

All Good Energy Co., Ltd.

Company Profile

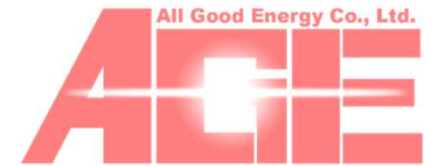
合谷
新能源

All Good Energy Co., Ltd.

AGIE



All Good Energy



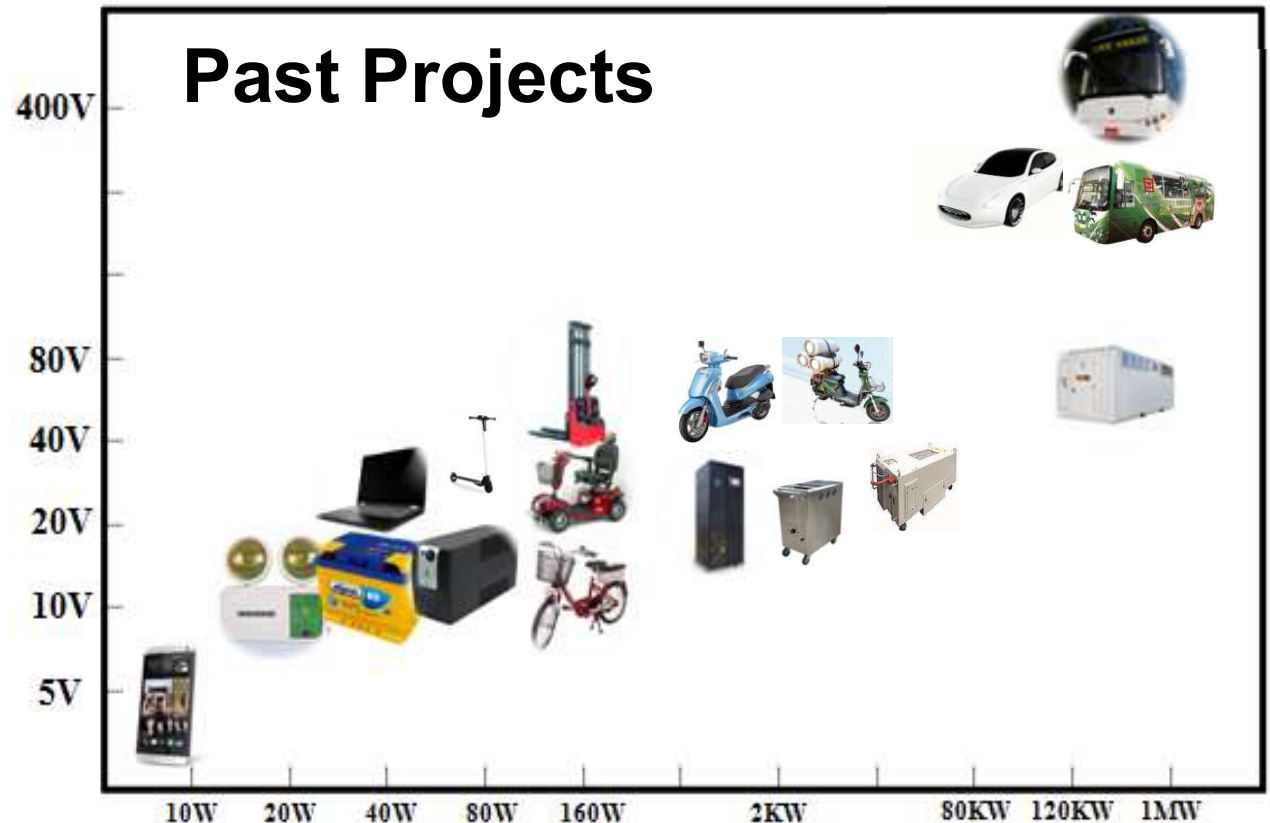
Highlight

- EV powertrain integration
- 10+ years of EV BMS design
- 50+ US and EU patents filed
- Global BMS consultancy

