



# Configuring EnergyWise

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

## Prerequisites for Configuring EnergyWise

### Prerequisites for Wake on LAN

- Check that you have enabled Wake on LAN (WoL) in the BIOS and the NIC of the PC that you want to wake up. Refer to your PC documentation for instructions on how to enable WoL in the BIOS and the NIC.
- WoL packets are sent as Layer 2 broadcast packets. To prevent broadcast storms, remove loops by using the Spanning Tree Protocol (STP).

- Check that an EnergyWise WoL query always has a name or keyword attribute associated with it. The importance, name, and keyword fields in the WoL query packet refer to attributes set on the interface that the PC connects to. WoL packets are sent only from interfaces where the name or key word attribute is set, which prevents broadcast storms. For example, enter this command:

```
DomainMember# configure terminal
DomainMember(config)# interface gigabitethernet 0/1
DomainMember(config-if)# energywise name PC-1
DomainMember(config-if)# end
DomainMember(config)# end
DomainMember# energywise query importance 100 name PC-1 wol mac <mac-address>
```

### Related Topics

[Using WoL with a MAC Address](#), on page 27

[Using WoL Without a MAC Address](#), on page 28

[Wake on LAN](#), on page 10

## Restrictions for Configuring EnergyWise

### Voice over IP and the Emergency Calling Services



#### Warning

Voice over IP (VoIP) service and the emergency calling service do not function if power fails or is disrupted. After power is restored, you might have to reset or reconfigure equipment to regain access to VoIP and the emergency calling service. In the USA, this emergency number is 911. You need to be aware of the emergency number in your country. Statement 361.

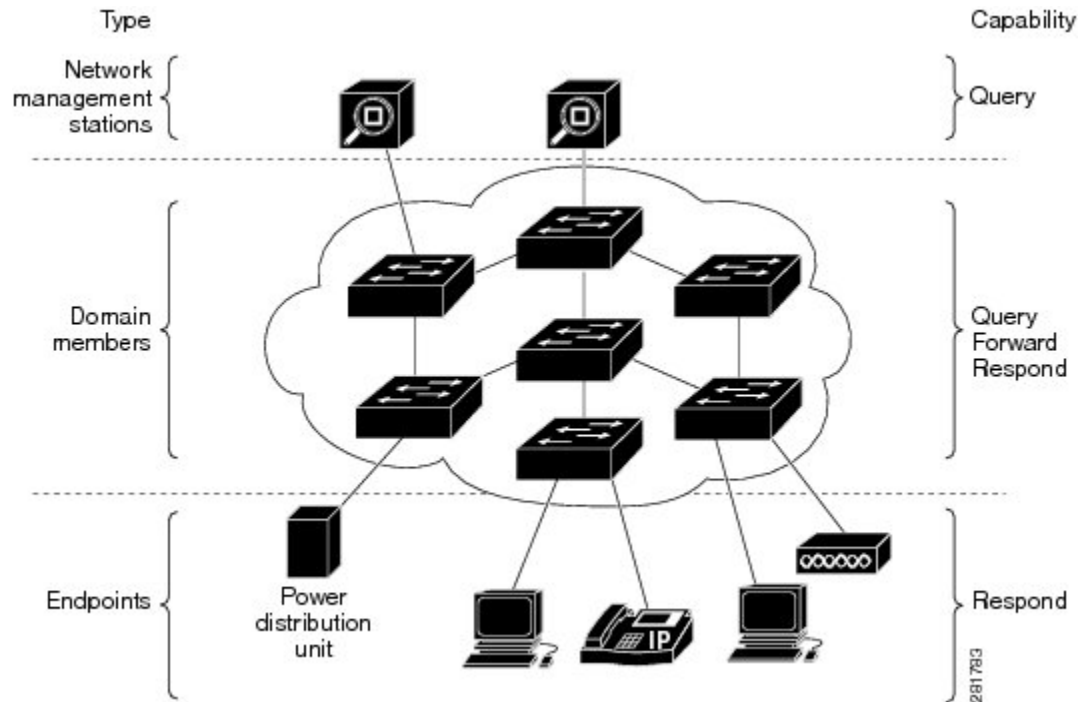
For more information, see the "Important Notice" appendix.

## Information About Configuring EnergyWise

### Cisco EnergyWise Network

In a network, Cisco EnergyWise monitors and manages the power usage of network devices and devices connected to the network.

Figure 1: Cisco EnergyWise Network



- **Management stations**—Control applications and devices that use EnergyWise to monitor and manage the power usage of domain members and endpoints. Management stations also send queries to domain members.
- **Domain members**—This group includes Cisco switches, routers, and network devices. They forward messages across an EnergyWise domain to endpoints. They also forward and reply to queries from the management station and other domain members and aggregate power-usage information from the endpoints.
- **Endpoints**—Devices that are connected to a domain member and that use power. They respond to queries but do not send or forward them. You can install the SDK library on IP endpoints. A Cisco EnergyWise domain member can also use SNMP to communicate with endpoint devices.

Domain members and endpoints receive power from an AC or DC power source or a power supply.

PoE domain members and endpoints also receive power from PoE switches or Cisco EtherSwitch service modules. For example, IP phones and access points connected to a PoE switch receive power from the switch.

## EnergyWise Domain

A Cisco EnergyWise domain is considered to be one unit of power management. The domain consists of Cisco networking devices, Power over Ethernet (PoE) endpoints, and endpoints running agents that are built using the software development kit (SDK) library. This domain is similar to a network-management community such as a VLAN Trunking Protocol (VTP) domain.

For example, if you have a building with a core router, 10 access switches, and 400 endpoints, such as phones, access points, and PCs, you can create an EnergyWise domain called MyBuilding with the router and switches as domain members.

If you want to implement power management applications on a management station and endpoints, all the domain members must run Cisco EnergyWise Version 2.6 or later.

After you enable and configure EnergyWise on the core router and access switches, the MyBuilding domain configures itself. Neighbor relationships are set among the domain members.

- Domain members use CDP when it is enabled or EnergyWise UDP messages to automatically discover neighbors.
- You can manually configure static neighbors.

Each domain member sets up a parent-child relationship with an attached endpoint. For example, an IP phone (child) is connected to a PoE switch (parent), or a PC (child) is connected to a router (parent).

After the domain is set, a domain member can forward queries and control messages to other domain members and endpoints. You can do the following:

- Use SNMP or a management station to query every domain member or endpoint.
- Use the domain member CLI to run an EnergyWise query to receive or set power usage information.
- Use a management application, server, or domain member CLI to define power usage policies or receive power usage information.

#### Related Topics

[Configuring Domain Member or Endpoint Attributes](#), on page 14

[Examples: Setting the Domain](#), on page 32

## Power Level Energy Management

Cisco EnergyWise uses a set of power levels to consistently manage power usage. A power level is a measure of the energy consumed by devices in an EnergyWise network.

The range is from 0 to 10. The default is 10.

**Table 1: Power Levels**

Category	Level	Description
Operational	10	Full
Operational	9	High
Operational	8	Reduced
Standby	7	Medium
Standby	6	Frugal
Standby	5	Low
Standby	4	Ready
Standby	3	Standby
Nonoperational	2	Sleep

Category	Level	Description
Nonoperational	1	Hibernate
Nonoperational	0	Shut

The devices in an EnergyWise network can be from different manufacturers.



**Note** A Cisco switch does not support level 0. You cannot turn off the power on a switch.

A PoE endpoint, such as an IP phone, receives power from a PoE switch port. The following are the PoE endpoint power characteristics:

- The power level applies to the port.
- The port supports levels 0 to 10.
- If the port power level is 0, the port does not provide power to connected endpoints.
- If the power level is between 1 and 10, the port is operational.

## Attributes

The following table describes Cisco EnergyWise attributes.

**Table 2: Cisco EnergyWise Attributes**

Attribute	Definition	Defaults
Importance	Device rating based on the business or deployment context.	The range is from 1 (least important) to 100 (most important). The default is 1.
Keywords	Device description (other than the name or role) for which query results are filtered.	None.
Name	Device identity for which query results are filtered.	For a PoE port, the short version of the port name. For example, Gi0.2 for Gigabit Ethernet 0/2. For a domain member, the hostname. For an endpoint, see the endpoint documentation. We recommend that you use the hostname.
Role	Device function based on the business or deployment context.	For a PoE port, the default is interface. For a domain member, the default can be the model number or the supervisor model number. For an endpoint, see the endpoint documentation.

