지식경제부
Ministry of Knowledge Economy

지식경제 R&D 전략기획단
OSP Office of Strategic R&D Planning

Business-oriented Korea's Flagship R&D Program: Korea Micro Energy Grid (K-MEG) Project

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Technology R&D Center

SAMSUNG C&T Corp.

Contents

Project Overview

Summary

Korea's Future Flagship Program – Project in Energy Field:

Korea Micro Energy Grid (K-MEG)

Project Administrator

- Korea Ministry of Knowledge Economy (MKE)

Project Leader

- Samsung C&T Corporation

Project Period

- July 2011 ~ June 2013 (3 years)

Budget

- Approx. 100 mil. USD (64% government fund + 36% matching fund)

Objectives

Develop Total Energy Solution Packages for Energy-Saving

Implementing IT, Smart Grid Technologies, EMS, Building Automation, DR, Security, Decentralized Power Sources, Renewables, etc.

- To develop an optimal total energy solution in response to energy production/supply/consumption
- To develop a systematized solution w/ a highly efficient O&M system
- To develop a custom-ready solution for the target market
- **To improve building energy saving by 30% w/ active systems** and limited renewable energy till 2015
- **To implement and validate the developed solutions** in domestic and overseas public or commercial buildings

Consortium Members

56 Members + 13 Supporting Partners
across Energy/IT/Engineering/Construction/etc.

11 Large Companies

SAMSUNG C&T · S.A.M.O.O. · 삼천리 · LG이노텍 · 삼성에버랜드 · 에스원 · ILJIN · olleh kt · 한전KDN · 한화S&C · HYOSUNG

33 Small & Medium Enterprises

(주)가교테크 · NARA 나라컨트롤 · DONGAH ELECOMM · ROOTECH · Techwin · POWER 21 · MAT · MAXFOR(주)맥스포 · sanjon · KOTEC ENG · KD POWER · ABIsystems · ecosian · xPRIME · ENTEC · M&D · YPP · DACO 주식회사 대륙 · 브레넥스 · (주)선도소프트 SUNDOSOFT, Inc. · OMNI · WOOAM · WOOWON M&E · INTER POWER · elec power 일렉파워 · SUNGHO · SANIL · SQI소프트 · JISAN (주)지산소프트 · ALU ENC · OK.com · