

CONSERVATION RESOURCE ENERGY DATA (The RED Book)

PURPOSE:

This document summarizes data on costs and savings pertaining to the Bonneville Power Administration's (BPA) energy conservation acquisition programs and resources. The document provides information and references for general audiences and for use in preparing general publications.

IMPORTANT NOTE FOR THE USER:

This information is sensitive to seemingly unimportant changes in the assumptions surrounding it. *Use data with care* to ensure that the correct characterizations of the monetary and energy figures are communicated together.

The RED Book information is presented to the nearest tenth of an average megawatt (aMW) in most of the tables. In the charts and graphs, the information is rounded to the nearest 5 aMW. When presenting this information to the public, however, we recommend using "rounded" numbers because we recognize that these data are not precise and are subject to adjustment over time. Prior to each support table, a narrative is provided.

This book contains data available through FY 2004 as reported on February 7, 2005. These data should be used as "official data" until an updated RED Book is published next year. Adjustments to the data are captured annually in the RED Book as information from evaluations or other sources prove savings estimates should be increased or decreased. Also, dollar amounts may change from one year to the next due to revised utility reports that are submitted for previous years.

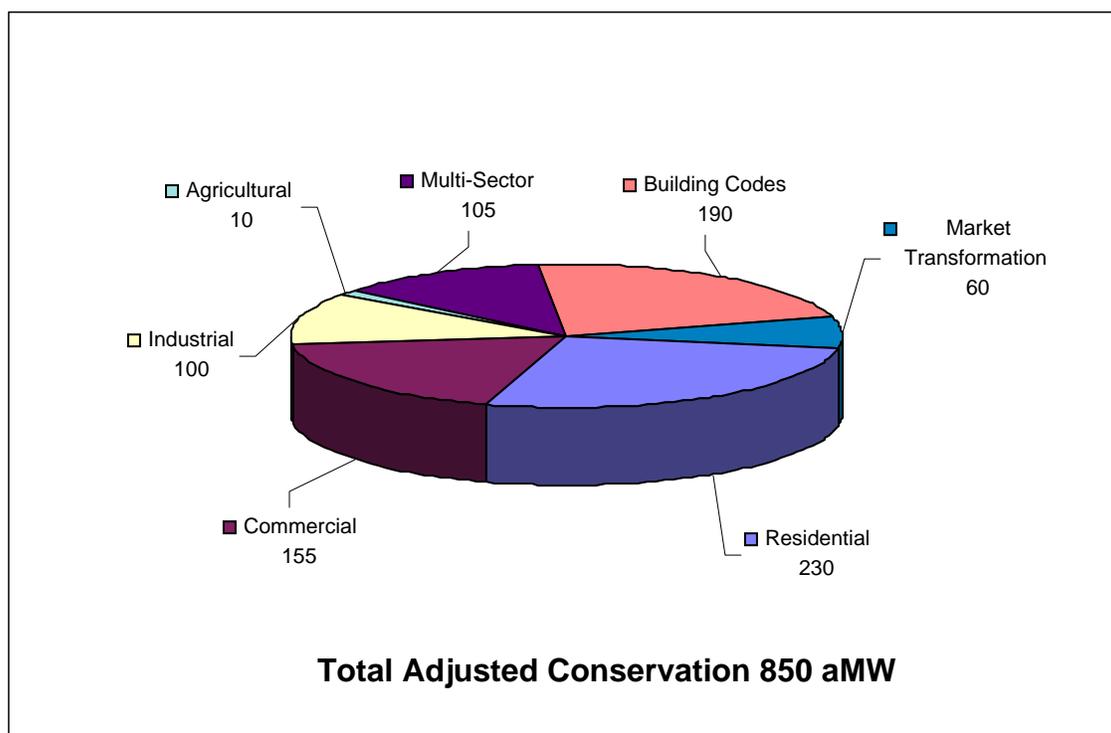
Please note that tables in this edition of the RED Book have been revised. Tables have been renamed for better consistency in naming conventions. They are now referred to as Tables A, B, C and D. Table D, Conservation Costs, has been reformatted and specific categories added in order to provide more detailed information than what has been provided in previous editions. The changes made to the tables make the expenditures more transparent. A significant change was made in how costs are reported. Third party financing traditionally has been reported in the years bonds were repaid. However, Federal Treasury costs are recorded as the proceeds are spent. Thus, third party financing costs have been changed to conform to the federal capital cost – the spending shows up in the year the savings are recorded.

If you have any questions about how to represent or use this information, please call Gene Ferguson at (503) 230-3608 or Roger Maddox at (509) 358-7454.

A QUICK OVERVIEW (Figure 1)

Figure 1 is a graphic comparison of BPA's historical (legacy and codes) savings (FY 1982-2004) and savings from current programs (Conservation Augmentation, Conservation and Renewables Discount, and Market Transformation). Figure 1 depicts savings for some specific market sectors and specific programs. Some savings reported in the cumulative totals have reached the accepted measure life for particular programs and projects. This RED Book includes an adjustment for certain savings or measures, such as Conservation Modernization (ConMod), where it has been deemed that the measure life has expired. Future editions of the RED Book will include additional adjustments to measures or programs where savings have also expired.

FIGURE 1
BPA's HISTORICAL CONSERVATION SAVINGS¹
FY 1982 – 2004



¹ All numbers are rounded to the nearest 5 aMW. Previous RED Book versions of this graph contain ConMod Savings. We have removed that component from the RED Book as of the April 2004 production. The Region is no longer receiving conservation benefits from the aluminum industry due to the economic downturn of the industry.

BPA'S HISTORICAL CONSERVATION SAVINGS BY SECTOR

(See Table A)

BPA'S HISTORICAL CONSERVATION SAVINGS BY PROGRAM

(See Tables B and C)

FY 1982 – 2004

TOTAL CUMULATIVE SAVINGS

BPA's total savings from 1982 – 2004 are approximately 971 aMWs. However, after adjustments are made, the adjusted total effective savings are 850 aMWs. (The aMWs in the following paragraphs are rounded to the nearest 5 aMW.) Through direct conservation acquisition programs, BPA has acquired about 600 aMWs from FY 1982 – 2004. Almost two-thirds of these savings are in the residential and commercial sectors.

