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News Release from: [Power Integrations](#)

Subject: **PeakSwitch**

Edited by the Electronicstalk Editorial Team on **12 October 2006**

## Design for low power using a power budget approach

**Douglas Bailey of Power Integrations discusses existing and upcoming power efficiency standards and outlines how an engineer may begin to analyse and make choices.**

**Note:** A **free** brochure or catalogue is available from Power Integrations on the products in this news release. [Click here to request a copy.](#)

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**Where product design is concerned, legislation and industry standards on energy saving have tended to focus on the efficiency of power conversion and ways of improving the power supply.** However, if power is misused by the functional system, any gains will be squandered. This

has not escaped the attention of regulators and new efforts are underway to establish energy budgets for common systems that apply to the whole product rather than just the power supply.

This brings a new dimension to the product design process because system designers and planners must trade off the market value of product features against not only their cost in material to implement, but also their marginal cost in power supply efficiency required to meet the power budget.

The total energy budget method of regulating for efficient use of energy works best for applications that have a fixed feature set - such as printing one page of colour text, a 17in LCD computer display, a device for playing DVDs and so on.

Many companies make similar products that work substantially the same way.

Therefore, regulators feel confident that they can bound the energy usage and provide incentives to the most efficient designs or penalties for the least efficient.

This 'power budget' philosophy has already been applied to standby power usage, yielding industry-wide improvements in the [standby power consumption](#) of certain classes of product.

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Power Integrations expects that regulators such as CEC, CECP, Energy Star, EU and the Australian Green House Office will elect to regulate an increasing number of products.

In the USA the Energy Star regulators are working on such budgeted standards for printers, PCs and TVs.

In Europe there is substantial focus on set top boxes.

Power Integrations tracks all of these activities closely to ensure that the ICs provided to customers meet or exceed all current and upcoming standards.

Take, for example, the ubiquitous inkjet printer.

Products from various manufacturers deliver more or less the same amount of ink to, generally speaking, standard paper stock at a rate and resolution that increases all the time, but is similar across makes and models of the same generation.

Our analysis shows that inkjet printers consume around 1W or less in standby mode, around 25 or 30W in operating mode and between 70 and 80W when engaging motors to advance the paper.

This large dynamic range creates significant [power supply design](#) challenges which must be taken into account when employing the power budget approach to product design.

When in standby mode, printers have to perform various well-defined functions, which include checking the on/off switch periodically for any activity and illuminating the 'power connected' LED.

Printers also tend to have a sleep mode that allows the device to power-up quickly when a print job is issued and to monitor the PC interface to determine if it is time to wake up and print a document.

To optimise the power consumption of the printer across its entire power range, the power supply has to deliver efficient power in all operational modes, from standby to peak-power modes.

Using PeakSwitch, an integrated switch-mode IC with peak-power capability from Power Integrations, it is possible to design a flyback PSU that can deliver at constant-efficiency across a broad power range.

The integrated switch-mode IC varies the average switching frequency to provide variable amounts of power across the range required by the printer and selects from four current-limit levels at various power thresholds to optimise switching efficiency.

This allows the power supply to maintain a high level of efficiency across a broad range of output requirements from standby to 300% peak load.

This ensures that the designer has a consistent and high proportion of power available at any mode at which regulators determine a fixed input power budget should be enforced.

New regulations will require that equipment be designed to adhere to predefined power budgets.

With these more exacting constraints on system-level power usage, the designer must work to derive energy savings from both the power supply and the functional system, and from the way these two elements interact.

The power budget approach to design not only provides power savings in standby mode, it can also lead to important efficiency gains in other operational modes, including no-load and peak-power modes. [Request a free brochure from Power Integrations...](#)

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