

Preliminary Draft Results

Economic Impact Analysis of Bundled Climate Mitigation Options

Prepared For the North Carolina Climate Action Advisory Group

N.C. Legislative Commission on Global Climate Change

David Ponder & Jeffry Tiller

October 23, 2007



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Overview

- ❖ Introduction to N.C. Energy Scenario Economic Impact Model
- ❖ Selection of Policies
- ❖ Flow of Data Processing
- ❖ Preliminary Draft Results
- ❖ Next Steps

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N.C. Energy Scenario Economic Impact Model

- ❖ Developed in 2005 for the N.C. Energy Policy Council
 - Skip Laitner, U.S. Environmental Protection Agency
 - Doug Arent, National Renewable Energy Laboratory
 - Christopher Larsen, ABB Group
 - Jeffry Tiller, Appalachian State University Energy Center
- ❖ Peer reviewed by Adam Rose, PhD. Univ. of Southern California
- ❖ Served as basis for similar analysis in Arizona, Colorado, Florida, Iowa, Michigan, Ohio, and Texas

Input-Output Modeling

- ❖ Conceptualized by Nobel laureate Wassily Leontief
 - ❖ Describes relationship among sectors of economy
 - ❖ Outputs for one sector are inputs for another
 - ❖ Multipliers measure ripple effect due to changes in demand
- ❖ Core of N.C. Energy Scenario Economic Impact Model
 - ❖ 39 x 39 economic sector matrix
 - ❖ Aggregated from IMPLAN 2004

Impact Analysis

- ❖ Impact model captures direct, indirect, induced effects
- ❖ Employment
 - Total full and part-time employment, not FTE's
- ❖ Income
 - Employee compensation & proprietor income
- ❖ Total Value Added
 - Income
 - Rents, royalties, dividends & profits
 - Indirect business taxes

Policy selection and bundling

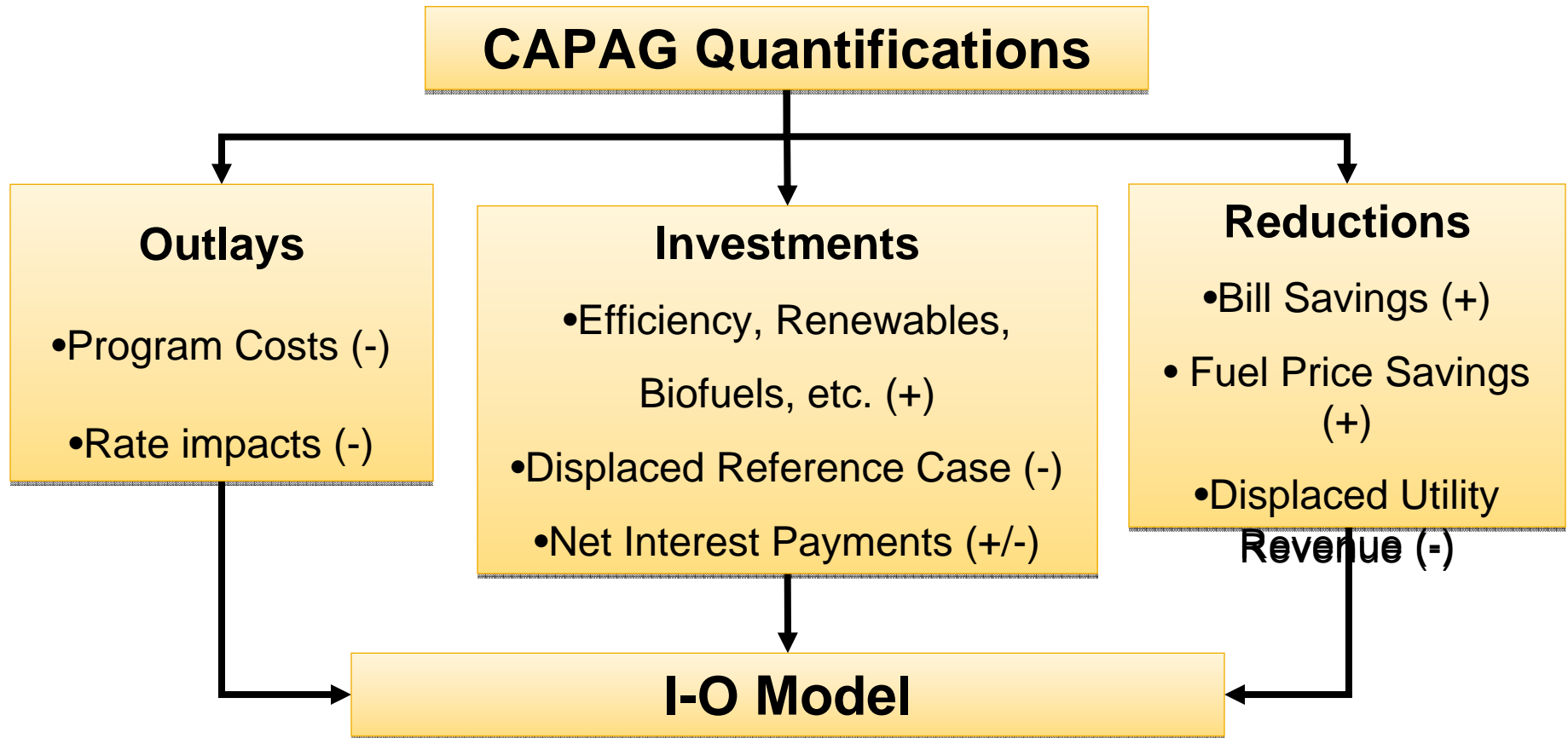
- ❖ 24 bundles representing 31 policy options from CAPAG
 - 7 Energy Supply
 - 10 Residential, Commercial, Industrial
 - 10 Agriculture, Forestry, Waste
 - 4 Transportation & Land Use

