does not currently include energy conservation management measures for private prisons.

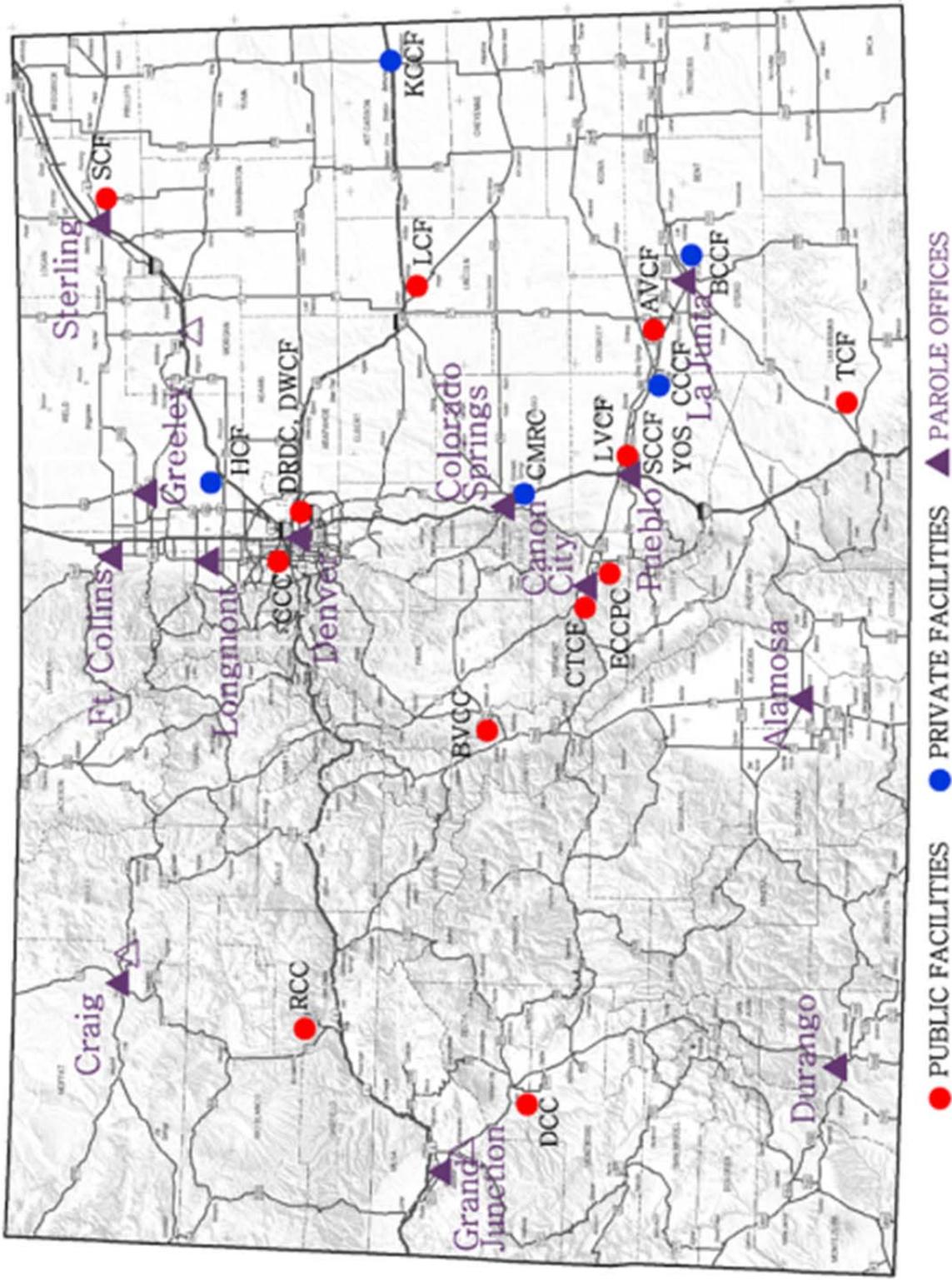


Figure 1 – Colorado Correctional Facility Locations

Table 1 – Colorado Correctional Facilities*

#	Acronym Year Built	Facility Name Square Footage	Bed Capacity	Location Comments
1	ACC 1989	Arrowhead Correctional Center 192,869 SF	520 Beds	Cañon City
2	AVCF 1987	Arkansas Valley Correctional Facility 373,651 SF	1,050 Beds	Crowley
3	BVCC 1889 & 1999	Buena Vista Correctional Complex (BVCF & BVMC) 531,917 SF	1,184 Beds	Buena Vista
4	CCAP 1991	Colorado Corrections Alternative Program Part of BVCC (deactivated as housing)		Buena Vista currently unutilized
5	CCC 1939	Colorado Correctional Center (<i>Camp George West</i>) 45,543 SF	150 Beds	Golden
6	CCF 1980	Centennial Correctional Facility 615,975 SF (Total) 167,753 SF 1980 448,222 SF 2010	320 Beds (Total) 320 Beds (North) 0 Beds (South) Closed	Cañon City
7	CSP 1993	Colorado State Penitentiary 458,906 SF	756 Beds	Cañon City
8	CTCF 1890	Colorado Territorial Correctional Facility 520,126 SF	929 Beds	Cañon City
9	CWCF 1966	Colorado Women's Correctional Facility International Correctional Management Training Center (ICMTC) 67,171 SF (deactivated as housing)		Cañon City converted to training facility
10	DCC 1952	Delta Correctional Center 148,654 SF	480 Beds	Delta
11	DRDC 1990	Denver Reception & Diagnostic Center 308,877 SF	572 Beds	Denver
12	DWCF 1998	Denver Women's Correctional Facility 437,029 SF	976 Beds	Denver

CDOC Energy Management Plan

#	Acronym Year Built	Facility Name Square Footage	Bed Capacity	Location
13	FCF 1939	Fremont Correctional Facility 557,908 SF	1,620 Beds	Cañon City
14	FMCC 1983	Four Mile Correctional Center 112,856 SF	521 Beds	Cañon City
15	LCF 1991	Limon Correctional Facility 385,422 SF	930 Beds	Limon
16	LVCF 1935	La Vista Correctional Facility (PMC) 212,773 SF	574 Beds	Pueblo
17	RCC 1978	Rifle Correctional Center 66,480 SF	192 Beds	Rifle
18	SCC 1957	Skyline Correctional Center 50,531 SF	252 Beds	Cañon City
19	SCCF 1995	San Carlos Correctional Facility 143,953 SF	255 Beds	Pueblo
20	SCF 1998	Sterling Correctional Facility 847,681 SF	2,488 Beds	Sterling
21	TCF 1999	Trinidad Correctional Facility 142,275 SF	500 Beds	Trinidad
22	YOS 1932	Youthful Offender System 86,110 SF	256 Beds	Pueblo

* Table updated September 30, 2014

Table 2 – Other CDOC Facilities**

	Acronym	Facility Name	Location
	Year Built	Square Footage	
Enterprise Operation	CCi	Colorado Correctional Industries 50,050 SF	Denver
Leased	HQ	Central Office – Headquarters 78,682 SF	Colorado Springs
Leased	PPMU	Private Prison Monitoring Unit 0 SF (Trailer Pad Rental) 2,521 SF	Burlington La Junta
Leased	TA	Training Academy 15,688 SF	Cañon City
Leased	CMHIP	Colorado Mental Health Institute - Pueblo Building 16 – Pharmacy 4,987 SF= Building 54 – Parole Board Offices 4,278 SF Building 54 – IG (Inspector General) Offices 2,780 SF Colorado Correctional Industries @ YOS 1,471 SF	Pueblo
Total Other CDOC Facilities**		160,457 SF	

** Table updated October 16, 2014

Table 3 – Colorado APCCY Offices*****APCCY – Adult Parole, Community Corrections, and Youthful Offender Service**

	Location	Square Footage
Leased	Alamosa Parole Office	1,792 SF
Leased	Cañon City Parole Office	2,142 SF
Leased	Colorado Springs Parole Office	17,500 SF
Leased	Craig Parole Office	1,354 SF
Leased	Denver Parole Office (Broadway)	28,600 SF
Leased	Denver Parole Office (Lincoln)	20,833 SF
Leased	Denver Parole Office (Sherman)	8,260 SF
Leased	Durango Parole Office	2,515 SF
Leased	Englewood Parole Office	9,512 SF
Leased	Fort Collins Parole Office	6,104 SF
Leased	Grand Junction Parole Office	9,431 SF
Leased	Greeley Parole Office	3,860 SF
Leased	La Junta Parole Office	697 SF
Leased	Longmont Parole Office	2,450 SF
Leased	Pueblo Parole Office	12,200 SF
Leased	Sterling Parole Office	1,288 SF
Leased	Westminster Parole Office	25,524 SF
Total APCCY Offices***		154,062 SF

*** Table updated October 16, 2014

Measurable Goals

The initial set of *Greening of State Government* goals established by gubernatorial executive order is as follows:

Reduction in use below the FY 2005-2006 baseline by June 30, 2012

- 20% reduction in energy use
- 10% reduction in energy use (*if energy performance contracting is not feasible*)
- 20% reduction in paper use
- 10% reduction in water consumption
- 25% volumetric reduction in state vehicle petroleum consumption**

***Excludes vehicles used for law enforcement, emergency response, road maintenance, and highway construction*

Additional *Greening of State Government* goals with future attainment dates are as follows.

Greenhouse Gas Emissions:

- **20% reduction** from 2005 baseline levels by FY 2020
- **80% reduction** from 2005 baseline levels by FY 2080
- 75% landfill diversion (by FY 2020)

Plan Objectives

The objective of the Energy Management and Water Conservation Plan (the Plan) is to promote energy efficiency throughout the department through cost effective programs and initiatives. Through the Plan, CDOC will attempt to implement energy usage reduction targets previously established under the *Greening of State Government* goals. Further, as part of the plan, CDOC will promote and encourage energy awareness and energy-related training of all employees.

To implement the Plan, CDOC will monitor, trend, and review facility energy usage and develop corrective actions if energy use falls outside the bounds of preset goals and KPIs (Key Performance Indicators). Throughout our work, CDOC will maintain a close working relationship with the local utility companies.

Utilities included in the Plan:

- Electricity
- Fuel Oil
- Propane
- Natural Gas
- Steam
- Water
- Waste Water

Organization – Corrections Energy Management Program

CDOC has developed a team approach for energy management. The Energy Management Program (EMP) works with Offices of Primary Responsibility to reduce energy consumption, increase the use of renewable energy sources, increase the energy efficiency and decrease the environmental impact of the State vehicle fleet, implement “smart water” use and conservation, implement environmental purchasing standards, reduce waste, and increase recycling. The Energy Management Program for FY 2014-2015 is funded with \$304,899 for 2.6 FTE but utilizes the resources of a number of other Facility Management Services staff, including the following.

