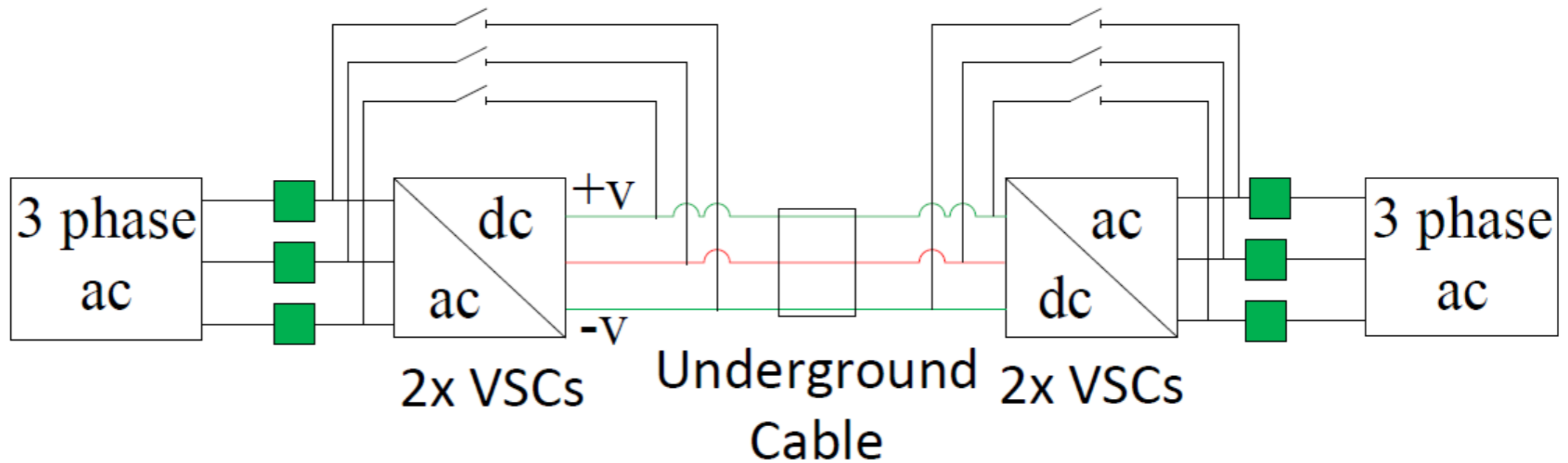


# Grid Hybridization using Reconfigurable AC-DC Links

**Aditya Shekhar,**

Department of Electrical Sustainable Energy  
Delft University of Technology

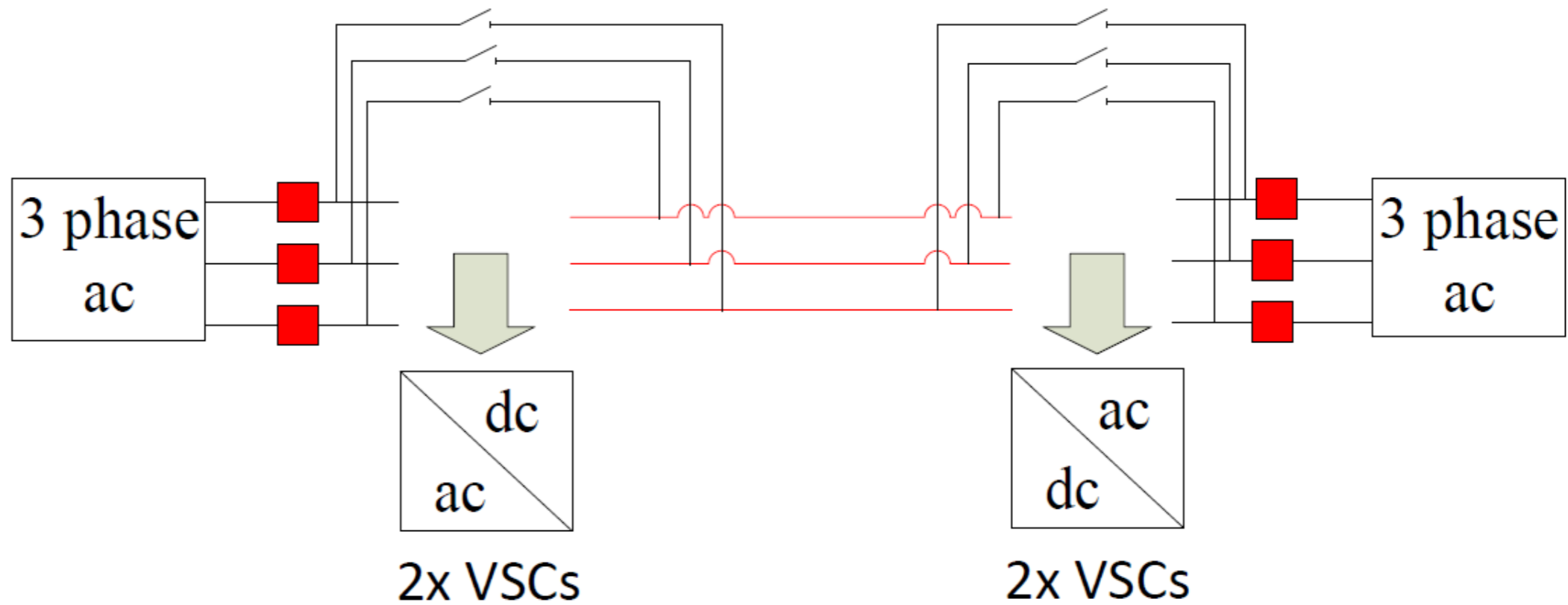
# Hardware Re-configurability



(a) Bipolar dc operation (One line redundant)

—■— Normally Closed Circuit Breaker  
—■— Circuit Breaker Opened

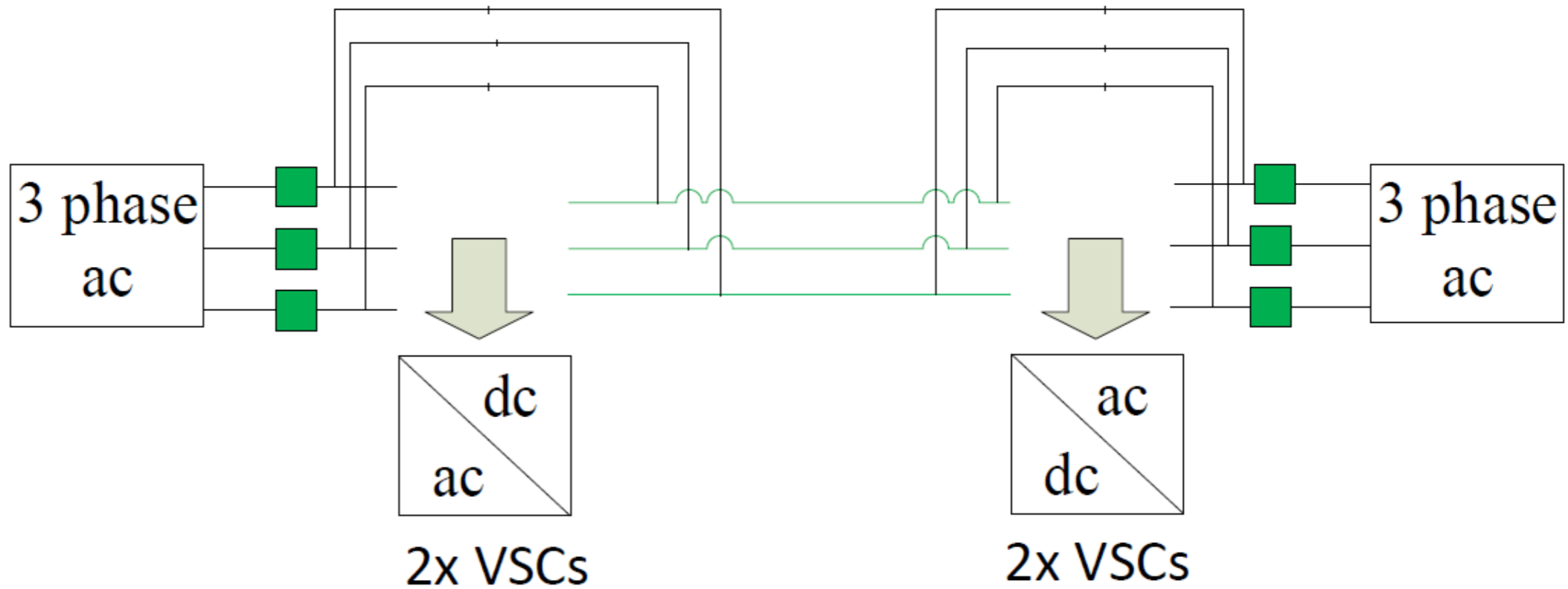
# Hardware Re-configurability





**(b) Modular removal of converter during fault**

—■— Normally Closed Circuit Breaker  
—■— Circuit Breaker Opened

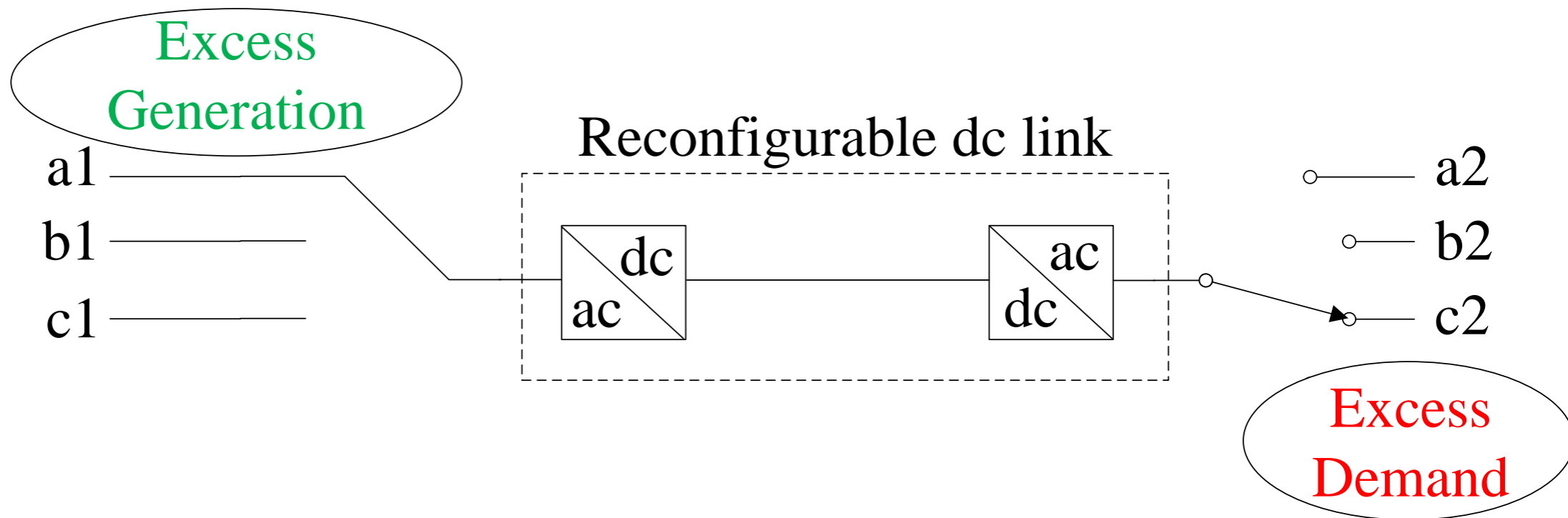
# Hardware Re-configurability



(c) Reverting to 3 phase ac operation during repairs

-  — Normally Closed Circuit Breaker
-  — Circuit Breaker Opened

# Software Re-configurability

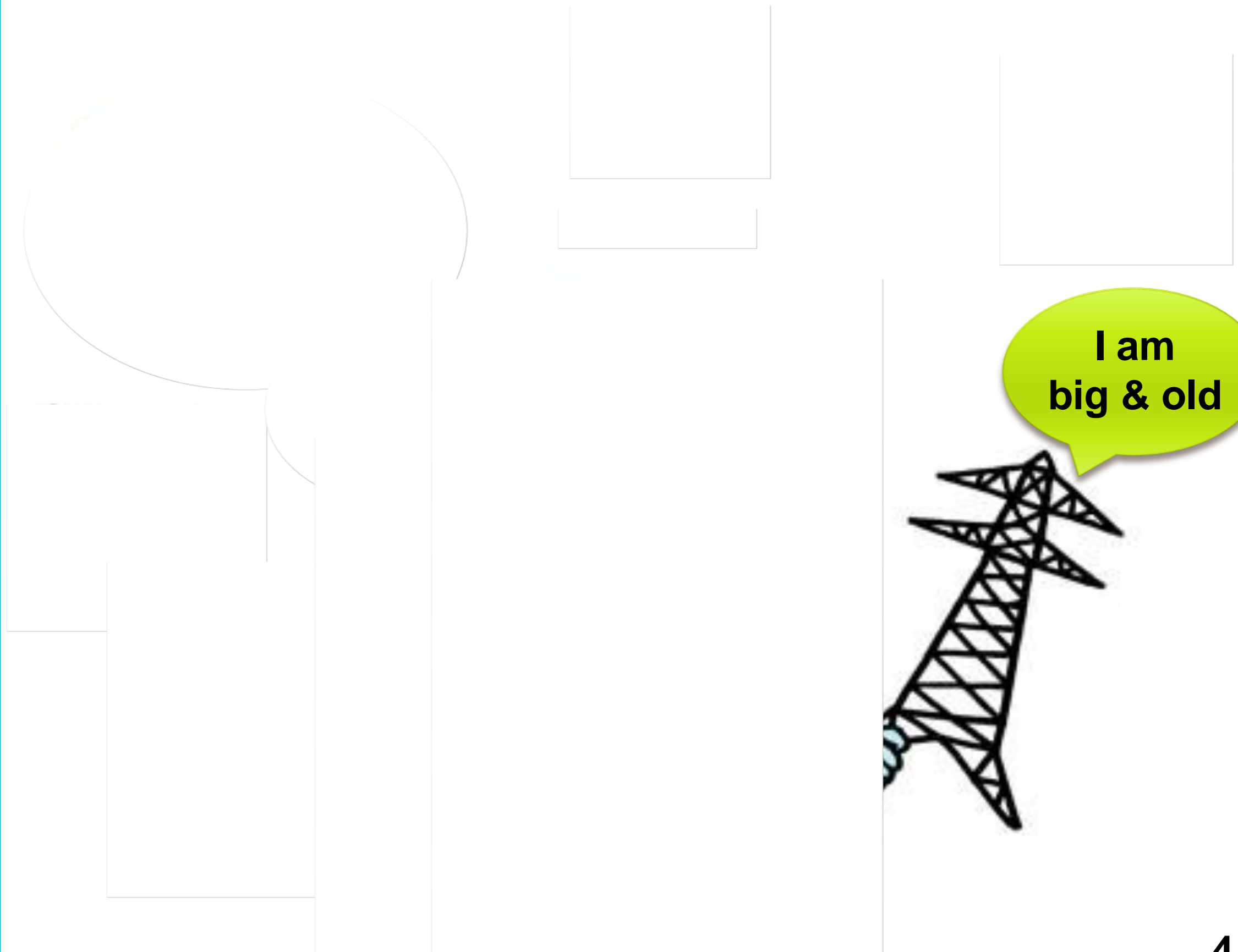


- Asynchronous inter phase connections
- Flexibility as STATCOM
- Monopolar/Bipolar swapping during faults