**Related Topics**

[Configuring Port Attributes](#), on page 18

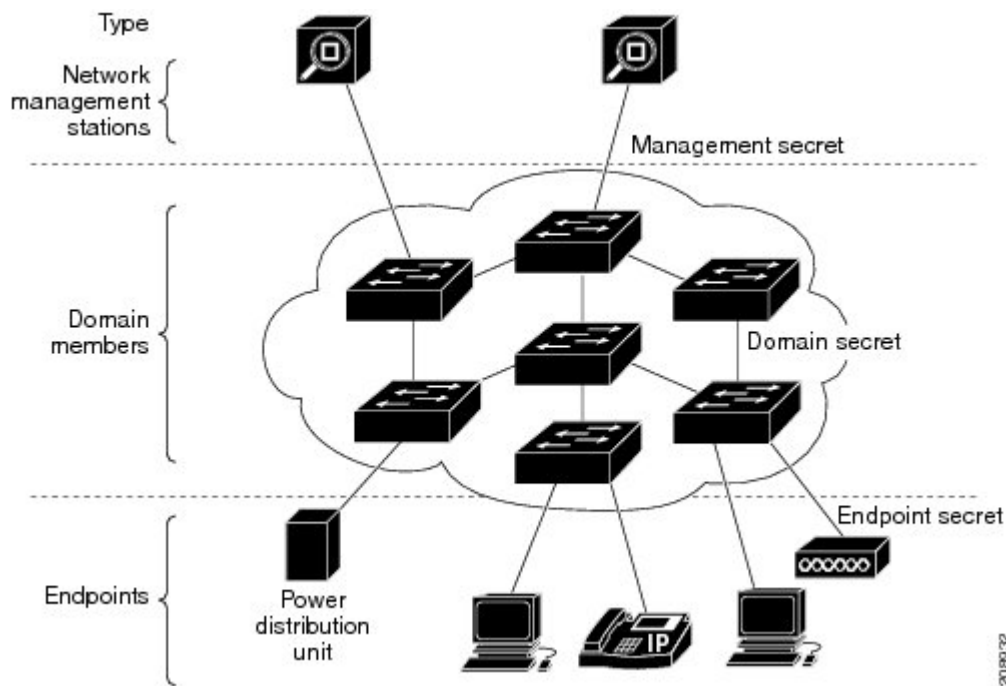
# Security

A Cisco EnergyWise network has three levels of security to prevent unauthorized communication.

- The management secret authenticates communication between the domain members and the management station.
- The domain secret authenticates communication between domain members.
- The endpoint secret authenticates communication between domain members and endpoints.

The network enforces security with *shared secrets*, also referred to as passwords.

**Figure 2: Cisco EnergyWise Security Levels**



# Recurrences

A recurrence is an event that repeats on a regular schedule. You can use this feature to schedule jobs to run periodically or at certain times or date. For example, you can configure the domain member to power an endpoint or interface on and off based on the time or date.

A recurrence uses the domain member time.

When configuring recurrences, you specify the time in CRON format (24-hour format). Cron is the time-based job scheduler in Unix computer operating systems.

When a recurrence occurs, changes to the Cisco EnergyWise power level exist only in the running configuration and are not saved in the startup configuration. If the domain member fails and then restarts, it uses the power level in the saved startup configuration.

### Related Topics

[Configuring Recurrences](#), on page 20

## Time Format and Time Zone

For time format, use the 24-hour clock. The time zone is based on the domain member.

- To set a recurrence at a specific time, enter the **energywise level *level* recurrence importance *importance* at *minute hour day\_of\_month month day\_of\_week*** interface configuration command.

For example, to configure a recurrence that occurs every day at 06:34, enter the **energywise level *level* recurrence importance at 34 6 \* \* \*** command.

- *minute* is 34.
  - *hour* is 6.
  - *day\_of\_month* is the wildcard (\*) for every day in the month.
  - *month* is the wildcard (\*) for every month.
  - *day\_of\_week* is the wildcard (\*) for every day in the week.
- To set 06:34 in a time range, enter the **absolute 06:34 \* \* 2009** and the **periodic 06:34** interface configuration commands.



**Note** When configuring recurrences, do not schedule multiple recurrence events to start at the same time. We recommend that you configure events at least 15 minutes apart.

## Day of the Month and Day of the Week Recurrences

When you use the *day\_of\_month* and the *day\_of\_week* variables in the **energywise level *level* recurrence importance *importance* at *minute hour day\_of\_month month day\_of\_week*** interface configuration command, follow these guidelines:

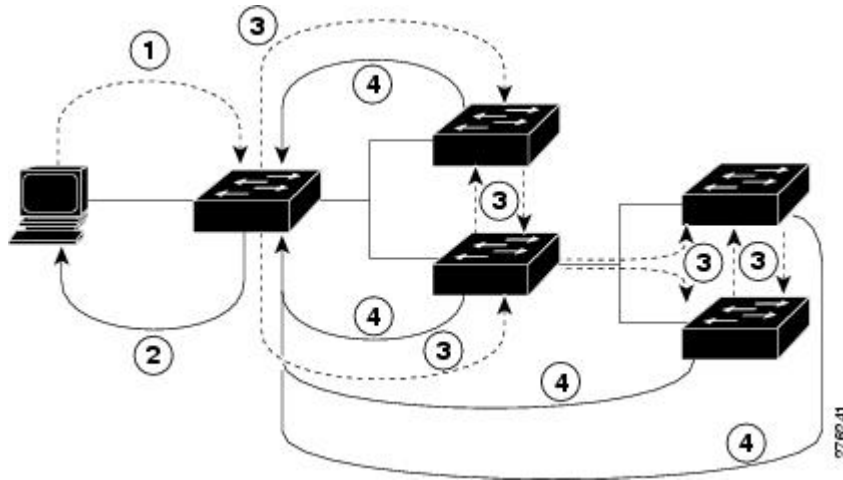
- The recurrence occurs when either the *day\_of\_month* or the *day\_of\_week* occurs first (in releases earlier than the Cisco EnergyWise Version 2.7 releases). See the *Release Notes for Cisco EnergyWise, EnergyWise Version 2.7* on Cisco.com for software releases with Cisco EnergyWise Version 2.7.
- If you specify both the *day\_of\_month* and the *day\_of\_week*, the event occurs when either the *day\_of\_month* or the *day\_of\_week* is first.
- If you specify the *day\_of\_month* and use a wildcard (\*) for the *day\_of\_week*, the event occurs on the *day\_of\_month*.
- If you use a wildcard for the *day\_of\_month* and specify the *day\_of\_week*, the event occurs on the *day\_of\_week*.
- If you use wildcards for both the *day\_of\_month* and the *day\_of\_week*, the event occurs on any day.

# Queries

The management station sending a query receives all the power-usage responses from the EnergyWise domain. The domain members use neighbor relationships to forward the query.

For secure communication, the domain members use a shared secret and send only authenticated queries to the endpoints.

**Figure 3: Query Requests and Replies**



**Table 3: Query Requests and Replies**

Number	Process
1	The management station sends queries and messages to the domain.
2	The domain member replies to queries and messages from the management station.
3	The domain member sends queries and messages to other domain members and endpoints.
4	The domain member replies to queries and messages from other domain members and endpoints.

EnergyWise supports the following query types:

- Collect—Receives power-usage information in watts (W) from the domain members and endpoints.
- Save—Saves the running configuration of a domain member. Use the **energywise allow query save** global configuration command.
- Set—Changes the power level of a domain member or endpoint in the running configuration.
- Sum—Summarizes the information from domain members and endpoints.

You can use these attributes to filter the results:



- Importance—Rate your devices based on the business or deployment context. For example, a desk phone has a lower importance than a business-critical emergency phone. The range is from 1 (least important) to 100 (most important). The default is 1.
- Keywords—Describes the device (other than the name or role).
- Name—Identifies the device.
- Role—Specifies the device function based on the business or deployment context.
- Usage—Specifies the energy usage type of the Cisco EnergyWise device. The default is consumer.
  - All—Devices of all usage types.
  - Consumer—A device that consumes power, such as a switch.
  - Meter—A device that measures the pass-through power, such as a power distribution unit (PDU) that sends power from a source to a connected device.
  - Producer—A device that generates power, such as a solar panel.

The query results show domain members and endpoints with importance values less than or equal to the specified value in the query.

#### Related Topics

[Examples: Querying to Analyze Domains](#), on page 35

[Examples: Querying with the Name Attribute](#), on page 35

[Examples: Querying with Keywords](#), on page 36

[Examples: Querying to Set Power Levels](#), on page 36

## Activity Check

You can use this feature to ensure that the switch does not power off a phone that is in use. For example, if you have a Cisco IP phone connected to a PoE port and activity check is enabled, the switch does not power off the phone if it is sending or receiving voice traffic. If the phone is not in use, it powers off within approximately 1 minute. If a PC is connected to the switch port of the phone, the PC loses network connectivity when the phone is powered off.

You can configure activity check on these Cisco devices:

- Cisco Catalyst 4500 and 6500 series switches.
- Cisco Catalyst 3850, 3750-X, 3750-E, 3750, 3650, 3560-X, 3650-E, 3560, 2960, 2960-X, 2960-XR switches.
- Cisco Industrial Ethernet (IE) 2000, 3000, and 3010 series switches.
- Cisco EtherSwitch service modules (NME-16ES-1G, NME-16ES-1G-P, NME-X-23ES-1G, NME-X-23ES-1G-P, NME-XD-24ES-1S-P, NME-XD-48ES-2S-P).
- Cisco enhanced EtherSwitch service modules (SM-D-ES2-48, SM-D-ES3-48-P, SM-D-ES3G-48-P, SM-ES2-16-P, SM-ES2-24, SM-ES2-24-P, SM-ES3-16-P, SM-ES3-24-P, SM-ES3G-16-P, SM-ES3G-24-P).

