Appendix 7

Center for Energy, Economic & Environmental Policy (CEEEP) of Rutgers University
Macroeconomic Impact of CO_2 Reductions in New Jersey

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Date: October 20, 2009

To: New Jersey Department of Environmental Protection

From: Center for Energy, Economics & Environmental Policy and the Rutgers Economic Advisory Service

Re: Macroeconomic Impact of CO_2 Reduction in New Jersey – Simulations for NJDEP

The New Jersey Department of Environmental Protection (NJDEP) solicited the Center for Energy, Economic and Environmental Policy (CEEEP) and the Rutgers Economic Advisory Service (R/ECON™) to analyze the economic impacts of the proposed Climate Action Plan prepared in response to Governor Corzine's Executive Order 54 and the Global Warming Response Act. Both organizations have previously worked together on behalf of the State to analyze the economic impacts of the State's Renewable Portfolio Standard (RPS), the Energy Master Plan (EMP), and the Low Emission Vehicle (LEV) program.

R/ECON Model

R/ECON™ is home to an econometric model of New Jersey. The model is comprised of over 300 equations, based on historical data for New Jersey and the United States, which are solved simultaneously. The historical data covers the period from 1970 to 2008. The heart of the model is a set of equations modeling employment, wages, and prices by industry. In general, employment in an industry depends on demand for that industry's output and the state's wages and prices relative to the nation's. Demand can be represented by a variety of variables including (but not limited to) New Jersey personal income, population, and sectoral output, or U.S. employment in the sector. Other sectors in the model include population, housing, vehicle registrations, state tax revenue, and energy. The data for the U.S. comes from IHS Global Insight, Inc., a national leader in economic forecasting.

Methodology

Eighteen supporting recommendations are proposed to assist in achieving the 2020 greenhouse gas emissions limit established in the 2007 Global Warming Response Act. The supporting recommendations affect the following sectors:

- Green Buildings;
- Waste Management;

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- Commercial and Industrial Refrigeration and Air Conditioning;
- Terrestrial Carbon Sequestration; and
- Transportation and Land Use.

CEEEP and R/ECON analyzed the economic impacts of the supporting recommendations; the environmental benefits of the proposed measures were not accounted for in the analysis. The baseline forecast for this scenario includes the programs in the EMP, LEV, and the Regional Greenhouse Gas Initiative (RGGI). The baseline forecast begins in the 2nd quarter of 2009 and runs through the end of 2020.

CEEEP estimated adjustments of several variables in the R/ECON model over the period from 2010 to 2020 to account for the supporting recommendations. All adjustments were applied to gross state product in the construction, transportation, and state and local government sectors, or to prices for vehicles, homes, or commercial and industrial buildings. Additionally, CEEEP estimated the direct employment resulting from these supporting recommendations, which was added to the construction and state government job base.

Besides the economic changes, the plan also indicates estimated future energy consumption for the supporting recommendations that apply to use of electricity, natural gas, diesel fuel, and motor fuel. Overall consumption of these energy sources has been directly reduced in the R/ECON model. Due to the interconnectivity of the model (and the economy), total consumption falls by slightly more in a few areas where no direct changes were made.

Key Assumptions

CEEEP utilized the Center for Climate Strategies (CCS) and NJDEP's September 2009 report, *Analysis of Potential Greenhouse Gas Emission Reductions and Costs of Supporting Recommendations for New Jersey's Climate Action Plan* to develop the adjustments for several of the R/ECON variables. The following tables provide the key assumptions and data gleaned from the report and the back-up data provided by NJDEP.

Green Buildings

The Green Buildings recommendations increase the cost of new and existing homes and commercial buildings. The total costs and benefits and the additional cost per residential home are shown in Tables 1 (a) and (b) respectively. The energy savings associated with the program can be found in Table 1 (c).

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Table 1 (a): Total Costs and Benefits 2010 to 2020 (millions $2007)

	Total Costs	**Total Benefits**	**Net Benefits**
New Residential	$734	$973	$239
New Commercial	$180	$241	$61
Existing Residential	$502	$1,213	$711
Existing Commercial	$123	$288	$165

Table 1 (b): Cost per New and Existing Residential Home

	Cost per New Home	**Cost per Existing Home**
2010	$2,067	$1,413
2011	$2,264	$1,547
2012	$2,479	$1,695
2013	$2,714	$1,855
2014	$2,969	$2,030
2015	$3,247	$2,220
2016	$3,550	$2,427
2017	$3,880	$2,652
2018	$4,239	$2,897
2019	$4,630	$3,165
2020	$5,056	$3,456

Table 1 (c): Electricity and Natural Gas Savings[1]

	Electricity Savings (MWh)				**Natural Gas Savings (Million Cubic Feet)**			
	Residential		***Commercial***		***Residential***		***Commercial***	
	New	*Existing*	*New*	*Existing*	*New*	*Existing*	*New*	*Existing*
2010	78,229	97,568	20,001	23,948	401	501	103	123
2011	156,728	195,474	40,071	47,979	804	1,003	206	246
2012	251,252	313,366	64,238	76,915	1,289	1,608	330	395
2013	362,149	451,679	92,592	110,863	1,858	2,318	475	569
2014	489,597	610,634	125,177	149,878	2,512	3,133	642	769
2015	633,772	790,451	162,039	194,014	3,252	4,056	831	995
2016	794,852	991,353	203,222	243,324	4,078	5,087	1,043	1,249
2017	956,817	1,193,359	244,632	292,906	4,909	6,123	1,255	1,503
2018	1,119,774	1,396,600	286,296	342,791	5,746	7,166	1,469	1,759
2019	1,283,721	1,601,078	328,213	392,980	6,587	8,215	1,684	2,016
2020	1,448,660	1,806,792	370,383	443,471	7,433	9,271	1,900	2,275

[1] Electricity savings is presented in megawatt hours, abbreviated MWh, equivalent to 1,000 kilowatt hours.

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Waste Management

The Waste Management recommendation is comprised of three programs. Overall, these programs will lower the cost of waste disposal to local governments, see Table 2.

Table 2: Total Costs, Total Savings, and Electricity Savings

	Wastewater Treatment Plant Efficiency		**Municipal Solid Waste**	**Landfill Gas Control**
	Total Cost ($2007)	*Electricity Savings (MWh)*	*Total Savings ($2007)*	*Total Costs ($2007)*
2010	$30,900	-	-	$66,333
2011	$95,481	65,403	$4,667,960	$132,665
2012	$240,400	130,805	$9,615,998	$198,998
2013	$450,204	196,208	$14,856,716	$265,331
2014	$718,750	261,611	$20,403,224	$331,663
2015	$1,062,707	327,013	$26,269,151	$331,663
2016	$1,426,654	392,416	$32,468,670	$331,663
2017	$1,874,820	457,818	$39,016,519	$331,663
2018	$2,387,735	523,221	$45,928,016	$331,663
2019	$2,970,055	588,624	$53,219,089	$331,663
2020	$3,059,157	654,026	$60,906,290	$331,663

Commercial and Industrial Refrigeration and Air Conditioning

The Commercial and Industrial Refrigeration and Air Conditioning recommendation lowers the construction costs of commercial and industrial properties. The total annual savings for New Jersey are shown in the table below. Construction jobs were estimated utilizing the California Air Resources Board's 2009 report, *High-Global Warming Potential Stationary Source Refrigerant Management Program Appendix A and B.*

Table 3: Total Annual Savings

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Total Annual Savings	
2010	$757,452
2011	$853,970
2012	$962,471
2013	$1,082,653
2014	$1,215,795
2015	$1,364,595
2016	$1,531,491
2017	$1,719,038
2018	$1,930,338
2019	$2,166,954
2020	$2,430,736

Terrestrial Carbon Sequestration

The Terrestrial Sequestration recommendation is comprised of five programs that propose restocking or planting trees in various areas of the state and removing land from the private sector. Removal of land from the private sector will increase the cost of building new homes. The annual costs of each program are shown in Table 4 (a) below.

The Urban Forest Canopy/Cover electricity savings were determined using the No Net Loss cost of electricity. The Sustainable Agriculture fuel savings were determined using the cumulative acres and cost of diesel per acre provided in the CCS and NJDEP report; see Table 4 (b).

Table 4 (a): Annual Costs ($2007)

	Forest Stewardship	No Net Loss	Urban Forest	Sustainable Agriculture	Garden State Preservation
2010	$146,926	$315,775	$2,866,881	$245,000	$50,000,000
2011	$187,277	$524,975	$8,167,763	$280,000	$50,000,000
2012	$227,627	$734,174	$13,468,644	$315,000	$50,000,000
2013	$267,977	$943,373	$18,769,526	$350,000	$50,000,000
2014	$308,327	$1,152,573	$24,070,407	$385,000	$50,000,000
2015	$348,678	$1,361,772	$29,371,289	$420,000	$50,000,000
2016	$389,028	$1,570,972	$34,672,170	$455,000	$50,000,000
2017	$429,378	$1,780,171	$39,973,051	$490,000	$50,000,000
2018	$469,728	$1,989,370	$45,273,933	$525,000	$50,000,000
2019	$510,079	$2,198,570	$50,574,814	$560,000	$50,000,000
2020	$550,429	$2,407,769	$55,875,696	$595,000	$50,000,000

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Table 4 (b): Energy Savings

	No Net Loss	**Urban Forest Canopy/Cover**	**Sustainable Agriculture**
	Electricity Saved (MWh)		*Diesel Savings (Million Gallons)*
2010			0.012
2011	54	1,936	0.025
2012	81	3,872	0.039
2013	108	5,615	0.053
2014	135	7,238	0.067
2015	162	8,746	0.083
2016	189	10,147	0.099
2017	216	11,444	0.116
2018	243	12,644	0.133
2019	270	13,751	0.152
2020	296	14,771	0.171

Transportation and Land Use

The Transportation Land Use recommendation is comprised of six programs that aim to boost transit ridership and the availability of hybrid electric and zero-emissions vehicles (PHEV and ZEV), reduce vehicle miles traveled (VMT), improve road infrastructure, and upgrade trucks and truck stops.[2] The increased availability of hybrid electric and zero emissions vehicles will increase the price of new cars and light trucks (see Table 5 (a)). The increased prices of new vehicles and homes will cause an increase in the consumer price index that R/ECON uses for New Jersey.

The four tables below present the inputs utilized by CEEEP to determine the adjustments to the R/ECON model variables. The annual incremental vehicle costs for the plug-in hybrid electric vehicles and zero emission vehicles, annual net costs and savings, and additional annual costs are shown in Tables 5 (a) and (b). Table 5 (c) shows energy consumption data and Table 5 (d) shows the key assumptions utilized for the remaining program, Road Infrastructure.

[2] Increasing shuttle rail goods movement was not included in the analysis because R/ECON does not account for changes in rail. The recommendation would have no net result on the economy because wholesale retail will increase as trucking decreases.

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Table 5 (a): Incremental Costs, Net Costs and Savings

	PHEV		**ZEV**		**Reduce VMT**	**Double Transit Ridership**
	Incremental Vehicle Costs (2005$)				*Net Savings (Million $2007)*	*Net Cost (Million $2007)*
	Auto	*Truck*	*Auto*	*Truck*		
2010	$8,934	$11,930	$14,842	$18,496	$112	$974
2011	$8,746	$11,777	$14,761	$18,471	$224	$946
2012	$8,558	$11,625	$14,680	$18,446	$336	$918
2013	$8,370	$11,472	$14,599	$18,421	$448	$890
2014	$8,181	$11,320	$14,517	$18,396	$560	$863
2015	$7,993	$11,167	$14,436	$18,371	$672	$835
2016	$7,805	$11,014	$14,355	$18,346	$784	$807
2017	$7,617	$10,862	$14,274	$18,321	$896	$779
2018	$7,429	$10,709	$14,193	$18,296	$1,008	$752
2019	$7,241	$10,557	$14,112	$18,271	$1,120	$724
2020	$7,053	$10,404	$14,031	$18,246	$1,233	$696

Table 5 (b): Low Carbon Goods Movement Annual Costs

Trailer Refrigeration Units/Truck Stop Electrification		
Additional Cost per Standby	$1,300	2002$
Annual Cost of Extra Weight	$10	2004$
Annual Maintenance Costs	$555	2004$
Cost/Electric Berth	$ 4,416	2004$
Idle Air Price per Hour	$2.67	2008$

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Table 5 (c): Electricity Consumed and Gasoline Savings

	PHEV	ZEV	Reduce VMT	Transit Ridership	PHEV	ZEV	Trailer Refrigerator Units	Truck Stop Electrification
	Gasoline Reduction (Million Gallons)				*Electricity Consumption (MWh)*			
2010	7	5	27	5	8,733	57,447	17,780	0.0038
2011	20	16	53	10	26,366	181,582	30,617	0.0038
2012	40	33	80	15	53,925	365,709	43,608	0.0038
2013	66	55	106	20	90,023	591,449	56,759	0.0038
2014	97	82	133	26	129,842	845,319	70,075	0.0038
2015	134	113	160	31	180,583	1,123,654	83,560	0.0038
2016	176	148	186	36	238,252	1,427,506	97,219	0.0038
2017	221	186	213	41	304,245	1,739,946	111,058	0.0038
2018	275	228	240	46	381,172	2,056,189	125,083	0.0038
2019	324	273	266	51	448,544	2,362,965	128,835	0.0038
2020	368	320	293	56	500,126	2,656,546	132,700	0.0038

Table 5 (d): Key Assumptions Associated with Road Infrastructure Improvement

Signal Synchronization	
Fuel Saved per Year (Gallon Gasoline)	580,038
Traffic Controller Cost	18,816,000
Time Value ($)	$ 5,287,042
Expand Emergency Service Patrols	
Gasoline Saved per Year (Gallons)	160,000
Diesel Consumed per Year (Gallons	14,000
Time Value ($)	$ 1,458,400
Capital Cost of Trucks	$ 601,450
Indirect Costs	20.29%

Results

In general, the proposed NJDEP programs have a slightly negative impact on the macro-economy, as seen in Table 6. By 2020, the scenario shows a 7,000 job (0.2 percent) reduction from the base case, as well as a small increase in the unemployment rate. There is also a 0.6 percent reduction in real gross state product in 2020, a 0.05 decrease in personal income, and a 0.4 percent increase in the consumer price index. Over the 12 year period from 2008 to 2020 the program would decrease total job creation by 4 percent, from 158,000 to 151,000.

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There are a few areas where the decreases would be greater—the areas where the recommendations are targeted. The green building program would increase the prices of both new and existing homes, resulting in a small decrease in residential building permits, a 2.6 percent decrease in existing home sales and a 1.5 percent decrease in new home sales in 2020. Vehicle prices are likely to rise by as much as 14 percent by 2020 to pay for conversion to low or no carbon fuel use, with the price of automobiles rising somewhat more than the price of light trucks. By 2020 vehicle registrations (the proxy for sales) will be 3.3 percent lower in the NJDEP scenario than in the baseline. Both the number of automobiles and light trucks registered will decline in the NJDEP scenario compared to the baseline. However, light truck registrations will fall more steeply, so that they will decrease from 43 percent of total registrations in 2008 to 38 percent in 2020 in the NJDEP scenario, compared to 39 percent in 2020 in the baseline. Retail sales will be 1.8 percent lower in 2020 in the NJDEP scenario than in the baseline because of the decrease in both vehicle sales and motor fuel sales. One result of the decline in vehicle sales will be a decline of 0.3 percent in vehicle miles traveled in 2020 in the NJDEP scenario compared to the baseline.

