



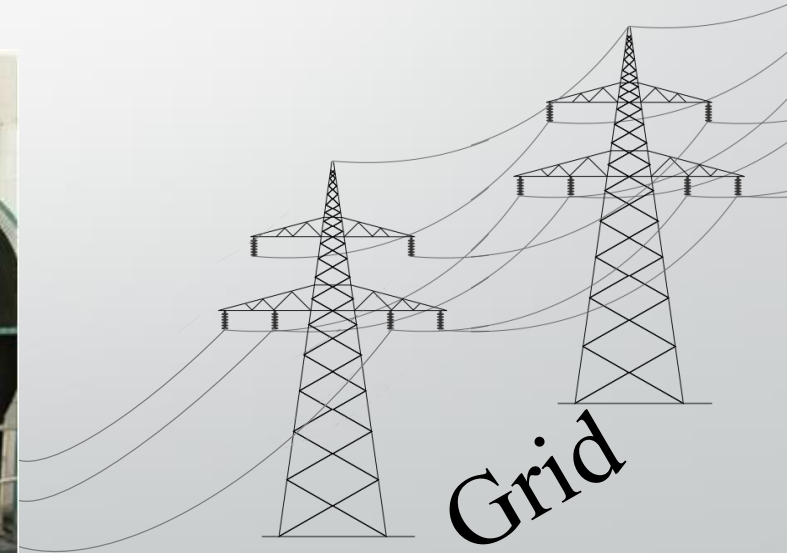
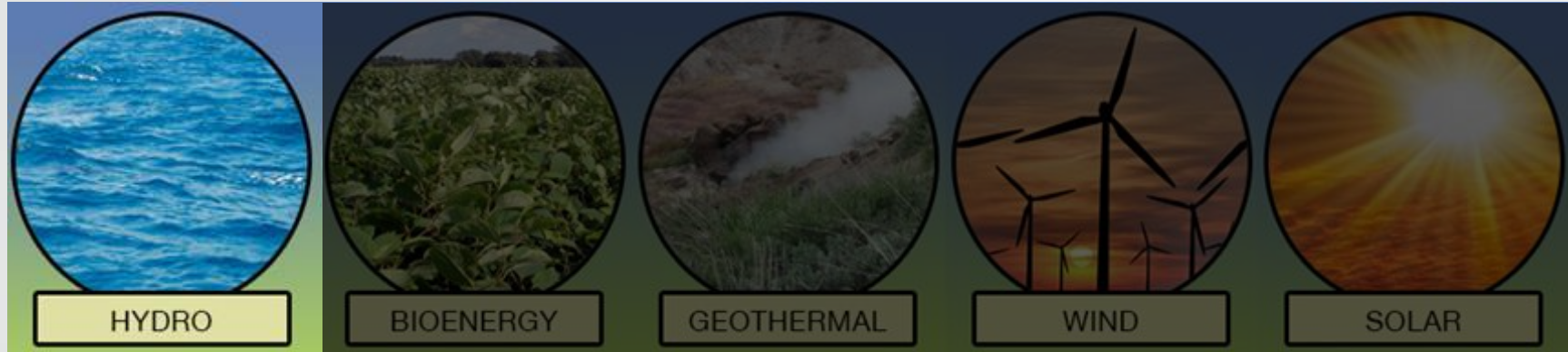
# Multi-Mode DC/DC Converters

Assoc. Prof. Erdal Irmak

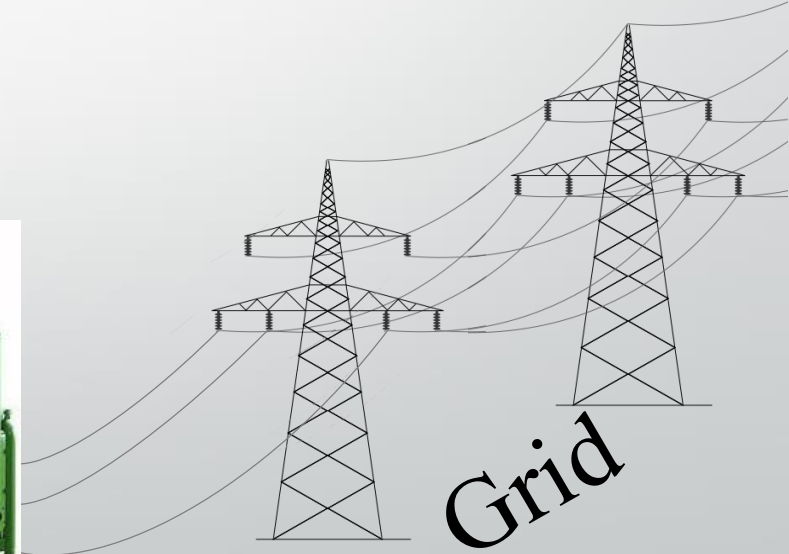
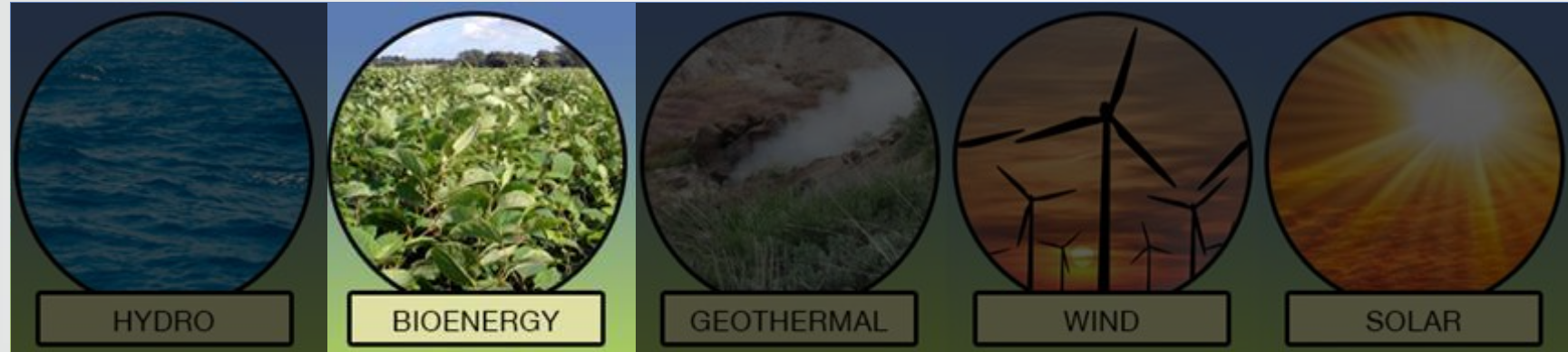
# Outline of the presentation

- Classic DC/DC Converter Topologies
- Multi Mode DC/DC Converter Types
- Single Inductor Multi Mode Converter Types
- Motivation & Background
- Conclusion