#### Related Topics

[Configuring Activity Check](#), on page 26

## Wake on LAN

Wake on LAN (WoL) is an Ethernet computer networking standard that uses a network message called a magic packet to wake up an endpoint device. The magic packet contains the MAC address of the destination endpoint device (typically a PC). For example, you can send a WoL magic packet to a PC. The listening PC waits for a magic packet addressed to it and then initiates the system to wake up.

WoL is implemented on the motherboard (BIOS) and the network interface. It is operating-system independent. WoL could be disabled by default on some PCs.

### Related Topics

[Using WoL with a MAC Address](#), on page 27

[Using WoL Without a MAC Address](#), on page 28

[Prerequisites for Wake on LAN](#), on page 1

## WoL with Cisco EnergyWise

You can configure the EnergyWise domain member to send a WoL magic packet to a specific endpoint device or all endpoint devices in the EnergyWise network. When a WoL-enabled PC is connected to the domain member, it receives the WoL magic packet and the power level of the PC changes from nonoperational to operational.

Some network interface cards (NICs) have a SecureOn feature with which you can store a hexadecimal password within the NIC. When you send WoL packets to NICs with SecureOn, the NICs store this password as part of the packet, making the wake up process secure. If the PC you are trying to wake up has an NIC that supports SecureOn, the domain member must send a magic packet with the hexadecimal password to power on the PC.

## Configuration Guidelines

### Enabling Cisco EnergyWise and Powering Devices

By default, Cisco EnergyWise is disabled on the domain member.

If you enter the **no energywise level** interface configuration command, the domain member does not immediately change to the default power level. The power level changes when you restart the domain member or enter the **energywise level level** command.

#### Domain Member with PoE Ports

For a domain member with PoE ports, such as a PoE-capable switch:

- When you add an endpoint to an EnergyWise domain, it becomes an EnergyWise domain member and EnergyWise is enabled on the new domain member and all the PoE ports.
- When you use the **energywise level 0** interface configuration command, the port does not provide power to connected endpoints.
- You cannot use the **energywise level 0** global configuration command to power off the domain member.

### Error-Disabled Ports

If a port is error-disabled:

- It appears as an EnergyWise domain member or endpoint in the **show** command output and in the *collect* query results. The query results show that the port uses 0 watts.
- It does not respond to a *set* query.

## PoE and EnergyWise Interactions

You can configure EnergyWise on the port and configure the port power level.

The following table shows you how to find out if a domain member port participates in Cisco EnergyWise. For each combination of port and PoE mode check the matrix entry, if it is **Yes**, then the port participates in Cisco EnergyWise; if it is **No**, then the port does not participate in EnergyWise.

For example, if the port is PoE and the **PoE** mode is **never**, the table matrix entry is **No**; this means Cisco EnergyWise is not disabled even if the port power is off.

**Table 4: Domain Member Port Participation in Cisco EnergyWise**

Port	PoE Mode—auto	PoE Mode—never	PoE mode—static
PoE	Yes	No	Yes
Non-PoE	No	No	No

When you change the port mode using the **power inline auto** or **power inline static** interface configuration commands, changes are effective immediately. You do not need to restart the domain member.

If Cisco EnergyWise is disabled, the domain member can use PoE to manage the port power usage.

When you configure a recurrence for PoE interfaces, EnergyWise functions the same way as when the **power inline** and **no power inline** interface configuration commands are executed. You might see messages that show the interface going up and down at time of the event.

## CLI Compatibility

Follow these guidelines for EnergyWise to work properly:

- All domain members must run Cisco EnergyWise Version 1 or Cisco EnergyWise Version 2.6 or later.
- All domain members must have the same domain name and security mode.
- If your switch is stacking-capable and is a member of a switch stack, all the stack members must run the same Cisco EnergyWise version.
- If your domain member is running Cisco EnergyWise Version 1, and you upgrade your software to a release supporting Cisco EnergyWise Version 2.6 or later:
  - The EnergyWise settings in the running configuration are updated. The domain member sets the management password as the same domain password in the **energywise domain** command.
  - Enter the **copy running-config startup-config** privileged EXEC command to save the EnergyWise settings in the configuration file.

- If your domain member is running Cisco EnergyWise Version 2.6 or later and you need to downgrade to Cisco EnergyWise Version 1.0 due to domain member compatibility issues, enter the **no energywise domain** global configuration command to disable EnergyWise before downgrading your software to a release supporting EnergyWise Version 1.

To display the Cisco EnergyWise version running on your domain member, use the **show energywise version** privileged EXEC command. The Cisco EnergyWise version is referred to as the EnergyWise specification in the command output.

To display the software version running on your domain member, use the **show version** privileged EXEC command.

In Cisco EnergyWise Version 1, these commands were modified:

- **energywise domain** *domain-name* **secret** [0 | 7] *password* global configuration command

We recommend that you reconfigure the EnergyWise domain with the **energywise domain security** {*ntp-shared-secret* | *shared-secret*} [0 | 7] *shared-secret* [**protocol udp port** *udp-port-number* [**interface** *interface-id* | **ip** *ip-address*]] global configuration command.

If you do not reconfigure the domain, the domain member synchronizes the management password with the domain password.

- **energywise management** *tcp-port-number* global configuration command

We recommend that you reconfigure the management password for the domain with the **energywise management security shared-secret** [0 | 7] *shared-secret* **port** *tcp-port-number* global configuration command.

# How to Configure EnergyWise

## Enabling Cisco EnergyWise

### SUMMARY STEPS

1. **configure terminal**
2. **service password-encryption**
3. **energywise domain** *domain-name* **security** {*ntp-shared-secret* | *shared-secret*} [0 | 7] *domain-password* [**protocol udp port** *udp-port-number* [**interface** *interface-id* | **ip** *ip-address*]]
4. **end**
5. **show energywise**
6. **show energywise domain**
7. **copy running-config startup-config**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure terminal</b> <b>Example:</b>	Enters the global configuration mode.

	Command or Action	Purpose
	DomainMember# <code>configure terminal</code>	
<b>Step 2</b>	<b>service password-encryption</b> <b>Example:</b> DomainMember (config)# <code>service password-encryption</code>	(Optional) Enables password encryption. If you set a hidden password in Step 3, enter this command.
<b>Step 3</b>	<b>energywise domain <i>domain-name</i> security</b> <b>{ ntp-shared-secret   shared-secret } [ 0   7 ]</b> <i>domain-password</i> [ <b>protocol udp port <i>udp-port-number</i></b> <b>[interface <i>interface-id</i>   ip <i>ip-address</i> ]</b> <b>Example:</b> DomainMember (config)# <code>energywise domain cisco</code> <code>security shared-secret cisco protocol udp</code> <code>port 43440 ip 2.2.4.30</code>	Enables Cisco EnergyWise on the network device, assigns it to a domain with the specified domain-name, sets the domain security mode, and sets the domain password to authenticate all communication in the domain. <ul style="list-style-type: none"> <li>• <b>ntp-shared-secret</b>—Sets a strong password with NTP. If the time between members varies <math>\pm 30</math> seconds, the domain member drops events.</li> <li>• <b>shared-secret</b>—Sets a strong password without NTP.</li> <li>• (Optional) <b>0</b>—Uses a plain-text password. This is the default.</li> <li>• (Optional) <b>7</b>—Uses a hidden password. If you do not enter <b>0</b> or <b>7</b>, the default is <b>0</b>.</li> <li>• (Optional) <b>port <i>udp-port-number</i></b>—Specifies the UDP port that communicates with the domain. The range is from 1 to 65000. The default is 43440.</li> <li>• (Optional) <b>interface <i>interface-id</i></b>—Specifies the port that communicates with the domain if the IP address is dynamically assigned. We recommend that you specify the <i>interface-id</i> value. You should use this in a bridged network.</li> <li>• (Optional) <b>ip <i>ip-address</i></b>—Specifies the IP address that communicates with the domain if the interface is a switched virtual interface (SVI) and VLAN trunking protocol (VTP) pruning is enabled. You should use this in a routed network.</li> </ul> For the <i>domain-name</i> and <i>domain-password</i> : <ul style="list-style-type: none"> <li>• You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>• Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul>
<b>Step 4</b>	<b>end</b> <b>Example:</b> DomainMember (config)# <code>end</code>	Returns to privileged EXEC mode.

	Command or Action	Purpose
<b>Step 5</b>	<b>show energywise</b> <b>Example:</b> DomainMember# <b>show energywise</b>	Verifies your entries
<b>Step 6</b>	<b>show energywise domain</b> <b>Example:</b> DomainMember# <b>show energywise domain</b>	Verifies your entries.
<b>Step 7</b>	<b>copy running-config startup-config</b> <b>Example:</b> DomainMember# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file.

