National Capital Region
Transportation Planning Board

2020 TPB Power Back-up & Signal Optimization Survey

Starting in 2005 with the first Traffic Signal Optimization survey TPB staff have conducted traffic signal surveys as part of the Unified Planning Work Program (UPWP). The Power Back-up survey was added in 2011. The 2020 surveys look to find conditions as of December 31, 2019.

TPB SIGNAL OPTIMIZATION SURVEY BACKGROUND

Signal optimization is a traffic engineering concept whereby traffic signals (often groups of signals in corridors and/or isolated systems) are (re-)timed to reduce delay for vehicles on the roadway system while ensuring safety.

TPB staff have conducted 4 previous optimization surveys in 2005, 2009 and 2013, 2018.

Originally conceived as a TERM in 2005.

TPB POWER BACK-UP SURVEY BACKGROUND

The 2011 Incident and Management and Response (IMR) action plan recommended that the region:

> *"Conduct an assessment of and expeditiously install back-up power for major traffic signals."*

TPB staff have conducted 7 power back-up surveys – 2011, 2012, 2012 (post Derecho), 2013, 2014, 2015, and 2018.

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2020 TPB Traffic Signals Survey Part 1: Power Backup

SECTION 1: Responder Information

1. Please provide your contact information.

Agency	
Name	
Job Title	
Telephone	
E-mail	

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SECTION 2: General Traffic Signal Statistics

2. How many signals are under your maintenance for signalized intersections?

No. of Signals

3. What technologies are used for the traffic signal power backup system in your organization?

- [ ] Battery-Based
- [ ] Generator-Based

Other (please specify)

4. How many signals have backup power?

Battery-Based Only

Generator-Based Only

Both Battery-Based and Generator-Based

Other Technology

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SECTION 3: Traffic Signal Battery Backup System Specifications

5. If applicable, please provide specifications for the battery-based power backup system.

Duration of Backup Power-Full Color Operations (hr)

Duration of Backup Power-Flash Mode Operations (hr)

Manufacturer and Model

6. Does the battery-based power backup system fit inside your traffic signal cabinet?

- ○ Yes
- ○ No
- ○ N/A

If no, what kind of accommodations do you have to do?

7. If applicable, how frequently do you routinely replace batteries so that they can maintain the designed performance?

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SECTION 4: Generator Based Traffic Signal Power Backup System Specifications

8. If applicable, please provide specifications for the generator-based power backup system.

Duration of Backup Power before Refilling- Full Color Operations (hr)

Duration of Backup Power before Refilling- Flash Mode Operations (hr)

Manufacturer and Model

9. Does your agency outfit signal controllers with generator plugs for portable generators?

- ◯ Always
- ◯ Sometimes
- ◯ Never
- ◯ N/A

10. Does your agency have generators dedicated primarily to power traffic signals?

- ◯ Yes
- ◯ No

11. If the answer to Question #11 is yes, how many generators dedicated to traffic signals does your agency maintain?

12. Can your agency access generators from other departments to provide power backups for traffic signals? From what other agencies? (check all that apply)

- ☐ Yes - Department of Transportation
- ☐ Yes - Department of Public Works
- ☐ Yes - Law Enforcement
- ☐ Other (please specify)

13. If the answer to Question #13 is yes, how many generators could your agency access?

14. Based on experience, how many signals could be run simultaneously by generators or battery backups during a widespread, long-term (24+ hours) power outage given your equipment and manpower?

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SECTION 5: Traffic Signal Operations under Backup Power

15. Does the power backup system change the mode under which traffic signals operate?

- ◯ Yes
- ◯ No

If yes, what mode do traffic signals operate under backup power?

16. Are traffic signals coordinated under backup power?

- ◯ Yes
- ◯ No

Other (please specify)

17. If applicable, does Emergency Vehicle Preemption (EVP) function under backup power?

- ◯ Yes
- ◯ No
- ◯ N/A

Other (please specify)

18. If applicable, does Transit Signal Priority (TSP) function under backup power?

- ◯ Yes
- ◯ No
- ◯ N/A

Other (please specify)

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SECTION 6: Procedures of Power Backup System Operations

19. Is there a procedure to prioritize the placement of the power backup system?

- ◯ Yes
- ◯ No

If yes, how is it established and is it associated with the identified evacuation routes?

20. If applicable, what are the policies/procedures/priorities for your agency to work with utility companies to restore the power to traffic signals?

21. If applicable, how does your agency coordinate with utility companies?

22. What other methods does your agency employ to control traffic flow at signalized intersections when widespread power outages inhibit the function of the traffic signal system? (check all that apply)

- ☐ Traffic barriers to divert vehicles or prohibit movements
- ☐ Dispatching traffic control officers
- ☐ Temporary stop signs
- ☐ Other (please specify)

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2020 TPB Traffic Signals Survey Part 1: Power Backup

SECTION 7: Additional Information

23. Is there any additional information you would like to share with us concerning the above questions or other topics?

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2020 TPB Traffic Signals Survey Part II: Signal Optimization

Responder Information

1. Please provide your contact information.

Agency	
Name	
Job Title	
Telephone	
E-mail	

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2020 TPB Traffic Signals Survey Part II: Signal Optimization

Traffic Signal Optimization (Timing) Questions

2. Number of signalized intersections (exclude firehouse, pedestrian crossing flashers, etc) under your maintenance in the National Capital Region as of December 31, 2019?

Number of Signals

3. Number of signals optimized/retimed at least once between January 1, 2017 and December 31, 2019 (3 year period)

Number of Signals Optimized

4. Technique(s) used for signal optimization/retiming (check all that apply)

- [ ] Computer based optimization (eg; Synchro)
- [ ] Active management using real-time observation
- [ ] Engineering judgement/Troubleshooting/Other
- [ ] Use of established Performance Measures
- [ ] None

5. Percentage of signals optimized by primary technique? (total adds up to 100)

1) Computer based optimization

2) Active managment using real time observation (if technique 1 not used)

3) Engineering judgement/Troubleshooting/Other (if techniques 1 and 2 not used)

4) None

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2020 TPB Traffic Signals Survey Part II: Signal Optimization

Cost and benefit analysis

6. What is the approximate annual budget of your signal optimization/retiming program?

7. Does your agency have a policy or standard for how frequently signals are optimized? If yes, please specify the most common applied standard.

8. Do you compile and report the results of your traffic signal timing efforts?

- Yes
- No

9. If yes, if possible please provide a web link to the document or email to: aburke@mwcog.org

10. If you want us to contact you regarding the signal optimization report please check the box below

- contact us

If you have any questions, please contact MWCOG/TPB staff member Andrew Burke:

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More information regarding traffic signal activities in the National Capital Region can be found at the link below: