Description of Control Strategy Tool (CoST) and AirControlNET

AirControlNET

AirControlNET (ACN) is a personal computer (PC-based) database tool for conducting pollutant emissions control strategy and costing analysis. First developed in 1999, it overlays a detailed control measure database on EPA emissions inventories to compute source- and pollutant-specific emission reductions and associated costs at various geographic levels (national, regional, local). It contains a database of control measures and cost information for reducing the emissions of criteria pollutants (e.g., NOx, SO_2, VOC, PM_{10}, $PM_{2.5}$, NH_3) as well as Hg from point (utility and non-utility), area, nonroad, and mobile sources as provided in EPA's National Emission Inventory (NEI). AirControlNET currently operates primarily as a control strategy and cost tool for non-EGU point and area source emissions. AirControlNET offers users estimates of the emissions reductions and costs associated with control strategies targeted for a single pollutant only, though it does provide limited estimates of emissions changes for other pollutants affected by these control strategies. Users of this tool may include their own inventory files within this tool, but these files must be in a suitable format to operate within ACN.

There are two key modules currently within AirControlNET:

1) Control Scenarios Module (CSM) that allows the user to select specific control measures from the database by pollutant, source, and geographic area to create an emissions reduction scenario with computed emissions reductions and associated costs. The user can then export this scenario into spreadsheet format for further analysis or into an input script for air quality modeling within REMSAD-ST.

2) Least-Cost Module (LCM) that allows the user to obtain an emissions reduction scenario by source and geographic area consisting of the set of control measures that achieves a stated pollutant-specific emission reduction target (in tons or percentage) with the least amount of total annual costs.

EPA has used AirControlNET to estimate control costs. Emission sources are sources that can be units found within an emissions inventory or categories of emission sources that are identified by Source Classification Codes (SCC).

AirControlNET has been used by a number of States as part of analyses in support of State Implementation Plans (SIPs) for ozone, PM, and regional haze, and by various RPOs in support of analyses they have prepared for control strategies to determine Best Available Retrofit Technology (BART) control levels in their States. See http://www.epa.gov/ttn/ecas/AirControlNET.htm for a description of how AirControlNET operates and what data is included in this tool.

Control Strategy Tool (CoST)

While AirControlNET has been effective as a control strategy and cost tool for EPA and for others over the past few years, new requirements to interface with recently developed tools and databases have made the current computing platform insufficient to meet today's needs. Therefore, it was determined in 2006 that it was an appropriate time to replace the ACN software with newer software that could provide improved effectiveness and functionality to support current and upcoming needs. The software is named the Control Strategy Tool (CoST). This tool will have the functionality of AirControlNET but also have capabilities that ACN does not possess, namely:

* The ability to insert emissions inventories almost seamlessly from the Emissions Modeling Framework (EMF). The EMF is a software construct that EPA uses to generate base year and future emissions inventories. It is necessary for our control strategy and cost tools to apply to such emissions inventories in order to work as designed. The new cost tool has a Java-based software that allows for easy linkage of emissions inventories to the tool. It is necessary to process emissions inventories into ACN, and this takes several days at a contractor's expense. Using a new cost tool that is linked to emissions inventories of interest makes cost modeling a much easier and effective effort.

* The ability to insert new control measure data. CoST gives users the capability to add their own controls to the existing control measure database if they possess such data. Thus, a user has some ability to customize their analysis to their specific control measure data if they wish. ACN does not have this capability; it is necessary to process new control measure data into the tool over several days.

* Easier ability for users to track their analyses and output. CoST gives the user the ability to see easily and quickly the results of their analyses and the input data that is being used in the course of analyses. Thus, the documentation of emissions and control measure data is now available to a user as they does their analyses, a capability not found in ACN where documentation is accessed separately from the analysis.

* Quality assurance (QA) steps provided to both emissions and control measure data. Many of the QA steps applied in the EMF will also apply to the control measure data in CoST, thus assuring the user that the data quality in the control strategy analysis will be high and provide confidence in the analysis outputs.