# Evolving Power Grid



# Evolving Power Grid



# Evolving Power Grid

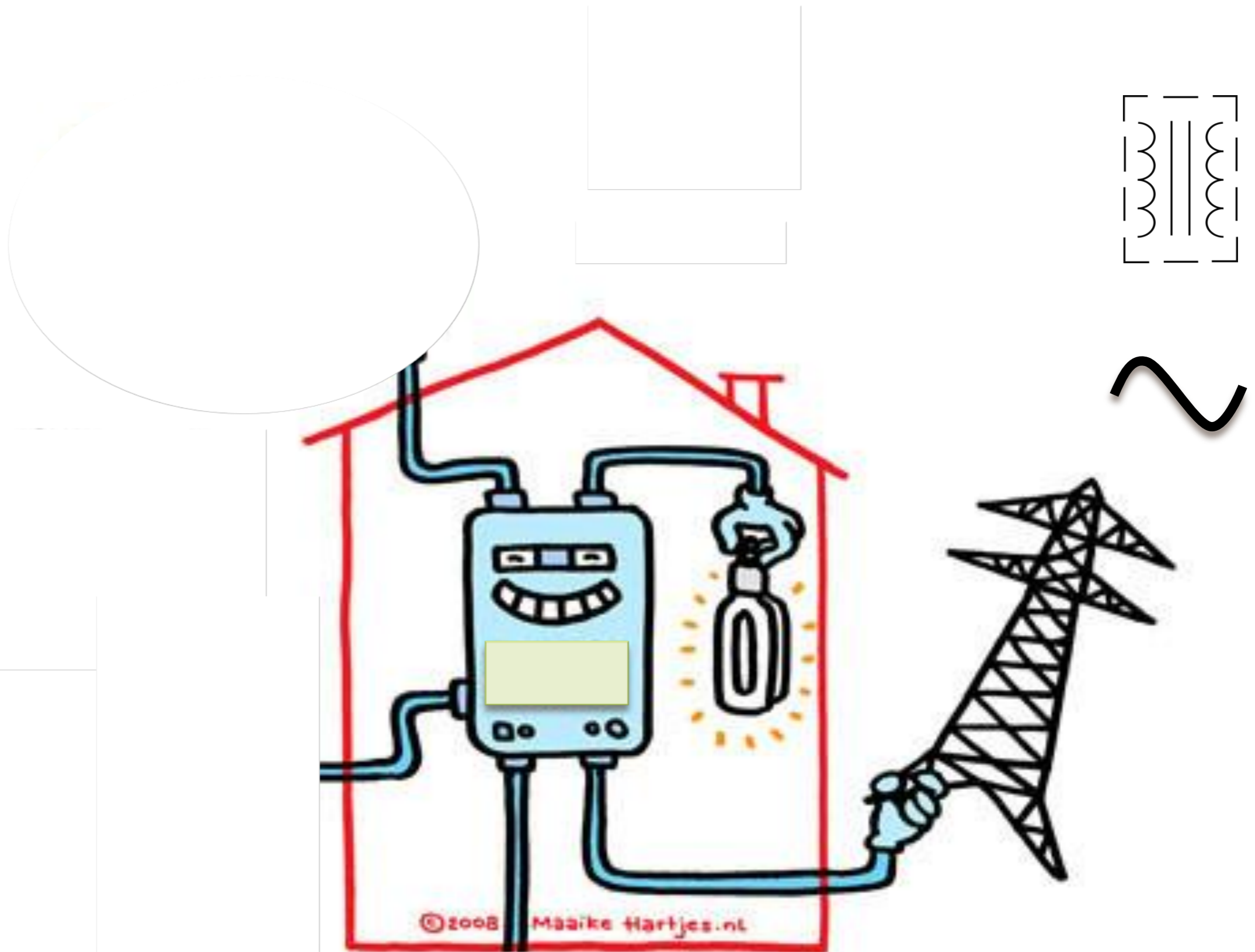




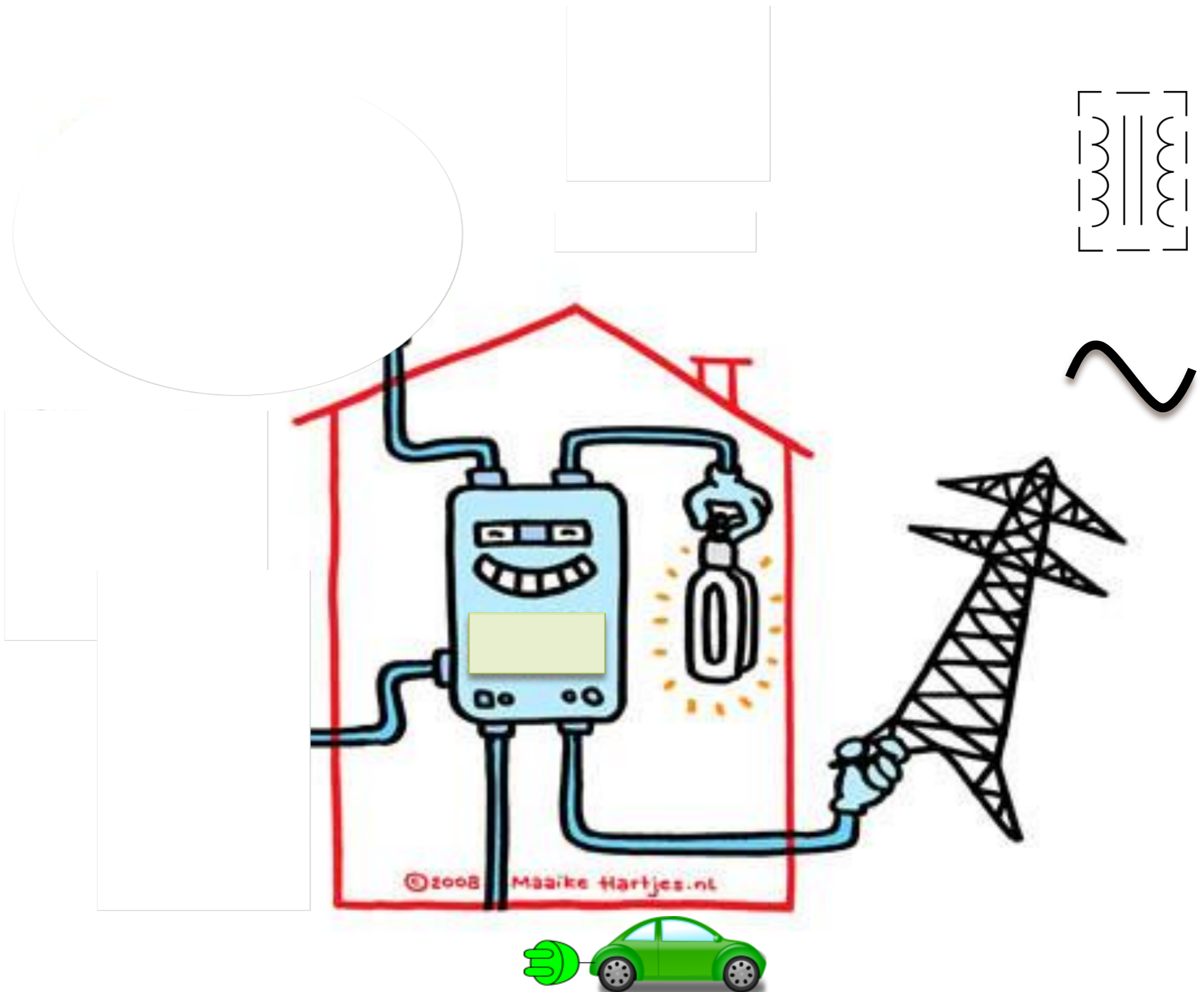
# Evolving Power Grid



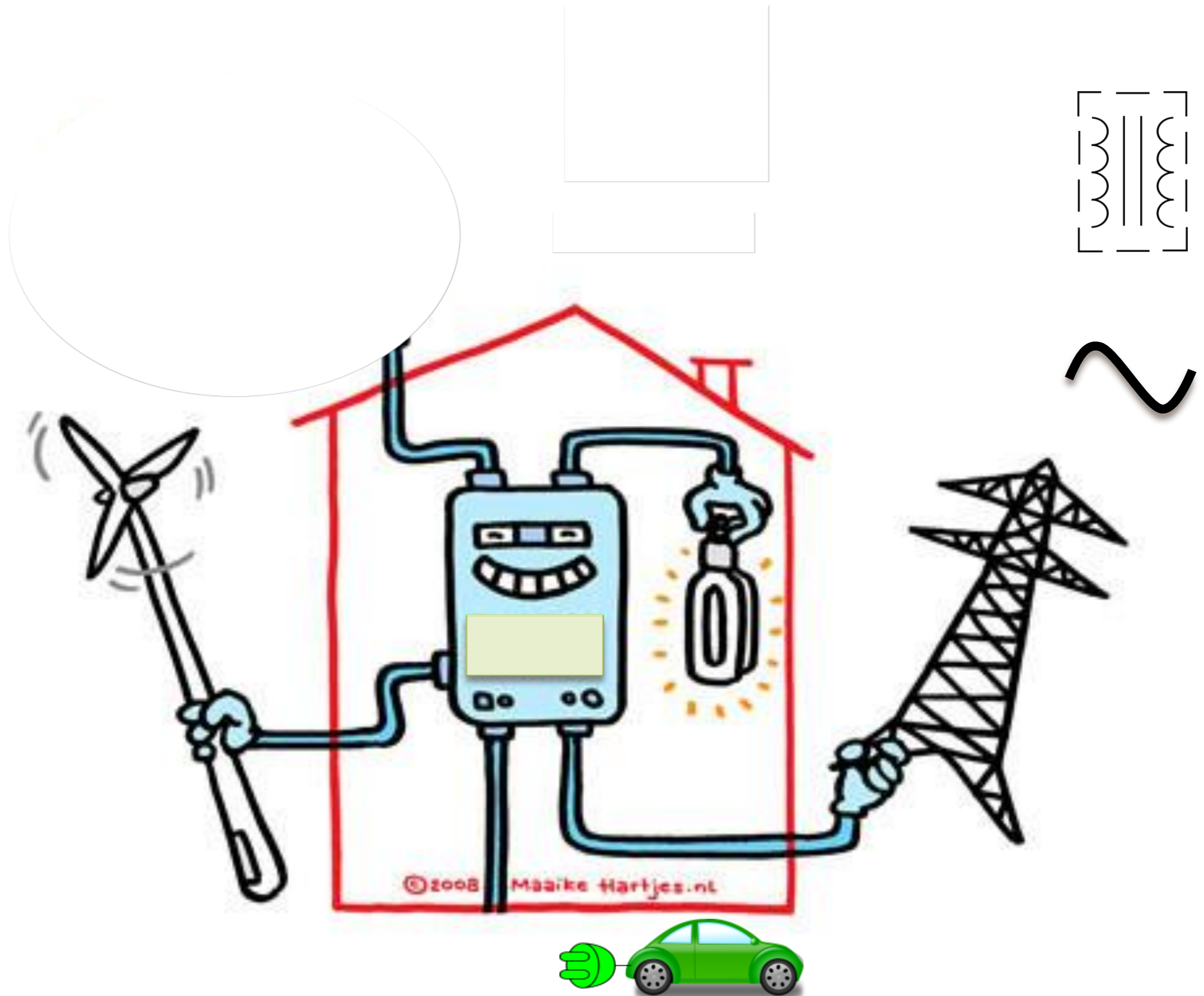
# Evolving Power Grid



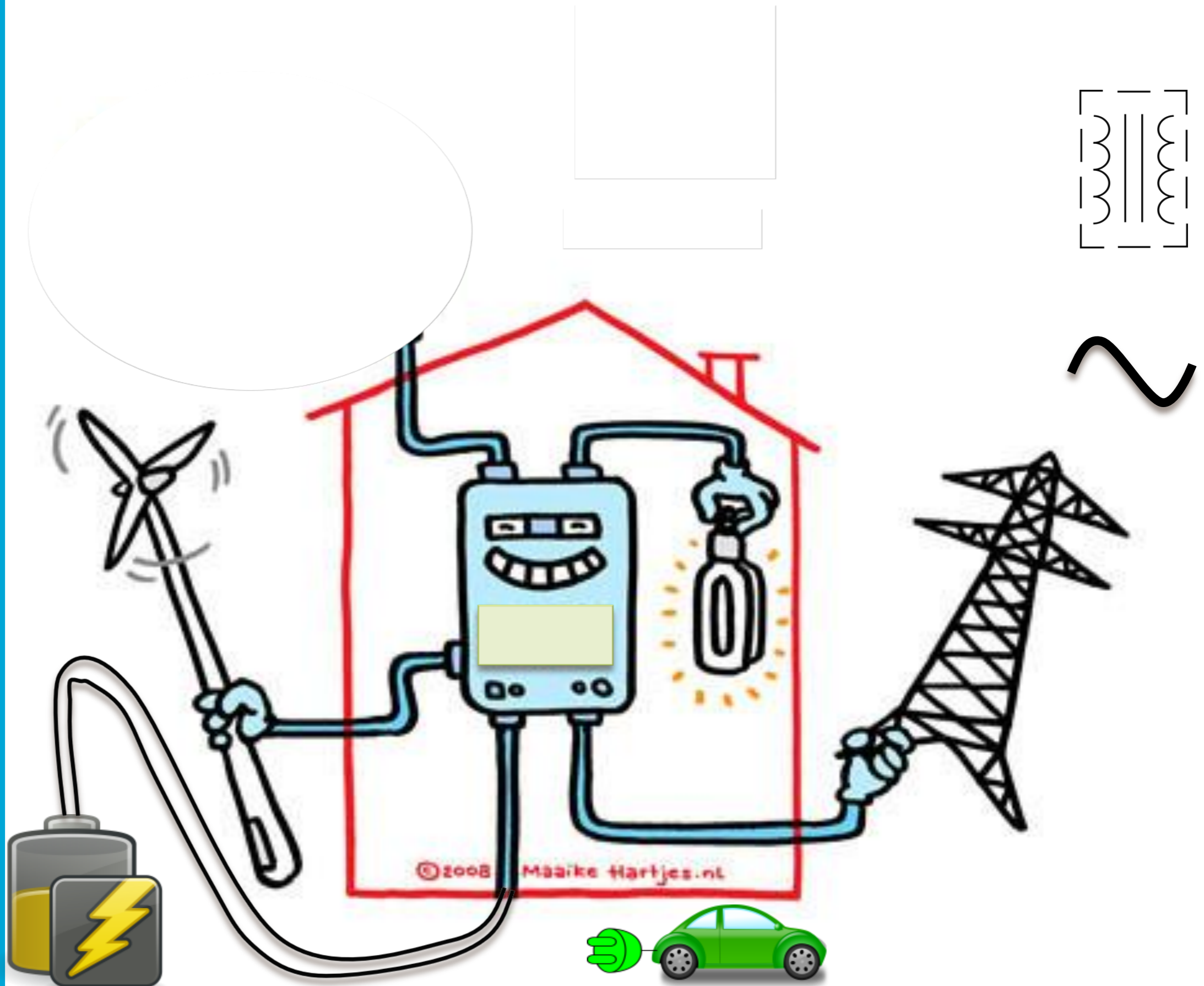
# Evolving Power Grid



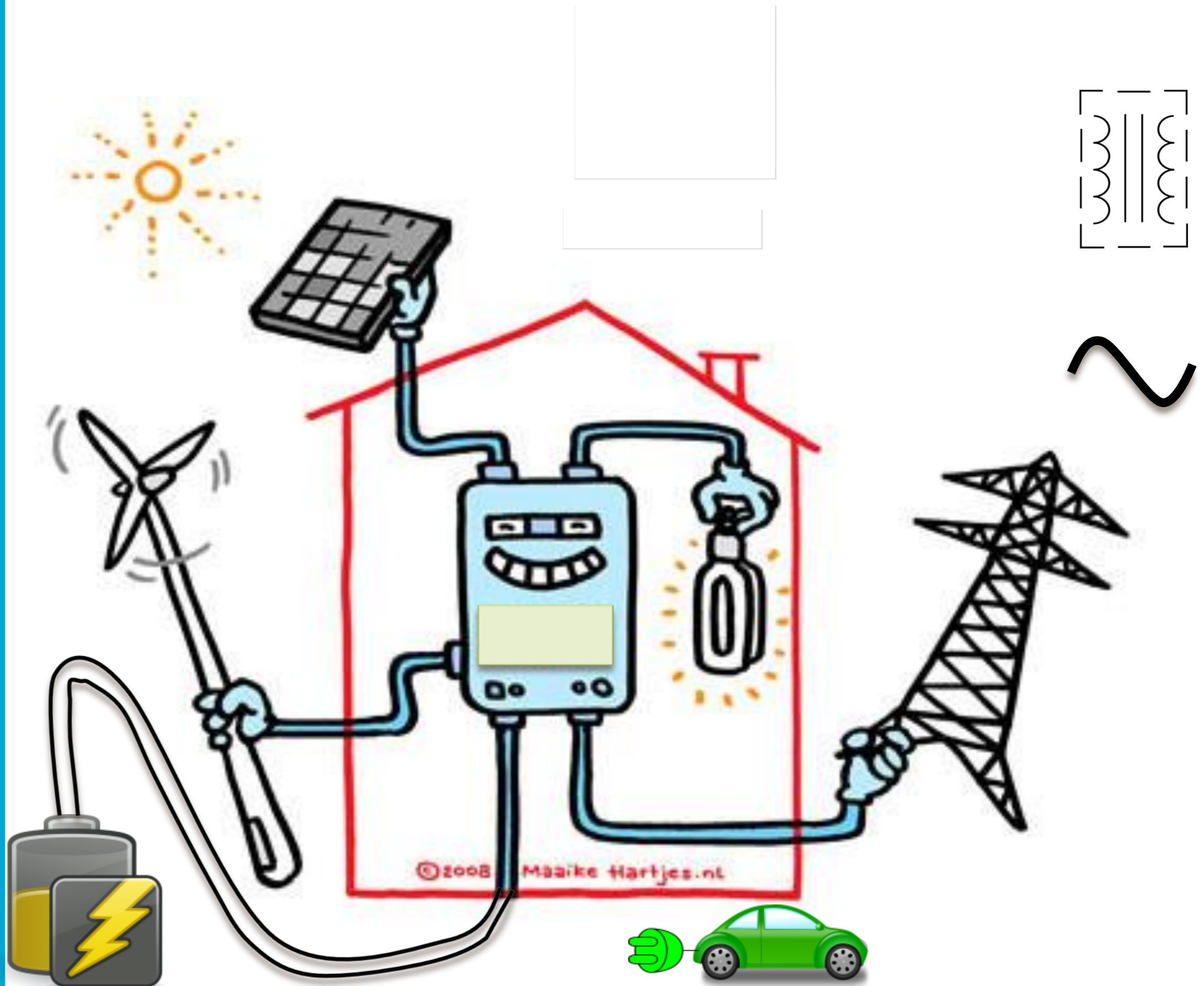
# Evolving Power Grid



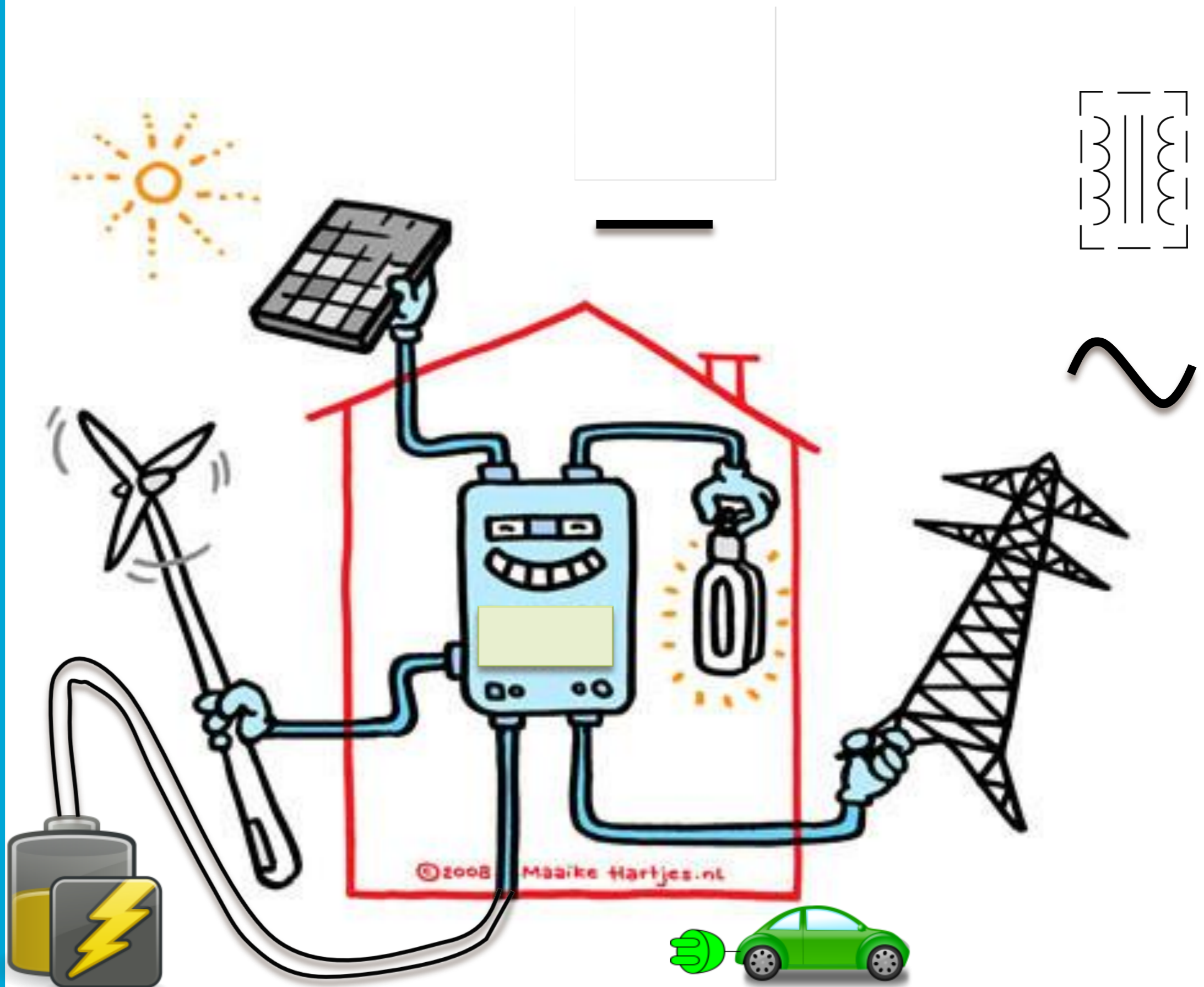
# Evolving Power Grid



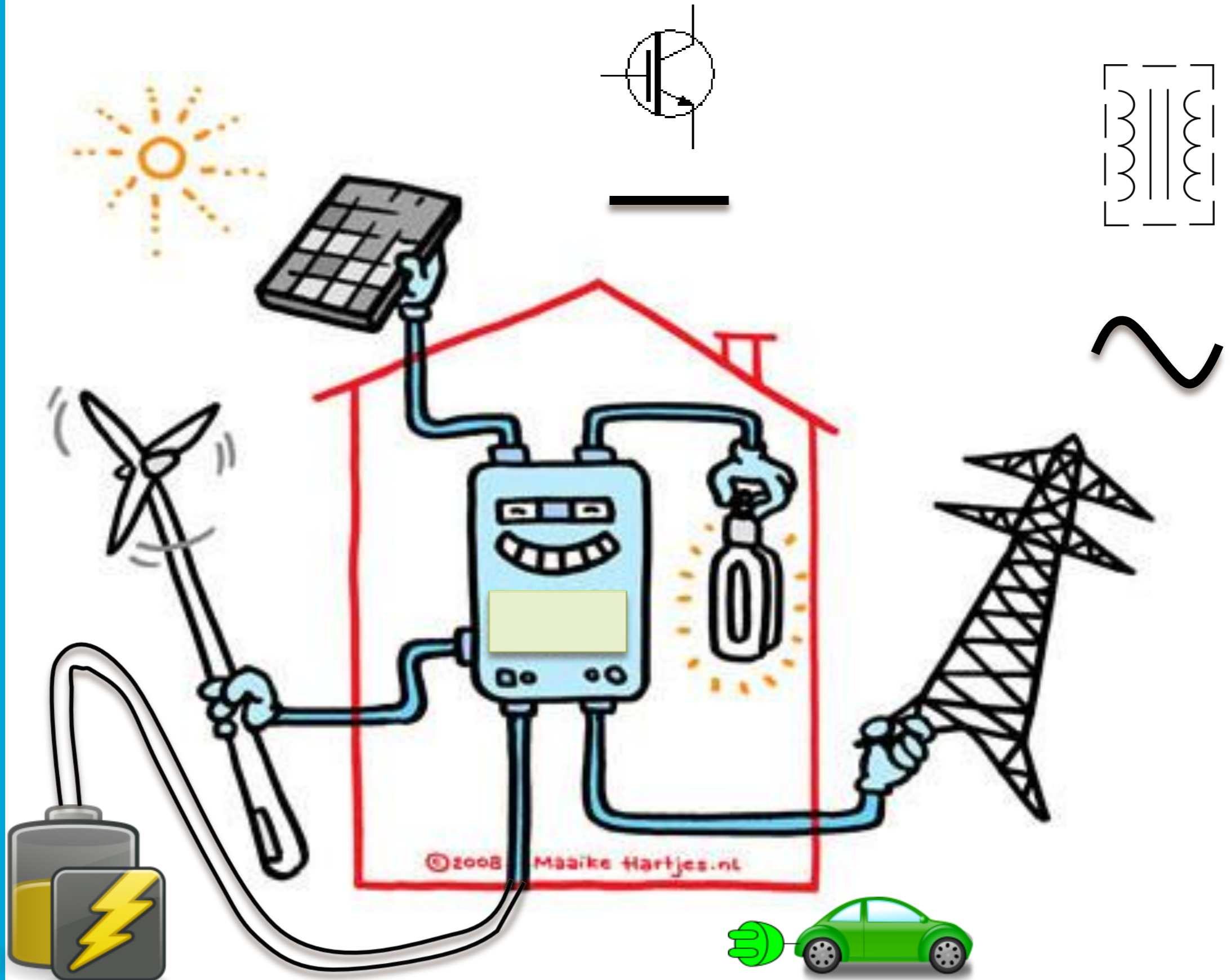
# Evolving Power Grid



# Evolving Power Grid

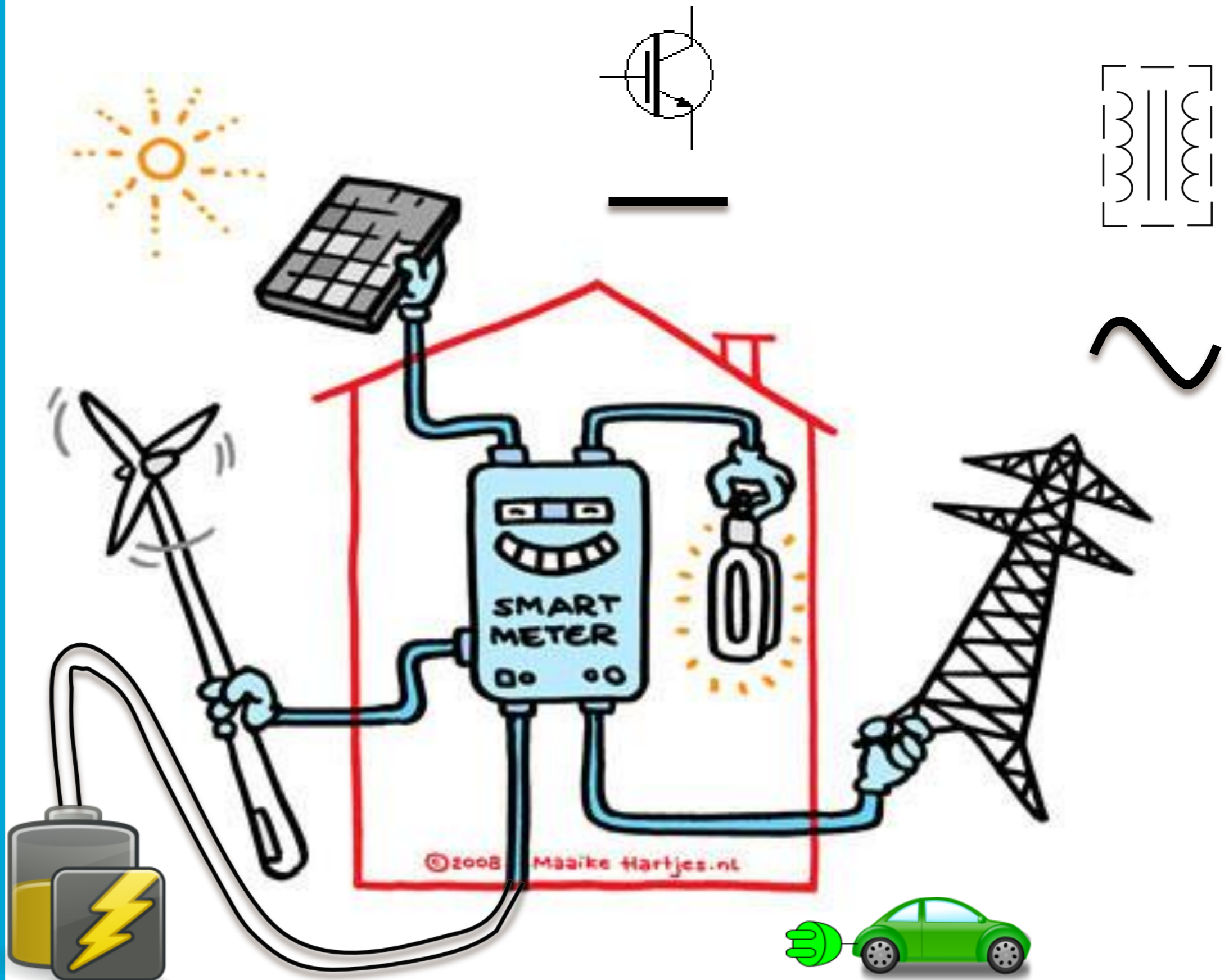


# Evolving Power Grid

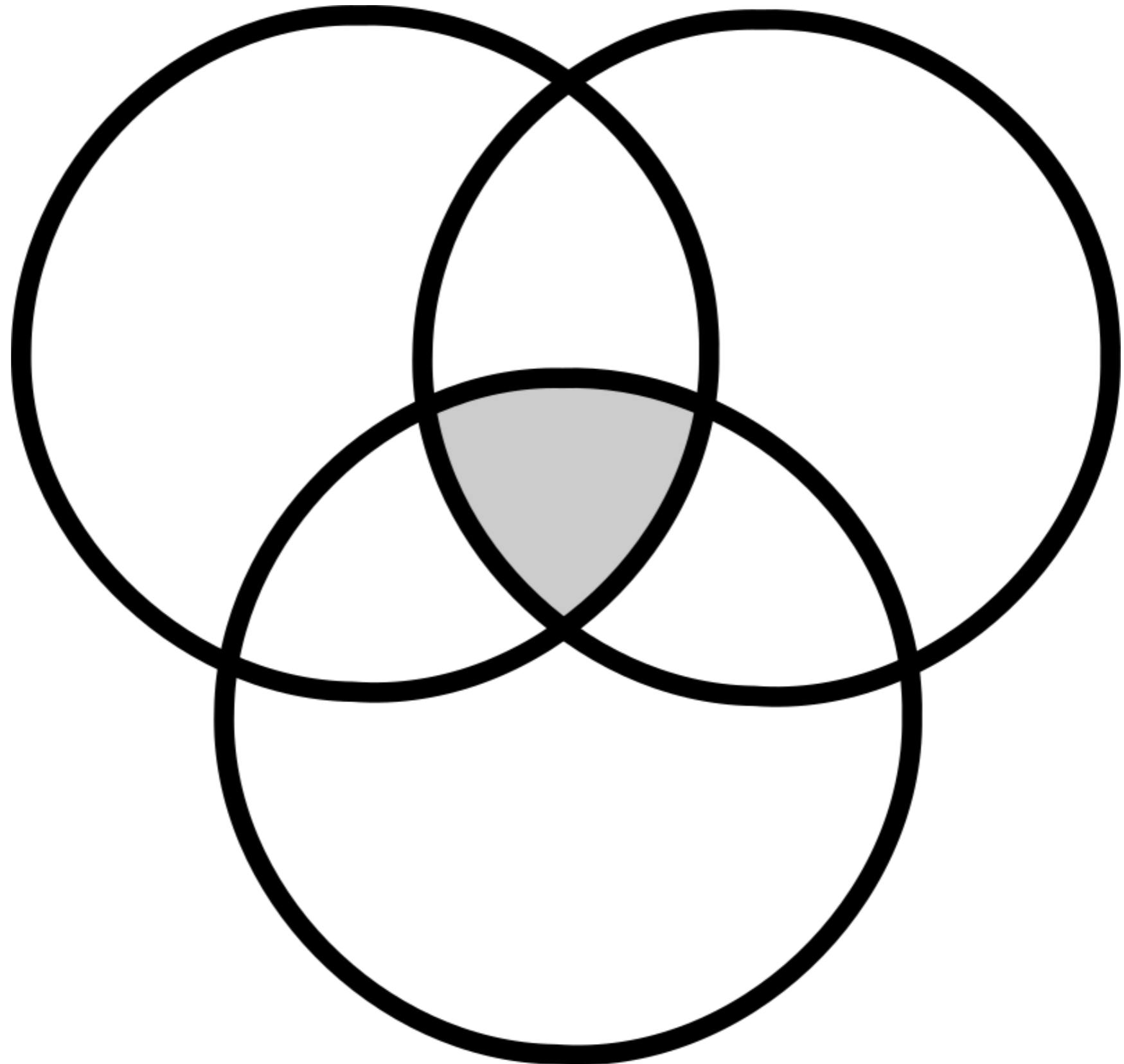




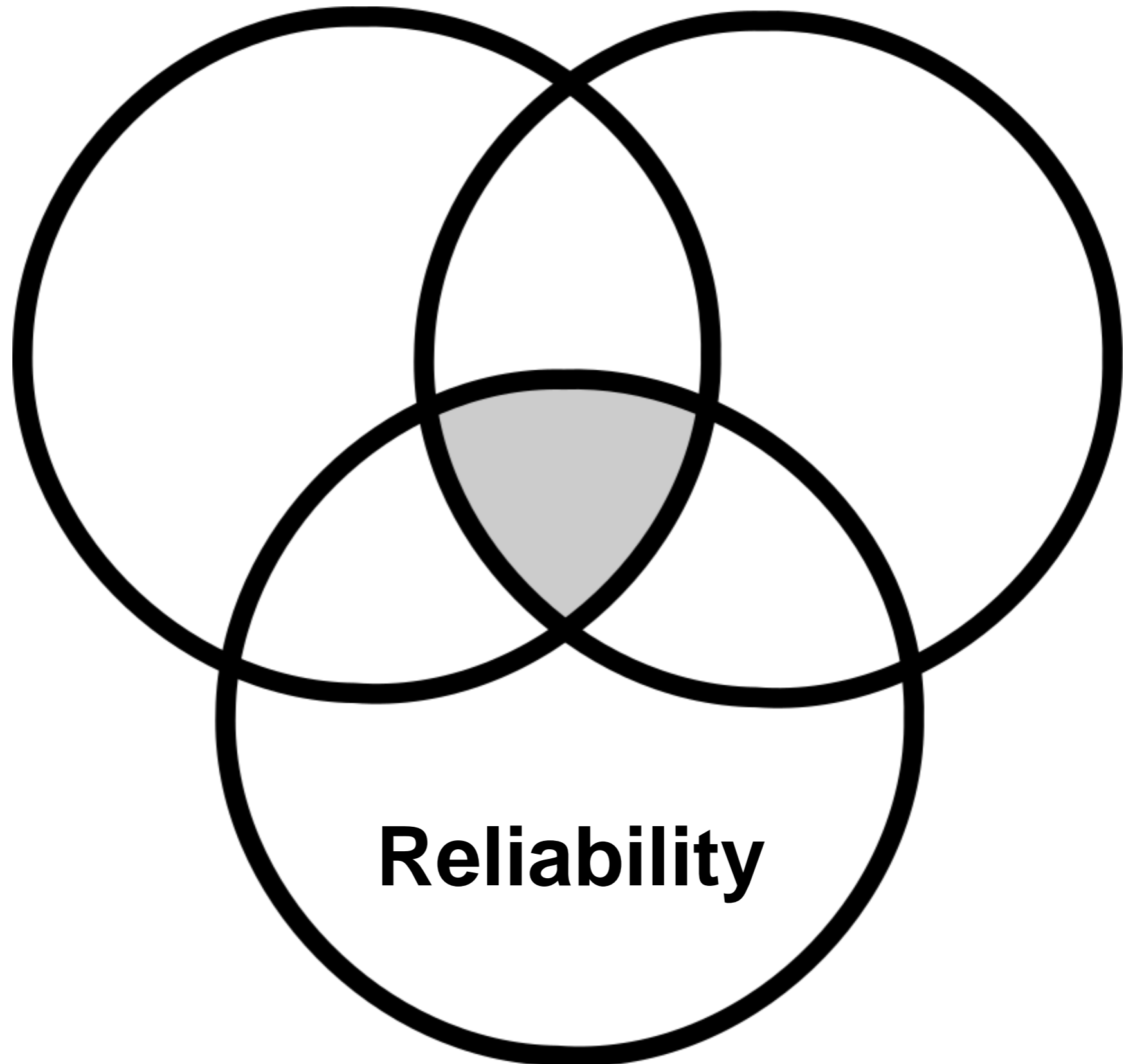
# Evolving Power Grid



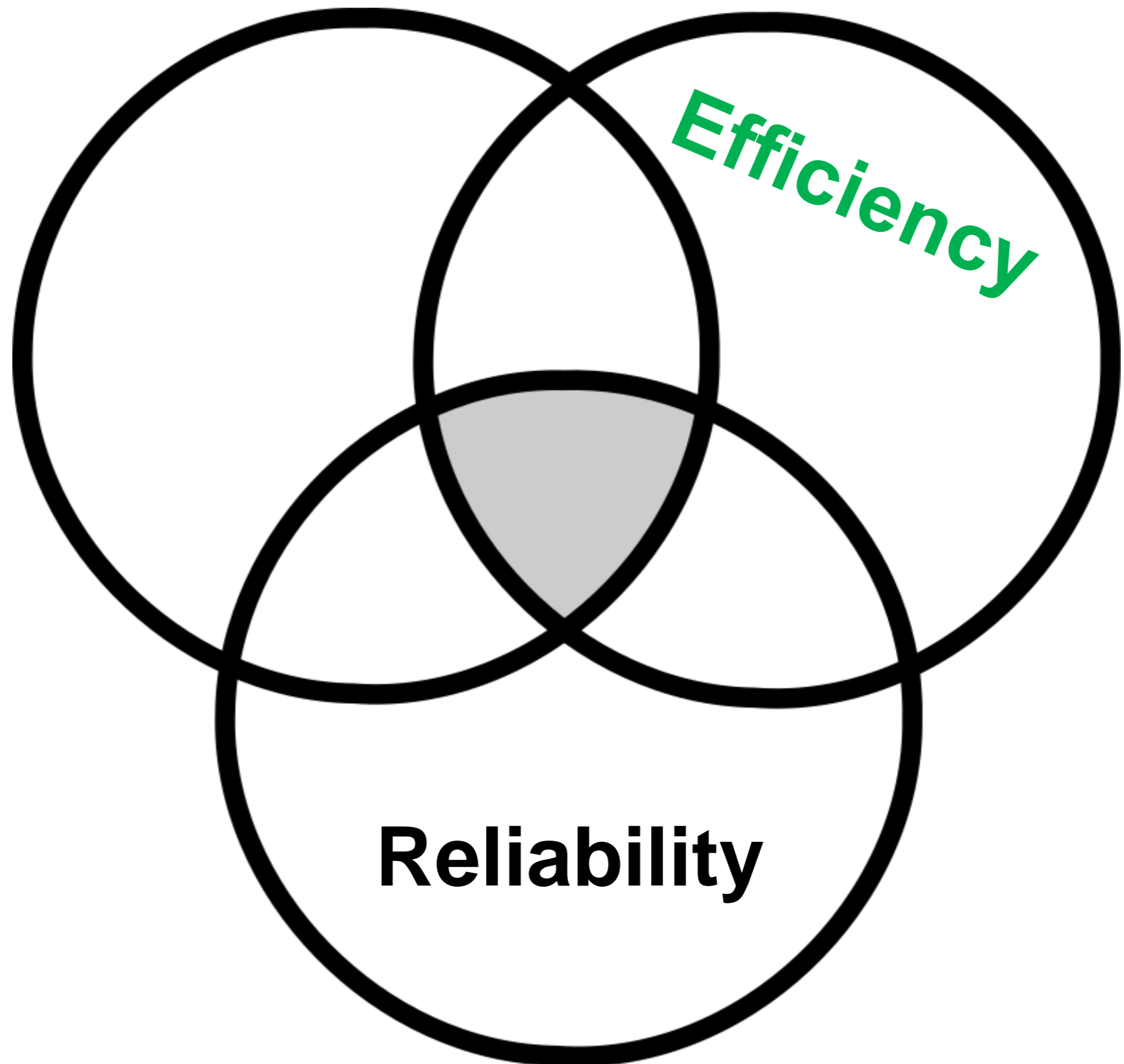
# The Three Domains



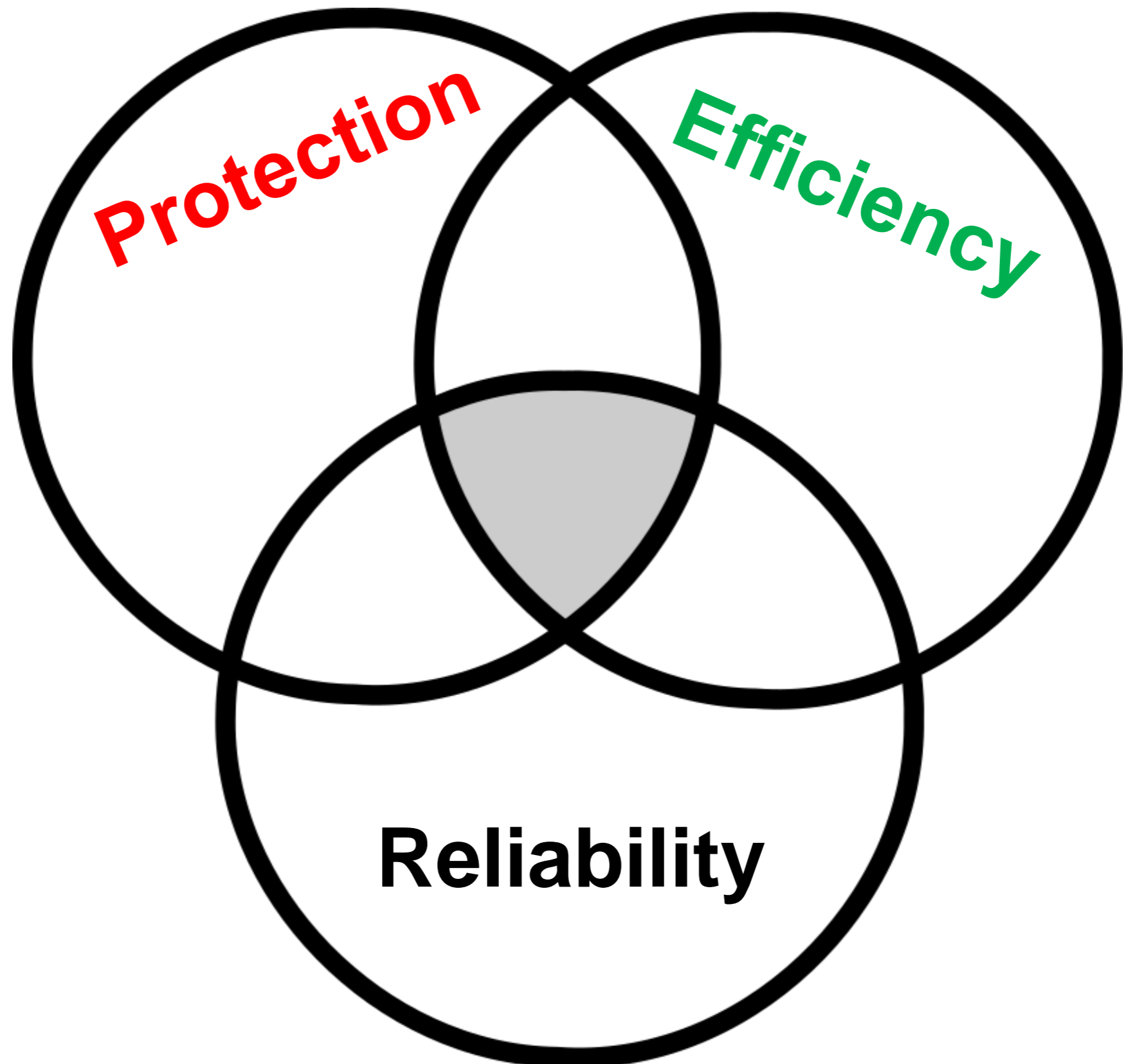
# The Three Domains



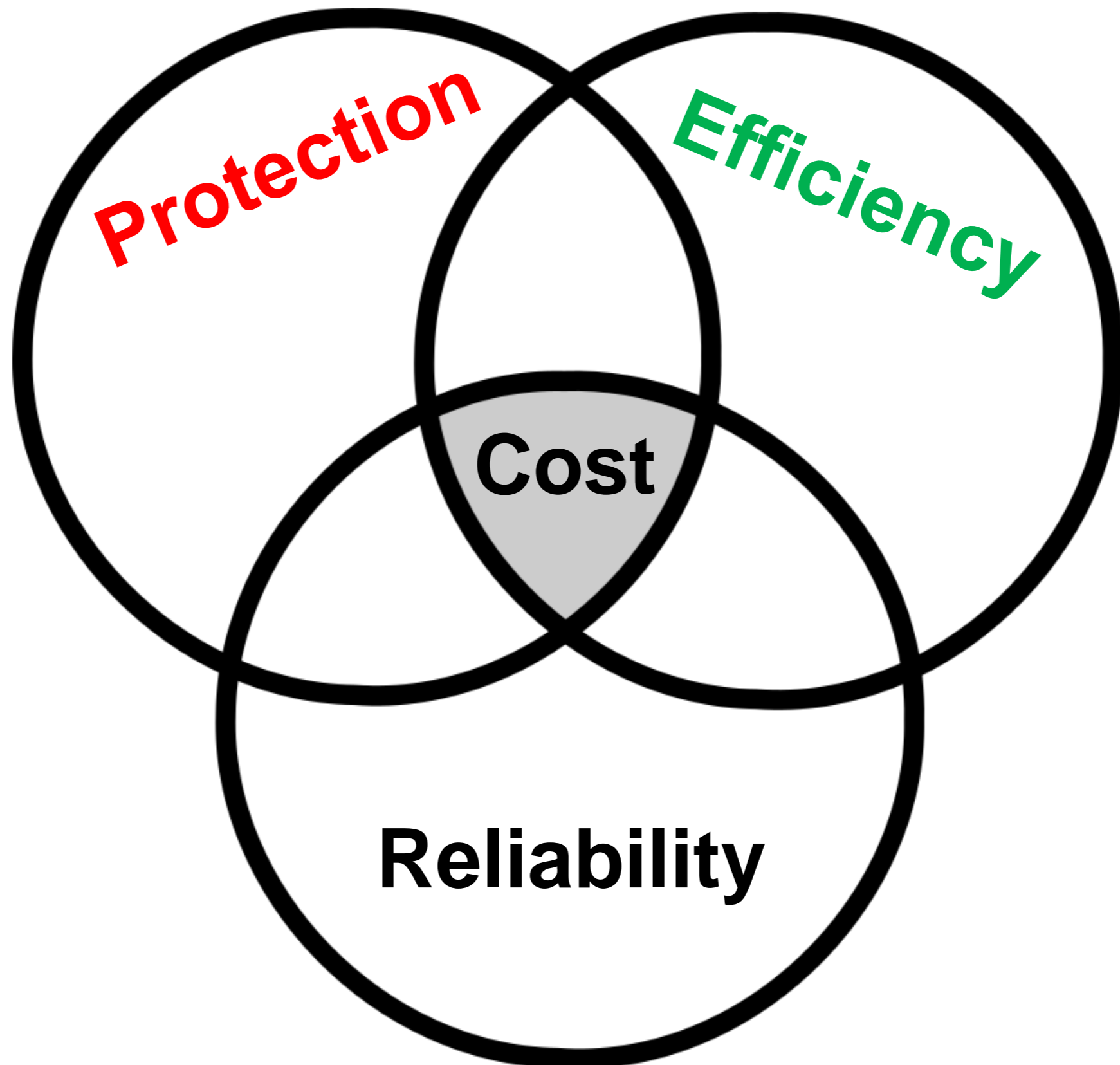
# The Three Domains



# The Three Domains

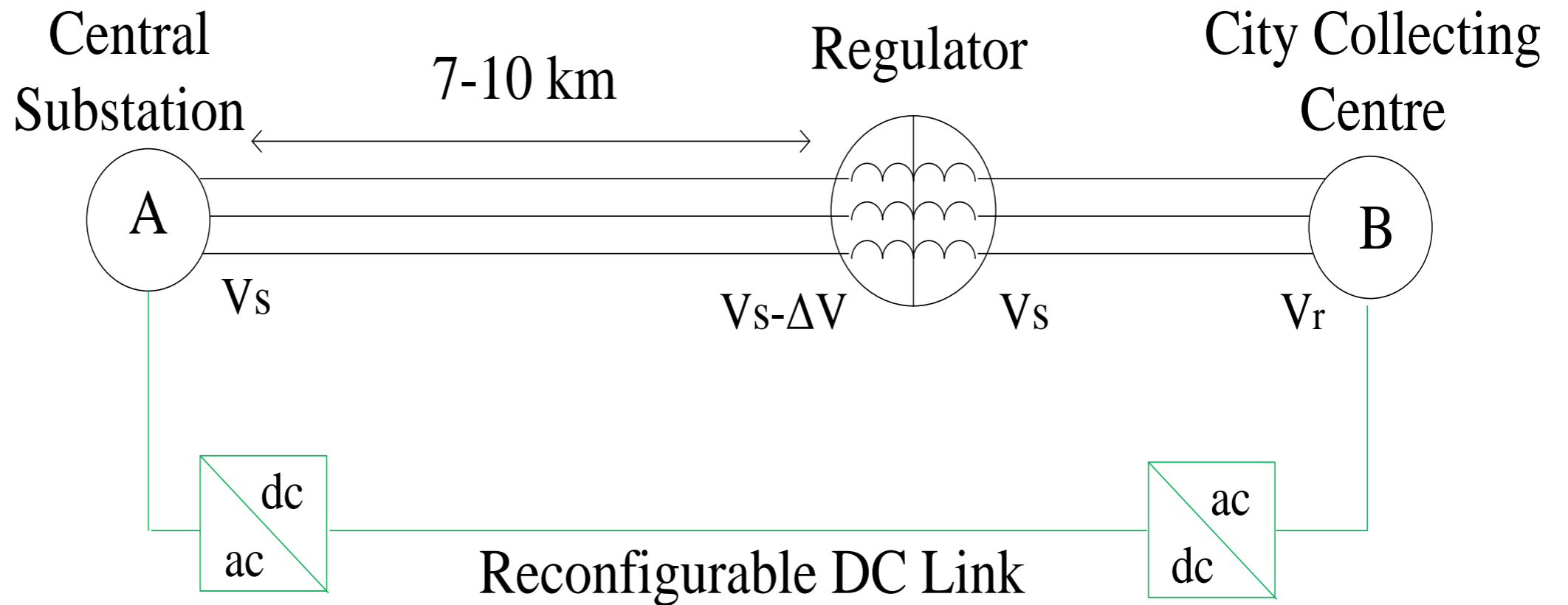


# The Three Domains



# CAPACITY ENHANCEMENT

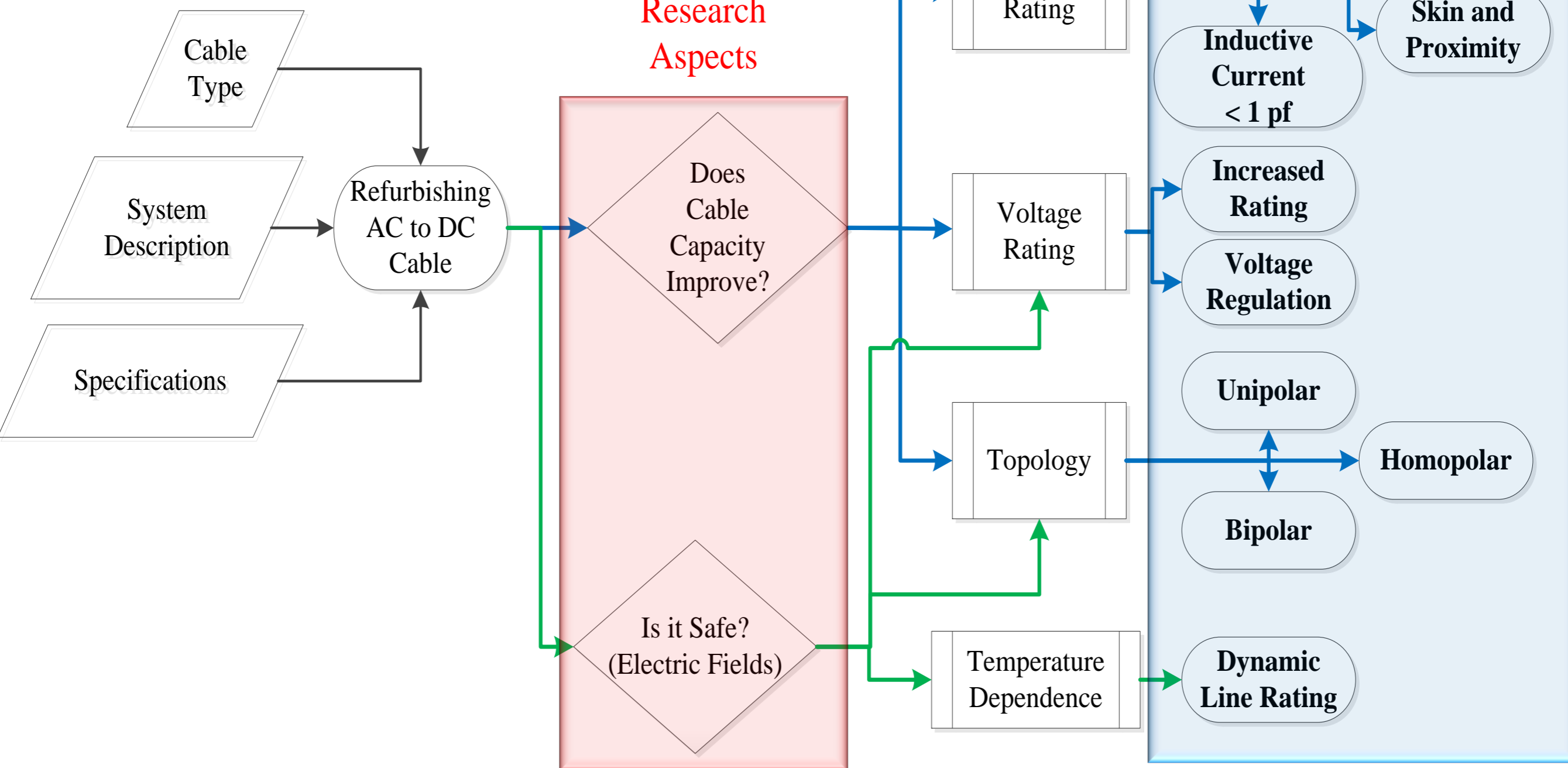
# Case Study



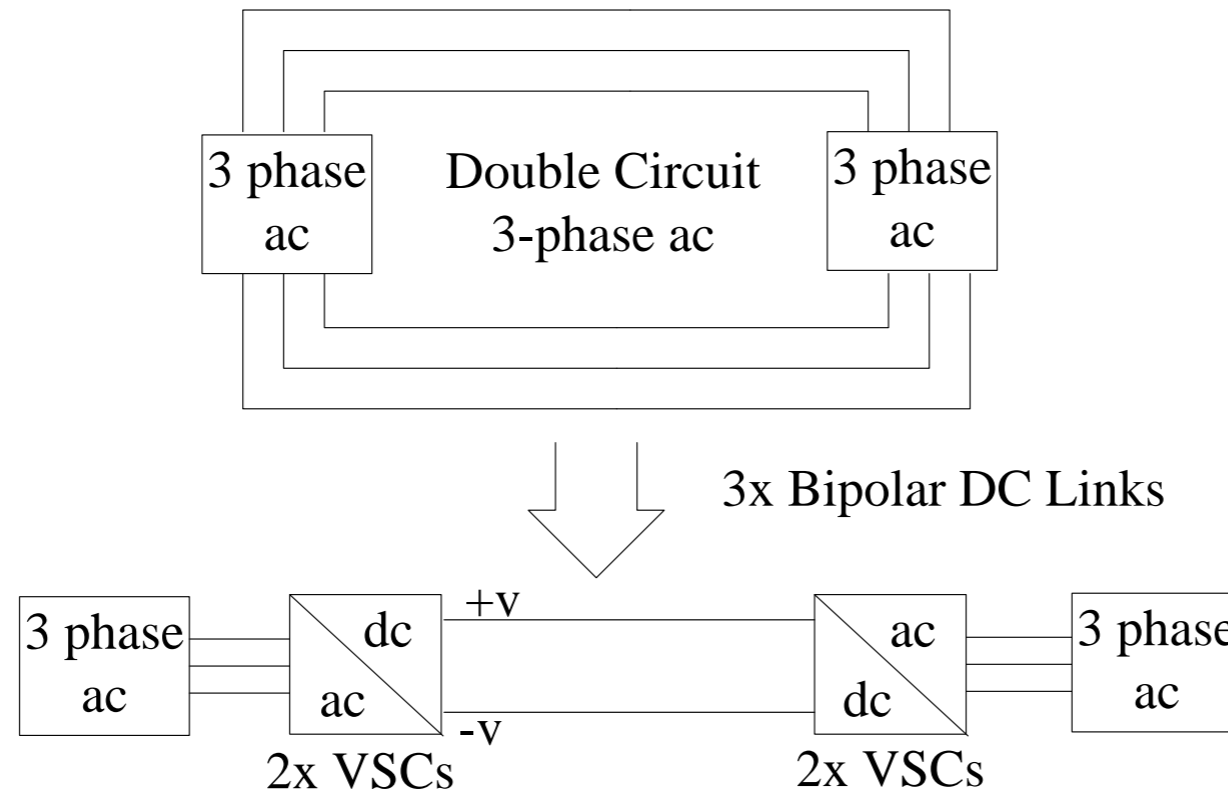


# Outcomes

## Research Aspects

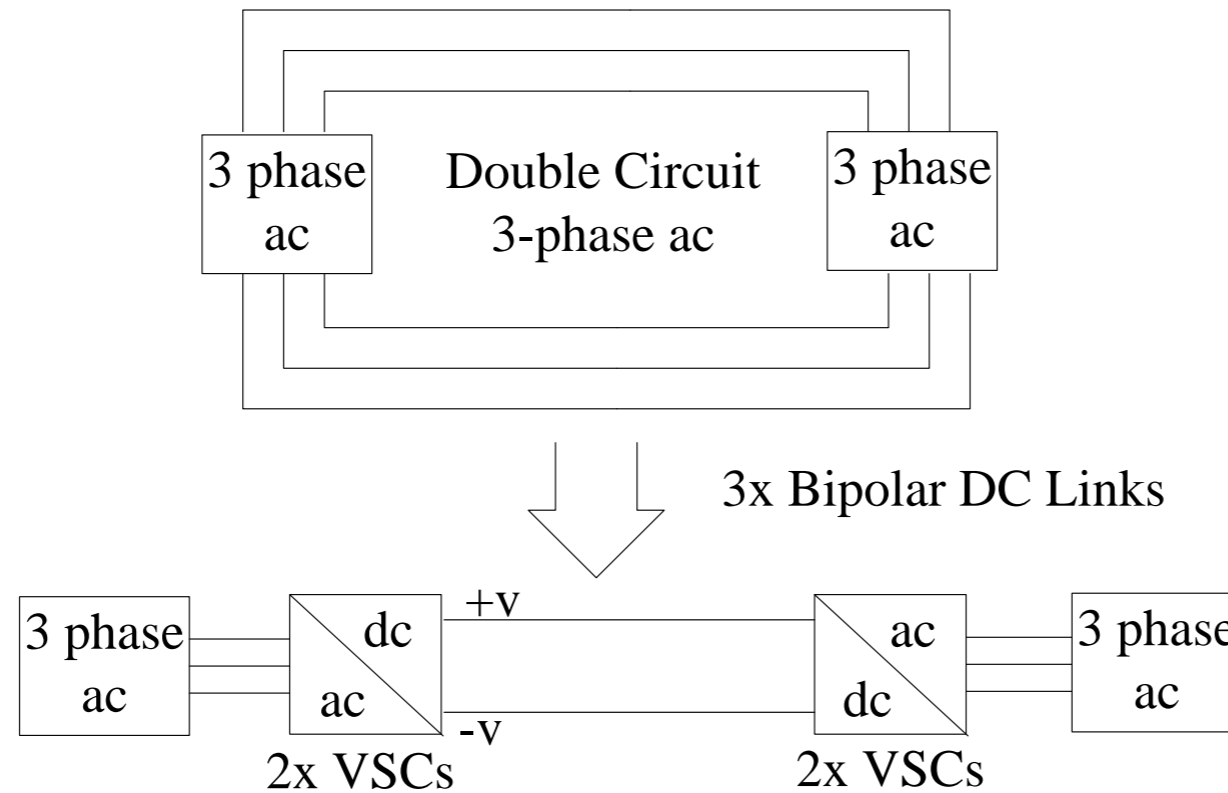


# 3 Phase Double Circuit ac to 3x Bipolar dc



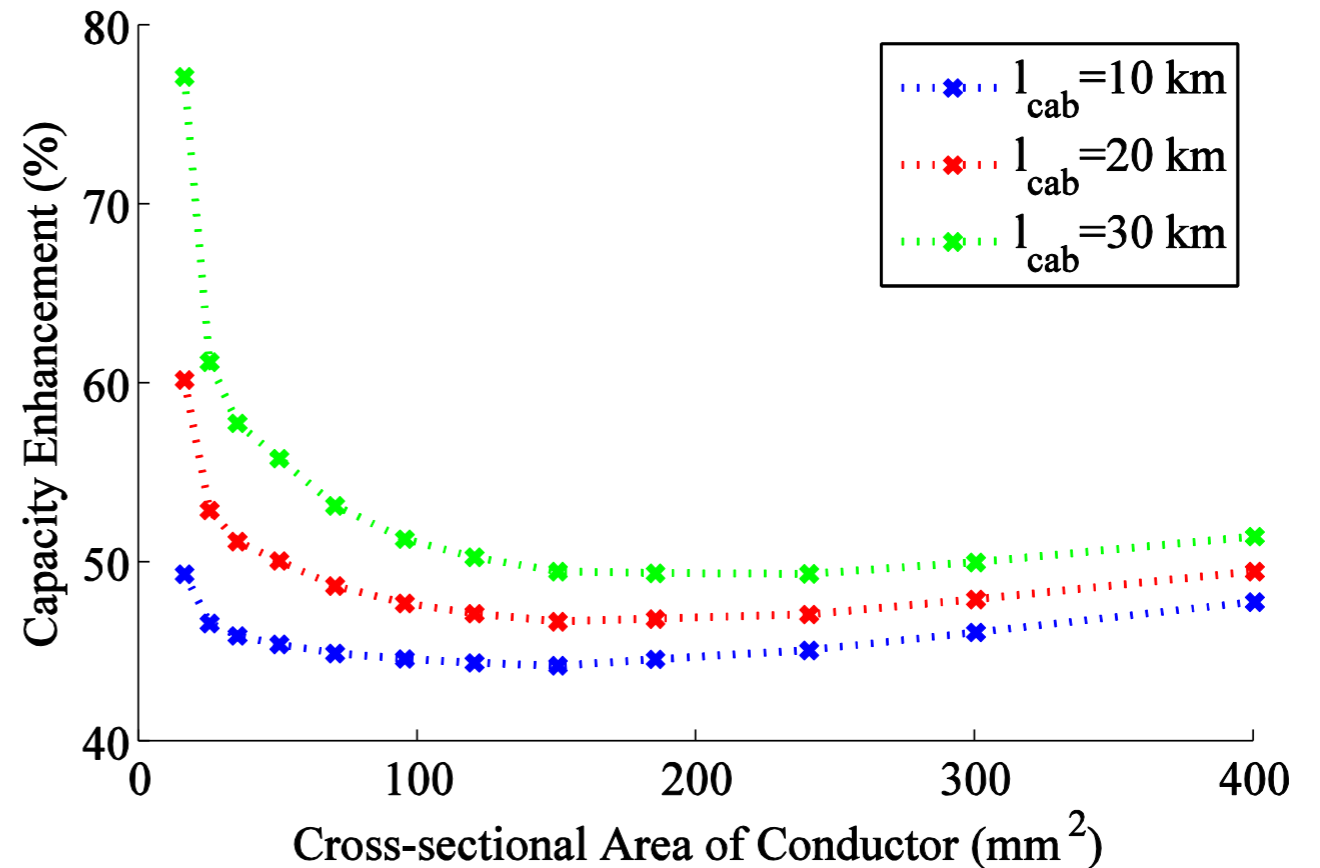
