Table 2-1. IVHS technology bundles for an emission analysis

| | |
|---|---|
| *Traffic and Incident Management Systems*<br>Traffic Signalization Systems (ATMS)<br>Freeway and Corridor Control Systems (ATMS)<br>Real Time Changeable Message Road Sign Display Systems (ATIS)<br>Incident Detection Systems (ATMS)<br>Emergency Mayday Systems (ATIS)<br>Hazardous Material Information Systems (CVO) | *Vehicle Control Systems*<br>Radar Braking Systems (AYCS)<br>Vehicle Speed Control Systems (AYCS)<br>Automatic Headway Control Systems (AYCS)<br>Automatic Steering Control Systems (AYCS)<br>Automated Highway Systems (AYCS) |
| *Route Guidance Systems*<br>Electronic Route Planning and Information Systems (ATIS)<br>Radio Data Systems (ATIS)<br>On-Board Navigation Systems (ATIS)<br>Externally Linked Route Guidance Systems (ATIS) | *Commercial Vehicle Inspection Systems*<br>Automatic Credentials Checking (CYO)<br>Electronic Permitting and Payment (CYO)<br>Electronic Recordkeeping (CYO)<br>Weigh-in-Motion (CYO)<br>Automated Safety Inspections (CYO)<br>Automated Driver Data Processing (CYO)<br>Traffic Data Collection Systems (CYO) |
| *Accident Reduction Systems*<br>SmartRamp Designs (CVO)<br>Site Specific Highway Warning Systems for Trucks (CVO)<br>Antilock Braking Systems (AVCS)<br>Intersection Hazard Warning Systems (AVCS)<br>Collision Avoidance Systems (AVCS) | *Trip Guidance and Public Transportation Systems*<br>Ridesharing Information Systems (ATIS)<br>Traveler Information and Service Systems (APTS)<br>Traffic Management Systems (APTS)<br>Transit and Fleet Management Systems (APTS) |
| *Enabling Technologies for Travel Fees*<br>Automatic Vehicle Identification<br>Automatic Vehicle Location<br>Automatic Vehicle Classification<br>Electronic Toll Collection (A TMS)<br>Smart Cards (APTS) | *Emission Control Enabling Technologies*<br>Remote Sensing Devices<br>Vehicle Condition Warning Systems (ATIS) |

The functional area from which a specific system originates is presented in parenthesis. ATMS corresponds to advanced traffic management systems. ATIS corresponds to advanced traveler information systems. CVO corresponds to commercial vehicle operations. AVCS corresponds to advanced vehicle control systems. APTS corresponds to advanced public transportation systems. Appendix A provides detailed definitions of each specific system, or systems, included in a particular technology bundle.

Table E-1.
Potential short-term, corridor-level impacts of IVHS technology bundles.

| | Traffic Flow | Vehicle Trips | Trip Distance | Mode Shifts | Hydrocarbon Emissions | Carbon Monoxide Emissions | Oxides of Nitrogen Emissions |
|---|---|---|---|---|---|---|---|
| Traffic and Incident Management Systems | Positive | Insignificant | Insignificant | Insignificant | Uncertain | Uncertain | Uncertain |
| Route Guidance Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Uncertain |
| Accident Reduction Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Vehicle Control Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Commercial Vehicle Inspection Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Positive |
| Trip Guidance and Public Transportation Systems | Positive | Positive | Insignificant | Positive | Positive | Positive | Uncertain |
| Enabling Technologies for Travel Fees | Positive | Positive | Insignificant | Positive | Positive | Positive | Uncertain |
| Emission Control Enabling Technologies | Insignificant | Insignificant | Insignificant | Insignificant | Positive | Positive | Positive |

- The short term is defined in this study to be from 2000 to 2010.
- Positive impacts reflect improvements in traffic flow, reductions in vehicle trips or trip distance, or mode shifts from single occupancy vehicles to high-occupancy vehicles.
- Negative impacts reflect increases in congestion, vehicle trips, and those impacts that reflect mode shifts from high-occupancy vehicles to single occupancy vehicles.
- Insignificant impacts reflect no changes (or very small changes) in traffic flow, the number of vehicle trips, trip distance, or mode shifts.
- Uncertain impacts are those for which changes in traffic flow, tripmaking, trip distance, or mode cannot be even qualitatively assessed given the current state of knowledge.

