

## KULI Energy Management Software

Efficient energy usage is one of the key tasks of today's automotive industry. This topic ranges from intelligent cooling systems for internal combustion engine vehicles (warm-up) to optimized HVAC systems for electric cars (passenger comfort vs. range). KULI energy management software supports engineers to achieve their goals.

### Your Benefits

- Quick Analysis and Solutions
- High Flexibility
- Save Time and Cost
- Easy to Learn and Comfortable Handling
- Clear Workflows for Engine-Cooling, E-Cooling and HVAC



### Technical applications

Engine cooling systems	Refrigerant circuits	Passenger comfort
Heat up / cool down	EV / HEV development	Recuperation

**KULI is the solution for passenger cars, trucks, trains, construction and farm machines and other industrial applications**

## KULI software

ENERGY MANAGEMENT OPTIMIZATION

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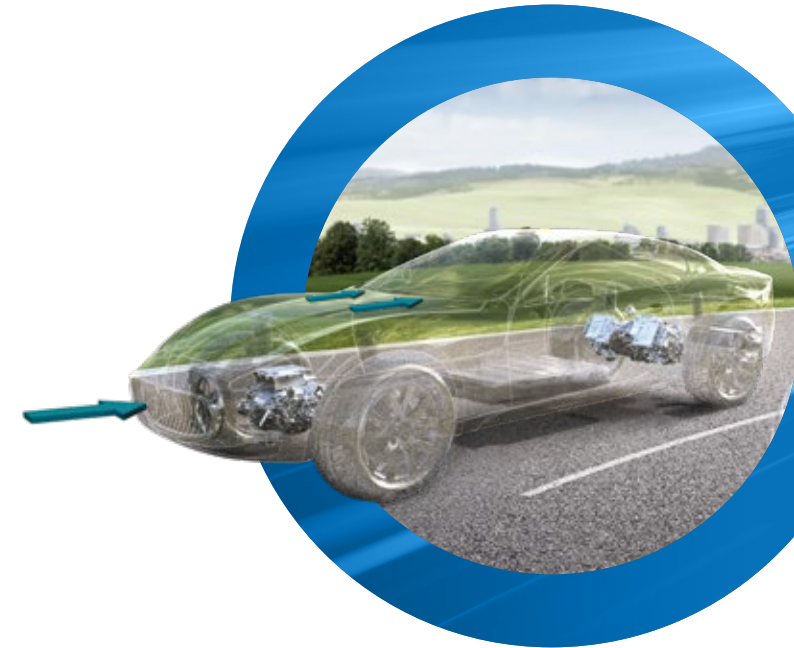
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Kuliflyer

## KULI software

BY MAGNA POWERTRAIN



## Energy Management

Virtual Vehicle Development

[kuli.magna.com](http://kuli.magna.com)



## Your Partner for Energy Management

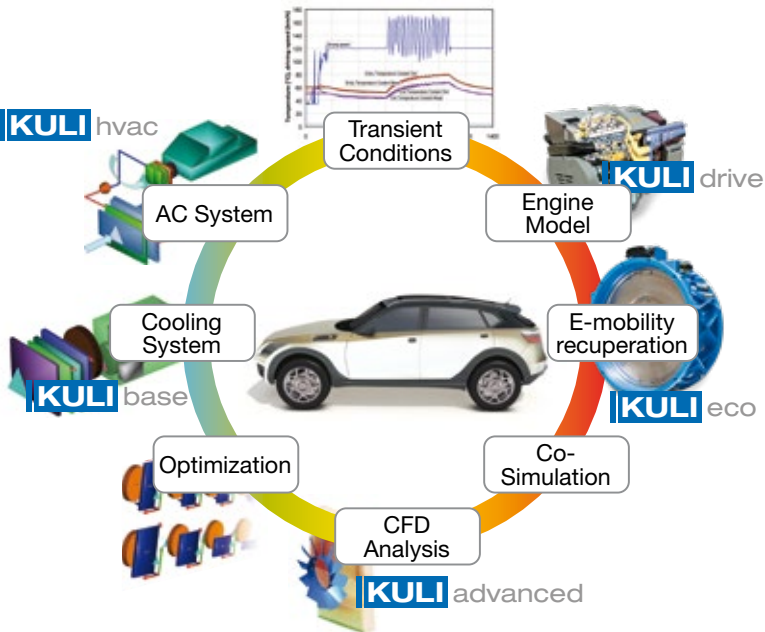
- Standard Thermal Management Tool for Premium OEMs and Suppliers
- More than 25 Years of Engineering Experience
- Support from Engineers for Engineers