Richard Weems is the Assistant Director of Facility Management Services (FMS). Weems is appointing authority for the Energy Management Program (EMP).

John Gillogley, FMS Utility Program Manager, provides day-to-day management of the Energy Management Program staff and oversight of staff work product. (Note: Gillogley currently also manages the agency’s land and water rights, water acquisition/trade/exchanges, augmentation plans, water resources, and water and wastewater management issues; and assists the Department with issues related to potable and non-potable water service and use, water reuse and recycling, water conservation practices, and energy and water conservation measures relating to water and wastewater systems.) Gillogley works together with the Utility Management Engineer to determine feasibility and promote renewable energy projects throughout the CDOC. Gillogley’s key subject areas in support of the EMP include:

- Specialty utility contracts
- Renewable project promotion
- Water Use/Reduction/Reuse/Conservation
- Wastewater
- Potable and Non-potable Water
- Irrigation
- Water Rights – including wells and storage
- Substitute Water Supply Plans (temporary and undecreed water needs)
- Land Acquisition, Exchange, Sale, Lease, Encumbrance, and "disposal"
- Water Quality Control Division liaison
- Legislation monitoring (land, water rights and use, wastewater, and related areas)
- Rule change monitoring (all areas)

Diana Dean, P.E.¹, CEM², LEED AP³, GBE⁴, is the Utility Management Engineer. Dean is responsible for identifying energy and water efficiency opportunities; reviewing and accepting the Technical Energy Audits associated with Energy Performance Contracts, and administering the CDOC Energy Performance Contract Measurement and Verification stages. Dean's key subject areas include:

- Utility Program Budget – Team Lead
- Energy Performance Contracting
 - Technical Energy Audits
 - Measurement and Verification
- Energy Efficiency (Electric, Natural Gas, Propane)
- Building Envelope (Insulation, Walls, Windows)
- Energy Management Control Systems
- HVAC (Heating Ventilating Air-Conditioning)
- Lighting & Daylighting
- Renewable Energy (Solar Photovoltaic, Solar Thermal, Biomass, Wind, Geothermal)
- Metering & Submetering
- Utility Rate Analysis - Unit Costs
- Composting
- Building Energy
 - Leadership in Energy and Environmental Design (LEED)
 - High Performance Buildings
 - ENERGY STAR®
- CDOC Primary Contact for Utility Vendors
- EnergyCAP Utility Management Database – Administrator
- Education & Awareness – Energy Efficiency and Water Conservation

The Department's former Energy Analyst position is currently vacant due to a recent retirement and is being repurposed to meet more of the needs of the EMP, FMS, and Department, as a whole. Currently, the majority of the Energy Analyst's former duties are being covered by the Utility Management Engineer. In the past, the Energy Analyst position was responsible for receiving, monitoring, and tracking electric, natural gas, propane, fuel oil, water, wastewater, and other EMP-related billings paid from the utility line; compiling utility use baseline data, and reporting on CDOC's progress in achieving energy and water reduction goals; and auditing utility

¹ P.E. – Professional Engineer

² CEM – Certified Energy Manager

³ LEED AP – Leadership in Energy and Environmental Design Accredited Professional

⁴ GBE – Green Building Engineer

invoices to ensure accurate billing. Examples of the Energy Analyst's key subject areas include:

- Utility Invoice Entry, Tracking, Verification, and Reporting
- Natural Gas Usage Tracking and Monthly Nominations
- Year-End Accruals Reports
- EnergyCAP Utility Management Database - Administrator
- Recycling Tracking (Paper, Plastics, Metal, Cardboard, Styrofoam, Writing Instruments)

James "Jim" Ramsey, LEED AP, serves as the State Buildings Delegate. In this capacity, Ramsey assists the EMP in coordinating with the Office of the State Architect and in implementing applicable High Performance Certification Program building standard for design and construction of our facilities. Ramsey's areas of support for the Energy Management Program include:

- Energy Performance Contracts – Contract negotiation and supervision of Project Representatives' contract administration during the implementation phase of EPCs
- High Performance Buildings implementation in funded Capital Construction projects

FMS has three Project Representatives who are responsible for interfacing with facility staff to lend support from Facility Management Services. Project Representatives serve in the construction observation and contract administration role for the department during the Energy Performance Contract construction/implementation phase. The three project representatives are:

- Lee Norgaard
- Diana Oldemeyer
- Chris Tenorio

The Energy Management Program works with other areas of the department including Fleet, Purchasing, and the Warehouse, on the following measures:

- State Vehicle Petroleum Reduction
- Alternative Fuels Vehicles
- Environmentally Preferable Product Purchasing
- Paper Use Reduction

The core EMP team members are assisted by CDOC correctional facilities Physical Plant Managers, Facility Management Services (FMS) Project Representatives, and FMS Planners. In cooperation with FMS and facility staff, the EMP works to verify and ensure that fundamental building elements and systems are installed, calibrated, and operating as efficiently as possible. The EMP also works with the Energy Service Companies (ESCOs) selected to perform Energy Performance Contracting to ensure that government efficiency goals are achieved.

Authority and Enabling Legislation

The Colorado Department of Corrections Utilities Subprogram – Energy Management Program was created in 1998. HB 01-1381 provided the CDOC further authority whereby long term energy savings contracts, funded by utility savings and avoided costs, make projects possible which require multiple year pay-back periods. CDOC has consistently managed this program under this legislation avoiding millions of dollars in utility costs over the last fifteen years. With the Governor’s Executive Order D0010 07, Facility Management Services continues to operate to “...Lead Colorado to a New Energy Economy by advancing energy efficiency, renewable and clean energy resources.”

Executive Orders:

Executive Order D 2010–006 Greening of State Government: Earth Day 2010, (April 22, 2010), to reduce the negative environmental impact of state government. This executive Order provides some modification but does not replace Executive Orders **D0012 07**, **D0011 07**, and **D005 05**. Key directives within the E.O. include:

- Recycling
- Paper Reduction
- Environmentally Preferable Purchasing
- Climate Action Plan
- Renewable Energy
- Petroleum Reduction
- Smart Use of Energy and Water
- Greening Government Coordinating Council
- EnergyCAP Software Use – Track utility bill information for state-owned facilities

Executive Order D 004–08 Reducing Greenhouse Gas Emissions in Colorado, (April 22, 2008), to establish the state’s greenhouse gas reduction goals and direct the Colorado Department of Public Health and Environment (CDPHE) to develop reporting regulations. State agencies are directed to join in a statewide effort, coordinated by CDPHE, the Department of Natural Resources, the Department of Agriculture, CEO, and the Governor’s Office of Policy and Initiatives, to achieve these goals.

Greenhouse Gas Emissions:

- **20% reduction** from 2005 baseline levels by FY 2020
- **80% reduction** from 2005 baseline levels by FY 2080

Executive Order D0012 07 Greening of State Government: Detailed Implementation, (April 16, 2007), State agencies shall establish policies and procedures to achieve the goals and objectives articulated in Executive Order D0011 07. Sections within the E.O. include:

- Reduction of State Energy Consumption
- Materials Management and Environmental Preferable Purchasing
- Greening the State Fleet
- Renewable Energy Sources for State Energy Consumption

Executive Order D0011 07 Greening of State Government: Goals and Objectives, (April 16, 2007), establishes the goals and objectives for “Greening State Government”

activities and initiatives. The Executive Order charges State departments to: “take a position of leadership in the new energy economy”. State agencies shall reduce state energy consumption, increase state use of renewable energy sources, increase the energy efficiency and decrease the environmental impact on the state vehicle fleet, and implement an environmental purchasing standard requiring attention to energy and environmental impacts of purchasing and materials decisions.

Executive Order D0010 07 the Governor’s Energy Office, (April 16, 2007), changes the name of the Governor’s Office of Energy Management and Conservation to the “Governor’s Energy Office”. The mission of the energy office shall be to lead Colorado to a New Energy Economy by advancing energy efficiency, renewable and clean energy resources.

Executive Order D005 05 Greening of State Government, (July 15, 2005) establishes the Greening of State Government. This order was modified under Executive Order D0012 07. The E.O. directs the Executive Directors of all state agencies to evaluate their current business operations and develop and implement policies and procedures to promote environmentally sustainable and economically efficient practices.

Executive Order D014 03 Energy Performance Contracting to Improve State Facilities (July 16, 2003) directs state agencies to initiate energy performance contracting where the opportunity exists to better utilize utility and operating budgets and to make capital improvements in facilities. Each state agency responsible for state-owned facilities shall investigate the feasibility for an energy performance contract. Legislation to govern energy performance contracts was adopted in House Bill 1381 in 2001, C.R.S. §§ 24-30-2001 through 24-30-2004 and C.R.S. §§ 24-75-108 and 29-4-729.

Colorado Climate Action Plan

The Colorado Climate Action Plan was issued in November 2007. The goal of the plan is to mobilize Colorado’s businesses, governments and citizens in an effort to first slow and halt the increase and then reduce emissions to 20 percent below 2005 levels by 2020. By 2050, the goal is to reduce greenhouse gas emissions by 80 percent below 2005 levels. Colorado state government has three important roles to play in facing the climate change challenge:

- Enact “bridge strategies” that immediately reduce greenhouse gas emissions while we pursue technologies to generate cleaner energy
- Provide leadership to ensure that long-term solutions, such as renewable energy and clean coal technologies, are fully developed and broadly implemented
- Prepare the state to adapt to those climate changes that cannot be avoided

Colorado Revised Statutes (CRS)

- 24-30-1301, *et seq* State Buildings, Department of Personnel
- 24-30-1305 Life-cycle cost – high performance standards
- 24-30-1104, *et seq* Alternative Fuel Use Requirement
- 24-30-2001, *et seq* Utility Cost Savings Measures
- 24-38.5-101, Colorado Energy Office – name and mission
- 24-82-60, *et seq* State-Owned Facilities – Energy Conservation
- 24-82-901, *et seq* Outdoor Lighting Fixtures (CDOC prisons, exempt)
- 24-103-207, *et seq* Recycled Paper Content Minimums

- 24-103-207.5, *et seq* Environmentally Preferable Purchasing Preference
- 40-2-124 Renewable Energy Standard

Legislation/Legislative:

- **Senate Bill 13-252** concerns measures to increase Colorado's renewable energy standard so as to encourage the deployment of methane capture technologies. The bill, which took effect July 1, 2013, amends CRS 40-2-124.
- **Senate Bill 13-028** concerns tracking the utility data of a state building that has achieved the highest performance certification attainable as part of its capital construction project. The bill, approved March 22, 2013, amends and updates amends CRS 24-30-1305.
- **House Bill 12-1315** Effective date July 1, 2012. Reorganization of the Governor's Energy Office, renamed the Colorado Energy Office (CEO), amends CRS 24-38.5-101, and updates and changes the CEO mission to focus on the following.
 - a. Sustain the Colorado energy economy and promote all Colorado energy;
 - b. Promote economic development in Colorado through energy-market advances that create jobs;
 - c. Encourage Colorado-based clean and innovative energy solutions that include traditional, clean, and renewable energy sources in order to encourage a cleaner and balanced energy portfolio;
 - d. Promote energy efficiency;
 - e. Increase energy security;
 - f. Lower long-term consumer costs
 - g. Protect the environment
- **Senate Bill 07-051** requires the state to adopt a "high performance standard certification program" for state building projects
- **Senate Joint Resolution 06-032** Greening of State Government Buildings
- **HB 07-1281** Increased Renewable Energy Standards; The Bill increases the renewable energy requirements to include all utilities, except municipally-owned utilities serving fewer than 40,000 customers
- **HB 07-1220** Environmentally Preferred Purchasing – State Government
- **HB 07-1169** Net Metering for Customer-Generators of Cooperative Electric Associations
- **HB 07-1150** Colorado Clean Energy Development Authority

Colorado Constitution:

- **Amendment 37**, dated 2004 Renewable Energy Portfolio Standard
Renewable energy standard for qualifying retail utilities in Colorado, pursuant to § 40-2-124, C.R.S. Section 40-2-124, C.R.S., was enacted by the voters of the State of Colorado as 2004 Ballot Amendment 37 and was amended by the 2005 Colorado General Assembly by Senate Bill 05-143. Section 40-2-124 was further amended by the 2007 Colorado General Assembly by House Bill 07-1281. The 2008 Colorado General Assembly amended, by House Bill 08-1160, provisions of § 40-2-124, C.R.S., and added § 40-9.5-118, C.R.S., to cause cooperative electric associations to come under the Commission's interconnection rules. The 2009 Colorado General Assembly further amended § 40-2-124, C.R.S., by

Senate Bill 09-051, and the 2010 Colorado General Assembly again amended § 40-2-124, C.R.S., by House Bill 10-1001.

American Correctional Association (ACA):

- ***ACA Standard on Recycling, Energy and Water Conservation, Pollution Reduction, and Renewable Energy***
4-4003-1 Added August 2010. The facility/agency shall demonstrate it has examined, and where appropriate and feasible, implemented strategies that promote recycling, energy and water conservation, pollution reduction, and utilization of renewable energy alternatives. Comment: Correctional facilities and programs have the responsibility to implement strategies that allow correctional facilities to be managed in ways that are most cost-effective and deliver superior performance, while improving environmental responsibility and sustainability. This includes recycling (including paper, metal, and plastic products), energy conservation (including building insulation, heating and ventilation, temperature controls, vehicle fuel efficiency, water economies, physical plant engineering, and energy measures), pollution reduction (including composting sewer treatment, litter abatement, and carbon emissions), and utilization of renewable energy alternatives (biofuels, solar collection, turbine energy production, and methane collection).

Objective and Scope

The scope of the Colorado Department of Corrections Plan was originally defined by the gubernatorial executive orders and enabling legislation discussed and referenced above. The Plan objective is to effectively accomplish the Governor's and the Colorado Energy Office (CEO) mission in the context of Corrections operations. This agency will work in close cooperation with CEO to implement *Greening of State Government* initiatives when and if possible, develop sound programs which will enhance efficiencies, and in turn make efficient use of the tax payer dollar. As the Plan evolves over time, the EMP will continue to incorporate the CDOC strategic planning measures and utility reduction targets for energy efficiency and water conservation.

Key Performance Indicators (KPIs)

The Energy Management Program continues the essential function of recording and tracking utility cost and use, and scanning and storing CDOC utility invoices. The EMP makes these records available to CDOC facilities, and uses the information to trend historical use, audit billings, project use, and develop budgets. Utility measurement and data analysis and recording are critical to the effective implementation of the energy program. Use and cost data is used to target facilities where utility use indicates improvements may be warranted and determine payback and cost-effectiveness of projects. The effort also creates baseline performance measures and characteristics by meter for buildings within the department. CDOC's Key Performance Indicators include:

- Utility Consumption Measurement
- Energy Budget Allocations and Performance
- Alignment with the Agency Strategic Plan

- Contributions to the accomplishment of Governor’s “effective, efficient, and elegant” vision and objectives
- Compliance with Executive Orders and Directives

Noted previously in the Authority and Enabling Legislation section, **Executive Order D 2010-006** requires that state agencies use EnergyCAP software to track utility bill information for state-owned facilities. In compliance with the E.O. and as a KPI, the CDOC has entered historical vendor bill data back to fiscal year 2006. CDOC enters and tracks current vendor bills on an ongoing basis. With the implementation of this utility tracking tool, the CDOC is able to report progress toward reaching efficiency goals related to purchased utilities.

Specific performance targets specified in gubernatorial Executive Orders and legislation include:

- Energy Management
- Materials and Resource Management
- Vehicle Petroleum Consumption Reduction

Specific performance goals specified in the Colorado Department of Corrections’ Plan include:

- Reduce electricity use
- Reduce natural gas use
- Reduce potable water consumption

Energy Management

The department intends to achieve at least a 20% reduction in energy consumption of state facilities below fiscal year 2005-2006 levels where energy savings reduction projects have been funded through the vehicle of Energy Performance Contracts (EPCs). On an ongoing basis, CDOC will assess and implement, where effective, the development of renewable energy projects. Correctional facilities pose certain unique design, construction, and operations requirements, some which are not compatible with specific LEED™ criteria. However, CDOC will strive to design and construct new facilities to achieve LEED™-NC Gold certification to the extent it is cost-effective and possible. CDOC will also initiate energy performance contracts where opportunity exists to better utilize utility and operating budgets and to make capital improvements in facilities. In the contracting for services where energy consumption is involved, energy conservation and efficiency are encouraged. In January of 2011, CDOC began construction of energy/water conservation measures for two, State-owned facilities under EPCs. In FY 2011-2012, CDOC entered into one additional EPC. Construction and implementation of measures at all three EPC Phase I facilities is complete. An overview of the measures completed in Phase I is listed in the Energy Performance Contracting section of this Plan. In FY 2012-2013 CDOC’s ESCOs completed Technical Energy Audits (TEAs) at three additional correctional facilities. CDOC enter into a contract and project financing of EPCs for two correctional facilities in FY 2013-2014. CDOC is currently in the contract negotiation stage for an EPC at one additional correctional facility. An overview of proposed measures for Phase II of the CDOC’s EPC efforts are listed in the Energy Performance Contracting section of this Plan

Materials and Resource Management

In the area of resource management, the CDOC is committed to adhering to the purchasing policies developed to reduce the state's environmental impact as a consumer of products and services: 1) Adopt a goal of reduced waste from construction of new buildings and operation and renovation of existing facilities; 2) Achieve a paper use reduction goal of 20% using fiscal year 2005-2006 as a baseline; 3) Achieve a reduction of water consumption goal of 10%, using fiscal year 2005-2006 as a baseline. In the area of Environmentally Preferable Purchasing (EPP), establish requirements to purchase "green" products to the extent possible and feasible and implement EPP as a matter of policy.

Vehicle Petroleum Consumption

In the area of petroleum consumption, achieve a 25% volumetric reduction in petroleum consumption by state vehicles measured against a fiscal year 2005-2006 baseline, while increasing energy efficiency of the fleet (excluded vehicles include those used for law enforcement, emergency response, road maintenance, and highway construction).

Strategy

CDOC energy and water use can be reduced through demand-side reductions, cost-effective supply-side alternatives including renewables and a commitment throughout the agency to change the culture. The EMP developed the agency's energy and water conservation plan so that implementation of the Plan will reduce energy and water consumption in an effort to achieve the State's *Greening of State Government* goals. CDOC is implementing the Environmentally Preferable Purchasing (EPP) practices under the State of Colorado Environmentally Preferable Purchasing Policy (*current version* – July 1, 2010).

Operations Performance Sectors

CDOC has identified the following core Operations Performance Sectors:

- Existing Buildings/Systems
- Energy Equipment/Fixtures/Systems – Upgrades/Replacements
- Energy Performance Contracting (EPC)
- Commissioning
- Re-commissioning and Retro-Commissioning
- Operation & Maintenance
- Water Conservation
- New Buildings/Systems
- New Construction Design/Engineering – LEED-NC
- Renewable Energy Technology – Geothermal, Solar, Wind, Biomass
- Water Conservation – Fixtures/Use/Xeriscaping/Watering-time/Native Species
- Operation & Maintenance
- Fleet Vehicles
- Transportation and Fuel Management Plan
- Transportation efficiency study
- Fuel type purchase and consumption tracking and reporting
- Petroleum volumetric consumption reduction plan

- Travel policies and directives
- Administration and Environmentally Preferable Purchasing (EPP)
- Purchasing Policies and Directives
- Recycling/Reuse
- Waste Management – Composting and Reduction

Energy Management

CDOC draws on available expertise, experience, and resources both from within the agency and from outside sources to develop and implement an effective energy management program. CDOC is fortunate to have the availability of our innovative Colorado Correctional Industries division which is enthusiastic in participating in energy efficiency, water conservation, and resource management efforts. CDOC explores opportunities and funding mechanisms which minimize the up-front development costs associated with the assessment and implementation of innovative energy solutions. CDOC will incorporate the following components within the Energy Management program:

- Energy Audits/Assessments
- Demand Side Management (DSM)
- Measurement & Verification/Reporting
- Interagency Cooperation/Collaboration
- Public Outreach/Information

Energy and Water Conservation Measures

Energy and water conservation measures (ECMs and WCMs) serve to eliminate energy waste while increasing equipment/building efficiencies. Additional demand-side reductions include increased energy efficiency through effective building operations and management. Potential energy and water conservation measures involve the following systems or equipment:

- Lighting
- Heating, ventilation, air conditioning (HVAC)
- Building envelope (roof, curtain walls, windows, doors)
- Plug Loads (Computers, Monitors, Speakers, Chargers/Transformers)
- Fax machines, Printers, Copiers, Scanners and multi-function devices
- Small power supplies
- Vending machines
- Task lighting
- Refrigeration
- Space heaters – reduce/eliminate use
- Water distribution systems
- Type of water use
- Point of use plumbing fixtures and controls

Equipment Replacement

The Energy Management Program (EMP) will work to develop and encourage purchasing/leasing standards that specify ENERGY STAR® products and premium efficient energy and water use equipment to reduce overall energy and water use. The

CDOC Purchasing Office is responsible for processing and/or oversight of virtually all of the Department’s purchases of goods and services costing more than \$5,000, and most small construction and maintenance project purchases costing between \$5,000 and \$100,000. The EMP works with the Purchasing Office and facility staff to assist in the selection of products and equipment which meet the current State of Colorado Environmentally Preferable Purchasing (EPP) Policy.

Plug Load Reduction

CDOC in collaboration with an Office of Information Technologies (OIT) policy and a staff education program, we can make an impact on plug loads through behavior modification, new equipment purchases, and the use of power-saving technology. Energy savings options should be enabled on all applicable equipment. Office equipment should include power management and power off features.