**System  
Configuration**

# 3 Phase Double Circuit ac to 3x Bipolar dc



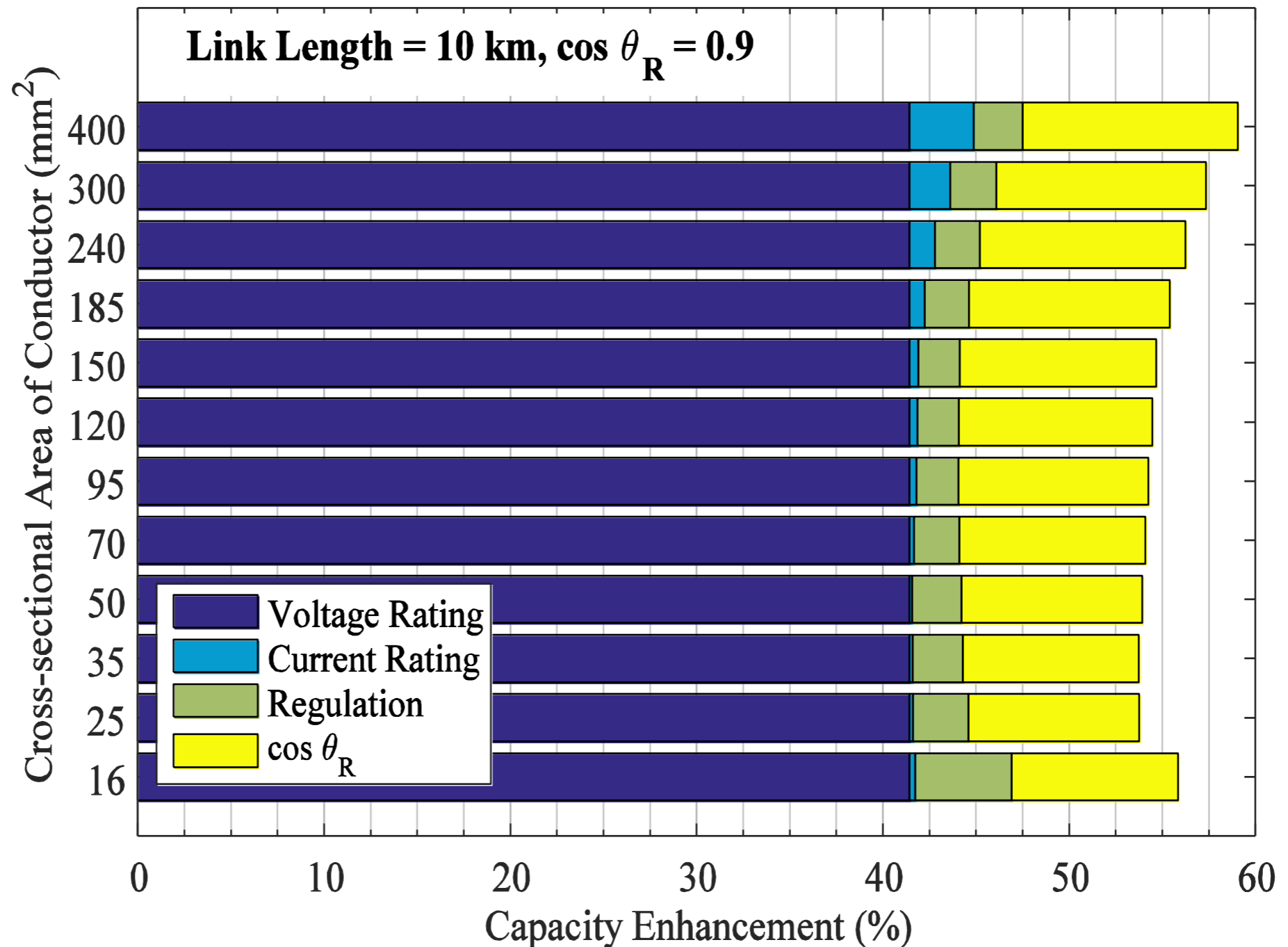
**System Configuration**

- Length
- Area
- UPF!



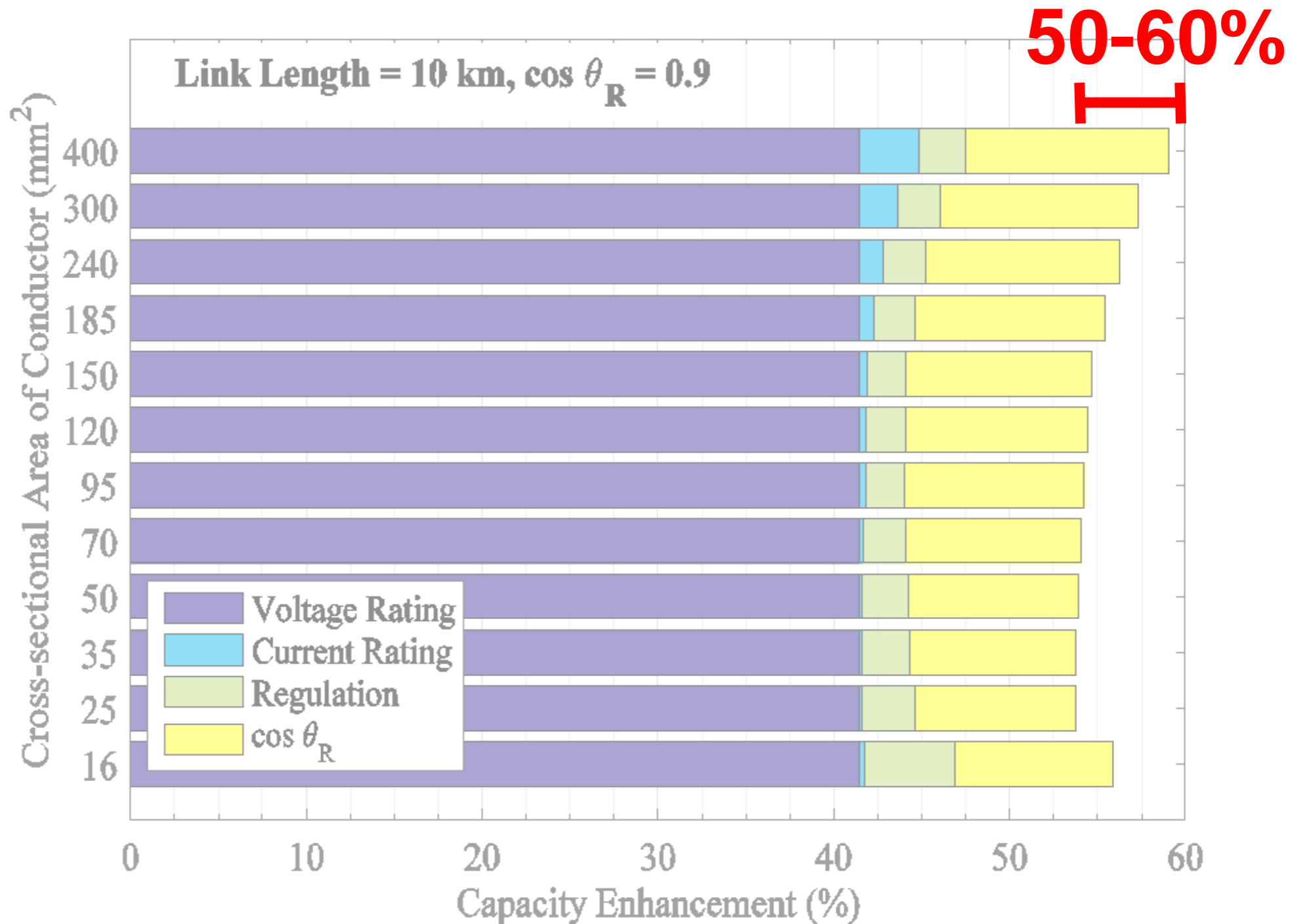
# Capacity Enhancement Quantification

Rated AC rms Voltage: 11 kV