## Configuring Domain Member or Endpoint Attributes

### SUMMARY STEPS

1. **configure terminal**
2. **energywise importance** *importance*
3. **energywise keywords** *word, word, word...*
4. **service password-encryption**
5. **energywise management security shared-secret** [ 0 | 7 ] *mgmt-password* [**port** *tcp-port-number*]
6. **energywise name** *name*
7. **energywise neighbor** [ *hostname* | *ip-address* ] *udp-port-number*
8. **energywise role** *role*
9. **energywise allow query** [ *save* | *set* ]
10. **energywise endpoint security** [ *none* | **shared-secret** [ 0 | 7 ] *shared-secret*]
11. **end**
12. **show energywise**
13. **show energywise domain**
14. **copy running-config startup-config**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> DomainMember# <b>configure terminal</b>	Enters the global configuration mode.
<b>Step 2</b>	<b>energywise importance</b> <i>importance</i> <b>Example:</b> DomainMember (config)# <b>energywise importance 65</b>	Sets the importance. The range is from 1 to 100. The default is 1.
<b>Step 3</b>	<b>energywise keywords</b> <i>word, word, word...</i>	Assigns at least one keyword.

	Command or Action	Purpose
	<p><b>Example:</b></p> <pre>DomainMember(config)# energywise keywords lab1,devlab</pre>	<p>When assigning multiple keywords, separate the keywords with commas, and do not use spaces between keywords.</p> <ul style="list-style-type: none"> <li>You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> <p>By default, keywords are not defined.</p>
<b>Step 4</b>	<p><b>service password-encryption</b></p> <p><b>Example:</b></p> <pre>DomainMember(config)# service password-encryption</pre>	<p>(Optional) Enables password encryption.</p> <p>If you set a hidden password in Step 3, enter this command.</p>
<b>Step 5</b>	<p><b>energywise management security shared-secret [ 0   7 ] mgmt-password [port tcp-port-number]</b></p> <p><b>Example:</b></p> <pre>DomainMember(config)# energywise management security shared-secret cisco port 1055</pre>	<p>Sets the management password on the domain member that the management station uses to communicate with the domain.</p> <ul style="list-style-type: none"> <li>(Optional) <b>0</b>—Uses a plain-text password.</li> <li>(Optional) <b>7</b>—Uses a hidden password.</li> </ul> <p>If you do not enter <b>0</b> or <b>7</b>, the default is <b>0</b>.</p> <p>For the <i>mgmt-password</i>:</p> <ul style="list-style-type: none"> <li>You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> <p>(Optional) port tcp-port-number—Specifies the TCP port for management access. The range is from 1025 to 65535. The default is 43440.</p> <p>By default, the management password is not set.</p>
<b>Step 6</b>	<p><b>energywise name name</b></p> <p><b>Example:</b></p> <pre>DomainMember(config)# energywise name LabSwitch</pre>	<p>Specifies the EnergyWise-specific name.</p> <ul style="list-style-type: none"> <li>You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> <p>The default is the host name.</p>
<b>Step 7</b>	<p><b>energywise neighbor [ hostname   ip-address ] udp-port-number</b></p> <p><b>Example:</b></p> <pre>DomainMember(config)# energywise neighbor member1 43440</pre>	<p>Assigns a static neighbor.</p> <ul style="list-style-type: none"> <li>Domain Name System (DNS) hostname (<i>hostname</i>) or IP address (<i>ip-address</i>).</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• UDP port (<i>udp-port-number</i>) that sends and receives queries.</li> </ul> <p>The range is from 1 to 65000.</p> <p>By default, static neighbors are not assigned.</p>
<b>Step 8</b>	<b>energywise role</b> <i>role</i> <b>Example:</b> <pre>DomainMember(config)# energywise role role.labaccess</pre>	<p>Specifies the role in the EnergyWise domain. For example, lobby.b20.</p> <ul style="list-style-type: none"> <li>• You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>• Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> <p>The default is the model number.</p>
<b>Step 9</b>	<b>energywise allow query</b> [save   set] <b>Example:</b> <pre>DomainMember(config)# energywise allow query save</pre>	<p>Configures the domain member to respond to queries from the management station or another domain member.</p> <ul style="list-style-type: none"> <li>• <b>save</b>—Responds to a query to save the running configuration.</li> <li>• <b>set</b>—Responds to a query to change the power level or the EnergyWise attributes.</li> </ul> <p>By default, the domain member responds to the set query.</p>
<b>Step 10</b>	<b>energywise endpoint security</b> [ none   shared-secret [ 0   7 ] <i>shared-secret</i> ] <b>Example:</b> <pre>DomainMember(config)# energywise endpoint security shared-secret cisco</pre>	<p>Sets the security mode for an endpoint.</p> <ul style="list-style-type: none"> <li>• <b>none</b>—Disables security.</li> <li>• <b>shared-secret</b>—Uses a password for secure communication with the domain member.</li> <li>• (Optional) <b>0</b>—Uses a plain-text password.</li> <li>• (Optional) <b>7</b>—Uses a hidden password.</li> </ul> <p>If you do not enter <b>0</b> or <b>7</b>, the default is <b>0</b>.</p> <ul style="list-style-type: none"> <li>• For the shared-secret: <ul style="list-style-type: none"> <li>• You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>• Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> </li> </ul> <p>By default, the password is not set.</p>
<b>Step 11</b>	<b>end</b> <b>Example:</b> <pre>DomainMember(config)# end</pre>	<p>Returns to privileged EXEC mode.</p>



	Command or Action	Purpose
Step 12	<b>show energywise</b> <b>Example:</b> DomainMember# <code>show energywise</code>	Verifies your entries
Step 13	<b>show energywise domain</b> <b>Example:</b> DomainMember# <code>show energywise domain</code>	Verifies your entries.
Step 14	<b>copy running-config startup-config</b> <b>Example:</b> DomainMember# <code>copy running-config startup-config</code>	(Optional) Saves your entries in the configuration file.

### Related Topics

[EnergyWise Domain](#), on page 3

[Examples: Setting the Domain](#), on page 32

## Powering the PoE Port

### SUMMARY STEPS

1. `configure terminal`
2. `interface interface-id`
3. `energywise level level`
4. `end`
5. `show energywise`
6. `show energywise domain`
7. `copy running-config startup-config`

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure terminal</b> <b>Example:</b> DomainMember# <code>configure terminal</code>	Enters the global configuration mode.
Step 2	<b>interface interface-id</b> <b>Example:</b> DomainMember (config)# <code>interface gigabitethernet1/0/2</code>	Specifies the port or the range of ports to be configured and enters interface configuration mode.
Step 3	<b>energywise level level</b> <b>Example:</b>	Manually powers on the port.

	Command or Action	Purpose
	DomainMember(config-if)# <b>energywise level 3</b>	<ul style="list-style-type: none"> <li>• For a connected PoE endpoint, enter a power level of 10.</li> <li>• For an non-PoE-capable endpoint, enter a power level from 1 to 10. The endpoint determines the appropriate action.</li> </ul>
<b>Step 4</b>	<b>end</b> <b>Example:</b> DomainMember(config-if)# <b>end</b>	Returns to privileged EXEC mode.
<b>Step 5</b>	<b>show energywise</b> <b>Example:</b> DomainMember# <b>show energywise</b>	Verifies your entries
<b>Step 6</b>	<b>show energywise domain</b> <b>Example:</b> DomainMember# <b>show energywise domain</b>	Verifies your entries.
<b>Step 7</b>	<b>copy running-config startup-config</b> <b>Example:</b> DomainMember# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file. <b>Note</b> The power level that you set in Step 3 is the default power level when the domain member restarts.

## Configuring Port Attributes

### Before you begin

Before entering the **energywise activitycheck** command in Step 7:

- Verify that automatic quality of service (auto-QoS) is enabled on the port and on the connected IP phone.
- If the domain member is connected to the IP phones through multiple Cisco devices, verify that they trust the CoS value in the incoming packets.

For more information about activity check and configuring auto-QoS, see [Activity Check, on page 9](#).

### SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-id*
3. **energywise importance** *importance*
4. **energywise keywords** *word, word, word...*
5. **energywise name** *name*
6. **energywise role** *role*

7. `energywise activitycheck`
8. `energywise allow query set`
9. `end`
10. `show running-config`
11. `copy running-config startup-config`

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure terminal</b> <b>Example:</b> DomainMember# <code>configure terminal</code>	Enters the global configuration mode.
Step 2	<b>interface <i>interface-id</i></b> <b>Example:</b> DomainMember (config)# <code>interface gigabitethernet1/0/2</code>	Specifies the port or the range of ports to be configured, and enters interface configuration mode.
Step 3	<b>energywise importance <i>importance</i></b> <b>Example:</b> DomainMember (config-if)# <code>energywise importance 90</code>	Sets the importance. The range is from 1 to 100. The default is 1.
Step 4	<b>energywise keywords <i>word, word, word...</i></b> <b>Example:</b> DomainMember (config-if)# <code>energywise keywords lab</code>	Assigns at least one keyword. When assigning multiple keywords, separate the keywords with commas, and do not use spaces between keywords. <ul style="list-style-type: none"> <li>• You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>• Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> By default, keywords are not defined.
Step 5	<b>energywise name <i>name</i></b> <b>Example:</b> DomainMember (config-if)# <code>energywise name labphone.5</code>	Specifies the EnergyWise-specific name. <ul style="list-style-type: none"> <li>• You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> <li>• Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> The default is the host name.
Step 6	<b>energywise role <i>role</i></b> <b>Example:</b> DomainMember (config-if)# <code>energywise role role.labphone</code>	Specifies the role in the EnergyWise domain. For example, lobby.b20. <ul style="list-style-type: none"> <li>• You can enter alphanumeric characters and symbols such as #, (, \$, !, and &amp;.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>Do not enter an asterisk (*) or a space between the characters or symbols.</li> </ul> <p>The default is the model number.</p>
<b>Step 7</b>	<b>energywise activitycheck</b> <b>Example:</b> DomainMember (config-if)# <b>energywise activitycheck</b>	Verifies that the connected IP phone is not sending or receiving traffic before the domain member powers off the port. <b>Note</b> The domain member cannot determine if the IP phone is in the hold state.
<b>Step 8</b>	<b>energywise allow query set</b> <b>Example:</b> DomainMember (config-if)# <b>energywise role role.labphone</b>	If the interface receives a query from the management station or another domain member, configures the interface to respond to a query changing the power level and the EnergyWise attributes. By default, the domain member responds to this query.
<b>Step 9</b>	<b>end</b> <b>Example:</b> DomainMember (config-if)# <b>end</b>	Returns to privileged EXEC mode.
<b>Step 10</b>	<b>show running-config</b> <b>Example:</b> DomainMember# <b>show running-config</b>	Verifies your entries.
<b>Step 11</b>	<b>copy running-config startup-config</b> <b>Example:</b> DomainMember# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file.

**Related Topics**

[Attributes](#), on page 5

## Configuring Recurrences

### SUMMARY STEPS

- show energywise**
- configure terminal**
- time-range** *time-range-name*
- absolute start** *hh:mm day\_of\_month month year*
- periodic** *days\_of\_the\_week hh:mm*
- interface** *interface-id*
- energywise level** *level recurrence importance importance {at minute hour day\_of\_month month day\_of\_week | time-range time-range-name}*
- end**

9. show energywise recurrence
10. copy running-config startup-config

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>show energywise</b> <b>Example:</b> DomainMember# <b>show energywise</b>	Verifies that EnergyWise is enabled.
Step 2	<b>configure terminal</b> <b>Example:</b> DomainMember# <b>configure terminal</b>	Enters the global configuration mode.
Step 3	<b>time-range time-range-name</b> <b>Example:</b> DomainMember(config)# <b>time-range onfirstfloor</b>	<p>Assigns a name to the time range, and enters the time-range configuration mode. If you do not configure a time range, go to Step 6.</p> <p>The time range is based on the system clock.</p> <ul style="list-style-type: none"> <li>• If EnergyWise is not running on the endpoint (for example, a PoE endpoint), the specified times are based on the domain member time zone.</li> <li>• If an agent or client is running on the endpoint, the specified times are based on the endpoint time zone.</li> </ul> <p>Use the <b>absolute</b> and the <b>periodic</b> time-range configuration commands to specify times and days for a recurrence. You can use one absolute condition and multiple periodic conditions.</p>
Step 4	<b>absolute start hh:mm day_of_month month year</b> <b>Example:</b> DomainMember(config-time-range)# <b>absolute start 0:00 1 August 2009</b>	<p>Sets the start time and day for the recurrence. If the <b>absolute</b> condition has an end time and day, the domain member ignores these values.</p> <ul style="list-style-type: none"> <li>• <i>hh:mm</i>—Specifies the time (24-hour format) in hours and minutes.</li> <li>• <i>day month year</i>—Specifies the date.               <ul style="list-style-type: none"> <li>• <i>day_of_month</i>—The range is from 1 to 31.</li> <li>• <i>month</i>—The range is from January to December.</li> <li>• <i>year</i>—The minimum year is 1993.</li> </ul> </li> </ul> <p>When configuring the absolute time range, the wild card * option is not supported for <i>day_of_month</i> and <i>month</i>.</p>
Step 5	<b>periodic days_of_the_week hh:mm</b> <b>Example:</b>	<p>Sets the weekly start time and day for the recurrence.</p> <ul style="list-style-type: none"> <li>• <i>days_of_the_week</i>—Valid values:</li> </ul>

	Command or Action	Purpose
	<pre>DomainMember(config-time-range) # <b>periodic weekdays</b> <b>06:00 to 22:00</b> DomainMember(config-time-range) # <b>periodic weekend</b> <b>10:00 to 16:00</b></pre>	<ul style="list-style-type: none"> <li>• <b>Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, or Sunday</b>—Enter a single day, a range of days with a dash between the starting and ending days, or multiple days separated by a comma.</li> <li>• <b>daily</b>—Enter if the recurrence starts from Monday to Sunday.</li> <li>• <b>weekdays</b>—Enter if the recurrence starts from Monday to Friday.</li> <li>• <b>weekend</b>—Enter if the event occurs on Saturday and Sunday.</li> <li>• <i>hh:mm</i>—Specifies the time (24-hour format) in hours and minutes.</li> </ul>
<b>Step 6</b>	<p><b>interface</b> <i>interface-id</i></p> <p><b>Example:</b></p> <pre>DomainMember(config) # <b>interface</b> <b>gigabitethernet1/0/2</b></pre>	Specifies the port or a range of ports to be configured, and enters interface configuration mode.
<b>Step 7</b>	<p><b>energywise level</b> <i>level</i> <b>recurrence importance</b> <i>importance</i>  {<b>at</b> <i>minute hour day_of_month month day_of_week</i>    <b>time-range</b> <i>time-range-name</i>}</p> <p><b>Example:</b></p> <pre>DomainMember(config-if) # <b>energywise level 10</b> <b>recurrence importance 70 time-range</b> <b>onfirstfloor</b></pre>	<p>Schedules a power-on or power-off event.</p> <ul style="list-style-type: none"> <li>• <b>level</b> <i>level</i>—Specifies the power level. <ul style="list-style-type: none"> <li>• To power off the endpoint, enter <b>0</b>.</li> <li>• To power on the endpoint: <ul style="list-style-type: none"> <li>If it is a PoE endpoint, enter <b>10</b>.</li> <li>If it is another powered device, enter a power level from 1 to 10. The endpoint determines the appropriate action.</li> </ul> </li> </ul> </li> <li>• <b>importance</b> <i>importance</i>—The event occurs if the importance value of the endpoint is less than or equal to the importance value. The range is from 1 to 100.</li> <li>• <b>at</b> <i>minute hour day_of_month month day_of_week</i>—Specifies the time (24-hour format) in cron format for the recurrence. <ul style="list-style-type: none"> <li>• <i>minute</i>—The range is from 0 to 59. Use * for the wildcard.</li> <li>• <i>hour</i>—The range is from 0 to 23. Use * for the wildcard.</li> <li>• <i>day_of_month</i>—The range is from 1 to 31. Use * for the wildcard.</li> </ul> </li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <i>month</i>—The range is from 1 (January) to 12 (December). Use * for the wildcard.</li> <li>• <i>day_of_week</i>—The range is from 0 (Sunday) to 6 (Saturday). Use * for the wildcard.</li> <li>• <b>time-range</b> <i>time-range-name</i>—Specifies the time range for the recurrence.</li> </ul> <p>The event uses the domain member time. Repeat this step to schedule another event.</p>
Step 8	<b>end</b> <b>Example:</b> DomainMember(config)# <b>end</b>	Returns to privileged EXEC mode.
Step 9	<b>show energywise recurrence</b> <b>Example:</b> DomainMember# <b>show energywise recurrence</b>	Verifies your entries.
Step 10	<b>copy running-config startup-config</b> <b>Example:</b> DomainMember# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file.

### Related Topics

[Recurrences](#), on page 6

## Using Queries to Manage Power in the Domain



**Note** If the timeout value in the **energywise query importance** privileged EXEC command is too short, the management station does not receive query results even if the domain members and endpoints respond to the query. For example, if you want to power off a specific phone but the timeout value in the **energywise query importance** command is too short, the phone is not powered off. When configuring the timeout, configure a minimum of 6 seconds to display correct output.

In the procedure, Steps 2 and 3 are interchangeable. You can perform either Step 2 or Step 3.