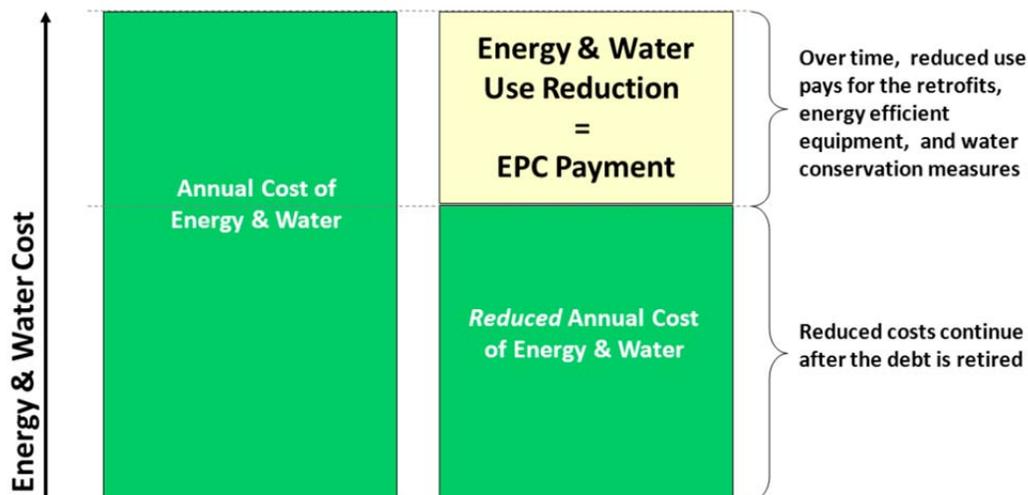
- **Power manage:** ensure that all ENERGY STAR® office equipment (computers, printers, copiers) are enabled to go into “low power” or “sleep mode” when not in use.
- **Power off:** encourage staff to turn off computers, printers, and other plug-load equipment when not being used.

Energy Performance Contracting

An Energy Performance Contract (EPC) is an agreement between an agency and an energy service company (ESCO). The ESCO conducts a comprehensive energy audit (Technical Energy Audit – TEA) of State facilities and identifies measures to reduce energy and water consumption. If the measures are accepted as feasible, the State Treasury, with agency support, arranges the necessary funding of an EPC through third-party financing. In consultation with the agency and the Colorado Energy Office, the ESCO designs and constructs a project that meets the agency's needs. The ESCO guarantees that the improvements will generate energy and water use reductions and associated avoided costs (at then-current or anticipated rates) sufficient to pay for the project over the term of the contract.

EPC Financing

Reductions in energy and water use pay for the improvement measures, over time.



EPC Strategy

The CDOC entered into its first two Energy Performance Contracts – one at CTCF (Colorado Territorial Correctional Facility) and the other at BVCC (Buena Vista Correctional Complex). The on-site audit phase, Technical Energy Audits (TEAs), for the two facilities were completed in 2010. During the EPC construction and implementation phase, which began in January 2011, approximately ten million dollars' worth of equipment and operational upgrades have been installed and implemented at these two facilities at no up-front capital cost to the state of Colorado. The energy and water conservation measures are projected to result in long-term energy savings of up to 30% and municipal water savings of over 10% during the useful life of the work done under these contracts. In Fiscal Year 2011-2012, CDOC embarked on an EPC at Sterling Correctional Facility (SCF). This project combined energy and water conservation measures throughout the facility with a chiller replacement project. The existing chillers had failed and a temporary chiller plant operated through the summer of 2011. The replacement chillers were brought on-line in time for the summer 2012 cooling season through the use of the EPC vehicle. The Department is currently in the construction phase for EPC improvements at the Arkansas Valley Correctional Facility (AVCF) and the Limon Correctional Facility (LCF). The Energy Performance Contract proposed for Fremont Correctional Facility (FCF) is currently in the negotiation state.

EPC Energy and Water Conservation Measures

Through the use of utility, operations, and management savings to fund improvements, where feasible and cost effective, the following measures are being implemented at CDOC facilities:

- Boiler and chiller plant replacement or improvements
- Building automation and energy management control systems
- Heating, ventilation, and air conditioning (HVAC) equipment
- Lighting improvements
- Building envelope modifications
- Chilled water, hot water, and steam distribution systems
- Electric motors and drives
- Refrigeration upgrades
- Distributed power generation systems
- Renewable energy systems
- Energy and utility distribution systems
- Water and sewer systems
- Electricity peak shaving or load shifting
- Energy cost reductions through rate adjustments
- Energy-related process improvements

Phase I - Energy Performance Contracts

CTCF – Energy Performance Contract Cañon City, Fremont County, CO

Contract Value:	\$6.65 million
Projected 1st year Savings:	\$382k
Simple Payback:	17.4 years
Payment Term:	20 years
Construction complete:	100%
Energy Services Company (ESCO):	Johnson Controls

EPC ACCOMPLISHMENTS CTCF

- Boilers replaced
- Variable Frequency Drives - boiler water pumps
- Summer Load Decouple
 - Facilities now independent from heat plant in summer months
- Cooling Towers replaced
- Heat Exchanger expanded
- Chiller Electrical Feeder (reduces demand charges)
- Building Automation System upgrade (DDC controls)
- Control Upgrade – heat pump
- Controls Addition – unit heater fan thermostats
- Air handling units
 - Controls upgrade, VFD retrofit, mix air conversion
- Heat pumps replaced
- Lighting retrofits
- Steam lines consolidated, steam traps replaced, steam pump replaced
- Steam piping insulated, steam pipe modified
- Ice machine replaced
- Water closet and fixture retrofit/replacements
- Laundry ozone system
- Vending miser – reduces vending machine energy use

BVCC – Energy Performance Contract Buena Vista, Chafee County, CO

Contract Value:	\$6.55 million
Projected 1st year Savings:	\$548k
Simple Payback:	12 years
Payment Term:	15 years
Construction complete:	100%
Energy Services Company (ESCO):	Long Energy Solutions

EPC Accomplishments BVCC

- Combined heat and power
- Stack economizer
- Digital controls
- Ventilation matched to occupancy
- Boiler steam controls optimized

- District heating & plant efficiency
- Boiler and water controls
- Dryer heat recovery in laundry
- Ozone generation system in laundry
- Steam line pipe insulation
- Air handling unit heat recovery
- Kitchen ventilation controls (exhaust fans turned off)
- Evaporator fan controls
- Variable frequency drives (VFDs)
- Interior lighting retro-fit
- Exterior lighting retro-fit

**SCF– Energy Performance Contract
Sterling, Logan County, CO**

Contract Value:	\$5.55 million
Projected 1st year Savings:	\$419k
Simple Payback:	13.25 years
Payment Term:	14 years
Construction complete:	100%
Energy Services Company (ESCO):	Johnson Controls
TEA Fast Tracked - completed:	12/12/2011

EPC Accomplishments SCF

- Chiller Replacement (emergency project)
- Cooling tower replacement
- Controls optimization
- Steam pressure reduction
- Pipe & valve insulation
- Steam traps replaced
- Water conservation measures
- Ozone laundry
- Retro commissioning
- “Best Value” Chiller Procurement SCF
 - First “Best Value” Chiller selection in State
 - Energy efficiency and performance verified
 - Modified Life Cycle Cost determined
 - Equipment cost + 20-year energy cost
 - Factory testing verified performance
 - 100%, 75%, 50%, and 25% load values verified
 - Engineer verified performance in factory

EPC PHASE I RESULTS
Projected Utility Reduction & Funds for Finance Payment

EPC Item	CTCF	BVCC	SCF	Total
Electricity Reduction	1,951,852 kWh	1,193,524 kWh	1,213,405 kWh	4,358,781 kWh
Gas Reduction	34,498 DkThrms	49,745 DkThrms	51,614 DkThrms	135,857 DkThrms
Water Reduction	9,793 k-Gal	508 k-Gal	30,558 k-Gal	40,859 k-Gal
Utility Cost Savings	\$381,684 First Year	\$547,828 First Year	\$418,867 First Year	\$1,348,379 First Year
Total Capital Improvements	\$6,652,380	\$6,546,186	\$5,550,988	\$18,749,554

Phase II - Energy Performance Contracts

**ARKANSAS VALLEY CORRECTIONAL FACILITY and
 LIMON CORRECTIONAL FACILITY – Energy Performance Contract
 Phase II – Energy Performance Contract FY 2011/12 – FY 2014/15**

Contract Value: \$10.8 million
 Projected 1st year Savings: \$791 k
 Simple Payback: 13.6 years
 Payment Term: 15 years
 Technical Energy Audit: 100% complete
 Construction complete: 44% complete (as of October 2014)
 Energy Services Company (ESCO): Long Energy Solutions

Proposed Measures – AVCF

- Direct Digital Control Upgrade/Expansion
- New High Efficiency Chillers
- Interior Lighting Retrofit
- Parking Lot & Wallpacks Lighting Retrofit
- Variable Volume Pumping
- Variable Air Volume Conversion
- Demand Controlled Ventilation
- Ozone Laundry System
- Plumbing Fixture Retrofit

Proposed Measures – LCF

- Direct Digital Control Upgrade/Expansion
- New High Efficiency Chillers
- Variable Volume Pumping Conversion
- Variable Air Volume Conversion
- Demand Controlled Ventilation
- Interior Lighting Retrofit
- Parking Lot and Wallpack Lighting Retrofit
- EC Motors/Evaporator Fan Controls
- Plumbing System Retrofit
- Domestic Hot Water Generator Retrofit
- Domestic Water Booster System

FREMONT CORRECTIONAL FACILITY

Phase II – Energy Performance Contract FY 2011/12 – FY 2014/15

Contract Value:	\$4.25 million
Projected 1st year Savings:	\$349 k
Simple Payback:	12.2 years
Payment Term:	15 years
Technical Energy Audit:	100% complete
Construction complete:	0%
Energy Services Company (ESCO):	Siemens Industry, Inc.

