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Energy Prices and Discount Factors for Life-Cycle Cost Analysis 1992

Annual Supplement to
NIST Handbook 135 and
NBS Special Publication 709

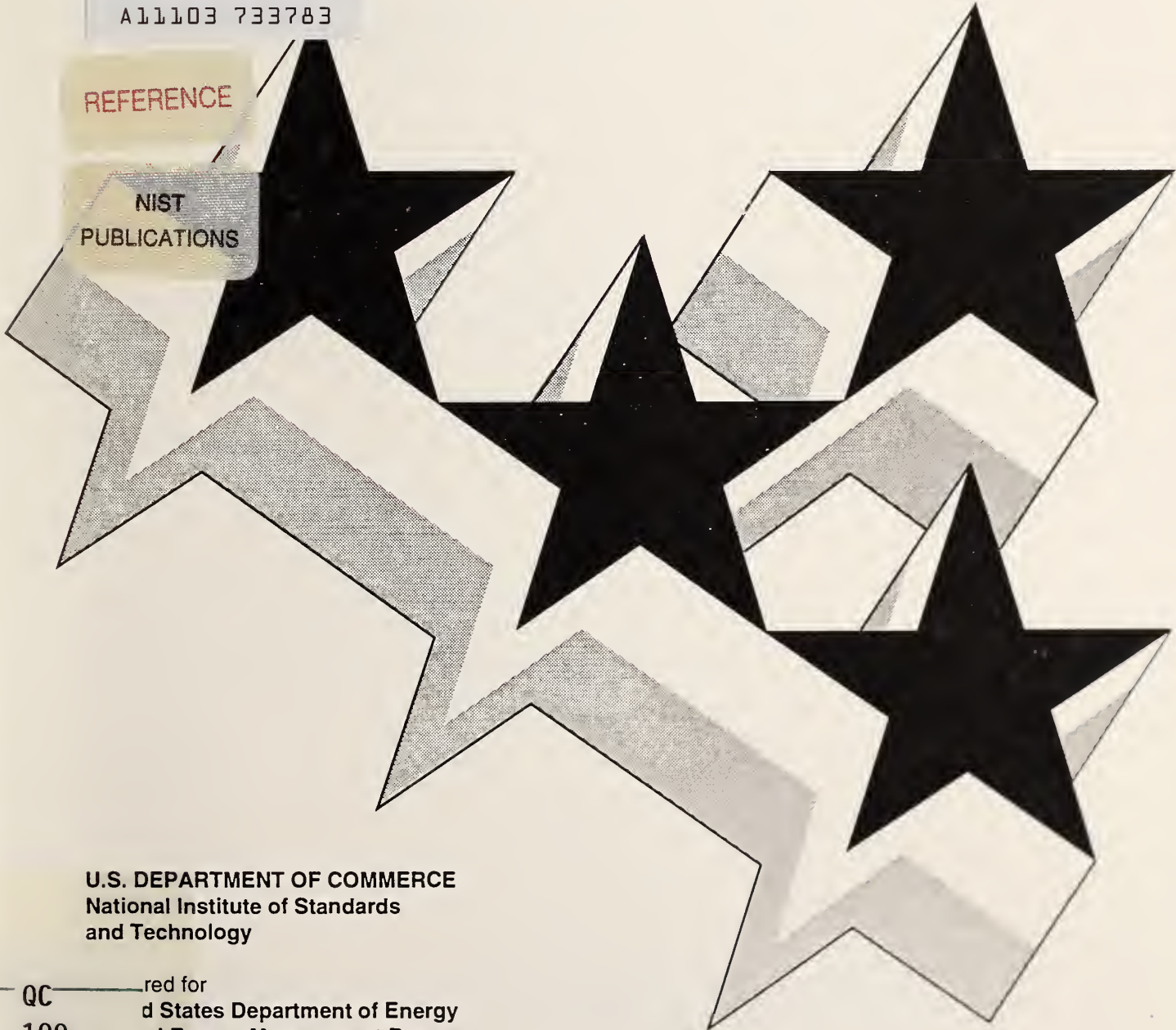
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ENERGY PRICES AND DISCOUNT FACTORS FOR LIFE-CYCLE COST ANALYSIS 1992

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NBS Special Publication 709

Data for the Federal Methodology for Life-Cycle Cost Analysis, Title 10, CFR, Part 436, Subpart A;
and for the Energy Conservation Mandatory Performance Standards for New
Federal Residential Buildings, Title 10, CFR, Part 435

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Federal Energy Management Program
Washington, DC 20585



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National Institute of Standards and Technology, John W. Lyons, *Director*

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PREFACE

This is the 1992 edition of energy prices and discount factors for life-cycle cost analysis as established by the U.S. Department of Energy (DOE) in Subpart A of Part 436 of Title 10 of the Code of Federal Regulations (10 CFR Part 436, Subpart A), and amplified in the Life-Cycle Costing Manual for the Federal Energy Management Program (NIST Handbook 135). The data are provided as an aid to implementing life-cycle cost evaluations of potential energy conservation and renewable energy investments in existing and new federally owned and leased buildings.

The life-cycle costing methods and procedures as set forth in 10 CFR, Part 436, Subpart A, are to be followed by all Federal agencies, unless specifically exempted, in evaluating the cost effectiveness of potential energy conservation and renewable energy investments in federally owned and leased buildings.

As called for by legislation, the National Institute of Standards and Technology has provided technical assistance to the U.S. Department of Energy in the development and implementation of life-cycle costing methods and procedures. This is the second of a three-volume set which together provide the methods, data, and computational tools for life-cycle cost analysis of Federal energy projects.

Included in the three-volume set for Federal life-cycle cost analysis are the following:

- (1) Life-Cycle Costing Manual for the Federal Energy Management Program, National Institute of Standards and Technology, Handbook 135 (revised 1992).

The manual is a guide to understanding life-cycle costing and related methods of economic analysis as they are applied to Federal decisions. It describes the required procedures and assumptions, defines and explains how to apply and interpret economic performance measures, gives examples of Federal decision problems and their solutions, explains how to use the energy price indices and discount factors which are updated annually in the supplement, and provides worksheets and other computational aids and instructions for calculating the required measures.

- (2) Energy Prices and Discount Factors for Life-Cycle Cost Analysis, National Institute of Standards and Technology; NISTIR 85-3273 (updated annually).

This report, which is updated annually, gives the energy price and discount factor multipliers needed to estimate the present value of energy and other future costs. The data are based on energy price projections developed by the Energy Information Administration of the U.S. Department of Energy. Request the latest edition when ordering.

- (3) NIST "Building Life Cycle Cost" (BLCC) Computer Program (version 3.1), National Institute of Standards and Technology, NISTIR 4481 (January 1991).

The NIST BLCC program, version 3.1, supersedes and incorporates both the Federal Buildings Life-Cycle Cost (FBLCC) and National Bureau of Standards Life-Cycle Cost (NBSLCC) programs. NIST BLCC is designed to run on IBM PC and compatible microcomputers with approximately 512 K of

random access memory (RAM). It can be used to calculate the LCC of capital investments in buildings and building systems which are intended to reduce future operating, maintenance, and energy costs. BLCC computes the LCC for each alternative, compares alternatives in order to determine which has the lowest LCC, performs cash flow analyses, and then computes the net savings, savings-to-investment ratio (SIR), and adjusted internal rate of return (AIRR) over the designated study period. BLCC can be used to perform economic analysis of Federal and of private sector projects. BLCC version 3.1 uses the 1992 energy price data in NISTIR 85-3273-6. BLCC in its application to Federal energy conservation and renewable energy projects is consistent with NIST Handbook 135 (see #1 above). In its application to non-energy projects, BLCC is consistent with OMB Circular A-94. In its application to private-sector and non-Federal public-sector projects, BLCC is consistent with ASTM standards for building economics. BLCC is integrated with the DOE ASEAM computer program which performs energy conservation analysis.

Included on the BLCC disk is a stand-alone program called DISCOUNT version 3.1 which can calculate present value, future value, and annual value factors for any discount rate and study period. DISCOUNT can access the DOE energy price projections included on the BLCC disk to compute the UPW* factors needed for Federal LCC analyses of energy projects, consistent with the factors included in this report.

The three-volume set can also be used to perform economic evaluations of Federal building projects which are not primarily for conserving energy or providing renewable energy but which have an energy cost component. Handbook 135 explains both applications.

The U.S. Department of Energy was directed by legislation and executive order to make available to the private sector the methods, procedures, and related aids developed for Federal use. In response to this directive, the National Institute of Standards and Technology, under sponsorship by the U.S. Department of Energy, published a life-cycle costing book for use by the private sector entitled Comprehensive Guide for Least-Cost Energy Decisions, NBS SP 709 (January 1987). The private sector guide is supported by the data provided here, as well as by the BLCC computer program. The BLCC program (version 3.1) supercedes the NBSLCC program which is documented in SP 709. BLCC provides LCC computational support for private sector projects as well as for Federal projects.

To order any of the printed publications contact:

Advanced Sciences, Inc.
2000 North 15th Street
Suite 407
Arlington, VA 22201
Telephone (703) 243-4900

Please request the publications by name and number.

To order BLCC for analyses of Federal buildings, contact the above address. Other users may order BLCC from one of the following:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone (703) 487-4650
(ask for disk PB91-507970)

PC Software Interest Group
1030D East Duane Avenue
Sunnyvale, CA 94086
Telephone (408) 730-9291
(ask for disk #0572)

MTS Software
5 Oak Forest Court
Saint Charles, MO 63303
(314) 441-1022

Workshops on the life-cycle costing method and energy analysis are conducted at locations around the country each year. The workshops include training and software for both BLCC and an energy analysis computer program called "A Simplified Energy Analysis Method" (ASEAM). A schedule of workshops can be obtained from the Office of Applied Economics, National Institute of Standards and Technology, Bldg. 101, Rm. A415, Gaithersburg, MD 20899, Telephone (301) 975-6132.

An introduction to the workshop is provided in a video training film, "Least-Cost Energy Decisions: An Introduction to Life-Cycle Cost Analysis." The video film and companion workbook can be ordered from Video Transfer, Inc., 5709-B Arundel Avenue, Rockville, MD 20852, Tel (301) 881-0270. Additional video training films in the series are in preparation.

Further information on the Federal Energy Management Program can be obtained from the Federal Energy Management Program Staff, Office of the Assistant Secretary for Conservation and Renewable Energy, U.S. Department of Energy. Please direct communication to: FEMP, CE 10.1, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, D.C. 20585.

NOTICE

Please note that Federal Methodology for Life-Cycle Cost Analysis, Title 10, CFR, Part 436, Subpart A has been revised to incorporate changes required by the Federal Energy Management Improvement Act of 1988 (P.L. 100-615), and to reflect 10-years experience with the Federal LCC Rule.

The principal change is a discount rate set annually by DOE. The rate for 1992 is equivalent to a market rate of 8.5% and is based on long-term Treasury bond rates averaged over the previous 12 months. The market rate is converted to a "real" discount rate of 4.6%, exclusive of the Administration's assumed rate of general price inflation, to correspond with the constant-dollar analysis approach that is used. The results are identical to those that would be obtained by using the 8.5% market rate as the discount rate and inflating all cash flows at the Administration's assumed rate of inflation. (For further discussion of changes in the Federal life-cycle costing rule see Notice of Final Rulemaking, Federal Register, October 31, 1990. For a more detailed description of how the Federal discount rate is determined, see NIST Handbook 135 (revised 1992).)

The SPW, UPW, and UPW* factors in Part I of this report are given both for the 4.6% discount rate and for a 10% discount rate. The former are for evaluating Federal energy conservation and renewable energy projects. The latter are for evaluating Federal projects subject to OMB Circular A-94, i.e., most Federal capital investment projects other than energy projects and water-resources projects.

An additional change in the Federal methodology that affects the data in this report is the allowance in the analysis of a planning/design/construction period prior to building occupancy. The text that accompanies the "B" series of tables explains how to use the UPW* factors to account for a planning/design/construction period.

ABSTRACT

This is the 1992 annual edition of energy prices and discount factors for performing life-cycle cost analyses of energy conservation and renewable energy projects. It supports the Federal life-cycle costing methodology by updating the energy price projections and discount factors that are described, explained, and illustrated in NIST Handbook 135 (HB 135). It supports private-sector life-cycle cost analysis by updating the energy price indices that are described, explained, and illustrated in NBS Special Publication 709 (SP 709). It also supports the Energy Conservation Mandatory Performance Standards for New Federal Residential Buildings (10 CFR 435) by providing a table of factors for updating appliance label values.

ACKNOWLEDGMENTS

The authors wish to thank Mr. K. Dean Devine of the Federal Energy Management Program of the U.S. Department of Energy (DOE) for his continued support and direction of this work. Appreciation is also extended to Mr. Michael D. Lehr of the Supply Analysis and Integration Branch of the DOE Energy Information Administration for providing the energy price projections and escalation rates upon which this report is based.

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ABBREVIATIONS

N	-	Number of Discount Periods (in Years)
ELEC	-	Electricity
DIST	-	Distillate Oil
LPG	-	Liquefied Petroleum Gas
NTGAS	-	Natural Gas
RESID	-	Residual Oil
COAL	-	Steam Coal
GASLNE	-	Gasoline

PART I: TABLES FOR FEDERAL LIFE-CYCLE COST ANALYSIS

Single Present Worth and Uniform Present Worth discount factors

Table A-1 presents the single present worth (SPW) factors for finding the present value of future nonfuel, nonannually recurring amounts, such as repair and replacement costs and salvage values. The formula for finding the present value (P) of a future amount (F) is the following:

$$P = F \times \frac{1}{(1+d)^N} = F \times SPW_N,$$

where d = discount rate; and
 N = number of periods, such as years, until F occurs.

Table A-2 presents uniform present worth (UPW) factors for finding the present value of future nonfuel amounts recurring annually, such as routine maintenance costs. The formula for finding the present value (P) of an annually recurring uniform amount (A) is the following:

$$P = A \times \frac{(1+d)^N - 1}{d(1+d)^N} = A \times UPW_N,$$

where N = number of periods, such as years, over which A recurs.

In tables A-1 and A-2 the factors are given for both 4.6 percent and 10 percent discount rates. The factors based on 4.6 percent are for finding the present value of future amounts associated with Federal energy conservation and renewable energy projects. The factors based on 10 percent are for finding the present value of future amounts associated with most other Federal projects (except those specifically exempted from the 10 percent rate). Both the 4.6 and 10 percent rates are defined for Federal use to be "real" rates exclusive of general price inflation. The factors are applied as multipliers to future amounts which are stated in "constant" dollars, that is, exclusive of general price inflation.

Examples of How to Use the Factors:

SPW(4.6%): To compute the present value of a replacement cost expected to occur in the 8th year for an energy efficient heating system, go to table A-1, find the 4.6 percent SPW factor for year 8 (0.70), and multiply the factor by today's replacement cost. "Today's" replacement cost is the cost as of the date of analysis.

SPW(10%): To compute the present value of a repair cost in the 5th year for a floor covering (non-energy related), go to table A-1, find the 10 percent SPW factor for year 5 (0.62), and multiply the factor by today's repair cost.

UPW(4.6%): To compute the present value of an annually recurring maintenance cost for a renewable energy system over 20 years, go to table A-2, find the 4.6 percent UPW factor for 20 years (12.90), and multiply the factor by the annual maintenance cost stated in today's dollars.

UPW(10%): To compute the present value of annually recurring costs of office cleaning over 30 years (for a project not primarily related to energy conservation), go to table A-2, find the 10 percent UPW factor for 30 years (9.43), and multiply the factor by the annual cleaning cost stated in today's dollars.

For further explanation and illustration of how to use these factors, see NIST Handbook 135.

**Table A-1. SPW factors for finding the present value of
future nonfuel, nonannually recurring amounts**

Number of Years Until Future Amount Occurs (N)	FEMP LCC Approach SPW Factor (d = 4.6%)	OMB A-94 LCC Approach SPW Factor (d = 10%)
1	0.96	0.91
2	0.91	0.83
3	0.87	0.75
4	0.84	0.68
5	0.80	0.62
6	0.76	0.56
7	0.73	0.51
8	0.70	0.47
9	0.67	0.42
10	0.64	0.39
11	0.61	0.35
12	0.58	0.32
13	0.56	0.29
14	0.53	0.26
15	0.51	0.24
16	0.49	0.22
17	0.47	0.20
18	0.45	0.18
19	0.43	0.16
20	0.41	0.15
21	0.39	0.14
22	0.37	0.12
23	0.36	0.11
24	0.34	0.10
25	0.32	0.09
26*	0.31	0.08
27*	0.30	0.08
28*	0.28	0.07
29*	0.27	0.06
30*	0.26	0.06

*SPW factors are reported for FEMP LCC Approach for years 26-30 to accommodate a planning/construction period of up to 5 years.

**Table A-2. UPW factors for finding the present value of
future nonfuel, annually recurring amounts**

Number of Years Over Which Amount Recurr (N)	FEMP LCC Approach UPW Factor (d = 4.6%)	OMB A-94 LCC Approach UPW Factor (d = 10%)
1	0.96	0.91
2	1.87	1.74
3	2.74	2.49
4	3.58	3.17
5	4.38	3.79
6	5.14	4.36
7	5.87	4.87
8	6.57	5.33
9	7.24	5.76
10	7.87	6.14
11	8.48	6.50
12	9.07	6.81
13	9.62	7.10
14	10.16	7.37
15	10.67	7.61
16	11.15	7.82
17	11.62	8.02
18	12.06	8.20
19	12.49	8.36
20	12.90	8.51
21	13.28	8.65
22	13.66	8.77
23	14.01	8.88
24	14.35	8.98
25	14.68	9.08
26*	14.99	9.16
27*	15.28	9.24
28*	15.57	9.31
29*	15.84	9.37
30*	16.10	9.43

*UPW factors are reported for FEMP LCC Approach for years 26-30
to accommodate a planning/construction period of up to 5 years.

Modified Uniform Present Worth discount factors for Federal use
 (Based on Federally required discount rates of 4.6 and 10 percent and DOE-projected rates of change in energy prices, both of which exclude general price inflation)

This section presents "modified" uniform present worth (UPW*) discount factors for the 4 Census regions and for the United States. The factors are modified in the sense that they incorporate projected energy price changes. There are two sets of tables: the "a" tables present UPW* factors based on a 4.6 percent "real" discount rate, and the "b" tables present UPW* factors based on a 10 percent real discount rate.

The factors presented in the "a" tables are for calculating the present value of energy costs or savings accruing over 1 to 25 years and are to be used in life-cycle cost analyses of Federal energy conservation and renewable energy projects. Factors are now reported in the "a" tables for 30 years to accommodate a planning/design/construction period of up to 5 years. (See "Example of How to Use UPW* Factors" below for instructions on use with planning/design/construction periods.)

The factors presented in the "b" tables are for calculating the present value of energy costs or savings accruing over 1 to 30 years and are to be used for life-cycle cost analysis of the energy component of Federal projects that are not primarily for conserving energy or providing renewable energy. Both sets of factors apply only to energy conservation that recurs in uniform amounts. Refer to NIST Handbook 135 for evaluating energy conservation that varies in amount over time.

The UPW* factors incorporate rates of change in energy prices computed from prices projected by the Energy Information Administration (EIA) of the U.S. Department of Energy. The EIA data are stated as annual averages. Therefore, the factors are not tied to a particular calendar date in the year. Assumptions underlying the IFFS model used by EIA to project energy prices are presented in Assumptions for the Annual Energy Outlook 1991 (DOE/EIA-0527(91)), April 1991. Projections at the national level are reported by EIA in the Annual Energy Outlook 1991 (DOE/EIA-0383(91)), March 1991. Projections of imported crude oil prices are reported in Oil Market Simulation User's Manual (DOE/EIA-M028(90)), 1990. Electricity prices at the national level can be found in National Energy Strategy Technical Annex 2 (DOE/S-0086P), 1st edition, 1991/1992.

The formula for finding the present value (P) of future energy costs or savings is the following:

$$P = A_0 \times \sum_{n=1}^N \frac{I_{(1991+n)}}{(1+d)^n} = A_0 \times UPW^*_N,$$

where A_0 = base-year dollar cost of energy, i.e., the annual quantity of energy times its price in today's dollars;
 n = counter used to designate each year, with $n=1$ for the year 1992;

N	=	number of periods, e.g. years, over which energy costs or savings accrue;
$I_{(1991+n)}$	=	projected average fuel price index ¹ given in tables Ca-1 through Ca-5 for the year 1991+n and
d	=	discount rate.

Examples of How to Use UPW* Factors:

UPW*(4.6%, no planning/design/construction period): To compute the present value of heating with distillate oil over 15 years for an energy-conserving design of a Federal office building in New Mexico, go to table B-4a, find the UPW* factor for commercial distillate for 15 years (11.63), and multiply the factor by the annual heating cost in today's dollars. The cost in "today's" dollars is the cost as of the date of analysis.

UPW*(4.6%, with planning/design/construction period): (1) Find the UPW* factor for the combined lengths of the planning/design/construction period and the occupancy period (not to exceed 30 years), and (2) subtract from (1) the UPW* factor for the planning/design/construction period alone. The difference is the UPW* factor for the years over which energy costs or savings accrue. For example, suppose an energy-conserving Federal office building in New York is being designed. It is expected to have a planning/design/construction period of 5 years, after which it will be occupied for at least 25 years. To compute the present value of natural gas costs over 25 years of occupancy, go to table B-1a and find the UPW* factors for commercial natural gas for 5 years (4.53) and for 30 years (20.77). The difference (16.24) is the UPW* factor for natural gas costs over 25 years, beginning 5 years hence. Multiply 16.24 by the annual natural gas cost in today's dollars to calculate the present value of natural gas costs over the study period.

UPW*(10%): To compute the present value of electricity costs over 30 years associated with rehabilitating a Federal office building in Ohio (energy conservation is not a primary objective), go to table B-2b, find the UPW* factor for commercial electricity for 30 years (9.22), and multiply by the annual electricity cost in today's dollars.

For further explanation of the use of UPW* factors, see NIST Handbook 135.

The data in the tables which follow are reported for the 4 Census regions and the U.S. average. Figure B-1 presents a map showing the states corresponding to the 4 Census regions. The Census regions do not include American Samoa, Canal Zone, Guam, Puerto Rico, Trust Territory of the Pacific Islands, or the Virgin Islands. Analysts of Federal projects in these areas should use data which are "reasonable under the circumstances," and may refer to the tables with U.S. average data for guidance.

Note: Motor gasoline data are not available for the 4 Census regions. Refer to the U.S. average motor gasoline data for guidance.

¹For greater precision, the UPW* factors reported in the Ba and Bb tables were computed using the unrounded form of the indices given in tables Ca-1 through Ca-5.

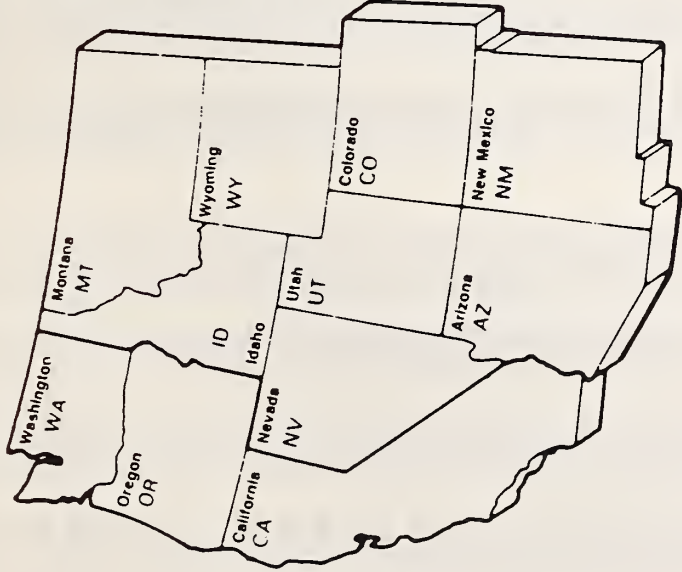
**NORTHEAST
(Region 1)**



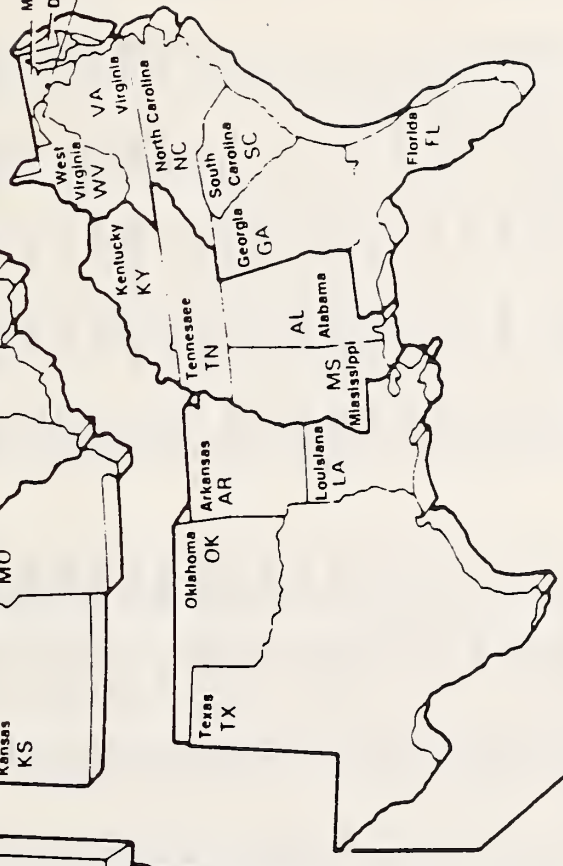
**MIDWEST
(Region 2)**



**WEST
(Region 4)**



**SOUTH
(Region 3)**



Source: U.S. Bureau of the Census

Figure B-1. Map of the United States Showing Census Regions.

Table B-1a. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 4.6 percent (FEMP LCC Approach)

Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)

N	RESIDENTIAL				COMMERCIAL				INDUSTRIAL						
	<u>ELEC</u>	<u>DIST</u>	<u>LPG</u>	<u>MTGAS</u>	<u>ELEC</u>	<u>DIST</u>	<u>RESID</u>	<u>NTGAS</u>	<u>COAL</u>	<u>ELEC</u>	<u>DIST</u>	<u>RESID</u>	<u>NTGAS</u>	<u>COAL</u>	N
1	0.95	0.97	0.93	0.95	0.95	0.97	1.00	0.98	0.97	0.96	0.97	1.00	0.91	0.97	1
2	1.86	1.89	1.80	1.87	1.86	1.90	1.97	1.92	1.93	1.88	1.90	1.97	1.80	1.92	2
3	2.74	2.78	2.62	2.76	2.73	2.79	2.92	2.83	2.87	2.76	2.79	2.92	2.66	2.84	3
4	3.55	3.62	3.39	3.60	3.54	3.63	3.84	3.70	3.77	3.60	3.63	3.84	3.48	3.72	4
5	4.32	4.43	4.13	4.41	4.30	4.44	4.72	4.53	4.63	4.40	4.45	4.72	4.26	4.57	5
6	5.04	5.20	4.83	5.18	5.02	5.22	5.55	5.33	5.46	5.16	5.22	5.56	5.01	5.40	6
7	5.72	5.94	5.51	5.93	5.69	5.96	6.36	6.09	6.26	5.89	5.97	6.36	5.74	6.19	7
8	6.37	6.66	6.17	6.66	6.34	6.69	7.15	6.85	7.03	6.59	6.70	7.16	6.46	6.96	8
9	7.00	7.37	6.80	7.38	6.96	7.41	7.92	7.60	7.79	7.28	7.42	7.93	7.18	7.72	9
10	7.60	8.06	7.42	8.09	7.55	8.11	8.69	8.34	8.52	7.94	8.13	8.70	7.91	8.46	10
11	8.18	8.73	8.03	8.80	8.12	8.81	9.45	9.09	9.23	8.57	8.83	9.47	8.66	9.17	11
12	8.73	9.39	8.62	9.50	8.66	9.50	10.20	9.84	9.94	9.18	9.52	10.22	9.40	9.87	12
13	9.26	10.04	9.19	10.18	9.18	10.17	10.94	10.57	10.62	9.77	10.20	10.97	10.14	10.56	13
14	9.77	10.67	9.76	10.86	9.68	10.84	11.68	11.30	11.28	10.34	10.87	11.70	10.88	11.22	14
15	10.26	11.29	10.30	11.53	10.17	11.49	12.39	12.02	11.92	10.88	11.53	12.42	11.62	11.87	15
16	10.72	11.89	10.83	12.19	10.63	12.13	13.09	12.73	12.53	11.40	12.17	13.12	12.35	12.50	16
17	11.17	12.47	11.34	12.82	11.07	12.74	13.77	13.41	13.13	11.90	12.79	13.81	13.07	13.11	17
18	11.59	13.03	11.83	13.44	11.49	13.34	14.42	14.08	13.70	12.37	13.40	14.46	13.76	13.71	18
19	11.99	13.57	12.30	14.04	11.89	13.92	15.06	14.73	14.26	12.82	13.98	15.10	14.45	14.29	19
20	12.38	14.10	12.76	14.62	12.28	14.48	15.67	15.36	14.80	13.26	14.54	15.71	15.11	14.85	20
21	12.75	14.61	13.21	15.18	12.66	15.02	16.27	15.98	15.32	13.68	15.10	16.32	15.75	15.39	21
22	13.11	15.10	13.65	15.74	13.02	15.55	16.85	16.58	15.82	14.08	15.63	16.90	16.38	15.90	22
23	13.45	15.59	14.07	16.27	13.36	16.07	17.41	17.17	16.29	14.46	16.15	17.47	16.99	16.40	23
24	13.78	16.06	14.48	16.80	13.69	16.57	17.96	17.73	16.75	14.83	16.66	18.02	17.58	16.88	24
25	14.10	16.51	14.88	17.30	14.01	17.05	18.50	18.28	17.19	15.19	17.15	18.56	18.16	17.34	25
26*	14.40	16.95	15.27	17.79	14.31	17.52	19.01	18.81	17.62	15.53	17.63	19.07	18.71	17.78	26*
27*	14.69	17.38	15.64	18.26	14.60	17.98	19.51	19.33	18.02	15.85	18.09	19.58	19.25	18.20	27*
28*	14.97	17.79	16.00	18.72	14.88	18.42	19.99	19.82	18.42	16.17	18.53	20.06	19.77	18.61	28*
29*	15.24	18.19	16.35	19.16	15.14	18.84	20.46	20.30	18.79	16.46	18.96	20.53	20.27	19.00	29*
30*	15.49	18.57	16.69	19.59	15.40	19.25	20.91	20.77	19.15	16.75	19.38	20.98	20.76	19.37	30*

∞

UPW factors are reported for years 26-30 to accommodate a planning/construction period of up to 5 years. (See p. 6 for instructions on use)

Table B-2a. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 4.6 percent (FEMP LCC Approach)

Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)

N	RESIDENTIAL				COMMERCIAL				INDUSTRIAL						
	ELEC	DIST	LPG	NTGAS	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	1.00	0.97	0.91	0.99	0.99	0.97	1.00	0.98	0.97	0.98	0.97	1.01	0.94	0.97	1
2	1.94	1.89	1.77	1.95	1.91	1.90	1.97	1.94	1.94	1.91	1.90	1.99	1.85	1.93	2
3	2.84	2.78	2.58	2.87	2.80	2.79	2.92	2.85	2.88	2.81	2.79	2.95	2.73	2.85	3
4	3.73	3.62	3.33	3.75	3.66	3.64	3.84	3.73	3.79	3.68	3.64	3.88	3.57	3.74	4
5	4.54	4.43	4.04	4.59	4.45	4.45	4.71	4.57	4.66	4.49	4.45	4.77	4.37	4.60	5
6	5.30	5.21	4.72	5.40	5.17	5.23	5.55	5.38	5.51	5.24	5.22	5.62	5.15	5.42	6
7	6.04	5.95	5.38	6.18	5.86	5.98	6.35	6.16	6.33	5.96	5.97	6.44	5.89	6.21	7
8	6.74	6.68	6.02	6.95	6.51	6.71	7.14	6.93	7.13	6.64	6.70	7.24	6.64	6.97	8
9	7.42	7.38	6.65	7.71	7.13	7.43	7.92	7.70	7.91	7.30	7.42	8.04	7.39	7.70	9
10	8.07	8.08	7.26	8.47	7.73	8.15	8.68	8.47	8.66	7.93	8.13	8.83	8.14	8.42	10
11	8.69	8.76	7.87	9.24	8.29	8.85	9.44	9.25	9.39	8.54	8.83	9.61	8.91	9.11	11
12	9.29	9.43	8.46	10.01	8.83	9.55	10.19	10.03	10.10	9.12	9.52	10.39	9.69	9.78	12
13	9.87	10.09	9.04	10.76	9.36	10.24	10.93	10.81	10.80	9.69	10.21	11.17	10.47	10.44	13
14	10.44	10.74	9.61	11.52	9.86	10.93	11.66	11.59	11.48	10.24	10.88	11.93	11.25	11.09	14
15	10.99	11.37	10.17	12.26	10.35	11.60	12.38	12.36	12.13	10.77	11.54	12.68	12.02	11.72	15
16	11.52	11.98	10.72	13.00	10.82	12.25	13.08	13.12	12.76	11.28	12.19	13.42	12.79	12.33	16
17	12.02	12.58	11.24	13.72	11.27	12.89	13.75	13.86	13.37	11.77	12.82	14.13	13.55	12.93	17
18	12.51	13.15	11.75	14.41	11.70	13.51	14.41	14.58	13.95	12.24	13.42	14.82	14.28	13.51	18
19	12.99	13.71	12.24	15.09	12.11	14.10	15.04	15.29	14.53	12.69	14.01	15.49	15.00	14.08	19
20	13.44	14.25	12.72	15.75	12.51	14.68	15.65	15.97	15.08	13.12	14.58	16.14	15.70	14.62	20
21	13.88	14.77	13.18	16.39	12.89	15.24	16.24	16.64	15.61	13.54	15.13	16.77	16.38	15.14	21
22	14.29	15.28	13.63	17.01	13.26	15.79	16.82	17.29	16.12	13.94	15.67	17.38	17.05	15.64	22
23	14.69	15.78	14.07	17.62	13.61	16.32	17.39	17.93	16.61	14.32	16.20	17.98	17.69	16.12	23
24	15.08	16.26	14.50	18.21	13.95	16.84	17.94	18.54	17.08	14.68	16.71	18.56	18.32	16.59	24
25	15.45	16.73	14.91	18.78	14.27	17.34	18.47	19.14	17.53	15.04	17.20	19.12	18.92	17.03	25
26*	15.80	17.18	15.31	19.34	14.58	17.83	18.98	19.71	17.97	15.37	17.68	19.66	19.51	17.46	26*
27*	16.14	17.61	15.70	19.87	14.88	18.30	19.48	20.27	18.38	15.70	18.14	20.19	20.08	17.87	27*
28*	16.47	18.04	16.07	20.39	15.16	18.75	19.96	20.81	18.78	16.01	18.59	20.70	20.63	18.26	28*
29*	16.78	18.45	16.43	20.89	15.44	19.19	20.42	21.33	19.17	16.30	19.02	21.19	21.16	18.64	29*
30*	17.08	18.84	16.78	21.38	15.70	19.62	20.87	21.84	19.54	16.59	19.44	21.67	21.67	19.00	30*

UPW factors are reported for years 26-30 to accommodate a planning/construction period of up to 5 years. (See p. 6 for instructions on use)

Table B-3a. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 4.6 percent (FEMP LCC Approach)

Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

N	RESIDENTIAL			COMMERCIAL			INDUSTRIAL							
	ELEC	DIST	LPG	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	0.96	0.97	0.92	0.97	0.97	1.01	1.00	0.98	0.97	0.97	1.00	0.93	0.98	1
2	1.89	1.89	1.79	1.91	1.88	1.99	1.96	1.94	1.90	1.90	1.98	1.85	1.95	2
3	2.79	2.78	2.61	2.82	2.78	2.95	2.89	2.88	2.81	2.79	2.94	2.74	2.90	3
4	3.64	3.62	3.37	3.68	3.63	3.89	3.78	3.78	3.67	3.64	3.87	3.59	3.81	4
5	4.43	4.43	4.10	4.51	4.41	4.78	4.63	4.66	4.48	4.45	4.76	4.40	4.69	5
6	5.19	5.20	4.80	5.31	5.16	5.63	5.45	5.50	5.25	5.23	5.60	5.19	5.55	6
7	5.90	5.94	5.48	6.07	5.87	6.45	6.24	6.32	5.99	5.97	6.41	5.95	6.38	7
8	6.58	6.67	6.13	6.83	6.54	7.26	7.02	7.11	6.70	6.71	7.21	6.73	7.18	8
9	7.23	7.37	6.77	7.57	7.19	7.43	7.06	7.89	7.40	7.43	8.00	7.52	7.96	9
10	7.87	8.07	7.38	8.31	7.81	8.14	8.85	8.64	8.07	8.14	8.79	8.34	8.72	10
11	8.48	8.74	7.99	9.05	8.41	8.85	9.64	9.37	8.72	8.84	9.56	9.20	9.46	11
12	9.07	9.41	8.58	9.79	8.98	9.55	10.42	10.09	9.36	9.54	10.34	10.09	10.19	12
13	9.64	10.06	9.16	10.52	9.54	10.24	11.20	10.81	9.97	10.23	11.10	10.98	10.90	13
14	10.20	10.70	9.73	11.24	10.07	10.93	11.97	11.50	10.56	10.91	11.86	11.89	11.60	14
15	10.73	11.32	10.28	11.95	10.58	11.60	12.73	12.45	11.14	11.58	12.60	12.81	12.27	15
16	11.24	11.93	10.82	12.65	11.07	12.25	13.47	12.83	11.69	12.23	13.32	13.73	12.93	16
17	11.73	12.51	11.34	13.33	11.54	12.89	14.19	13.95	12.22	12.86	14.02	14.64	13.57	17
18	12.20	13.08	11.83	13.99	11.99	13.51	14.88	14.66	12.72	13.48	14.70	15.52	14.20	18
19	12.65	13.63	12.31	14.64	12.42	14.11	15.55	15.36	13.21	14.07	15.36	16.40	14.80	19
20	13.09	14.15	12.78	15.26	12.84	14.69	16.20	16.04	13.68	14.64	16.00	17.25	15.38	20
21	13.50	14.67	13.24	15.87	13.24	15.25	16.84	16.71	14.13	15.20	16.62	18.07	15.94	21
22	13.90	15.17	13.68	16.46	13.62	15.80	17.46	17.35	14.56	15.75	17.22	18.88	16.48	22
23	14.29	15.66	14.11	17.04	13.98	16.33	18.06	17.98	14.97	16.28	17.81	19.67	17.00	23
24	14.66	16.14	14.53	17.60	14.34	16.85	18.65	18.59	15.37	16.79	18.38	20.43	17.50	24
25	15.01	16.60	14.93	18.14	14.67	17.36	19.21	19.18	15.75	17.29	18.93	21.16	17.97	25
26*	15.35	17.04	15.33	18.67	15.00	17.84	19.76	19.75	16.12	17.77	19.47	21.88	18.43	26*
27*	15.67	17.47	15.71	19.18	15.31	18.31	20.29	20.30	16.47	18.24	19.99	22.57	18.87	27*
28*	15.99	17.89	16.07	19.67	15.61	18.77	20.80	20.84	16.80	18.69	20.49	23.24	19.30	28*
29*	16.28	18.29	16.43	20.15	15.89	19.21	21.30	21.36	17.12	19.13	20.97	23.88	19.70	29*
30*	16.57	18.68	16.77	20.60	16.16	19.63	21.77	21.86	17.43	19.55	21.44	24.51	20.09	30*

UPW factors are reported for years 26-30 to accommodate a planning/construction period of up to 5 years. (See p. 6 for instructions on use)

Table B-4a. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 4.6 percent (FEMP LCC Approach)

Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)

