**Evaluating the Impacts of Carbon Costs**

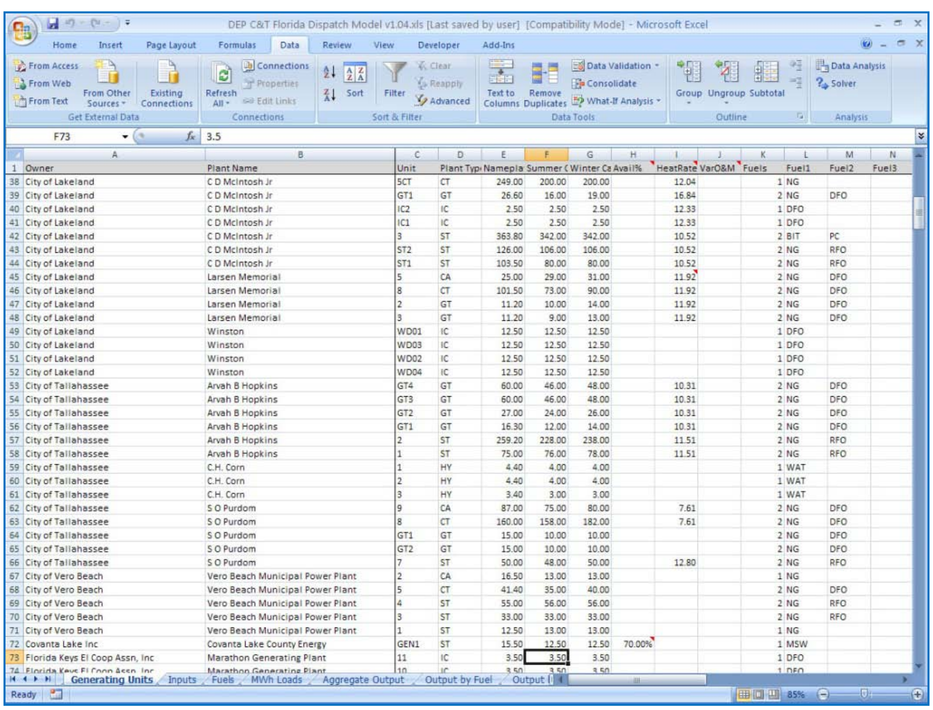
Critical to addressing climate change is controlling greenhouse gas emissions, primarily $CO_2$. As a state, Florida has taken steps to reduce greenhouse gas emissions from prominent sources such as power plants. And with research performed by members of FESC, the economic impact curbing emissions will have on the state's utilities and residents can be projected.

In July of 2007, Governor Charlie Crist signed three Executive Orders to curtail the production of greenhouse gases. Legislation was passed the following summer putting Florida in position to mandate a reduction of $CO_2$ emissions within its borders. The specific method of reduction was not spelled out, and both a cap and trade program and a carbon tax were considered realistic options.

While now it looks as though a national program may take precedence over a Florida-specific one, either way Florida's utilities and residents will be impacted. The specific extent of that impact has yet to be determined, but researchers have started to determine the variables involved and potential outcomes.

Ted Kury, Director of Energy Studies with the Public Utility Research Center at the University of Florida teamed with Julie Harrington, Director of the Center for Economic Forecasting Analysis at Florida State University to determine the factors involved in reducing $CO_2$ emissions and the price of electricity. In cooperation with the Florida Department of Environmental Protection (DEP), Kury and Harrington developed an economic model to simulate the dispatch of electricity to the grid with respect to $CO_2$ emissions.

The model relies on operating characteristics such as the amounts and types of fuel used to generate electricity, the wholesale cost of the fuel, the amount of electricity used, and the changes in $CO_2$ emissions with respect to fuel-type.

