

## Model Results for Year 2020

	<b>ARB</b>	<b>CRA International</b>	<b>Tanton</b>	<b>U.S. EPA (analysis of federal policy – Waxman- Markey bill)</b>
	Energy 2020 and E-DRAM models	Integrated MRN-NEEM Model (runs ARB1, ARB2, and CRA10)		(IGEM and ADAGE models)
Specified Emissions Reduction	25%	25%	25%	17%
Allowance Price Range	-	\$52-\$78	\$20, \$60, \$200 (assumed)	\$18
Gross State Product (% change)	-0.2 to -1.4	-1.4 to -2.2	-2.0	-0.3 to -0.7
Income Gain (+) or Loss (-) per household	+\$86 to -\$270	-\$1175 to -\$1380	-\$930, -\$2800, and -\$9330 for allow prices of \$20, \$60, and \$200	-\$80 to -\$146
Jobs Gained (+) or Lost (-) (thousands)	+10 to -320		-162, -485, -1617 for allow prices of \$20, \$60, and \$200	

## Model Results for Year 2020

	<b>ARB</b>	<b>CRA International</b>	<b>Tanton</b>	<b>U.S. EPA</b> (analysis of federal policy – Waxman-Markey bill)
	Energy 2020 and E-DRAM models	Integrated MRN-NEEM Model (runs ARB1, ARB2, and CRA10)		(IGEM and ADAGE models)
Specified Emissions Reduction	25%	25%	25%	17%
Allowance Price Range	-	\$52-\$78	\$20, \$60, \$200 (assumed)	\$18
Gross State Product (% change)	-0.2 to -1.4	-1.4 to -2.2	-2.0	-0.3 to -0.7
Income Gain (+) or Loss (-) per household	+\$86 to -\$270	-\$1175 to -\$1380	-\$930, -\$2800, and -\$9330 for allow prices of \$20, \$60, and \$200	-\$80 to -\$146
Jobs Gained (+) or Lost (-) (thousands)	+10 to -320		-162, -485, -1617 for allow prices of \$20, \$60, and \$200	

## Model Results for Year 2020

	ARB	CRA International	Tanton	U.S. EPA (analysis of federal policy – Waxman- Markey bill)
	Energy 2020 and E-DRAM models	Integrated MRN-NEEM Model (runs ARB1, ARB2, and CRA10)		(IGEM and ADAGE models)
Specified Emissions Reduction	25%	25%	25%	17%
Allowance Price Range	-	\$52-\$78	\$20, \$60, \$200 (assumed)	\$18
Gross State Product (% change)	-0.2 to -1.4	-1.4 to -2.2	-2.0	-0.3 to -0.7
Income Gain (+) or Loss (-) per household	+\$86 to -\$270	-\$1175 to -\$1380	-\$930, -\$2800, and -\$9330 for allow prices of \$20, \$60, and \$200	-\$80 to -\$146
Jobs Gained (+) or Lost (-) (thousands)	+10 to -320		-162, -485, -1617 for allow prices of \$20, \$60, and \$200	

## Model Results for Year 2020

	<b>ARB</b>	<b>CRA International</b>	<b>Tanton</b>	<b>U.S. EPA</b> (analysis of federal policy – Waxman-Markey bill)
	Energy 2020 and E-DRAM models	Integrated MRN-NEEM Model (runs ARB1, ARB2, and CRA10)		(IGEM and ADAGE models)
Specified Emissions Reduction	25%	25%	25%	17%
Allowance Price Range	-	\$52-\$78	\$20, \$60, \$200 (assumed)	\$18
Gross State Product (% change)	-0.2 to -1.4	-1.4 to -2.2	-2.0	-0.3 to -0.7
Income Gain (+) or Loss (-) per household	+\$86 to -\$270	-\$1175 to -\$1380	-\$930, -\$2800, and -\$9330 for allow prices of \$20, \$60, and \$200	-\$80 to -\$146
Jobs Gained (+) or Lost (-) (thousands)	+10 to -320		-162, -485, -1617 for allow prices of \$20, \$60, and \$200	