N	RESIDENTIAL				COMMERCIAL				INDUSTRIAL						
	ELEC	DIST	LPG	NTGAS	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	0.96	0.97	0.92	0.96	0.95	0.97	0.99	0.98	0.97	0.95	0.97	1.00	0.95	0.97	1
2	1.88	1.89	1.80	1.88	1.85	1.90	1.96	1.93	1.91	1.86	1.90	1.98	1.89	1.91	2
3	2.76	2.78	2.62	2.77	2.71	2.79	2.90	2.84	2.83	2.73	2.79	2.94	2.78	2.82	3
4	3.61	3.62	3.38	3.63	3.53	3.64	3.81	3.71	3.71	3.55	3.64	3.87	3.64	3.69	4
5	4.41	4.43	4.12	4.44	4.31	4.45	4.67	4.55	4.56	4.34	4.45	4.76	4.46	4.52	5
6	5.19	5.20	4.82	5.22	5.05	5.23	5.50	5.35	5.37	5.10	5.22	5.60	5.25	5.32	6
7	5.93	5.95	5.50	5.98	5.76	5.98	6.30	6.13	6.15	5.82	5.97	6.42	6.02	6.09	7
8	6.64	6.67	6.15	6.72	6.43	6.71	7.07	6.89	6.91	6.52	6.71	7.22	6.78	6.83	8
9	7.33	7.38	6.79	7.45	7.07	7.44	7.84	7.65	7.65	7.19	7.43	8.01	7.55	7.55	9
10	8.00	8.07	7.41	8.18	7.70	8.15	8.59	8.41	8.35	7.84	8.14	8.79	8.33	8.23	10
11	8.64	8.76	8.02	8.92	8.29	8.86	9.33	9.19	9.03	8.47	8.84	9.57	9.13	8.89	11
12	9.26	9.43	8.61	9.65	8.87	9.57	10.06	9.96	9.68	9.08	9.54	10.34	9.94	9.54	12
13	9.86	10.08	9.19	10.37	9.42	10.26	10.78	10.72	10.30	9.67	10.23	11.11	10.75	10.16	13
14	10.44	10.73	9.76	11.09	9.96	10.95	11.49	11.48	10.91	10.24	10.91	11.86	11.57	10.76	14
15	10.99	11.35	10.31	11.80	10.47	11.63	12.18	12.23	11.48	10.79	11.57	12.61	12.38	11.35	15
16	11.53	11.97	10.84	12.50	10.97	12.29	12.85	12.97	12.04	11.32	12.22	13.33	13.19	11.91	16
17	12.05	12.56	11.35	13.17	11.45	12.93	13.50	13.70	12.57	11.83	12.86	14.04	13.98	12.48	17
18	12.54	13.13	11.85	13.83	11.91	13.55	14.13	14.40	13.09	12.32	13.47	14.72	14.75	13.01	18
19	13.02	13.68	12.33	14.47	12.34	14.15	14.74	15.09	13.58	12.79	14.06	15.37	15.51	13.52	19
20	13.47	14.22	12.79	15.09	12.77	14.74	15.33	15.76	14.06	13.24	14.63	16.01	16.24	14.02	20
21	13.91	14.74	13.24	15.70	13.17	15.31	15.90	16.41	14.51	13.67	15.19	16.63	16.96	14.49	21
22	14.33	15.25	13.68	16.29	13.56	15.86	16.46	17.04	14.95	14.08	15.74	17.24	17.66	14.95	22
23	14.73	15.74	14.11	16.87	13.93	16.40	17.00	17.66	15.38	14.48	16.27	17.83	18.34	15.39	23
24	15.11	16.22	14.53	17.43	14.28	16.92	17.53	18.26	15.78	14.86	16.78	18.40	19.00	15.81	24
25	15.48	16.68	14.93	17.97	14.62	17.43	18.04	18.84	16.17	15.23	17.28	18.95	19.64	16.22	25
26*	15.83	17.13	15.32	18.49	14.95	17.92	18.53	19.40	16.54	15.58	17.76	19.49	20.25	16.61	26*
27*	16.17	17.57	15.69	19.00	15.27	18.39	19.01	19.94	16.90	15.91	18.23	20.00	20.85	16.98	27*
28*	16.50	17.99	16.06	19.49	15.57	18.85	19.47	20.47	17.25	16.23	18.68	20.51	21.43	17.34	28*
29*	16.81	18.40	16.41	19.96	15.86	19.29	19.92	20.98	17.58	16.54	19.11	20.99	21.99	17.69	29*
30*	17.11	18.79	16.75	20.42	16.13	19.72	20.35	21.47	17.90	16.84	19.54	21.46	22.53	18.02	30*

UPW factors are reported for years 26-30 to accommodate a planning/construction period of up to 5 years. (See p. 6 for instructions on use)

Table B-5a. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 4.6 percent (FEMP LCC Approach)

United States Average

N	RESIDENTIAL				COMMERCIAL				INDUSTRIAL				TRANSPORTATION			
	ELEC	DIST	LPG	MTGAS	ELEC	DIST	RESID	MTGAS	COAL	ELEC	DIST	RESID	MTGAS	COAL	GASLN	N
1	0.97	0.97	0.92	0.97	0.96	0.97	1.00	0.98	0.97	0.97	0.97	1.00	0.94	0.98	0.97	1
2	1.90	1.89	1.79	1.91	1.88	1.90	1.98	1.94	1.94	1.89	1.90	1.98	1.85	1.94	1.90	2
3	2.79	2.78	2.60	2.81	2.76	2.79	2.93	2.86	2.87	2.79	2.79	2.94	2.74	2.87	2.78	3
4	3.64	3.62	3.36	3.68	3.59	3.64	3.85	3.73	3.78	3.64	3.64	3.86	3.58	3.77	3.63	4
5	4.44	4.43	4.09	4.50	4.37	4.45	4.73	4.57	4.64	4.44	4.45	4.75	4.39	4.64	4.45	5
6	5.20	5.20	4.78	5.30	5.10	5.23	5.57	5.38	5.48	5.20	5.22	5.59	5.17	5.47	5.23	6
7	5.91	5.94	5.45	6.06	5.79	5.98	6.38	6.16	6.29	5.93	5.97	6.40	5.93	6.28	5.99	7
8	6.60	6.67	6.10	6.81	6.45	6.71	7.18	6.93	7.08	6.63	6.70	7.20	6.69	7.06	6.72	8
9	7.26	7.37	6.73	7.56	7.08	7.44	7.96	7.70	7.85	7.31	7.42	7.99	7.46	7.82	7.44	9
10	7.90	8.06	7.35	8.30	7.68	8.15	8.73	8.46	8.59	7.96	8.13	8.77	8.25	8.55	8.14	10
11	8.51	8.74	7.95	9.04	8.26	8.85	9.50	9.24	9.31	8.59	8.83	9.54	9.08	9.27	8.82	11
12	9.10	9.40	8.55	9.78	8.82	9.55	10.26	10.01	10.02	9.20	9.53	10.31	9.91	9.97	9.49	12
13	9.67	10.05	9.13	10.50	9.36	10.24	11.01	10.77	10.71	9.79	10.22	11.07	10.74	10.65	10.15	13
14	10.23	10.69	9.70	11.23	9.87	10.92	11.76	11.54	11.38	10.36	10.89	11.82	11.59	11.32	10.79	14
15	10.76	11.31	10.25	11.94	10.37	11.58	12.48	12.29	12.03	10.91	11.56	12.56	12.44	11.96	11.42	15
16	11.27	11.91	10.79	12.64	10.84	12.23	13.19	13.04	12.66	11.45	12.21	13.28	13.29	12.59	12.02	16
17	11.76	12.50	11.31	13.32	11.30	12.87	13.88	13.77	13.26	11.95	12.84	13.98	14.13	13.20	12.61	17
18	12.23	13.06	11.81	13.98	11.74	13.48	14.55	14.47	13.85	12.44	13.45	14.66	14.94	13.79	13.18	18
19	12.68	13.60	12.30	14.63	12.16	14.07	15.19	15.16	14.42	12.91	14.03	15.31	15.74	14.37	13.73	19
20	13.12	14.13	12.77	15.26	12.56	14.64	15.81	15.83	14.97	13.36	14.61	15.94	16.51	14.92	14.26	20
21	13.53	14.64	13.22	15.87	12.95	15.20	16.42	16.49	15.50	13.79	15.16	16.56	17.27	15.46	14.78	21
22	13.93	15.14	13.67	16.46	13.32	15.75	17.01	17.12	16.01	14.20	15.71	17.16	18.01	15.97	15.28	22
23	14.32	15.63	14.11	17.04	13.67	16.28	17.59	17.74	16.49	14.60	16.23	17.75	18.73	16.46	15.77	23
24	14.69	16.10	14.53	17.60	14.01	16.79	18.15	18.35	16.96	14.98	16.75	18.31	19.42	16.93	16.25	24
25	15.04	16.56	14.93	18.14	14.34	17.29	18.69	18.93	17.41	15.35	17.24	18.86	20.10	17.38	16.71	25
26*	15.38	17.00	15.33	18.67	14.66	17.77	19.21	19.49	17.84	15.70	17.72	19.40	20.75	17.82	17.15	26*
27*	15.70	17.43	15.71	19.18	14.96	18.24	19.72	20.03	18.26	16.03	18.19	19.91	21.38	18.24	17.59	27*
28*	16.01	17.84	16.08	19.67	15.24	18.69	20.21	20.56	18.66	16.35	18.64	20.41	21.99	18.64	18.00	28*
29*	16.31	18.24	16.44	20.15	15.52	19.12	20.69	21.07	19.04	16.66	19.07	20.89	22.58	19.02	18.41	29*
30*	16.60	18.63	16.78	20.61	15.79	19.54	21.14	21.56	19.41	16.96	19.49	21.36	23.15	19.40	18.80	30*

UPW factors are reported for years 26-30 to accommodate a planning/construction period of up to 5 years. (See p. 6 for instructions on use)

Table B-1b. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 10 percent (OMB A-94 LCC Approach)
Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)

N	RESIDENTIAL			COMMERCIAL			INDUSTRIAL							
	ELEC	DIST	LPG	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	0.90	0.92	0.88	0.91	0.90	0.92	0.95	0.93	0.93	0.91	0.92	0.95	0.87	1
2	1.73	1.76	1.67	1.74	1.73	1.76	1.83	1.78	1.79	1.74	1.76	1.83	1.67	2
3	2.48	2.52	2.38	2.50	2.48	2.52	2.64	2.56	2.60	2.50	2.53	2.65	2.41	3
4	3.15	3.21	3.01	3.19	3.14	3.22	3.40	3.27	3.33	3.19	3.22	3.40	3.08	4
5	3.74	3.83	3.58	3.81	3.73	3.85	4.08	3.92	4.00	3.81	3.85	4.08	3.68	5
6	4.28	4.40	4.10	4.39	4.26	4.42	4.70	4.51	4.61	4.37	4.42	4.70	4.24	6
7	4.76	4.93	4.58	4.91	4.73	4.94	5.26	5.05	5.18	4.89	4.95	5.27	4.75	7
8	5.19	5.41	5.02	5.40	5.16	5.43	5.79	5.56	5.69	5.36	5.44	5.80	5.24	8
9	5.59	5.86	5.42	5.86	5.56	5.89	6.28	6.03	6.17	5.79	5.89	6.29	5.70	9
10	5.95	6.27	5.79	6.29	5.92	6.31	6.75	6.48	6.62	6.19	6.32	6.76	6.14	10
11	6.29	6.66	6.14	6.69	6.24	6.71	7.18	6.91	7.03	6.55	6.72	7.20	6.56	11
12	6.59	7.02	6.47	7.08	6.54	7.09	7.59	7.32	7.41	6.89	7.10	7.61	6.97	12
13	6.86	7.36	6.76	7.43	6.81	7.44	7.98	7.70	7.77	7.19	7.46	7.99	7.35	13
14	7.11	7.67	7.04	7.77	7.06	7.77	8.34	8.06	8.10	7.47	7.79	8.36	7.72	14
15	7.34	7.96	7.30	8.08	7.29	8.08	8.68	8.40	8.39	7.73	8.10	8.70	8.07	15
16	7.55	8.23	7.53	8.38	7.49	8.36	8.99	8.71	8.67	7.96	8.38	9.01	8.40	16
17	7.74	8.48	7.75	8.65	7.68	8.62	9.28	9.01	8.92	8.17	8.65	9.30	8.70	17
18	7.91	8.70	7.95	8.90	7.85	8.86	9.54	9.28	9.15	8.36	8.89	9.57	8.98	18
19	8.07	8.91	8.13	9.13	8.00	9.08	9.79	9.53	9.37	8.54	9.12	9.81	9.24	19
20	8.21	9.10	8.30	9.34	8.15	9.29	10.01	9.76	9.57	8.70	9.32	10.04	9.48	20
21	8.34	9.28	8.46	9.53	8.28	9.48	10.22	9.97	9.75	8.84	9.51	10.24	9.71	21
22	8.45	9.44	8.60	9.72	8.40	9.65	10.41	10.17	9.91	8.98	9.69	10.44	9.92	22
23	8.56	9.60	8.73	9.89	8.50	9.82	10.59	10.35	10.06	9.10	9.86	10.62	10.11	23
24	8.66	9.74	8.86	10.04	8.60	9.97	10.75	10.52	10.20	9.21	10.01	10.78	10.29	24
25	8.75	9.87	8.97	10.19	8.69	10.10	10.90	10.68	10.32	9.31	10.15	10.93	10.45	25
26	8.83	9.98	9.07	10.32	8.77	10.23	11.04	10.82	10.44	9.40	10.27	11.07	10.60	26
27	8.91	10.09	9.17	10.44	8.85	10.35	11.17	10.95	10.54	9.48	10.39	11.20	10.74	27
28	8.97	10.19	9.26	10.55	8.92	10.45	11.29	11.08	10.64	9.56	10.50	11.32	10.86	28
29	9.04	10.29	9.34	10.65	8.98	10.55	11.40	11.19	10.72	9.63	10.60	11.43	10.98	29
30	9.09	10.37	9.41	10.75	9.03	10.64	11.50	11.29	10.80	9.69	10.69	11.53	11.09	30

Table B-2b. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 10 percent (OMB A-94 LCC Approach)

Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)

N	RESIDENTIAL			COMMERCIAL			INDUSTRIAL							
	ELEC	DIST	LPG	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	0.95	0.92	0.87	0.94	0.92	0.95	0.93	0.93	0.93	0.92	0.96	0.89	0.92	1
2	1.80	1.76	1.65	1.81	1.77	1.83	1.80	1.80	1.80	1.77	1.84	1.72	1.79	2
3	2.58	2.52	2.34	2.60	2.54	2.64	2.59	2.61	2.61	2.55	2.67	2.47	2.58	3
4	3.30	3.21	2.95	3.32	3.24	3.39	3.30	3.35	3.35	3.26	3.43	3.16	3.31	4
5	3.94	3.84	3.50	3.97	3.86	3.85	4.08	3.96	4.03	3.89	3.85	3.78	3.97	5
6	4.50	4.41	4.01	4.57	4.39	4.43	4.69	4.55	4.66	4.44	4.42	4.36	4.58	6
7	5.01	4.93	4.47	5.12	4.87	4.95	5.26	5.10	5.23	4.95	4.95	4.88	5.14	7
8	5.48	5.42	4.90	5.63	5.31	5.44	5.79	5.62	5.77	5.41	5.44	5.38	5.64	8
9	5.91	5.87	5.30	6.12	5.71	5.90	6.28	6.10	6.26	5.82	5.90	5.85	6.11	9
10	6.31	6.29	5.67	6.58	6.06	6.34	6.74	6.57	6.72	6.21	6.32	6.85	6.54	10
11	6.66	6.68	6.02	7.02	6.39	6.74	7.18	7.02	7.14	6.55	6.73	7.30	6.94	11
12	6.99	7.05	6.34	7.44	6.68	7.12	7.59	7.45	7.52	6.87	7.11	7.73	7.31	12
13	7.30	7.39	6.64	7.83	6.96	7.48	7.97	7.85	7.89	7.17	7.46	8.13	7.58	13
14	7.58	7.71	6.93	8.21	7.21	7.82	8.33	8.24	8.22	7.44	7.80	8.51	7.97	14
15	7.83	8.01	7.19	8.56	7.43	8.14	8.67	8.60	8.53	7.69	8.11	8.86	8.33	15
16	8.07	8.28	7.43	8.88	7.64	8.43	8.98	8.94	8.81	7.92	8.39	9.19	8.68	16
17	8.28	8.53	7.66	9.19	7.83	8.70	9.27	9.25	9.07	8.12	8.66	9.49	9.00	17
18	8.48	8.77	7.86	9.47	8.01	8.95	9.53	9.54	9.31	8.31	8.91	9.77	9.29	18
19	8.66	8.98	8.05	9.73	8.17	9.18	9.78	9.82	9.53	8.49	9.13	10.03	9.57	19
20	8.83	9.18	8.22	9.97	8.31	9.39	10.00	10.07	9.73	8.65	9.34	10.26	9.83	20
21	8.98	9.36	8.38	10.19	8.45	9.58	10.21	10.30	9.91	8.79	9.53	10.48	10.06	21
22	9.12	9.53	8.53	10.40	8.57	9.77	10.40	10.51	10.08	8.92	9.71	10.69	10.28	22
23	9.25	9.68	8.67	10.59	8.68	9.93	10.58	10.71	10.24	9.04	9.88	10.87	10.49	23
24	9.36	9.83	8.80	10.77	8.78	10.09	10.74	10.90	10.38	9.15	10.03	11.05	10.67	24
25	9.47	9.96	8.92	10.93	8.87	10.23	10.89	11.07	10.50	9.25	10.17	11.21	10.85	25
26	9.56	10.08	9.02	11.08	8.95	10.36	11.03	11.22	10.62	9.34	10.30	11.35	11.00	26
27	9.65	10.19	9.12	11.22	9.03	10.48	11.16	11.37	10.73	9.42	10.42	11.49	11.15	27
28	9.73	10.30	9.22	11.34	9.10	10.59	11.27	11.50	10.83	9.50	10.53	11.61	11.28	28
29	9.80	10.39	9.30	11.46	9.16	10.70	11.38	11.62	10.92	9.57	10.63	11.73	11.41	29
30	9.87	10.48	9.38	11.57	9.22	10.79	11.48	11.73	11.00	9.63	10.72	11.83	11.52	30

Table B-3b. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 10 percent (OMB A-94 LCC Approach)

Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

N	RESIDENTIAL				COMMERCIAL				INDUSTRIAL						
	ELEC	DIST	LPG	NTGAS	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	0.92	0.92	0.88	0.93	0.91	0.92	0.96	0.95	0.93	0.92	0.92	0.95	0.89	0.93	1
2	1.75	1.76	1.66	1.78	1.75	1.76	1.85	1.82	1.80	1.76	1.76	1.84	1.72	1.81	2
3	2.53	2.52	2.37	2.55	2.52	2.53	2.67	2.62	2.61	2.54	2.53	2.66	2.48	2.63	3
4	3.23	3.21	2.99	3.26	3.21	3.22	3.44	3.35	3.35	3.24	3.22	3.42	3.18	3.37	4
5	3.84	3.84	3.56	3.91	3.82	3.85	4.13	4.01	4.03	3.88	3.85	4.11	3.81	4.06	5
6	4.40	4.41	4.08	4.49	4.38	4.43	4.76	4.61	4.65	4.45	4.43	4.74	4.39	4.69	6
7	4.90	4.93	4.55	5.03	4.87	4.95	5.34	5.17	5.22	4.97	4.95	5.31	4.92	5.27	7
8	5.35	5.41	4.99	5.53	5.32	5.44	5.88	5.69	5.75	5.45	5.44	5.84	5.44	5.81	8
9	5.77	5.86	5.39	6.01	5.74	5.90	6.39	6.18	6.25	5.89	5.90	6.35	5.95	6.31	9
10	6.15	6.28	5.76	6.45	6.11	6.33	6.86	6.65	6.70	6.29	6.33	6.82	6.44	6.77	10
11	6.50	6.67	6.11	6.88	6.46	6.74	7.32	7.10	7.12	6.67	6.74	7.27	6.94	7.19	11
12	6.83	7.03	6.44	7.29	6.77	7.12	7.75	7.53	7.52	7.01	7.12	7.69	7.42	7.59	12
13	7.12	7.37	6.74	7.66	7.06	7.48	8.15	7.93	7.89	7.33	7.48	8.08	7.89	7.96	13
14	7.40	7.69	7.02	8.02	7.32	7.82	8.53	8.31	8.23	7.63	7.81	8.46	8.34	8.30	14
15	7.65	7.98	7.28	8.35	7.56	8.14	8.89	8.67	8.55	7.89	8.13	8.81	8.77	8.62	15
16	7.87	8.25	7.52	8.67	7.78	8.43	9.22	9.01	8.84	8.14	8.42	9.13	9.18	8.92	16
17	8.08	8.50	7.74	8.96	7.98	8.70	9.52	9.33	9.11	8.37	8.69	9.43	9.57	9.19	17
18	8.27	8.73	7.94	9.22	8.16	8.95	9.80	9.62	9.36	8.57	8.93	9.70	9.92	9.44	18
19	8.45	8.94	8.12	9.47	8.32	9.18	10.06	9.88	9.59	8.76	9.16	9.96	10.26	9.67	19
20	8.61	9.13	8.29	9.70	8.48	9.39	10.30	10.13	9.81	8.93	9.37	10.19	10.57	9.88	20
21	8.75	9.31	8.45	9.91	8.62	9.59	10.52	10.36	10.00	9.09	9.57	10.40	10.86	10.08	21
22	8.88	9.48	8.60	10.11	8.74	9.77	10.73	10.58	10.18	9.23	9.75	10.60	11.12	10.26	22
23	9.00	9.63	8.73	10.29	8.86	9.94	10.91	10.77	10.34	9.36	9.91	10.79	11.37	10.42	23
24	9.11	9.77	8.86	10.46	8.96	10.09	11.09	10.96	10.49	9.48	10.07	10.96	11.60	10.57	24
25	9.22	9.90	8.97	10.61	9.06	10.23	11.25	11.12	10.63	9.59	10.21	11.12	11.81	10.70	25
26	9.31	10.02	9.08	10.75	9.15	10.37	11.40	11.28	10.75	9.68	10.34	11.26	12.00	10.83	26
27	9.39	10.13	9.18	10.88	9.23	10.49	11.53	11.42	10.86	9.77	10.46	11.39	12.18	10.94	27
28	9.47	10.23	9.27	11.00	9.30	10.60	11.66	11.55	10.97	9.86	10.57	11.52	12.34	11.04	28
29	9.54	10.33	9.35	11.11	9.36	10.70	11.77	11.67	11.06	9.93	10.67	11.63	12.49	11.14	29
30	9.60	10.41	9.43	11.21	9.42	10.79	11.88	11.78	11.15	10.00	10.76	11.73	12.63	11.22	30

Table B-4b. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Discount rate = 10 percent (OMB A-94 LCC Approach)

Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)

N	RESIDENTIAL			COMMERCIAL			INDUSTRIAL							
	ELEC	DIST	LPG	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	N
1	0.91	0.92	0.88	0.90	0.92	0.94	0.93	0.92	0.91	0.92	0.95	0.91	0.92	1
2	1.74	1.76	1.67	1.72	1.77	1.82	1.79	1.78	1.73	1.76	1.84	1.75	1.77	2
3	2.50	2.52	2.37	2.46	2.53	2.62	2.57	2.57	2.47	2.53	2.66	2.52	2.56	3
4	3.19	3.21	3.00	3.13	3.22	3.37	3.29	3.29	3.15	3.22	3.42	3.22	3.27	4
5	3.82	3.84	3.57	3.73	3.86	4.04	3.94	3.94	3.76	3.85	4.11	3.86	3.91	5
6	4.40	4.41	4.09	4.28	4.43	4.65	4.53	4.54	4.32	4.43	4.74	4.45	4.51	6
7	4.92	4.93	4.57	4.78	4.96	5.21	5.08	5.09	4.83	4.95	5.31	4.98	5.05	7
8	5.39	5.42	5.00	5.23	5.45	5.73	5.59	5.60	5.30	5.44	5.85	5.50	5.54	8
9	5.83	5.87	5.41	5.64	5.91	6.22	6.07	6.07	5.72	5.90	6.35	5.98	5.99	9
10	6.23	6.29	5.79	6.01	6.34	6.67	6.53	6.49	6.12	6.33	6.82	6.46	6.41	10
11	6.60	6.68	6.13	6.36	6.75	7.10	6.97	6.88	6.48	6.73	7.27	6.92	6.79	11
12	6.94	7.04	6.46	6.67	7.13	7.50	7.40	7.24	6.81	7.12	7.69	7.36	7.14	12
13	7.25	7.38	6.76	6.96	7.50	7.87	7.79	7.56	7.12	7.47	8.09	7.78	7.47	13
14	7.54	7.70	7.04	7.22	7.84	8.22	8.17	7.86	7.40	7.81	8.46	8.18	7.76	14
15	7.80	8.00	7.30	7.47	8.15	8.55	8.52	8.13	7.66	8.12	8.81	8.56	8.04	15
16	8.04	8.27	7.54	7.69	8.45	8.85	8.85	8.38	7.89	8.41	9.14	8.93	8.29	16
17	8.26	8.52	7.75	7.89	8.72	9.12	9.16	8.61	8.11	8.68	9.43	9.26	8.53	17
18	8.46	8.75	7.95	8.08	8.97	9.38	9.45	8.82	8.31	8.93	9.71	9.57	8.74	18
19	8.64	8.97	8.14	8.24	9.20	9.61	9.71	9.01	8.49	9.16	9.96	9.87	8.94	19
20	8.81	9.16	8.31	8.40	9.42	9.83	9.95	9.18	8.65	9.37	10.20	10.13	9.12	20
21	8.96	9.34	8.46	8.54	9.61	10.02	10.18	9.34	8.80	9.56	10.41	10.38	9.29	21
22	9.10	9.51	8.61	8.67	9.80	10.21	10.39	9.48	8.94	9.74	10.61	10.61	9.44	22
23	9.22	9.67	8.74	8.78	9.97	10.38	10.58	9.62	9.06	9.91	10.80	10.83	9.58	23
24	9.34	9.81	8.87	8.89	10.12	10.54	10.76	9.74	9.18	10.06	10.97	11.02	9.70	24
25	9.44	9.94	8.98	8.99	10.27	10.68	10.93	9.85	9.28	10.20	11.12	11.20	9.82	25
26	9.54	10.06	9.09	9.08	10.40	10.82	11.08	9.95	9.38	10.33	11.27	11.37	9.92	26
27	9.63	10.17	9.18	9.16	10.52	10.94	11.22	10.04	9.46	10.45	11.40	11.53	10.02	27
28	9.70	10.28	9.27	9.23	10.63	11.05	11.35	10.13	9.54	10.56	11.52	11.67	10.11	28
29	9.78	10.37	9.36	9.30	10.74	11.16	11.46	10.20	9.61	10.66	11.64	11.80	10.19	29
30	9.84	10.46	9.43	9.36	10.83	11.25	11.57	10.27	9.68	10.76	11.74	11.92	10.26	30

Table B-5b. UPW* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.
Discount rate = 10 percent (OMB A-94 LCC Approach)
United States Average

N	RESIDENTIAL			COMMERCIAL			INDUSTRIAL			TRANSPORTATION					
	ELEC	DIST	LPG	ELEC	DIST	RESID	NTGAS	COAL	ELEC	DIST	RESID	NTGAS	COAL	GASLN	N
1	0.92	0.92	0.87	0.91	0.92	0.95	0.94	0.93	0.92	0.92	0.95	0.89	0.93	0.92	1
2	1.76	1.76	1.66	1.74	1.76	1.83	1.80	1.80	1.76	1.76	1.84	1.72	1.80	1.76	2
3	2.53	2.52	2.36	2.50	2.53	2.65	2.59	2.60	2.52	2.53	2.66	2.48	2.60	2.52	3
4	3.23	3.21	2.98	3.18	3.22	3.41	3.31	3.34	3.22	3.22	3.42	3.17	3.34	3.22	4
5	3.85	3.83	3.54	3.78	3.85	4.09	3.96	4.01	3.85	3.85	4.10	3.80	4.01	3.85	5
6	4.40	4.41	4.06	4.32	4.43	4.71	4.56	4.63	4.41	4.42	4.73	4.38	4.63	4.43	6
7	4.91	4.93	4.53	4.81	4.96	5.28	5.10	5.20	4.92	4.95	5.30	4.91	5.19	4.96	7
8	5.36	5.41	4.96	5.25	5.45	5.81	5.62	5.73	5.39	5.44	5.83	5.42	5.72	5.45	8
9	5.79	5.86	5.36	5.65	5.91	6.31	6.10	6.22	5.82	5.90	6.33	5.91	6.20	5.91	9
10	6.17	6.28	5.74	6.02	6.34	6.78	6.57	6.67	6.21	6.33	6.80	6.39	6.64	6.33	10
11	6.52	6.67	6.08	6.35	6.74	7.22	7.01	7.08	6.58	6.73	7.25	6.86	7.05	6.72	11
12	6.85	7.03	6.41	6.66	7.12	7.64	7.44	7.47	6.91	7.11	7.67	7.32	7.44	7.09	12
13	7.15	7.37	6.71	6.93	7.48	8.03	7.83	7.83	7.22	7.47	8.06	7.75	7.79	7.43	13
14	7.42	7.68	6.99	7.19	7.82	8.39	8.21	8.16	7.50	7.80	8.44	8.17	8.12	7.75	14
15	7.67	7.97	7.25	7.42	8.13	8.74	8.57	8.47	7.76	8.11	8.78	8.57	8.42	8.04	15
16	7.90	8.24	7.49	7.63	8.42	9.05	8.90	8.74	8.00	8.40	9.10	8.95	8.70	8.31	16
17	8.11	8.49	7.71	7.83	8.69	9.35	9.21	9.00	8.21	8.67	9.40	9.30	8.96	8.56	17
18	8.29	8.72	7.92	8.00	8.94	9.62	9.49	9.24	8.41	8.92	9.68	9.63	9.20	8.79	18
19	8.47	8.93	8.10	8.17	9.16	9.86	9.76	9.46	8.59	9.14	9.93	9.94	9.42	9.00	19
20	8.63	9.12	8.28	8.31	9.37	10.09	10.00	9.66	8.75	9.35	10.16	10.22	9.63	9.20	20
21	8.77	9.30	8.43	8.45	9.57	10.30	10.23	9.84	8.90	9.55	10.37	10.48	9.81	9.38	21
22	8.90	9.46	8.58	8.57	9.75	10.50	10.44	10.01	9.04	9.73	10.57	10.73	9.98	9.55	22
23	9.03	9.62	8.72	8.68	9.91	10.68	10.64	10.16	9.16	9.89	10.75	10.95	10.14	9.70	23
24	9.14	9.76	8.84	8.78	10.07	10.84	10.82	10.30	9.28	10.04	10.92	11.16	10.28	9.84	24
25	9.24	9.89	8.96	8.88	10.21	11.00	10.98	10.43	9.38	10.18	11.08	11.35	10.40	9.97	25
26	9.33	10.01	9.07	8.96	10.34	11.14	11.13	10.55	9.48	10.31	11.22	11.53	10.52	10.09	26
27	9.41	10.12	9.16	9.04	10.46	11.27	11.27	10.66	9.56	10.43	11.36	11.69	10.63	10.20	27
28	9.49	10.22	9.25	9.11	10.57	11.39	11.40	10.75	9.64	10.54	11.48	11.84	10.73	10.31	28
29	9.56	10.31	9.34	9.17	10.67	11.50	11.52	10.84	9.71	10.64	11.59	11.98	10.82	10.40	29
30	9.62	10.40	9.41	9.23	10.76	11.60	11.63	10.92	9.78	10.74	11.69	12.10	10.90	10.49	30

Projected average fuel price indices and escalation rates for Federal use (Indices and escalation rates exclude general price inflation)

Table C, "Regional and U.S. average base-year fuel prices by end-use sector and major fuel," has been discontinued. Use your actual energy prices as of the date the analysis is performed as the starting point for estimating present value energy costs.

Tables Ca-1 through Ca-5 present projected average fuel price indices for the 4 Census regions and for the United States. These are multipliers which when applied to today's prices provide estimates of the corresponding future-year prices. Note that the resulting price estimates are in constant dollars, that is, exclusive of general price inflation. Constant dollar prices are needed when discounting is performed with discount rates which do not include general price inflation.

Example of How to Use the Indices:

To estimate the price of industrial steam coal in year 2005 in Connecticut, go to table Ca-1, find the year 2005 index for industrial steam coal (1.25), and multiply by today's price for industrial steam coal in Connecticut.

Tables Cb-1 through Cb-5 present the projected average fuel price escalation rates (percentage change compounded annually) for seven selected periods from 1991 to 2021 for the 4 Census regions and for the United States. Note that these are "real" rates exclusive of general price inflation. Their use results in prices expressed in constant dollars.

The escalation rates consolidate the information provided by the indices in the Ca tables so that trends in projected price changes can be seen at a glance. They are provided primarily to accommodate those who use computer programs which require escalation rates as inputs.

Unless there is a compelling reason to use escalation rates, it is recommended that you use the indices in the Ca tables when you need estimates of future-year energy prices, since the indices include year-to-year information rather than averages over a number of years.

Example of How to Use the Escalation Rates:

To estimate the price of residential distillate in 1998 (p_{98}) in Wyoming using the escalation rates, go to table Cb-4 and find the 1991-1995 and 1995-2000 escalation rates for residential distillate (0.28% and 0.98% per year, respectively). Enter these values and today's price of residential distillate in Wyoming (p_{92}) into the following formula. Then solve for the 1998 energy price (stated in today's dollars):

$$\begin{aligned} p_{98} &= p_{92} \times (1 + e_1)^k \times (1 + e_2)^k, \\ &= p_{92} \times (1 + 0.0028)^4 \times (1 + 0.0098)^3 \end{aligned}$$

where e_i = Annual compound escalation rate for period i from the Cb tables (in decimal form); and
 k_i = Number of years over which escalation rate e_i occurs.

For further explanation of how to use these tables, see NIST Handbook 135.

The data in the tables which follow are reported for the 4 Census regions and the U.S. average. Figure B-1 presents a map showing the states corresponding to the 4 Census regions. The Census regions do not include American Samoa, Canal Zone, Guam, Puerto Rico, Trust Territory of the Pacific Islands, or the Virgin Islands. Analysts of Federal projects in these areas should use data which are "reasonable under the circumstances," and may refer to the tables with U.S. average data for guidance.

Note: Motor gasoline data are not available for the 4 Census regions. Refer to the U.S. average motor gasoline data for guidance.

Table Ca-1. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)

Sector and Fuel	Projected Average Fuel Price Indices (1991 = 1.00)														
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Residential															
Electricity	1.00	1.00	1.00	1.00	0.97	0.96	0.95	0.93	0.93	0.94	0.95	0.95	0.95	0.95	0.95
Distillate Oil	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.02	1.04	1.06	1.08	1.11	1.13	1.16	1.19
LPG	1.00	0.97	0.96	0.94	0.92	0.92	0.92	0.93	0.94	0.95	0.97	0.99	1.01	1.03	1.05
Natural Gas	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.02	1.05	1.08	1.11	1.16	1.20	1.23	1.28
Commercial															
Electricity	1.00	0.99	0.99	1.00	0.97	0.95	0.94	0.93	0.92	0.93	0.93	0.93	0.93	0.93	0.94
Distillate Oil	1.00	1.01	1.02	1.02	1.01	1.01	1.01	1.02	1.05	1.07	1.10	1.14	1.18	1.21	1.25
Residual Oil	1.00	1.04	1.06	1.09	1.10	1.10	1.10	1.10	1.13	1.16	1.20	1.25	1.29	1.33	1.37
Natural Gas	1.00	1.02	1.03	1.04	1.04	1.04	1.04	1.05	1.08	1.12	1.17	1.23	1.28	1.31	1.37
Steam Coal	1.00	1.02	1.05	1.07	1.08	1.08	1.09	1.10	1.11	1.13	1.15	1.17	1.20	1.23	1.24
Industrial															
Electricity	1.00	1.00	1.00	1.01	1.01	1.00	1.00	1.00	1.01	1.02	1.03	1.04	1.05	1.05	1.06
Distillate Oil	1.00	1.01	1.02	1.02	1.01	1.01	1.02	1.02	1.05	1.08	1.11	1.15	1.19	1.22	1.26
Residual Oil	1.00	1.04	1.07	1.09	1.10	1.10	1.10	1.10	1.13	1.17	1.21	1.25	1.29	1.34	1.38
Natural Gas	1.00	0.96	0.97	0.98	0.98	0.98	0.99	1.00	1.04	1.08	1.14	1.22	1.28	1.33	1.40
Steam Coal	1.00	1.01	1.04	1.05	1.06	1.07	1.08	1.09	1.11	1.13	1.15	1.17	1.20	1.23	1.25
Oil Price Assumption															
Oil Price Assumption	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.04	1.07	1.11	1.15	1.20	1.25	1.29

Table Ca-1, continued. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)

Projected Average Fuel Price Indices

(1991 = 1.00)

Sector and Fuel	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	2018*	2019*	2020*	2021*
Residential																
Electricity	0.95	0.96	0.96	0.94	0.95	0.96	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.99
Distillate Oil	1.21	1.23	1.25	1.26	1.27	1.29	1.31	1.34	1.36	1.38	1.40	1.42	1.44	1.45	1.47	1.48
LPG	1.07	1.09	1.10	1.10	1.11	1.13	1.15	1.17	1.19	1.21	1.23	1.24	1.26	1.27	1.29	1.30
Natural Gas	1.31	1.35	1.37	1.38	1.41	1.43	1.46	1.49	1.51	1.54	1.55	1.57	1.59	1.61	1.63	1.65
Commercial																
Electricity	0.94	0.95	0.95	0.94	0.95	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.99
Distillate Oil	1.28	1.31	1.33	1.34	1.35	1.37	1.40	1.43	1.45	1.48	1.49	1.51	1.53	1.55	1.57	1.58
Residual Oil	1.41	1.44	1.46	1.47	1.48	1.51	1.54	1.57	1.59	1.62	1.64	1.66	1.68	1.70	1.72	1.74
Natural Gas	1.41	1.45	1.48	1.50	1.53	1.55	1.58	1.62	1.64	1.67	1.69	1.71	1.73	1.75	1.77	1.79
Steam Coal	1.25	1.26	1.27	1.29	1.32	1.32	1.33	1.34	1.34	1.35	1.36	1.36	1.37	1.38	1.38	1.39
Industrial																
Electricity	1.07	1.07	1.07	1.05	1.07	1.07	1.08	1.08	1.08	1.09	1.09	1.09	1.10	1.10	1.10	1.11
Distillate Oil	1.29	1.32	1.34	1.36	1.37	1.39	1.42	1.44	1.47	1.49	1.51	1.53	1.55	1.56	1.58	1.60
Residual Oil	1.41	1.44	1.46	1.48	1.49	1.51	1.54	1.57	1.60	1.63	1.64	1.67	1.69	1.71	1.73	1.75
Natural Gas	1.45	1.50	1.54	1.56	1.60	1.62	1.66	1.69	1.72	1.75	1.77	1.79	1.81	1.83	1.85	1.87
Steam Coal	1.27	1.29	1.32	1.34	1.37	1.38	1.38	1.39	1.40	1.40	1.41	1.42	1.42	1.43	1.44	1.45
Projected world oil price indices																
(1991 = 1.00)																
Oil Price Assumption	1.33	1.36	1.39	1.41	1.43	1.45	1.48	1.50	1.53	1.55	1.57	1.59	1.61	1.63	1.65	1.67

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table Ca-2. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)

	Projected Average Fuel Price Indices (1991 = 1.00)														
Sector and Fuel	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Residential															
Electricity	1.00	1.04	1.03	1.04	1.06	1.02	1.00	1.00	1.01	1.02	1.02	1.02	1.03	1.05	1.06
Distillate Oil	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.02	1.04	1.06	1.09	1.12	1.15	1.18	1.21
LPG	1.00	0.96	0.94	0.92	0.89	0.90	0.90	0.90	0.92	0.94	0.96	0.99	1.02	1.05	1.07
Natural Gas	1.00	1.03	1.05	1.05	1.05	1.05	1.06	1.07	1.10	1.14	1.19	1.26	1.31	1.36	1.42
Commercial															
Electricity	1.00	1.03	1.01	1.02	1.02	0.99	0.94	0.94	0.94	0.93	0.93	0.93	0.93	0.94	0.95
Distillate Oil	1.00	1.02	1.02	1.02	1.01	1.02	1.02	1.03	1.05	1.08	1.12	1.16	1.20	1.24	1.28
Residual Oil	1.00	1.04	1.06	1.08	1.10	1.10	1.10	1.10	1.13	1.16	1.20	1.24	1.29	1.33	1.37
Natural Gas	1.00	1.03	1.04	1.05	1.05	1.05	1.06	1.07	1.11	1.15	1.21	1.28	1.34	1.39	1.46
Steam Coal	1.00	1.02	1.05	1.08	1.09	1.09	1.11	1.13	1.14	1.17	1.18	1.20	1.22	1.25	1.27
Industrial															
Electricity	1.00	1.03	1.02	1.03	1.04	1.02	0.98	0.98	0.99	0.99	0.99	0.99	1.00	1.02	1.03
Distillate Oil	1.00	1.01	1.02	1.02	1.01	1.01	1.02	1.02	1.05	1.08	1.11	1.15	1.19	1.23	1.27
Residual Oil	1.00	1.05	1.08	1.10	1.12	1.12	1.11	1.12	1.15	1.19	1.24	1.29	1.34	1.39	1.44
Natural Gas	1.00	0.98	1.00	1.01	1.01	1.01	1.01	1.02	1.07	1.12	1.18	1.27	1.34	1.39	1.47
Steam Coal	1.00	1.02	1.04	1.06	1.06	1.07	1.08	1.08	1.09	1.11	1.12	1.14	1.16	1.18	1.21
Oil Price Assumption															
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.04	1.07	1.11	1.15	1.20	1.25	1.29

Table Ca-2, continued. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel

Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)

**Projected Average Fuel Price Indices
(1991 = 1.00)**

Sector and Fuel	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	2018*	2019*	2020*	2021*
Residential																
Electricity	1.08	1.08	1.09	1.10	1.11	1.12	1.12	1.12	1.13	1.13	1.14	1.14	1.14	1.14	1.15	1.15
Distillate Oil	1.24	1.26	1.28	1.29	1.30	1.32	1.35	1.37	1.40	1.42	1.44	1.45	1.47	1.49	1.51	1.52
LPG	1.10	1.12	1.13	1.14	1.15	1.17	1.19	1.22	1.24	1.26	1.27	1.29	1.30	1.32	1.33	1.35
Natural Gas	1.46	1.51	1.54	1.56	1.59	1.62	1.65	1.68	1.71	1.74	1.76	1.78	1.80	1.82	1.85	1.87
Commercial																
Electricity	0.95	0.96	0.96	0.97	0.97	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.01	1.01
Distillate Oil	1.32	1.35	1.37	1.39	1.40	1.42	1.45	1.48	1.50	1.53	1.54	1.56	1.58	1.60	1.62	1.64
Residual Oil	1.40	1.43	1.45	1.47	1.48	1.50	1.53	1.56	1.59	1.61	1.63	1.65	1.68	1.69	1.71	1.73
Natural Gas	1.51	1.56	1.60	1.62	1.66	1.68	1.72	1.75	1.78	1.81	1.83	1.85	1.88	1.90	1.92	1.94
Steam Coal	1.28	1.29	1.31	1.32	1.35	1.36	1.36	1.37	1.38	1.38	1.39	1.40	1.40	1.41	1.42	1.43
Industrial																
Electricity	1.04	1.05	1.05	1.05	1.06	1.07	1.07	1.07	1.07	1.08	1.08	1.09	1.09	1.09	1.09	1.10
Distillate Oil	1.30	1.33	1.35	1.36	1.38	1.40	1.43	1.45	1.48	1.50	1.52	1.54	1.56	1.57	1.59	1.61
Residual Oil	1.48	1.51	1.53	1.55	1.57	1.59	1.62	1.65	1.68	1.71	1.73	1.75	1.77	1.79	1.81	1.83
Natural Gas	1.53	1.58	1.62	1.64	1.69	1.72	1.75	1.79	1.82	1.85	1.87	1.89	1.91	1.93	1.96	1.98
Steam Coal	1.23	1.26	1.29	1.30	1.33	1.33	1.34	1.35	1.35	1.36	1.37	1.37	1.38	1.39	1.39	1.40

**Projected world oil price indices
(1991 = 1.00)**

Oil Price Assumption	1.33	1.36	1.39	1.41	1.43	1.45	1.48	1.50	1.53	1.55	1.57	1.59	1.61	1.63	1.65	1.67
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*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table Ca-3. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel

Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

		Projected Average Fuel Price Indices (1991 = 1.00)														
Sector and Fuel		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Residential																
Electricity		1.00	1.01	1.02	1.03	1.02	0.99	0.99	0.97	0.97	0.99	0.99	1.01	1.02	1.02	1.03
Distillate Oil		1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.02	1.04	1.06	1.08	1.11	1.14	1.17	1.20
LPG		1.00	0.96	0.95	0.93	0.92	0.92	0.92	0.92	0.94	0.95	0.97	0.99	1.02	1.04	1.06
Natural Gas		1.00	1.02	1.03	1.04	1.04	1.04	1.04	1.05	1.08	1.12	1.16	1.22	1.27	1.30	1.36
Commercial																
Electricity		1.00	1.00	1.01	1.03	1.01	0.99	0.98	0.97	0.97	0.97	0.97	0.98	0.99	0.99	1.00
Distillate Oil		1.00	1.02	1.02	1.02	1.01	1.02	1.02	1.02	1.05	1.08	1.12	1.16	1.20	1.24	1.28
Residual Oil		1.00	1.05	1.08	1.10	1.12	1.12	1.11	1.12	1.16	1.20	1.24	1.29	1.35	1.40	1.45
Natural Gas		1.00	1.04	1.06	1.06	1.06	1.06	1.07	1.08	1.12	1.16	1.22	1.29	1.34	1.39	1.45
Steam Coal		1.00	1.02	1.06	1.08	1.08	1.09	1.11	1.12	1.14	1.16	1.18	1.20	1.24	1.28	1.30
Industrial																
Electricity		1.00	1.01	1.02	1.04	1.03	1.02	1.01	1.01	1.02	1.04	1.05	1.07	1.09	1.10	1.12
Distillate Oil		1.00	1.02	1.02	1.02	1.01	1.02	1.02	1.02	1.05	1.08	1.12	1.16	1.20	1.24	1.28
Residual Oil		1.00	1.05	1.07	1.10	1.11	1.11	1.11	1.11	1.15	1.18	1.23	1.27	1.32	1.37	1.42
Natural Gas		1.00	0.98	1.01	1.02	1.02	1.02	1.03	1.04	1.11	1.19	1.29	1.42	1.52	1.60	1.71
Steam Coal		1.00	1.03	1.06	1.09	1.09	1.10	1.12	1.13	1.15	1.18	1.19	1.21	1.24	1.28	1.31
Oil Price Assumption																
		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.04	1.07	1.11	1.15	1.20	1.25	1.29

Table Ca-3, continued. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

	Projected Average Fuel Price Indices (1991 = 1.00)															
Sector and Fuel	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	2018*	2019*	2020*	2021*
Residential																
Electricity	1.04	1.05	1.05	1.06	1.06	1.07	1.07	1.08	1.08	1.08	1.09	1.09	1.09	1.10	1.10	1.11
Distillate Oil	1.22	1.24	1.26	1.27	1.28	1.30	1.33	1.35	1.37	1.40	1.41	1.43	1.45	1.46	1.48	1.50
LPG	1.08	1.10	1.11	1.12	1.13	1.15	1.17	1.19	1.21	1.23	1.25	1.26	1.28	1.29	1.31	1.32
Natural Gas	1.40	1.44	1.46	1.48	1.51	1.54	1.57	1.60	1.62	1.65	1.67	1.69	1.71	1.73	1.75	1.77
Commercial																
Electricity	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.03	1.03	1.03	1.04	1.04	1.05	1.05	1.05	1.06
Distillate Oil	1.32	1.35	1.37	1.39	1.40	1.42	1.45	1.48	1.50	1.53	1.54	1.57	1.59	1.60	1.62	1.64
Residual Oil	1.49	1.52	1.54	1.56	1.58	1.60	1.63	1.67	1.69	1.72	1.74	1.76	1.79	1.80	1.83	1.85
Natural Gas	1.50	1.56	1.59	1.61	1.65	1.67	1.70	1.74	1.77	1.80	1.82	1.84	1.86	1.88	1.91	1.93
Steam Coal	1.32	1.35	1.36	1.39	1.43	1.43	1.44	1.45	1.45	1.46	1.47	1.48	1.48	1.49	1.50	1.50
Industrial																
Electricity	1.13	1.13	1.14	1.14	1.15	1.15	1.16	1.16	1.16	1.17	1.17	1.18	1.18	1.18	1.18	1.19
Distillate Oil	1.31	1.34	1.36	1.38	1.39	1.41	1.44	1.47	1.49	1.52	1.53	1.55	1.57	1.59	1.61	1.63
Residual Oil	1.46	1.49	1.51	1.53	1.54	1.56	1.60	1.63	1.65	1.68	1.70	1.72	1.74	1.76	1.78	1.80
Natural Gas	1.80	1.89	1.95	1.98	2.06	2.09	2.13	2.17	2.21	2.24	2.27	2.30	2.33	2.35	2.38	2.41
Steam Coal	1.33	1.35	1.38	1.39	1.43	1.43	1.44	1.45	1.45	1.46	1.47	1.48	1.48	1.49	1.50	1.50
	Projected world oil price indices (1991 = 1.00)															
Oil Price Assumption	1.33	1.36	1.39	1.41	1.43	1.45	1.48	1.50	1.53	1.55	1.57	1.59	1.61	1.63	1.65	1.67

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table Ca-4. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)

Sector and Fuel	Projected Average Fuel Price Indices (1991 = 1.00)														
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Residential															
Electricity	1.00	1.00	1.00	1.01	1.02	1.01	1.02	1.01	1.02	1.03	1.04	1.05	1.06	1.08	1.08
Distillate Oil	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.02	1.04	1.06	1.09	1.12	1.15	1.18	1.21
LPG	1.00	0.97	0.95	0.94	0.92	0.92	0.92	0.93	0.94	0.96	0.97	1.00	1.02	1.04	1.06
Natural Gas	1.00	1.00	1.01	1.02	1.02	1.02	1.02	1.03	1.06	1.10	1.15	1.21	1.25	1.29	1.35
Commercial															
Electricity	1.00	0.99	0.99	0.98	0.98	0.98	0.97	0.96	0.96	0.96	0.97	0.98	0.99	1.00	1.00
Distillate Oil	1.00	1.02	1.02	1.02	1.02	1.02	1.02	1.03	1.05	1.09	1.12	1.16	1.21	1.25	1.29
Residual Oil	1.00	1.04	1.06	1.07	1.09	1.09	1.08	1.09	1.12	1.14	1.18	1.22	1.25	1.29	1.33
Natural Gas	1.00	1.02	1.04	1.05	1.05	1.05	1.05	1.06	1.10	1.14	1.19	1.26	1.32	1.36	1.43
Steam Coal	1.00	1.02	1.03	1.05	1.05	1.06	1.06	1.07	1.09	1.10	1.10	1.11	1.12	1.12	1.13
Industrial															
Electricity	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.02	1.03	1.04	1.06	1.07
Distillate Oil	1.00	1.02	1.02	1.02	1.01	1.02	1.02	1.02	1.05	1.08	1.12	1.16	1.20	1.23	1.27
Residual Oil	1.00	1.05	1.07	1.10	1.11	1.11	1.11	1.12	1.15	1.19	1.23	1.28	1.33	1.37	1.42
Natural Gas	1.00	1.00	1.02	1.03	1.03	1.03	1.04	1.05	1.10	1.15	1.22	1.32	1.39	1.45	1.53
Steam Coal	1.00	1.02	1.03	1.04	1.04	1.04	1.05	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13
Oil Price Assumption															
Oil Price Assumption	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.04	1.07	1.11	1.15	1.20	1.25	1.29

Table Ca-4, continued. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)

Sector and Fuel	Projected Average Fuel Price Indices (1991 = 1.00)																
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	2018*	2019*	2020*	2021*	
Residential																	
Electricity	1.09	1.10	1.11	1.11	1.11	1.12	1.12	1.13	1.13	1.13	1.14	1.14	1.14	1.14	1.15	1.15	1.15
Distillate Oil	1.23	1.26	1.27	1.29	1.30	1.31	1.34	1.37	1.39	1.41	1.43	1.45	1.47	1.48	1.50	1.51	1.51
LPG	1.08	1.09	1.10	1.11	1.12	1.14	1.16	1.18	1.20	1.22	1.24	1.25	1.27	1.28	1.30	1.31	1.31
Natural Gas	1.39	1.43	1.46	1.47	1.51	1.53	1.56	1.59	1.62	1.65	1.66	1.69	1.71	1.72	1.75	1.76	1.76
Commercial																	
Electricity	1.01	1.02	1.03	1.03	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.05	1.06	1.06	1.06	1.07	1.07
Distillate Oil	1.33	1.36	1.38	1.40	1.41	1.43	1.46	1.49	1.52	1.54	1.56	1.58	1.60	1.61	1.64	1.65	1.65
Residual Oil	1.36	1.38	1.40	1.41	1.42	1.44	1.47	1.50	1.53	1.55	1.57	1.59	1.61	1.63	1.65	1.67	1.67
Natural Gas	1.48	1.53	1.56	1.58	1.62	1.64	1.67	1.71	1.74	1.76	1.78	1.81	1.83	1.85	1.87	1.89	1.89
Steam Coal	1.13	1.14	1.15	1.16	1.16	1.17	1.17	1.18	1.19	1.19	1.20	1.20	1.21	1.22	1.22	1.23	1.23
Industrial																	
Electricity	1.08	1.09	1.10	1.10	1.10	1.11	1.11	1.11	1.12	1.12	1.13	1.13	1.13	1.13	1.14	1.14	1.14
Distillate Oil	1.31	1.34	1.36	1.38	1.39	1.41	1.44	1.47	1.49	1.51	1.53	1.55	1.57	1.59	1.61	1.62	1.62
Residual Oil	1.46	1.49	1.51	1.53	1.54	1.57	1.60	1.63	1.66	1.68	1.70	1.72	1.75	1.76	1.79	1.81	1.81
Natural Gas	1.60	1.66	1.70	1.73	1.78	1.81	1.84	1.88	1.91	1.94	1.96	1.99	2.01	2.04	2.06	2.08	2.08
Steam Coal	1.14	1.16	1.21	1.19	1.21	1.22	1.22	1.23	1.24	1.24	1.25	1.25	1.26	1.27	1.27	1.28	1.28
	Projected world oil price indices (1991 = 1.00)																
Oil Price Assumption	1.33	1.36	1.39	1.41	1.43	1.45	1.48	1.50	1.53	1.55	1.57	1.59	1.61	1.63	1.65	1.67	1.67

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table Ca-5. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel
United States Average

Sector and Fuel	Projected Average Fuel Price Indices (1991 = 1.00)														
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Residential															
Electricity	1.00	1.01	1.01	1.03	1.02	1.00	0.99	0.98	0.98	0.99	1.00	1.01	1.02	1.02	1.04
Distillate Oil	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.02	1.04	1.06	1.08	1.11	1.14	1.17	1.19
LPG	1.00	0.96	0.95	0.93	0.91	0.91	0.91	0.91	0.93	0.95	0.97	0.99	1.02	1.04	1.07
Natural Gas	1.00	1.02	1.03	1.03	1.03	1.03	1.04	1.05	1.08	1.12	1.16	1.22	1.27	1.30	1.36
Commercial															
Electricity	1.00	1.01	1.00	1.01	0.99	0.97	0.96	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.97
Distillate Oil	1.00	1.02	1.02	1.02	1.02	1.02	1.02	1.03	1.05	1.08	1.12	1.16	1.20	1.24	1.27
Residual Oil	1.00	1.05	1.07	1.09	1.11	1.10	1.10	1.11	1.14	1.17	1.21	1.26	1.30	1.35	1.39
Natural Gas	1.00	1.03	1.04	1.05	1.05	1.05	1.06	1.07	1.10	1.15	1.20	1.27	1.33	1.37	1.43
Steam Coal	1.00	1.02	1.05	1.07	1.08	1.08	1.10	1.11	1.13	1.15	1.16	1.18	1.21	1.25	1.26
Industrial															
Electricity	1.00	1.01	1.01	1.02	1.02	1.01	1.00	1.00	1.00	1.01	1.02	1.04	1.05	1.06	1.07
Distillate Oil	1.00	1.01	1.02	1.02	1.01	1.01	1.02	1.02	1.05	1.08	1.11	1.15	1.19	1.23	1.27
Residual Oil	1.00	1.05	1.07	1.09	1.11	1.11	1.10	1.11	1.14	1.18	1.22	1.27	1.32	1.36	1.41
Natural Gas	1.00	0.98	1.00	1.01	1.01	1.01	1.02	1.04	1.09	1.16	1.24	1.35	1.43	1.50	1.60
Steam Coal	1.00	1.02	1.05	1.07	1.07	1.08	1.09	1.10	1.12	1.14	1.15	1.17	1.20	1.23	1.25
Transportation															
Motor Gasoline	1.00	1.02	1.01	1.01	1.02	1.02	1.02	1.03	1.05	1.07	1.10	1.12	1.15	1.17	1.21
Oil Price Assumption	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.04	1.07	1.11	1.15	1.20	1.25	1.29

Projected world oil price indices
(1991 = 1.00)

Table Ca-5, continued. Projected average fuel price indices tied to the value of the dollar in 1991, by end-use sector and major fuel

United States Average

Projected Average Fuel Price Indices
(1991 = 1.00)

Sector and Fuel	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	2018*	2019*	2020*	2021*
Residential																
Electricity	1.04	1.05	1.05	1.06	1.06	1.07	1.07	1.08	1.08	1.08	1.09	1.09	1.09	1.09	1.10	1.10
Distillate Oil	1.22	1.24	1.25	1.27	1.28	1.29	1.32	1.35	1.37	1.39	1.41	1.42	1.44	1.46	1.48	1.49
LPG	1.09	1.11	1.12	1.13	1.14	1.15	1.18	1.20	1.22	1.24	1.25	1.27	1.29	1.30	1.32	1.33
Natural Gas	1.40	1.44	1.47	1.48	1.52	1.54	1.57	1.60	1.63	1.65	1.67	1.69	1.72	1.73	1.76	1.77
Commercial																
Electricity	0.97	0.98	0.98	0.98	0.99	0.99	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.02
Distillate Oil	1.31	1.34	1.36	1.38	1.39	1.41	1.44	1.47	1.49	1.51	1.53	1.55	1.57	1.59	1.61	1.62
Residual Oil	1.43	1.46	1.48	1.50	1.51	1.53	1.56	1.59	1.62	1.65	1.66	1.69	1.71	1.73	1.75	1.77
Natural Gas	1.48	1.53	1.56	1.58	1.62	1.65	1.68	1.71	1.74	1.77	1.79	1.81	1.84	1.86	1.88	1.90
Steam Coal	1.27	1.28	1.30	1.32	1.35	1.35	1.36	1.37	1.37	1.38	1.39	1.39	1.40	1.41	1.41	1.42
Industrial																
Electricity	1.08	1.09	1.09	1.09	1.10	1.11	1.11	1.11	1.12	1.12	1.13	1.13	1.13	1.13	1.13	1.14
Distillate Oil	1.30	1.33	1.35	1.37	1.38	1.40	1.43	1.46	1.48	1.51	1.53	1.55	1.57	1.58	1.60	1.62
Residual Oil	1.45	1.48	1.50	1.52	1.53	1.56	1.59	1.62	1.65	1.67	1.69	1.71	1.74	1.75	1.78	1.79
Natural Gas	1.67	1.75	1.79	1.82	1.88	1.91	1.95	1.98	2.02	2.05	2.07	2.10	2.13	2.15	2.18	2.20
Steam Coal	1.27	1.29	1.31	1.33	1.35	1.36	1.37	1.37	1.38	1.39	1.40	1.40	1.41	1.42	1.42	1.43
Transportation																
Motor Gasoline	1.23	1.25	1.26	1.28	1.29	1.30	1.33	1.36	1.38	1.40	1.42	1.44	1.46	1.47	1.49	1.50
Projected world oil price indices (1991 = 1.00)																
Oil Price Assumption	1.33	1.36	1.39	1.41	1.43	1.45	1.48	1.50	1.53	1.55	1.57	1.59	1.61	1.63	1.65	1.67

* Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

**Table Cb-1. Projected average fuel price escalation rates
exclusive of general price inflation
by end-use sector and major fuel
(percentage change compounded annually)**

*Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts,
Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)*

Sector and Fuel	1991 to 1995	1995 to 2000	2000 to 2005	2005 to 2010	2010 to 2015	2015 to 2020*	2020 to 2021*
Residential							
Electricity	-0.63	-0.68	0.25	-0.09	0.35	0.28	0.58
Distillate Oil	0.25	0.89	2.41	1.29	1.75	1.20	1.01
Liquefied Petroleum Gas	-1.99	0.69	1.99	1.08	1.75	1.20	1.01
Natural Gas	0.27	1.29	3.45	1.98	1.75	1.20	1.01
Commercial							
Electricity	-0.77	-0.83	0.20	0.26	0.35	0.28	0.58
Distillate Oil	0.33	1.16	3.09	1.61	1.75	1.20	1.01
Residual Oil	2.42	1.15	3.36	1.55	1.75	1.20	1.01
Natural Gas	0.97	1.54	4.06	2.26	1.75	1.20	1.01
Steam Coal	1.83	1.08	1.75	1.26	0.50	0.49	0.48
Industrial							
Electricity	0.20	0.32	0.77	0.04	0.35	0.28	0.58
Distillate Oil	0.35	1.21	3.20	1.66	1.75	1.20	1.01
Residual Oil	2.45	1.17	3.41	1.57	1.75	1.20	1.01
Natural Gas	-0.52	2.05	5.20	2.78	1.75	1.20	1.01
Steam Coal	1.40	1.43	1.96	1.83	0.50	0.49	0.48
Oil Price Assumption	0.00	1.38	3.82	1.98	1.75	1.20	1.01