# Capacity Enhancement Quantification

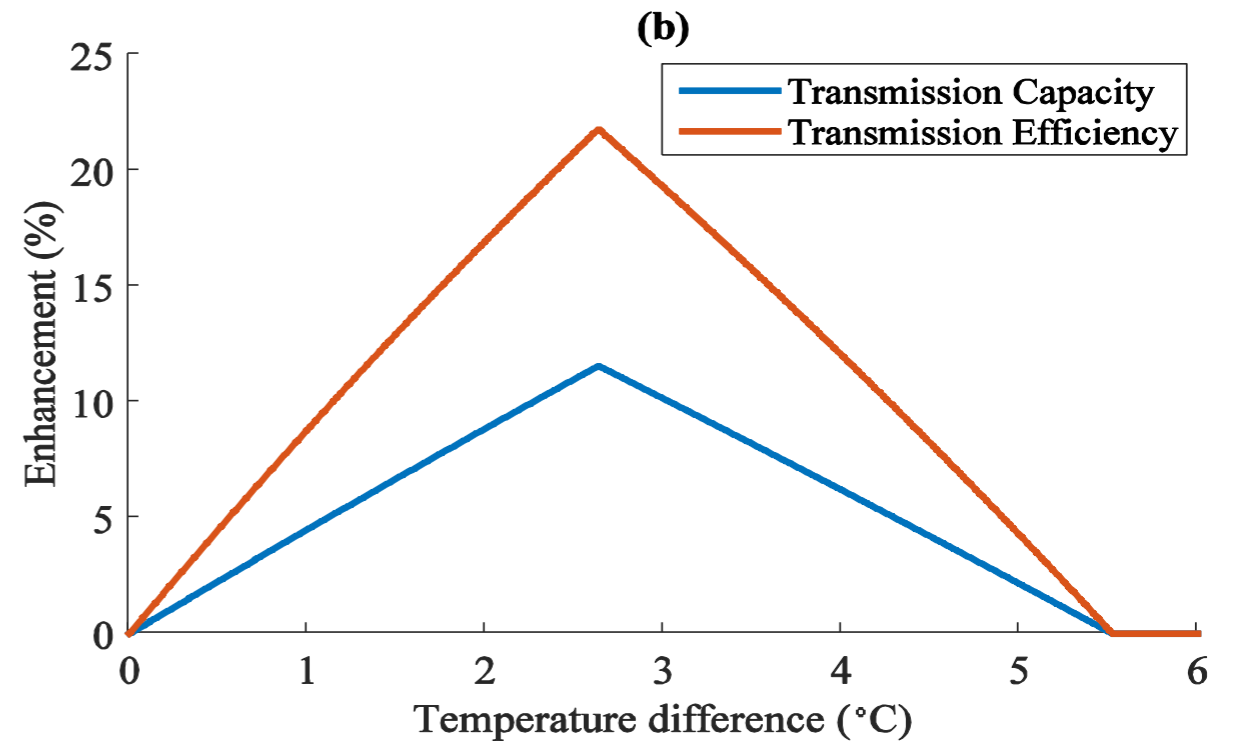
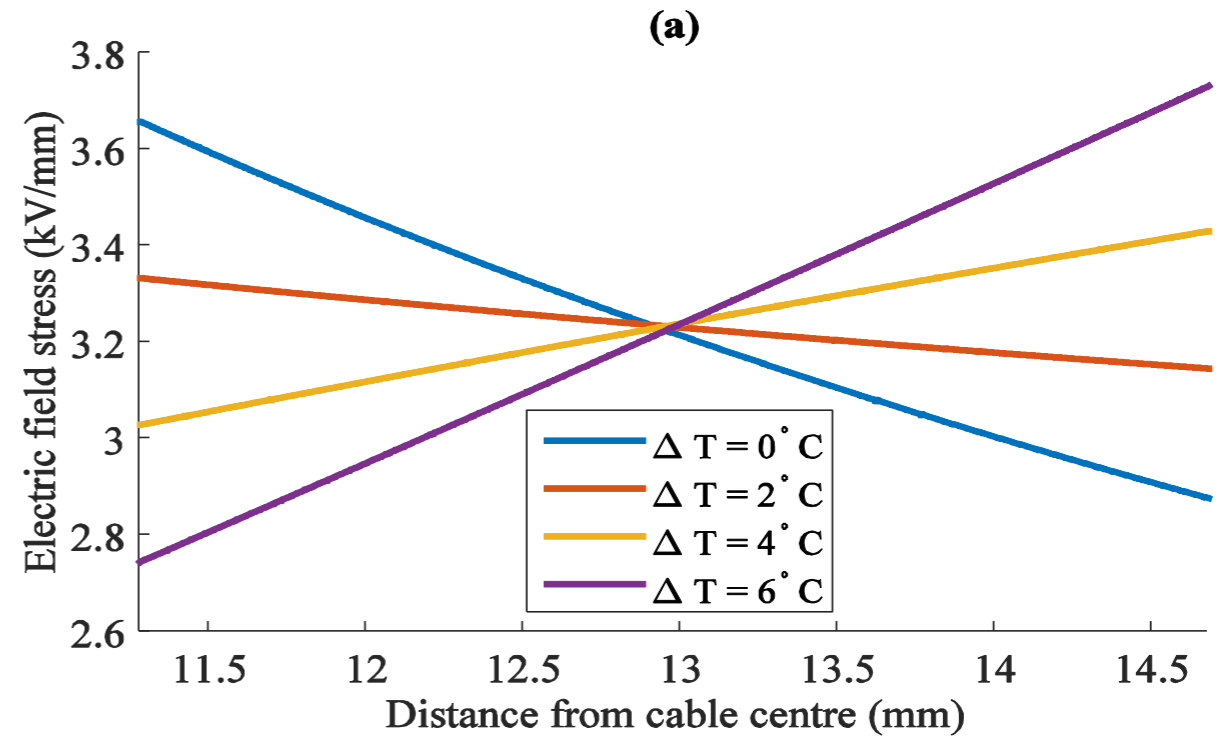
Rated AC rms Voltage: 11 kV



# CONSEQUENCES AND OPPORTUNITIES

# Temperature Dependent Capacity Enhancement

This is an approximation to represent an idea!





# Thank You!