Overall tax revenues in 2020 will be 0.3 percent lower in the NJDEP scenario compared to the baseline. However, in 2020, higher vehicles prices will result in a 4.7 percent increase in motor vehicle registration fees, while the decline in the number of vehicles and vehicle miles traveled will result in lower motor fuel tax revenues. Real property transfer tax revenues will also be lower in the NJDEP scenario because the decline in home sales is larger than the increase in home prices.

As noted earlier, these results do not reflect the co-benefits that would accrue to the state from implementing the recommendations discussed in this report. For example, reducing greenhouse gas emissions emitted by fossil fuel-fired electric generating units will also reduce emissions of sulfur dioxide and various nitrogen oxides that are air pollutants in their own right as well as components of acid rain. Certain nitrogen oxides are also ozone precursors, and ozone is known to have adverse health effects in some circumstances. Reducing greenhouse gas emissions will also help protect New Jersey's natural capital, which produces a variety of valuable ecosystem goods and services. Some of these co-benefits are being quantified in a separate study which is expected to be completed during the fall of 2009.

Table 6: Comparison of New Jersey Economy under NJDEP Baseline August 2009 and NJDEP Scenario October 12, 2009

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	NJDEP Baseline		**NJDEP Scenario**		**Difference in 2020**	
	2008	*2020*	*2008*	*2020*	*Scenario-Baseline*	
Non-Agriculture Employment (thousands)	4,058	4,216	4,058	4,209	-7.0	-0.17%
Unemployment Rate (%)	5.5%	4.8%	5.5%	4.8%	0.0	0.41%
Population (thousands)	8,683	9,286	8,683	9,283	-2.7	-0.03%
Households (thousands)	3,253	3,442	3,253	3,441	-0.3	-0.01%
Personal Income (billions)	$442	$706	$442	$705	-0.4	-0.05%
Retail Sales (billions)	$147	$206	$147	$202	-3.7	-1.81%
New Vehicle Registrations	529,575	703,070	529,575	679,941	-23,129	-3.29%
New Car Registrations	299,600	425,661	299,600	423,274	-2,387	-0.56%
New Light Trucks and Vans	229,975	277,409	229,975	256,667	-20,742	-7.48%
Vehicle Miles Traveled (Millions)	74,163	76,636	74,163	76,394	-242.5	-0.32%
Residential Building Permits	19,000	36,759	19,000	36,468	-291.2	-0.79%
Commercial Floorspace (Mill. Sq.Ft.)	2,331	2,844	2,331	2,825	-19.8	-0.70%
Consumer Price Index (1982=100)	230	288	230	290	1.2	0.40%
Gross State Product ($2000 billions)	$390	$472	$390	$469	-2.8	-0.60%
Total Taxes ($millions)[3]	$27,649	$45,411	$27,649	$45,296	-115.7	-0.25%
Motor Vehicle Fees	$131	$127	$131	$133	5.9	4.65%
Motor Fuel Taxes	$138	$124	$138	$123	-1.2	-0.98%
Property Transfer Tax	$67	$102	$67	$100	-1.4	-1.42%

It is important to note that energy use under the NJDEP scenario will be 3.3 percent lower in 2020 than in the baseline scenario. The state will lower electricity usage by 3.3 percent, natural gas usage by 3.2 percent, fuel oil usage (including diesel) by 0.5 percent, and motor fuel usage by 5.4 percent. See Table 7 for additional energy results. These reductions will help increase the

[3] Total taxes includes about 80% of state tax revenues: gross income tax, corporation business tax, sales tax, motor fuel tax, motor vehicle fee, transfer inheritance tax, alcoholic beverage tax, property transfer tax, petroleum products tax, cigarette tax, corporate business and financial institutions tax, and public utility tax.

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country's energy independence and the security of our energy supplies, benefits which are not included in this report because of the difficulty in quantifying them.