## Flexible and Efficient Software

- Virtual Driving Cycles
- Fastest Tool on the Market for Steady State Investigations

## Comprehensive Simulation Tool

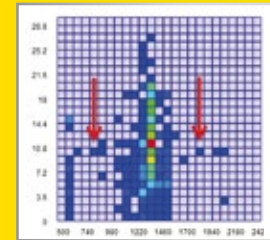
- Cooling System Layout and Optimization for all Powertrains
  - Combustion Engine
  - Hybrid Vehicles
  - Electric Vehicles (Battery, Fuel Cell)
- Energy Recuperation
  - Rankine Cycle
  - Thermal Electric Generators
  - Electric Recuperation in EVs
- HVAC Simulation
  - Air Conditioning Circuits
  - Heat Pump Applications
  - Multi-Zone Cabin Model



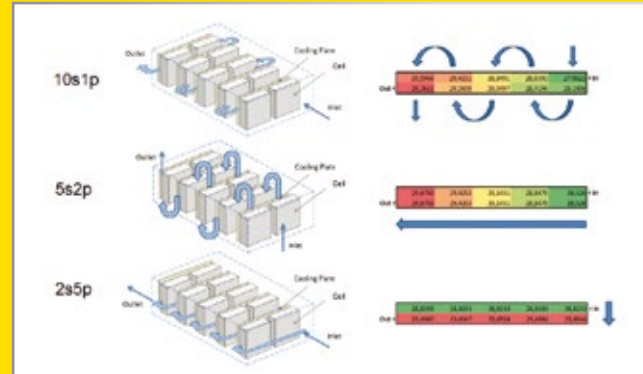
### KULI Example Hybrid Vehicle Control Strategy Optimization



Hybrid Strategy Optimization

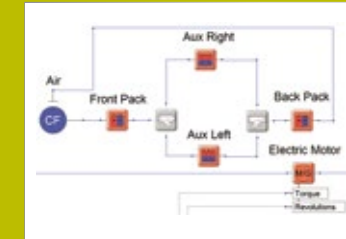


Engine Load Point Shifting

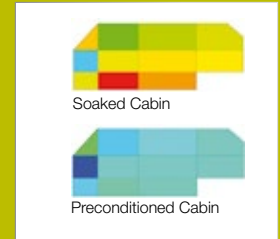


Cell Level Battery Thermal Management

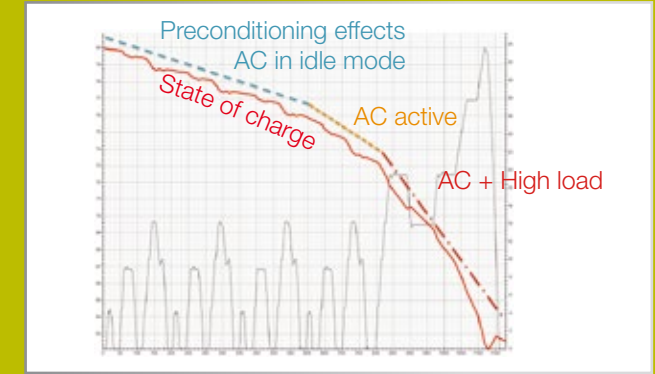
### KULI Example Electric Vehicle HVAC and Thermal Comfort



E-Component Cooling Concepts

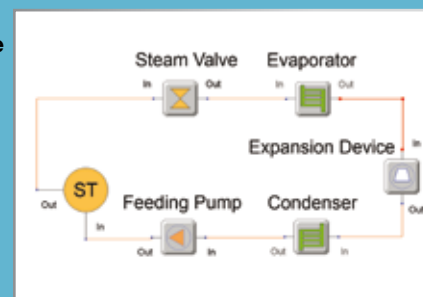


Transient Comfort Analysis

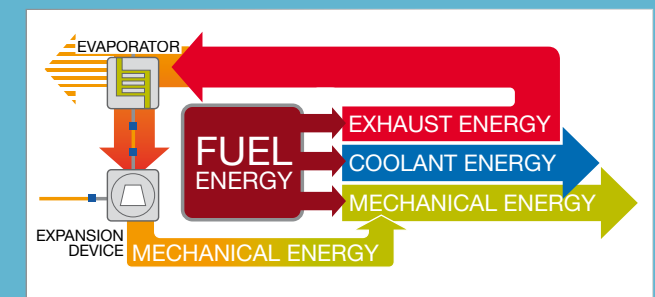


State of Charge Tracking

### KULI Example Combustion Engine Rankine Cycle for Energy Recuperation



Complete Steam Circuit Model



Energy Flow Analysis

