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Compliance with the legal measure "Set up automated power-management on servers" within a data center[1]

The obligation to take measures in the domain of sustainable energy use at companies with a payback period within five years is covered by the Environmental Activities Decree ("Besluit Activiteiten Leefomgeving", Bal) as of January 1, 2024. These obligations also apply to activities taking place within the data center.

The implementation of this legal measure depends on the cooperation of several parties. Therefore, the trade organizations NLdigital, Dutch Datacenter Association (DDA), and the representation of- the environmental services in the Netherlands agree on a specific working method for this measure.

The procedure described in this document was developed by the trade organizations NLdigital and DDA, and ODNL. Data centers that choose to implement the measure "Set up automated power-management on servers" (see Appendix 1) per this procedure, can indicate this in their Investigation Obligation Report 2023, report Notification Obligation 2023, or during a physical inspection at the local Environmental Authority. Participating data centers that embrace this procedure will be checked for compliance with this measure by the local Environmental authority following the procedure below.

Only then after approval from the local Environmental Authority, the measure "Set up automated power-management on the servers" need not be taken or an equivalent measure can be taken by the data center. If no approval is granted, supervision and enforcement shall be performed based on the National Enforcement Strategy for Environmental Law (LHSO) by the local Environmental Authority.

This measure within the data center contributes greatly to the realization of the (inter)national CO2 reduction target.

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[1] Note to the reader; This translation of the original into English is provided for your convenience, this is not a legal document. In any dispute, interpretation or similar issues, the original "Procedure" in Dutch will take precedence.

With regards to the measure "Set up automated power management on servers," the undersigned parties agree to the following procedure;

A the participating data center shares this procedure with their customers to ensure that customers are aware of how the data center implements this measure. When submitting the Investigation Obligation report, Notification Obligation, or during the physical inspection, data centers indicate whether they adopt this procedure or opt for supervision and enforcement of this measure per the LHSO by the local Environmental Authority. A component of this procedure is that the customer of the data center is informed by the data center of the fact that the customer is obliged to cooperate in the inspection of compliance with this measure;

B the participating data center, through the audit described in Appendix 2, to be conducted by the data center **by July 31 of each year beginning in 2025**, establishes that the servers are on automated power management per Appendix 1 with all customers who have not invoked exception or equivalency;

C after it is determined by the participating data center that for two consecutive calendar years, the audit described in Appendix 2 results in > 95% of the servers in the sample are on automated power-management per Appendix 1, the subsequent audit shall be conducted every third year;

D the participating data center keeps the information collected from the audit under E of at least three consecutive audits for the benefit of the local Environmental Authority, which can request it at any time during an audit on the realization of measures for sustainable energy use;

E the information to be recorded under D regarding audits pertains to the following items (Annex 2);
1) the procedure used should reflect that there is a randomly selected sample;
2) the (pseudonymized) list of the 100 servers selected for the audit;
3) the number of the selected 100 servers that are set up correctly;
4) the (pseudonymized) evidence submitted by customers to the data center for the audit;

F if it cannot be demonstrated that the audit involves randomly selected servers from different customers, the locally authorized environmental authority may designate 100 new servers to be re-audited by the participating data center, to be performed within six months of discovery;

G if the audit by the participating data center reveals that > 90% and < 95% of the servers are on automated power-management mode, the participating data center will notify the customers whose servers are not on automated power-management that they are not compliant. The customer must change the server settings of all servers under its management to automated power-management within six months of the data center's observation, per Appendix 1. If a customer still fails to comply, the customary sanctions as described in the contract will apply and the local Environmental Authority may enforce per LHSO;

H if the results of the audit show that < 90 servers are on automated power-management mode, a new audit must be performed by the participating data center within 6 months per Appendix 2, in addition to direct contact with the above customers. If the outcome of this audit is 95% or better, the participating data center complies. If the outcome again shows that < 90% of the servers are on automated power-management, the participating data center, will impose sanctions on the offending customers within six months of finding non-compliance with the contract, and may be enforced by the local Environmental Authority following LHSO;

I to verify the information from the participating data center mentioned in point E, the locally authorized environmental authority may ask the participating data center for 10 servers, selected by the locally authorized environmental authority, out of 100 servers from the most recent audit by the data center to provide insight into real-time settings;

J If a customer indicates it cannot set servers on automated power-management[2] for reasons or if an equivalent solution is applied (see Appendix 1 Measure Introduce automated power-management on servers (EML2023 FI2)), substantiation must be provided by the customer to the participating data center for approval. The data center shall submit the approved substantiation to the local Environmental Authority for approval by December 31, 2024;

K if a customer of a participating data center invokes J, the participating data center, following their approval of that customer's substantiation, must submit the following information to the local Environmental Authority by December 31, 2024;

[2] The measure "Set up automated power-management on servers" specifically targets generic server equipment. While specialized devices such as "appliances" or data storage systems (storage) bear a strong resemblance to servers, they are not subject to automated power-management.

1 test results[3] of the relevant customers' servers that indicate that applying automated power management is not possible or that an equivalent measure is taken;
2 in addition to K1, information about the customer's servers' brand and type, should the server brand or type be the reason that the application of automated power-management is not possible;
3 in addition to K1, screenshots showing the CPU load of the customer's servers, if the degree of CPU load is the cause that applying automated power-management is not possible;

L If a customer places servers after December 31, 2024, that are not configured with automated power-management, the customer will provide a justification which must be approved by the participating data center. **Starting in 2025**, the participating data center shall report by **December 31 of the relevant calendar year** if exceptions to the automated power-management state are granted by the data center for the newly placed servers based on test results provided by the customers (see K1);

M if participating data centers do not comply with the procedure described above, supervision and enforcement per the LHSO will be carried out by the local Environmental Authority.

N the non-participating data centers of this procedure will be monitored and enforced according to the LHSO by the local Environmental Authority.

[3] See Appendix 1. A server does not have to be put on automated power-management if the customer has demonstrated that there is an average CPU load of more than 80% for the server in question. Nor does a server need to be put on automated power-management if the customer has demonstrated that the applications on the server are delay-sensitive to the extent that delays of a few microseconds are problematic.

Appendix 1 Measure Set up automated power-management on servers (EML2023 FI2)

FI2 Set up automated power-management on servers

Subject	Server room
Number Measure	FI2
Measure to be applied	**Set up automated power-management on servers** By setting up automated power-management (power management), the server adjusts its power consumption to the current demand for processing capacity. Alignment can be done by setting an appropriate dynamic power management profile (balanced mode). The settings at the hardware (BIOS) and operating system level must be such that the server can take advantage of all possibilities for adjusting its power usage.
Current situation	There is a server room with an installed capacity of ICT equipment of at least 5 kW. There is an average CPU load of less than 80%.
Economic precondition	Not applicable
Technical precondition	The applications placed on the server are not delay-sensitive to the extent that delays of a few microseconds are problematic.
Immediately executable (independently)	Yes
Aspects of effective management and maintenance	Not applicable

Appendix 2 Audit to be conducted among clients by the data center on account of the measure "Set up automated management on servers"

Introduction

Under the Environmental Activities Decree (Bal), all energy-relevant companies with energy consumption of ≥50,000 kWh or 25,000 m3 of natural gas equivalents must implement measures aimed at making energy use more sustainable with a payback period of less than 5 years.

The measure "Set up automated power-management on servers" applies to server rooms -servers are part of this- of data centers, but also to other business functions (for example, an office, medical institution, or education institute with a server room).

Following the procedure, the data center will conduct a sample to verify that the customers set the servers on automated power-management, starting from 1-1-2025 per this Annex. The retrieved information from the conducted sample shall be retained by the data center for at least three consecutive audits. At the request of the local environmental authority, the information from the sampling shall be submitted (pseudonymized) to the environmental authority.

Sample

The sample involves the a-selected (pseudonymized) customer providing auditable insight into the settings by collecting (pseudonymized) screenshots and sending them to the data center. These images will display the effective power management settings at the BIOS and primary operating system levels[4].

Procedure

The collection of this information requires that the following procedures be followed by the data center in an auditable, i.e., recorded in a logbook in which information from (at least) three consecutive audits is retained for the benefit of the local Environmental Authority:

1) Selection of servers to be monitored

The purpose of the sampling is to give the data center and therefore the competent authority a 95% statistical certainty that at least 98% of the servers in the data center comply with the measure "Set up automated power-management on servers." Therefore, an a-select sample of the physical server population present in the data center should be made, excluding the servers from the population for which a documented exception has been accepted by the local Environmental Authority[5].
Assuming a population larger than 100 servers, the sample size is set at 100 servers. If the population is smaller than 100, the entire population should be screened.
The data center is free to choose its own method of selection under the condition that the selection mechanism is transparent, the selection process is documented, and results in a reasonable distribution of selected servers across the data center space.
Of the selected servers, both the rack identification number (location number or similar) and the position of the server in the rack are noted by the data center. This position is the vertical position expressed in rack units. For virtually all data center racks, this numbering is on the vertical sections.
Identification includes, in addition to recording the position, registration of the serial number of the server in question. Depending on the manufacturer, service tags are also sufficient for unambiguous identification. In addition to being physically on the device, these IDs can also be traced by the customer using software. The customer's screenshots to be delivered should therefore include this number, making it transparent that the screenshot concerns the server selected by the data center.

2) Requesting evidence by the data center from the clients showing the power management settings of the selected servers

The relationship between the physical server and the client must be established by the data center operator. The data center asks the server operator(owner) of the selected servers to demonstrate the actual power

[4] The primary operating system (OS) is the OS that runs directly on the hardware, also known as the "host OS." In virtualized servers, this primary OS refers to the virtualization software such as VMware ESXi or Microsoft HyperV, among others.
[5] See footnotes to items J and K for documenting exceptions.

management settings. Such proof may be possible through screenshots taken by servers' system management that show these settings and IDs.

As mentioned in Appendix 1, automated power-management can be controlled at the BIOS and OS levels. Within Windows, there are several possibilities for setting and displaying the so-called power plan.

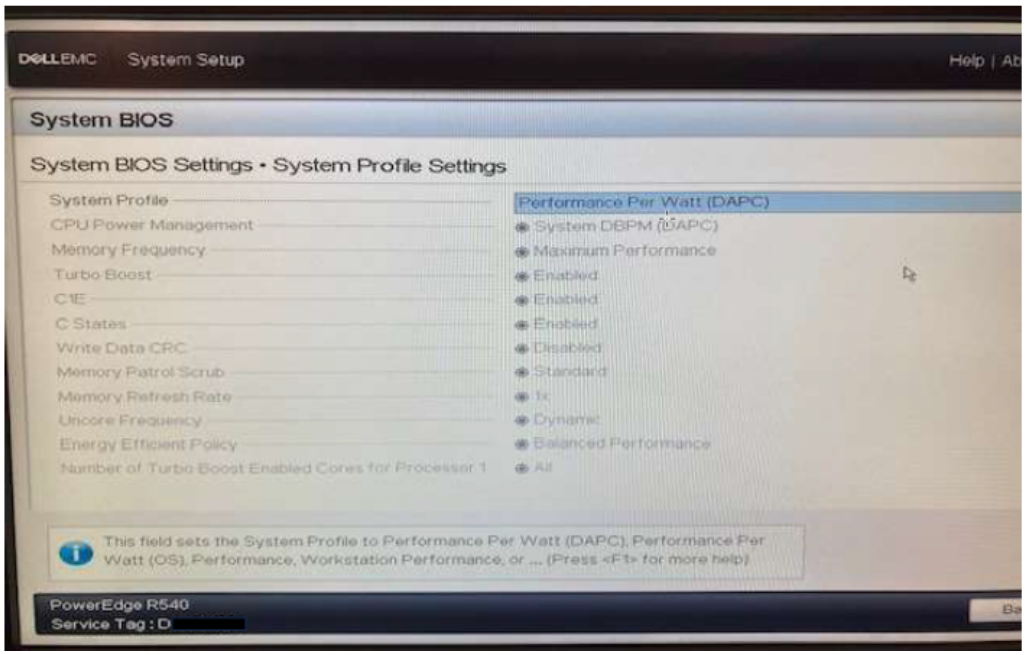

Figure 1: Example of screenshot BIOS setting, note details: C-states enabled and the service tag ID in the lower left corner

```
PS C:\Users\dirkh> hostname
DESKTOP-4EFKTFQ
PS C:\Users\dirkh> wmic bios get serialnumber
SerialNumber
6FVTT33

PS C:\Users\dirkh>  powercfg /getactivescheme
Power Scheme GUID: 381b4222-f694-41f0-9685-ff5bb260df2e  (Balanced)
PS C:\Users\dirkh>
```

Figure 2: Example using the "powercfg" command in Windows

Alternatively, the power plan can also be selected and read in the Windows control panel, see Figure 3.

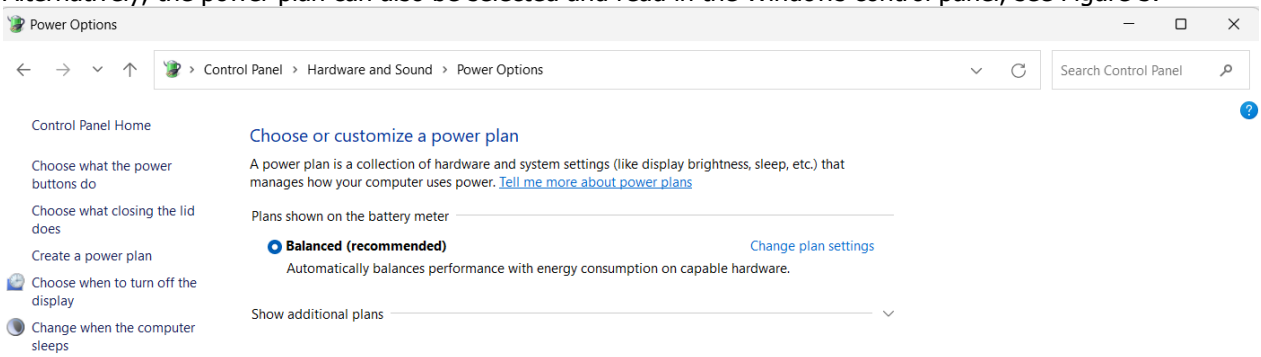

Figure 3: Example Windows power plans via Control Panel

For a server running the VMWare hypevisor, power management is set in the VMWare host management console, see Figure 4.