*Escalation rates are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

**Table Cb-2. Projected average fuel price escalation rates
exclusive of general price inflation
by end-use sector and major fuel
(percentage change compounded annually)**

*Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin,
Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)*

Sector and Fuel	1991	1995	2000	2005	2010	2015	2020
	to 1995	to 2000	to 2005	to 2010	to 2015	to 2020*	to 2021*
Residential							
Electricity	1.42	-0.80	0.93	0.85	0.35	0.28	0.58
Distillate Oil	0.28	1.00	2.68	1.42	1.75	1.20	1.01
Liquefied Petroleum Gas	-2.74	0.96	2.72	1.43	1.75	1.20	1.01
Natural Gas	1.32	1.66	4.35	2.40	1.75	1.20	1.01
Commercial							
Electricity	0.59	-1.83	0.36	0.49	0.35	0.28	0.58
Distillate Oil	0.37	1.31	3.43	1.76	1.75	1.20	1.01
Residual Oil	2.40	1.14	3.34	1.54	1.75	1.20	1.01
Natural Gas	1.23	1.87	4.84	2.62	1.75	1.20	1.01
Steam Coal	2.20	1.37	1.73	1.20	0.50	0.49	0.48
Industrial							
Electricity	0.92	-0.96	0.86	0.52	0.35	0.28	0.58
Distillate Oil	0.35	1.24	3.26	1.69	1.75	1.20	1.01
Residual Oil	2.81	1.32	3.81	1.73	1.75	1.20	1.01
Natural Gas	0.14	2.18	5.53	2.92	1.75	1.20	1.01
Steam Coal	1.55	0.78	1.81	1.89	0.50	0.49	0.48
Oil Price Assumption	0.00	1.38	3.82	1.98	1.75	1.20	1.01

* Escalation rates are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

**Table Cb-3. Projected average fuel price escalation rates
exclusive of general price inflation
by end-use sector and major fuel
(percentage change compounded annually)**

Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

Sector and Fuel	1991	1995	2000	2005	2010	2015	2020
	to 1995	to 2000	to 2005	to 2010	to 2015	to 2020*	to 2021*
Residential							
Electricity	0.39	-0.60	0.98	0.57	0.35	0.28	0.58
Distillate Oil	0.26	0.93	2.52	1.34	1.75	1.20	1.01
Liquefied Petroleum Gas	-2.20	0.81	2.23	1.21	1.75	1.20	1.01
Natural Gas	0.88	1.50	3.98	2.23	1.75	1.20	1.01
Commercial							
Electricity	0.23	-0.75	0.53	0.37	0.35	0.28	0.58
Distillate Oil	0.37	1.31	3.45	1.77	1.75	1.20	1.01
Residual Oil	2.86	1.34	3.87	1.75	1.75	1.20	1.01
Natural Gas	1.56	1.77	4.60	2.51	1.75	1.20	1.01
Steam Coal	1.97	1.47	2.30	1.82	0.50	0.49	0.48
Industrial							
Electricity	0.66	0.24	1.44	0.54	0.35	0.28	0.58
Distillate Oil	0.37	1.28	3.37	1.73	1.75	1.20	1.01
Residual Oil	2.69	1.27	3.68	1.67	1.75	1.20	1.01
Natural Gas	0.41	3.22	7.55	3.72	1.75	1.20	1.01
Steam Coal	2.18	1.59	2.09	1.75	0.50	0.49	0.48
Oil Price Assumption	0.00	1.38	3.82	1.98	1.75	1.20	1.01

* Escalation rates are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

**Table Cb-4. Projected average fuel price escalation rates
exclusive of general price inflation
by end-use sector and major fuel
(percentage change compounded annually)**

*Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico,
Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)*

Sector and Fuel	1991	1995	2000	2005	2010	2015	2020
	to 1995	to 2000	to 2005	to 2010	to 2015	to 2020*	to 2021*
Residential							
Electricity	0.44	0.20	1.00	0.56	0.35	0.28	0.58
Distillate Oil	0.28	0.98	2.63	1.39	1.75	1.20	1.01
Liquefied Petroleum Gas	-2.07	0.78	2.10	1.14	1.75	1.20	1.01
Natural Gas	0.48	1.56	4.11	2.29	1.75	1.20	1.01
Commercial							
Electricity	-0.45	-0.38	0.79	0.51	0.35	0.28	0.58
Distillate Oil	0.38	1.35	3.53	1.81	1.75	1.20	1.01
Residual Oil	2.12	1.02	3.02	1.41	1.75	1.20	1.01
Natural Gas	1.11	1.77	4.60	2.51	1.75	1.20	1.01
Steam Coal	1.28	0.92	0.48	0.61	0.50	0.49	0.48
Industrial							
Electricity	-0.26	0.29	1.22	0.61	0.35	0.28	0.58
Distillate Oil	0.36	1.28	3.36	1.73	1.75	1.20	1.01
Residual Oil	2.70	1.27	3.69	1.68	1.75	1.20	1.01
Natural Gas	0.68	2.34	5.84	3.05	1.75	1.20	1.01
Steam Coal	0.94	0.64	1.12	1.35	0.50	0.49	0.48
Oil Price Assumption	0.00	1.38	3.82	1.98	1.75	1.20	1.01

* Escalation rates are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

**Table Cb-5. Projected average fuel price escalation rates
exclusive of general price inflation
by end-use sector and major fuel
(percentage change compounded annually)
*United States Average***

Sector and Fuel	1991 to 1995	1995 to 2000	2000 to 2005	2005 to 2010	2010 to 2015	2015 to 2020*	2020 to 2021*
Residential							
Electricity	0.49	-0.53	0.84	0.52	0.35	0.28	0.58
Distillate Oil	0.26	0.91	2.47	1.32	1.75	1.20	1.01
Liquefied Petroleum Gas	-2.36	0.86	2.38	1.29	1.75	1.20	1.01
Natural Gas	0.83	1.53	4.01	2.24	1.75	1.20	1.01
Commercial							
Electricity	-0.13	-0.99	0.43	0.38	0.35	0.28	0.58
Distillate Oil	0.39	1.29	3.32	1.72	1.75	1.20	1.01
Residual Oil	2.54	1.20	3.50	1.61	1.75	1.20	1.01
Natural Gas	1.25	1.77	4.57	2.50	1.75	1.20	1.01
Steam Coal	1.97	1.29	1.78	1.33	0.50	0.49	0.48
Industrial							
Electricity	0.47	-0.10	1.14	0.48	0.35	0.28	0.58
Distillate Oil	0.35	1.26	3.32	1.71	1.75	1.20	1.01
Residual Oil	2.63	1.25	3.65	1.66	1.75	1.20	1.01
Natural Gas	0.31	2.74	6.60	3.34	1.75	1.20	1.01
Steam Coal	1.80	1.20	1.86	1.62	0.50	0.49	0.48
Transportation							
Motor Gasoline	0.48	1.03	2.41	1.25	1.75	1.20	1.01
Oil Price Assumption	0.00	1.38	3.82	1.98	1.75	1.20	1.01

* Escalation rates are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Factors for updating appliance label values in compliance with the Energy Conservation Mandatory Performance Standards for New Federal Residential Buildings (10 CFR 435)

Compliance with energy conservation performance standards for new Federal residential buildings requires calculation of a building's energy costs, including appliance costs. For this purpose, label values for gas and electric water heaters are given in the Federal micro-computer program, COSTSAFR, as \$176 and \$406 per year, respectively, in 1987 dollars, and for refrigerator/freezers, as \$61 per year in 1987 dollars. To adjust 1987 prices to today's prices, multiply these 1987 label values by the factors below.

Table D. Factors for updating appliance label values

Fuel	Factor
Gas	1.14
Electricity	1.15

PART II: TABLES FOR PRIVATE SECTOR LIFE-CYCLE COST ANALYSIS

Projected average fuel price indices for private sector use
(Indices are given inclusive of four alternative rates of general price inflation)

This section presents in tables S-1 through S-5 projected average fuel price indices for 4 fuels in the residential sector and 5 fuels in the commercial sector for each of the years from 1991 through 2021. They update tables originally published in the report, Comprehensive Guide for Least-Cost Energy Decisions (NBS SP 709).

As a convenience for the user, the indices include the effect of four alternative, hypothetical rates of general price inflation: 0, 2.5, 5, and 7.5 percent. Selection of these rates is intended in no way to suggest what actual rates might be. Use of the indices produce price estimates which are in current dollars, inclusive of general price inflation. Current dollar prices are needed when discounting is performed with discount rates which include general price inflation. For the case of 0 percent inflation, the price indices in the S series of tables are identical to those in the counterpart Ca table series. When there is no inflation, there is no difference between constant and current dollars.

The indices based on inflation rates of 2.5, 5, and 7.5 percent allow the analyst to perform evaluations based on the assumption of a positive rate of general price inflation that changes the purchasing power of the dollar. Performing evaluations in current dollars is sometimes preferred for private investment decisions, primarily because it facilitates the treatment of taxes.

The indices in tables S-1 through S-5 are derived from the indices reported in tables Ca-1 through Ca-5 by means of the following equation:

$$I_s = I_c \times (1 + g)^N,$$

where I_s = index found in tables S-1 through S-5;
 I_c = index found in tables Ca-1 through Ca-5;
 g = annual rate of general price inflation in decimal form; and
 N = number of periods, in this case equal to the year of the index minus 1991.

Example of How to Use the Indices:

Suppose you wish to estimate the present value of energy savings in year 2000, and you expect an annual inflation rate of 5 percent per year. Taking natural gas for residential use in Maryland, estimate present value savings as follows: (1) multiply today's price for residential natural gas in Maryland by the projected quantity of energy savings in the year 2000 to estimate savings in the year 2000 in today's prices; (2) go to table S-3, find the year 2000 index for residential natural gas at a 5 percent inflation rate (1.73), and multiply the index by the result from (1) to determine savings in the year 2000 in 2000 prices; and (3) discount the savings back to the present, using an SPW factor

based on a discount rate that reflects a 5 percent inflation rate. To obtain present value savings over the entire study period, this calculation must be repeated for each year that there are savings, and the results summed. (UPW* factors are not given for private sector use because of the large number of tables required to cover potential discount rates that might be used by the analyst. Of course the private sector analyst may use the UPW* factors provided in Part I, provided (1) the analysis is performed in constant dollars, and (2) the desired discount rate is either 4.6% or 10%. The DISCOUNT program (version 3.1) included with BLCC can perform these calculations on a personal computer (see page iv for information on DISCOUNT).)

For further explanation of the use of these indices, see NBS Special Publication 709, appendix B, Part I.

The data in the tables which follow are reported for the 4 Census regions and the U.S. average. Figure B-1 presents a map showing the states corresponding to the 4 Census regions. The Census regions do not include American Samoa, Canal Zone, Guam, Puerto Rico, Trust Territory of the Pacific Islands, or the Virgin Islands. Analysts of Federal projects in these areas should use data which are "reasonable under the circumstances," and may refer to the tables with U.S. average data for guidance.

Note: Motor gasoline data are not available for the 4 Census regions. Refer to the U.S. average motor gasoline data for guidance.

Table S-1. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)

YEAR	RESIDENTIAL														
	ELECTRICITY			DISTILLATE FUEL			LIQUEFIED PETROLEUM GAS			NATURAL GAS					
	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.00	1.02	1.04	1.01	1.04	1.06	1.01	1.04	1.06	1.02	1.04	1.00	1.00	1.02	1.05
1993	1.00	1.05	1.10	1.01	1.06	1.12	1.01	1.06	1.10	1.05	1.11	1.01	1.01	1.06	1.11
1994	1.00	1.08	1.16	1.01	1.09	1.17	1.01	1.09	1.17	1.09	1.17	1.01	1.01	1.09	1.17
1995	0.97	1.08	1.19	1.01	1.11	1.23	1.01	1.11	1.23	1.02	1.12	1.01	1.01	1.12	1.23
1996	0.96	1.08	1.22	1.01	1.14	1.29	1.01	1.14	1.29	1.04	1.18	1.01	1.01	1.14	1.29
1997	0.95	1.10	1.28	1.01	1.17	1.36	1.01	1.17	1.36	1.07	1.24	1.01	1.01	1.18	1.36
1998	0.93	1.11	1.31	1.02	1.21	1.43	1.02	1.21	1.43	1.10	1.30	1.02	1.02	1.21	1.44
1999	0.93	1.13	1.37	1.04	1.26	1.53	1.04	1.26	1.53	1.15	1.39	1.05	1.05	1.28	1.55
2000	0.94	1.18	1.46	1.06	1.32	1.64	1.06	1.32	1.64	1.19	1.48	1.08	1.08	1.35	1.67
2001	0.95	1.21	1.54	1.08	1.38	1.76	1.08	1.38	1.76	1.24	1.58	1.11	1.11	1.43	1.81
2002	0.95	1.24	1.62	1.11	1.45	1.89	1.11	1.45	1.89	1.30	1.70	1.16	1.16	1.53	1.99
2003	0.95	1.27	1.70	1.13	1.53	2.04	1.13	1.53	2.04	1.36	1.82	1.20	1.20	1.62	2.16
2004	0.95	1.31	1.79	1.16	1.60	2.19	1.16	1.60	2.19	1.42	1.95	1.23	1.23	1.70	2.32
2005	0.95	1.35	1.89	1.19	1.68	2.36	1.19	1.68	2.36	1.49	2.09	1.28	1.28	1.80	2.53
2006	0.95	1.38	1.98	1.21	1.76	2.52	1.21	1.76	2.52	1.55	2.23	1.31	1.31	1.90	2.73
2007	0.96	1.42	2.09	1.23	1.83	2.69	1.23	1.83	2.69	1.61	2.37	1.35	1.35	2.00	2.94
2008	0.96	1.46	2.19	1.25	1.90	2.86	1.25	1.90	2.86	1.67	2.51	1.37	1.37	2.08	3.13
2009	0.94	1.47	2.27	1.26	1.97	3.03	1.26	1.97	3.03	1.72	2.66	1.38	1.38	2.15	3.32
2010	0.95	1.52	2.40	1.27	2.03	3.21	1.27	2.03	3.21	1.78	2.81	1.41	1.41	2.25	3.56
2011	0.96	1.57	2.54	1.29	2.11	3.41	1.29	2.11	3.41	1.85	2.99	1.43	1.43	2.34	3.79
2012	0.96	1.61	2.67	1.31	2.21	3.66	1.31	2.21	3.66	1.93	3.21	1.46	1.46	2.45	4.06
2013	0.96	1.66	2.81	1.34	2.30	3.92	1.34	2.30	3.92	2.02	3.43	1.49	1.49	2.56	4.35
2014	0.96	1.70	2.96	1.36	2.40	4.18	1.36	2.40	4.18	2.11	3.67	1.51	1.51	2.67	4.64
2015	0.97	1.75	3.12	1.38	2.50	4.46	1.38	2.50	4.46	2.19	3.91	1.54	1.54	2.78	4.95
2016	0.97	1.80	3.29	1.40	2.59	4.73	1.40	2.59	4.73	2.27	4.15	1.55	1.55	2.88	5.26
2017*	0.97	1.85	3.47	1.42	2.69	5.04	1.42	2.69	5.04	2.36	4.42	1.57	1.57	2.99	5.59
2018*	0.98	1.90	3.65	1.44	2.80	5.36	1.44	2.80	5.36	2.45	4.70	1.59	1.59	3.10	5.95
2019*	0.98	1.95	3.83	1.45	2.90	5.68	1.45	2.90	5.68	2.54	4.98	1.61	1.61	3.21	6.31
2020*	0.98	2.01	4.04	1.47	3.01	6.05	1.47	3.01	6.05	2.64	5.30	1.63	1.63	3.34	6.71
2021*	0.99	2.07	4.26	1.48	3.11	6.41	1.48	3.11	6.41	2.73	5.62	1.65	1.65	3.45	7.12

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-1, continued. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

Census Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania)

YEAR	C O M M E R C I A L															
	ELECTRICITY			DISTILLATE FUEL			RESIDUAL FUEL			NATURAL GAS			STEAM COAL			
	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	0.99	1.02	1.04	1.07	1.01	1.04	1.06	1.09	1.04	1.07	1.10	1.12	1.02	1.05	1.07	1.10
1993	0.99	1.04	1.10	1.15	1.02	1.07	1.12	1.17	1.06	1.12	1.17	1.23	1.03	1.09	1.14	1.20
1994	1.00	1.08	1.16	1.24	1.02	1.09	1.18	1.26	1.09	1.17	1.26	1.35	1.04	1.12	1.20	1.29
1995	0.97	1.07	1.18	1.29	1.01	1.12	1.23	1.35	1.10	1.21	1.34	1.47	1.04	1.15	1.26	1.39
1996	0.95	1.07	1.21	1.36	1.01	1.15	1.29	1.46	1.10	1.24	1.40	1.58	1.04	1.18	1.33	1.49
1997	0.94	1.09	1.25	1.45	1.01	1.18	1.36	1.57	1.10	1.27	1.47	1.69	1.04	1.21	1.40	1.61
1998	0.93	1.11	1.31	1.54	1.02	1.22	1.44	1.70	1.10	1.31	1.55	1.83	1.05	1.25	1.48	1.75
1999	0.92	1.13	1.36	1.65	1.05	1.27	1.55	1.87	1.13	1.38	1.67	2.02	1.08	1.32	1.60	1.93
2000	0.93	1.16	1.44	1.78	1.07	1.34	1.67	2.06	1.16	1.45	1.81	2.23	1.12	1.40	1.74	2.15
2001	0.93	1.19	1.52	1.92	1.10	1.41	1.80	2.28	1.20	1.54	1.96	2.48	1.17	1.49	1.90	2.41
2002	0.93	1.22	1.59	2.06	1.14	1.50	1.95	2.53	1.25	1.63	2.13	2.76	1.23	1.61	2.10	2.72
2003	0.93	1.26	1.68	2.22	1.18	1.58	2.11	2.81	1.29	1.73	2.32	3.07	1.28	1.72	2.29	3.04
2004	0.93	1.29	1.76	2.39	1.21	1.67	2.29	3.11	1.33	1.83	2.51	3.41	1.31	1.81	2.48	3.36
2005	0.94	1.33	1.86	2.59	1.25	1.77	2.47	3.44	1.37	1.94	2.72	3.78	1.37	1.93	2.71	3.77
2006	0.94	1.37	1.96	2.79	1.28	1.85	2.66	3.79	1.41	2.04	2.93	4.17	1.41	2.04	2.93	4.18
2007	0.95	1.41	2.08	3.03	1.31	1.94	2.85	4.15	1.44	2.13	3.14	4.57	1.45	2.16	3.17	4.62
2008	0.95	1.45	2.18	3.25	1.33	2.02	3.04	4.53	1.46	2.22	3.34	4.98	1.48	2.25	3.39	5.06
2009	0.94	1.47	2.26	3.46	1.34	2.09	3.23	4.93	1.47	2.29	3.54	5.41	1.50	2.33	3.60	5.50
2010	0.95	1.52	2.41	3.76	1.35	2.16	3.42	5.35	1.48	2.37	3.75	5.86	1.53	2.45	3.87	6.05
2011	0.96	1.57	2.54	4.07	1.37	2.25	3.64	5.83	1.51	2.47	4.00	6.40	1.55	2.55	4.12	6.60
2012	0.96	1.61	2.68	4.39	1.40	2.35	3.90	6.40	1.54	2.58	4.28	7.01	1.58	2.66	4.42	7.24
2013	0.96	1.66	2.82	4.73	1.43	2.46	4.18	7.01	1.57	2.70	4.58	7.69	1.62	2.78	4.73	7.93
2014	0.97	1.70	2.97	5.10	1.45	2.56	4.46	7.66	1.59	2.81	4.89	8.40	1.64	2.90	5.05	8.67
2015	0.97	1.75	3.12	5.50	1.48	2.67	4.76	8.37	1.62	2.93	5.22	9.18	1.67	3.02	5.39	9.47
2016	0.97	1.81	3.30	5.94	1.49	2.77	5.05	9.10	1.64	3.03	5.54	9.98	1.69	3.13	5.72	10.29
2017*	0.98	1.86	3.47	6.40	1.51	2.87	5.38	9.91	1.66	3.15	5.89	10.87	1.71	3.25	6.08	11.21
2018*	0.98	1.91	3.65	6.90	1.53	2.98	5.72	10.79	1.68	3.27	6.27	11.83	1.73	3.37	6.47	12.21
2019*	0.98	1.96	3.84	7.43	1.55	3.09	6.07	11.72	1.70	3.39	6.65	12.85	1.75	3.49	6.86	13.26
2020*	0.98	2.01	4.04	8.00	1.57	3.21	6.45	12.76	1.72	3.52	7.07	13.99	1.77	3.63	7.30	14.44
2021*	0.99	2.07	4.27	8.65	1.58	3.32	6.84	13.86	1.74	3.64	7.50	15.20	1.79	3.76	7.74	15.68

