

**Annex 2F. Use of ODS Substitutes (IPCC 2F)
to the Technical Support Document for California's Greenhouse Gas Emissions
Inventory and the 1990 Emissions Level**

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Variables Used in the Emissions Estimation Equations

Values last updated on Monday, November 19, 2007

IPCC category = 2F — Product Uses as Substitutes for Ozone Depleting Substances

► **Sector = Not Specified Not Specified >**

Activity = Use of substitutes for ozone depleting substances - CF4

<i>- Variable Name -</i>	<i>- Year -</i>	<i>- Value and Units -</i>	<i>- Reference -</i>
Use of substitutes for ozone depleting substances - CF4	1990	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1991	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1992	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1993	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1994	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1995	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1996	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1997	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1998	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	1999	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	2000	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	2001	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	2002	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	2003	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - CF4	2004	Not used in estimates	None, see text
Ratio of California to US population	1990	0.12	USCB, various years a
Ratio of California to US population	1991	0.121	USCB, various years a
Ratio of California to US population	1992	0.121	USCB, various years a
Ratio of California to US population	1993	0.121	USCB, various years a
Ratio of California to US population	1994	0.12	USCB, various years a
Ratio of California to US population	1995	0.12	USCB, various years a
Ratio of California to US population	1996	0.12	USCB, various years a
Ratio of California to US population	1997	0.12	USCB, various years a
Ratio of California to US population	1998	0.121	USCB, various years a
Ratio of California to US population	1999	0.122	USCB, various years a
Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a
Ratio of California to US population	2004	0.122	USCB, various years a
US emissions from ODS substitutes	1990	0 g	Godwin, 2007
US emissions from ODS substitutes	1991	0 g	Godwin, 2007
US emissions from ODS substitutes	1992	0 g	Godwin, 2007
US emissions from ODS substitutes	1993	0 g	Godwin, 2007
US emissions from ODS substitutes	1994	0 g	Godwin, 2007

US emissions from ODS substitutes	1995	0 g	Godwin, 2007
US emissions from ODS substitutes	1996	0 g	Godwin, 2007
US emissions from ODS substitutes	1997	0 g	Godwin, 2007
US emissions from ODS substitutes	1998	0 g	Godwin, 2007
US emissions from ODS substitutes	1999	0 g	Godwin, 2007
US emissions from ODS substitutes	2000	1 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2001	1 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2002	1 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2003	1 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2004	1 Mg (tonnes)	Godwin, 2007

Activity = Use of substitutes for ozone depleting substances - HFC-125

- Variable Name -	- Year -	- Value and Units -	- Reference -
Use of substitutes for ozone depleting substances - HFC-125	1990	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1991	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1992	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1993	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1994	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1995	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1996	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1997	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1998	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	1999	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	2000	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	2001	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	2002	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	2003	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-125	2004	Not used in estimates	None, see text
Ratio of California to US population	1990	0.12	USCB, various years a
Ratio of California to US population	1991	0.121	USCB, various years a
Ratio of California to US population	1992	0.121	USCB, various years a
Ratio of California to US population	1993	0.121	USCB, various years a
Ratio of California to US population	1994	0.12	USCB, various years a
Ratio of California to US population	1995	0.12	USCB, various years a
Ratio of California to US population	1996	0.12	USCB, various years a
Ratio of California to US population	1997	0.12	USCB, various years a
Ratio of California to US population	1998	0.121	USCB, various years a
Ratio of California to US population	1999	0.122	USCB, various years a
Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a
Ratio of California to US population	2004	0.122	USCB, various years a
US emissions from ODS substitutes	1990	0 g	Godwin, 2007
US emissions from ODS substitutes	1991	0 g	Godwin, 2007
US emissions from ODS substitutes	1992	214.29 Mg (tonnes)	Godwin, 2007

Variables Used in the Emissions Estimation Equations

Values last updated on Monday, November 19, 2007

US emissions from ODS substitutes	1993	464.29 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1994	750 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1995	1.25 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1996	1.86 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1997	2.5 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1998	3.11 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1999	3.5 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2000	4 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2001	4.43 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2002	4.89 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2003	5.5 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2004	6.18 Gg (thousand tonnes)	Godwin, 2007

Activity = Use of substitutes for ozone depleting substances - HFC-134a

- Variable Name -	- Year -	- Value and Units -	- Reference -
Use of substitutes for ozone depleting substances - HFC-134a	1990	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1991	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1992	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1993	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1994	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1995	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1996	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1997	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1998	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	1999	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	2000	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	2001	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	2002	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	2003	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-134a	2004	Not used in estimates	None, see text
Ratio of California to US population	1990	0.12	USCB, various years a
Ratio of California to US population	1991	0.121	USCB, various years a
Ratio of California to US population	1992	0.121	USCB, various years a
Ratio of California to US population	1993	0.121	USCB, various years a
Ratio of California to US population	1994	0.12	USCB, various years a
Ratio of California to US population	1995	0.12	USCB, various years a
Ratio of California to US population	1996	0.12	USCB, various years a
Ratio of California to US population	1997	0.12	USCB, various years a
Ratio of California to US population	1998	0.121	USCB, various years a
Ratio of California to US population	1999	0.122	USCB, various years a
Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a
Ratio of California to US population	2004	0.122	USCB, various years a
US emissions from ODS substitutes	1990	0 g	Godwin, 2007

US emissions from ODS substitutes	1991	0 g	Godwin, 2007
US emissions from ODS substitutes	1992	1.31 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1993	4.23 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1994	9.15 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1995	20 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1996	26.46 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1997	32.85 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1998	35.77 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1999	39.54 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2000	43.31 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2001	46.69 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2002	49.77 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2003	52.54 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2004	55.23 Gg (thousand tonnes)	Godwin, 2007