Table 7: Comparison of New Jersey Fuel Use under NJDEP Baseline August 2009 and NJDEP Scenario October 12, 2009

	NJDEP Baseline		**NJDEP Scenario**		**Difference in 2020**	
	2008	*2020*	*2008*	*2020*	*Scenario-Baseline*	
Electricity (MWh)						
Residential Use	29,131,708	24,028,685	29,131,708	23,718,248	-310,437	-1.3%
Commercial Use	40,280,110	36,735,323	40,280,110	35,999,534	-735,789	-2.0%
Industrial Use	9,158,167	8,306,391	9,158,167	8,258,607	-47,784	-0.6%
Other Use	286,391	270,523	286,391	265,241	-5,282	-2.0%
Total	78,856,376	69,340,922	78,856,376	68,241,630	-1,099,292	-1.6%
Natural Gas (Billion Cubic Feet)						
Residential Use	184,635	158,352	184,635	142,609	-15,743	-9.9%
Commercial Use	145,584	241,487	145,584	236,875	-4,612	-1.9%
Industrial Use	38,251	55,167	38,251	55,165	-2	0.0%
Electricity Use	147,615	74,405	147,615	70,657	-3,748	-5.0%
Total	516,085	529,411	516,085	505,306	-24,105	-4.6%
Fuel Oil (Thousand Gallons)						
Residential Use	310,568	71,975	310,568	71,857	-118	-0.2%
Commercial Use	160,971	25,143	160,971	25,143	0	0.0%
Industrial Use	8,749	146	8,749	146	0	-0.1%
Other Use	90,556	108,279	90,556	108,279	0	0.0%
Transportation Use	1,000,748	1,231,097	1,000,748	1,145,730	-85,367	-6.9%
Residual Use	900,113	270,290	900,113	268,065	-2,226	-0.8%
Total	2,471,706	1,706,929	2,471,706	1,619,219	-87,711	-5.1%
Annual Sales Motor Fuel (Million Gallons)	4,192	3,475	4,192	2,992	-483	-13.9%
Total Annual Use (Billion British Thermal Units)	1,661,989	1,447,945	1,661,989	1,347,329	-100,617	-6.9%

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A Comparison of the R/ECON Baseline and NJDEP Baseline Scenarios

The macroeconomic effects of changes in energy prices and consumption are seen in Table 1. Most of the effects of the Energy Master Plan policies are marginal. However, they do indicate that the EMP policies lead to an increase in non-agricultural employment (approximately 18,600 jobs), a decline in the unemployment rate, a 1.7 percent increase in personal income, and a 1.9 percent increase in major state tax revenues. As noted in Section III, the results below do not include the economic benefits of reducing greenhouse gases in the Energy Master Plan Scenario. Thus, even without accounting for the greenhouse gas reduction, the economy improves slightly under the Energy Master Plan Scenario as compared to the Baseline.

Table 1. Macroeconomic Indicators Based on R/ECON™ Output

	2020 Average BAU	2020 Average Alt.	% Difference
Non-ag. Employment(thous)	4392.1	4410.7	0.4%
Unemployment Rate(%)	4.8%	4.7%	-0.8%
Personal Income($bill)	$791.0	$804.8	1.7%
Real Personal Income($bill, 2000)	$274.0	$278.5	1.6%
Retail Sales($bill)	$270.3	$274.0	1.4%
Real Retail Sales($bill, 2000)	$93.6	$94.8	1.3%
New Vehicle Registrations(thous)	658.8	659.0	0.0%
New Car Registrations	397.9	398.0	0.0%
New Light Trucks and Vans	260.9	261.0	0.1%
Residential Building Permits	26,204	25,466	-2.8%
Contract Construction($mill)	$14,818	$15,156	2.3%
Consumer Price Index(1982=100)	288.6	289.0	0.1%
Gross State Product($2000 bill)	$507.0	$507.4	0.1%
Total Tax Revenues($bill)	$51.2	$52.1	1.9%

Source: R/ECON™ model output generated on 9/30/2008 (BAU) and 10/10/2008 (Energy Master Plan).