In addition to the direct acquisition of conservation, BPA has promoted the adoption of more energy-efficient building codes (residential and commercial) in Washington and Oregon, and has supported the adoption of residential and commercial Model Conservation Standards (MCS). BPA has also influenced the purchase of more energy efficient appliances, and other essential consumer life-style products and standards through Market Transformation activities. These codes and Market Transformation efforts have resulted in energy savings for BPA's service area of about 250 aMWs. This makes the adjusted total energy savings attributable to BPA's investments 850 aMWs through FY 2004.

SECTOR SPECIFIC CUMULATIVE SAVINGS:

BPA's savings from direct acquisition programs from FY 1982 – 2004 resulted in 230 aMWs from the **residential** sector; 155 aMWs from the **commercial** sector; and 100 aMWs from the **industrial** sector. **Agricultural** sector savings are 10 aMWs. Since 1992, **multi-sector** programs, including Billing Credits, Competitive Acquisitions, BPA Transmission System Efficiency projects, Third Party Financing, and Flex Agreements, resulted in a total of 105 aMWs. Prior to the economic downturn in the Aluminum Industry, **ConMod** saved 95 aMWs. The conservation savings for ConMod have been adjusted to zero (0). Load reductions from the adoption of more stringent **building codes** and **MCS** have resulted in 190 aMWs. **Market Transformation** contributed 60 aMWs for a total adjusted energy savings from all activities of 850 aMWs through FY 2004.

NOTES ON TABLES A, B & C:

ACHIEVED SAVINGS:

The reported average megawatt (aMW) savings *are first year savings only* and not the true measure life or program life savings. Measure life is an estimated median time a measure will remain in place, or whenever the structure in which measure is installed ceases to exist.

ADJUSTED SAVINGS:

The adjusted savings reflect, in some cases, the end of a measure life when BPA assumes the measures are no longer producing savings. In addition, the adjusted savings may reflect findings from evaluations that show savings are more or less than expected when the program was initiated.

LINE LOSS:

Reported savings include transmission and distribution line-loss credit savings of 7.5 percent for direct acquisition programs and 2.5 percent for ConMod. This adjustment is made to account for transmission and distribution line losses avoided through the acquisition of conservation.

During the transmission and distribution of electricity, a certain amount of electricity is lost due to electrical resistance inherent in conductors. Since conservation causes less electricity to be consumed by the end-uses, less electricity is transmitted and, therefore, less electricity is lost and less is needed to be generated. BPA credits its conservation with the line-loss savings. This adjustment allows conservation and generation savings to be compared from the same point in the electrical system often referred to as the “bus bar”.

FUEL CHOICE:²

In 1993, BPA analyzed the following programs for possible fuel choice switching effects: Residential Weatherization, Manufactured Housing Acquisition Program (MAP), New Residential, Energy Smart Design (ESD), and Water Heating. These analyses concluded that the Residential Weatherization program had no fuel choice effect and only a modest effect on the Water Heating program.

However, a fuel choice effect was found in the New Residential sector and MAP. This analysis concluded that the 1993 new residential program incentives from Long Term Super Good Cents (LTSGC), Super Good Cents (SGC), Washington State Energy Code, and/or Northwest Energy Code, and the MAP program do affect fuel choice. The report states that the incentives paid to build energy efficient electrically-heated homes throughout the region appear to be causing approximately 8 percent of the certified LTSGC homes and 6 percent of the new manufactured homes to be built using electricity when, absent the incentives, natural gas would have been the preferred fuel. The fuel choice impacts noted in the report are the result of builders responding to the available incentives from all the programs in their area.

² Fuel choice effects occur when a consumer decides to change fuel sources from what would have been done absent the program. Of concern here is a decision to stay with electricity due to the increased efficiency when the consumer may have decided to use natural gas or another fuel instead.

In the Commercial Sector, a similar fuel choice impact was found in the ESD program where analysis concluded that incentives did effect fuel choice decisions for HVAC equipment and water heating units. The incentives resulted in unintended fuel choice effects that accounted for 3 percent of the program savings occurring because the participants selected electricity instead of natural gas. The above fuel choice effects are incorporated into the program savings for LTSGC, MAP, and ESD.

BUILDING CODES:

Building Code savings are a result of new building codes being passed in 1985 and MCS (or codes close to MCS) that were implemented in Washington in 1991, and in Oregon, Idaho, and Montana in 1992. Commercial MCS were implemented in Washington in 1994 and in Oregon in 1996. Savings from building codes and MCS are estimated through a backward-looking methodology in the load forecast and, therefore, are only approximate.

Residential Code savings from 2003 forward are no longer counted since it is likely that codes would have reached current standards by now. In 2003, Idaho adopted a code equivalent to the 1988 MCS. Oregon and Washington codes have gone beyond MCS at this point, and current practice in Montana appears to be equivalent to the MCS. Although the national energy codes and international energy codes upon which Idaho codes were finally based may have been influenced by MCS efforts in the Pacific Northwest, it is appropriate to stop counting additional new benefits due to BPA's efforts in the 1980's and 1990's.

TABLE A
BPA's HISTORICAL CONSERVATION SAVINGS³
(FY 1982 – 2004)
Incremental aMW

	FY 82-94	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	SubTotal FY 82-04	Adjustment FY 82-04	Total FY 82-04
Residential	172.6	3.4	1.4	0.6	0.7	0.6	0.3	6.6	20.2	11.4	9.8	227.6	2.5	230.1
Commercial	92.5	9.3	5.3	4.8	6.8	0.5	0.0	2.1	14.3	17.5	11.7	164.8	(7.6)	157.2
Industrial	53.4	18.2	11.8	6.7	0.2	0.2	0.0	0.4	4.3	6.8	4.9	106.9	(5.6)	101.3
Agricultural ⁴	12.4	1.8	0.6	0.0	0.0	0.0	0.0	5.2	2.5	3.3	2.7	28.5	(19.1)	9.4
Multi-Sector	6.3	20.1	23.6	27.9	12.9	13.4	0.0	0.0	0.2	0.2	0.2	104.8	(0.0)	104.8
Incremental Total	337.2	52.8	42.7	40.0	20.6	14.7	0.3	14.3	41.5	39.2	29.3	632.6	(29.7)	602.8
Con/Mod	95.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	95.9	(95.9)	0.0
Incremental Total with Con/Mod	433.1	52.8	42.7	40.0	20.6	14.7	0.3	14.3	41.5	39.2	29.3	728.5	(125.7)	602.8
Load Reductions from Improved Building Codes:														
Residential	59.0	10.3	8.7	8.8	8.2	8.2	8.4	8.3	8.7	0.0	0.0	128.6	(0.0)	128.6
Commercial	10.8	4.6	5.9	6.5	4.9	6.2	4.5	4.1	4.3	4.2	3.9	59.9	(0.0)	59.9
Incremental Total	69.8	14.9	14.6	15.3	13.1	14.4	12.9	12.4	13.0	4.2	3.9	188.5	(0.0)	188.5
Market Transformation ⁵	0.0	0.0	0.0	0.0	0.0	4.0	5.0	7.0	12.0	16.0	14.0	58.0	(0.0)	58.0
Incremental Total with Load Reductions and Market Transformation	502.9	67.7	57.3	55.3	33.7	33.1	18.2	33.7	66.5	59.4	47.2	975.0	(125.7)	849.3⁶