In addition, CoST will eventually contain control measures for greenhouse gas reductions, and this data is not found within ACN. Finally, CoST will also have more complete data regarding impacts on other pollutants that are not targeted but are affected by a control strategy (e.g., mercury reductions that occur when PM controls are applied to coal-fired units) than found in CAN.

CoST calculates control costs using three different methods: (1) by multiplying an average annualized cost per ton estimate against the total tons of a pollutant reduced to derive a total cost estimate; (2) by calculating cost using an equation that incorporates

information regarding key plant information; or (3) by using both cost per ton and cost equations. Most control cost information currently within CoST has been developed based on the cost per ton approach (especially for area sources). This is because estimating engineering costs using an equation requires more extensive data, and parameters used in other non-cost per ton methods may not be readily available or broadly representative across sources within the emissions inventory. The costing equations used in CoST, which are primarily available for point source control measures, require either plant capacity or stack flow to determine annual, capital and/or operating and maintenance (O&M) costs. Capital costs are converted to annual costs, in dollars per ton, using the capital recovery factor. Where possible cost calculations are used to calculate total annual control cost (TACC) which is a function of the capital cost (CC) and O&M costs. Capital costs are converted to annual costs, in dollars per ton, using the capital recovery factor (CRF). The capital recovery factor incorporates the interest rate and equipment life (in years) of the control equipment. Operating costs are calculated as a function of annual O&M and other variable costs. The resulting TACC equation is TACC = (CRF * CC) + O&M.

Control measure costs identified as "both" use equations unless plant capacity or stack flow data is incomplete in the EPA emission inventories. Control cost includes, but is not limited to, capital investments in pollution controls as an up front and an annualized costs, and O&M expenses. Engineering control costs will differ based upon quantity of emissions reduced, plant capacity, or stack flow, which can vary by emissions inventory year. Engineering costs will also differ by the year the costs are calculated (i.e., 1999$ versus 2006$). Our engineering cost analysis uses the equivalent uniform annual costs (EUAC) method, in which annualized costs are calculated based on the equipment life for the control measure along with the interest rate by use of the CRF as mentioned previously. Annualized costs are estimated as equal for each year the control is expected to operate. Hence, our annualized costs for nonEGU point and area sources estimated, for example, for 2020 are the same whether the control measure is installed in 2019 or in 2010. The EUAC method is discussed in detail in the EPA Air Pollution Control Cost Manual (found at http://epa.gov/ttn/catc/products.html#cccinfo).

While CoST has not undergone a formal peer review, this software tool has undergone substantial review within EPA's OAR and OAQPS. Much of the control measure data has been included in a control measure database that will be distributed to EPA Regional offices for use by States as they prepare their ozone, regional haze, and PM2.5 SIPs over the next 10 months. See http://www.epa.gov/particles/measures/pm_control_measures_tables_ver1.pdf for more details on this control measures database. In addition, the control measure data within CoST has been used by Regional Planning Organizations (RPOs) such as the Lake Michigan Air District Commission (LADCO), the Ozone Transport Commission (OTC), and the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) as part of their technical analyses associated with SIP development over the last 3 years. All of their technical reports are available on their web sites.

Future work to Improve CoST -

CoST will undergo an internal peer review within EPA in early 2009, and will receive external peer review in late 2009. During that time, CoST will be under internal development within EPA with a public release expected in 2009. Also, the control measure database within CoST will be released to the public later in 2008. CoST has been used to estimate the cost of control strategies for the ozone NAAQS RIA that was released to the public in March 2008, and will be used in the NOx/SOx NAAQS proposal RIA that will be released to the public in 2009.

Finally, because the existing ACN has been an integral component of the Air Strategy Assessment Program (ASAP), we will also investigate linking CoST with ASAP, along with adding some enhancements to ASAP to address sensitivity and uncertainty analysis.