# Renewable Energy Systems

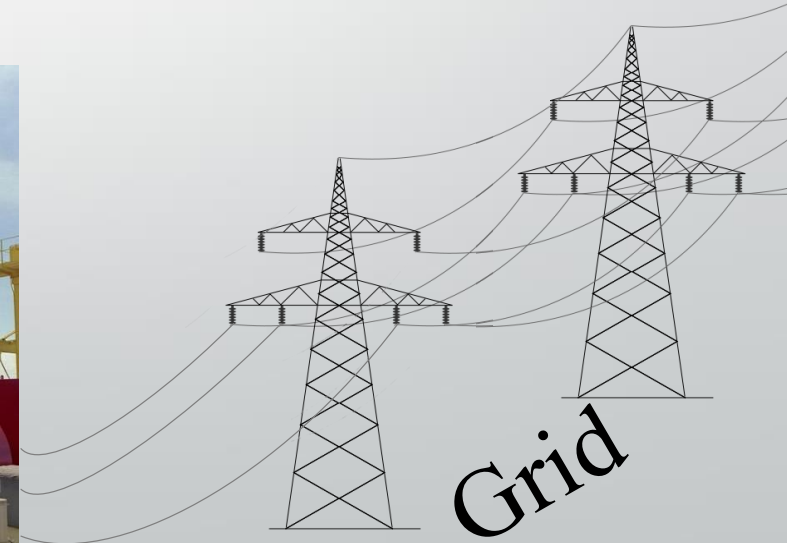


# Renewable Energy Systems

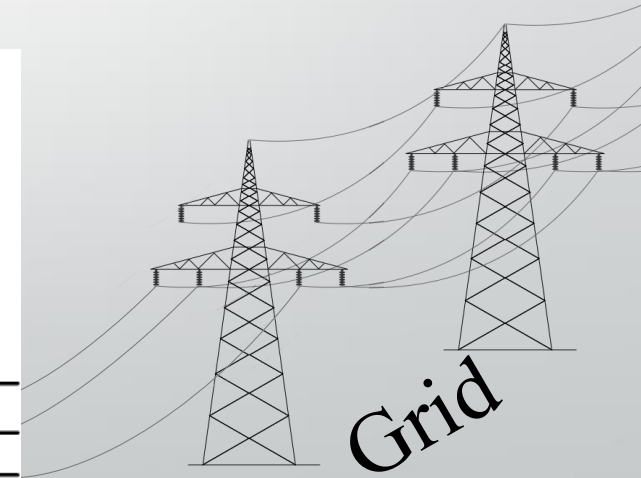
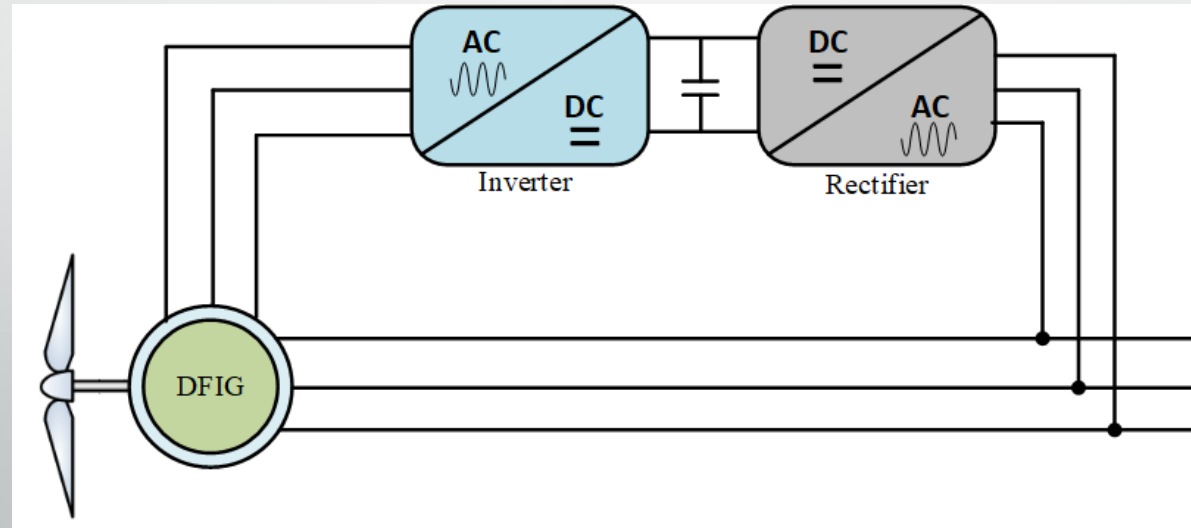
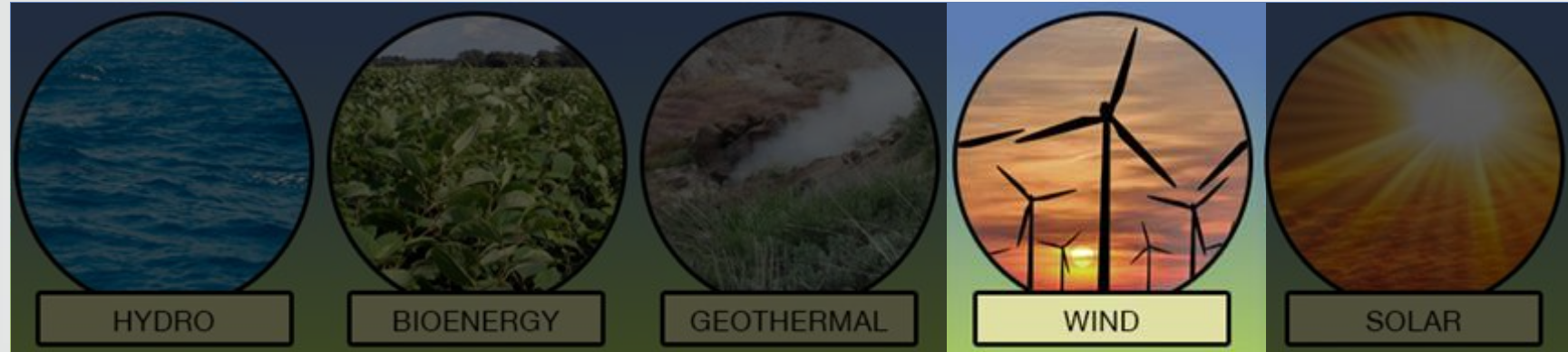




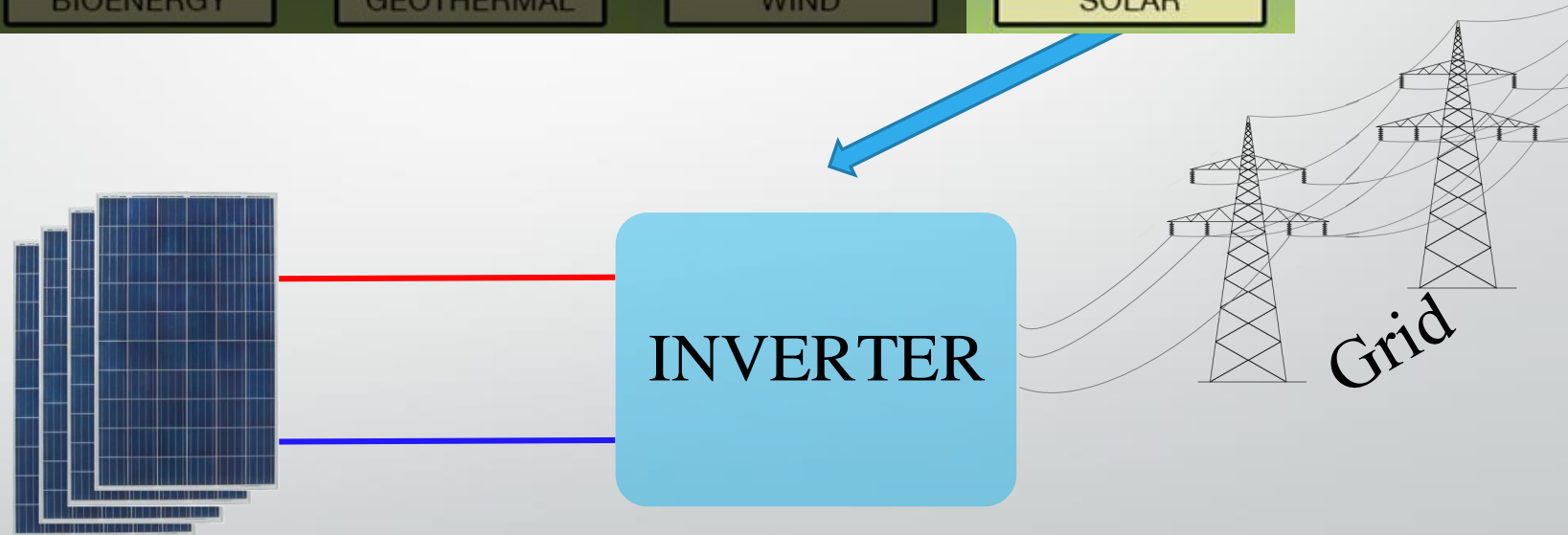
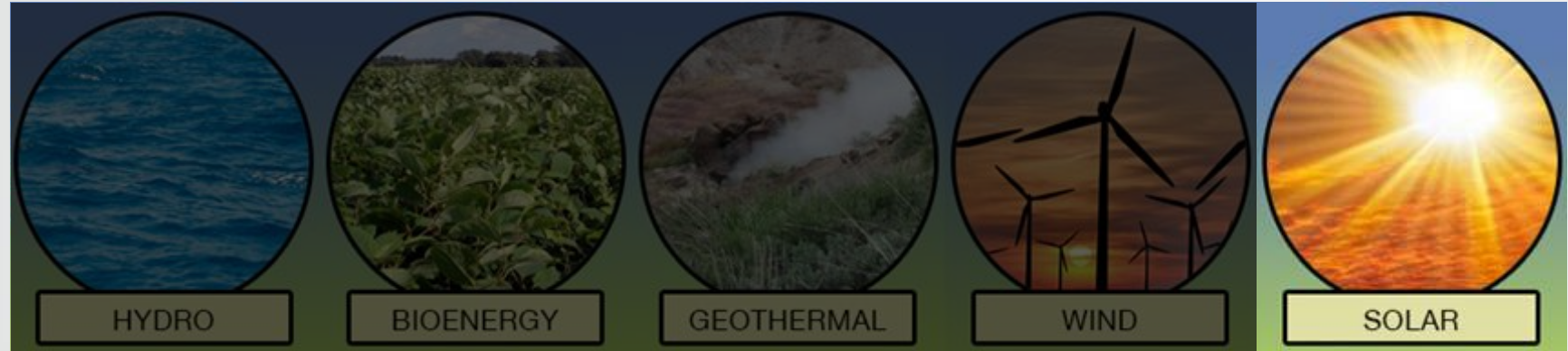
# Renewable Energy Systems