³ Includes transmission line loss credit savings.

⁴ The savings achieved related to irrigation scheduling are not included in the total column. These are one-year savings only and do not carry over to other years.

⁵ Market Transformation includes only BPA's share and not regional market transformation savings.

⁶ The numbers will not agree when added vertically and horizontally due to rounding effects and irrigation scheduling savings (see Footnote 3).

TABLE B
BPA's HISTORICAL CONSERVATION SAVINGS
BY PROGRAM (POST LEGACY) (FY 2000 – 2004)
Incremental aMW⁷

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Adjustment	TOTAL FY 00-04
RESIDENTIAL							
Low Income Residential Weatherization (States)	0.3	0.4	0.3	0.4	0.3	(0.0)	1.7
C&RD Low Income Weatherization	0.0	0.0	0.2	0.2	0.2	(0.0)	0.6
<i>Conservation Augmentation (ConAug)</i>							
CFL Program	0.0	1.8	4.6	0.0	0.0	(1.9)	8.3
IRLC	0.0	0.7	2.6	2.4	1.8	(0.5)	8.0
TOTAL RESIDENTIAL CONAUG	0.0	2.5	7.2	2.4	1.8	(2.4)	16.3
Conservation Renewable Discount (C&RD)	0.0	3.6	12.5	8.4	7.5	(0.0)	32.0
RESIDENTIAL TOTAL	0.3	6.5	20.2	11.4	9.8	(2.4)	50.6
COMMERCIAL							
<i>Conservation Augmentation</i>							
Federal	0.0	1.2	3.1	2.5	1.9	(0.0)	8.7
LSO & ESO	0.0	0.2	2.3	2.5	1.1	(0.0)	6.1
Vending Miser	0.0	0.2	1.1	0.3	0.0	(0.0)	1.6
C&I	0.0	0.0	0.2	0.5	0.2	(0.0)	0.9
IRLC	0.0	0.1	5.9	7.7	7.2	(0.0)	20.9
TOTAL COMMERCIAL CONAUG	0.0	1.7	12.6	13.5	10.4	(0.0)	38.2
<i>Conservation Renewable Discount (C&RD)</i>	<i>0.0</i>	<i>0.4</i>	<i>1.7</i>	<i>3.9</i>	<i>1.3</i>	<i>(0.0)</i>	<i>7.3</i>
<i>New Initiatives - Institutional Program</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.1</i>	<i>0.0</i>	<i>(0.0)</i>	<i>0.1</i>
COMMERCIAL TOTAL	0.0	2.1	14.3	17.5	11.7	(0.0)	45.6
INDUSTRIAL							
<i>Conservation Augmentation</i>							
Water/Wastewater	0.0	0.0	0.3	0.2	1.7	(0.0)	2.2
C&I	0.0	0.0	0.0	0.5	0.1	(0.0)	0.6
IRLC	0.0	0.0	3.2	4.4	1.7	(0.0)	9.3
SUBTOTAL INDUSTRIAL CONAUG	0.0	0.0	3.5	5.1	3.5	(0.0)	12.1
Conservation Renewable Discount (C&RD)	0.0	0.4	0.8	1.7	1.4	(0.0)	4.3
INDUSTRIAL SUBTOTAL	0.0	0.4	4.3	6.8	4.9	(0.0)	16.4
Agricultural							
Conservation Augmentation	0.0	0.0	0.0	0.0	0.0	(0.0)	0.0
Conservation Renewable Discount (C&RD)	0.0	5.2	2.5	3.3	2.7	(12.5)	1.2
AGRICULTURAL TOTAL	0.0	5.2	2.5	3.3	2.7	(12.5)	1.2
Multi-Sector							
Conservation Augmentation	0.0	0.0	0.0	0.0	0.0	(0.0)	0.0
Conservation Renewable Discount (C&RD)	0.0	0.0	0.2	0.2	0.2	(0.0)	0.6
MULTI-SECTOR SUBTOTAL	0.0	0.0	0.2	0.2	0.2	(0.0)	0.6
TOTAL CONSERVATION AUGMENTATION	0.0	4.2	23.3	21.0	15.7	(2.4)	66.6
TOTAL CONSERVATION RENEWABLE DISCOUNT (C&RD)	0.0	9.6	17.7	17.5	13.1	(12.5)	40.2
BUILDING CODES							
Residential	8.4	8.3	8.7	0.0	0.0	(0.0)	25.4
Commercial	4.5	4.1	4.3	4.2	0.0	(0.0)	17.1
BUILDING CODES TOTAL	12.9	12.4	13.0	4.2	0.0	0.0	42.5
Market Transformation	5.0	7.0	12.0	16.0	14.0	(0.0)	54.0
TOTAL POST LEGACY CONSERVATION	18.2	33.6	66.3	59.2	43.1	(10.1)	211.0

⁷ Under the Agricultural Sector, irrigation scheduling projects have a one-year life cycle. Therefore, 10.0 aMW has been adjusted in order to exclude it from the total column.