Proposed Measures – FCF

- Boiler - Burner controls
- HVAC and controls retro-commissioning
- Building automation system replacement
- HVAC economizer/controls
- Multi-zone HVAC to variable air volume
- Interior lighting
- Kitchen HVAC system
- Heat recovery
- Water conservation
- Ice machines
- Building weatherization
- Pipe insulation

TECHNOLOGY SPECIFIC EPC

Energy Efficient Light Emitting Diode (LED) Exterior Lighting Opportunities

Locations

- Buena Vista Correctional Complex
- Fremont Correctional Facility

Benefits

- Reduces energy use
- Improves visibility
- Replaces legacy lighting systems (that have outdated components, no longer available)
- Color rendition greatly improved
- Visual acuity improved
- Uniform illumination
- Lower illumination levels required
- Reduced operating cost
- Instant strike & re-strike
- Optical control improved (dimming)

Future Phases - Energy Performance Contracts

Facilities

- East Cañon City Prison Complex
 - CSP, ACC, FMCC, SCC
 - Maintenance Support Center
 - Central Warehouse – Visiting Center
 - Armory, Check Point, OIT Center
 - CCI Facilities
- Denver Complex
 - Denver Reception & Diagnostic Center (DRDC)
 - Denver Women’s Correctional Facility (DWCF)
 - Denver Complex Alternate Water
- Pueblo Complex (Electric Only)
 - La Vista Correctional Facility (LVCF)
 - San Carlos Correctional Facility (SCCF)
- Trinidad Correctional Facility (TCF)
- Delta Correctional Center (DCC)
- Rifle Correctional Center (RCC)

Energy-and-Water Management Plan Implementation

The CDOC has been greeted with refreshing new ideas and attitudes from their staff and management with regard to energy and water management planning. While change is not always something people are comfortable with, it has been embraced and we are moving forward to create permanent realignment of procedures and behavior patterns. These changes will create a positive impact for the citizens of our state.

The following implementation steps were outlined in a September 2011 presentation to CDOC Executive Staff:

- Buy in from all stakeholders
- Baseline of existing energy use
- Targeted goals for the energy efficiency plan
- Energy Efficiency (& Water Conservation) Plan (refined and developed)
- Energy Performance Contracting statewide
- Enterprise Management Control System
- Demand Side Management
- Market Commodity Purchasing
- Education & Awareness
- Celebrate & share the success of the program

Roadmap to Achieve Plan Goals

We strive to deliver correctional services with optimal efficiency.

- Demand-side Reductions:
 - Reduce utility use and operating costs while sustaining the Mission
 - Ensure sustainability in facility design, renovation, and construction
 - Focus on operations and maintenance

- Supply-side Alternatives:
 - Install renewable systems and procure renewable source energy
 - Reduce waste stream costs by recycling and reusing materials
 - Establish Environmentally Preferable Purchasing (EPP) practices
- Change the Culture:
 - Provide occupant awareness and education
 - Create an informal conservation team – or “Green Team”

Demand-Side Reductions

CDOC employs demand-side reduction measures which involve facility and building system alternatives that will reduce the agency’s energy intensity. Building energy audits, commissioning, and Energy Performance Contracting will develop and implement measures to further reduce utility costs. Employing operations and maintenance best practices should enhance energy efficiency and lower maintenance costs.

High Performance Buildings

CDOC strives to incorporate requirements of the Office of the State Architect High Performance Certification Program in new construction and substantial renovations. High Performance Buildings involve the full spectrum of the project from initial facility master planning to final long-term operation and maintenance of buildings. Life Cycle Cost Analysis will be used in the following situations, when applicable:

- Energy Audits and Assessments
- Project Funding and Financing
- Energy-Efficient and Sustainable Procurement
- Sustainable Building Design and Construction
- Building and System Commissioning
- Operations and Maintenance

New construction, major renovation, and replacement of major building systems in correctional facilities will include the following, as appropriate:

- Highly Efficient Systems
- Petroleum Use Reduction and Energy Security
- Source Energy (pollution reduction)
- Renewable Energy
- Water Conservation
- Use of life cycle costing in procurement
- Use of ENERGY STAR® and energy-saving equipment and products

Through the use of sustainable design and construction for new facilities and major renovation, CDOC plans to achieve an optimum balance of costs, environmental, and human benefit.

- Goal of LEED™ Gold for new construction (*if cost effective and Mission-compatible*)
- Optimize energy efficiency
- Protect water resources
- Optimize site potential
- Assure good indoor air quality

- Use environmentally friendly products
- Minimize waste

Capital and minor repair and alteration projects will employ sustainable design and construction principals where applicable. Key approaches for repairs and alterations include:

- Invest in new, more efficient equipment
- Base decisions on life-cycle costing
- Opportunities with utility programs
- Focus on ENERGY STAR® and environmentally preferable products

Operations and Maintenance (O&M)

Operations and Maintenance practices and procedures have a direct impact on building energy use. The EMP will work with Correctional Facilities' Physical Plant Managers and staff in the following areas:

- Perform routine walk-through energy audits
- Monitor equipment run/cycle time
- Energy efficient and ENERGY STAR® equipment replacement
- Integrate building automation systems & maintenance management systems
- Continual operation and maintenance training

Commissioning (Cx)

CDOC will perform commissioning, re-commissioning, and retro-commissioning in applicable situations, if feasible. Commissioning services may be considered in the following applications:

- Quality assurance for new buildings
- Improve performance of existing assets
- Full building/system Cx for capital projects
- Full retro-commissioning for major assets
- Continuous re-commissioning of major equipment
- Training and on-the-job experience

Energy Service Provider Demand Side Management (DSM) Programs

In FY 2009-2010, CDOC implemented a demand response program at the Denver and Sterling correctional facilities through the Xcel Energy – EnerNOC Peak Savings Program. Participants voluntarily reduce electricity consumption during periods of peak electricity demand or high wholesale electricity prices. After four successful years, due to new environmental regulations, the Department has been forced to end its participation in this particular Peak Savings program. However, CDOC will continue to explore and implement additional opportunities to reduce electric power demand as they are made available.

Small Energy Efficiency and Water Conservation Projects

CDOC performs small-scale energy efficiency projects on a periodic basis through utility line cost avoidance. These small projects are identified by facility staff or by Facility Management Services as measures that may avoid utility line costs. A cost estimate and energy or water use reduction is developed to determine probable payback. If the

measure is feasible based on cost and simple payback, and if sufficient funds are available, the measure is recommended for implementation. The following list is an example of small projects that have been implemented or considered by CDOC over the past few years. Measures that show use and cost avoidance at one facility are shared with the Physical Plant Managers and are implemented at other facilities as opportunities and funds are available.

- **ACC – Arrowhead Correctional Center**
 - Controls Upgrade - Building heating & cooling
- **CCC – Colorado Correctional Center**
 - Furnace Upgrade
 - Hot Water Heater Upgrade
- **CCF – Centennial Correctional Facility**
 - Variable Frequency Drive (VFD)
 - Shower and Wall-Pack Lighting Upgrade
- **CSP – Colorado State Penitentiary**
 - Water Controls and Valves for Cells
- **DCC – Delta Correctional Center**
 - LED Lighting Efficiency Upgrade
 - Replaced 417 light fixtures in the 5 living units with LED fixtures
 - Replaced 14 pole mounted light fixtures with LED light fixtures
 - Replaced a heating and cooling unit on the food service building DE31
 - Added Insulation
 - Installed a lower ceiling and insulation on general maintenance building DE23
 - Installed new foam roofs, increased insulation and reflectivity - vehicle maintenance DE20 and the Quonset hut DE28
 - Best Management Practice
 - All landscaping, greenhouse, and gardens watered with irrigation water
 - Variable Frequency Drives
 - Installed two VFD motor controllers on the two 7 1/2 Horsepower domestic water pumps.
 - Upgraded Control System
 - Upgraded the Robert Shaw DDC (direct digital control) environmental controls system
 - Compost and recycle program
- **DRDC & DWCF – Denver Complex**
 - Water Conservation
 - Reduced irrigation usage by ~15% through reduce zone watering time
 - Low Flow Water Fixture Project
 - 113 low flow toilets
 - 7 low flow urinals
 - LED Exterior Lighting Upgrade for low mast lights at DWCF

- **ECCPC – East Cañon City Prison Complex**
 - Wastewater Pretreatment Wash Water Reduction
 - Alternate Water – Piping, Wells, Tank
 - LED Lighting Upgrade – Armory & Maintenance
- **FCF – Fremont Correctional Facility**
 - Variable Frequency Drives
 - LED Exterior Lighting Upgrade
- **FMCC – Four Mile Correctional Center**
 - LED Lighting Upgrade
- **LVCF – La Vista Correctional Facility**
 - LED Wall Pack Lighting Upgrade
- **RCC – Rifle Correctional Center**
 - Compost and recycle program
 - Dining Room Window Replacement
 - Replaced the single pane windows with thermo-pane windows
 - Reduced glass area (reducing heat loss) RI07
 - LED Lighting Efficiency Upgrade
 - Replaced 170 light fixtures in the 2 living units with LED light fixtures
 - Roof Replacement – Installed new foam type roofs; increase insulation and reflectivity
 - Food service building RI07
 - Utility building RI05
 - General maintenance building RI06
 - Best Management Practice
 - All landscaping, greenhouse, and gardens watered with irrigation water
 - Water Conservation Project
 - Replaced 24 shower heads with low flow 1.25 gpm shower heads
 - Replaced the 24 lavatory faucet fixtures in the 2 living units with timed push button faucets
- **SCCF – San Carlos Correctional Facility**
 - Cooling Tower Efficiency Upgrade
- **TCF – Trinidad Correctional Facility**
 - LED Exit Lights
 - ~ 10,750 kWh annual reduction in energy
 - 2.5 year simple payback

Supply-Side Alternatives

CDOC is considering supply side alternatives which will diversify the agency's utility portfolio, enhance reliability, provide emergency supply, and incorporate cost-effective renewable energy. Potential supply-site alternatives include:

- Solar Photovoltaic
- Ground source heat pumps
- Biomass and alternative methane fuels
- Solar thermal

- Wind generation
- On-site generation
- Combined heat and power
- Heat recovery

A completed and operational renewable energy, supply-side alternative project is the solar photovoltaic (PV) system installation at four (4) correctional facilities in the Black Hills Energy service territory. The systems (combined total just under 400kW) generate renewable electric energy. The project was implemented through Power Purchase Agreements (PPAs). An additional one megawatt (1MW) of solar PV was installed through a PPA at the Denver Complex in FY 2013-2014 and has been operational since April, 2014. Construction is nearing completion at the Sterling Correctional Facility (SCF) of a 500 kilowatt solar PV array. Interconnection of the SCF array under the PPA should occur in FY 2014-2015. Community Solar Garden participation efforts are ongoing and could result in up to an additional 2MW of panels installed, a portion of which will benefit the cost of electrical service at SCF.