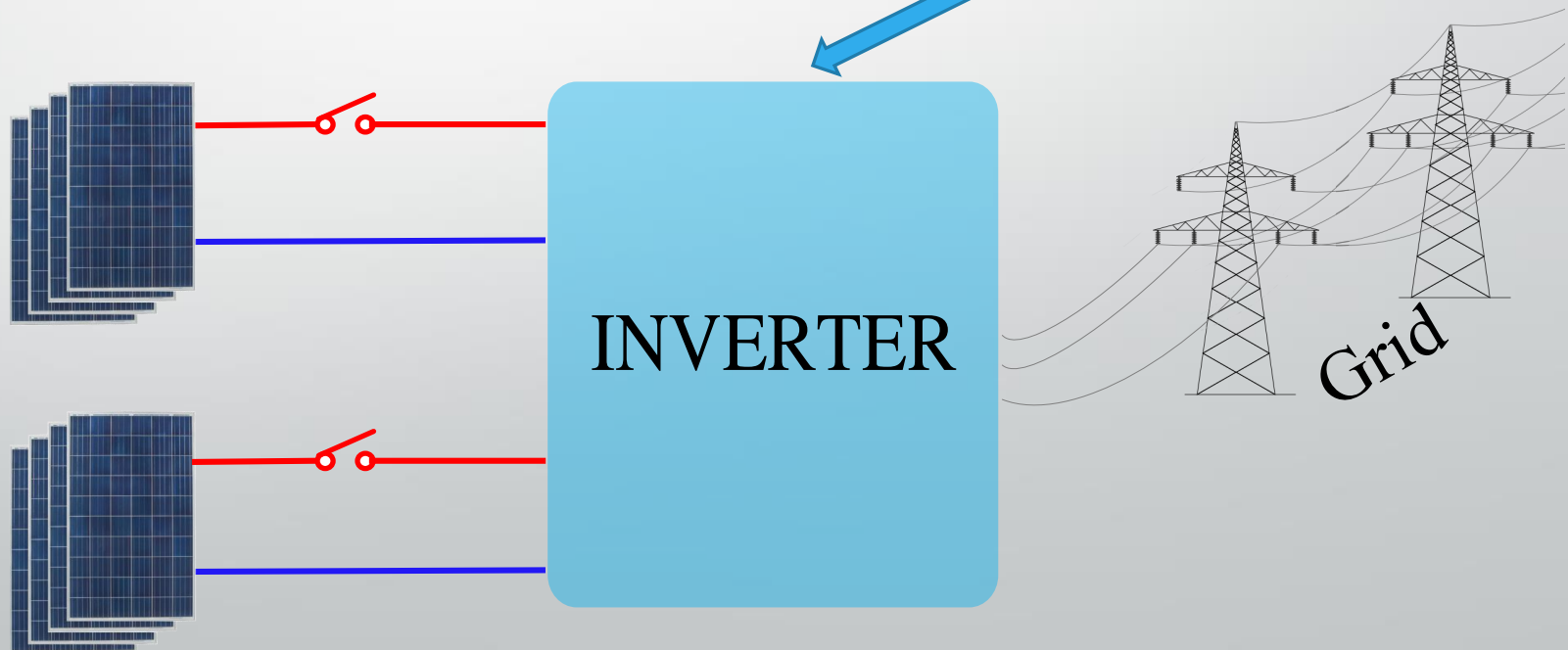
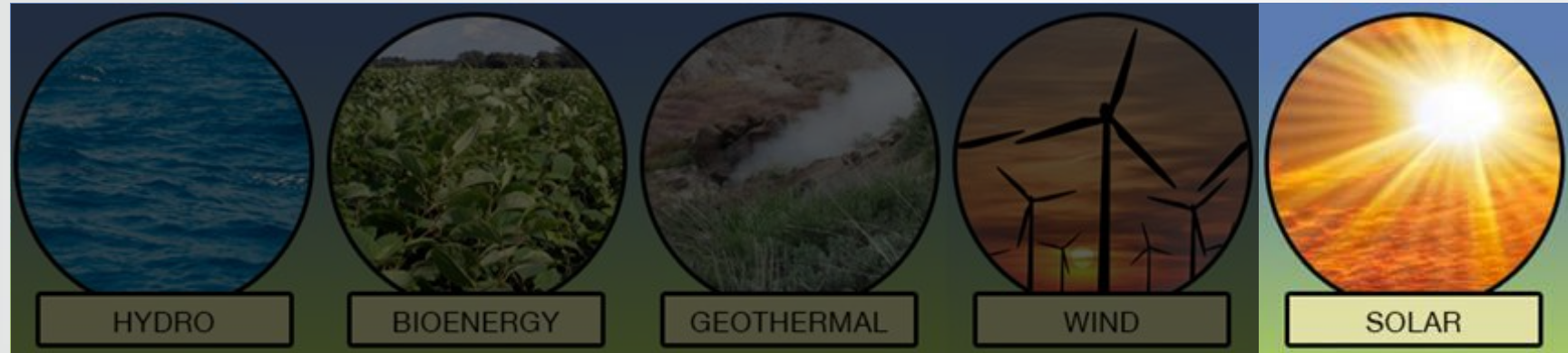
# Renewable Energy Systems



# Renewable Energy Systems

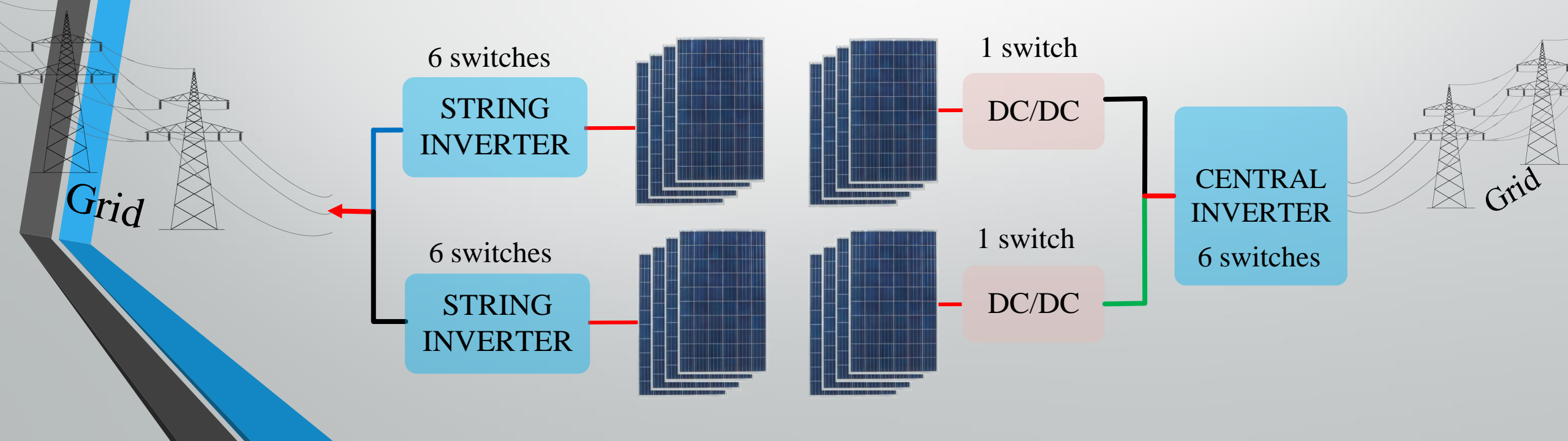
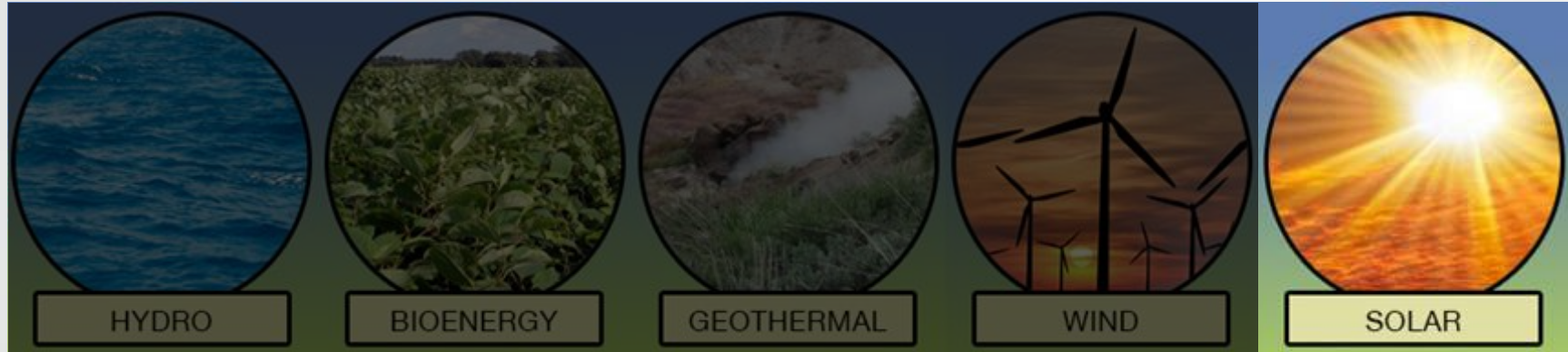


# Renewable Energy Systems

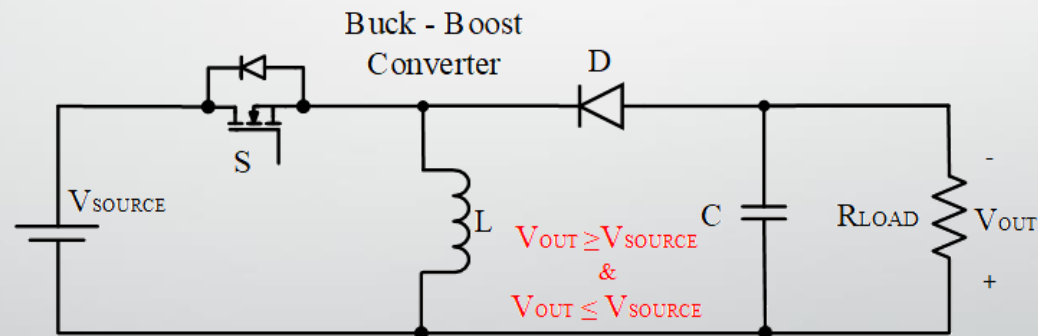
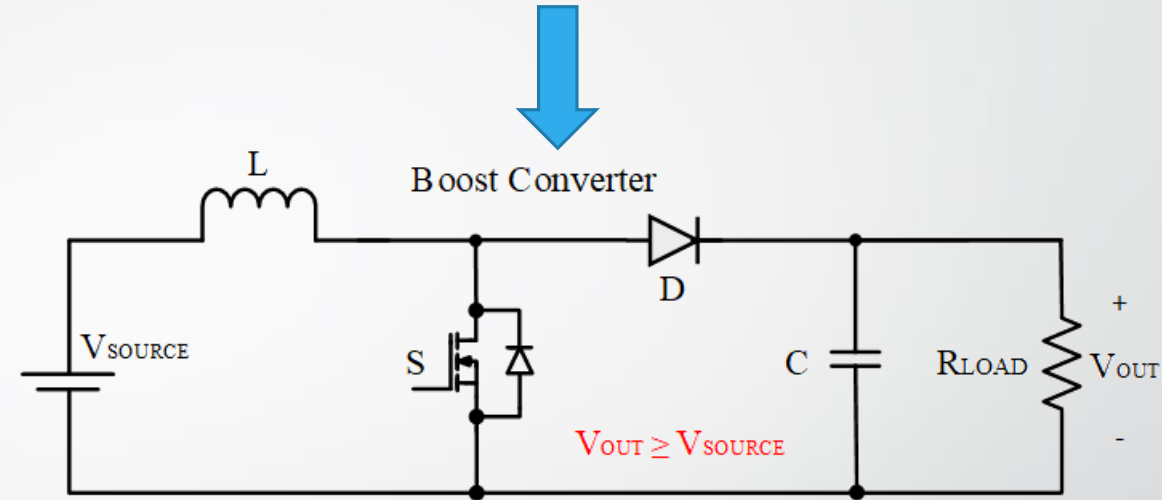
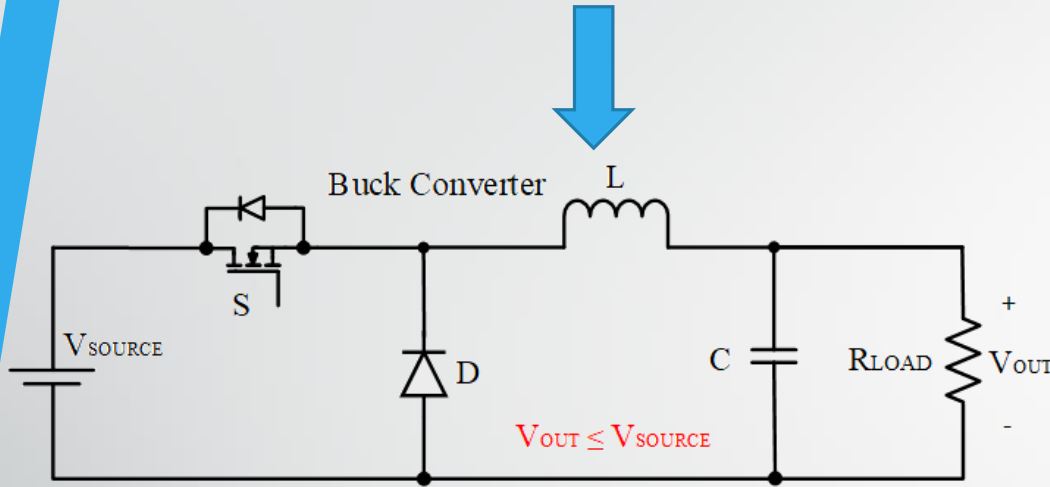




