

Memo

To: Central Indiana Air Quality Consultation Group Members
From: Philip D. Roth, Indianapolis Metropolitan Planning Organization
Date: May 30, 2007
Re: Air Quality Emissions Analysis and Notice of Findings: Regional Transportation Plan Amendment and Indianapolis Regional Transportation Improvement Program (May/June, 2007)

Introduction and Purpose

In order to correct deficiencies outlined in its 2006 Certification Review, the Indianapolis Metropolitan Planning Organization (IMPO) initiated an amendment to its Regional Transportation Plan, in order to include a transit element. The transit element designated for inclusion is the 2005 Comprehensive Operational Analysis (COA), a joint study of the IMPO and the Indianapolis Public Transportation Corporation (IPTC, a.k.a. "IndyGo"). Members of the Consultation Group have requested a cursory analysis of the air quality impacts of the amendment, which, while "off-model", would confirm the benefits of the amendment. This memorandum is intended to address the consulting parties' request. It should be noted that an amendment to the Indianapolis Regional Transportation Improvement Program (IRTIP) is contingent upon this Plan amendment. Both documents have been available for public review, and no public comment has been received.

Methodology

Net emissions resulting from the planned transit service improvements outlined in the COA will be subject to both positive and negative forces. The diversion of (private) motor vehicle trips to transit vehicles will result in reductions in overall motor vehicle emissions; however, the increased service mileage of the transit fleet will produce increased emissions.

Estimating the reduction in private motor vehicle emissions can be accomplished by taking the average motor vehicle trip length (previously calculated by the travel demand model) by the increased number of transit trips, to yield a total private motor vehicle vehicle-mile-of-travel (VMT) reduction resulting from the increased transit service. This approach is crude, as 1) it fails to take into consideration emissions improvements resulting from lowered congestion on the roadway system, a positive factor, and 2) it neglects induced travel on the roadway system resulting from self-same congestion reductions, a negative factor. It is expected that the positive benefits of #1 would outweigh the increased costs of #2 (that is, we would not reasonably expect overall roadway speed to be *lower* following the introduction of improved transit service). This decrease in motor vehicle emissions can then be compared to the increased transit vehicle service mileage (estimated in the COA) in order to make some conclusions about overall emissions.

Ideally, we would like to take each component (i.e., reduced private vehicle VMT and increased transit service VMT) and utilize appropriate emissions factors to derive overall changes in emissions. However, the application of the Mobile 6.2 emissions factors model to the Indianapolis Regional Travel Demand Model does not report emissions factors. A quick survey of emissions factors for buses relative to automobiles in comparable urban regions indicates that bus emissions per mile generally do not exceed private motor vehicle emissions by more than a factor of three.

Results

The following table outlines the net VMT for the nine-county Central Indiana area:

	<u>Increased annual transit trips (over 2005)</u>	<u>Average private motor vehicle trip length</u>	<u>Annual VMT reduction</u>	<u>Increased annual service miles (over 2005)</u>	<u>Net VMT change</u>	<u>VMT change ratio</u>
2006	4,550,000	7.41	(33,735,000)	1,190,000	(32,545,000)	(28.35)
2010	12,330,000	7.53	(92,827,286)	7,710,000	(85,117,286)	(12.04)
2015	20,440,000	7.67	(156,804,000)	13,440,000	(143,364,000)	(11.67)
2020	26,770,000	7.81	(209,188,429)	16,490,000	(192,698,429)	(12.69)
2025	31,310,000	7.96	(249,138,143)	16,860,000	(232,278,143)	(14.78)
2030	37,040,000	8.10	(299,968,926)	16,990,000	(282,978,926)	(17.66)

Since most of the transit service improvements are in Marion County/Indianapolis, it is expected that most of the air quality benefits will accrue to this area. It is worthy of note that, given the estimates of ridership in the COA, a significant overall reduction in VMT (and, accordingly, emissions) will accrue.

Conclusions

Based on this analysis, it is expected that the inclusion of the COA in the Regional Plan will result in improved air quality, or at least will not worsen regional air quality. This amendment is therefore considered to be air-quality neutral, because there will be minimal air quality impacts. This methodology and finding is consistent with air quality review requirements of other federal programs, notably CMAQ. Therefore, the Amendments to the Plan and IRTIP may proceed.