Purchase Power Agreement @ AVCF Arkansas Valley Correctional Facility

Status: Operational

- ~100 kW-DC photovoltaic (PV) solar system
- Delivers electrical energy produced by a renewable energy source directly to the electrical distribution system at AVCF
- No “up-front”, operating or maintenance costs for the term of the contract
- Reduced greenhouse gas emissions, as CO₂, associated with electrical energy use by over 1,800 metric tons over the full 20-yr contract term
- Option to purchase after contract year six
- Utility Provider Conventional Fuel Use Reductions
- Reduced fossil fuel utility usage by 3.1 million kWh (equivalent to 13.3 homes each year) over 20 year term of contract

Purchase Power Agreement @ CTCF Colorado Territorial Correctional Facility

Status: Operational

- ~90 kW-DC photovoltaic (PV) solar system
- Reduced CO₂ greenhouse gas emissions by over 1,700 metric tons over the full 20-yr contract term
- Reduced fossil fuel utility usage by 2.9 million kWh (equivalent to 12.4 homes each year) over a 20 year contract term

Purchase Power Agreement @ SCCF San Carlos Correctional Facility

Status: Operational

- ~100 kW-DC photovoltaic (PV) solar system
- Reduced CO₂ greenhouse gas emissions by over 1,800 metric tons over the full 20-yr contract term
- Reduced fossil fuel utility usage by 3.1 million kWh (equivalent to 13.3 homes each year) over a 20 year contract term

Purchase Power Agreement @ ECCPC East Cañon City Prison Complex

Status: Operational

- ~100 kW-DC photovoltaic (PV) solar system
- Reduced CO₂ greenhouse gas emissions by over 1,800 metric tons over the full 20-yr contract term
- Option to purchase after contract year five
- Reduced fossil fuel utility usage by 3.1 million kWh (equivalent to 13.3 homes each year) over a 20 year contract term

Purchase Power Agreement @ Denver Complex Denver Reception & Diagnostic Center (DRDC) Denver Women's Correctional Facility (DWCF)

Status: Operational

- Two ~500 kW-DC photovoltaic (PV) solar systems
- Reduced CO₂ greenhouse gas emissions by over 26 thousand metric tons over a 20-yr contract term
- Option to purchase after contract year five
- Reduced fossil fuel utility usage by over 30 million kWh over a 20 year contract term

Purchase Power Agreement @ SCF In-Process Renewable Energy

Status: Construction in final completion phase

- ~500 kW-DC photovoltaic (PV) solar system
- Deliver energy produced by a renewable source directly to the electrical distribution system at SCF
- No "up-front", operating, or maintenance costs for the term of the contract
- Option to purchase after contract year six
- Reduce CO₂ greenhouse gas emissions by over 13,400 metric tons over the full 20-yr term of the contract
- Reduced fossil fuel utility usage by 19.1 million kWh (equivalent to 82.6 homes each year) over 20 year term of contract

Subscription Agreement in Community Solar Garden for SCF

Status: Agreement completed; construction completion is imminent

- The subscription agreement relating to SCF is for roughly thirty-percent (30%) of the output of a 1.97MW-DC photovoltaic (PV) solar system
- No "up-front", operating or maintenance costs for the term of the contract
- Reduced CO₂ greenhouse gas emissions by over 53,000 metric tons over the full 20-yr contract term
- Reduced fossil fuel utility usage by 75.2 million kWh (equivalent to 320 homes each year) over 20 year contract term

Change the Culture: Energy Awareness and Water Conservation

The agency's Energy-and-Water Management Plan includes development of an ongoing energy awareness campaign to change the culture of CDOC. The approach to Energy Education includes a multi-stepped plan.

Step 1 – Assemble the Teams

- Step 2 – Identify opportunities and objectives
- Step 3 – Communications plan
- Step 4 – Implement Education program
- Step 5 – Evaluate program
- Step 6 – Track and report data and results
- Step 7 – Follow through

Training and multi-media communications will engage and educate staff and building occupants. Campaign materials may include:

- Awareness posters
- Events (potentially for Energy Awareness Month and Earth Day)
- O&M checklists and equipment signs
- Stickers with reminder messages
- Electronic messaging
- Staff meeting energy awareness materials
- Training material included during annual, training sessions
 - Beginning in 2013, the Corrections Training Academy on-line training offerings include an energy efficiency and water conservation module

CDOC will build a greater understanding of the importance of energy efficiency and create individual and team ownership of the energy and water management plan. Through a focus on the benefits and results of supply side alternatives and reduced demand, the awareness campaign will demonstrate how individuals can help to achieve organizational goals.

Individual conservation practices:

- Create a culture of conservation in everyday decisions by staff and tenants
- Conscious choices minimize energy use
- Turn off lights and electronic equipment
- Unplug electronics to avoid standby loads
- Limit or eliminate personal appliances
- Turn off faucets and report leaky fixtures
- Energy efficiency focused O&M

As *Greening of State Government* Awareness increases, staff members will buy-in to green policies, procedures, and practices. Since we have staffing of over 6,000 full time equivalents, it is our plan to incorporate input from individuals who have knowledge of their operations and equipment. Staff “ideas” will be prioritized based on life-cycle costs, implementation costs, and projected savings. Projects with reasonable return on investment will be implemented when possible.

The State Employee Cost Savings Incentive Plan [Administrative Regulation 1450-46 - implemented October 1, 2010], provides rewards for innovative ideas that result in specific, identifiable cost savings to state government. It is the policy of the Department of Corrections to encourage innovative thinking and the involvement of CDOC employees in the development of ideas that will increase the productivity and service level of the Department, while decreasing costs. The CDOC recognizes that employee incentive programs will help encourage employee involvement in making state government more efficient and effective. The Energy Management Program and CCEO

will work with the CDOC Business Operations and the FMS Planning Group to evaluate the cost savings potential of innovative ideas submitted that are related to utility use.

Philosophy

The Energy Management mission continues to be to improve plant and program operational energy and/or utility efficiency through life cost analysis, cost-effective energy and/or utility procurement, improved maintenance, system optimization, and user education and incentive systems.

As a state agency that serves the public, CDOC continues to strive to meet both its overall Mission and that of the Energy Management Program. As managers of public funds and assets, we are required to operate in the most cost effective manner practical. We continue to strive to reduce the use of limited resources, improve Colorado's environment and the health of future generations through the management of our utilities and fossil fuel consumption. Building on the fundamental drivers of sustainability and fiscal responsibility, the Department of Corrections philosophy centers on the following goals and objectives:

- Develop custody specific design standards for utility services for new and existing facilities to permit adequate redundancy to allow for simultaneous scheduled maintenance and periodic replacement
- Identify standard, emergency and standby electrical capacities, including existing contracts for current needs and potential expansions
- Initiate a departmental energy conservation program which results in reduced energy usage
- Establish guidelines and standards for purchase of energy consuming devices based on life cost effectiveness and availability in the industry
- Achieve the goals and objectives of the *Greening of State Government* Executive Order D0012-07

The CDOC's Energy Management Program has implemented numerous Cost Avoidance projects over the course of nearly two decades. CDOC has completed the construction phase of the first three Energy Performance Contracts (EPC), two of which were at our oldest correctional facilities. CDOC is in the construction phase of an EPC at two facilities and in the contracting phase of an EPC at one additional facility. The Department continually seeks funding mechanisms to reduce initial capital investments and provide the lowest life-cycle-cost equipment and measures.

Benefits

The benefits of energy efficiency, water conservation, and natural resource reduction initiatives to the State of Colorado, its citizens, and State of Colorado Offenders include:

- Reduce dependence on fossil fuels
- Conserve natural resources
- Reduce environmental impact
- Optimize use of operating funds
- Improve the comfort of building occupants
- Increase learning opportunities and meaningful work assignments for offenders
- Improve employee productivity

Appendix A

CDOC Utility Baseline Data – FY 2005/2006

FACILITY	ELECTRIC CONSUMPTION	ELECTRIC CONSUMPTION	ELECTRIC COST	NATURAL GAS CONSUMPTION	NATURAL GAS COST	WASTEWATER VOLUME	WASTEWATER COST	WATER CONSUMPTION	WATER COST	PROPANE CONSUMPTION (PGal)	PROPANE COST	DIESEL CONSUMPTION	DIESEL COST
ACC	See ECCPC	See ECCPC		13,045 MMBtu	\$ 121,154	See ECCPC		See ECCPC					
AD*	1,537 MMBtu	450,000 kWh	\$ 25,948	5,921 MMBtu	\$ 58,413	200 kGal	\$ 701	201 kGal	\$ 1,558				
AVCF	30,835 MMBtu	9,037,000 kWh	\$ 604,282	38,085 MMBtu	\$ 450,595	57,382 kGal	\$ 105,583	71,891 kGal	\$ 193,286				
BVCC	25,103 MMBtu	7,357,000 kWh	\$ 555,621	106,868 MMBtu	\$ 1,254,230	63,652 kGal	\$ 120,000	57,636 kGal	\$ 312				
CCF	See ECCPC	See ECCPC		11,609 MMBtu	\$ 106,645	See ECCPC		See ECCPC					
CI	See ECCPC	See ECCPC		27,324 MMBtu	\$ 256,113	See ECCPC		See ECCPC					
CIBV	477 MMBtu	140,000 kWh	\$ 13,836										
CIDV	546 MMBtu	160,000 kWh	\$ 15,168	3,279 MMBtu	\$ 34,067	344 kGal	\$ 671	344 kGal	\$ 659				
CS**	283 MMBtu	83,000 kWh	\$ 6,130	307 MMBtu	\$ 4,028	18 kGal	\$ 176	18 kGal	\$ 71				
CSP	See ECCPC	See ECCPC		29,453 MMBtu	\$ 267,212	See ECCPC		See ECCPC					
CTCF	23,134 MMBtu	6,780,000 kWh	\$ 479,117	72,794 MMBtu	\$ 645,295	55,422 kGal	\$ 132,482	60,771 kGal	\$ 110,728			1,391 MMBtu	\$ 20,763
CWCF	See ECCPC	See ECCPC		8,720 MMBtu	\$ 80,311	See ECCPC		See ECCPC					
DCC	7,816 MMBtu	2,291,000 kWh	\$ 144,753	19,577 MMBtu	\$ 229,782	17,329 kGal	\$ 37,620	15,631 kGal	\$ 29,465				
DRDC	16,074 MMBtu	4,711,000 kWh	\$ 292,456	28,077 MMBtu	\$ 292,623	19,329 kGal	\$ 33,423	19,329 kGal	\$ 33,423				
DWGF	29,956 MMBtu	8,780,000 kWh	\$ 532,227	47,122 MMBtu	\$ 462,812	29,808 kGal	\$ 58,126	36,473 kGal	\$ 65,749				
ECCPC***	95,209 MMBtu	27,904,000 kWh	\$ 1,744,532	10,087 MMBtu	\$ 93,025	179,595 kGal	\$ 488,617	271,236 kGal	\$ 624,638				
FCF	See ECCPC	See ECCPC		82,089 MMBtu	\$ 738,118	See ECCPC		See ECCPC					
FLCF	24,483 MMBtu	7,176,000 kWh	\$ 619,837	84,408 MMBtu	\$ 1,021,239	See ECCPC		52,557 kGal					
FMCC	See ECCPC	See ECCPC		17,471 MMBtu	\$ 156,724	See ECCPC		See ECCPC					
LCF	30,675 MMBtu	8,990,000 kWh	\$ 529,859	36,051 MMBtu	\$ 407,194	43,990 kGal	\$ 31,511	61,974 kGal	\$ 187,778				
LVCF	14,039 MMBtu	4,115,000 kWh	\$ 274,394										
RCC	3,876 MMBtu	1,136,000 kWh	\$ 73,176	See ECCPC		See ECCPC		See ECCPC					
SCC	See ECCPC	See ECCPC											
SCCF	9,481 MMBtu	2,779,000 kWh	\$ 199,388										
SCF	51,160 MMBtu	14,994,000 kWh	\$ 885,363	143,421 MMBtu	\$ 1,364,184	130,578 kGal	\$ 317,050	167,083 kGal	\$ 196,667	11,048 MMBtu	\$ 138,768		
TCF	12,160 MMBtu	3,564,000 kWh	\$ 207,213	22,707 MMBtu	\$ 226,989	40,069 kGal	\$ 160,706	40,069 kGal	\$ 160,706	489 MMBtu	\$ 8,049		
YOS				409 MMBtu	\$ 4,348					1,233 MMBtu	\$ 19,219		
TOTALS	376,844 MMBtu	110,447,000 kWh	\$ 7,203,300	808,824 MMBtu	\$ 8,275,101	578,318 kGal	\$ 1,292,537	861,381 kGal	\$ 1,605,040	12,770	\$ 166,036		\$ 44,371