- ❖ Represent more than 90% of greenhouse gas emissions reductions

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Preliminary Draft Findings

❖ Cumulative Annual Net Jobs, 2007-2020: **328,738**

- Energy supply options: **45,996**
- Demand side options: **132,985**
- Agriculture, forestry, & waste: **149,757**

❖ Cumulative Income , 2007-2020 (millions, 2004): **\$14,210**

- Energy supply options: \$3,122
- Demand side options: \$4,632
- Agriculture, forestry, & waste: \$6,455

❖ Cumulative Value Added , 2007-2020 (millions, 2004): **\$20,561**

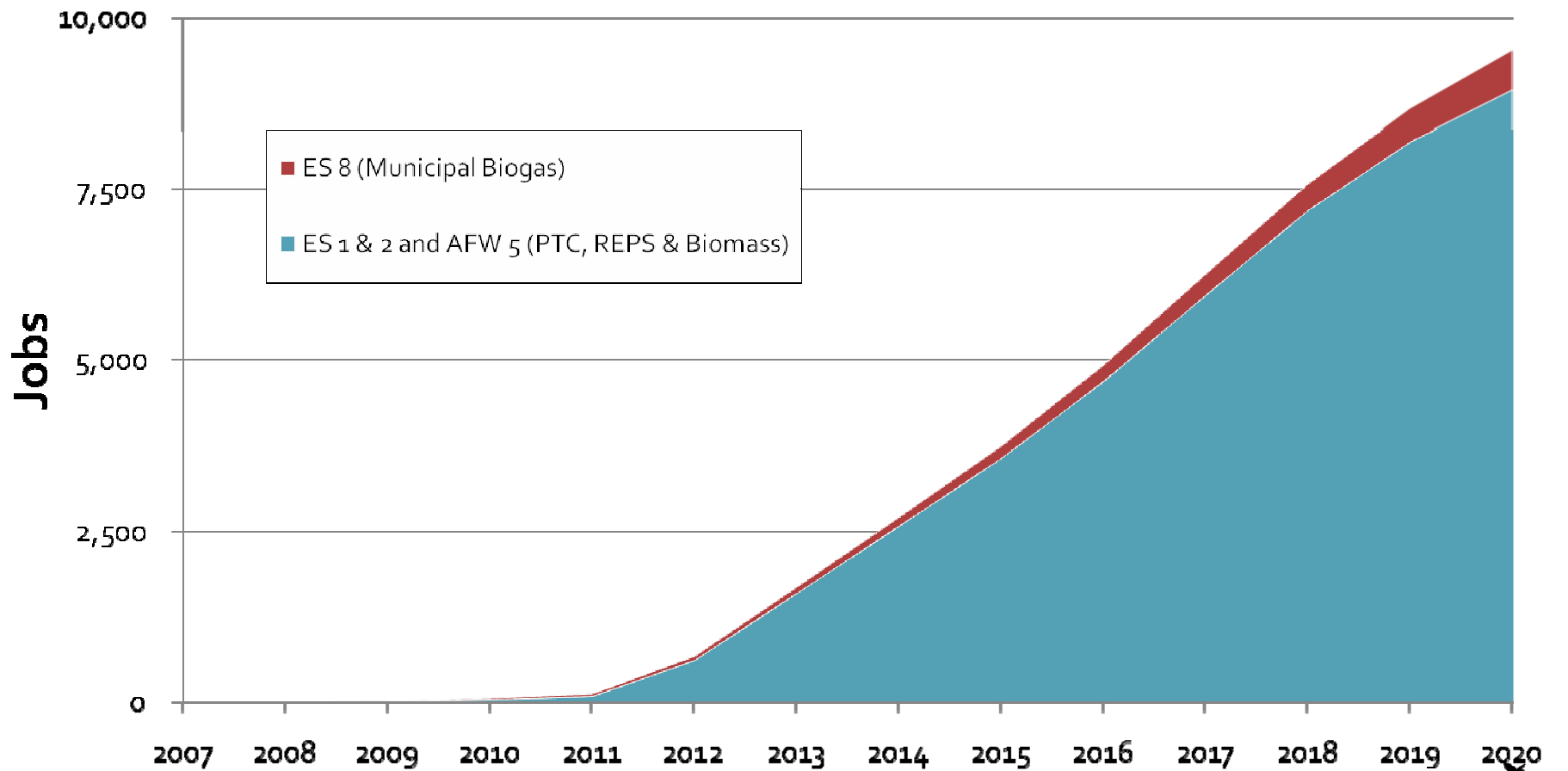