## Model Results for Year 2020

	<b>ARB</b>	<b>CRA International</b>	<b>Tanton</b>	<b>U.S. EPA</b> (analysis of federal policy – Waxman-Markey bill)
	Energy 2020 and E-DRAM models	Integrated MRN-NEEM Model (runs ARB1, ARB2, and CRA10)		(IGEM and ADAGE models)
Specified Emissions Reduction	25%	25%	25%	17%
Allowance Price Range	-	\$52-\$78	\$20, \$60, \$200 (assumed)	\$18
Gross State Product (% change)	-0.2 to -1.4	-1.4 to -2.2	-2.0	-0.3 to -0.7
Income Gain (+) or Loss (-) per household	+\$86 to -\$270	-\$1175 to -\$1380	-\$930, -\$2800, and -\$9330 for allow prices of \$20, \$60, and \$200	-\$80 to -\$146
Jobs Gained (+) or Lost (-) (thousands)	+10 to -320		-162, -485, -1617 for allow prices of \$20, \$60, and \$200	

## Model Results for Year 2020

	ARB	CRA International	Tanton	U.S. EPA (analysis of federal policy – Waxman- Markey bill)
	Energy 2020 and E-DRAM models	Integrated MRN-NEEM Model (runs ARB1, ARB2, and CRA10)		(IGEM and ADAGE models)
Specified Emissions Reduction	25%	25%	25%	17%
Allowance Price Range	-	\$52-\$78	\$20, \$60, \$200 (assumed)	\$18
Gross State Product (% change)	-0.2 to -1.4	-1.4 to -2.2	-2.0	-0.3 to -0.7
Income Gain (+) or Loss (-) per household	+\$86 to -\$270	-\$1175 to -\$1380	-\$930, -\$2800, and -\$9330 for allow prices of \$20, \$60, and \$200	-\$80 to -\$146
Jobs Gained (+) or Lost (-) (thousands)	+10 to -320		-162, -485, -1617 for allow prices of \$20, \$60, and \$200	

*Important to note that allowance value is not the same as economic cost. The costs in the ARB and CRA models are a very small fraction of allowance value.*

## Potential Limitations of the Models And Their Implications for Cost Estimates

	ARB	CRA International	Tanton
<b>Model Characteristic</b>			
Optimistic Assumptions regarding Costs of VMT and Pavley II Efforts	-		
Inattention to Emissions Leakage	-		-
Restricted Scope for Pre-Existing Market Failures		+	+
Absence of Potential for Input Substitution			+
Absence of Technological Change			+
Optimistic Assumptions for Growth of Economy under Business as Usual	+		
Inattention to Alternative Methods for Auction Revenue Recycling	+	+	+
Disregard of Co-Benefits	+	+	+

## Potential Limitations of the Models And Their Implications for Cost Estimates

	ARB	CRA International	Tanton
<b>Model Characteristic</b>			
Optimistic Assumptions regarding Costs of VMT and Pavley II Efforts	-		
Inattention to Emissions Leakage	-		-
Restricted Scope for Pre-Existing Market Failures		+	+
Absence of Potential for Input Substitution			+
Absence of Technological Change			+
Optimistic Assumptions for Growth of Economy under Business as Usual	+		
Inattention to Alternative Methods for Auction Revenue Recycling	+	+	+
Disregard of Co-Benefits	+	+	+



# Differing Impacts of Pavley II Requirements

**ARB analysis:** Pavley II reduces AB 32 cost

- fuel savings exceed additional purchase (capital) cost

**CRA analysis:** Pavley II adds to AB 32 cost

- fuel savings fall short of additional purchase cost

## Potential Limitations of the Models And Their Implications for Cost Estimates

	ARB	CRA International	Tanton
<b>Model Characteristic</b>			
Optimistic Assumptions regarding Costs of VMT and Pavley II Efforts	-		
Inattention to Emissions Leakage	-		-
Restricted Scope for Pre-Existing Market Failures		+	+
Absence of Potential for Input Substitution			+
Absence of Technological Change			+
Optimistic Assumptions for Growth of Economy under Business as Usual	+		
Inattention to Alternative Methods for Auction Revenue Recycling	+	+	+
Disregard of Co-Benefits	+	+	+

# Overall Impacts

ARB and CRA models have different structures and employ different inputs

Yet taken together they yield a similar general conclusion: AB 32's net costs are small relative to the CA economy

Annual Growth Rate of Gross State Product				
		ARB Analysis		CRA Analysis
Business As Usual	▼	2.4%		2.4%
AB 32		2.3%-2.4%	▼	2.3%

# Impacts on Specific Industries

In absence of offsetting design components, energy-intensive trade-exposed industries could experience significant profit losses.

- ARB's analysis: value-added in mining and utilities declines ~ 10% relative to BAU (value-added grows, but at slower rate)

These losses can be reduced or avoided through

- Output-based free allowance allocation, or
- Border adjustments