



# EPRI Research Proposal on Digital Control

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- Results of EPRI Switched-Mode Power Supply Workshop
  - Held 11/9/01
  - Objective: to define directions for new EPRI funding effort in SMPS
  - Consortium for Electric Infrastructure to Support a Digital Society  
[www.epri.com/ceids](http://www.epri.com/ceids)
- Discussion of proposed project:
  - Goals
  - Path to commercialization
  - Collaboration between researchers and manufacturers
  - Administration and role of CoPEC

EPRI: Electric Power Research Institute, Palo Alto CA



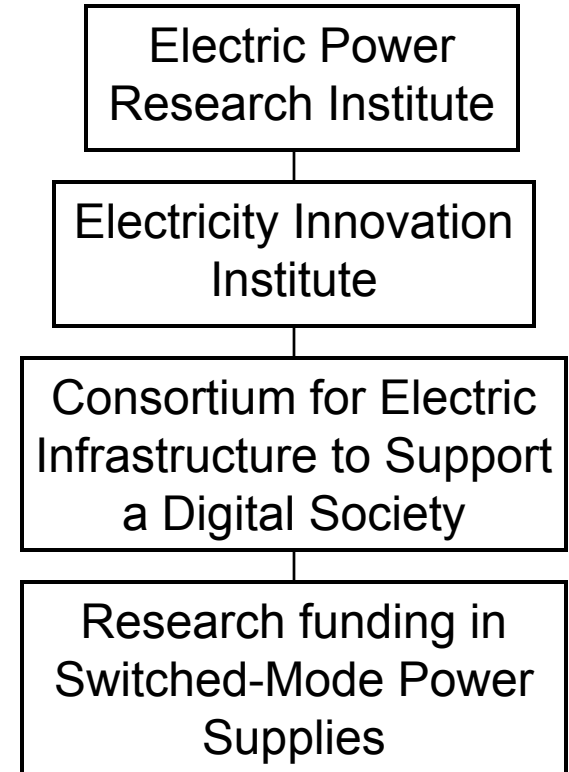
# EPRI Switched-Mode Power Supply Workshop

## Workshop objectives:

- To direct new CEIDS/E2I - sponsored research efforts in the future of SMPS for the Digital Society
- To bring together key researchers, manufacturers, and users to discuss the critical issues, needs, and barriers to driving significant advancements in SMPS technology

## EPRI envisions:

- Funding three major projects
- Total funding level: \$6 - 10 million over next four years (i.e., \$500k to \$800k per year per project)
- 3 to 5 year projects, which include
  - Collaboration between researchers and manufacturers
  - Path to commercialization



## Timetable:

- RFPs issued in late January
- Proposals due 60 days later



# Results of Workshop

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Program manager stated that RFPs would be issued in three areas, with two defined as:

- Materials (Virginia Tech proposed this area)
- Digital control (CoPEC proposed this area)

Breakout groups suggested the following goals in the digital control area:

- Partnerships between university and manufacturers
- Economic implementation
- Enabling adaptive behavior
- Improved performance

Important components of proposals:

- Development of hardware and technology
- Path to commercialization
- Good team, well-rounded project, how will university and manufacturers collaborate



# SMPS Digital Controller Technology

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Performance gains, such as:

- Increased sophistication of control and protection algorithms
- Ability to change compensation in software or EPROM
- Estimation of currents and system parameters
- Digital transmission of error signal across isolation boundary

Economic gains:

- Reduction or elimination of external passive components
- Scalable digital IC designs that can take advantage of digital IC process advances
- System integration

What this technology requires:

- New circuit approaches for practical realization in switched-mode power supplies
- SMPS design engineers having expertise in digital control, embedded systems, and/or IC design



