



Power Partners is Ready for EU Energy Efficiency CoC Tier 2 Legislation



Ever-Evolving Efficiency Standards

Since 2004, a number of regulatory agencies dedicated to the common goal of energy conservation have sprung up around the globe. This trend was kicked off when researchers at UC Berkeley determined that approximately 195TWh of electrical energy was being wasted yearly in the United States as a result of standby power in electrical devices that were left plugged into the grid when they were not in use. That's enough energy to power the entirety of China for more than 10 days.

As time goes on, these agencies continue to put ever-increasing pressure on OEMs to develop energy efficient products. New standards have been published almost every year since 2004 by agencies in the US, Canada, China, Australia, Canada, and the European Union, each more stringent than the last. Since 2014, the US Department of Energy (DoE) and the European Union's Institute for Energy and Transport (a division of the JRC) have been at the forefront of the energy conservation movement.

The most recent legislation, DoE Level VI, was put into effect in February of 2016. DoE Level VI places rigorous mandates on the minimum active mode efficiencies and maximum no-load consumptions for all external power supplies sold within the US. Right around the same time as the DoE was developing their Level VI standard, the JRC was developing a standard known as the Code of Conduct on Energy Efficiency of External Power Supplies, or CoC. The CoC was released as a voluntary standard in two separate tiers of rigor in 2014 and 2016 respectively. The JRC reports that if 90% of the power supplies sold in Europe were compliant with the standard, over 1TWh of would be saved in the year 2020.

Although the CoC remains a voluntary standard for now, Tier 2 is under review to become law throughout Europe as early as this year, and it is a good deal more stringent than DoE Level VI. The mandate for products being sold in Europe to adhere to the CoC is fast approaching, and now is a critical time for OEMs to evaluate whether or not their external supplies are going to remain in compliance with the ever-evolving legislation.



The global consumption of electrical energy per year has more than doubled over the past 25 years, but the consumption in Europe alone has only increased by 33%



Did You Know?

— Global Energy Statistical Yearbook 2017 —

CEC:
California Energy Commission

MEPS:
Minimum Efficiency Performance Standard

EISA:
Energy Independence and Security Act

ErP:
Energy related Products

NRCan:
Natural Resources Canada

EU CoC:
European Union Code of Conduct

DoE:
US Department of Energy



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What's new in EU CoC Tier 2?

Many equipment manufacturers are wondering what CoC Tier 2 requires that DoE Level VI did not. In general, CoC Tier 2 simply proposes **more rigorous requirements** on the active mode efficiency and no-load power consumption of external ITE power supplies than DoE Level VI did. There are a few other differences at work as well. Most notably, **CoC Tier 2 adds a data point to the average active mode efficiency requirements**. While DoE Level VI was only concerned with the efficiency of external power supplies at 25%, 50%, 75%, and 100% rated load conditions, CoC Tier 2 is concerned additionally with the device efficiency at 10% of the rated load. The average efficiency is calculated as shown in the equation below:

$$\eta_{av} = \frac{\sum_{x \in S} \frac{(V_{out} \cdot I_{out})|_{I=xI_{rated}}}{Re[V_{in} \cdot I_{in}]}}{4}; S = \{0.25, 0.5, 0.75, 1\}$$

Both DoE VI and CoC Tier 2 calculate efficiency in this manner. However, CoC Tier 2 also places a separate requirement, independent of the four point average, on the efficiency of a power supply running at 10% of its rated output power. Another important difference to note between the two standards, is that **CoC Tier 2 does not cover power supplies with nameplate power ratings above 250W**. DoE Level VI casts a blanket mandate over supplies in this range for both average active mode efficiency and no-load power consumption. Unlike DoE VI, **CoC Tier 2 is not concerned with multiple output supplies**.

Requirements: DoE VI vs. CoC Tier 2 — The Numbers

No-Load Power Consumption Requirements

Rated Output Power	DoE VI	CoC Tier 2
300mW < P _{out} < 49W	100mW	75mW
49W < P _{out} < 250W	210mW	150mW
250W < P _{out}	500mW	N/A

Active Mode Average Efficiency Requirements

(V_{out} < 6V, I_{out} > 550mA)

Rated Output Power	DoE VI (η _{av})	CoC Tier 2 (η _{av})	CoC Tier 2 (10% load)
300mW < P _{out} < 1W	0.517 • P _{out} + 0.087	0.517 • P _{out} + 0.091	0.517 • P _{out}
1W < P _{out} < 49W	0.1 • [0.834 • ln(P _{out}) - 0.014 • P _{out} + 6.09]	0.1 • [0.834 • ln(P _{out}) - 0.011 • P _{out} + 6.09]	0.1 • [0.834 • ln(P _{out}) - 0.0127 • P _{out} + 5.18]
49W < P _{out} < 250W	0.87	0.88	0.78
P _{out} > 250W	0.875	N/A	N/A

Active Mode Average Efficiency Requirements

(V_{out} > 6V || V_{out} < 6V, I_{out} < 550mA)

Rated Output Power	DoE VI (η _{av})	CoC Tier 2 (η _{av})	CoC Tier 2 (10% load)
300mW < P _{out} < 1W	0.5 • P _{out} + 0.16	0.5 • P _{out} + 0.169	0.5 • P _{out} + .06
1W < P _{out} < 49W	0.1 • [0.71 • ln(P _{out}) - 0.014 • P _{out} + 6.7]	0.1 • [0.71 • ln(P _{out}) - 0.0115 • P _{out} + 6.7]	0.1 • [0.71 • ln(P _{out}) - 0.0115 • P _{out} + 5.7]
49W < P _{out} < 250W	0.88	0.89	0.79
P _{out} > 250W	0.875	N/A	N/A



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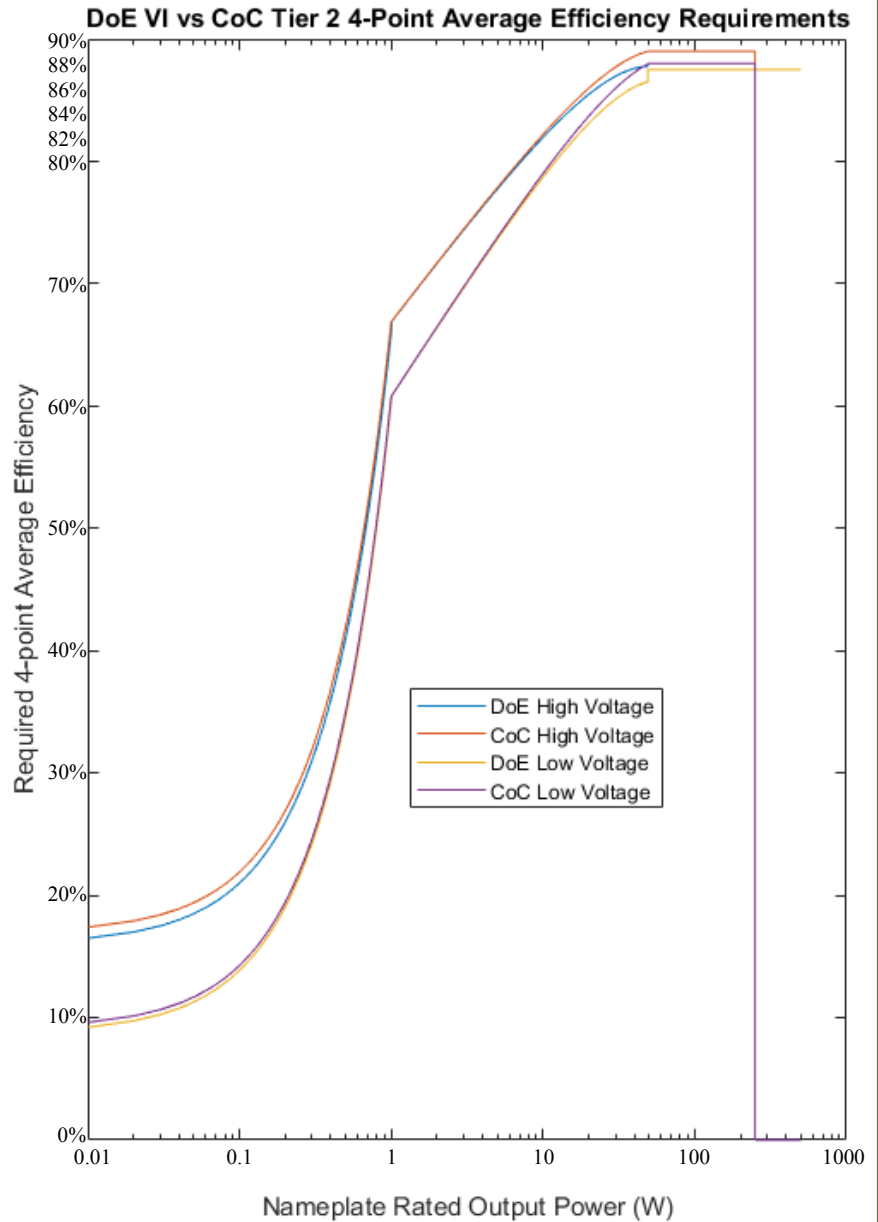


All Currently Marketed Power Partners External ITE Products are Already CoC Tier 2 Compliant!

- PEA W6I —
- PEA W6NA —
- PEA W12I —
- PEA W12NA —
- PEA W20NA —
- PEA W30I —
- PEA W36I —
- PSA W36I —
- PSA W36NA —
- PSA W65I —
- PEA D36B —
- PSA D36B —
- PEA D50 —
- PSA D65 —
- PEA D72 —
- PEA D120 —
- PEA D120B —
- PEA D150B —
- PEA D180 —

Please contact us with any inquiries regarding the compliance of legacy products.

A Graphic Depiction



The Bottom Line

The EU CoC Tier 2 standard is the latest and most strenuous energy efficiency standard to be published to date. The standard is likely to become law in Europe as early as this year. Now is a good time for OEMs to find out if the power supplies that support their designs are compliant with this upcoming efficiency standard, and plan for the coming legislation. Power Partners Inc is dedicated to maintaining compliance with all of the newest regulations in safety, EMC, and efficiency.

Dylan Howes

Applications Engineer

(978)567-9600 x230

dhowes@powerpartner-inc.com