### SUMMARY STEPS

1. **energywise query analyze domain** *domain-name*
2. **energywise query importance** *importance* {**keywords** *word, word,...* | **name** *name*} **collect** {**delta** | **usage**} [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] | **timeout** *timeout*]

3. **energywise query importance** *importance* {**keywords** *word, word,...* | **name** *name*} **sum** {**delta** | **usage**} [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] | **timeout** *timeout*]
4. **energywise query importance** *importance* {**keywords** *word, word,...* | **name** *name*} **set level** *level* [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] | **timeout** *timeout*]

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>energywise query analyze domain</b> <i>domain-name</i> <b>Example:</b> DomainMember# <b>energywise query analyze domain</b>	Runs a query to analyze and display information about the domain, including the domain size and the number of members and endpoints.
<b>Step 2</b>	<b>energywise query importance</b> <i>importance</i> { <b>keywords</b> <i>word, word,...</i>   <b>name</b> <i>name</i> } <b>collect</b> { <b>delta</b>   <b>usage</b> } [ <b>all</b> [ <b>timeout</b> <i>timeout</i> ]   <b>consumer</b> [ <b>timeout</b> <i>timeout</i> ]   <b>meter</b> [ <b>timeout</b> <i>timeout</i> ]   <b>producer</b> [ <b>timeout</b> <i>timeout</i> ]   <b>timeout</b> <i>timeout</i> ] <b>Example:</b> DomainMember# <b>energywise query importance 100 name * collect usage consumer</b>	Runs a query to display power information for the domain members and endpoints. Runs a query to change the power level and to power on or off the domain members, PoE ports, or endpoints. <ul style="list-style-type: none"> <li>• <b>importance</b> <i>importance</i>—Filters the results based on the importance value. Only domain members and endpoints with importance values less than or equal to the specified value respond to the query. The importance range is from 1 to 100.</li> <li>• <b>keywords</b> <i>word, word</i>—Filters the results based on one or more keywords.</li> </ul> <p><b>Note</b> Do not run a query with <b>keywords</b> *. No results are generated.</p> <ul style="list-style-type: none"> <li>• <b>name</b> <i>name</i>—Filters the results based on the name. For the wildcard, use * or <i>name*</i> with the asterisk at the end of the name phrase.</li> <li>• <b>collect</b> {<b>delta</b>   <b>usage</b>}—Displays power-usage information in watts (W) from the domain members and endpoints.               <ul style="list-style-type: none"> <li>• <b>delta</b>—Displays the delta vector with the difference between the actual power usage and the maximum power usage for each power level for what-if calculations.</li> <li>• <b>usage</b>—Displays the actual power usage.</li> </ul> </li> <li>• <b>sum</b> {<b>delta</b>   <b>usage</b>}—Displays the summary of the power-usage information from domain members and endpoints.               <ul style="list-style-type: none"> <li>• <b>delta</b>—Displays the delta vector.</li> <li>• <b>usage</b>—Displays the actual power usage.</li> </ul> </li> </ul>



	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• (Optional) <b>all</b>—Displays EnergyWise devices of all usage types.</li> <li>• (Optional) <b>consumer</b>—Filters the results to display devices that consume power, such as a switch. This is the default usage type.</li> <li>• (Optional) <b>meter</b>—Filters the results to display devices that measure the pass-through power, such as a PDU that sends power from a source to a connected device.</li> <li>• (Optional) <b>producer</b>—Filters the results to display devices that generate power, such as a solar panel.</li> <li>• (Optional) <b>timeout</b> <i>timeout</i>—Sets the time in seconds that the management station waits for query results. When configuring the timeout, configure a minimum of 6 seconds to display correct output.</li> </ul> <p>The default <b>timeout</b> is 6 seconds. The range is from 1 to 180.</p> <p>Repeat this step to run another query.</p>
<p><b>Step 3</b></p>	<p><b>energywise query importance</b> <i>importance</i> {<b>keywords</b> <i>word, word,...</i>   <b>name</b> <i>name</i>} <b>sum</b> {<b>delta</b>   <b>usage</b>} [<b>all</b> [<b>timeout</b> <i>timeout</i>]   <b>consumer</b> [<b>timeout</b> <i>timeout</i>]   <b>meter</b> [<b>timeout</b> <i>timeout</i>]   <b>producer</b> [<b>timeout</b> <i>timeout</i>]   <b>timeout</b> <i>timeout</i>]</p> <p><b>Example:</b></p> <pre>DomainMember# energywise query importance 90 keyword lobby sum usage</pre>	<p>You can perform Step 2 or Step 3</p>
<p><b>Step 4</b></p>	<p><b>energywise query importance</b> <i>importance</i> {<b>keywords</b> <i>word, word,...</i>   <b>name</b> <i>name</i>} <b>set level</b> <i>level</i> [<b>all</b> [<b>timeout</b> <i>timeout</i>]   <b>consumer</b> [<b>timeout</b> <i>timeout</i>]   <b>meter</b> [<b>timeout</b> <i>timeout</i>]   <b>producer</b> [<b>timeout</b> <i>timeout</i>]   <b>timeout</b> <i>timeout</i>]</p> <p><b>Example:</b></p> <pre>DomainMember# energywise query importance 80 name shipping.2 set level 0</pre>	<p>(Optional) Runs a query to change the power level and to power on or off the domain members, PoE ports, or endpoints.</p> <p><b>Note</b> Use this query with care. It affects both the domain member on which you enter the command and other domain members and endpoints that match the query criteria.</p> <ul style="list-style-type: none"> <li>• <b>importance</b> <i>importance</i>— Filters the results based on the importance value. Only domain members and endpoints with values less than or equal to the specified value appear. The range is from 1 to 100.</li> <li>• <b>keywords</b> <i>word, word...</i>—Filters the results based on one or more keywords.</li> </ul> <p><b>Note</b> Do not run a query with <b>keywords*</b>. No results are generated.</p>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>name</b> <i>name</i>—Filters the results based on the name. For the wildcard, use * or <i>name*</i> with the asterisk at the end of the name phrase.</li> <li>• <b>set level</b> <i>level</i>— Sets the power level of the domain members, endpoints, or PoE ports. The range is from 0 to 10.</li> <li>• (Optional) <b>all</b>—Displays EnergyWise devices of all usage types.</li> <li>• (Optional) <b>consumer</b>—Filters the results to display devices that consume power, such as a switch. This is the default usage type.</li> <li>• (Optional) <b>meter</b>—Filters the results to display devices that measure the pass-through power, such as a PDU that sends power from a source to a connected device.</li> <li>• (Optional) <b>producer</b>—Filters the results to display devices that generate power, such as a solar panel.</li> <li>• (Optional) <b>timeout</b> <i>timeout</i>—Sets the time in seconds that the management station waits for query results. When configuring the timeout, configure a minimum of 6 seconds to display correct output.</li> </ul> <p>The default is 6 seconds. The range is from 1 to 180.</p> <p>Repeat this step to run another query.</p>

## Configuring Activity Check

### SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-id*
3. **energywise activity check**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> DomainMember# <b>configure terminal</b>	Enters the global configuration mode.
<b>Step 2</b>	<b>interface</b> <i>interface-id</i> <b>Example:</b>	Specifies the port or a range of ports to be configured, and enters the interface configuration mode.

	Command or Action	Purpose
	DomainMember (config) # <b>interface gigabitethernet0/2</b>	In the examples, the <i>interface-id</i> is in this format: <i>type slot-or-module-number/port-number</i> , for example, gigabitethernet 0/5. To specify an interface, see your device software documentation.
<b>Step 3</b>	<b>energywise activity check</b>  <b>Example:</b> DomainMember (config-if) # <b>energywise activitycheck</b>	Configures the domain member to wait until a Cisco IP phone connected to a PoE port is not sending or receiving traffic before the domain member powers off the port.  <b>Note</b> The domain member cannot determine if the IP phone is in the hold state.

**What to do next**

Proceed to test activity check.

**Related Topics**

[Activity Check](#), on page 9

## Testing Activity Check

After you have enabled activity check, perform the following checks to make sure that the switch powers off the port only when a connected Cisco IP phone is not sending or receiving voice traffic.

While making a phone call, set the port power level to 0. The switch should not power off the IP phone. To set the port power level, you can:

- Run a query (using the CLI or the management application programming interface [MAPI]) — The switch performs an activity check before powering off.
- Use a recurrence—The switch performs an activity check before powering off.
- Use the CLI—The switch does not perform an activity check and powers off the PoE port immediately.

## Using WoL with a MAC Address

**SUMMARY STEPS**

1. **energywise query importance** *importance* {**keywords** *word, word,...* | **name** *name*} **wol mac** *mac-address* [**password** *password* | **port** *tcp-port-number* [**password** *password*]]

**DETAILED STEPS**

	Command or Action	Purpose
<b>Step 1</b>	<b>energywise query importance</b> <i>importance</i> { <b>keywords</b> <i>word, word,...</i>   <b>name</b> <i>name</i> } <b>wol mac</b> <i>mac-address</i> [ <b>password</b> <i>password</i>   <b>port</b> <i>tcp-port-number</i> [ <b>password</b> <i>password</i> ]]  <b>Example:</b>	Sends a WoL magic packet to a specific device or to all devices in the EnergyWise network.  <ul style="list-style-type: none"> <li>• <b>importance</b> <i>importance</i>—Only domain members and endpoints with importance values less than or equal</li> </ul>

Command or Action	Purpose
<pre>DomainMember# energywise query importance 100 keyword PC wol mac 0123.4567.89ab</pre>	<p>to the specified value respond to the query. The range is from 1 to 100.</p> <ul style="list-style-type: none"> <li>• <b>keywords</b> <i>word, word...</i>—Filters the results based on one or more keywords.</li> </ul> <p><b>Note</b> If you know that the PC that you want to power on is connected to an interface with the keyword <b>PC</b>, use the <b>energywise query importance 100 keyword PC wol mac mac-address</b> command. You can also use a name qualifier.</p> <ul style="list-style-type: none"> <li>• <b>name</b> <i>name</i>—Filters the results based on the name. For the wildcard, use * or <i>name*</i> with the asterisk at the end of the name phrase.</li> <li>• <b>wol mac</b> <i>mac-address</i>—Filters the results based on the MAC address and powers on only the device with the matching MAC address.</li> </ul> <p><b>Note</b> If you do not know where the device is located, use the <b>energywise query importance 100 name * wol mac mac-address</b> command to send the WoL packet to all the domain members.</p> <ul style="list-style-type: none"> <li>• (Optional) <b>password</b> <i>password</i>—Sets the password for the WoL-enabled endpoint.</li> <li>• (Optional) <b>port</b> <i>port-number</i>—Specifies a port number to communicate with the EnergyWise domain. The default is 7.</li> </ul>

### Related Topics

[Wake on LAN](#), on page 10

[Prerequisites for Wake on LAN](#), on page 1

## Using WoL Without a MAC Address

To use WoL without entering a MAC address, first configure the EnergyWise endpoint device to include off-state caching and WoL. To wake up the device and set its power level, use the **energywise query** privileged EXEC command. For example, enter this command:

```
DomainMember# energywise query importance 100 keywords pc set level 10
```

Device MAC addresses are cached along with their keywords or names. The domain member matches the keywords or name you enter with the cached keywords, names, and MAC addresses and sends the WoL packet to the matching device.

The WoL packet is sent only if the device is powered off.

**Related Topics**[Wake on LAN](#), on page 10[Prerequisites for Wake on LAN](#), on page 1

# Monitoring and Troubleshooting EnergyWise

## Monitoring EnergyWise

Use the following commands to monitor EnergyWise.

*Table 5: show Privileged EXEC Commands*

Command	Purpose
<b>show energywise</b>	Displays the settings and status for the domain member or endpoint.
<b>show energywise children</b>	Displays the status of the connected endpoints.
<b>show energywise provisioned</b>	Displays a summary of the EnergyWise information for the domain member and the connected endpoints.
<b>show energywise domain</b>	Displays the domain to which the domain member or endpoint belongs.
<b>show energywise events</b>	Display the last ten events (messages) sent to other domain members or endpoints in the domain.
<b>show energywise neighbor</b>	Displays the neighbor tables for the domain member.
<b>show energywise recurrences</b>	Displays the EnergyWise settings and status for recurrence.
<b>show energywise statistics</b>	Displays the counters for events and errors.
<b>show energywise usage</b>	Displays the actual power usage on the domain member or endpoint.
<b>show energywise version</b>	Displays the EnergyWise version.
<b>show version</b>	Displays the software version.
<b>show power inline</b>	Displays the PoE status.
<b>show cdp neighbors</b>	Displays the neighbors discovered by CDP.

## Verifying Power Usage

This example shows you how to verify that the Cisco 7960 IP Phone uses 6.3 W and that the Cisco 7970G IP Phone uses 10.3 W:

```
Switch# show energywise usage children
Interface Name Usage Caliber
-----
Switch 144.0 (W) max
```

```
Gi0/1 Gi0.1 6.3 (W) trusted
Gi0/2 Gi0.2 10.3 (W) trusted
```

## Detecting Communication Failures

Use the EnergyWise debug mode commands to show communication failures.

**Table 6: Detecting Communication Failures**

Command	Purpose
<b>debug energywise debug</b>	Displays errors such as invalid sequence numbers and communication errors on the domain.
<b>debug energywise discovery</b>	Displays all EnergyWise discovery information.
<b>debug energywise endpoint</b>	Displays information about EnergyWise endpoints running a client or agent and helps detect mismatched domain names, secrets, and sequence numbers of connected endpoints.
<b>debug energywise ha</b>	Displays EnergyWise high availability (HA) information for devices that have HA capability.
<b>debug energywise management</b>	Displays information about authentication failures and EnergyWise management stations running power management applications.
<b>debug energywise packet</b>	Displays EnergyWise packet trace information.
<b>debug energywise query</b>	Displays query information relating to the device from which the query is initiated.
<b>debug energywise trace</b>	Displays information about all the EnergyWise processes relating to the device from which the query is initiated.
<b>debug energywise wol</b>	Displays Wake on LAN (WoL) query information relating to the device from which the query is initiated.

## Disabling EnergyWise

To disable EnergyWise, enter the interface configuration commands followed by the global configuration commands.

**Table 7: Interface Configuration Commands for Disabling EnergyWise**

Command	Purpose
<b>no energywise</b>	Disables EnergyWise on the PoE port or on the endpoint.

Command	Purpose
<b>no energywise activitycheck</b>	Configures the domain member not to wait until a Cisco IP phone connected to a PoE port is not sending or receiving voice traffic before the domain member powers off the port.
<b>no energywise allow query set</b>	Configures the interface to drop all set queries for the interface and children. If configured, you cannot change the power level or EnergyWise attributes of connected devices on the interface. To prevent power levels on all interfaces from being changed, apply the command to all interfaces.
<b>no energywise</b> [ <b>importance</b>   <b>keywords</b> [ <i>word</i> , <i>word</i> , ... ]   <b>level</b>   <b>name</b> [ <i>name</i> ]   <b>role</b> [ <i>role</i> ]]	Removes the EnergyWise configuration on a domain member port.  If you enter the <b>no energywise level</b> command, the domain member changes the power level to the default only when you restart the domain member or you enter the <b>energywise level level</b> command.
<b>no energywise level level recurrence importance importance</b> { <i>at minute hour day_of_month month day_of_week</i>   <b>timerange</b> <i>timerange-name</i> }	Removes the recurrence configuration on a domain member port.

Table 8: Global Configuration Commands for Disabling EnergyWise

Command	Purpose
<b>no energywise allow query save</b>	Configures the domain member not to respond to a query that saves the running configuration.
<b>no energywise allow query set</b>	Configures the domain member to drop all set queries for the parent entity.  If configured, you cannot change the power level or EnergyWise attributes of the domain member. This configuration does not apply to the interfaces or endpoints connected to any interfaces.
<b>no energywise domain</b>	Disables EnergyWise on the domain member.
<b>no energywise endpoint</b>	Configures the domain member not to establish parent-child relationships with connected EnergyWise-compatible endpoints. The endpoints cannot receive queries or messages from the domain member.
<b>no energywise</b> { <i>importance</i>   <b>keywords</b> [ <i>word</i> , <i>word</i> , ... ]   <b>name</b>   <b>neighbor</b> [ <i>hostname</i>   <i>ip-address</i> ]   <i>udp-port-number</i>   <b>role</b> }	Removes the EnergyWise configuration on the domain member.

Command	Purpose
<code>no energywise management</code>	Configures the domain member to not communicate with a connected management station that sends queries.

## Configuration Examples for EnergyWise

### Examples: Setting the Domain

The following example displays how to set the domain:

```
DomainMember# show energywise
Interface Role Name Usage Lvl Imp Type
-----
fanfare jsmith 1009.0(W) 5 100 paren
```

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security ntp-shared-secret cisco protocol
udp port 43440 ip 2.2.4.30
DomainMember(config)# energywise importance 50
DomainMember(config)# energywise keywords lab1,devlab
DomainMember(config)# energywise name LabSwitch
DomainMember(config)# energywise neighbor member1 43440
DomainMember(config)# energywise role role.labaccess
DomainMember(config)# energywise allow query save
DomainMember(config)# end
```

```
DomainMember# show energywise domain
Name : member1
Domain : cisco
Protocol : udp
IP : 2.2.2.21
Port : 43440
```

```
DomainMember# show energywise neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Id Neighbor Name Ip:Port Prot Capability
-----
1 member-21 2.2.2.21:43440 udp S I
2 member-31 2.2.4.31:43440 static S I
3 member-22 2.2.2.22:43440 cdp S I
```

#### Related Topics

[Configuring Domain Member or Endpoint Attributes](#), on page 14

[EnergyWise Domain](#), on page 3

### Examples: Manually Managing Power

The following example displays how to manually manage the power.



To power on the lab IP phones:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.44
DomainMember(config)# interface gigabitethernet0/3
DomainMember(config-if)# energywise importance 65
DomainMember(config-if)# energywise name labphone.5
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# end
```

To power off an IP phone connected to a PoE port:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.44
DomainMember(config)# interface gigabitethernet0/2
DomainMember(config-if)# energywise importance 65
DomainMember(config-if)# energywise name labphone.5
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# energywise level 0
DomainMember(config-if)# end
```

The domain member powers the IP phone whether Cisco EnergyWise is enabled or not.

## Examples: Automatically Managing Power

The following example displays how to automatically manage the power:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.30
DomainMember(config)# interface gigabitethernet1/0/3
DomainMember(config-if)# energywise level 10 recurrence importance 90 at 0 8 * * *
DomainMember(config-if)# energywise level 0 recurrence importance 90 at 0 20 * * *
DomainMember(config-if)# energywise importance 50
DomainMember(config-if)# energywise name labInterface.3
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# end
```

```
DomainMember# show energywise recurrences
Id Addr Class Action Lvl Cron
-- ---
1 Gi0/3 QUERY SET 10 minutes: 0 hour: 8 day: * month: * weekday: *
2 Gi0/3 QUERY SET 0 minutes: 0 hour: 20 day: * month: * weekday: *
```

```
DomainMember# show running-config
<output truncated>
interface GigabitEthernet0/3
energywise level 10 recurrence at 0 8 * * *
energywise level 0 recurrence at 0 20 *
energywise importance 50
energywise role role.labphone
energywise name labInterface.3
end
<output truncated>
```

To automatically power on the lab IP phones at 08:00 and power off at 20:00:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.30
DomainMember(config)# interface gigabitethernet1/0/3
DomainMember(config-if)# energywise level 10 recurrence importance 90 at 0 8 * * *
DomainMember(config-if)# energywise level 0 recurrence importance 90 at 0 20 * * *
DomainMember(config-if)# energywise importance 50
DomainMember(config-if)# energywise name labInterface.3
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# end

DomainMember# show energywise recurrences
Id Addr Class Action Lvl Cron
-- ---
1 Gi0/3 QUERY SET 10 minutes: 0 hour: 8 day: * month: * weekday: *
2 Gi0/3 QUERY SET 0 minutes: 0 hour: 20 day: * month: * weekday: *

DomainMember# show running-config
<output truncated>
interface GigabitEthernet0/3
energywise level 10 recurrence at 0 8 * * *
energywise level 0 recurrence at 0 20 *
energywise importance 50
energywise role role.labphone
energywise name labInterface.3
end
<output truncated>
```

To automatically power on the PCs on the first floor at 06:00 and power off at 21:00:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# service password-encryption
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.30

DomainMember(config)# time-range onfirstfloor
DomainMember(config-time-range)# absolute start 0:00 1 August 2009
DomainMember(config-time-range)# periodic daily 06:00 to 21:00

DomainMember(config)# time-range offfirstfloor
DomainMember(config-time-range)# absolute start 0:00 1 August 2009
DomainMember(config-time-range)# periodic daily 00:00 to 05:55
DomainMember(config-time-range)# periodic daily 21:01 to 23:59
DomainMember(config-time-range)# exit

DomainMember(config)# interface gigabitethernet0/3
DomainMember(config-if)# energywise level 10 recurrence importance 70 time-range onfirstfloor
DomainMember(config-if)# energywise level 0 recurrence importance 70 time offfirstfloor
DomainMember(config-if)# energywise name floor.1
DomainMember(config-if)# energywise role pc-mgr
DomainMember(config-if)# end

DomainMember# show energywise recurrences
Id Addr Class Action Lvl Cron
-- ---
1 Gi0/3 QUERY SET 10 onfirstfloor
2 Gi0/3 QUERY SET 0 offfirstfloor
```

```

DomainMember# show running-config
<output truncated>
interface GigabitEthernet0/3
energywise level 10 recurrence importance 70 time-range onfirstfloor
energywise level 0 recurrence importance 70 time-range offfirstfloor
energywise role pc-mgr
energywise name floor.1
end
<output truncated>

```




---

**Note** Cisco EnergyWise uses only the start time for the **absolute** condition. Any configured end times are ignored. However, a start and end time is mandatory for the **periodic** condition.

---

## Examples: Querying to Analyze Domains

This example shows how to display information about the domain, such as the number of members, endpoints and the domain size:

```

DomainMember# energywise query analyze domain
EnergyWise is currently analyzing the domain, please wait...
EnergyWise Domain Statistics
-----
Querying from HW Model: WS-C3560G-48PS
Number of Domain Members: 3
Number of Endpoints: 1

```

### Related Topics

[Queries](#), on page 8

## Examples: Querying with the Name Attribute

In this example, Switch 1 and Switch 2 are in the same domain. shipping.1 is a PoE port on Switch 1, and shipping.2 is a PoE port on Switch 2.

The example shows the power usage of the domain members and endpoints with names beginning with shipping and with importance values less than or equal to 80. Run this query on Switch 1:

```

DomainMember# energywise query importance 80 name shipping.* collect usage
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
-----
192.168.20.1 shipping.1 6.3 (W) 10 1
192.168.20.2 shipping.2 8.5 (W) 10 1
Queried: 2 Responded: 2 Time: 0.4 seconds

```

The first row (shipping.1) is from Switch 1. The second row (shipping.2) is from Switch 2, a neighbor of Switch 1.

### Related Topics

[Queries](#), on page 8

## Examples: Querying with Keywords

In this example, Switch 1 and Switch 2 are in the same domain. shipping.1 is a PoE port on Switch 1, and shipping.2 is a PoE port on Switch 2.

The example shows the power usage of IP phones with different names, different roles, and importance values less than or equal to 80, but all that have the Admin keyword. Run this query on Switch 1:

```
DomainMember# energywise query importance 80 keyword Admin collect usage
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
-----
192.168.40.2 shipping.1 6.3 (W) 10 1
192.168.50.2 orders.1 10.3 (W) 10 1
192.168.60.3 pc.1 200.0 (W) 8 75
Queried: 3 Responded: 3 Time: 0.5 seconds
```

Switch 1 reports two phones connected to Switch 2, a neighbor of Switch 1.




---

**Note** Do not run a query with keywords \*. No results are generated.

---

### Related Topics

[Queries](#), on page 8

## Examples: Querying to Set Power Levels

In these examples shipping.1 and shipping.2 are PoE ports on Switch 1. Run these queries on Switch 1:

- Set the power level of PoE port shipping.2 to 0:

```
DomainMember# energywise query importance 80 name shipping.2 set level 0
```

- Set the power level of PoE ports shipping.1 and shipping.2 to 0:

```
DomainMember# energywise query importance 90 name shipping.* set level 0
```

- Set the power level of devices that have the keyword Admin to 10:

```
DomainMember# energywise query importance 60 keyword Admin set level 10
EnergyWise query, timeout is 6 seconds:
!!!!
Success rate is (2/2) setting entities
Queried: 2 Responded: 2 Time: 0.15 seconds
```

To show the power usage of EnergyWise devices with usage type all:

```
DomainMember# energywise query importance 100 name * collect usage all
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
-----
10.1.2.83 SEP5475d0db0dcb 3.8 (W) 10 5
10.1.2.71 SEP1c17D340834E 8.8 (W) 10 1
10.1.2.68 SEP3037A61748E2 8.8 (W) 10 1
10.1.2.211 Local_InfeedA_Outlet1 0.0 (W) 0 50
```

```

10.1.2.211 Local_InfeedA_Outlet2 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet3 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet4 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet5 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet6 34.0 (W) 0 50

```

To show the power usage of an IP phone with usage type **consumer**:

```

DomainMember# energywise query importance 100 name * collect usage consumer
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
-----
10.1.2.83 SEP5475d0db0dcb 3.8 (W) 10 5
10.1.2.71 SEP1C17D340834E 8.8 (W) 10 1
10.1.2.68 SEP3037A61748E2 8.8 (W) 10 1

```

To show the power usage of a PDU outlet with usage type **meter**:

```

DomainMember# energywise query importance 100 name * collect usage meter
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
-----
10.1.2.211 Local_InfeedA_Outlet1 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet2 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet3 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet4 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet5 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet6 34.0 (W) 0 50

```

### Related Topics

[Queries](#), on page 8

## Additional References

### Related Documents

Related Topic	Document Title
List of Cisco network devices supporting Cisco EnergyWise	<a href="#">Cisco IOS Release Notes for Cisco EnergyWise, EnergyWise Version 2.8</a>
EnergyWise Commands	
IP-Enabled Energy Management	<a href="#">IP-Enabled Energy Management: A Proven Strategy for Administering Energy as a Service</a>
Cisco EnergyWise partner documentation	Go to the <a href="#">Cisco Developer Network</a> . <ul style="list-style-type: none"> <li>• <i>Cisco EnergyWise Documentation Roadmap</i></li> <li>• <i>Cisco EnergyWise Partner Development Guide</i></li> <li>• <i>Cisco EnergyWise Programmer Reference Guide for the Endpoint SDK</i></li> <li>• <i>Cisco EnergyWise Programmer Reference Guide for the Management API</i></li> </ul>

**MIBs**

MIB	MIBs Link
Cisco EnergyWise domain members support the CISCO-ENERGYWISE-MIB.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco IOS MIB Locator found at the following URL:  <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**Technical Assistance**

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/support">http://www.cisco.com/support</a>

## Feature Information for EnergyWise

Feature / EW Version	Cisco IOS Release	Description
EnergyWise Version 2.8	Cisco IOS Release 15.2 (1)E	<p>Option to use SNMP to communicate with endpoint devices that are connected to a Cisco network but do not have an EnergyWise agent installed. To use SNMP, you have to configure an EnergyWise SNMP proxy on the domain member that the endpoint device is connected to.</p> <p>Option to wake up a device without entering a MAC address. If you configure an EnergyWise endpoint device to include off-state caching and Wake on LAN, you can use the energywise query privileged EXEC command to wake up the device and set its power level.</p>