Activity = Use of substitutes for ozone depleting substances - HFC-143a

- Variable Name -	- Year -	- Value and Units -	- Reference -
Use of substitutes for ozone depleting substances - HFC-143a	1990	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1991	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1992	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1993	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1994	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1995	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1996	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1997	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1998	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	1999	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	2000	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	2001	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	2002	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	2003	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-143a	2004	Not used in estimates	None, see text
Ratio of California to US population	1990	0.12	USCB, various years a
Ratio of California to US population	1991	0.121	USCB, various years a
Ratio of California to US population	1992	0.121	USCB, various years a
Ratio of California to US population	1993	0.121	USCB, various years a
Ratio of California to US population	1994	0.12	USCB, various years a
Ratio of California to US population	1995	0.12	USCB, various years a
Ratio of California to US population	1996	0.12	USCB, various years a
Ratio of California to US population	1997	0.12	USCB, various years a
Ratio of California to US population	1998	0.121	USCB, various years a
Ratio of California to US population	1999	0.122	USCB, various years a
Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a

Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a
Ratio of California to US population	2004	0.122	USCB, various years a
US emissions from ODS substitutes	1990	0 g	Godwin, 2007
US emissions from ODS substitutes	1991	0 g	Godwin, 2007
US emissions from ODS substitutes	1992	0 g	Godwin, 2007
US emissions from ODS substitutes	1993	0 g	Godwin, 2007
US emissions from ODS substitutes	1994	15.87 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1995	31.75 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1996	47.62 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1997	63.49 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1998	79.37 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1999	95.24 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2000	111.11 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2001	126.98 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2002	126.98 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2003	142.86 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2004	158.73 Mg (tonnes)	Godwin, 2007

Activity = Use of substitutes for ozone depleting substances - HFC-32

- Variable Name -	- Year -	- Value and Units -	- Reference -
Use of substitutes for ozone depleting substances - HFC-32	1990	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1991	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1992	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1993	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1994	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1995	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1996	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1997	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1998	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	1999	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	2000	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	2001	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	2002	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	2003	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - HFC-32	2004	Not used in estimates	None, see text
Ratio of California to US population	1990	0.12	USCB, various years a
Ratio of California to US population	1991	0.121	USCB, various years a
Ratio of California to US population	1992	0.121	USCB, various years a
Ratio of California to US population	1993	0.121	USCB, various years a
Ratio of California to US population	1994	0.12	USCB, various years a
Ratio of California to US population	1995	0.12	USCB, various years a
Ratio of California to US population	1996	0.12	USCB, various years a
Ratio of California to US population	1997	0.12	USCB, various years a

Ratio of California to US population	1998	0.121	USCB, various years a
Ratio of California to US population	1999	0.122	USCB, various years a
Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a
Ratio of California to US population	2004	0.122	USCB, various years a

US emissions from ODS substitutes	1990	0 g	Godwin, 2007
US emissions from ODS substitutes	1991	0 g	Godwin, 2007
US emissions from ODS substitutes	1992	0 g	Godwin, 2007
US emissions from ODS substitutes	1993	0 g	Godwin, 2007
US emissions from ODS substitutes	1994	0 g	Godwin, 2007
US emissions from ODS substitutes	1995	0 g	Godwin, 2007
US emissions from ODS substitutes	1996	153.85 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1997	307.69 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1998	461.54 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1999	461.54 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2000	461.54 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2001	461.54 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2002	615.38 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2003	615.38 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	2004	769.23 Mg (tonnes)	Godwin, 2007

Activity = Use of substitutes for ozone depleting substances - Other ODS substitutes

- Variable Name -	- Year -	- Value and Units -	- Reference -
Use of substitutes for ozone depleting substances - Other ODS substitutes	1990	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1991	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1992	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1993	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1994	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1995	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1996	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1997	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1998	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	1999	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	2000	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	2001	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	2002	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	2003	Not used in estimates	None, see text
Use of substitutes for ozone depleting substances - Other ODS substitutes	2004	Not used in estimates	None, see text

Ratio of California to US population	1990	0.12	USCB, various years a
Ratio of California to US population	1991	0.121	USCB, various years a
Ratio of California to US population	1992	0.121	USCB, various years a
Ratio of California to US population	1993	0.121	USCB, various years a
Ratio of California to US population	1994	0.12	USCB, various years a
Ratio of California to US population	1995	0.12	USCB, various years a

Ratio of California to US population	1996	0.12	USCB, various years a
Ratio of California to US population	1997	0.12	USCB, various years a
Ratio of California to US population	1998	0.121	USCB, various years a
Ratio of California to US population	1999	0.122	USCB, various years a
Ratio of California to US population	2000	0.121	USCB, various years a
Ratio of California to US population	2001	0.121	USCB, various years a
Ratio of California to US population	2002	0.122	USCB, various years a
Ratio of California to US population	2003	0.122	USCB, various years a
Ratio of California to US population	2004	0.122	USCB, various years a
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US emissions from ODS substitutes	1990	207.47 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1991	414.94 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1992	484.09 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1993	484.09 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1994	484.09 Mg (tonnes)	Godwin, 2007
US emissions from ODS substitutes	1995	1.11 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1996	1.94 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1997	2.42 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1998	2.84 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	1999	2.97 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2000	2.9 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2001	2.77 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2002	3.11 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2003	3.53 Gg (thousand tonnes)	Godwin, 2007
US emissions from ODS substitutes	2004	3.73 Gg (thousand tonnes)	Godwin, 2007