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-2. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)

YEAR	RESIDENTIAL												
	ELECTRICITY			DISTILLATE FUEL			LIQUEFIED PETROLEUM GAS			NATURAL GAS			
	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.04	1.07	1.10	1.12	1.06	1.09	0.96	0.98	1.00	1.03	1.03	1.06	1.09
1993	1.03	1.08	1.13	1.19	1.07	1.12	0.94	0.99	1.04	1.09	1.05	1.10	1.16
1994	1.04	1.12	1.20	1.29	1.09	1.17	0.92	0.99	1.06	1.14	1.05	1.14	1.22
1995	1.06	1.17	1.29	1.41	1.12	1.23	0.89	0.99	1.09	1.20	1.05	1.16	1.28
1996	1.02	1.16	1.30	1.47	1.01	1.14	0.90	1.01	1.14	1.29	1.05	1.19	1.35
1997	1.00	1.15	1.33	1.54	1.01	1.17	0.90	1.04	1.20	1.38	1.06	1.23	1.42
1998	1.00	1.19	1.41	1.66	1.02	1.21	0.90	1.07	1.27	1.49	1.07	1.27	1.50
1999	1.01	1.23	1.49	1.80	1.04	1.27	0.92	1.12	1.36	1.64	1.10	1.34	1.63
2000	1.02	1.27	1.58	1.95	1.06	1.33	0.94	1.17	1.46	1.80	1.14	1.43	1.78
2001	1.02	1.30	1.66	2.10	1.09	1.39	0.96	1.23	1.57	1.98	1.19	1.53	1.95
2002	1.02	1.34	1.75	2.26	1.12	1.47	0.99	1.30	1.69	2.19	1.26	1.66	2.16
2003	1.03	1.39	1.85	2.46	1.15	1.55	1.02	1.37	1.83	2.42	1.31	1.77	2.36
2004	1.05	1.44	1.97	2.68	1.18	1.63	1.05	1.44	1.97	2.68	1.36	1.87	2.56
2005	1.06	1.50	2.11	2.93	1.21	1.71	1.07	1.52	2.13	2.95	1.42	2.00	2.80
2006	1.08	1.56	2.23	3.18	1.24	1.79	1.10	1.59	2.28	3.24	1.46	2.12	3.04
2007	1.08	1.61	2.37	3.45	1.26	1.87	1.12	1.66	2.44	3.55	1.51	2.24	3.30
2008	1.09	1.66	2.50	3.73	1.28	1.94	1.13	1.72	2.59	3.86	1.54	2.34	3.53
2009	1.10	1.71	2.64	4.04	1.29	2.02	1.14	1.78	2.75	4.20	1.56	2.43	3.75
2010	1.11	1.78	2.81	4.39	1.30	2.08	1.15	1.84	2.91	4.55	1.59	2.55	4.03
2011	1.12	1.83	2.97	4.75	1.32	2.16	1.17	1.92	3.10	4.97	1.62	2.65	4.29
2012	1.12	1.88	3.12	5.12	1.35	2.26	1.19	2.00	3.32	5.45	1.65	2.77	4.60
2013	1.12	1.94	3.29	5.52	1.37	2.37	1.22	2.09	3.56	5.97	1.68	2.90	4.92
2014	1.13	1.99	3.46	5.95	1.40	2.47	1.24	2.18	3.80	6.53	1.71	3.02	5.26
2015	1.13	2.04	3.64	6.41	1.42	2.57	1.26	2.27	4.05	7.13	1.74	3.15	5.61
2016	1.14	2.11	3.85	6.93	1.44	2.66	1.27	2.36	4.30	7.75	1.76	3.26	5.95
2017*	1.14	2.16	4.05	7.47	1.45	2.76	1.29	2.45	4.58	8.44	1.78	3.38	6.33
2018*	1.14	2.22	4.26	8.05	1.47	2.87	1.30	2.54	4.87	9.19	1.80	3.51	6.74
2019*	1.14	2.28	4.48	8.66	1.49	2.97	1.32	2.63	5.17	9.98	1.82	3.64	7.15
2020*	1.15	2.35	4.72	9.33	1.51	3.08	1.33	2.73	5.49	10.87	1.85	3.78	7.60
2021*	1.15	2.42	4.98	10.09	1.52	3.19	1.35	2.83	5.83	11.80	1.87	3.91	8.06

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-2, continued. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.
Census Region 2 (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas)

YEAR	ELECTRICITY						COMMERCIAL					
	DISTILLATE FUEL			RESIDUAL FUEL			NATURAL GAS			STEAM COAL		
	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.03	1.06	1.08	1.11	1.02	1.04	1.07	1.09	1.03	1.05	1.08	1.10
1993	1.01	1.06	1.11	1.17	1.02	1.07	1.12	1.18	1.04	1.10	1.15	1.21
1994	1.02	1.10	1.18	1.27	1.02	1.10	1.18	1.27	1.05	1.13	1.22	1.30
1995	1.02	1.13	1.24	1.37	1.01	1.12	1.23	1.36	1.05	1.16	1.28	1.40
1996	0.99	1.12	1.27	1.42	1.02	1.15	1.30	1.46	1.05	1.19	1.34	1.51
1997	0.94	1.09	1.27	1.46	1.02	1.18	1.36	1.57	1.06	1.23	1.42	1.63
1998	0.94	1.12	1.32	1.56	1.03	1.22	1.44	1.70	1.07	1.27	1.50	1.77
1999	0.94	1.14	1.39	1.68	1.05	1.28	1.55	1.88	1.11	1.35	1.63	1.97
2000	0.93	1.17	1.45	1.79	1.08	1.35	1.68	2.08	1.15	1.44	1.79	2.21
2001	0.93	1.19	1.51	1.91	1.12	1.43	1.82	2.30	1.21	1.55	1.97	2.49
2002	0.93	1.21	1.58	2.05	1.16	1.52	1.98	2.57	1.28	1.69	2.20	2.85
2003	0.93	1.25	1.67	2.22	1.20	1.61	2.16	2.86	1.34	1.81	2.41	3.20
2004	0.94	1.30	1.77	2.41	1.24	1.71	2.34	3.18	1.39	1.92	2.62	3.56
2005	0.95	1.34	1.88	2.62	1.28	1.81	2.54	3.53	1.46	2.06	2.89	4.02
2006	0.95	1.38	1.98	2.82	1.32	1.91	2.73	3.89	1.51	2.19	3.14	4.47
2007	0.96	1.43	2.10	3.06	1.35	2.00	2.94	4.28	1.56	2.32	3.42	4.98
2008	0.96	1.47	2.21	3.30	1.37	2.08	3.13	4.68	1.60	2.43	3.66	5.46
2009	0.97	1.51	2.32	3.55	1.39	2.16	3.34	5.10	1.62	2.52	3.89	5.95
2010*	0.97	1.56	2.46	3.85	1.40	2.24	3.54	5.53	1.66	2.65	4.20	6.56
2011	0.98	1.61	2.60	4.16	1.42	2.33	3.77	6.03	1.68	2.76	4.47	7.16
2012	0.98	1.65	2.74	4.49	1.45	2.43	4.03	6.61	1.72	2.89	4.79	7.85
2013	0.99	1.70	2.88	4.84	1.48	2.54	4.32	7.25	1.75	3.02	5.13	8.60
2014	0.99	1.74	3.04	5.22	1.50	2.65	4.61	7.92	1.78	3.14	5.47	9.40
2015	0.99	1.79	3.20	5.62	1.53	2.76	4.92	8.66	1.81	3.28	5.84	10.27
2016	1.00	1.85	3.38	6.08	1.54	2.86	5.22	9.41	1.83	3.39	6.20	11.16
2017*	1.00	1.90	3.55	6.55	1.56	2.97	5.56	10.24	1.85	3.52	6.60	12.16
2018*	1.00	1.95	3.74	7.06	1.58	3.08	5.91	11.16	1.88	3.66	7.02	13.24
2019*	1.00	2.00	3.93	7.60	1.60	3.19	6.27	12.12	1.90	3.79	7.44	14.38
2020*	1.01	2.06	4.14	8.19	1.62	3.32	6.67	13.19	1.92	3.93	7.91	15.66
2021*	1.01	2.12	4.37	8.85	1.64	3.43	7.07	14.33	1.94	4.07	8.39	17.00

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-3. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

YEAR	ELECTRICITY			RESIDENTIAL						LIQUEFIED PETROLEUM GAS			NATURAL GAS		
	0%	2.5%	5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.01	1.03	1.06	1.01	1.04	1.06	1.09	0.96	0.99	1.01	1.04	1.02	1.04	1.07	1.09
1993	1.02	1.07	1.12	1.01	1.06	1.12	1.17	0.95	1.00	1.05	1.10	1.03	1.08	1.14	1.19
1994	1.03	1.11	1.20	1.01	1.09	1.17	1.26	0.93	1.01	1.08	1.16	1.04	1.12	1.20	1.29
1995	1.02	1.12	1.23	1.01	1.12	1.23	1.35	0.92	1.01	1.11	1.22	1.04	1.14	1.26	1.38
1996	0.99	1.12	1.26	1.01	1.14	1.29	1.45	0.92	1.04	1.17	1.31	1.04	1.17	1.32	1.49
1997	0.99	1.15	1.33	1.01	1.17	1.36	1.56	0.92	1.06	1.23	1.41	1.04	1.21	1.39	1.61
1998	0.97	1.15	1.36	1.02	1.21	1.43	1.69	0.92	1.09	1.30	1.53	1.05	1.25	1.48	1.74
1999	0.97	1.19	1.44	1.04	1.26	1.53	1.85	0.94	1.14	1.38	1.67	1.08	1.32	1.59	1.93
2000	0.99	1.23	1.53	1.06	1.32	1.64	2.03	0.95	1.19	1.48	1.83	1.12	1.39	1.73	2.14
2001	0.99	1.27	1.62	1.08	1.39	1.76	2.23	0.97	1.24	1.58	2.00	1.16	1.48	1.89	2.39
2002	1.01	1.32	1.72	1.11	1.46	1.90	2.47	0.99	1.30	1.70	2.20	1.22	1.60	2.08	2.70
2003	1.02	1.37	1.82	1.14	1.54	2.05	2.72	1.02	1.37	1.83	2.42	1.27	1.70	2.27	3.01
2004	1.02	1.41	1.93	1.17	1.61	2.21	3.00	1.04	1.43	1.96	2.66	1.30	1.79	2.45	3.33
2005	1.03	1.46	2.05	1.20	1.69	2.37	3.30	1.06	1.50	2.11	2.93	1.36	1.92	2.68	3.73
2006	1.04	1.51	2.17	1.22	1.77	2.54	3.62	1.08	1.57	2.25	3.20	1.40	2.02	2.91	4.13
2007	1.05	1.56	2.29	1.24	1.85	2.71	3.95	1.10	1.63	2.40	3.50	1.44	2.14	3.14	4.58
2008	1.05	1.60	2.41	1.26	1.92	2.89	4.31	1.11	1.69	2.55	3.80	1.46	2.23	3.36	5.01
2009	1.06	1.65	2.54	1.27	1.98	3.06	4.68	1.12	1.75	2.70	4.12	1.48	2.31	3.56	5.44
2010	1.06	1.70	2.69	1.28	2.05	3.24	5.06	1.13	1.81	2.86	4.46	1.51	2.42	3.83	5.98
2011	1.07	1.76	2.84	1.30	2.13	3.45	5.52	1.15	1.88	3.04	4.87	1.54	2.52	4.08	6.52
2012	1.07	1.81	2.99	1.33	2.23	3.69	6.06	1.17	1.96	3.26	5.34	1.57	2.63	4.37	7.16
2013	1.08	1.86	3.15	1.35	2.33	3.96	6.64	1.19	2.05	3.49	5.85	1.60	2.75	4.67	7.84
2014	1.08	1.91	3.32	1.37	2.43	4.22	7.26	1.21	2.14	3.72	6.40	1.62	2.87	4.99	8.57
2015	1.08	1.96	3.49	1.40	2.53	4.51	7.93	1.23	2.23	3.97	6.99	1.65	2.99	5.32	9.37
2016	1.09	2.02	3.69	1.41	2.62	4.78	8.61	1.25	2.31	4.22	7.60	1.67	3.09	5.65	10.18
2017*	1.09	2.08	3.88	1.43	2.72	5.09	9.38	1.26	2.40	4.49	8.27	1.69	3.21	6.01	11.09
2018*	1.09	2.13	4.09	1.45	2.82	5.41	10.22	1.28	2.49	4.77	9.01	1.71	3.34	6.40	12.07
2019*	1.10	2.19	4.30	1.46	2.92	5.74	11.10	1.29	2.58	5.06	9.79	1.73	3.46	6.78	13.11
2020*	1.10	2.25	4.52	1.48	3.04	6.11	12.08	1.31	2.68	5.39	10.65	1.75	3.59	7.22	14.28
2021*	1.11	2.32	4.78	1.50	3.14	6.48	13.12	1.32	2.77	5.71	11.57	1.77	3.71	7.65	15.50

* Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-3, continued. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

Census Region 3 (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

YEAR	COMMERICAL																			
	ELECTRICITY			DISTILLATE FUEL			RESIDUAL FUEL			NATURAL GAS			STEAM COAL							
	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%				
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
1992	1.00	1.03	1.05	1.08	1.02	1.04	1.07	1.09	1.05	1.08	1.10	1.13	1.04	1.07	1.09	1.12	1.02	1.05	1.07	1.10
1993	1.01	1.06	1.11	1.17	1.02	1.07	1.12	1.18	1.08	1.13	1.19	1.24	1.06	1.11	1.17	1.22	1.06	1.11	1.16	1.22
1994	1.03	1.11	1.19	1.28	1.02	1.10	1.18	1.26	1.10	1.19	1.28	1.37	1.06	1.15	1.23	1.32	1.08	1.16	1.25	1.34
1995	1.01	1.11	1.23	1.35	1.01	1.12	1.23	1.36	1.12	1.24	1.36	1.50	1.06	1.17	1.29	1.42	1.08	1.19	1.31	1.44
1996	0.99	1.12	1.26	1.42	1.02	1.15	1.30	1.46	1.12	1.26	1.43	1.60	1.06	1.20	1.36	1.53	1.09	1.23	1.39	1.57
1997	0.98	1.13	1.31	1.51	1.02	1.18	1.36	1.57	1.11	1.29	1.49	1.72	1.07	1.24	1.43	1.65	1.11	1.28	1.48	1.71
1998	0.97	1.15	1.36	1.60	1.02	1.22	1.44	1.70	1.12	1.33	1.58	1.86	1.08	1.28	1.52	1.79	1.12	1.33	1.58	1.86
1999	0.97	1.18	1.43	1.73	1.05	1.28	1.55	1.88	1.16	1.41	1.71	2.06	1.12	1.36	1.65	1.99	1.14	1.38	1.68	2.02
2000	0.97	1.21	1.51	1.86	1.08	1.35	1.68	2.08	1.20	1.49	1.86	2.29	1.16	1.45	1.80	2.23	1.16	1.45	1.80	2.23
2001	0.97	1.25	1.59	2.01	1.12	1.43	1.82	2.31	1.24	1.59	2.02	2.56	1.22	1.56	1.98	2.50	1.18	1.51	1.92	2.42
2002	0.98	1.29	1.68	2.17	1.16	1.52	1.98	2.57	1.29	1.70	2.21	2.87	1.29	1.69	2.20	2.85	1.20	1.57	2.05	2.66
2003	0.99	1.33	1.77	2.35	1.20	1.62	2.16	2.86	1.35	1.81	2.42	3.20	1.34	1.81	2.41	3.20	1.24	1.67	2.23	2.95
2004	0.99	1.36	1.86	2.53	1.24	1.71	2.34	3.18	1.40	1.92	2.63	3.57	1.39	1.91	2.62	3.55	1.28	1.77	2.42	3.29
2005	1.00	1.41	1.98	2.75	1.28	1.81	2.54	3.53	1.45	2.04	2.86	3.98	1.45	2.06	2.88	4.00	1.30	1.84	2.58	3.59
2006	1.00	1.45	2.08	2.97	1.32	1.91	2.74	3.90	1.49	2.15	3.09	4.40	1.50	2.18	3.13	4.45	1.32	1.92	2.75	3.92
2007	1.01	1.50	2.20	3.21	1.35	2.00	2.94	4.28	1.52	2.26	3.32	4.84	1.56	2.31	3.40	4.95	1.35	2.00	2.94	4.28
2008	1.01	1.53	2.31	3.45	1.37	2.08	3.14	4.68	1.54	2.35	3.54	5.28	1.59	2.41	3.64	5.43	1.36	2.07	3.12	4.66
2009	1.01	1.57	2.43	3.71	1.39	2.17	3.34	5.11	1.56	2.44	3.76	5.74	1.61	2.50	3.86	5.90	1.39	2.16	3.34	5.10
2010	1.02	1.63	2.57	4.02	1.40	2.24	3.54	5.54	1.58	2.52	3.99	6.23	1.65	2.63	4.16	6.51	1.43	2.28	3.60	5.63
2011	1.02	1.68	2.72	4.35	1.42	2.33	3.77	6.04	1.60	2.62	4.25	6.80	1.67	2.74	4.43	7.10	1.43	2.35	3.80	6.09
2012	1.03	1.72	2.86	4.69	1.45	2.44	4.04	6.62	1.63	2.74	4.55	7.46	1.70	2.86	4.75	7.78	1.44	2.42	4.01	6.58
2013	1.03	1.77	3.01	5.05	1.48	2.55	4.33	7.26	1.67	2.87	4.87	8.18	1.74	2.99	5.09	8.53	1.45	2.49	4.23	7.10
2014	1.03	1.82	3.17	5.45	1.50	2.65	4.62	7.94	1.69	2.99	5.20	8.93	1.77	3.12	5.43	9.33	1.45	2.57	4.47	7.68
2015	1.03	1.87	3.34	5.87	1.53	2.76	4.93	8.67	1.72	3.11	5.55	9.76	1.80	3.25	5.79	10.19	1.46	2.64	4.71	8.29
2016	1.04	1.93	3.52	6.35	1.54	2.86	5.23	9.42	1.74	3.22	5.89	10.61	1.82	3.37	6.15	11.07	1.47	2.72	4.97	8.96
2017*	1.04	1.98	3.71	6.84	1.57	2.97	5.57	10.26	1.76	3.35	6.27	11.55	1.84	3.50	6.54	12.06	1.48	2.80	5.25	9.68
2018*	1.05	2.04	3.90	7.37	1.59	3.09	5.92	11.18	1.79	3.48	6.67	12.58	1.86	3.63	6.96	13.13	1.48	2.89	5.54	10.45
2019*	1.05	2.09	4.10	7.93	1.60	3.20	6.28	12.14	1.80	3.60	7.07	13.67	1.88	3.76	7.38	14.26	1.49	2.98	5.84	11.29
2020*	1.05	2.15	4.32	8.55	1.62	3.32	6.68	13.21	1.83	3.74	7.52	14.88	1.91	3.90	7.85	15.53	1.50	3.06	6.16	12.20
2021*	1.06	2.21	4.56	9.24	1.64	3.44	7.08	14.35	1.85	3.87	7.98	16.16	1.93	4.04	8.32	16.86	1.50	3.16	6.50	13.17

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-4. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.
Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)