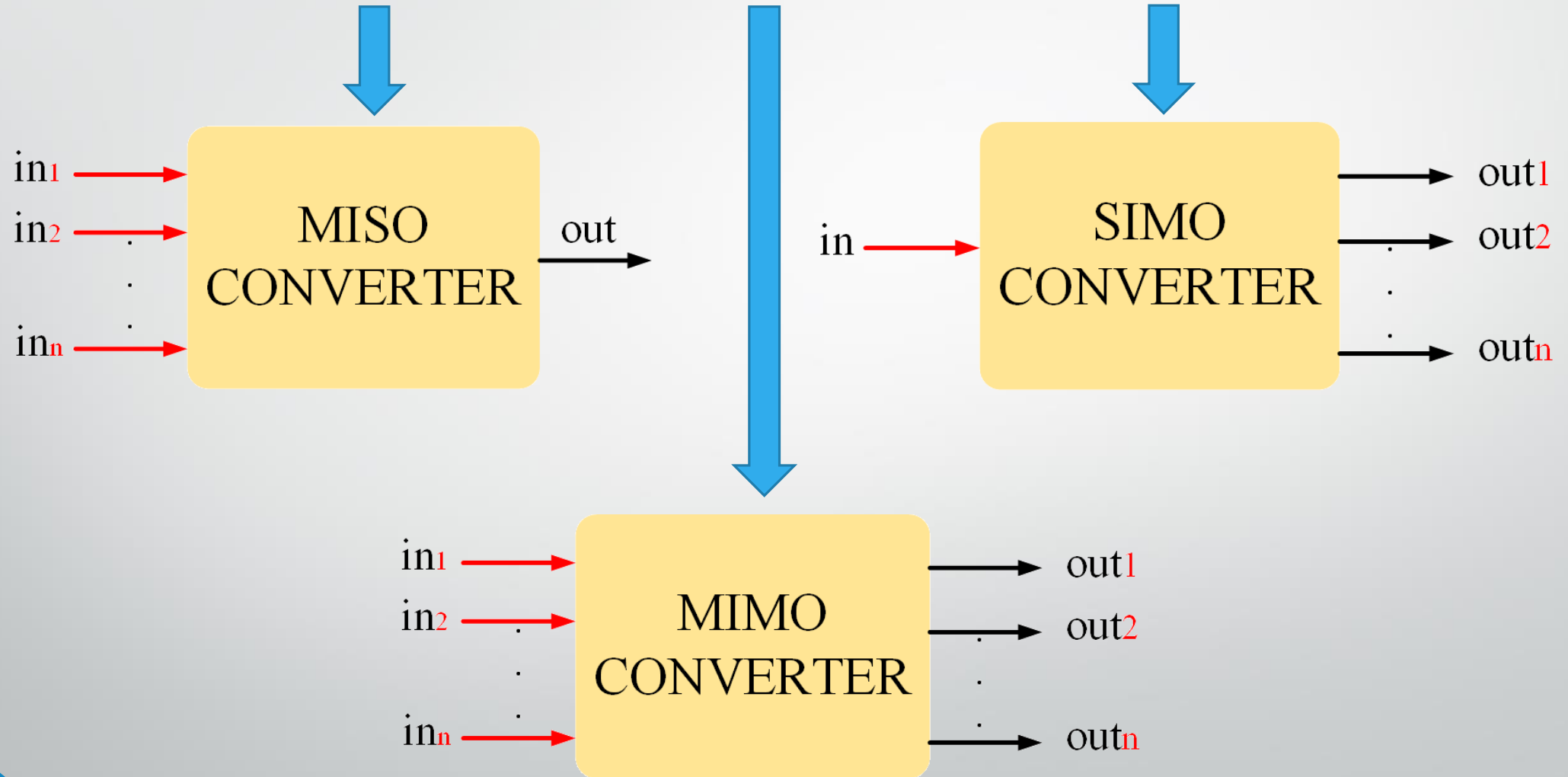
# Renewable Energy Systems



# Classic DC/DC Converter Topologies

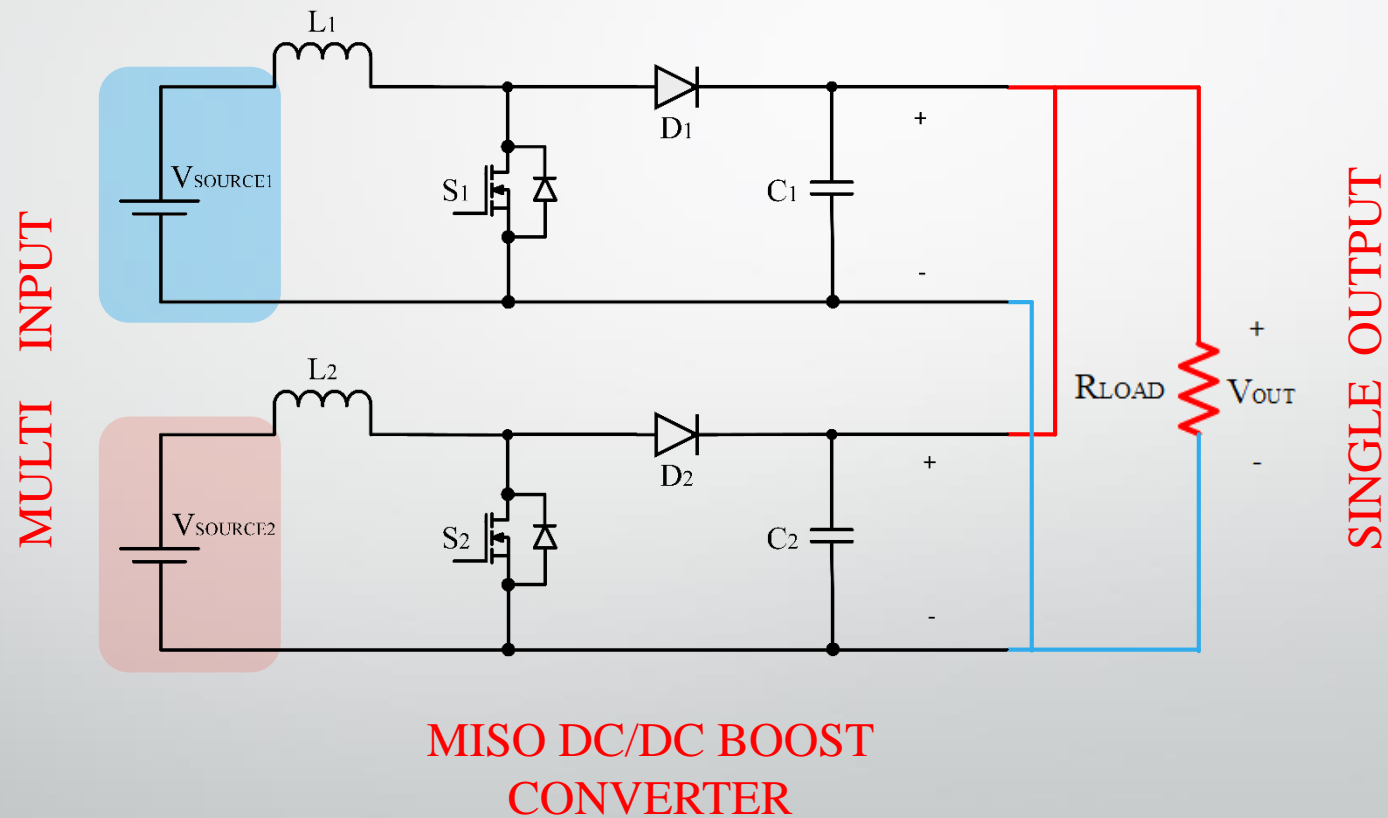


# Multi Mode DC/DC Converter Types



# Multi Mode DC/DC Converter Types

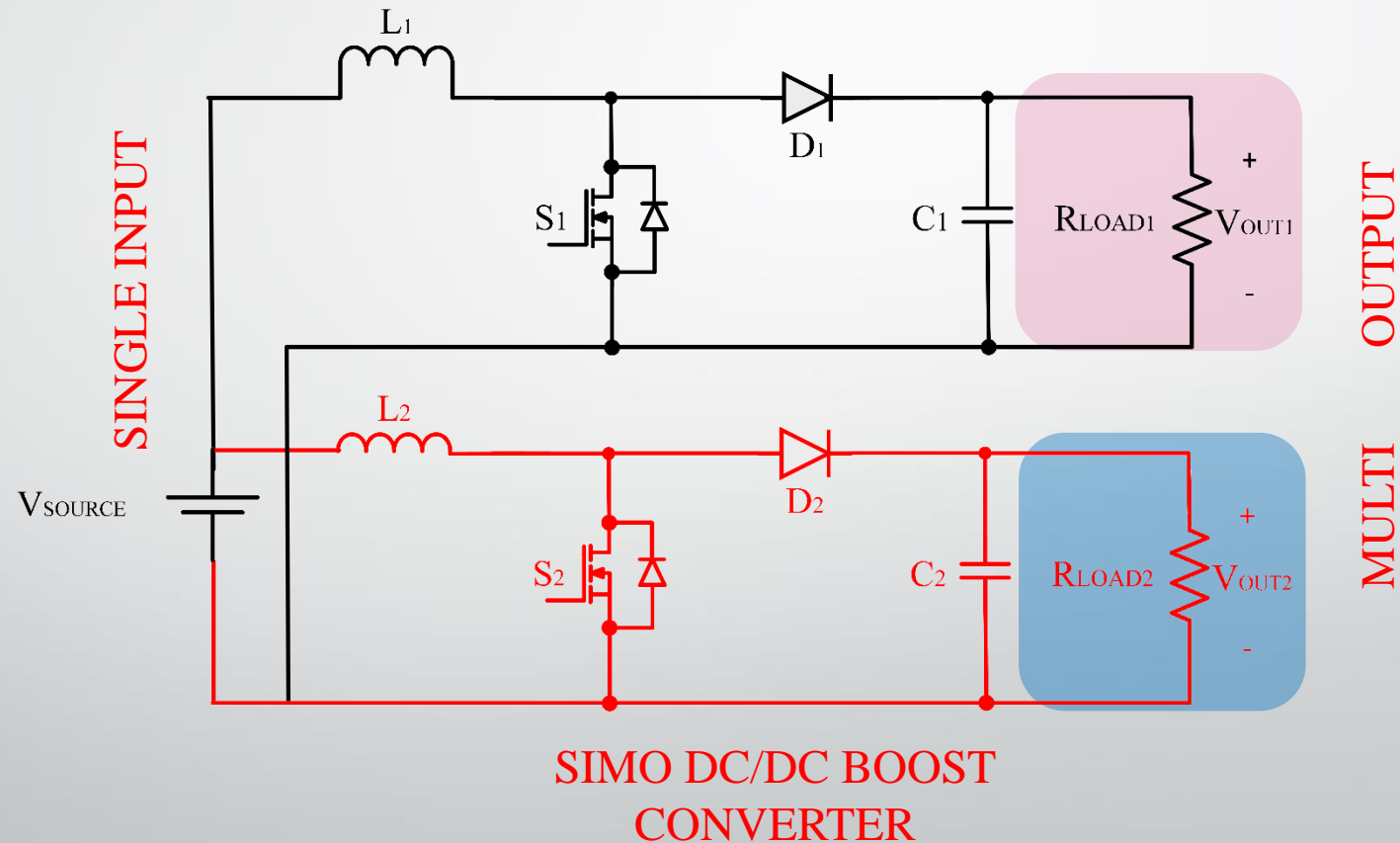
## Classic Parallel Types





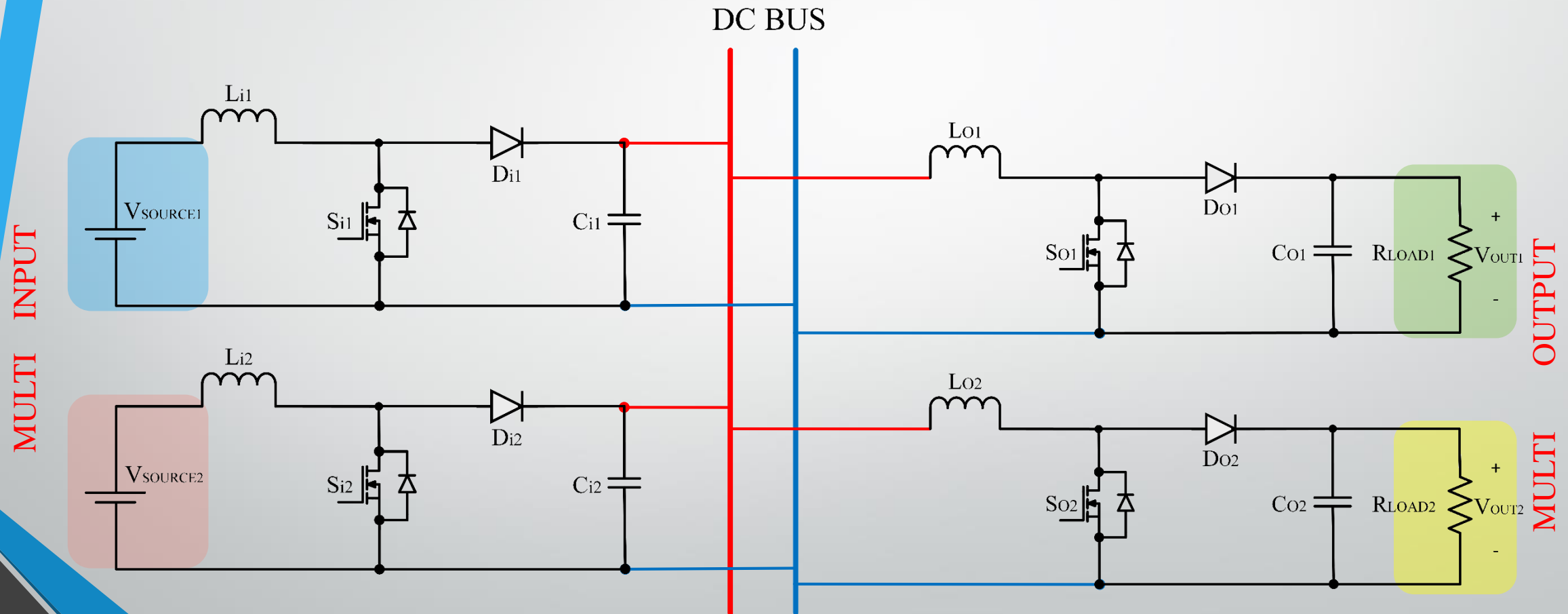
# Multi Mode DC/DC Converter Types

## Classic Parallel Types

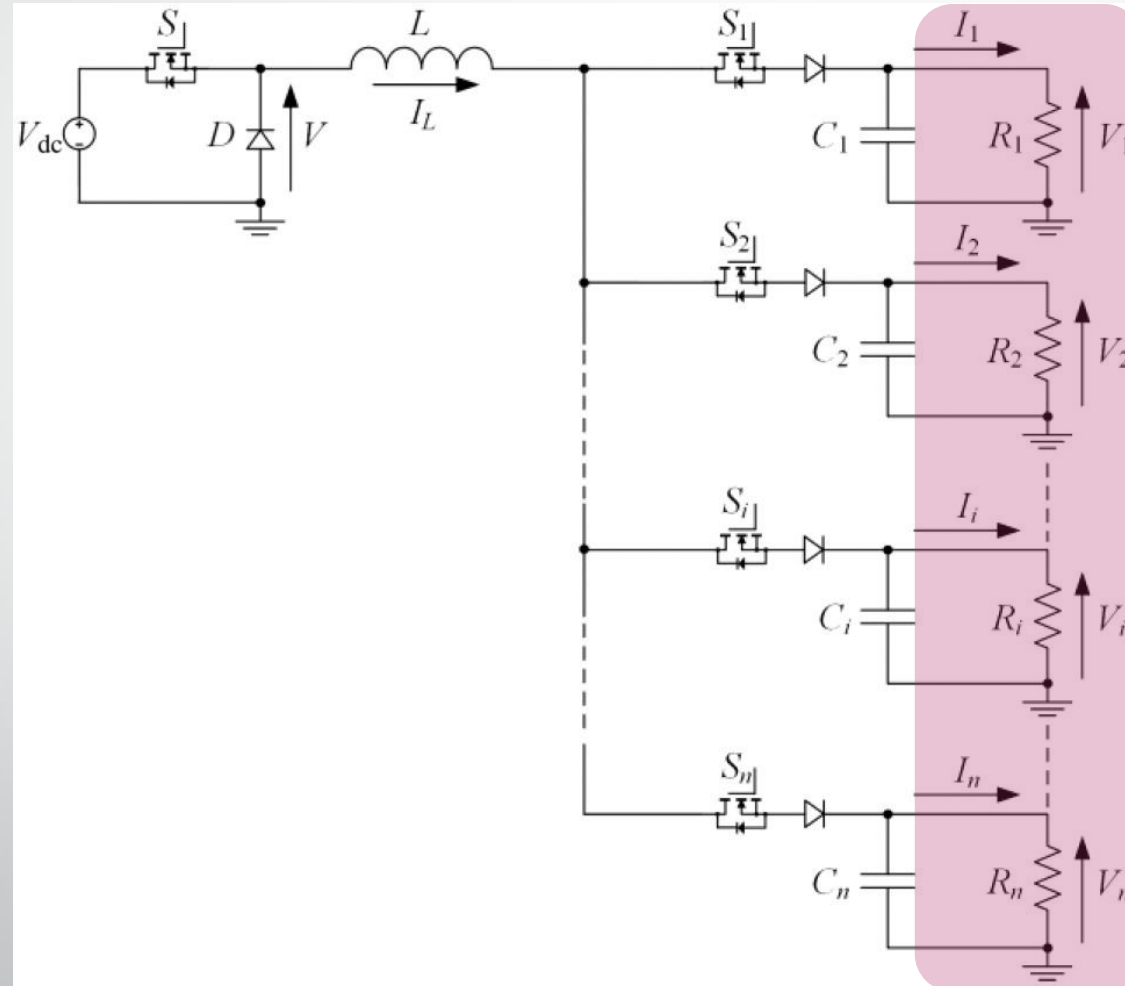