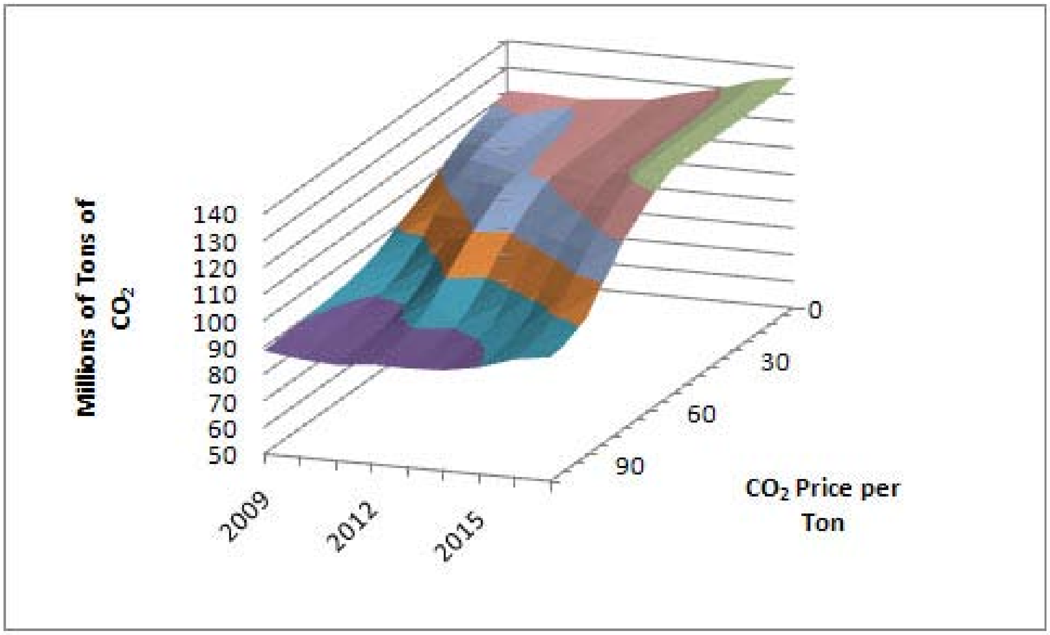



"We built a model for dispatch to look at different carbon prices," says Kury. "When the price of carbon goes up, either through a tax or cap and trade, emissions go down. But we wanted to know the effects of those increases in carbon prices. And what cost is there a significant reduction?"

They found that the effects vary year to year.

"We have learned there are flat spots on the emissions curve, for the generation mix here in Florida," says Kury. "In 2011, when you start to increase the cost of $CO_2$ emissions from zero to $10 per ton, you will see a one to two percent reduction in carbon emissions."

**Dispatch Model Emissions Surface**




The reduction is based on changing fuel sources, from higher $CO_2$ emitted fuels to lower. Petroleum coke produces more $CO_2$ than coal. With a relatively low carbon tax in place ($10 or less), petroleum coke will no longer be used providing a reduction in emissions at a relatively low cost.

"But once petroleum coke is gone, the carbon tax would have to increase to $40 or $50 per ton before the next significant carbon emission reduction would be seen," says Kury. "This is the point when natural gas would replace coal. This scenario could also have significant impact on the rate payers."

Without the model to anticipate how costs relate to emission reductions, policy makers could be unaware of the impact of the reductions that they impose. A relatively high increase in utility rates, with only a negligible reduction in emissions, would not only be disruptive to utility operations as well as rate payers, it cast a shadow on the reality of reducing the production of greenhouse gases.

While Kury admits that any cost for $CO_2$ emissions, whether in tax form or cap and trade, will ultimately be felt by consumers, he suggests that what is done with the revenue generated is an important part of the equation that is often overlooked.

"When people talk about the cost impacts of emissions reduction, they often make the implicit assumption that revenue generated from emissions is thrown away, but that's not a fair assumption. It can always be redistributed," Kury says.

He gives this example.

> Suppose the average electrical utility bill is $200 a month. A carbon tax (either directly or as a result of a cap and trade system) could be enacted that increases that bill to $250 per month. This increase in cost would likely encourage homeowners to lower their electrical use, possibly to the extent that their monthly bill is reduced to $225 a month. If the government then refunded the carbon tax and returned an amount equal to $40 a month to the electric customers, the customers would then be paying $185 a month or $15 less than they were paying originally with no carbon tax in place. Those who don't adjust their consumption, of course, would pay more.

This is the case in British Columbia where residents receive a carbon dividend. Bills currently being discussed and debated in congress do not specifically identify how revenue generated from a carbon tax would be managed, but this is integral to the policy. If revenue is distributed as rebates for the purchase of energy efficient appliances, it could discriminate against those who can afford to purchase those appliances. And if used to reimburse those who make energy efficient home improvements, renters would be excluded. Policy decisions need to take all of these into consideration, and these considerations may prove helpful in reducing the negative perception of charging a carbon tax.

While it's not known when (or if) $CO_2$ emissions will be curtailed on a national or state level, Kury and Harrington's model will assist policy makers on evaluating realistic costs on Florida's economy, utilities, and rate payers.