YEAR	RESIDENTIAL												
	ELECTRICITY			DISTILLATE FUEL			LIQUEFIED PETROLEUM GAS			NATURAL GAS			
	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.00	1.03	1.05	1.08	1.06	1.09	0.97	0.99	1.01	1.04	1.00	1.03	1.08
1993	1.00	1.05	1.11	1.16	1.06	1.12	0.95	1.00	1.05	1.10	1.01	1.07	1.17
1994	1.01	1.08	1.17	1.25	1.09	1.17	0.94	1.01	1.09	1.17	1.02	1.10	1.27
1995	1.02	1.12	1.24	1.36	1.01	1.12	0.92	1.02	1.12	1.23	1.02	1.13	1.36
1996	1.01	1.14	1.29	1.45	1.01	1.14	0.92	1.04	1.17	1.32	1.02	1.15	1.46
1997	1.02	1.18	1.36	1.57	1.01	1.17	0.92	1.07	1.23	1.42	1.02	1.19	1.58
1998	1.01	1.21	1.43	1.68	1.02	1.21	0.93	1.10	1.30	1.54	1.03	1.23	1.71
1999	1.02	1.25	1.51	1.82	1.04	1.27	0.94	1.14	1.39	1.68	1.06	1.30	1.90
2000	1.03	1.28	1.59	1.97	1.06	1.33	0.96	1.19	1.48	1.83	1.10	1.38	2.11
2001	1.04	1.34	1.70	2.15	1.09	1.39	0.97	1.25	1.59	2.01	1.15	1.47	2.36
2002	1.05	1.38	1.80	2.34	1.12	1.47	1.00	1.31	1.70	2.21	1.21	1.58	2.67
2003	1.06	1.43	1.91	2.53	1.15	1.54	1.02	1.37	1.83	2.42	1.25	1.69	2.99
2004	1.08	1.49	2.03	2.76	1.18	1.62	1.04	1.43	1.96	2.66	1.29	1.78	3.31
2005	1.08	1.53	2.14	2.97	1.21	1.71	1.06	1.50	2.10	2.92	1.35	1.90	3.71
2006	1.09	1.59	2.28	3.24	1.23	1.79	1.08	1.56	2.24	3.19	1.39	2.01	4.11
2007	1.10	1.64	2.41	3.51	1.26	1.86	1.09	1.62	2.39	3.48	1.43	2.13	4.55
2008	1.11	1.69	2.54	3.79	1.27	1.94	1.10	1.68	2.53	3.78	1.46	2.22	4.99
2009	1.11	1.74	2.68	4.09	1.29	2.01	1.11	1.74	2.68	4.10	1.47	2.30	5.42
2010	1.11	1.78	2.81	4.39	1.30	2.07	1.12	1.79	2.84	4.44	1.51	2.41	5.96
2011	1.12	1.83	2.97	4.75	1.31	2.15	1.14	1.87	3.02	4.84	1.53	2.51	6.50
2012	1.12	1.88	3.13	5.12	1.34	2.25	1.16	1.95	3.24	5.31	1.56	2.62	7.13
2013	1.13	1.94	3.29	5.52	1.37	2.35	1.18	2.04	3.47	5.82	1.59	2.74	7.82
2014	1.13	1.99	3.46	5.95	1.39	2.45	1.20	2.13	3.70	6.36	1.62	2.86	8.54
2015	1.13	2.05	3.65	6.42	1.41	2.56	1.22	2.21	3.95	6.94	1.65	2.98	9.33
2016	1.14	2.11	3.85	6.94	1.43	2.65	1.24	2.29	4.19	7.55	1.66	3.08	10.14
2017*	1.14	2.17	4.05	7.47	1.45	2.75	1.25	2.38	4.46	8.22	1.69	3.20	11.05
2018*	1.14	2.23	4.27	8.05	1.47	2.85	1.27	2.47	4.74	8.95	1.71	3.33	12.03
2019*	1.14	2.28	4.49	8.67	1.48	2.96	1.28	2.56	5.03	9.72	1.72	3.44	13.07
2020*	1.15	2.35	4.72	9.34	1.50	3.07	1.30	2.66	5.35	10.58	1.75	3.57	14.23
2021*	1.15	2.42	4.98	10.10	1.51	3.18	1.31	2.75	5.67	11.49	1.76	3.70	15.45

* Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-4, continued. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

Census Region 4 (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii)

YEAR	C O M M E R C I A L															
	ELECTRICITY			DISTILLATE FUEL			RESIDUAL FUEL			NATURAL GAS			STEAM COAL			
	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	0.99	1.02	1.04	1.07	1.02	1.04	1.07	1.09	1.04	1.06	1.09	1.12	1.02	1.05	1.07	1.10
1993	0.99	1.04	1.09	1.14	1.02	1.07	1.12	1.18	1.06	1.11	1.16	1.22	1.04	1.09	1.15	1.20
1994	0.98	1.06	1.14	1.22	1.02	1.10	1.18	1.27	1.07	1.16	1.24	1.34	1.05	1.13	1.21	1.30
1995	0.98	1.08	1.19	1.31	1.02	1.12	1.23	1.36	1.09	1.20	1.32	1.45	1.05	1.15	1.27	1.40
1996	0.98	1.10	1.24	1.40	1.02	1.15	1.30	1.46	1.09	1.23	1.39	1.56	1.05	1.18	1.33	1.50
1997	0.97	1.13	1.30	1.50	1.02	1.18	1.36	1.57	1.08	1.26	1.45	1.67	1.05	1.22	1.41	1.62
1998	0.96	1.14	1.35	1.60	1.03	1.22	1.44	1.70	1.09	1.30	1.53	1.81	1.06	1.26	1.49	1.76
1999	0.96	1.18	1.43	1.72	1.05	1.28	1.56	1.88	1.12	1.36	1.65	1.99	1.10	1.34	1.62	1.96
2000	0.96	1.20	1.50	1.85	1.09	1.36	1.68	2.08	1.14	1.43	1.78	2.19	1.14	1.43	1.77	2.19
2001	0.97	1.25	1.59	2.01	1.12	1.44	1.83	2.31	1.18	1.51	1.92	2.43	1.19	1.53	1.94	2.46
2002	0.98	1.29	1.68	2.17	1.16	1.53	1.99	2.58	1.22	1.59	2.08	2.69	1.26	1.66	2.16	2.80
2003	0.99	1.33	1.77	2.35	1.21	1.62	2.17	2.88	1.25	1.69	2.25	2.99	1.32	1.78	2.37	3.15
2004	1.00	1.37	1.88	2.55	1.25	1.72	2.36	3.20	1.29	1.78	2.43	3.30	1.36	1.88	2.57	3.49
2005	1.00	1.42	1.98	2.76	1.29	1.82	2.56	3.55	1.33	1.88	2.63	3.65	1.43	2.02	2.83	3.93
2006	1.01	1.47	2.11	3.00	1.33	1.92	2.76	3.92	1.36	1.97	2.82	4.02	1.48	2.14	3.07	4.37
2007	1.02	1.52	2.23	3.25	1.36	2.01	2.96	4.32	1.38	2.05	3.02	4.40	1.53	2.27	3.33	4.86
2008	1.03	1.56	2.35	3.51	1.38	2.10	3.16	4.72	1.40	2.13	3.21	4.79	1.56	2.37	3.57	5.33
2009	1.03	1.60	2.48	3.78	1.40	2.18	3.37	5.14	1.41	2.20	3.40	5.19	1.58	2.46	3.80	5.80
2010	1.03	1.64	2.60	4.06	1.41	2.26	3.57	5.58	1.42	2.28	3.60	5.63	1.62	2.59	4.09	6.39
2011	1.03	1.70	2.75	4.40	1.43	2.35	3.80	6.09	1.44	2.37	3.83	6.14	1.64	2.69	4.35	6.97
2012	1.04	1.74	2.89	4.74	1.46	2.46	4.07	6.68	1.47	2.48	4.11	6.73	1.67	2.81	4.66	7.65
2013	1.04	1.79	3.05	5.11	1.49	2.57	4.36	7.32	1.50	2.59	4.40	7.38	1.71	2.94	4.99	8.38
2014	1.04	1.84	3.21	5.51	1.52	2.67	4.66	8.00	1.53	2.70	4.69	8.06	1.74	3.06	5.33	9.16
2015	1.05	1.89	3.38	5.94	1.54	2.79	4.97	8.74	1.55	2.81	5.01	8.81	1.76	3.19	5.69	10.01
2016	1.05	1.95	3.56	6.42	1.56	2.89	5.27	9.49	1.57	2.91	5.32	9.57	1.78	3.31	6.04	10.87
2017*	1.05	2.00	3.75	6.92	1.58	3.00	5.61	10.34	1.59	3.02	5.66	10.43	1.81	3.43	6.42	11.84
2018*	1.06	2.06	3.95	7.45	1.60	3.11	5.97	11.26	1.61	3.14	6.02	11.36	1.83	3.57	6.83	12.90
2019*	1.06	2.11	4.15	8.02	1.61	3.22	6.33	12.23	1.63	3.25	6.38	12.33	1.85	3.69	7.25	14.01
2020*	1.06	2.17	4.37	8.64	1.64	3.35	6.73	13.32	1.65	3.37	6.79	13.43	1.87	3.83	7.71	15.25
2021*	1.07	2.24	4.61	9.34	1.65	3.47	7.14	14.46	1.67	3.49	7.20	14.58	1.89	3.97	8.18	16.56

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-5. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.
United States Average

YEAR	RESIDENTIAL												
	ELECTRICITY			DISTILLATE FUEL			LIQUEFIED PETROLEUM GAS			NATURAL GAS			
	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	0%	2.5%	5%	7.5%
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.01	1.04	1.06	1.01	1.04	1.06	1.09	0.96	0.99	1.01	1.03	1.02	1.04
1993	1.01	1.07	1.12	1.01	1.06	1.12	1.17	0.95	1.00	1.05	1.10	1.03	1.08
1994	1.03	1.11	1.19	1.01	1.09	1.17	1.26	0.93	1.00	1.08	1.16	1.03	1.11
1995	1.02	1.13	1.24	1.01	1.12	1.23	1.35	0.91	1.00	1.10	1.21	1.03	1.14
1996	1.00	1.13	1.27	1.01	1.14	1.29	1.45	0.91	1.03	1.16	1.31	1.03	1.17
1997	0.99	1.15	1.33	1.01	1.17	1.36	1.56	0.91	1.06	1.22	1.40	1.04	1.21
1998	0.98	1.16	1.38	1.02	1.21	1.43	1.69	0.91	1.09	1.29	1.52	1.05	1.24
1999	0.98	1.20	1.45	1.04	1.26	1.53	1.85	0.93	1.13	1.38	1.66	1.08	1.31
2000	0.99	1.24	1.54	1.06	1.32	1.64	2.03	0.95	1.18	1.47	1.82	1.12	1.39
2001	1.00	1.28	1.63	1.08	1.38	1.76	2.23	0.97	1.24	1.58	2.00	1.16	1.48
2002	1.01	1.32	1.72	1.11	1.46	1.90	2.46	0.99	1.30	1.70	2.20	1.22	1.60
2003	1.02	1.37	1.82	1.14	1.53	2.04	2.71	1.02	1.37	1.83	2.43	1.27	1.70
2004	1.02	1.41	1.93	1.17	1.61	2.20	2.99	1.04	1.44	1.97	2.67	1.30	1.80
2005	1.04	1.46	2.05	1.19	1.69	2.37	3.29	1.07	1.51	2.11	2.94	1.36	1.92
2006	1.04	1.51	2.17	1.22	1.76	2.53	3.60	1.09	1.58	2.26	3.22	1.40	2.03
2007	1.05	1.56	2.29	1.24	1.84	2.70	3.94	1.11	1.64	2.41	3.52	1.44	2.14
2008	1.05	1.60	2.42	1.25	1.91	2.87	4.29	1.12	1.70	2.56	3.82	1.47	2.23
2009	1.06	1.65	2.54	1.27	1.98	3.05	4.66	1.13	1.76	2.72	4.15	1.48	2.31
2010	1.06	1.70	2.69	1.28	2.04	3.22	5.04	1.14	1.82	2.88	4.50	1.52	2.42
2011	1.07	1.75	2.84	1.29	2.12	3.43	5.50	1.15	1.89	3.06	4.90	1.54	2.52
2012	1.07	1.80	2.99	1.32	2.22	3.68	6.03	1.18	1.98	3.28	5.38	1.57	2.64
2013	1.08	1.85	3.15	1.35	2.32	3.94	6.61	1.20	2.07	3.51	5.90	1.60	2.76
2014	1.08	1.90	3.31	1.37	2.42	4.20	7.22	1.22	2.15	3.75	6.44	1.63	2.87
2015	1.08	1.96	3.49	1.39	2.52	4.49	7.89	1.24	2.24	4.00	7.04	1.65	2.99
2016	1.09	2.02	3.68	1.41	2.61	4.76	8.57	1.25	2.33	4.25	7.65	1.67	3.10
2017*	1.09	2.07	3.88	1.42	2.71	5.07	9.34	1.27	2.42	4.52	8.33	1.69	3.22
2018*	1.09	2.13	4.08	1.44	2.81	5.39	10.17	1.29	2.51	4.81	9.07	1.72	3.34
2019*	1.09	2.19	4.29	1.46	2.91	5.72	11.05	1.30	2.60	5.10	9.86	1.73	3.46
2020*	1.10	2.24	4.51	1.48	3.02	6.08	12.03	1.32	2.70	5.42	10.73	1.76	3.59
2021*	1.10	2.31	4.77	1.49	3.13	6.45	13.06	1.33	2.79	5.75	11.65	1.77	3.72

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

Table S-5, continued. Projected average fuel price indices with assumed general price inflation rates of 0, 2.5, 5, and 7.5 percent, by end-use sector and major fuel.

United States Average

YEAR	COMMERCIAL																				
	ELECTRICITY				DISTILLATE FUEL				RESIDUAL FUEL				NATURAL GAS				STEAM COAL				
	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	0%	2.5%	5%	7.5%	
1991	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1992	1.01	1.03	1.06	1.08	1.02	1.04	1.07	1.09	1.05	1.07	1.10	1.12	1.03	1.05	1.08	1.11	1.02	1.04	1.07	1.10	1.10
1993	1.00	1.05	1.10	1.16	1.02	1.07	1.12	1.18	1.07	1.12	1.18	1.23	1.04	1.10	1.15	1.21	1.05	1.10	1.16	1.22	1.22
1994	1.01	1.09	1.17	1.26	1.02	1.10	1.18	1.27	1.09	1.17	1.26	1.35	1.05	1.13	1.22	1.31	1.07	1.16	1.24	1.33	1.33
1995	0.99	1.10	1.21	1.33	1.02	1.12	1.23	1.36	1.11	1.22	1.34	1.48	1.05	1.16	1.28	1.40	1.08	1.19	1.31	1.44	1.44
1996	0.97	1.10	1.24	1.40	1.02	1.15	1.30	1.46	1.10	1.25	1.41	1.58	1.05	1.19	1.34	1.51	1.08	1.23	1.38	1.56	1.56
1997	0.96	1.11	1.28	1.48	1.02	1.18	1.36	1.57	1.10	1.28	1.48	1.70	1.06	1.23	1.42	1.63	1.10	1.27	1.47	1.69	1.69
1998	0.95	1.13	1.33	1.57	1.03	1.22	1.44	1.70	1.11	1.32	1.56	1.84	1.07	1.27	1.50	1.77	1.11	1.32	1.56	1.84	1.84
1999	0.95	1.15	1.40	1.69	1.05	1.28	1.56	1.88	1.14	1.39	1.68	2.03	1.10	1.35	1.63	1.97	1.13	1.37	1.67	2.01	2.01
2000	0.95	1.18	1.47	1.82	1.08	1.35	1.68	2.08	1.17	1.47	1.82	2.25	1.15	1.43	1.78	2.20	1.15	1.44	1.79	2.21	2.21
2001	0.95	1.21	1.54	1.95	1.12	1.43	1.82	2.30	1.21	1.55	1.98	2.50	1.20	1.54	1.95	2.47	1.16	1.49	1.90	2.40	2.40
2002	0.95	1.25	1.63	2.11	1.16	1.52	1.98	2.56	1.26	1.65	2.15	2.79	1.27	1.67	2.17	2.82	1.18	1.55	2.03	2.62	2.62
2003	0.96	1.28	1.72	2.27	1.20	1.61	2.15	2.85	1.30	1.75	2.34	3.11	1.33	1.78	2.38	3.16	1.21	1.63	2.18	2.89	2.89
2004	0.96	1.32	1.81	2.46	1.24	1.70	2.33	3.16	1.35	1.86	2.54	3.45	1.37	1.89	2.58	3.51	1.25	1.72	2.35	3.19	3.19
2005	0.97	1.37	1.92	2.66	1.27	1.80	2.52	3.51	1.39	1.97	2.76	3.84	1.43	2.03	2.84	3.95	1.26	1.78	2.49	3.46	3.46
2006	0.97	1.41	2.02	2.88	1.31	1.89	2.72	3.87	1.43	2.07	2.97	4.23	1.48	2.15	3.09	4.39	1.27	1.84	2.64	3.76	3.76
2007	0.98	1.45	2.14	3.11	1.34	1.98	2.92	4.25	1.46	2.17	3.19	4.64	1.53	2.28	3.35	4.88	1.28	1.91	2.80	4.09	4.09
2008	0.98	1.49	2.25	3.35	1.36	2.07	3.11	4.64	1.48	2.25	3.39	5.06	1.56	2.38	3.59	5.35	1.30	1.98	2.98	4.45	4.45
2009	0.98	1.53	2.36	3.60	1.38	2.15	3.31	5.06	1.50	2.33	3.60	5.50	1.58	2.47	3.81	5.82	1.32	2.05	3.17	4.84	4.84
2010	0.99	1.58	2.49	3.90	1.39	2.22	3.51	5.49	1.51	2.41	3.81	5.97	1.62	2.60	4.10	6.41	1.35	2.15	3.40	5.32	5.32
2011	0.99	1.63	2.63	4.21	1.41	2.31	3.74	5.98	1.53	2.51	4.06	6.51	1.65	2.70	4.37	7.00	1.35	2.22	3.59	5.74	5.74
2012	1.00	1.67	2.77	4.54	1.44	2.41	4.00	6.56	1.56	2.62	4.35	7.14	1.68	2.82	4.68	7.67	1.36	2.28	3.79	6.20	6.20
2013	1.00	1.72	2.92	4.90	1.47	2.52	4.29	7.19	1.59	2.74	4.66	7.82	1.71	2.95	5.01	8.41	1.37	2.35	3.99	6.70	6.70
2014	1.00	1.77	3.07	5.28	1.49	2.63	4.58	7.86	1.62	2.86	4.98	8.55	1.74	3.07	5.35	9.19	1.37	2.42	4.21	7.24	7.24
2015	1.00	1.81	3.24	5.69	1.51	2.74	4.88	8.59	1.65	2.98	5.31	9.34	1.77	3.20	5.71	10.04	1.38	2.49	4.45	7.82	7.82
2016	1.01	1.87	3.42	6.15	1.53	2.84	5.18	9.33	1.66	3.09	5.64	10.15	1.79	3.32	6.06	10.91	1.39	2.57	4.69	8.45	8.45
2017*	1.01	1.92	3.60	6.63	1.55	2.95	5.51	10.17	1.69	3.20	6.00	11.05	1.81	3.45	6.45	11.89	1.39	2.65	4.95	9.13	9.13
2018*	1.01	1.97	3.78	7.14	1.57	3.06	5.87	11.07	1.71	3.33	6.38	12.04	1.84	3.58	6.86	12.95	1.40	2.73	5.22	9.86	9.86
2019*	1.02	2.03	3.98	7.69	1.59	3.17	6.22	12.03	1.73	3.45	6.77	13.08	1.86	3.71	7.28	14.06	1.41	2.81	5.51	10.65	10.65
2020*	1.02	2.08	4.19	8.29	1.61	3.29	6.62	13.09	1.75	3.58	7.19	14.24	1.88	3.85	7.74	15.31	1.41	2.89	5.82	11.51	11.51
2021*	1.02	2.15	4.42	8.96	1.62	3.41	7.02	14.22	1.77	3.70	7.63	15.46	1.90	3.98	8.21	16.62	1.42	2.98	6.14	12.43	12.43

*Indices are reported for years 2017-2021 to accommodate a planning/construction period of up to 5 years.

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10. SUPPLEMENTARY NOTES

This report is comprised of energy price and discount factor tables which are annual updates of tables referenced in NIST Handbook 135 and NBS Special Publication 709. Only minor changes have been made to this previously WERB-approved material.

11. ABSTRACT (A 200-WORD OR LESS FACTUAL SUMMARY OF MOST SIGNIFICANT INFORMATION. IF DOCUMENT INCLUDES A SIGNIFICANT BIBLIOGRAPHY OR LITERATURE SURVEY, MENTION IT HERE.)

This is the 1992 annual edition of energy prices and discount factors for performing life-cycle cost analyses of energy conservation and renewable energy projects. It supports the Federal life-cycle costing methodology by updating the energy price projections and discount factors that are described, explained, and illustrated in NIST Handbook 135 (HB 135). It supports private-sector life-cycle cost analysis by updating the energy price indices that are described, explained, and illustrated in NBS Special Publication 709 (SP 709). It also supports the Energy Conservation Mandatory Performance Standards for New Federal Residential Buildings (10 CFR 435) by providing a table of factors for updating appliance label values.

12. KEY WORDS (6 TO 12 ENTRIES; ALPHABETICAL ORDER; CAPITALIZE ONLY PROPER NAMES; AND SEPARATE KEY WORDS BY SEMICOLONS)

average fuel prices; energy conservation; energy price forecasts; Federal Energy Management Program; life-cycle cost analysis; single present worth discount factors; uniform present worth discount factors

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