# Multi Mode DC/DC Converter Types

## Classic Multi-Input Multi Output

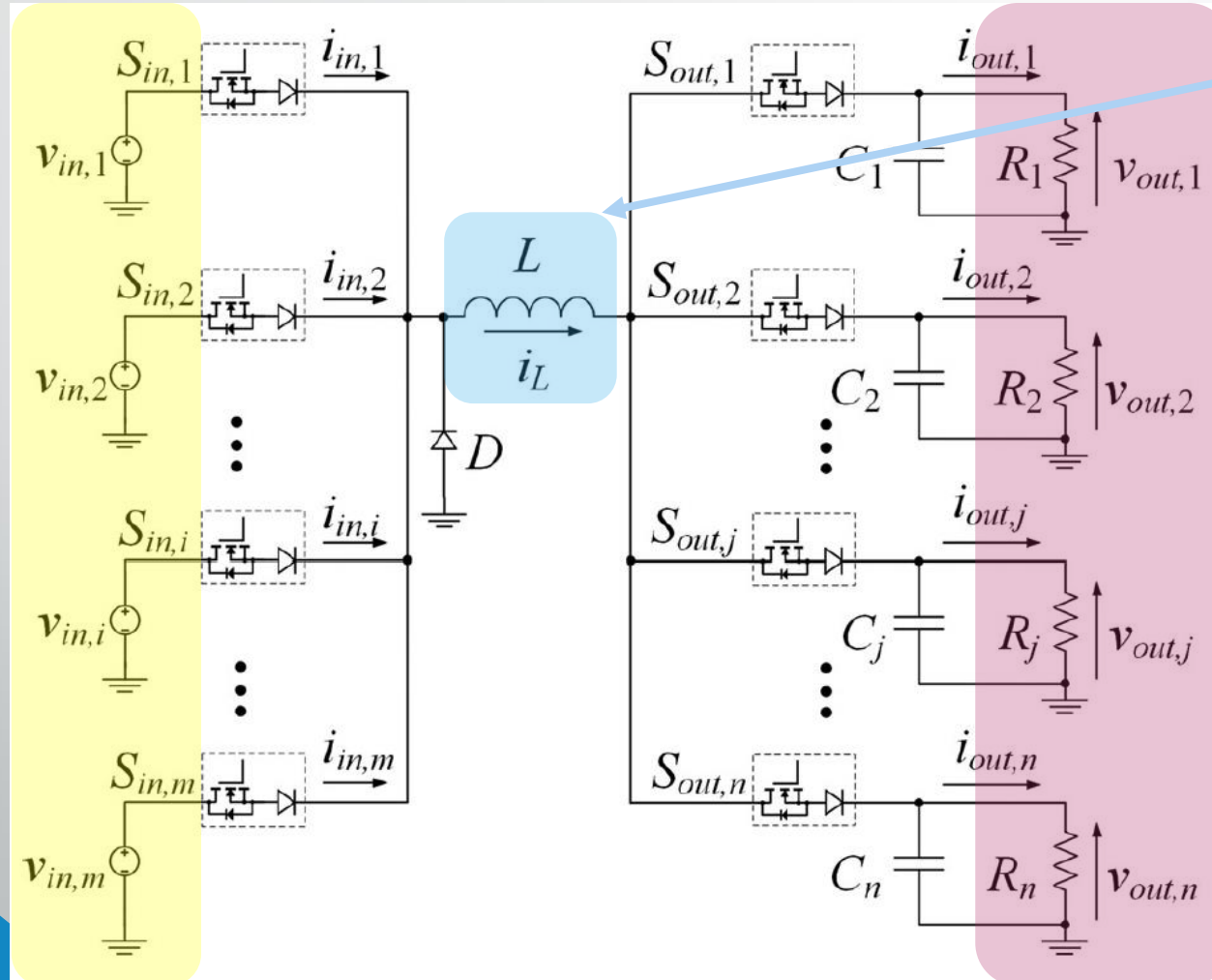


# Single Inductor Multi Mode Converter Types-SIMO

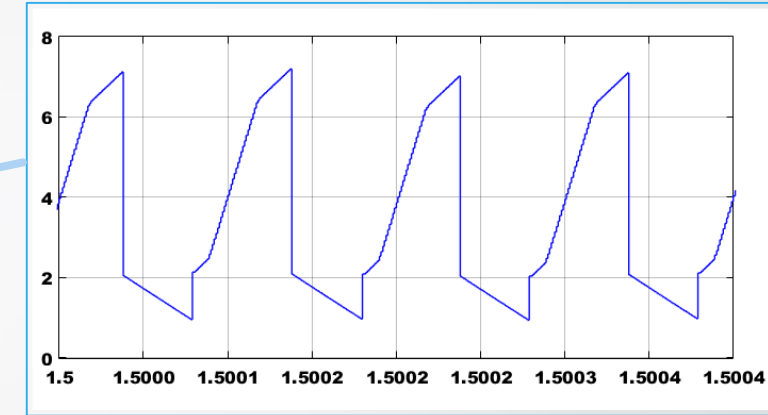


# Single Inductor Multi Mode Converter Types-MIMO

MULTI INPUT



MULTI OUTPUT



Cross Coupling



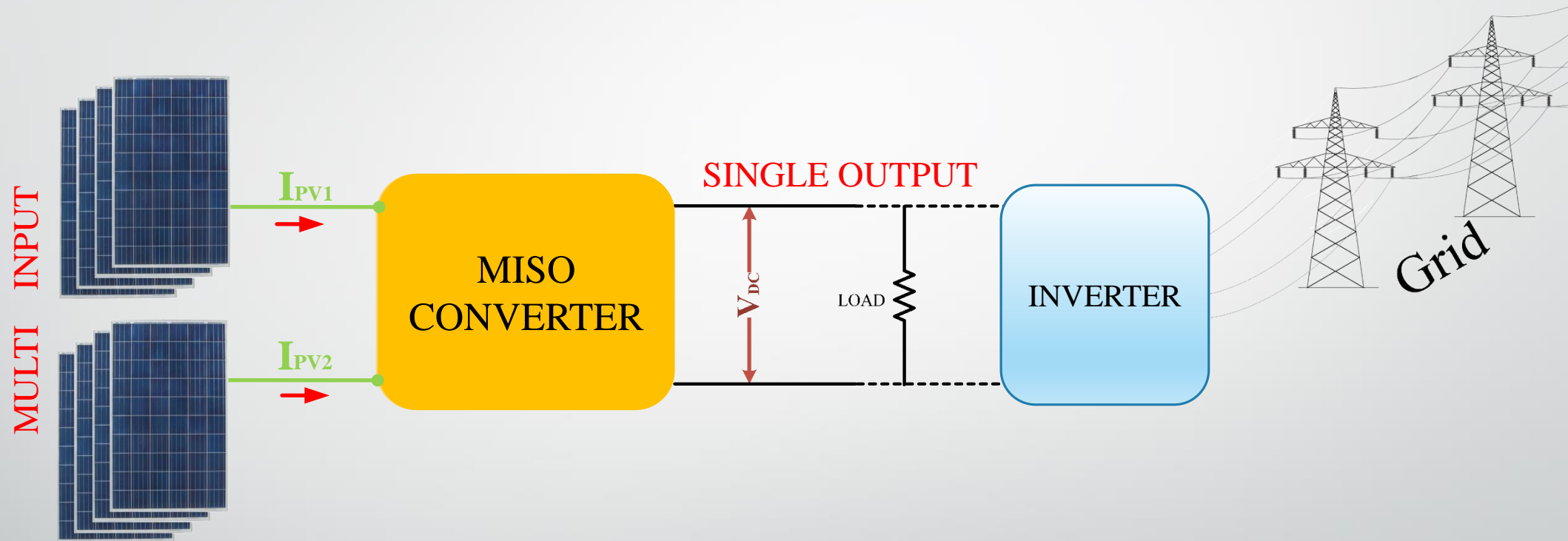
# Comparison of Classic Types and Single-Inductor Multi-Mode Converters

	Classic Based	Single Inductor
Power Sharing	✓	✓
Component Number	More	Less
Control	Simple	Difficult
High Voltage Gain	Yes	No
Cross Coupling on Inductance	No	Yes

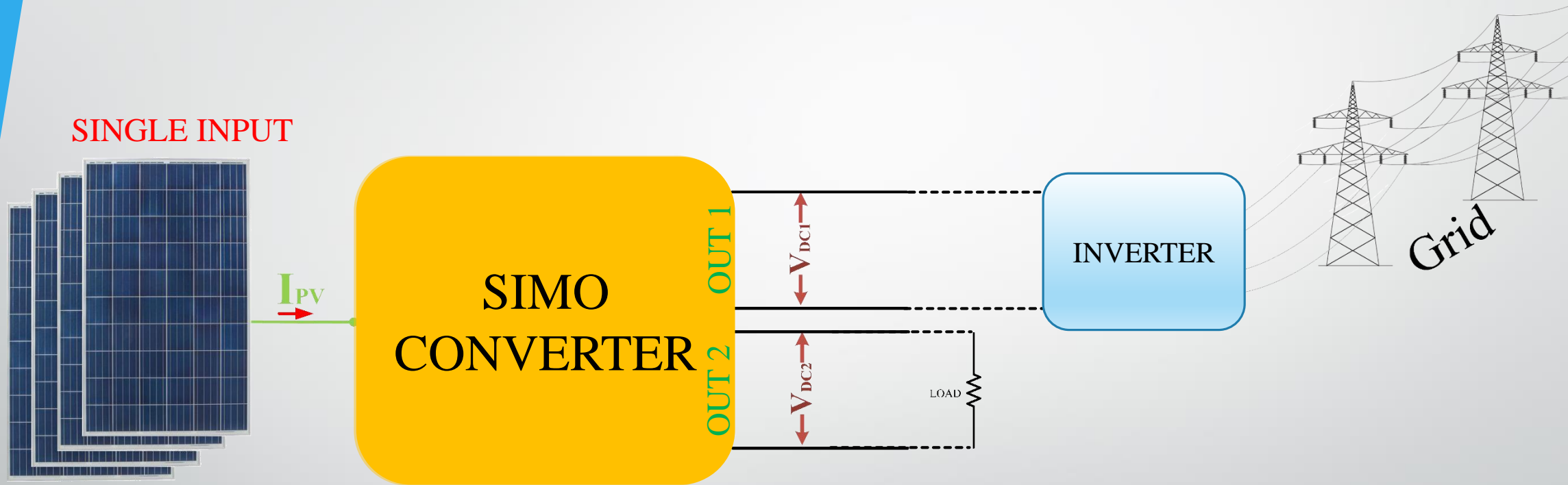
Advantage

Disadvantage

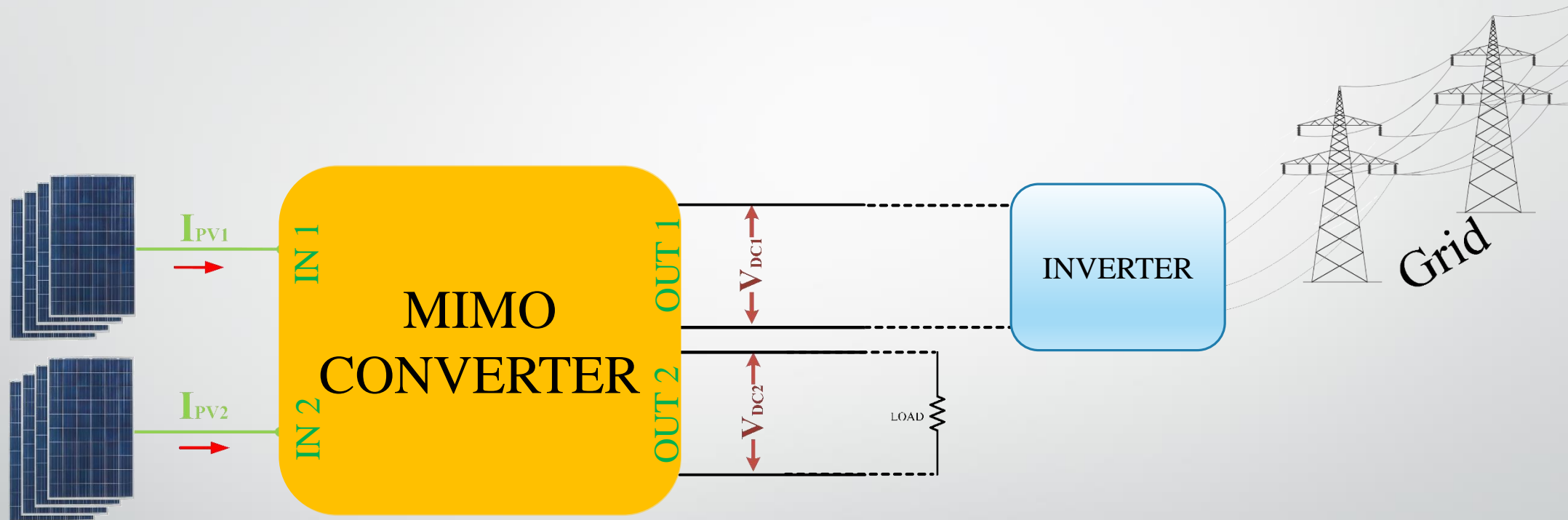
# Motivation & Background



# Motivation & Background



# Motivation & Background





# Conclusions

Multi-mode converters are used to:

- Combine of more than one energy sources on same bus,
- Different voltage required applications,
- Power control between the input sources,
- To control of more than one systems on the same structure.

# Conclusions

- Thanks to Multi-output feature, different voltage levels can be obtained at the outputs.
- Thanks to Multi-input feature, Power sharing control can be provided between the input sources.

# Multi-Mode Converters

**Thank you for listening**



**QUESTIONS & ANSWERS**