*Includes 8th Street Warehouse; Canteen; Misc. Buildings; Training Academy

**Includes Parole Offices In Longmont And Grand Junction

***Includes All Electric, Water, & Wastewater for East Complex; Gas For Skyline

CWCF Prison Decommissioned in 2009

Appendix B

Table B-1 – Implemented and Anticipated Energy Conservation Measures (ECCPC)

Location ¹	General ECM's		Procurement efficiencies				Building systems					Renewables					
	Education & Awareness	Metering	Electric service ²	Demand management	Gas ³	Waste heat (e.g., CHP)	Shell	System	Equipment	Controls	Operations	Solar	Wind	Geothermal	Biomass	Hydro-electric power ⁴	other
ECCPC Campus	●	●			✓							✓	●	●	●		
Arrowhead Correctional Center	●	●	●		✓	●		●	●	●		●		●	●		
Centennial Correctional Facility	●	●	●		✓	●		●	●	●		●		●	●		
Colorado State Penitentiary	●	●	●		✓	●		●	●	●		●		●	●		
Colorado Women's Correctional Facility <i>(Decommissioned & Repurposed)</i>	●	●	●		✓	●		●	●	●		●					
Four Mile Correctional Center	●	●	●		✓	●		●	●	●		●		●			
Fremont Correctional Facility	●	●	●		✓	●		●	●	●		●		●			
Skyline Correctional Center	●	●	●		n/a	●		●	●	●		●		●			
Correctional Industries operations	●	●	●		✓	●											

¹ All of the facilities and centers listed in this table are located on the East Cañon City Prison Complex (ECCPC).

² This would include rate changes, capacity and energy sales, and similar changes to the cost of service.

³ The ECCPC is already served by contract gas purchase; an interruptible rate is not possible.

⁴ A low-head dam exists on the Arkansas, adjacent to the facility, but the elevation difference may prove uneconomical for practical hydroelectric application.

Table B-2 – Implemented and Anticipated Energy Conservation Measures

Location ¹	General ECM's		Procurement efficiencies				Buildings and Systems						Renewables				
	Education	Metering	Electric service	Demand management	Gas	Waste heat (e.g., CHP)	Shell	System	Equipment	Controls	Operations	Solar	Wind	Geothermal	Biomass/biogass	Hydro-electric power	Other
	● Potential ECMs ✓ In-Place ECMs																
Arkansas Valley Correctional Facility	●	●	●		●	●		●	●	●	●	✓					
Buena Vista Correctional Complex ¹	●	●	●		●	✓	●	✓	✓	●	●	●		●	●	●	
Colorado Correctional Center (Camp George West)	●	●						●	●	●							
Colorado Territorial Correctional Facility	●	●	●		✓	●	●	✓	✓	●	●	✓				●	
Delta Correctional Center	●	●	●		●	●		●	●	●	●	●		●	●		
Denver Complex ²	●	●	●	✓	●			●	●	●	●	✓					
Fort Lyon Correctional Facility (Decommissioned)																	
Limon Correctional Facility	●	●	●		●			●	●	●	●	●					
La Vista Correctional Facility	●	✓	●					●	●	●	●						
Rifle Correctional Center	●	●	●			●		●	●	●	●	●			●		
San Carlos Correctional Facility	●	✓						●	●	●	●	✓					
Sterling Correctional Facility	●	●	●	✓	●	●		✓	✓	●	●	✓	●				
Trinidad Correctional Facility	●	●	●		●	●		●	●	●	●	●			●		
Youthful Offender System	●	✓															

¹ Includes the Buena Vista Correctional Facility (BVCF), the Buena Vista Minimum Center (BVMC), and the Colorado Correctional Alternative Program (CCAP)

² Includes the Denver Reception & Diagnostic Center (DRDC) and the Denver Women's Correctional Facility (DWCF)

Appendix C

CDOC Water Conservation Plan – Executive Brief

INTRODUCTION:

During the first few months of Fiscal Year 2011 – 2012, the Colorado Department of Corrections (CDOC) developed a Water Conservation Plan in response to the Governor's water conservation directive. The directive, as relayed by then CDOC Executive Director Tom Clements, charges each department to reduce water usage by 10% over the next 5 years, using Fiscal Year 2010 – 2011 as a baseline year. The CDOC Plan is consistent with best management practices developed by the Federal Energy Management Program.

The primary component of the CDOC Water Conservation Plan is reducing potable water use. CDOC established a baseline water use of 904,500 thousand gallons (k-Gal) of potable water (based on metered use in FY 2010 – 2011). Reducing potable water use benefits the state by: conserving this limited natural resource; reducing the environmental impacts of developing, producing, treating, and delivering potable water; and, reducing related utility costs associated with potable water use. The current CDOC Water Conservation Plan has the potential to save 135,373 k-Gals of potable water use per year when and if fully implemented.

The secondary component of the CDOC Water Conservation Plan is developing and maintaining full use of all water assets, including alternative water sources such as owned or leased water rights. The Plan intends to preserve the owned water rights of CDOC – thereby preserving the full market value of these assets.

THE PLAN:

The primary goal of the Plan is to reduce potable water usage by an average of 28,900 k-Gal per year; however, the annual usage reduction, by the end of FY15/16, will be no less than 90,450 k-Gal, or 10% of the FY10/11 baseline amount of 904,500 k-Gal. Plan components include the following. 48,000 k-Gal of this goal was realized by the repurposing of the Fort Lyon Correctional Facility. An estimated additional reduction of no less than 596 k-Gal should be realized by the implementation of a low-flow fixture and valve project at the Denver Complex.

- Save 3,090 k-Gal by replacing outdated equipment with water-conserving, energy efficient equipment.
- Save 11,527 k-Gal through water conservation elements of the Energy Performance Contracts (EPCs) Colorado Territorial Correctional Facility (CTCF), Sterling Correctional Facility (SCF), and Fremont Correctional Facility (FCF). Water conservation measures were included in EPCs at SCF and CTCF; the EPC at FCF is in the contract negotiation stage. Monitoring of water use continues at these facilities. Initial measurement and verification results indicate that the reduction in metered use at SCF and CTCF is roughly 60,000 k-Gal, based on a FY 2010-2011 baseline, which far exceeds the 11,527 k-Gal goal.

- Save 59,380 k-Gal by developing alternate water systems through additional Energy Performance Contracts at Sterling Correctional Facility (SCF), the Denver Complex, and East Cañon City Prison Complex (ECCPC). Potable water use will be replaced with alternate water sources. A portion of the ECCPC alternate water system, identified as Phase 1, is nearly fully designed and was partially implemented in FY2013-2014. Another small portion of Phase 1 is currently under way. When this phase is completed, potable water use on the ECCPC will be reduced by an estimated 32,990 k-Gal. Development of the other alternate water systems has not progressed beyond the conceptual stage.
- Save 12,244 k-Gal through implementing additional water conservation best management practices statewide.

ACTIONS:

Funding:

- The Plan is self-funded by CDOC, through energy/utility cost avoidance or cash contributions from Colorado Correctional Industries (CCi), and requires no additional appropriation; however, the Plan does require full funding of the current utility line and annual rate adjustments necessary to keep up with utility increases until Energy Performance Contracts are retired.

Contracting:

70,907 k-Gal of savings (52.4% of the entire potential Plan water use reduction) are dependent upon the use of Energy Performance Contracts (EPCs). CDOC originally intended to amend the existing EPCs, where possible; however, this has proven to be contractually difficult. CDOC may create new EPC contracts where required; but, may be limited to effecting conservation efforts solely through its cost savings measures on an annual basis.

Verification and Measurement:

The technical audit, water savings calculations, and measurement and verification components of the performance contracts will verify and confirm implementation of the planned reductions.

CDOC Water Conservation Plan

I. Plan Inclusions

The CDOC team determined that a comprehensive water management and conservation plan should contain all the elements that have been identified by the federal Department of Energy (DOE) through their Federal Energy Management (FEMP) program water conservation document. The CDOC Plan incorporates those Best Management Practices (BMPs) and organizes them into a series of practices which result in efficient and sustainable use of water. The table of contents developed for the BMP plan indicates the breadth of its considerations:

- BMP #1 – Water Management Planning
- BMP #2 – Information and Education Programs
- BMP #3 – Distribution System Audits, Leak Detection, and Repair
- BMP #4 – Water-Efficient Landscaping
- BMP #5 – Water-Efficient Irrigation
- BMP #6 – Toilets and Urinals
- BMP #7 – Faucets and Showerheads
- BMP #8 – Boiler/Steam Systems
- BMP #9 – Single-Pass Cooling Equipment
- BMP #10 – Cooling Tower Management
- BMP #11 – Commercial Kitchen Equipment
- BMP #12 – Laboratory/Medical Equipment
- BMP #13 – Other Water Intensive Processes (includes laundry, evaporative cooling, & vehicle washing)
- BMP #14 – Alternate Water Sources

The EERE/DOE document is attached to the CDOC Water Conservation Plan (the Plan) in its entirety for reference and consideration as the Plan is further developed and implemented over the next five (5) years, and beyond.

The unique nature of the Colorado Department of Corrections requires that additional BMPs be developed. To date, these include the following issues.

- Industrial Process Water
- Agricultural water use (specific to the arid West and its associated water law)
- Housekeeping and cleaning
- Operational consolidation

Industrial process water and agricultural water use relate to CCI enterprise operations. Increased efficient use is a positive trend since it equates to increased offender employment, training, and potential revenue.

Water rights owned for agricultural use in Colorado must be fully utilized or be subject to the possibility of abandonment. Hence, the BMP developed for agricultural water use includes planning for 100% utilization. Simply preserving a water right through full use does not mean that right should be preserved through inefficient use. Efficient use is

actually a mandate of Colorado water law. The CDOC Plan acts to utilize water in the most efficient ways possible.

Most CDOC facilities have already converted landscape irrigation over to non-potable irrigation sources however, and most of those locations are directly supported by owned water rights. As noted above, fully and efficiently utilizing such resources is critical to maintaining those water rights.

The following is a summary of the status of irrigation water sources by location.

Location	Landscape irrigation source	Comments
Administration	potable	
AVCF	potable	
BVCC	non-potable	owned water rights
CCi	varies	Plan will convert to non-potable source
Community Services	potable	
CTCF	non-potable	owned water rights
DCC	non-potable	owned water rights
DRDC	potable	Plan will convert to non-potable source
DWCF	potable	Plan will convert to non-potable source
ECCPC	varies	Plan will convert to non-potable source
LCF	potable	
RCC	non-potable	owned water rights
SCF	potable	Plan will convert to non-potable source
TCF	potable	

The Plan may appear to have a lack of focus on landscaping changes (adoption of xeriscape techniques and evapotranspiration/water balance irrigation systems). This is not the case, though, since such measures will be considered in all locations and implemented where possible within the limitations of available resources and appropriate given site specific circumstances.

II. Water Reduction Elements

CDOC Water Conservation Plan Metered Potable Water Reduction Elements – The major elements of the metered potable water reduction for the CDOC come from the following plan elements.

- Facility repurposing (limited to FLCF in the next five years)
- Scheduled upgrades in food service equipment resulting from the purchase of water-conserving equipment when replacing old equipment
- Current Energy Performance Contracts (EPCs) at AVCF, BVCC, CTCF, LCF, and SCF
- Pending EPC at FCF
- Anticipated EPCs at SCF, the Denver Complex, and ECCPC, involving alternate water systems (replacing potable water usage with non-potable water sources where water meeting potable standards are not required)

These reductions should be measurable and significant enough to meet and provide verification of the Plan reduction goals (2% per year for 5 years for a total of 10% reduction in metered potable water usage as measured against the FY10/11 baseline of 904,500,000 gallons or 2,776 acre feet). The following table is a summary of the CDOC metered potable water usage by location or function.

Location	FY11 USAGE (k-Gal)	
	CDOC PWS ¹	water service
Administration		23
Arkansas Valley Correctional Facility		66,821
Buena Vista Correctional Complex (city)		1,282
Buena Vista Correctional Complex (well)	70,224	
Division of Correctional Industries		370
Community Services		302
Colorado Territorial Correctional Facility		56,271
Delta Correctional Center		17,580
Denver Reception & Diagnostic Center		28,706
Denver Women's Correctional Facility		24,448
East Cañon City Prison Complex		309,963
Fort Lyon Correctional Facility	48,047	
Limon Correctional Facility		60,413
Rifle Correctional Center	8,257	
Sterling Correctional Facility		166,515
Trinidad Correctional Facility		45,348
Subtotals (rounded)	126,500	778,000
Total	904,500	

¹ PWS indicates a public water system which has its own source of raw water, versus being provided water from another water service provider (city, district, etc.)

² The indicated volume is the actual pumped water and includes water that is lost in treatment

Other plan elements are not readily measurable because they lack adequate metering; they result in such a small reduction in water that they cannot be measured; or, they cannot be guaranteed because of conditions that are beyond reasonable control. These include the following.

- Use of low-flow plumbing devices (faucets, toilets, and showers)
- Use of controls to reduce unnecessary uses of potable water (e.g., controls that limit total volume, duration of flow, and/or frequency of use)
- Dental equipment changes (namely, going to waterless dental vacuum units)
- Operational changes in kitchen and snack bar practices (e.g., not using water to cool foods)
- Changes to mechanical processes (heating, cooling, boiler cycling, etc.)
- Awareness and education programs

III. Cost of Implementation

An investment is required to implement a water conservation plan – either a direct cost or an indirect cost. Due to lack of appropriations to fund energy conservation measures, this Plan utilizes a means of self-funding, including the use of EPCs. The funding picture is further complicated by the fact that a significant portion of this Plan does not result in savings that would allow for near-term paybacks. For correctional facilities served by invoiced water and sewer service providers, current water rates average approximately \$3.45/k-Gal for water and \$3.04/k-Gal for sewer (of which roughly \$1.96/k-Gal is the average cost for the flow-*only* component of wastewater billings). Depending on the specific water rates and flow-component wastewater charges at each facility, some correctional facilities may have a challenge funding the Plan, or even small projects, from savings solely related to reduced water and sewer charges. The Plan will be selectively implemented and may require significant modification along the way.

This Plan, as proposed, would be funded in the following manner. Changes in these assumptions would also require Plan changes.

- Procurement of water efficient devices and equipment during their normal replacement cycle (no additional cost but equipment replacement may be delayed when there is significant additional cost associated with such equipment)
- Funding through Energy Services Companies (ESCOs) using Energy Performance Contracting (EPC) which allows the state to pay for improvements over time from continuing funding and appropriation of related normal rate increases
- It is critical to understand that the ability to retire the described EPC's, within the limits of projected project specific negative cashflow (i.e., identified additional funding needs), is contingent upon getting appropriations for what would have been the related rate increases, as well as continuing base appropriations. If such will not be possible, cashflow and payback analyses need to be revisited before the alternate water system portion of the Plan is implemented
- Allocation of other available utility cost avoidances to Plan implementation, when and if available

Please note, as described in the detailed descriptions and supporting information in the Plan, when using EPCs there is substantial premium associated with overhead and financing costs, that must be paid over time, which results in significantly higher overall project costs and extended payback periods. The alternate water systems may require the department to identify funding sources beyond the projected rate increases to retire the full project cost. The identified funding comes from cost avoidance realized from other ECMs, EPCs, and/or SLB land improvements funds.

This Plan requires that the utility line be fully funded each fiscal year, including all related rate increases over the baseline usage in FY10/11. The CDOC will not have sufficient funds to retire the loan(s) financed through the EPCs without full funding.

Plan Funding Sources Table

General note: the following indicates by major plan component the source of identified funding.

Component	Utility line			CCi small projects	continuing operations	grants/rebates
	FY11/12 base ¹	annual rate increases ¹	other utility cost avoidance			
FLCF Repurposing	N/A	N/A	N/A	N/A	N/A	N/A
EPC's (general)						
BVCC (Long)	✓	✓				
CTCF (JCI)	✓	✓				
FCF (Siemens)	✓	✓				
SCF (JCI)	✓					
EPC's (alternate water)						
Denver Complex	✓	✓	✓		✓	
SCF	✓	✓	✓		✓	
ECCPC	✓	✓	✓	✓	✓	
Food Service/Laundry			✓		✓	✓
Low-flow fixtures			✓		✓	✓
Water Management			✓	✓	✓	✓
Education/Awareness			✓		✓	✓
Audits/Detection			✓	✓	✓	✓

¹ Base continuation and rate increases must be appropriated based upon the original (FY10/11) usage and the water rates current at the time of implementation.

IV. Schedule and Metered Potable Water Reductions

The following is a general outline of the timing of the Plan implementation by fiscal year or other period of time.

Fiscal Year	Component	Source of funding (primary ¹)	Estimated/Actual Consumption Savings (percentage of baseline)	Reduction Attainment Date & Plan totals
FY 2011-2012 Completed	<ul style="list-style-type: none"> • FLCF repurposing • Energy Performance Contract (EPC) @ CTCF • SCF Dishwashers • EPC @ SCF • TCF dishwash machine 	<ul style="list-style-type: none"> • Included in closure • Utility cost avoidance • Operating Expense • Utility cost avoidance • Operating Expense 	1.81% / 2.9% 0.26% / 1.0% 0.19% / (combined) 0.01% / 0.15% 0.06% / 0.0%** Period total: 2.35% Period Achieved: 7.71%	June 30, 2012 Plan total: 2.35% Achieved: 1.77% ¹
FY 2012-2013	<ul style="list-style-type: none"> • FLCF repurposing (cont.) • BVCC laundry ozone • EPCs @ BVCC, CTCF, & SCF (cont.) • SCF Alternate Water System (<i>delayed</i>) • Denver Alternate Water System (<i>delayed</i>) • EPC @ FCF (<i>implementation delayed</i>) • DCC dishwash machine 	<ul style="list-style-type: none"> • Included in closure • Operating Expense • Utility cost avoidance • Utility cost avoidance • Utility cost avoidance • Utility cost avoidance • Operating Expense 	3.59% / 2.9% 0.05% / 0.0%** 0.77% / 4.1% 0.60% / 0.00% 0.34% / 0.00% 0.08% / 0.00% 0.07% / 0.00% Period total: 5.5% Period Achieved: 7.0%	June 30, 2013 1.09% Reductions <i>delayed</i> Plan total: 7.86% Achieved: 7.00%
FY 2013-2014	<ul style="list-style-type: none"> • EPC @ FCF (<i>implementation delayed</i>) • ECCPC Alternate Water System • SCF Alternate Water System (<i>delayed</i>) • Denver Alternate Water System (<i>delayed</i>) 	<ul style="list-style-type: none"> • Utility cost avoidance • Utility cost avoidance • Utility cost avoidance • Utility cost avoidance 	0.08% of CDOC 1.44% of CDOC 0.90% of CDOC 0.70% of CDOC Period total: 3.12%	June 30, 2014 Reductions <i>delayed</i> Plan total: 10.98%
FY 2014-2015	<ul style="list-style-type: none"> • ECCPC Alternate Water System (cont.) • AVCF reuse (<i>delayed</i>) 	<ul style="list-style-type: none"> • Utility cost avoidance • Utility cost avoidance 	2.15% of CDOC 0.28% of CDOC Period total: 2.51%	June 30, 2015 Plan total: 13.41%
FY 2012-2016	<ul style="list-style-type: none"> • Fixtures – Controls – Rules • Education/Behavior • Water Management • Auditing/leak reduction • Laundry equipment replacements system-wide • TCF reuse • Dental vacuums 	<ul style="list-style-type: none"> • Utility cost avoidance • Operating Expense • Utility cost avoidance • Operating Expense 	0.84% of CDOC 0.50% of CDOC 0.001% of CDOC 0.01% of CDOC 0.02% of CDOC 0.12% of CDOC 0.001% of CDOC Period total: 1.49%	June 30, 2016 Plan total: 14.90%

* See Section III for other sources of funding for each component.

** Facility is master-metered. Savings were not able to be accurately measured.

¹ Metered potable water use actually increased in FY 11/12 despite the success of the ECM's due to new water uses, notably expanded CCI operations on the ECCPC (estimated at 17,000 kgal/yr); the addition of Wastewater Pretreatment Facilities at the Brewster and Adams outfalls (no less than 5,000 kgal/yr); and, the addition of turf at TCF to reduce the impacts of wind-driven fines on building maintenance and HVAC equipment (estimated at 9,000 kgal/yr).