TABLE C
BPA's HISTORICAL CONSERVATION SAVINGS
BY PROGRAM (LEGACY)
FY 1982 – 1999

Incremental aMW

	Total FY 82-94	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	SubTotal FY 82-99	Adjustment FY 82-99	Total FY 82-99
RESIDENTIAL									
EXISTING:									
Weatherization-SF&MF	99.4	1.4	0.0	0.0	0.0	0.0	100.8	(0.0)	100.8
Weatherization-MH	0.1	0.0	0.0	0.0	0.0	0.0	0.2	(0.0)	0.2
Low-Income Wx	0.0	0.0	0.5	0.3	0.4	0.6	1.8	(0.0)	1.8
NEW									
Super Good Cents	4.8	0.0	0.0	0.0	0.0	0.0	4.8	(0.0)	4.8
New Manuf. Homes	1.9	0.0	0.0	0.0	0.0	0.0	1.9	(0.0)	1.9
L/T Super Good Cents	1.9	0.5	0.4	0.2	0.2	0.0	3.2	(0.0)	3.2
Manuf. Hsg. Acq.(MAP)	6.3	1.1	0.4	0.0	0.0	0.0	7.8	(0.0)	7.8
Water Heater Wraps	30.4	0.0	0.0	0.0	0.0	0.0	30.4	(0.0)	30.4
Shower Flow Restrictors	9.1	0.0	0.0	0.0	0.0	0.0	9.1	(0.0)	9.1
Waterheat/sh-hds/aerators	18.7	0.4	0.1	0.1	0.1	0.0	19.4	(0.0)	19.4
RES. SUBTOTAL	172.6	3.4	1.4	0.6	0.7	0.6	179.4	(0.0)	179.4
COMMERCIAL									
LTNG. & WTR. HTNG.:									
Water Heater Wraps	2.0	0.0	0.0	0.0	0.0	0.0	2.0	(0.0)	2.0
Shower Flow Restrictors	0.3	0.0	0.0	0.0	0.0	0.0	0.3	(0.0)	0.3
Lamps	1.7	0.0	0.0	0.0	0.0	0.0	1.7	(0.0)	1.7
Street & Area Lighting	16.9	0.0	0.0	0.0	0.0	0.0	16.9	(0.0)	16.9
INSTITUTIONAL BLDG.									
TAS's Tech Assist-Info.	7.6	0.0	0.0	0.0	0.0	0.0	7.6	(7.6)	0.0
ECM's	26.7	0.0	0.0	0.0	0.0	0.0	26.7	(0.0)	26.7
ACQUISITION SUPPORT									
Purch. of Energy Svngs.	1.3	0.0	0.0	0.0	0.0	0.0	1.3	(0.0)	1.3
Finance (CIPP)	3.2	0.0	0.0	0.0	0.0	0.0	3.2	(0.0)	3.2
PSP&L	0.6	0.0	0.0	0.0	0.0	0.0	0.6	(0.0)	0.6
PECI - Comm/Ind Ltng.	0.4	0.0	0.0	0.0	0.0	0.0	0.4	(0.0)	0.4
CREUS End-use Study	0.1	0.0	0.0	0.0	0.0	0.0	0.1	(0.0)	0.1
Energy Smart Design	28.5	8.0	4.6	2.1	2.2	0.1	45.5	(0.0)	45.5
Targeted Acq. (TAP)	3.0	0.5	0.5	2.7	4.6	0.4	11.7	(0.0)	11.7
ODOE - Schools	0.1	0.8	0.2	0.0	0.0	0.0	1.1	(0.0)	1.1
COM. SUBTOTAL	92.5	9.3	5.3	4.8	6.8	0.5	119.2	(7.6)	111.6

TABLE C (continued)
BPA's HISTORICAL CONSERVATION SAVINGS
(FY 1982 – 1999)

	Total FY 82-94	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	SubTotal FY 82-99	Adjustment FY 82-99	Total FY 82-99
INDUSTRIAL									
Sponsor-Designed	9.7	0.0	0.0	0.0	0.0	0.0	9.7	(5.6)	4.1
Energy Savings Plan	31.3	16.9	9.8	3.6	0.2	0.0	61.8	(0.0)	61.8
Major Plants	12.4	1.3	2.0	3.1	0.0	0.2	19.0	(0.0)	19.0
IND. SUBTOTAL	53.4	18.2	11.8	6.7	0.2	0.2	90.5	(5.6)	84.9
AGRICULTURAL									
Irrigation Hardware	12.4	1.8	0.6	0.0	0.0	0.0	14.8	(0.0)	14.8
Irrigation Scheduling ⁸	5.2	1.2	0.0	0.0	0.0	0.2	6.6	(6.6)	0.0
AG. SUBTOTAL	12.4	1.8	0.6	0.0	0.0	0.0	14.8	(6.6)	8.2
MULTI-SECTOR									
Billing Credits	1.0	0.5	0.6	0.3	0.0	0.0	2.4	(0.0)	2.4
Competitive Acquisition	0.1	0.6	0.0	0.1	0.1	1.1	2.0	(0.0)	2.0
BPA Sys Efficiencies	0.3	0.4	0.0	0.0	0.0	0.0	0.7	(0.0)	0.7
Third-Party Financing	4.9	10.3	12.4	18.1	6.8	4.8	57.3	(0.0)	57.3
Flex Agreements	0.0	8.3	10.6	9.4	6.0	7.5	41.8	(0.0)	41.8
MULTI-S. SUBTOTAL	6.3	20.1	23.6	27.9	12.9	13.4	104.2	(0.0)	104.2
SECTOR									
SUBTOTALS	337.2	52.8	42.7	40.0	20.6	14.7	508.1	(19.8)	488.3
Con/Mod	95.9	0.0	0.0	0.0	0.0	0.0	95.9	(95.9)	
SUBTOTAL W/ CON/MOD	433.1	52.8	42.7	40.0	20.6	14.7	604.0	(115.7)	488.3
LOAD REDUCTION FROM BLDG. CODES									
Residential	59.0	10.3	8.7	8.8	8.2	8.2	103.2	(0.0)	103.2
Commercial	10.8	4.6	5.9	6.5	4.9	6.2	38.9	(0.0)	38.9
Improved Bld Codes	69.8	14.9	14.6	15.3	13.1	14.4	142.1	(0.0)	142.1
Market Transformation⁹	0.0	0.0	0.0	0.0	0.0	4.0	4.0	(0.0)	4.0
TOTAL HISTORICAL CONSERVATION	502.9	67.7	57.3	55.3	33.7	33.1	750.1	(115.7)	634.4

⁸ Irrigation Scheduling represents one-year savings only and are not accumulated in the total column.

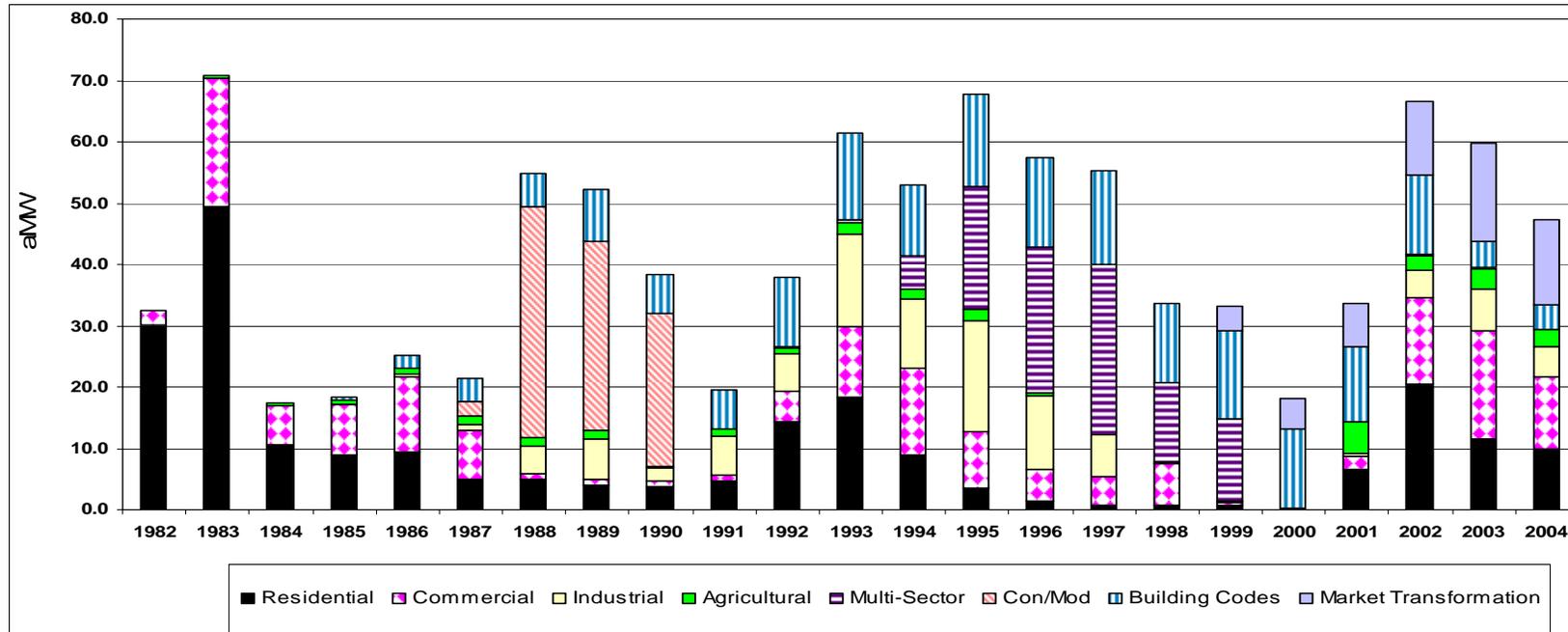
⁹ Market Transformation includes only BPA's share and not regional Market Transformation savings.

BPA'S Conservation Savings from Acquisition Programs
FY 1982 – 2004
(See Figures 2 & 3)

Figure 2 is a cumulative graphic comparison of BPA's historical direct acquisition program by year by sector.

Figure 3 is the annual acquisition in each of these sectors.

FIGURE 3
BPA's HISTORICAL CONSERVATION SAVINGS¹⁰
FY 1982 – 2004



¹⁰ Multi-Sector includes billing credits, BPA system efficiencies, and other cross-sector programs.

TOTAL BPA CONSERVATION COSTS
(See Table D)

TABLE D

BPA spent approximately \$2.1 billion on conservation efforts from FY 1982 – 2004. Acquisition expenditures were: residential, \$1.1 billion; commercial, \$397 million; industrial, \$128 million; ConMod, \$48 million; agricultural, \$32 million; and multi-sector acquisitions, \$157 million. Conservation support and other costs make up an additional \$235 million.

NOTES ON TABLE D:

The costs in this table are “accrued” expenditures – the amount actually invoiced in a given year. The expenditures reported have been “loaded” to include all direct costs (measure costs, installation, administrative, and program evaluation costs) related to conservation, indirect costs associated with BPA’s Energy Efficiency Program (load forecasting, planning, and economic analysis) and a share of other corporate overhead. The costs reported in the table do not include interest expense on conservation borrowing.

BPA’s historical conservation costs have not always been reported consistently from year to year. Prior to 1988, costs were allocated to specific sectors and to resource planning. Starting in 1988, some resource planning costs were allocated to specific sectors. In addition, two new cost categories were created: multi-sector acquisitions, and miscellaneous costs. (Misc. costs have now been replaced with other categories.) Although this change in categories makes it difficult to do a year-by-year comparison of sector costs, the change more accurately reflects expenditures. Multi-sector Acquisitions cover more than one sector and include costs for billing credits, competitive acquisitions, and financial and technical assistance programs. Program and support costs are not sector specific and consist of resource planning costs and various overhead costs associated with conservation activity through FY 1986. Program and support costs shown in FY 1996 are costs related to the new Energy Efficiency organization. In FY 1995, BPA was reorganized and also implemented a new accounting system. This resulted in some changes in how costs were accounted for and reported. Every attempt was made to allocate the appropriate costs to the correct categories.

Table D has been reformatted and categories added to better inform the reader on the conservation costs. FY 1997 reflects the format change.

BPA has performed a thorough review of conservation costs. Third party costs have been realigned to show them consistent with Federal Treasury borrowing (capital costs) which are tracked as the money is spent. Third party financing costs have been reassigned to the first five years after the bonds proceeds were made available.

SPECIAL NOTE:

To get an estimate of per-unit conservation costs, it is tempting to divide the dollars in Table D by the energy savings in Tables A, B or C. This would supposedly yield an “average cost per megawatt”. While this may seem useful, BPA generally considers this to be an inappropriate way to measure resource costs. First, this method of estimation does not take into consideration the varying lifetimes and characteristics of energy resources. For example, 1 aMW of energy savings from a new residential building code program having an expected lifetime of 70 years cannot be equated with 1 aMW of savings from a program having a much shorter life.

Secondly, the simple division method is inappropriate because:

Some savings were achieved in Pay for Performance or Competitive Acquisition contracts. These savings are reported as first year savings while the cost is paid from year-to-year expense budgets over a number of years.

Most savings were paid for from the capital budget and costs were amortized through federal borrowing. Our cost for these projects shows up as the capital cost and not the year-to-year amortization payments. The way we treat savings, therefore, is consistent year-to-year while the costs are a mixture of predominantly capital with a substantial expense component.

Our cost table makes no distinction between capital and expense payments. This means not all year-to-year costs can be directly compared to any single year savings reported.

Table D
BPA Energy Conservation Costs
1982 - 1996
Dollars (000's)¹¹

Fiscal Year	Residential	Commercial	Industrial	Con/Mod	Agricultural	Multi-Sector Acq.	Program & Support Costs	Third Party Financing Costs	Debt Service Payments Adjustment	Various Costs Adjustment (e.g. Bond Transaction Costs)	Total Incremental Costs	Total Cumulative Costs
1982	\$50,346	\$11,247	\$0	\$0	\$0	\$0	\$5,321	\$0	\$0	\$0	\$66,914	\$66,914
1983	\$162,114	\$39,892	\$1,409	\$0	\$895	\$0	\$2,689	\$0	\$0	\$0	\$206,999	\$273,913
1984	\$57,374	\$8,656	\$513	\$0	\$1,309	\$0	\$7,242	\$0	\$0	\$0	\$75,094	\$349,007
1985	\$77,907	\$26,553	\$957	\$0	\$2,098	\$0	\$20,232	\$0	\$0	\$0	\$127,747	\$476,754
1986	\$79,898	\$13,007	\$1,013	\$0	\$3,546	\$0	\$7,458	\$2,125	(\$2,048)	\$0	\$104,999	\$581,753
1987	\$60,651	\$7,546	\$2,233	\$0	\$1,918	\$0	\$11,008	\$4,250	(\$2,047)	(\$10,000)	\$75,559	\$657,312
1988	\$40,979	\$14,144	\$3,297	\$1,881	\$2,166	\$3,950	\$8,483	\$4,250	(\$2,045)	(\$10,000)	\$67,105	\$724,417
1989	\$37,269	\$15,467	\$5,889	\$4,726	\$1,428	\$3,000	\$5,479	\$4,250	(\$2,048)	(\$11,748)	\$63,712	\$788,129
1990	\$40,016	\$18,062	\$5,681	\$6,063	\$1,428	\$3,232	\$3,515	\$2,125	(\$2,043)	\$0	\$78,079	\$866,208
1991	\$49,808	\$19,554	\$6,181	\$6,254	\$3,257	\$2,959	\$3,495	\$0	(\$1,983)	\$0	\$89,525	\$955,733
1992	\$80,949	\$25,334	\$8,397	\$4,553	\$2,593	\$6,673	\$4,134	\$0	(\$1,986)	\$0	\$130,647	\$1,086,380
1993	\$89,241	\$32,485	\$13,899	\$4,179	\$2,187	\$7,944	\$8,119	\$0	(\$1,905)	\$0	\$156,149	\$1,242,529
1994	\$77,726	\$45,764	\$22,383	\$6,462	\$2,617	\$17,133	\$8,210	\$6,212	(\$6,453)	\$0	\$180,054	\$1,422,583
1995	\$49,783	\$23,061	\$17,346	\$4,045	\$1,712	\$26,676	\$7,915	\$12,824	(\$7,408)	\$0	\$135,954	\$1,558,537
1996	\$29,071	\$13,540	\$9,839	\$4,595	\$1,227	\$34,330	\$7,863	\$12,824	(\$7,483)	\$0	\$105,806	\$1,664,343
Total	\$983,132	\$314,312	\$99,037	\$42,758	\$28,381	\$105,897	\$111,163	\$48,860	(\$37,449)	(\$31,748)	\$1,664,343	

¹¹ Program and Program Support Costs includes the overhead costs of the Energy Efficiency Group and other conservation support costs.

TABLE D (continued)
TOTAL BPA CONSERVATION COSTS BY SECTOR
Accrued & Committed
Dollars (000's)

