Cisco Meraki

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Solution Guide

MS Series: Ethernet Power Study

AUGUST 2016

This document explores the power saving benefits that Cisco Meraki switches can bring to your Ethernet fabric by adding intelligence and reducing power consumption.

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1 Introduction

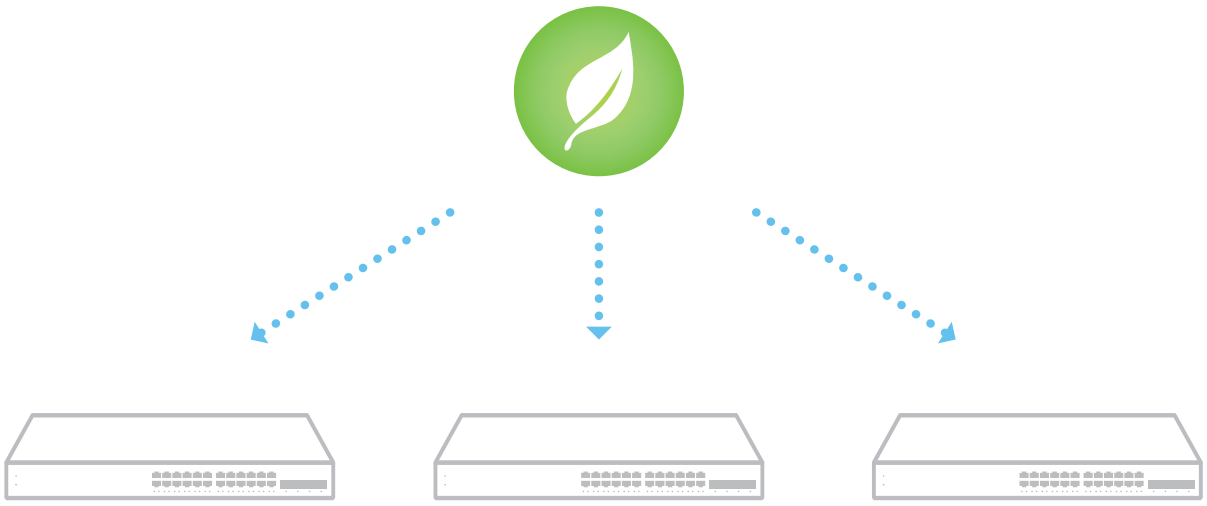
In today's economic climate, businesses are looking for new ways to shave costs and reduce operating expenses of their IT networks. This can typically be achieved by investing in technologies that provide monitoring and centralized management of network and powered devices.

A business armed with information, technology, and the ability to easily and intelligently control powered network devices can see cost savings of up to $270,000 over a 5-year deployment — including 750 tons of CO2 emissions reductions[1]. This return on investment often spans far beyond recovering original technology costs to include benefits such as improved building security and fostering an employee culture for environmental responsibility.

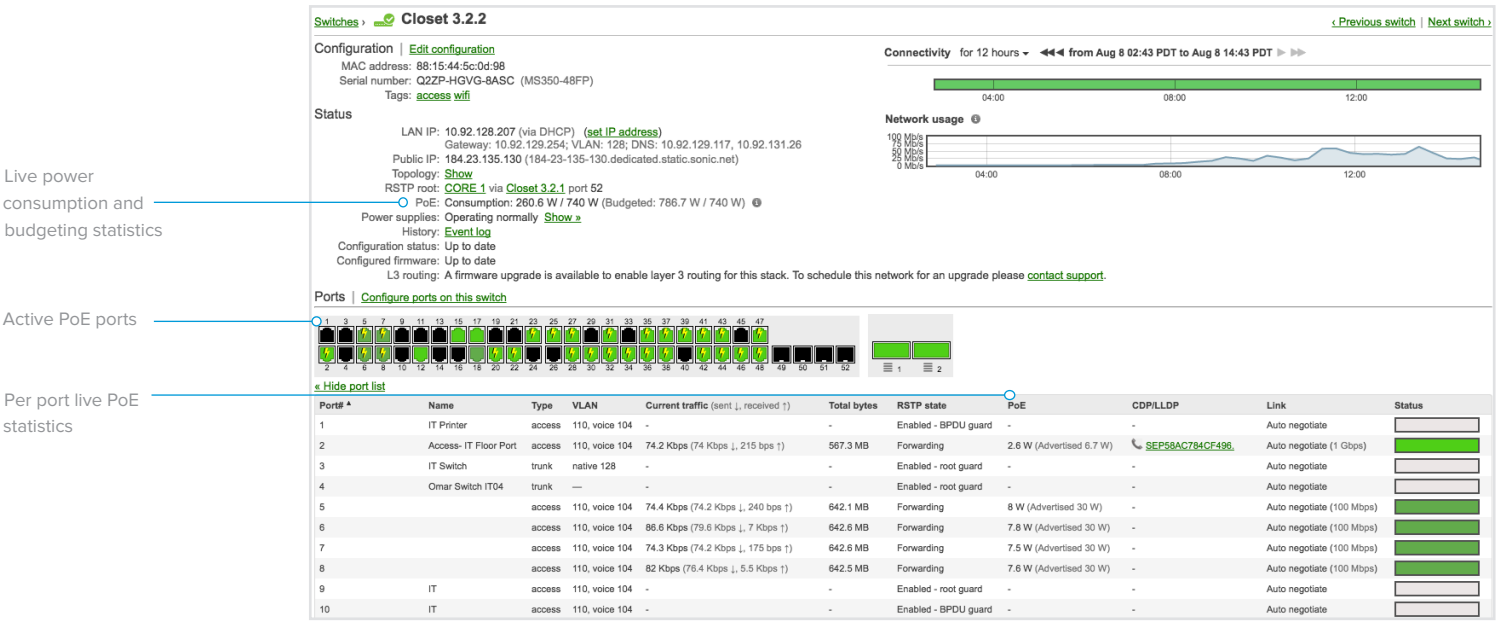
Leveraging Meraki switches to reduce energy costs in the network edge

Adding energy efficiency to IT operations is typically done with a focus on the network edge, which includes devices like IP phones, desktop workstations, wireless APs and other PoE or network access devices. For maximum efficiency, a powerful, easy-to-use, and centrally managed platform is key.

Meraki's unique cloud platform enables IT organizations of any size to rapidly deploy energy-saving policies to the entire network edge using a browser-based interface — without the need for additional hardware or training.



[1] The California Public Utilities Commission (CPUC) average emissions rate is 0.524 lbs CO2 per KWh generated electricity.



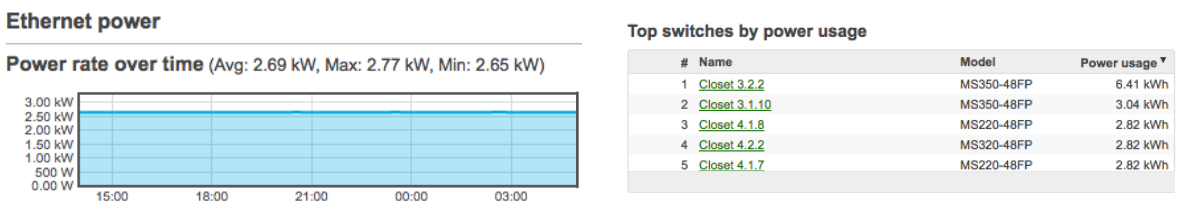
Adding intelligence to powered network devices

PoE devices such as IP phones are becoming more prominent as businesses adopt new technologies. This creates additional opportunities for cost savings through the reduction of off-hour energy consumption.

Meraki switches add several intelligent features to your network for monitoring power draw. By leveraging standard protocols, Meraki's cloud readily displays real-time PoE information on a per port, per device, and global switch basis. This data can quickly be analyzed to determine how much power draw your PoE devices are consuming in a given 24-hour period.

Additionally, Meraki switches perform intelligent PoE budget allocation by analyzing discovery protocols for device-advertised power requirements. This means your PoE switch budget is used more efficiently across all of your switch interfaces.

A variety of real-time and historical power consumption reporting is also directly available in the Meraki Dashboard. Ethernet power reporting is available via the network summary report for any switching network. This provides deep visibility into the power consumed (in kW) by the network over a specified time period and also collectively by the entire network. You can even view switches by power consumption to find switches with heavy consumption.



2 Enhancing Energy Efficiency with the Cisco Meraki Cloud

Port Scheduling

Meraki's Port Scheduling feature allows you to define one or more weekly reoccurring schedules that can be applied to selected switch ports within your network. For example, a typical office building may have an 8am – 6pm operating schedule. Taking this into account, the IT team that manages the network could create a new port schedule, as shown in Figure 1.

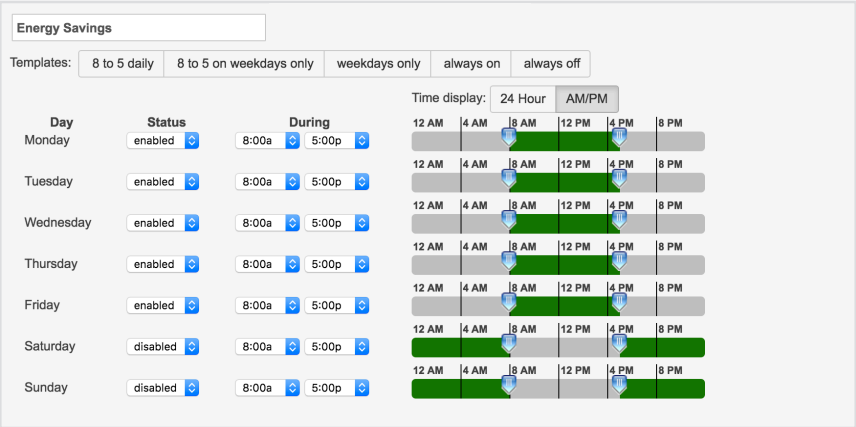


FIGURE 1: CREATING AN ENERGY-SAVING PORT SCHEDULE IN MERAKI'S DASHBOARD

This new schedule can then be applied to all access ports throughout the building with a single dashboard click using Meraki's virtual stacking technology. In Figure 2 below, you'll see that a subset of 18 ports (across 4 switches) have been selected and configured with the new schedule.

Configured within minutes, this port schedule can add significant cost savings for the life of the deployment as well as provide additional security in the building during off-hours.

With the power of Meraki's cloud, configuring and deploying a repeating port schedule to switch ports across your building, campus, branch locations, or any switch deployment is done with incredible ease.

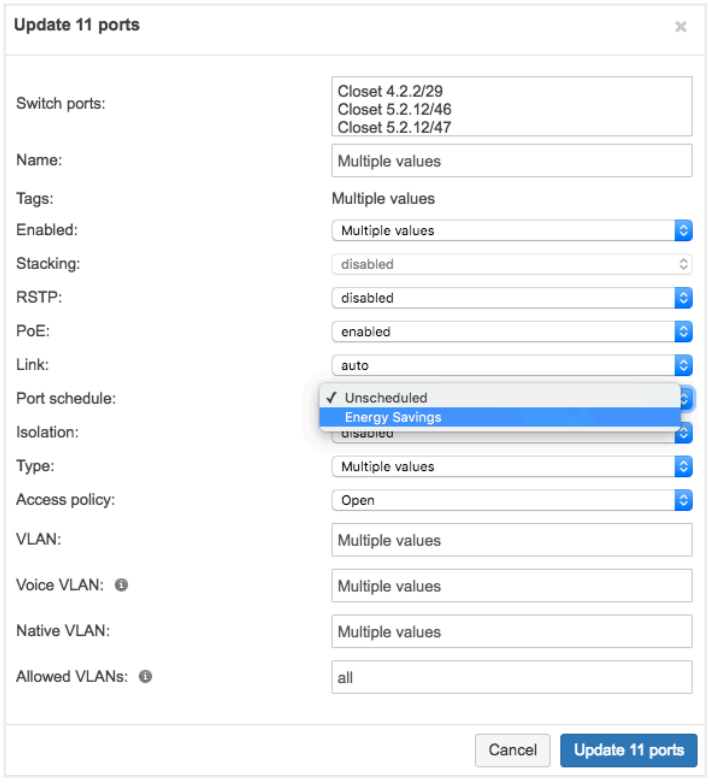
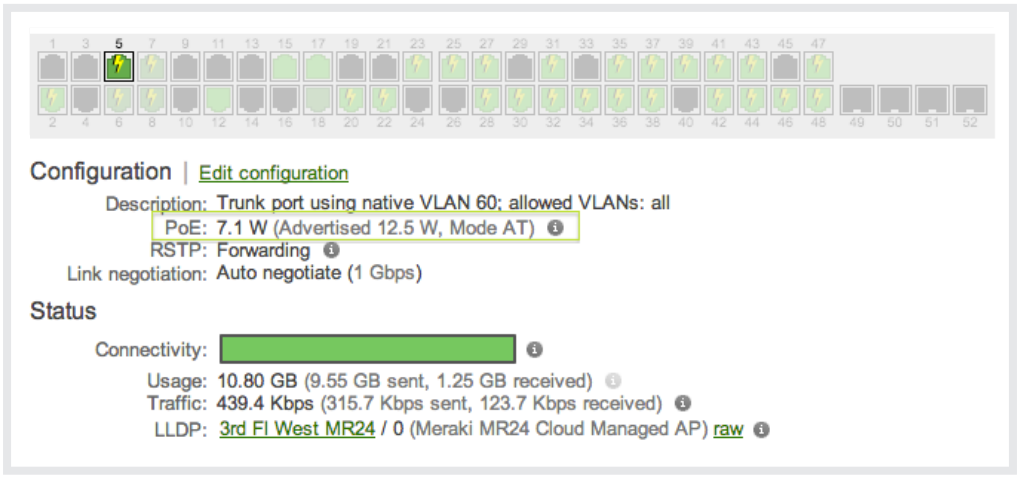


FIGURE 2: APPLYING ENERGY-SAVING PORT SCHEDULE TO SELECTED PORTS ACROSS SEVERAL SWITCHES

Smart power budgeting

The Meraki dashboard supplies detailed, real-time statistics about your PoE devices and overall switch power budget usage. Additionally, using discovery protocols, the switch will snoop for — and only allocate — the advertised power amount per device. This adds efficiency to per-port power budget allocation and also provides IT administrators with detailed power consumption information.

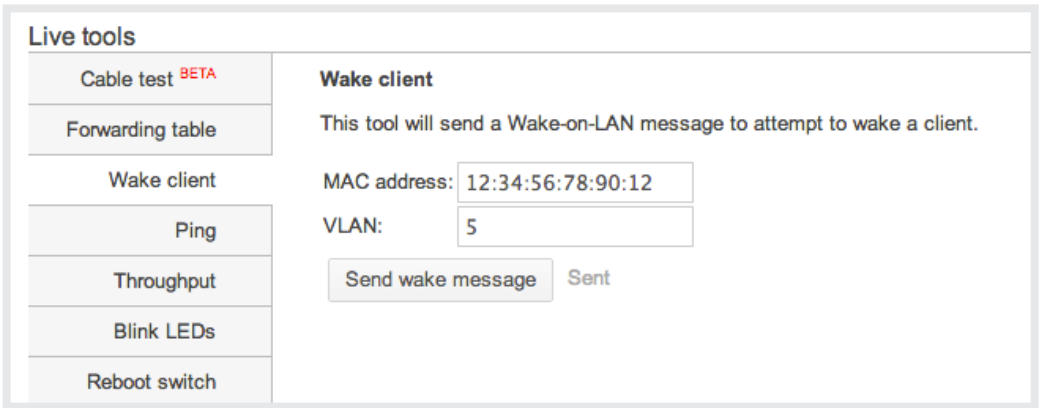


PoE
8 W (Advertised 12.5 W)
10.9 W (Advertised 12.5 W)
7.6 W (Advertised 12.5 W)
8.5 W (Advertised 12.5 W)
-
3.1 W (Advertised 4.4 W)
3.3 W (Advertised 4.4 W)
-
3.2 W (Advertised 4.4 W)
-

Wake on LAN (WoL) Live tool

Adding energy-saving policies directly to access devices, such as workstations, can also significantly contribute to energy savings. However, from time to time it may be necessary to remotely wake or access a device that is in a low power state.

Cisco Meraki switches include a feature that allows administrators to send WoL (Wake on LAN) packets to a specified device in order to wake it up. This live tool can save lots of time yet still allow for administrators to wake — and gain network access to — a device in standby.



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3 Power Study

Meraki tested the impact of port scheduling on a typical[2] enterprise switch deployment in order to highlight the impact of this easy-to-use yet powerful feature. All four models were tested (MS220-24, MS220-24P, MS220-48, MS220-48LP) and our findings were documented.

A port schedule was created and then applied to all access ports on the test switches. This included all ports except the uplink (trunk) port. This schedule could be applied during off-hours to disable all access ports when devices are not in use.

A control test was run with all ports active for a 24-hour period. Subsequently, a second test was run to capture the impact of the activated port schedule, again for a 24-hour period. This test procedure was repeated for all four models, with a 75% (285W) PoE power draw added to the PoE model switches. The results were then compared to highlight the change impact of the applied port schedule.

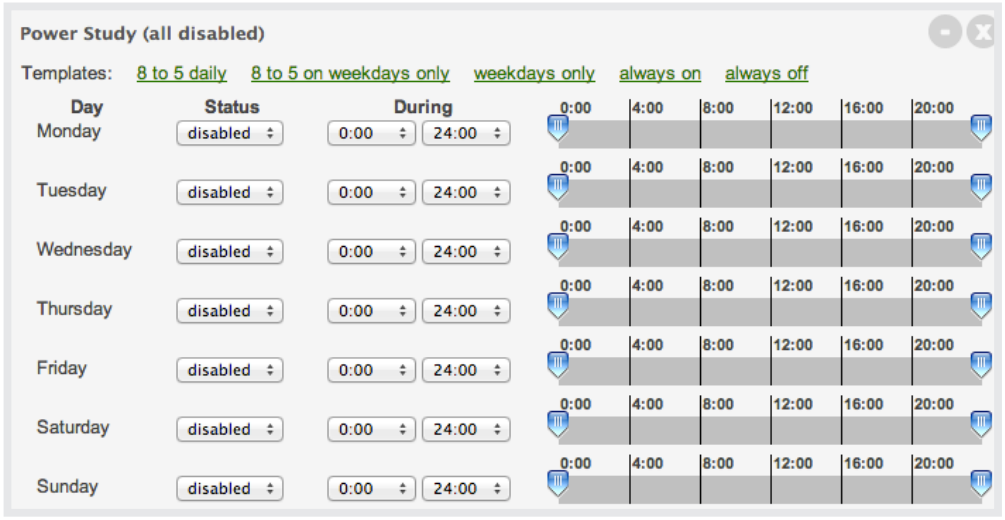


FIGURE 3: PORT SCHEDULE FOR POWER STUDY TESTING

All On (MS220-48LP)

Port Schedule Active (MS220-48LP)

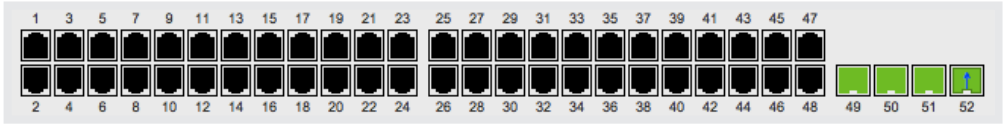


FIGURE 4: SWITCH INTERFACE VIEW FOR TEST SCENARIOS

[2] Typical Enterprise deployment consisted of each switch with all interfaces connected including 75% (285W) PoE draw.

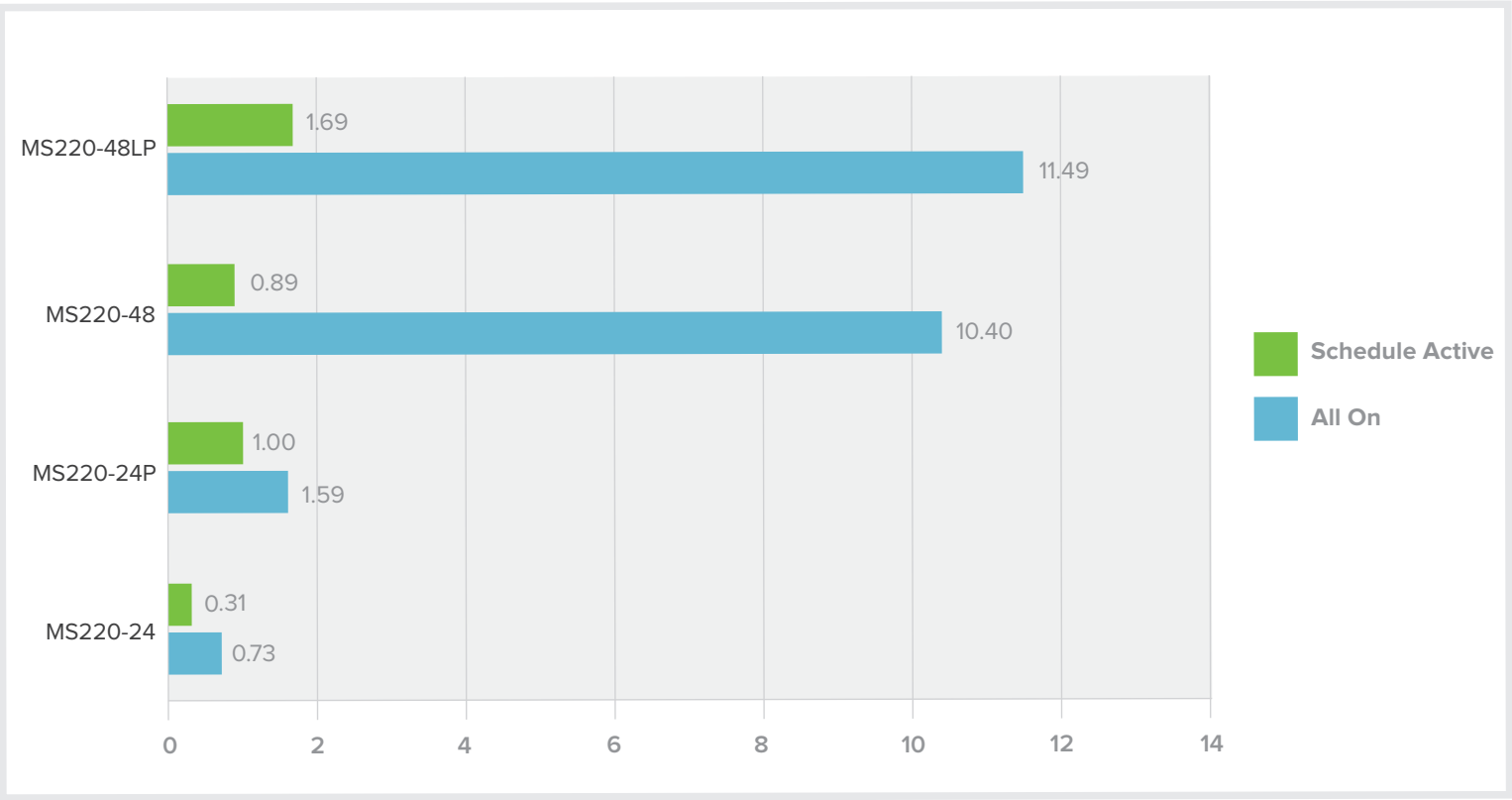


FIGURE 5: POWER CONSUMPTION DATA FOR TEST SCENARIOS

Figure 5 above highlights the results found across all four models in the MS series. The “All On” field is used to describe a switch that had all available interfaces connected and active, including a 75% active PoE draw from the power budget on the PoE model switches. The “Schedule Active” field describes the same setup but with a Port Schedule defined and applied to all access ports (only uplink and trunk ports remained enabled). While this exemplifies aggressive power savings, it highlights the difference between the two cases.

As evident in the findings highlighted above, the switches that had an active Port Schedule applied to all access ports saw a significant reduction in power consumption (KWh). If you take a typical enterprise switch deployment into consideration, a 5-year average technology lifespan is common. When applying these power savings to a 5-year energy cost calculation, the cost savings are even more substantial.

Deployment Scenario	Number of Locations	Switch Quantities (per location)
Distributed Enterprise	8	5 of each model (MS220-24, MS220-24P, MS220-48, MS220-48LP)
Campus Deployment	1 (multi-building)	75 of each model (MS220-24, MS220-24P, MS220-48, MS220-48LP)
Branch Deployment	50	2 of each model (MS220-24P, MS220-48LP)

Let's take a look at the cost savings analysis across several common deployment scenarios. Figure 6 below illustrates the five-year cost savings that can be achieved when configured in a multi-branch deployment, a distributed enterprise deployment, and a campus switch deployment.

If we take the findings highlighted in Figure 3 of our power study above and an average cost of 9.87 cents[3] per KWh, the five-year energy savings achieved can be up to $270,000, including 750 tons of CO2 emissions reductions[4].

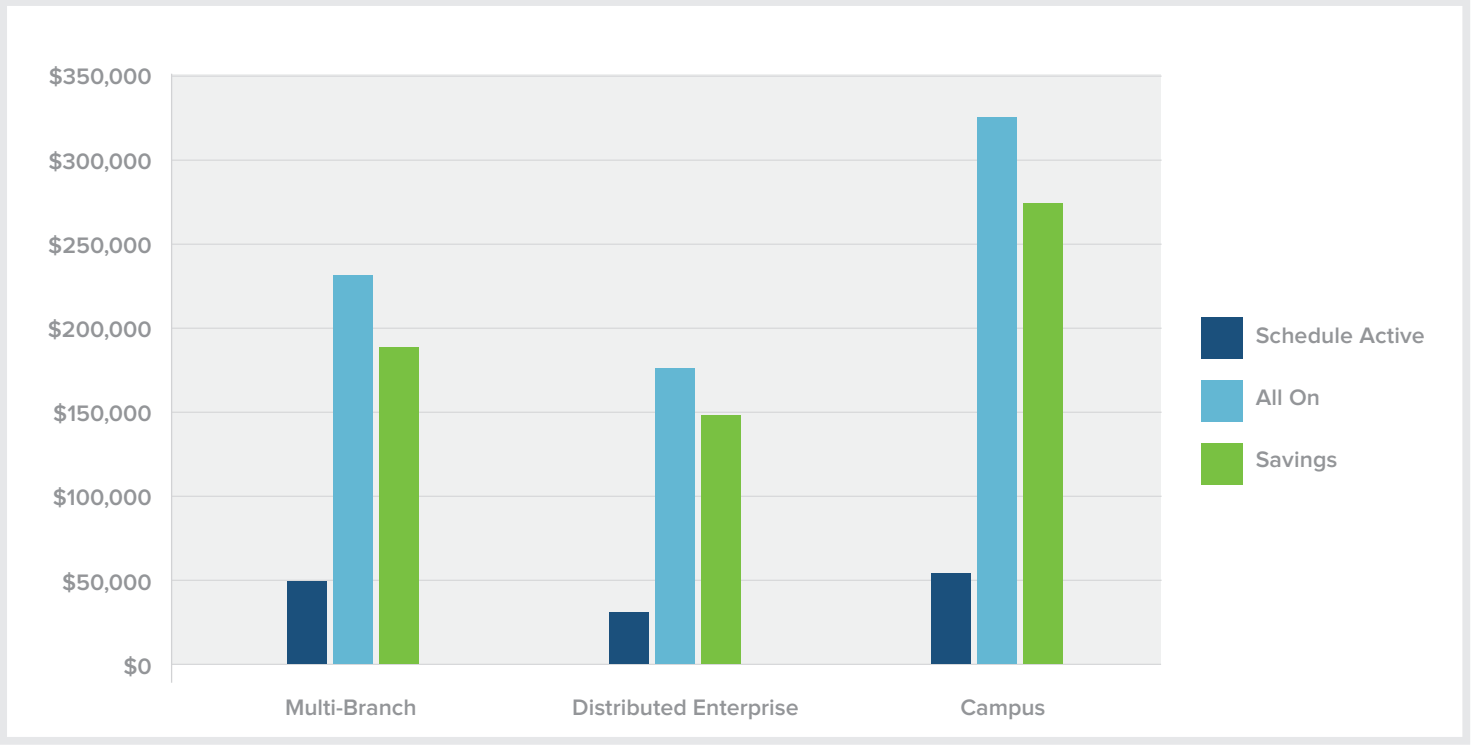


FIGURE 6: ENERGY SAVINGS AND ROI ON 5-YEAR DEPLOYMENT

[3] Average National Retail Price of Electricity in 2012 according to the U.S. Energy Information Administration (EIA).

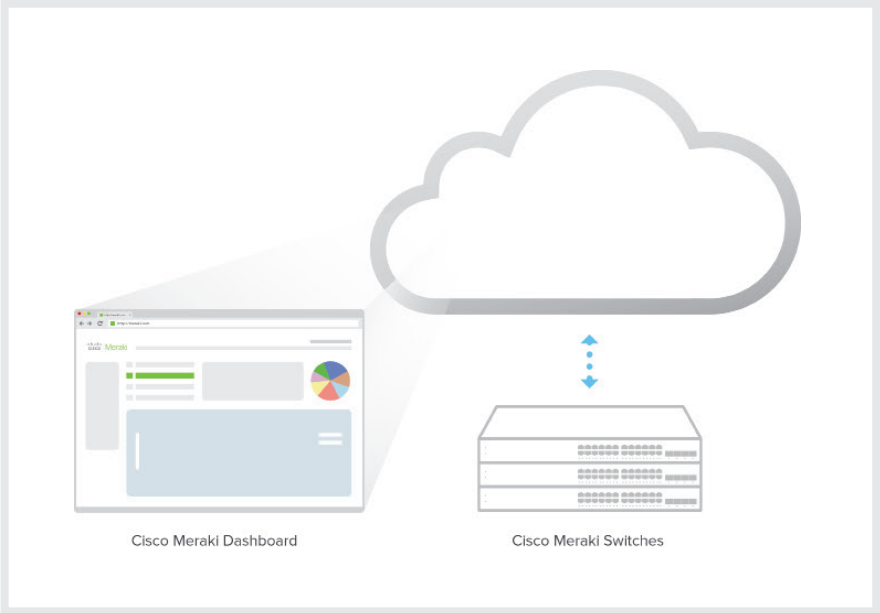
[4] The California Public Utilities Commission (CPUC) average emissions rate is 0.524 lbs CO2 per KWh generated electricity.

4 Competitive Analysis

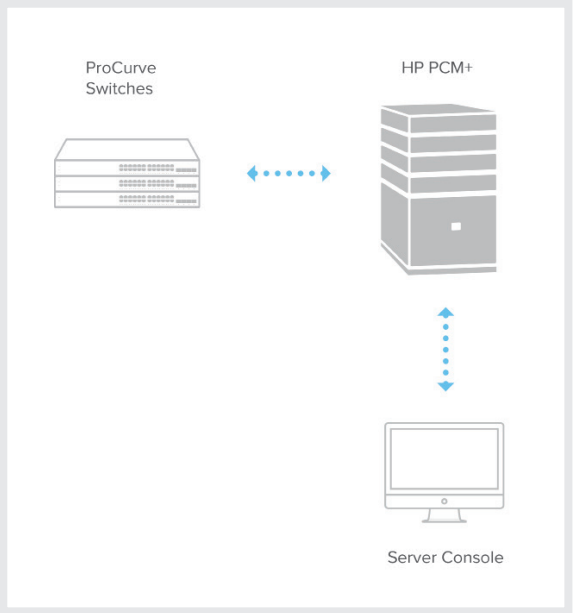
Creating port schedules using Meraki's dashboard takes only three clicks, and doesn't require in-depth training — so it's easy to begin reaping the cost savings of this feature. Let's take a look at a locally managed vendor's solution for comparison.

Being able to configure port scheduling on locally managed switches typically requires hosted management platforms or 3rd-party integration and software. For example, let's investigate a typical setup required for an HP ProCurve switch deployment.

To set up and configure port scheduling, the HP network management utility ProCurve Manager Plus (PCM+) and CLI knowledge are both required. After following HP's deployment guide for port scheduling, which consists of staging the necessary port CLI commands and then scheduling them, a port schedule can be enforced.



MERAKI ARCHITECTURE



HP ARCHITECTURE

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This setup is cumbersome and requires additional investments, on-premise hardware, and advanced knowledge of HP's CLI. In order to manage multiple distributed switch deployments, each site would require a PCM+ instance and/or licensing. Meraki's solution is plug-and-play, does not require any additional hardware overlay, and all features are included.

	Cisco Meraki MS Series	HP ProCurve
Feature License	Included, Standard Enterprise license	Separate per-device license
Overlay management platform	Included, Meraki Cloud	HP ProCurve Manager Plus server at a cost of up to $29,000
Complexity	Browser Based, one-click Virtual Stacking technology	Graphical user interface with CLI knowledge required

5 Conclusion

Using Cisco Meraki switch port scheduling can introduce significant annual cost savings and carbon emission reductions for your organization. This feature can also provide network security by making the shutdown of non-critical ports easy. Coupled with additional features like smart power budgeting and Wake on LAN technologies, the Meraki MS switch facilitates intuitive, centralized management of energy-efficient networks.

Providing this level of control empowers network administrators to quickly deploy intelligent and efficient configuration settings to one or even thousands of network ports across their switch fabric for the life of their switch deployment. By using Cisco Meraki switches, administrators can count Enterprise grade hardware powered by cloud-based software.

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[1] Nécessite l'éligibilité à des critères définis par Cisco Meraki, vérifiez que vous êtes éligible sur le site de Cisco Meraki