# PSMA Workshop

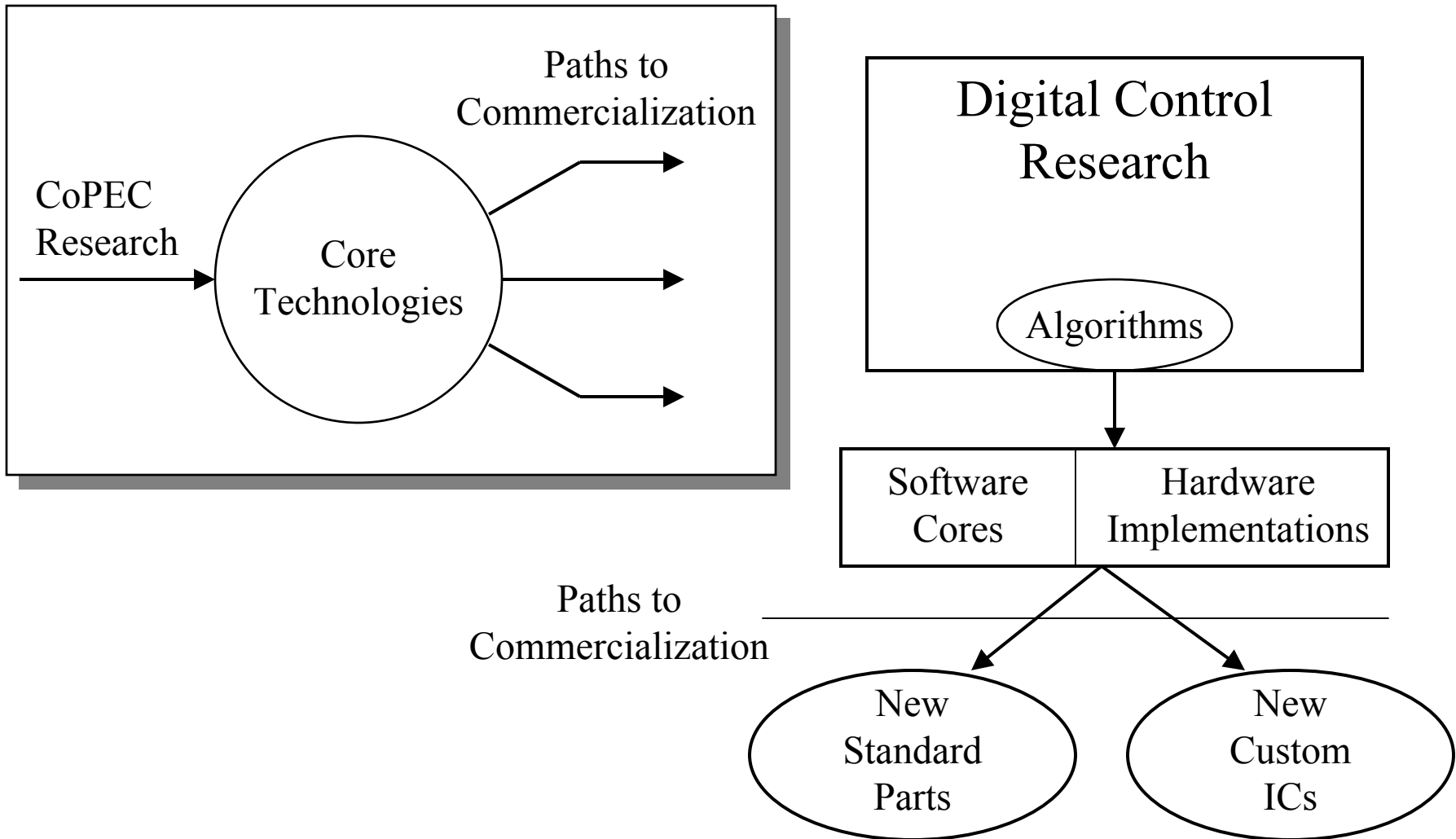
## on silicon integration in power supplies

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- To be held prior to APEC 2002, run by Bob White
- Will address pros and cons of:
  - Buying ICs off-the-shelf
  - Working with an IC supplier on custom or semi-custom ICs
  - Designing your own ICs and using a silicon foundry for fabrication (i.e., own the entire process)
- Five companies will make presentations



# The Role of CoPEC





# Technical Demonstration Vehicles

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Defined by CoPEC members, in the areas of:

- DC-DC converter
- Isolated DC-DC converter
- PFC rectifier
- Lighting

Demonstration of working hardware, with the following goals:

- Practical, economic implementations
- Increased functionality and sophistication of control
- Approaches to implement all important functions



# Proposal Issues

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Benefits to CoPEC members:

- Leveraging of membership fees
- Intellectual property rights (in accordance with CoPEC contract)
- Larger graduate pool

Note standard EPRI contract reserves IP for EPRI. Can be negotiated if matching funds are involved.

Our goal for proposal: matching EPRI 50%, other sources 50%. “Other sources” might include

- CoPEC membership fees
- Internships
- CU equipment matching funds
- CU nonresident tuition remission
- CU overhead rate
- Other