The above table does not include the Low Emissions Vehicles (LEV) policy. To compare this set of data accurately to the latest version the LEV policies must be included. The macroeconomic effects of changes in energy prices and consumption including LEV are seen in Table 2. Most of the effects of the Energy Master Plan policies are marginal. However, they do indicate that the EMP policies lead to an increase in non-agricultural employment (approximately 16,500 jobs), a decline in the unemployment rate, a 1.7 percent increase in personal income, and a 1.6 percent increase in major state tax revenues. However, they also show a tiny decrease in real Gross State Product. Higher vehicle and home prices result in lower new vehicle registrations and residential building permits, and consequently lower nominal and real retail sales. The latter results are the consequence of higher vehicle and home prices. Thus the EMP including LEV produces a mixed set of results for the state's economy.

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Table 2. Macroeconomic Indicators Based on R/ECON™ Output Inclusive of LEV

	2020 Average BAU	2020 Average Alt.with LEV	% Difference
Non-ag. Employment(thous)	4,392.1	4,408.6	0.4%
Unemployment Rate(%)	4.80%	4.73%	-1.4%
Personal Income($bill)	$791.0	$804.5	1.7%
Real Personal Income($bill, 2000)	$274.1	$278.4	1.6%
Retail Sales($bill)	$270.3	$269.7	-0.2%
Real Retail Sales($bill, 2000)	$93.7	$93.3	-0.4%
New Vehicle Registrations(thous)	658.8	658.0	-0.1%
New Car Registrations	397.9	398.0	0.0%
New Light Trucks and Vans	260.9	260.0	-0.4%
Residential Building Permits	26,204	25,435	-2.9%
Consumer Price Index(1982=100)	288.6	289.0	0.1%
Gross State Product($2000 bill)	$507.0	$505.8	-0.2%
Total Tax Revenues($bill)	$51.2	$52.0	1.6%

Source: R/ECON™ model output generated on 9/30/2008 (BAU) and 11/2/2008 (Energy Master Plan with LEV).

Table 3 shows the results of the EMP with LEV using the latest R/ECON model and data updated through the first quarter of 2009. For the most part the levels of the indicators are lower than in the simulations from last summer, because of the impact of the recession on the state's economy. That is not true of either vehicle registrations or residential building permits. That is an artifact of the pattern of recovery. Both are quite low during most of the forecast period and only begin to catch up after 2015. Again, most of the effects of the Energy Master Plan policies are marginal, although they do indicate that the EMP plus LEV policies lead to an increase in non-agricultural employment (approximately 18,300 jobs) and a decline in the unemployment rate. However, they also show tiny decreases in personal income, real Gross State Product. Higher vehicle and home prices result in lower new vehicle registrations and residential building permits, and consequently lower nominal and real retail sales and lower tax collections. The latter results are the consequence of higher vehicle and home prices. Thus the EMP including LEV produces a mixed set of results for the state's economy.

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Table 3. Macroeconomic Indicators Based on R/ECON™ Output Inclusive of LEV

	2020 Average BAU	2020 Average Alt.with LEV	% Difference
Non-ag. Employment(thous)	4,197.4	4,215.7	0.4%
Unemployment Rate(%)	4.8%	4.8%	-0.5%
Personal Income($bill)	$706.4	$705.8	-0.1%
Real Personal Income($bill, 2000)	$245.2	$244.8	-0.2%
Retail Sales($bill)	$208.4	$206.0	-1.2%
Real Retail Sales($bill, 2000)	$72.4	$71.4	-1.3%
New Vehicle Registrations(thous)	705.4	703.1	-0.3%
New Car Registrations	425.6	425.7	0.0%
New Light Trucks and Vans	279.8	277.4	-0.9%
Residential Building Permits	38,026	36,759	-3.3%
Consumer Price Index(1982=100)	288.1	288.4	0.1%
Gross State Product($2000 bill)	$473.8	$471.7	-0.4%
Total Tax Revenues($bill)	$45.6	$45.4	-0.3%

Source: R/ECON™ model output generated August 2009 (BAU) and September 2009 (Energy Master Plan with LEV).