# NCON SMART POWER CONTROLLER
# OVERVIEW

**THE CONTEXT:**

The inquiry is to identify relevant parties (preferably TEEMA members) who would be interested in **taking a licence from NCON, an Australian technology development company, for manufacture, distribution, sales and marketing for a patented Smart Power Controller (SPC) within China and associated countries.**

**EXECUTIVE SUMMARY**

**1) What, briefly, is Ncon's SPC?**

The Smart Power Controller (SPC) reduces electricity consumption and greenhouse gasses in Commercial and Industrial lighting environments by 30%. It reduces demand by 33%, improves power factor up to 15% plus all lamps last up to 30% longer with no discernible change in light output or quality.

**2) What is the current situation in the field in which Ncon's SPC appears?**

Responsible corporations have an ever increasing focus on energy saving and the challenge of reducing greenhouse emissions. The ability to simply integrate with other building efficiency systems is essential. The US Dept. of Energy states: "of all building upgrades lighting is considered the easiest and most lucrative for energy saving".

**3) What is the problem with this situation that the SPC is seeking to address?**

"Older" technologies are electromechanical, only work on fluorescent lamps and in several cases has proven unreliable. Generally they are installed in each circuit, which necessitates many "smaller" unconnected boxes being installed. Technically they don't meet all the requirements for commercial success. They cannot be integrated into Building Management Systems.

**4) How does the SPC address this situation?**

Ncon's innovation uniquely solves these problems due to its digital 3-phase technology, which is installed at the main switchboard. Its digital design includes communication protocols and retrofits quickly and easily. It's safe, reliable and reacts to surge and brownout conditions. The software can be tuned to any voltage or lamp type.

**5) What is particularly novel or noteworthy about the SPC?**

It's a globally patented (1996)-energy efficiency technology incorporating digital switching (no moving parts) and microprocessor software control (novelty). It's designed for "set and forget" configuration, but has communications ability. It's

cost effective and incorporates easy low cost installation (retrofit) including a handy bypass switch.

## A CLOSER LOOK

### 1. The SPC explained.

Ncon's SPC is a microprocessor-controlled energy management system. It is installed in the lighting circuits at the main distribution sub-board.

The SPC operates by monitoring line voltage and current. It monitors the incoming power levels and based on pre-set conditions, it controls the outgoing power to pre-selected banks of lights by lowering the voltage in a pre-determined manner with all management and control via a fully digital switching and microprocessor system (the essential basis of claims in our patent).

Additionally, the SPC incorporates various safety features including Ncon's patented Automatic Minimum Voltage Limitation System which among other things provides surge and brownout protection.

It was designed with the added ability of allowing maintenance and/or fault resolution by employing a unique "bypass" switch facility without disruption to the lighting environment.

The flexible model range has been designed to cater to varying market specifications and sizes.

- 1210 model – Single-Phase 200 lamp - 10 kVA: Approx. 5,000 sq. ft.
- 3210 model – Three Phase 250 lamp - 12 kVA: Approx. 6,000+ sq. ft.
- 3420 model – Three Phase 400 lamp - 20 kVA: Approx. 10,000+ sq. ft.
- 3630 model – Three Phase 600 lamp - 30 kVA: Approx. 15,000+ sq. ft.

The SPC's digital microprocessor technology easily works with other electrical/digital energy efficiency products, including the latest:

- Lighting Control Products (Dimmers, sensors, etc); and
- Building Automation Systems, either locally or remotely, e.g. via the Internet.

The SPC delivers electricity savings of 28% – 33% saving on gas discharge lighting consumption. The global market is mainly fluorescent, which is 65% - 95% of most commercial lighting depending on country.

Each installed SPC also reduces Greenhouse Gas Emissions by an average (depending on product mix) of 20 tonnes per annum generically known as "carbon credits". Prime facie, carbon credits could be, over a 5 year period (from 2008) be valued at say, AUD$400 to $800 p.a. per Ncon unit, where the "Kyoto Protocol" applies, e.g. Australia, UK/EU, Japan, China, etc.

In many countries and business sectors, commercial and industrial lighting accounts for between 40-60% of energy costs.
The scope for economic value creation is significant re:

(a) High and increasingly higher electricity costs,
(b) Lighting being a major component of electricity usage &
(c) Fluorescent and HID Lighting is a major component of Commercial & Industrial lighting.

Global lighting electricity is estimated at over US$230 billion per annum. In the USA fluorescent lighting accounts for 56% of the 391 TWh per year of commercial lighting electricity use which accounts for more than 40% of commercial sector electricity consumption.

The SPC (branded Y.E.S – Your Environmental or Energy or Efficiency Solution) has been repeatedly tested and verified by independent accredited bodies and is currently installed and running successfully (for over 5 years) in various commercial facilities.

**2. What is novel about the SPC? Please explain how the SPC breaks with conventional ideas or processes in its field. How does it go beyond marginal improvements on something that already exists?**

In Australia, the lamps strike at full voltage (240) and after 30 seconds the SPC, while monitoring the line voltage, reduces it to 207 volts ("save mode"). If the system detects lamps on the circuit being turned on, the SPC reverts back to full voltage ("bypass") in less than 2 milliseconds to allow the lamps to strike at full voltage. This avoids damage to the lamps and causing accelerated degradation. Then after 30 seconds while continuously monitoring the voltage and current the system switches back to "save" mode.
**This can only happen with microprocessor control,** which is the clear point of differentiation from all other technologies. The key words in claim 1 of our patent are "by digital processing means", which in essence is the novelty, the prior art of which dates back to 1996.

Ncon's competitive advantage is the patented digital control of the three-phase voltage management process, which provides:

- An ability to address the "low cost/high energy efficiency" market segment.
- A clear "audit trail" from digital readings on a minute by minute basis for voltage and electricity consumption
- Technical superiority - ranks first with engineering decision-makers.
- A defendable IP position residing in several key areas:
    1. The hardware that is the product;
    2. The microprocessor based controller board; and
    3. The software to drive the unit. (This is an integral part in the design and operation of the SPC).
- Measurable result aids cost-benefit analysis & purchase justification
- The technology addresses energy and greenhouse in a direct, measurable and verifiable way.
- Value created & Greenhouse Emissions saved are QUANTIFIABLE.
- Applicable to any voltage system.
- "Set and forget" system.
- Ncon's system incorporates various safety features including Automatic Minimum Voltage Limitation System which provides surge and brownout

protection. It also limits under running of lamps (damage) when the supply voltage drops below acceptable thresholds.
- Controls all fluorescent and high intensity discharge lamps (Metal halide etc).
- Easy low cost installation at switchboard; also provides handy bypass switch.
- Integrated 3 phase sub-distribution panel (Ncon = 3 phase; Most competitors are single phase).

The SPC also provides wider benefits to, and have positive impacts on:
- **Utilities (Generator / Transmission Network / Retailer)** – Reduced demand; Improved power factor; Frees capacity that can be sold elsewhere.
- **Environmental Agencies** - Reduced greenhouse gas emissions; fast / cheap application.
- **Building Developers & Property Owners** - Improved Building Energy / "Star" Rating; lowers total cost of ownership, improved yields, higher capitalisation / valuation for buildings thus more attractive to new tenants, etc.

3. **What milestones have been achieved?**

1. Finalist in 2002 - UCLA Anderson Business School FEMBA Global Access Program.
2. Establishment of Resellers / Distributors in the entire major capitals and regional Australia i.e. Melbourne, Sydney, Brisbane, Adelaide, Perth and Tasmania.
3. In July 2006 achieved Victorian Government Sustainability in New Investment customer grants to Unilever and BMW to encourage the rollout of new and innovative technology. These grants (completed) aim to assist with funding projects that go beyond conventional practice to achieve energy savings.

4. **Please state if the SPC is patented, copyrighted, published in a technical journal, or otherwise "on the record" with any recognized arbiters of innovation.**

As part of the company's intellectual property strategy, Ncon owns "granted" patents in 8 major countries (USA # 6,188,182 B1, China, Japan, Canada, Australia, New Zealand, South Korea and Singapore), with further patents under the final stages of examination in the 25 plus countries within the EU.

The prior art date for all patents is October 1996 and covers approximately 70% of the global electricity usage where the technology is equally relevant and directly applicable in all International voltage/electricity supply regimes.

The software to drive the unit is an integral part in the design and operation of unit so the technology is also protected by copyright under the BERN Convention.

**4. Please describe any practical results that the SPC has achieved to date, such as sales, profits, users, citations, etc.**

Since January 2003, when beta testing first began and subsequently after the release in January 2006, the company has delivered units totaling $1,400,000 in revenue.

Over 150 SPC's have been successfully trialled in over 40 sites owned or operated by "iconic" customers, in Australia. These customers indicate a clearly established and immediate scope for repeat sales and continuing referral sales to peers and industry aligned parties.

Ncon has current identified potential orders of $65,500,000, and conservatively estimates that current demand based on existing customer repeat / extended business will be a further $13,500,000 over the next 6-12 months. The majority of the existing business is focused in Australia.

The technology has been repeatedly tested and verified by independent authorities and customers, including:

1. Monash University – tested by Creative Power Technologies
2. Toys R Us and (Ritchies) IGA Supermarkets
3. Energy Retailers: Western Power, Energy Australia & United Energy (Testimonials and reports available on request)

6. **Where did development of the innovation take place?**

All development was conducted in Victoria, Australia. The technology and IP is wholly Australian owned to date by Ncon Corporation (N for energy and con for conservation).

Current stage of development:

- Sales strategy and company infrastructure planning complete
- Product pricing and financing strategy complete
- Comprehensive Information Memorandum with select Country Business plans complete
- Manufacturing agreements in place
- Required manufacturing capacity available
- Warehousing facility established
- Strategic distribution agreements identified
- Long-term testing completed
- Major Customer endorsements
- Independent evaluations completed
- Endorsed as technology of choice by industry leaders
- Implementation across different market segments
- International placement and distribution interests
- Data room available with key strategic documentation
- Future R&D / product enhancement identified
- Positioning for International licence opportunities begun early 2008.

7. **Are you aware of any competitors or others working on--or who have introduced--a similar solution? If so, how is your SPC superior to theirs?**

Prior and existing "older" technologies are electromechanical and in several cases have proven to be unreliable. In general they are installed in each circuit which usually necessitates many "smaller" boxes being installed. They have a disjointed installation footprint, only work on fluorescent lamps and cannot be integrated into Building Management Systems.

Based on analysis of the energy efficiency market, Ncon believes it is one of the few, if not the only; company to offer a fully independent three-phase unit that is fully digital with “no mechanical moving parts”.

This unit is applicable to general and large-scale commercial and industrial applications. It provides superior coverage, stability / safety and a range of other features relative to almost every other known competitor product.

The SPC’s differentiating benefits and features are:

- Reduces energy consumption around 30%.
- Reduces energy demand levels by around 33%.
- Reduces Greenhouse Gas Emissions (as does competitors).
- Improves Power Factor (15% demonstrated).
- Low capital costs with wide coverage capability of up to 600+ Lamps.
- Unique specifically designed “rental product” facility provides no capital outlay and immediate savings income on day one (1) of commissioning to customer.
- Based on non-preferred outright sale the IRR is 60-100%; a 1-year payback is achievable in many instances; with less than 2 years payback being the norm.
- Applicable to any business with a minimum of 75 lamps.
- No discernible change in light output or quality.
- Reduces lamp replacement / maintenance costs. Increases lamp and ballast life.
- No moving parts; unit life estimated at 14+ years; (Mean Time Before Failure).
- High-value retrofit application; significantly more cost-effective than installing new high efficiency lighting which invariably has a significantly higher relative capital outlay and installation cost, particularly across larger lighting installations.
- Ncon SPC’s installed with existing lighting can generate savings of 10-20% approx. over most new lighting technologies; e.g. electronic ballasts.
- Small footprint; fits easily in several ways in most situations.
- Ease of Installation; low labour cost (essential for future installed cost planning).
- Reduces air-conditioning cooling costs (ballast approx. 27 degrees Centigrade cooler).

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