	1982-1996	1997	1998	1999	2000	2001	2002	2003	2004	Totals
RESIDENTIAL:										
State Low Income Weatherization		\$1,662	\$3,124	\$3,600	\$2,520	\$3,103	\$2,429	\$3,745	\$2,474	\$22,657
C&RD Low Income Weatherization		\$0	\$0	\$0	\$0	\$70	\$1,379	\$1,321	\$1,197	\$3,967
Legacy Acquisition		\$9,082	\$2,643	\$633	\$11	\$0	\$0	\$0	\$0	\$12,369
Conservation Augmentation		\$0	\$0	\$0	\$0	\$2,688	\$8,550	\$3,068	\$2,868	\$17,174
Conservation & Renewables Discount		\$0	\$0	\$0	\$0	\$6,083	\$24,685	\$19,352	\$17,560	\$67,680
Residential Total	\$983,132	\$10,744	\$5,767	\$4,233	\$2,531	\$11,944	\$37,043	\$27,486	\$24,099	\$1,106,979
COMMERCIAL:										
Legacy Acquisition		\$7,770	\$10,495	\$5,888	\$85	\$0	\$0	\$0	\$0	\$24,238
Conservation Augmentation		\$0	\$0	\$0	\$0	\$742	\$14,587	\$15,368	\$13,409	\$44,106
Conservation & Renewables Discount		\$0	\$0	\$0	\$0	\$695	\$2,723	\$7,226	\$3,814	\$14,458
New Initiatives		\$0	\$0	\$0	\$0	\$0	\$0	\$92	\$6	\$98
Commercial Total	\$314,312	\$7,770	\$10,495	\$5,888	\$85	\$1,437	\$17,310	\$22,686	\$17,229	\$397,212
INDUSTRIAL:										
Legacy Acquisition		\$3,988	\$3,674	\$1,902	\$0	\$0	\$0	\$0	\$0	\$9,564
Conservation Augmentation		\$0	\$0	\$0	\$0	\$258	\$4,864	\$5,669	\$2,581	\$13,372
Conservation & Renewables Discount		\$0	\$0	\$0	\$0	\$105	\$1,623	\$3,011	\$1,583	\$6,322
Industrial Total	\$99,037	\$3,988	\$3,674	\$1,902	\$0	\$363	\$6,487	\$8,680	\$4,164	\$128,295
CON/MOD	\$42,758	\$2,744	\$2,358	\$280	\$0	\$0	\$0	\$0	\$0	\$48,140
AGRICULTURAL:										
Legacy		\$338	\$173	\$49	\$5	\$0	\$0	\$0	\$0	\$565
Conservation Augmentation		\$0	\$0	\$0	\$0	\$0	\$16	\$30	\$0	\$46
Conservation & Renewables Discount		\$0	\$0	\$0	\$0	\$1,283	\$814	\$697	\$518	\$3,312
Agricultural Total	\$28,381	\$338	\$173	\$49	\$5	\$1,283	\$830	\$727	\$518	\$32,304
MULTI-SECTOR:										
Legacy		\$16,373	\$12,857	\$20,438	\$0	\$0	\$0	\$0	\$0	\$49,668
Conservation Augmentation		\$0	\$0	\$0	\$0	\$0	\$184	(\$342)	\$259	\$101
Conservation & Renewables Discount		\$0	\$0	\$0	\$0	\$0	\$290	\$521	\$200	\$1,011
Multi-Sector Total	\$105,897	\$16,373	\$12,857	\$20,438	\$0	\$0	\$474	\$179	\$459	\$156,677
SUBTOTAL	\$1,573,517	\$41,957	\$35,324	\$32,790	\$2,621	\$15,027	\$62,144	\$59,758	\$46,469	\$1,869,607
Market Transformation		\$3,900	\$12,000	\$5,600	\$12,000	\$9,600	\$7,750	\$9,300	\$9,700	\$69,850
C&RD Expense		\$0	\$0	\$0	\$0	\$1,007	\$8,396	\$9,311	\$7,880	\$26,594
(Includes Donations/Admin/IT Development)										
Energy Web		\$0	\$0	\$1,400	\$300	\$1,450	\$3,200	\$4,300	\$800	\$11,450
SUBTOTAL	\$0	\$3,900	\$12,000	\$7,000	\$12,300	\$12,057	\$19,346	\$22,911	\$18,380	\$107,894
CONSERVATION SUPPORT COSTS:										
PBL Conservation Sales/Support (Includes Planning & Evaluation)	\$0	\$0	\$0	\$0	\$2,050	\$650	\$1,100	\$350	\$1,000	\$5,150
Conservation Support Expense (Includes Staffing and related expenses)	\$111,163	\$9,800	\$7,200	\$6,500	\$6,200	\$5,550	\$6,850	\$7,250	\$7,450	\$167,963
SUBTOTAL	\$111,163	\$9,800	\$7,200	\$6,500	\$8,250	\$6,200	\$7,950	\$7,600	\$8,450	\$173,113
OTHER COSTS:										
Third Party Financing Costs	\$48,860	\$12,624	\$12,023	\$6,012	\$0	\$0	\$0	\$0	\$0	\$79,519
Debt Service Payment Adjustment	(\$37,449)	(\$7,305)	(\$7,670)	(\$11,637)	(\$7,447)	(\$4,079)	(\$4,160)	(\$5,273)	(\$5,295)	(\$90,315)
Various Costs Adjustment (e.g. Bond Transaction Costs)	(\$31,748)	\$0	\$0	\$0	\$0	\$0	\$0	(\$3,371)	\$0	(\$35,119)
SUBTOTAL	(\$20,337)	\$5,319	\$4,353	(\$5,625)	(\$7,447)	(\$4,079)	(\$4,160)	(\$8,644)	(\$5,295)	(\$45,915)
Total Incremental Costs		\$60,976	\$58,877	\$40,665	\$15,724	\$29,205	\$85,280	\$81,625	\$68,004	
With Carryover from 1996 Table		\$1,664,343	\$1,725,319	\$1,784,196	\$1,824,861	\$1,840,585	\$1,869,790	\$1,955,070	\$2,036,695	\$2,104,699
Total Cumulative Costs	\$1,664,343	\$1,725,319	\$1,784,196	\$1,824,861	\$1,840,585	\$1,869,790	\$1,955,070	\$2,036,695	\$2,104,699	

	1982-1996	1997	1998	1999	2000	2001	2002	2003	2004	Totals
RESIDENTIAL:										
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Conservation & Renewables Discount		\$0	\$0	\$0	\$0	\$695	\$2,723	\$7,226	\$3,814	\$14,458
New Initiatives		\$0	\$0	\$0	\$0	\$0	\$0	\$92	\$6	\$98

Glossary of Terms

- CFL:** An energy-efficient electric light used primarily in residential applications. The initials are from the name compact fluorescent lamp, a fluorescent bulb that usually can be placed in any normal lighting fixture in homes. There are some models that can only be screwed into special fixtures designed to insure the lights are not replaced with incandescent light bulbs.
- ConMod:** Conservation Modernization is a legacy conservation program designed to save energy in the Northwest aluminum industry. The program was designed to save energy by offering a 5.0 mill incentive for every kWh of energy saved to produce 1 pound of aluminum.
- C&I:** Commercial and Industrial sectors and programs that serve both sectors.
- C&RD:** The Conservation and Renewable Discount program provides a discount to utilities for measures and practices that increase efficient use of energy. Under this program utilities may design their own program and set their own budget for conservation and renewable energy measures which are pre-approved by Bonneville based upon recommended measures and savings values provided by the Regional Technical Forum.
- ConAug:** Conservation Augmentation is a program to Augment Bonneville resources through increased efficiency of energy use. This program serves all sectors.
- CREUS:** The Commercial and Residential End Use Study provided electric energy usage information on various types of loads typically found in either commercial or residential buildings. Businesses and homes were randomly selected throughout the region and various end use loads were monitored for several months, and those data were then analyzed. A few businesses installed some measures during 1989 based on the energy use data.

