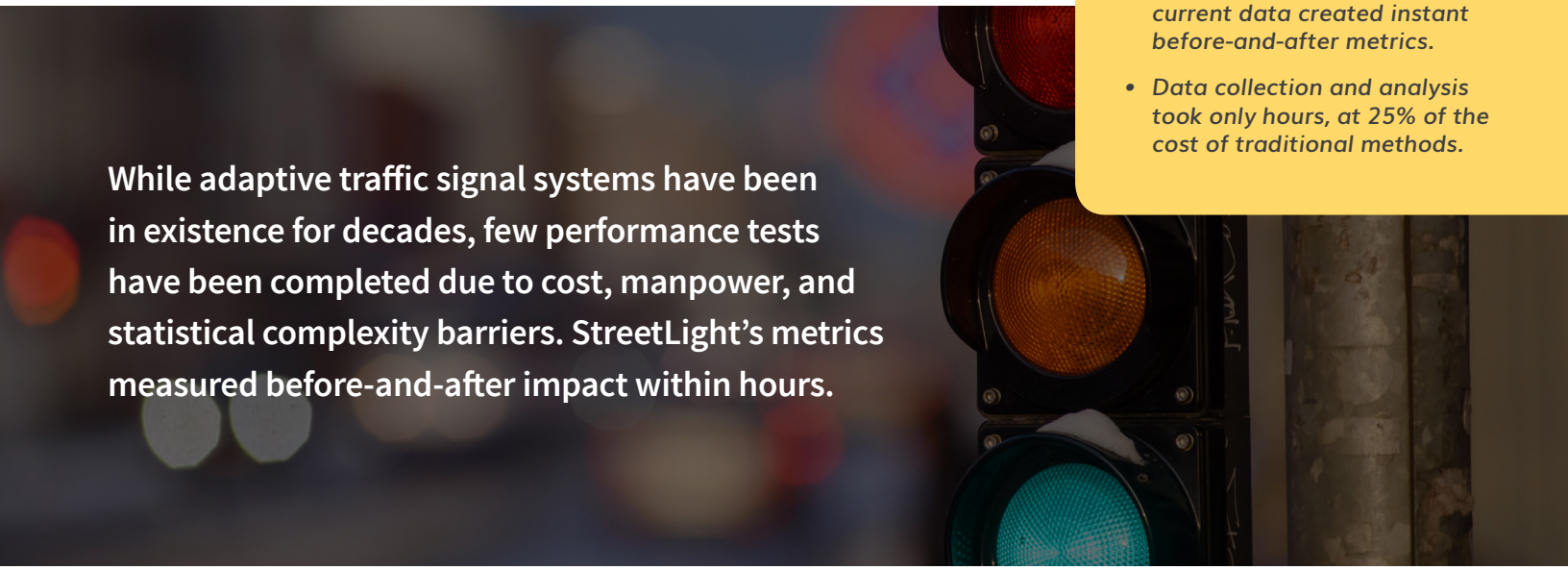
Quantifying Performance for Siemens' Adaptive Traffic Signals

EXECUTIVE SUMMARY

- *Siemens wanted to measure the impact of adaptive signal control but had no historical data.*
- *StreetLight's historical and current data created instant before-and-after metrics.*
- *Data collection and analysis took only hours, at 25% of the cost of traditional methods.*



While adaptive traffic signal systems have been in existence for decades, few performance tests have been completed due to cost, manpower, and statistical complexity barriers. StreetLight's metrics measured before-and-after impact within hours.

Mission: Measure Results for SCOOT

Adaptive traffic signal control systems offer cities and local governments a cost-effective and dynamic means to optimize traffic flow. These systems work alongside existing traffic control, incorporating real-time traffic movement data to continually optimize signal timing.

Siemens' Split Cycle Offset Optimization Technique (SCOOT) technology locates sensors ahead of intersections, and applies intelligent software at the traffic control center level. SCOOT can automatically adjust timing in response to real-time travel patterns.

Although Siemens had plenty of anecdotal and qualitative evidence that SCOOT was effective, the majority of North American studies were conducted back in the 90s. Siemens wanted up-to-date, empirical evidence of SCOOT's effectiveness – not stale data that described a much older product.

Siemens turned to StreetLight for metrics to measure the value of its technology for reducing congestion, and for definitive results to share with a broad range of stakeholders.

> **"In effect, we went back in time to gather information that we had no other way to obtain."**
>
> WENDY TAO
> Siemens Mobility

Analysis: Go Back in Time for "Before" Data

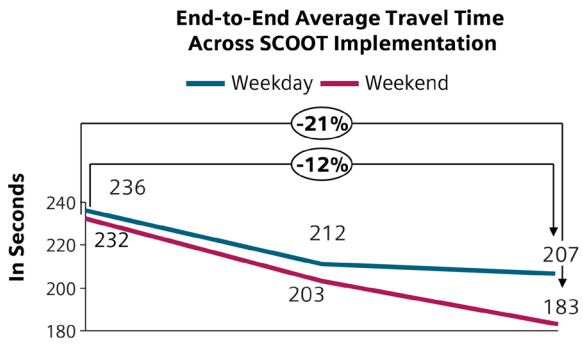
On-site travel behavior data had not been collected prior to SCOOT's implementation in Ann Arbor. Without a record of travel times prior to deployment, it seemed impossible to measure the difference SCOOT made.

But because StreetLight Data's metrics are derived from archival data going back to January 2014, Siemens could run analyses retroactively using StreetLight InSight®. In effect, the study "went back in time" to gather information that there was no other way to obtain.

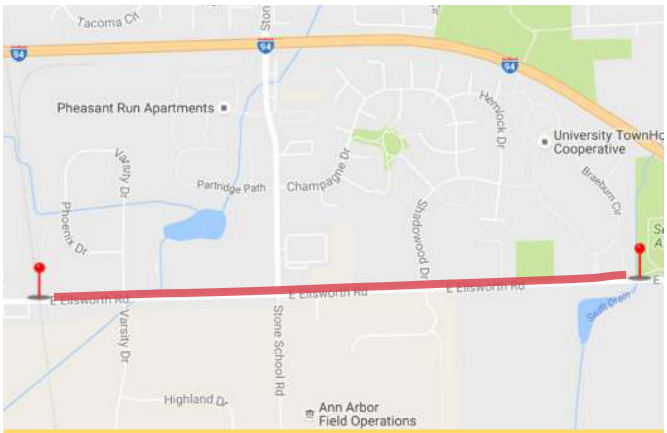
Siemens engineers studied Ellsworth Road, with high traffic volumes from drivers bypassing congestion on I-94. Located near the University of Michigan, Ellsworth Road is particularly congested when special events are held on campus.

Siemens ran a corridor analysis measuring travel times down Ellsworth before and after SCOOT was installed. The analysis studied more than 11,000 complete trips traveling along the entire length of the two-mile corridor, and an additional 30,000 trips that traveled along a portion of the corridor, but not from end to end.

The study took about an hour, at a fraction of the cost (approximately 25% or less) of using traditional sources.



Weekday and weekend travel time dropped significantly.



Heavily congested Ellsworth Road was chosen for corridor analysis.

Results: Clear Corridor Improvements

The performance study showed a dramatic change in congestion after SCOOT went into effect.

Overall, travel times improved by 10-20%. Weekday trips along the corridor took 12% less time and weekend trips took 21% less time than they did previously.

In addition, the likelihood of drivers completing the corridor in a timely manner increased, especially within the three-minute window. Before SCOOT, a driver could expect to navigate the corridor in less than three minutes only 15% of the time on an average weekday.

After implementing SCOOT, the likelihood of making it through the corridor in less than three minutes jumped to over 70%. Results were similar for the weekend, where the likelihood of making the trip in less than three minutes increased from 20% to more than 80%.

Performance studies like this from StreetLight InSight support a complete cost-benefit analysis. Accurate data helps cities confidently allocate taxpayers' valuable dollars to the most beneficial projects.