



# State Transportation Innovation Council (STIC)

## 2015 Fact Sheet

### Adaptive Signals

#### The Optimal Balance of Red Light/Green Light

Poor traffic signal timing contributes to traffic congestion and delay. Conventional signal systems use preprogrammed, daily signal timing schedules that are labor intensive to update. In contrast, adaptive signal control systems use real-time traffic information to continually determine which lights should be red and which should be green. By adjusting the timing of red, yellow, and green lights, the adaptive signal control technologies accommodate changing traffic patterns and ease traffic congestion.

Adaptive signal deployments in Pennsylvania have been effective since selected corridors have diverse traffic demands over a normal day. PennDOT's Adaptive Signal Control System Evaluation (TE-153) helps identify the objectives, requirements, and appropriate solutions to address the corridors' needs by following the Modal Systems Engineering Document for Adaptive provided by Federal Highway Administration.

#### How do adaptive signals work?

Adaptive signal control technologies determine which lights should be red and which should be green through data received from strategically placed sensors. The process is simple. First, traffic sensors collect data. Next, adaptive signal control technologies evaluate the data to determine when and how long lights should be green. Finally, the signal technology implements signal timing updates. The process is repeated every few minutes to keep traffic flowing smoothly. The data collection and analysis are done automatically, and signal timing updates are made continually as traffic situations occur.

#### What are the benefits?

- Improves travel time and reduces delays by more than 10 percent. In areas with particularly outdated signal timing, improvements can be 50 percent or more.
- Improves travel time reliability by progressively moving vehicles through green lights.
- Reduces traffic congestion, fuel consumption, and greenhouse emissions.
- Adapts automatically to unexpected changes in traffic conditions, such as crashes and special events.
- Prolongs the effectiveness of traffic signal timing.



Adaptive signal systems keep traffic moving smoothly.

- Reduces complaints received in response to outdated signal timing.
- Makes traffic signal operations proactive by monitoring and responding to gaps in performance.
- Reduces intersection congestion that causes many crashes. Studies indicate crashes could be reduced by up to 15 percent through improved signal timing.



Pennsylvania's State Transportation Innovation Council (STIC) has selected adaptive signals as an innovative technology for improving travel efficiency and reducing congestion on roads. The Federal Highway Administration has also included adaptive signal control technologies as part of its Every Day Counts program, which is an initiative designed to identify and deploy innovation that shortens project delivery, enhances safety, and protects the environment.

#### What does the future hold?

Pennsylvania has successfully implemented 176 adaptive traffic signal projects in various locations around the state. Another 246 projects are planned for an expected total of 422. PennDOT is constantly considering road projects that would benefit from these systems and encourages local governments to employ this technology at their intersections where feasible.