



Residential, Commercial and Industrial Technical Work Group

Assessment of Cumulative Impacts

In addition to estimating the impacts of each individual policy option considered by the RCI TWG, we have estimated the *combined* impacts of all of the policies in this sector if all were implemented together. This involves accounting for any overlaps in coverage that would occur to avoid double-counting of impacts either from partially redundant policies, or from policies that interact in ways that reduce the total benefit. We have also evaluated and quantified any overlaps between the RCI and ES sectors to establish an assessment of the cumulative impacts of all policy options in these sectors.

The methodology applied to perform these assessments is as follows.

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In order to assess the cumulative emissions reductions for the policies in the RCI sector, it is necessary to consider any overlaps among the policies that affect similar types of energy use. Specifically, some policies (such as RCI-1 and -2) are defined by their usage reduction goals, while others (such as RCI-3) are defined by addressing a specific type of energy use. In these cases it is important to consider whether addressing the specific energy use would add to the overall reductions, or just be subsumed into the more general reduction goal.

To address this issue, we compared the target usage and energy reduction strategies of all RCI policies. We considered whether the sector (residential, commercial, industrial, or government/institutional) and type of energy use addressed by each policy was covered under the goals of other policies. When such overlaps were found, we compared the size of the impacts for policies targeting each specific measure and sector to determine which policy option would have the greatest incremental impact.

Policies with No Overlaps: RCI-3, RCI-5, and RCI-8

RCI-3's solar hot water (SHW) targets are assumed to have no overlaps with RCI-1, electricity Demand-Side Management (DSM). Solar hot water is rarely included as a measure in electric utility DSM portfolios. Moreover, other measures that target hot water use usually represent only a very small portion of the electric DSM portfolio energy savings, in part because electricity consumption for water-heating is a relatively small portion of total sector energy consumption. In the Southeast, residential electricity consumption for hot water accounts for 7.2% of total residential energy consumption, and commercial electricity consumption for hot water accounts

for only 3.7% of total commercial energy consumption. For these reasons, we assume no overlap between RCI-3 and RCI-1.

We also assume that the SHW component of RCI-3 has no overlaps with gas, propane, and fuel oil DSM programs (RCI-2). As with electric DSM, natural gas utility DSM portfolios usually do not promote solar hot water, and other measures targeting hot water use are likely to represent only a small portion of the portfolio energy savings. Natural gas consumption by residential hot water appliances accounts for 5.3% of the total residential energy consumption in the Southeast, and natural gas consumption for commercial hot water accounts for 4.5% of total commercial energy consumption. For fuel oil and propane, energy consumptions for hot water as a portion of total sector energy consumption are even lower.

The solar cooling component of RCI-3 is also assumed to have no overlaps with other RCI policies. Utility DSM portfolios are very unlikely to include solar cooling systems as a measure. In addition, the participants for RCI-3/solar cooling consist of a small subset of energy consumers: commercial and industrial businesses with large cooling loads and facilities with existing chilled water distribution systems. It is doubtful that existing chilled water systems would be targeted by broadly-focused energy efficiency programs such as RCI-1 and RCI-2.

RCI-5 (the expanded use of combined heat and power, or CHP) is assumed not to overlap with any other options in its impact on residential and commercial energy or gas use. CHP is not typically included in electricity DSM portfolios, and any overlap with commercial gas DSM is estimated to be very small (around 0.1 MMtCO₂e).

RCI-8 is assumed not to overlap with any other policy, and we kept 100% of its costs and benefits in the cumulative analysis. RCI-8 is intended to go above and beyond the measures that an industrial user would implement within RCI-1 and RCI-2 (e.g., by targeting process emissions, which are not taken into account in any other policy). It is also assumed that the participants for RCI -8 would not overlap with those for RCI-1 and RCI-2.

Policies with Full Overlaps: RCI-9

RCI-9 focuses on highly efficient appliances, either by instituting statewide appliance standards or by increasing market penetration of Energy Star appliances. The DSM programs in RCI-1 and RCI-2 would be likely to include appliance programs, which would overlap with the results for RCI-9. Efforts to reduce energy use by government buildings and schools within RCI-7 would likely include upgrades to office equipment that would fully overlap with the government and school results for RCI-9. If RCI-1, RCI-2, and RCI-7 were all implemented, there would be no incremental benefit to also implementing RCI-9.

As RCI-9 is fully subsumed by other policies, we did not include the costs and benefits of this policy in the cumulative analysis.

Policies with Partial Overlaps: RCI-1, RCI-2, RCI-6 and RCI-7

RCI-6 focuses on new construction within the residential and commercial sectors, while RCI-7 focuses on government and school buildings. These overlap in part with the cumulative greenhouse gas emissions reductions from RCI-1 and RCI-2 that correspond to these components of the two policies.

RCI-6 has greater cumulative greenhouse gas emissions reductions than the residential and commercial new construction components of RCI-1 and RCI-2 together. RCI-7 has greater cumulative greenhouse gas emissions reductions than the government/school components of RCI-1 and RCI-2 together. As a result, 100% of the costs and benefits for RCI-6 and RCI-7 were included in the cumulative analysis. The costs and benefits for RCI-1 and RCI-2 that overlapped with RCI-6 and RCI-7 were removed from the cumulative analysis.

The components of the costs and benefits for RCI-2 and RCI-10 that did not overlap with any other policies, those pertaining to the industrial sector and existing structures, were included in the cumulative analysis.

Cumulative Impacts Summary Table

A summary of the overlaps for each RCI policy is presented in the following table.

Policy	Interaction	Notes
RCI-1	Efforts for new manufactured housing and residential, commercial, and gov't new construction overlap with RCI-6 and RCI-7	Partially Included; Results for residential and commercial existing stock, existing manufactured homes, and all industrial facilities are incremental to other policies
RCI-2	Efforts for new manufactured housing and residential, commercial, and gov't new construction overlap with RCI-6 and RCI-7	Partially Included; Results for residential and commercial existing stock and industrial are incremental to other policies
RCI-3	No overlaps	Fully included
RCI-4	Not quantified—no overlaps	
RCI-5	Negligible overlaps with RCI-1 and RCI-2	Fully included; overlaps with RCI-1 and RCI-2 are within margin of error.
RCI-6	Building code and ENERGY STAR efforts for manufactured homes overlap with residential and commercial new construction within RCI-1 and RCI-2	Fully included; the residential and commercial components of this policy are more aggressive than the residential and commercial new construction components for RCI-1 & -2 combined.
RCI-7	Energy efficiency efforts overlap with	Fully included in RCI; This policy is

Policy	Interaction	Notes
	government and school efforts within RCI-1 and RCI-2	more aggressive than the government components of RCI-1 and RCI-2 combined.
RCI-8	No overlaps	Fully Included; This policy is assumed to primarily target process emissions, which are not covered by any other policy
RCI-9	Overlaps with parts of RCI-1, RCI-2, and RCI-7	Not Included: Fully subsumed by these policies

Combined RCI and Energy Supply

There are two primary interactions between the RCI and Energy Supply sector policies, both concerning the clean energy portfolio components in policy ES-1. First, ES-1 includes a requirement that some of the electricity demand in the state be met with DSM measures. This component is assumed to be redundant with the electricity DSM requirement under RCI-1.¹ In addition, a number of the RCI policies (RCI-1, -3, -5, -6, and -7) decrease overall electricity demand.² As the clean energy portfolio requirements are based on meeting a percentage of load with specific clean energy or nuclear resources, the impact of ES-1 would be reduced by reducing energy demand through these RCI policies.

A secondary feedback is that certain ES policies (including ES-1) will have the effect of reducing the GHG emissions associated with energy production, so that RCI policies that target electricity use will have a reduced impact on overall emissions. However, this impact is small and has not been reflected in the analysis.

¹ ES-4 also concerns regulatory reform to support energy efficiency measures; however, this policy entails no specific demand reduction targets and has not been quantified, and thus will not be reflected in the cumulative analysis.

² RCI-9 is also anticipated to reduce electricity demand, but its impact on load is assumed to fully overlap with load reductions from RCI-1, RCI-2, and RCI-7. Reductions in electricity consumption are also expected from RCI-8 but have not been quantified.