Table E-2.
Potential short-term, regional-level impacts of IVHS technology bundles.

| | Traffic Flow | Vehicle Trips | Trip Distance | Mode Shifts | Hydrocarbon Emissions | Carbon Monoxide Emissions | Oxides of Nitrogen Emissions |
|---|---|---|---|---|---|---|---|
| Traffic and Incident Management Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Route Guidance Systems | Positive | Positive | Uncertain | Insignificant | Positive | Positive | Uncertain |
| Accident Reduction Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Vehicle Control Systems | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant |
| Commercial Vehicle Inspection Systems | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant |
| Trip Guidance and Public Transportation Systems | Positive | Positive | Insignificant | Positive | Positive | Positive | Uncertain |
| Enabling Technologies for Travel Fees | Uncertain | Uncertain | Uncertain | Uncertain | Uncertain | Uncertain | Uncertain |
| Emission Control Enabling Technologies | Insignificant | Insignificant | Insignificant | Insignificant | Positive | Positive | Positive |

- The short term is defined in this study to be from 2000 to 2010.
- Positive impacts reflect improvements in traffic flow, reductions in vehicle trips or trip distance, or mode shifts from single occupancy vehicles to high-occupancy vehicles.
- Negative impacts reflect increases in congestion, vehicle trips, and those impacts that reflect mode shifts from high-occupancy vehicles to single occupancy vehicles.
- Insignificant impacts reflect no changes (or very small changes) in traffic flow, the number of vehicle trips, trip distance, or mode shifts.
- Uncertain impacts are those for which changes in traffic flow, tripmaking, trip distance, or mode cannot be even qualitatively assessed given the current state of knowledge.

Table E-3.
Potential long-term, corridor-level impacts of IVHS technology bundles.

| | Traffic Flow | Vehicle Trips | Trip Distance | Mode Shifts | Hydrocarbon Emissions | Carbon Monoxide Emissions | Oxides of Nitrogen Emissions |
|---|---|---|---|---|---|---|---|
| Traffic and Incident Management Systems | Positive | Insignificant | Insignificant | Insignificant | Uncertain | Uncertain | Uncertain |
| Route Guidance Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Uncertain |
| Accident Reduction Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Vehicle Control Systems | Positive | Insignificant | Negative | Insignificant | Uncertain | Uncertain | Uncertain |
| Commercial Vehicle Inspection Systems | Positive | Insignificant | Insignificant | Insignificant | Insignificant | Positive | Positive |
| Trip Guidance and Public Transportation Systems | Positive | Positive | Insignificant | Positive | Positive | Positive | Uncertain |
| Enabling Technologies for Travel Fees | Positive | Positive | Positive | Positive | Positive | Positive | Positive |
| Emission Control Enabling Technologies | Insignificant | Insignificant | Insignificant | Insignificant | Positive | Positive | Positive |

- The short term is defined in this study to be from 2000 to 2010.
- Positive impacts reflect improvements in traffic flow, reductions in vehicle trips or trip distance, or mode shifts from single occupancy vehicles to high-occupancy vehicles.
- Negative impacts reflect increases in congestion, vehicle trips, and those impacts that reflect mode shifts from high-occupancy vehicles to single occupancy vehicles.
- Insignificant impacts reflect no changes (or very small changes) in traffic flow, the number of vehicle trips, trip distance, or mode shifts.
- Uncertain impacts are those for which changes in traffic flow, tripmaking, trip distance, or mode cannot be even qualitatively assessed given the current state of knowledge.

Table E-4.
Potential long-term, regional-level impacts of IVHS technology bundles.

| | Traffic Flow | Vehicle Trips | Trip Distance | Mode Shifts | Hydrocarbon Emissions | Carbon Monoxide Emissions | Oxides of Nitrogen Emissions |
|---|---|---|---|---|---|---|---|
| Traffic and Incident Management Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Route Guidance Systems | Positive | Positive | Uncertain | Insignificant | Positive | Positive | Uncertain |
| Accident Reduction Systems | Positive | Insignificant | Insignificant | Insignificant | Positive | Positive | Negative |
| Vehicle Control Systems | Positive | Uncertain | Negative | Insignificant | Uncertain | Uncertain | Uncertain |
| Commercial Vehicle Inspection Systems | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant | Insignificant |
| Trip Guidance and Public Transportation Systems | Positive | Positive | Insignificant | Positive | Positive | Positive | Uncertain |
| Enabling Technologies for Travel Fees | Positive | Positive | Positive | Positive | Positive | Positive | Positive |
| Emission Control Enabling Technologies | Insignificant | Insignificant | Insignificant | Insignificant | Positive | Positive | Positive |

- The short term is defined in this study to be from 2000 to 2010.
- Positive impacts reflect improvements in traffic flow, reductions in vehicle trips or trip distance, or mode shifts from single occupancy vehicles to high-occupancy vehicles.
- Negative impacts reflect increases in congestion, vehicle trips, and those impacts that reflect mode shifts from high-occupancy vehicles to single occupancy vehicles.
- Insignificant impacts reflect no changes (or very small changes) in traffic flow, the number of vehicle trips, trip distance, or mode shifts.
- Uncertain impacts are those for which changes in traffic flow, tripmaking, trip distance, or mode cannot be even qualitatively assessed given the current state of knowledge.