- Energy supply options: \$5,887
- Demand side options: \$4,449
- Agriculture, forestry, & waste: \$10,225

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Energy Supply Options Net Jobs Impact



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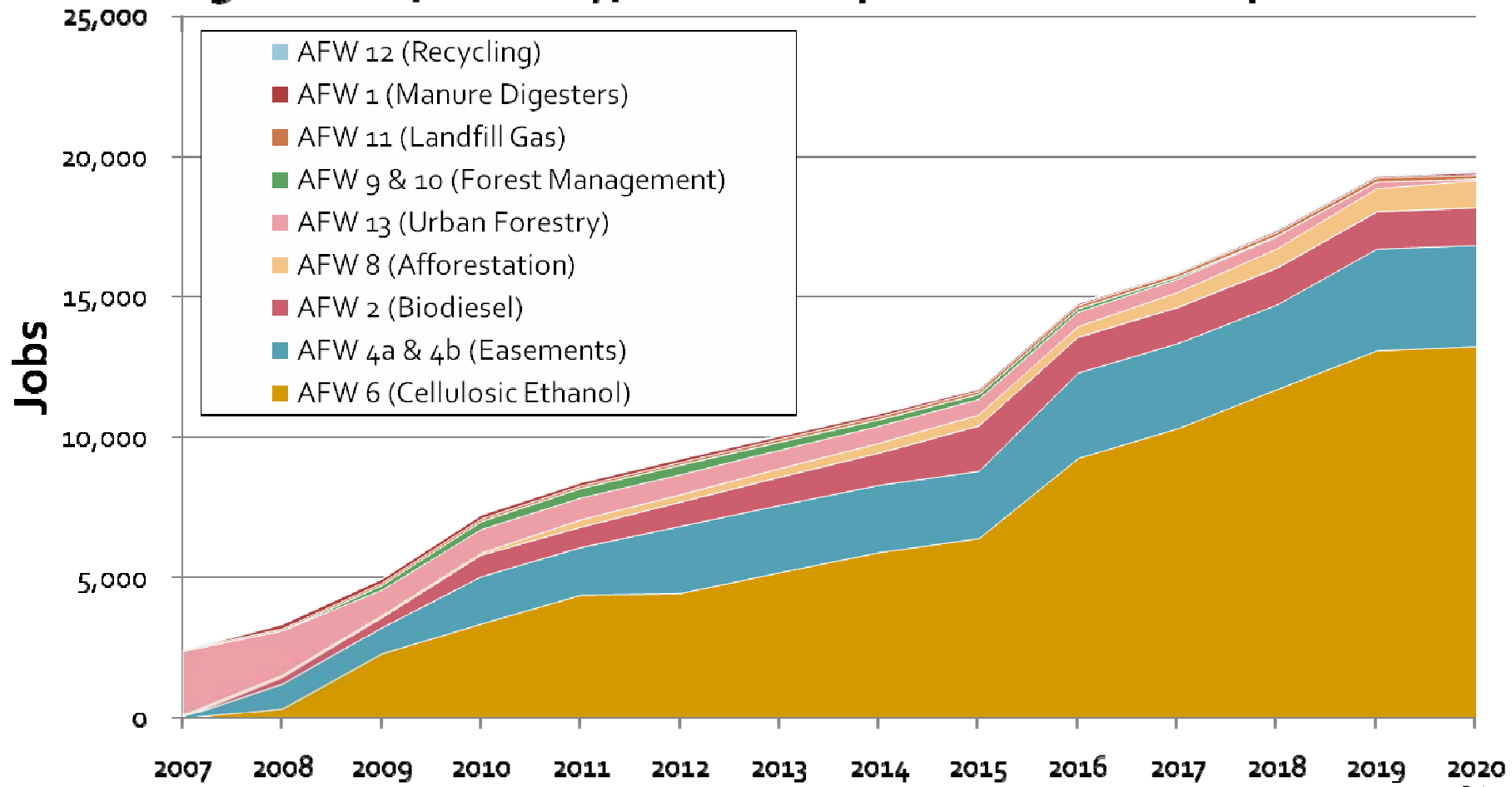
Total Value Added by Policy (\$million, 2004)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFW 5 (PTC, REPS & Biomass)	0	0	1	3	7	53	132	214	299	400	514	629	724	803
ES 8 (Municipal Biogas)	0	2	7	16	29	48	73	105	145	195	254	325	408	503
All Policies	0	2	8	19	36	100	204	318	445	595	768	954	1,132	1,306

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Agriculture, Forestry, & Waste Options Net Jobs Impact



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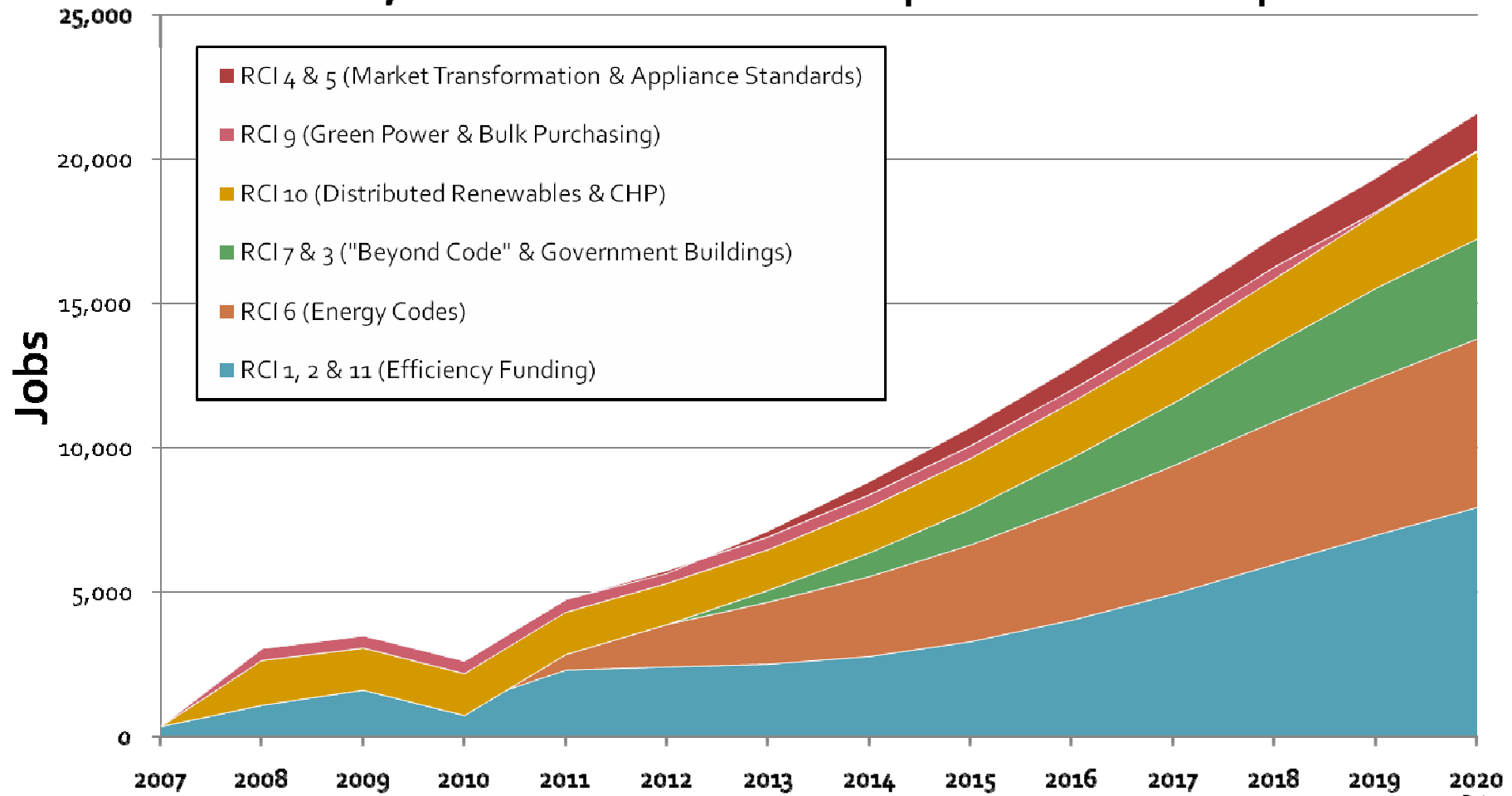
Total Value Added by Policy (\$million, 2004)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFW 1 (Manure Digesters)	(1)	10	9	10	9	9	8	8	6	6	4	5	6	7
AFW 2 (Biodiesel)	0	15	24	53	52	63	75	88	124	103	106	109	112	115
AFW 4a & 4b (Easements)	3	32	35	65	66	95	97	98	100	129	130	132	161	162
AFW 6 (Cellulosic Ethanol)	0	24	155	234	314	324	386	448	496	722	824	952	1,083	1,113
AFW 8 (Afforestation)	4	4	5	5	19	19	23	26	30	30	42	54	66	78
AFW 9 & 10 (Forest Management)	0	0	12	21	27	29	27	25	23	21	19	17	3	-8
AFW 11 (Landfill Gas)	3	5	6	7	7	8	9	9	10	11	11	13	14	14
AFW 12 (Recycling)	0	0	0	0	0	0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
AFW 13 (Urban Forestry)	36	27	16	14	12	10	8	6	3	(1)	(7)	(16)	(33)	(85)
All Policies	160	194	300	438	514	557	621	687	761	985	1081	1208	1350	1369

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Residential, Commercial & Industrial Options Net Jobs Impact



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Total Value Added by Policy (\$million, 2004)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
RCI 1, 2 & 11 (Efficiency Funding)	19	62	78	6	45	13	(22)	(44)	(47)	(36)	(12)	21	56	91
RCI 4 & 5 (Market Transformation & Appliance Standards)	0	0	0	0	0	(16)	(5)	2	6	6	5	5	4	3
RCI 6 (Energy Codes)	0	(3)	1	(15)	26	63	99	133	167	201	231	263	293	321
RCI 7 & 3 ("Beyond Code" & Government Buildings)	0	(11)	(23)	(36)	(32)	(24)	(3)	18	41	68	97	128	159	180
RCI 9 (Green Power & Bulk Purchasing)	0	26	27	28	29	30	30	30	30	29	29	28	1	(1)
RCI 10 (Distributed Renewables & CHP)	0	94	90	91	94	93	93	107	123	137	151	168	195	233
All Policies	19	168	173	74	161	158	192	247	319	404	501	613	709	827

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Next Steps

❖ Complete technical review by CAPAG

facilitators

❖ Complete TLU options analysis

❖ Complete final report

Acknowledgements

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