- Direct Acquisition:** This refers to programs that pay for energy efficiency measures that result directly from actions taken, such as installing measures, rather than by paying someone for activities like code enforcement or other programs that indirectly cause conservation to occur. Acquisition is a term from the regional act and is used in conservation where that activity is equivalent to and as reliable as acquiring actual generation produced energy. Under the regional act acquisition of energy, whether through conservation or through generation, must be done under contracts that allow for rigorous verification.
- ESD:** Energy Smart Design was a legacy program initially designed to award builders for significant savings features in new commercial building. It eventually became a standard design program to increase efficiency above codes and to change building practices to bring about codes enforcing higher building efficiency standards.
- ESP:** The Energy Savings Program was a legacy conservation program that provided incentives for improvements in energy efficiency in industrial processes (other than in the aluminum industry, see ConMod). This program served both new and existing industries. The program depended upon audits or design reviews to identify potential cost effective savings. Actual savings and the amount of incentive paid were determined through pre- and post-metering of energy consumption for existing industrial processes or between estimated use and actual metered use in new industrial plants.
- First Year Savings:** Most Bonneville programs are reported in terms of the savings that occur in one year's time, and the cost effectiveness of measures is based on the expected life of the measure. Measures often last 10, 20, or more years. Therefore, to calculate total savings, multiply first year savings times the measure life.

- Flex:** This refers to contracts with utilities to use money “flexibly” from one program or sector to another without seeking approval on each change when there were cost effective opportunities. The program required that the average cost per kWh saved would be equal to or less than the average cost for conservation were it allocated to the individual programs that were available to the utilities. For example, residential weatherization cost more than industrial so if the utility increased expenditures on residential above the allocated budget it must find other less costly kWh savings or repay the difference to Bonneville.
- Fuel Choice:** This term is explained on page (X). It refers to the possible unintended result that someone might choose to use electrical energy rather than gas or another fuel due to incentives for energy efficiency measures for electrically-heated homes or electrical industrial and commercial uses.
- HVAC:** HVAC stands for heating, ventilation and air conditioning systems. Included in this system are the furnace, the ducts, air control system filters, baffles, motors, vents, sensors and chillers. These systems present many different efficiency improvement opportunities. HVAC systems are found in houses and industries, but the primary use of the term is associated with cooling, heating and venting of air within large commercial structures.
- Incremental Savings:** A certain amount of conservation may take place without Bonneville acquisition. Incremental conservation is that reduction in loads below that which would have occurred due to the actions of others and in the absence of a particular program.
- IRLC:** This refers to the Conservation Augmentation contract that utility customers began signing in FY 2002. It stands for Invitation to Reduce Load through Conservation. Various energy conservation measures are authorized to be installed through the IRLC portion of the power sales contracts. The umbrella contract for each utility is a Purchase of Conservation Agreement.

Irrigation Scheduling: By careful measurement of water content in soil, air temperatures, wind speed and other weather information irrigation can be scheduled in such a way that crop growth is optimized and water use reduced. By using less water, electricity is saved because less water must be pumped up to the fields and forced through the sprinkler system.

Legacy: Legacy Programs are all those that were started prior to the year 2000. Only a few are still operating. Among these are the Low-Income Weatherization Program, The Energy Northwest pay for performance contract, the Tacoma Fort Lewis program, and some others with minor savings impacts. All, but the Low-Income Weatherization are no longer adding first year savings. However, payments are still made since these projects produce more savings than others of the same type and age due to the management of the program. So rather than a drop expected in savings (a drop that is anticipated and factored into first year savings calculations for all other programs) they remain fairly constant.

Line Loss: When energy is transmitted from its source and distributed to the end user there is, on average, a 7.5 percent loss due to line resistance to the flow of energy. For each kWh of conservation, there is one less kWh subject to line loss. That extra 7.5 percent is added to the total of energy saved.

Long Term Super Good Cents: This is the final version of the New Residential Construction program that was designed to save energy and to influence code development. Long Term refers to the fact that this program was increased above the existing code standards and was to be available for some years after codes were achieved.

LSO The Limited Standard Offer, was the first Standard Offer made to utilities within the ConAug program. This program provided incentives for commercial buildings based upon set payments for specific lighting measures that saved energy above standard lighting practices.

Market

Transformation: This is a program designed to cause new technologies to be built or accepted as standard practice. Super Good Cents is an example of a program designed to change the home building standards and, thus, the market. The term now refers to a specific programmatic effort that is done by Bonneville, the IOUs and a few large Public Power Utilities called the Regional Forum. The standards for new technologies and the programs to be implemented are designed and approved through the Regional Forum. Each of the member utilities contributes funds for programs and serves on the Forum.

MAP: This is a program for manufactured home building. The program requires Super Good Cents building standards be certified at the factory. The home in many instances is subject to a site “set up” inspection as well. The acronym stands for Manufactured Home Acquisition Program.

MCS: Model Conservation Standards. These standards were called for in the Regional Electric Power Planning and Conservation Act (Act.) The Northwest Power and Conservation Council, the policy group authorized through the Act to set standards and plan for future conservation and power acquisition, and Bonneville worked to set the MCS and to encourage utilities to create programs to begin promoting such standards. The MCS was designed as an early step in bringing around the Energy Efficiency Code Standards which three of the four Northwest States served by Bonneville eventually adopted.

- Multi-sector:** Some of the programs were designed to serve more than one sector (see definition of sector). Standard practice in the early years was to design programs specific to a sector. Multi-sector was a one-size fits all approach. The utilities wanted to have more flexibility in choosing which sector they would serve and more room to design programs that served their needs while meeting Bonneville's requirements. Flex, defined above, was one example.
- PSP&L:** Puget Sound Power and Light, an investor owned utility in the Puget Sound region.
- Sector:** A marketing term used to refer to a segment of a market. In energy efficiency terms, it refers mainly to Residential, Commercial, Industrial or Agricultural customers.
- Super Good Cents:** This was a very successful marketing and incentive based program that transformed the market for building homes in the Northwest. The program was marketed with award winning commercials and marketing campaigns. This program was a key part of the code programs that followed.
- Vending Miser:** A program to install energy savings controllers called the "Vending Miser" which cycles vending machines off and on during times in which usage has been minimal. The on/off cycle maintains the quality of the products sold.