Partners



Past Projects



Field of Expertise



Electric Vehicle Powertrain Design

Vehicle simulation & concept design

Requirement specifications

Digital, mockup, packaging, cooling, battery design

Documentation & Certification



Battery management

Safety

Vehicle integration

Battery assembly

Supplier management

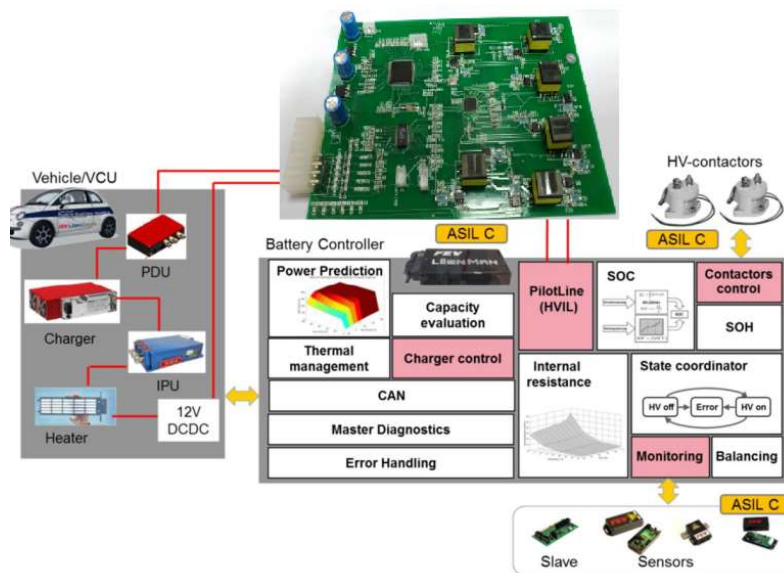
Testing

Highlight

- Over 30 integration projects
- EV battery pack design
- EV thermal management design
- Global regulation (ASIL C intended)
- EV production line setup

Field of Expertise

Battery Management System

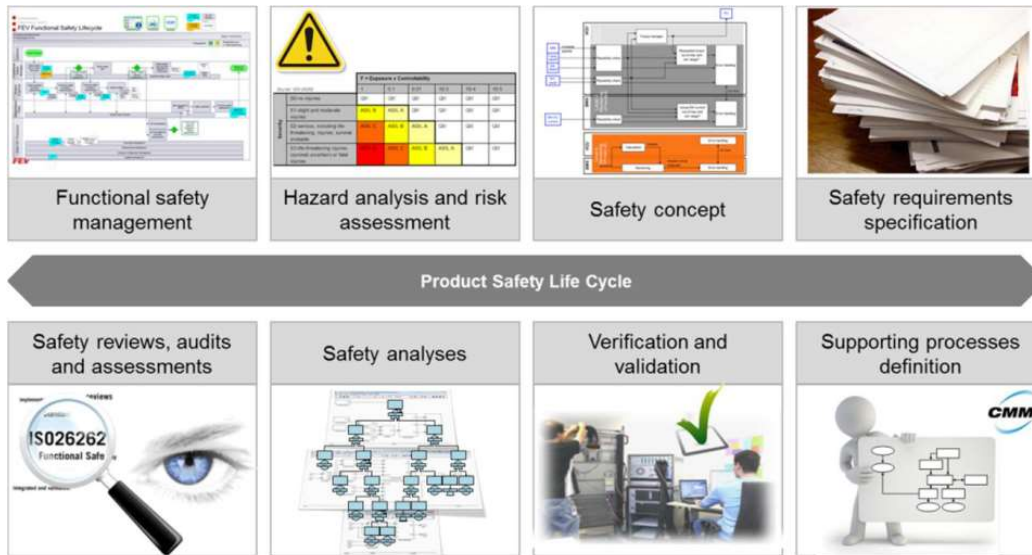


Highlight

- Dual Computing System®
Car level redundancy design
- EMI optimization
- Fully customized protocol
- Autocode system (TargetLink)
- EV/Buses application for 8+ years

Field of Expertise

Global Regulation Consultancy



Highlight

- ISO26262 Standard
- TS16949 Certification
- Regulation and risk assessment (UL、CE、ISO、CNS)
- Multi-phase safety mechanism
- FMEA model

Developed US patents



Battery management system

Patent number: 9931956

Electric vehicle thermal management system

Patent number: 9533547, 9707822, 9908382

Particle removal system and method thereof

Patent number: 10067418

Power management in electric vehicles

Patent number: 9895995, 9440554, 9610857

Vehicle condition detection and warning system

Patent number: 9975549, 9884622, 9478132, 10081343

Note:

- Listing only mobility related patents in the US
- Excluding energy storage system related patents

Fully designable vehicle information panel interface

Patent number: 9851882

Electric vehicle thermal management system with series and parallel structure

Patent number: 9533551, 9539877, 9809082, 9802460

Team



**Vance
Dai**
CEO

EV Powertrain Expert
Developed 50 Global Patents

- Battery Management System
- Thermal Management System
- Communication Protocol

- Work Experience:
 - Thunder Power (TPEV) – Powertrain Section Manager
 - Aleees Eco Ark Co., Ltd. – BMS Section Manager
 - Emerald Battery – Firmware Engineer
 - National Formosa University Industry
- Highlight:
 - Complete Battery Management System (360V)
 - Collaborate with Engineering partner, Dallara, in the project of Battery Module Architecture Design
 - Collaborate with Engineering partners, Bosch and Magneti Marelli for powertrain system
 - Execute TS16949, ISO26262, DFMEA developer certification

Team



**Reco
Chuang**
CTO

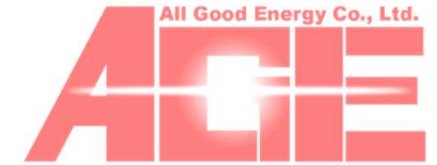
- Experience:
 - Thunder Power (TPEV) – Section Manager
 - Aleees Eco Ark Co., Ltd. – BMS Section Manager
 - Emerald Battery – Section Manager
 - Taiwan Technology University Alumni



**Theo
Wan**
CFO

- Experience:
 - DTZ - Consultant
 - Emerald Battery - Engineer
 - University of Southern California Alumni

Recent Projects



- 50V28Ah Cargo Scooter Battery
- 50V14Ah Passenger Scooter Battery
- IOT Cargo Scooter
- New Taipei City ESS System
- Portable Power for Surgery Station
- Delta ESS Pilot Program



Recognition



- 2019 Taiwan IOT Startup Award
- Amazon Web Service Accelerator
- Delta Electronics Pilot Program

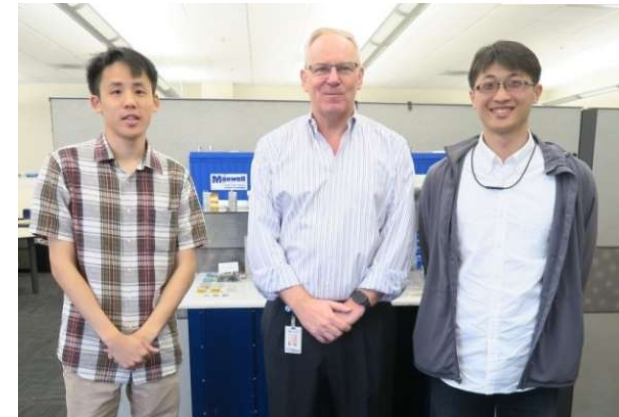


International Partner



Phillip Rayer II
General Manager,
Local Motors

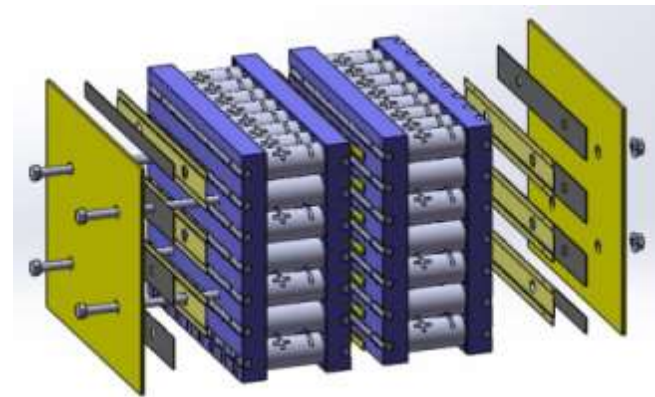
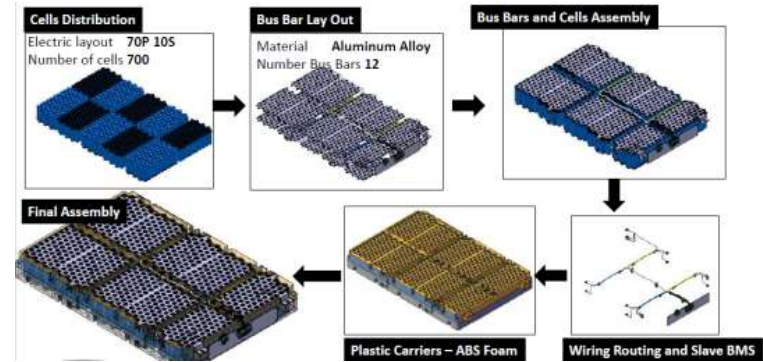
Electric Shuttle Bus



Earl Wiggins
Vice President,
Maxwell Technology

Ultra Capacitor
Manufacturer

Projects



Cargo Scooter



200kg max. loading
150km per charge

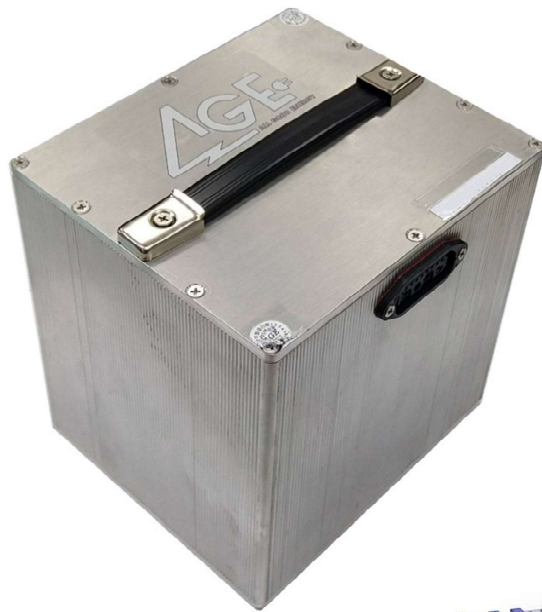


3000km/month
Over 8 hours of operation

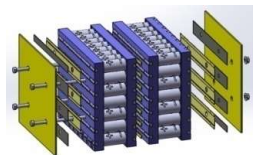


Improve delivery service
Collect battery data online

Battery Solution



50V/28Ah

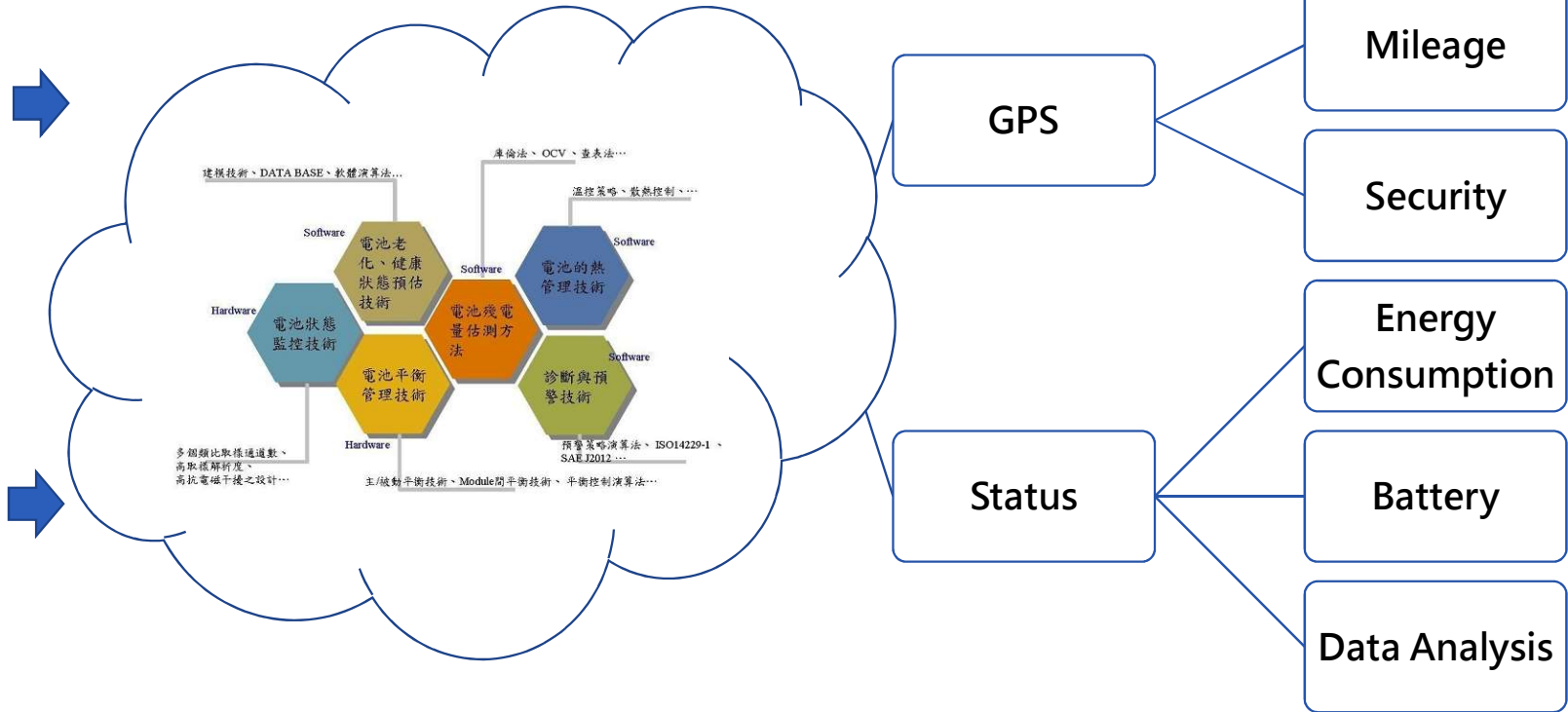


Dual Computing System®
BMS with redundancy design
and failsafe mechanism

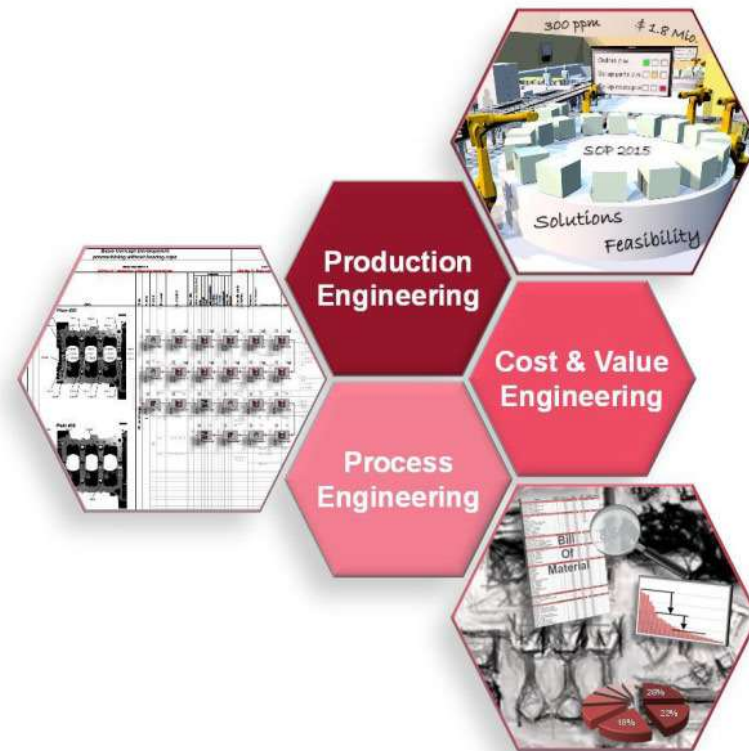


UL 、 CE 、 CNS certified
(including 10000kg crush
test, drop test, temperature
cycle test, short circuit test,
over charge and over
discharge test)

BMS Data Upload



Services



From Design to Production

Engineering Services



Feasible & suitable concepts



Consulting



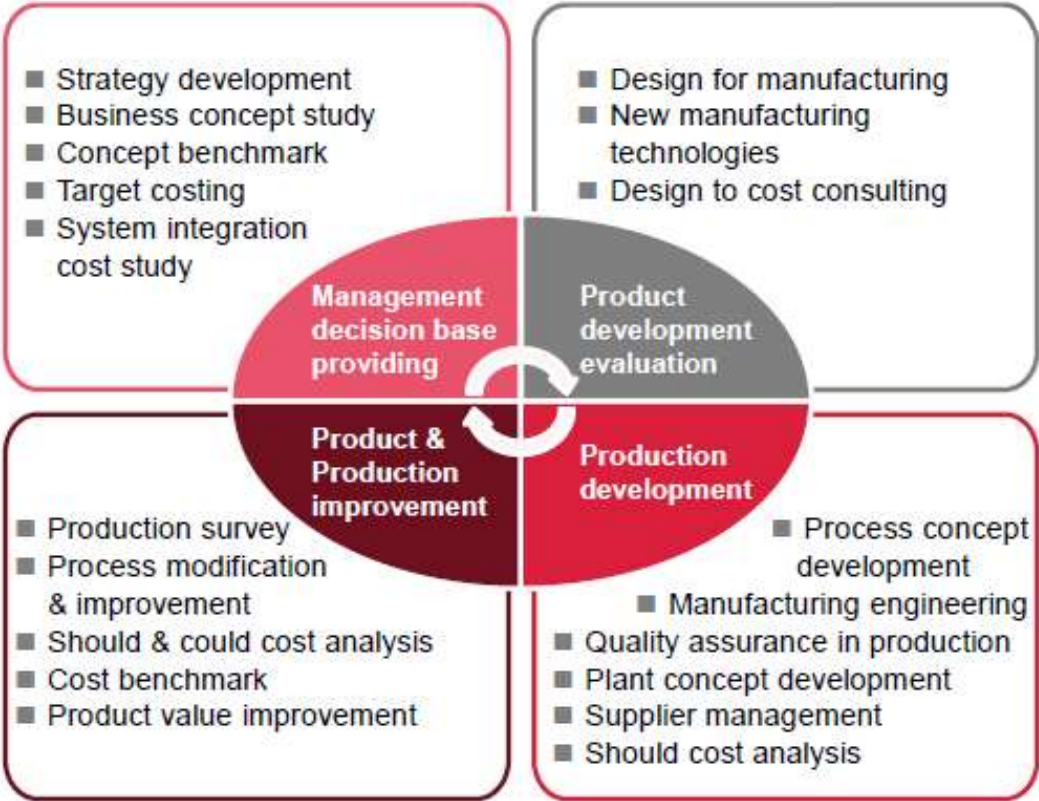
Advisory & solving problems



On-site Support



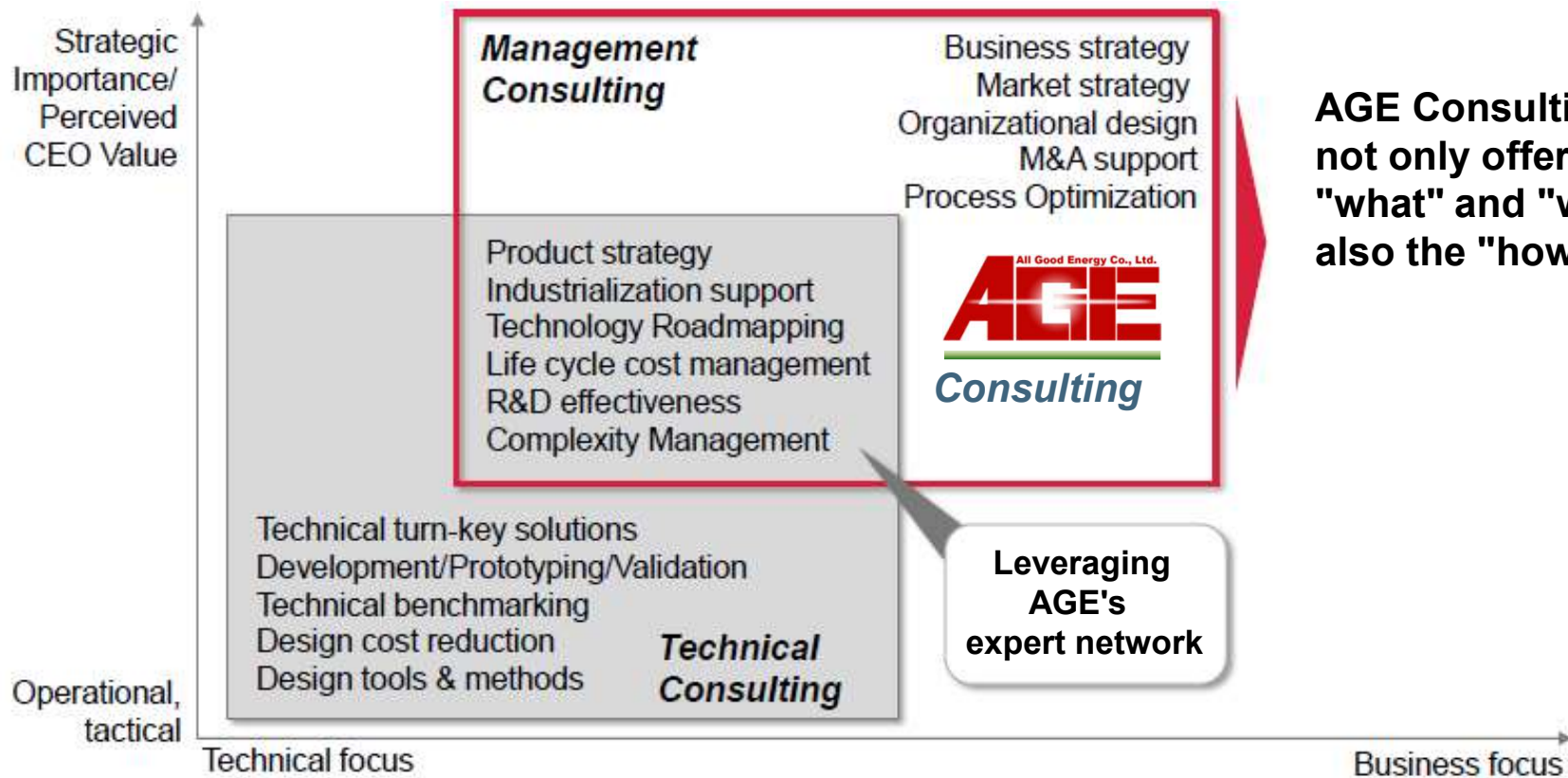
Expertise & capacity allocation



Consulting



Service portfolio



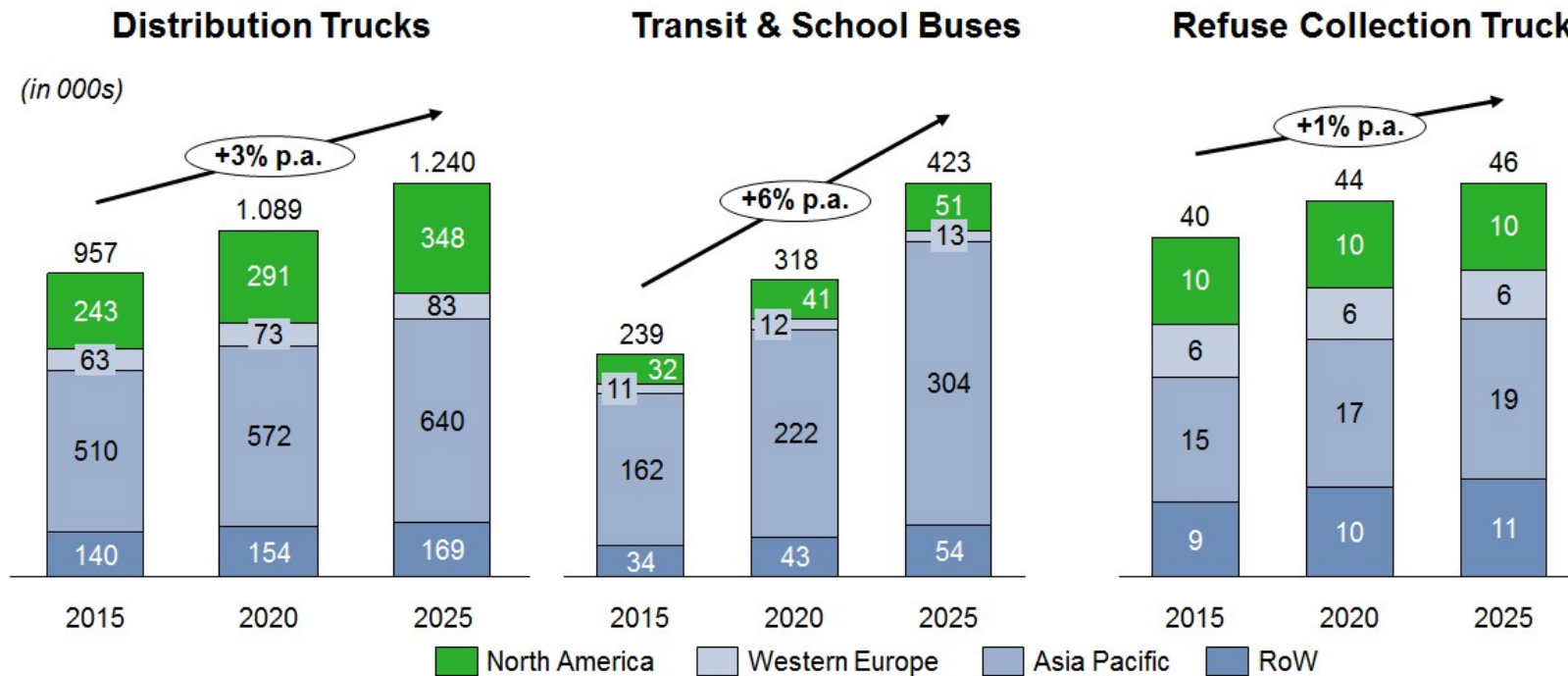
AGE Consulting can not only offer the "what" and "why", but also the "how"

Market Analysis

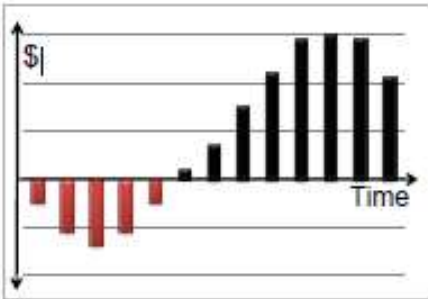


Overall market size by application

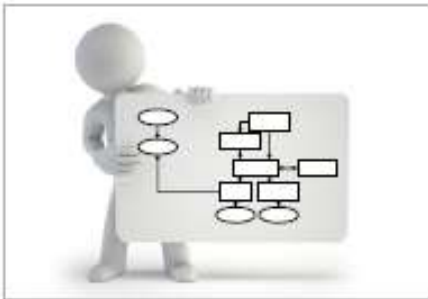
All prime markets for xxx applications show solid growth over the coming decade and provide substantial absolute volume potential



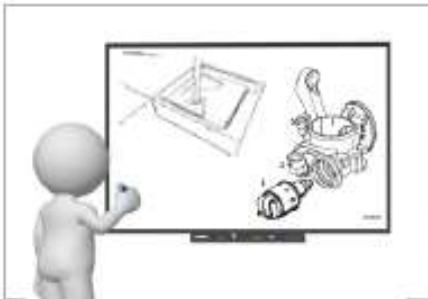
Product Life Cycle



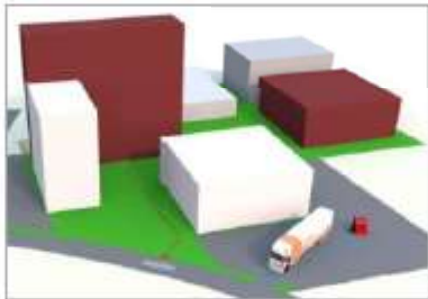
Business Concept Study



Process Concept Development



Manufacturing Engineering



Plant Concept Development



On-site production support




Production & Supplier Survey



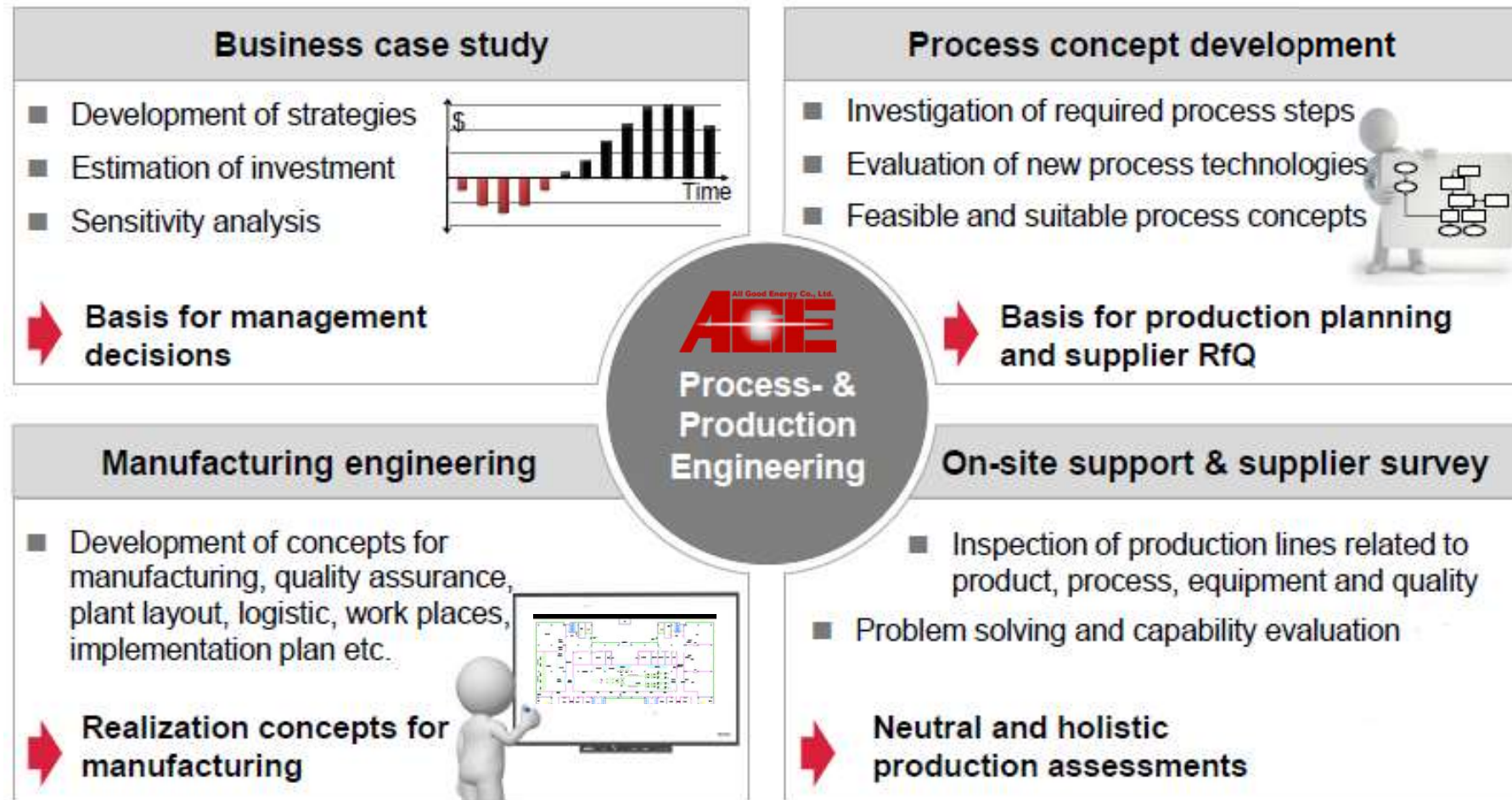
Cost Engineering



Value Engineering



Production Engineering



Documentation

BOM

Assembly processes and sequence, structuring to workstations

Assembly sequence per workstation

Process time estimation

code	process step	est. time (min)
pre-assembly processes of cylinder head components		
PA-CH-100	prepare cylinder head	8.9
PA-CH-150	pre-assembly cam shaft	3.7
PA-CH-200	pre-assembly rocker arms	10.0
PA-CH-250	prepare Valve cover	3.0
pre-assembly cylinder head		
AS-CH-150	assemble valves into cylinder head	9.9
AS-CH-200	assemble dial 4 at cylinder head	1.4
AS-CH-250	install camshaft	4.7
AS-CH-300	install rocker arm assy	3.9
pre-assembly processes of cylinder block components		
PA-CB-100	prepare block	4.1
PA-CB-150	pre-assembly crankshaft	2.3

Workstation concept

Assembly layout

Plant layout

Cost estimation

equipment	unit	estimated price
assembly system	set 100m	400,000
product center	set 10	300,000
software system	set	100,000
3D printing device	set	100,000
test equipment	set	100,000
quality tools	set	100,000
assembly system tools	set	100,000
worktable, bench, etc.	set	100,000
communication system	set	100,000
security system	set	100,000
total		3,200,000

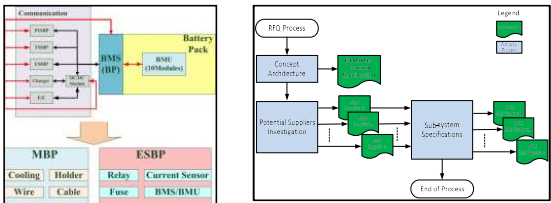
required area for assembly line	price
70m x 30m	2,100,000

additional equipment to the operation of the assembly line	price
assembly system	20
reference system	2
quality assurance software	1
material logistics	2

Example Case

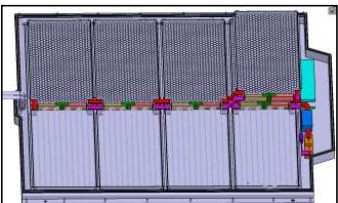
Battery Pack System Level Communication Protocol

Control logic, system level specification



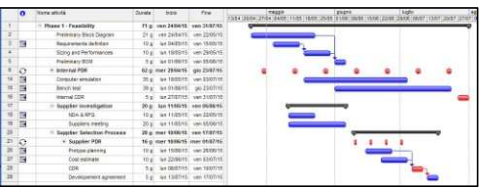
New Car Battery Pack Concept Design

EV battery pack concept design for Italy start up



Benchmarking of Product Development Processes

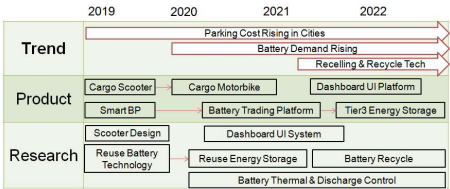
Process analysis and industry benchmarking



Example Case

Technology Roadmap

Provide inputs for future R&D projects and budgets



Manufacturing Strategy

Plant automation strategy



Business Plan Development

Business plan for Taiwan start up wind farm storage



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