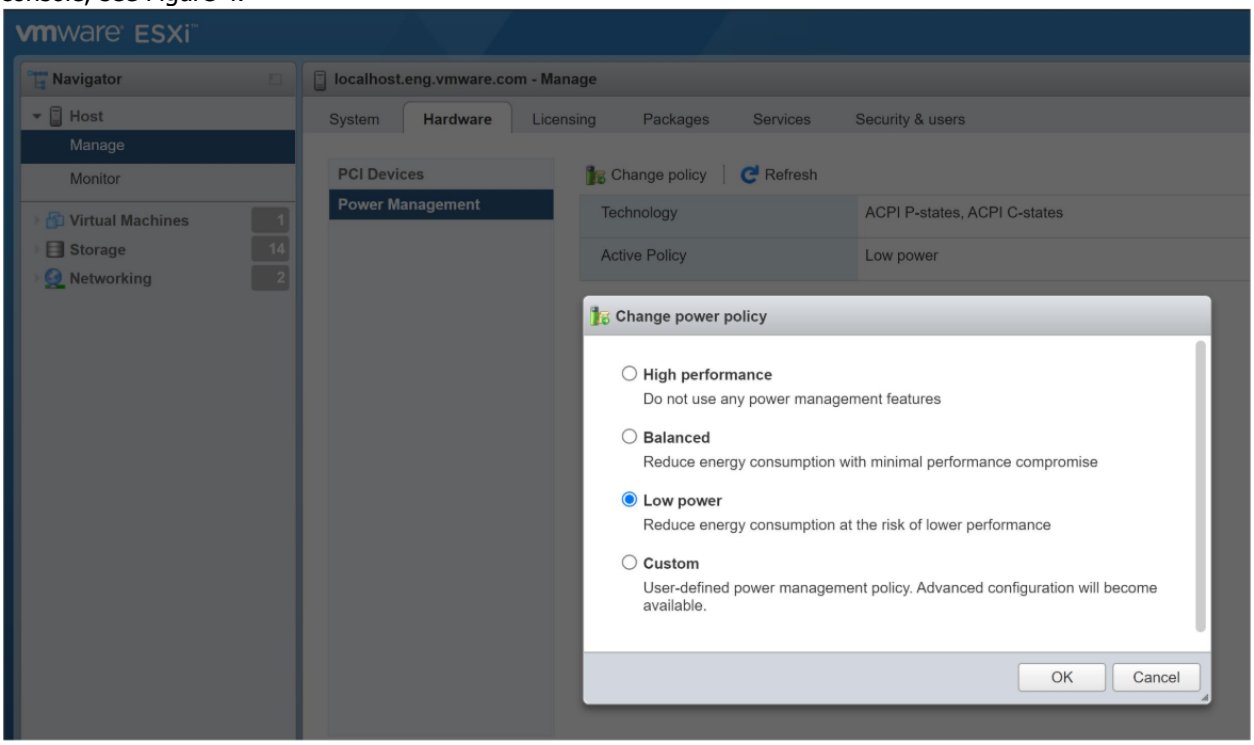

Figure 4: Example setting host power management in VMware ESXi
(source https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/techpaper/performance/hpm-vsphere7-perf.pdf)

The Happy Flow Manual can be used by the customer in putting the servers on automated power-management. https://www.rvo.nl/sites/default/files/2022-05/Manual-Happy-flow-English.pdf

3) Expected value and reporting obligation

The reporting requirement on the measure taken requires the data center to indicate whether it complies with the measure. The data center can do this by having the example form, included in the appendix, completed with the addition of screenshots by clients of selected servers. Based on the outcome of the sample, the data center can, with a statistical certainty of greater than 95, answer this question with "does comply" if the sample shows 95 or more servers are set up correctly.

4) Follow-up verification of up to 10 servers in real-time

For follow-up verification of the information provided by the customers at the data center of the 100 selected servers, the local Environmental Authority may ask the data center to provide insight into the real-time settings of 10 servers of the previously sampled 100 servers.
Through i.e. a video call, the data center, in the presence of the local Environmental Authority, verifies that the customer's previously provided data recorded in the data center's log matches the real-time settings.

Appendix Example Forms Audit "Set up automated power-management on servers"

In the procedure, data centers are asked to provide (pseudonymized) evidence to prove the servers are effectively on automated power-management. Pseudonymized refers to the information collected need not be traceable by third parties, including the local Environmental Authority, to a specific customer of the data center, if the data center so desires. However, the data center itself should be able to link the information to the customer and the specific system from which the information was collected.

Reporting to the local Environmental Authority by the data center

An audit includes the information in Table 1 with Tables 2 through 4 in the appendices. The data center has to store this information for at least three consecutive audits. At the request of the local Environmental Authority, the data center shall hand over this information.

Table 1: Data center reporting to local Environmental Authority.

Data Center Name Adress	Submitter Name Job Title

Date Audit	25-1-2025
Number of servers on automated power-management	97
Number of servers not compliant	3

Background information to be added to Table 1

1 Selection of the 100 servers

The selection procedure eventually leads to a list of 100 server locations to which (by a pseudonym) a client name is associated.

Table 2: Selection table (pseudonymized).

NR	Location and height number	Server identifier	Customer Pseudonym
1	Room: A RackID: A23 RU : 30	Serial number: Servicetag:	Customer AA
2	Room: F RackID: Y11 RU : 12	Serial number: Servicetag:	Customer AB
3	Room: C RackID: X01 RU : 20	Serial number: Servicetag:	Customer AC
4			
… (100)			

If the data center chooses not to include customer names in Table 2, the data center maintains an internal list linking the pseudonym to the actual customer

Table 3: Pseudonyms table

Pseudoniem	
Customer AA	Certios b.v. Doetichem Nederland
Customer AB	ACME corp Holywood USA

2 Report of selected customers to data center

The data center then collects the necessary information, which may include multiple servers selected from a single customer. The respective customer provides the following information to the data center;

Table 4: Customer report to data center

Date	

Data Center Location	
Name Submitter	
Company name	

Host Name	Serial number /identifier	Location	BIOS	Host OS	remarks
SQLserver1	Aa11bb22	Room: A RackID: A23 RU : 30			Confor m FI2

3 Optional check by local Environmental Authority for real-time settings

Based on the aforementioned information, the local Environmental Authority can select the 10 servers whose real-time settings will be checked during a follow-up verification.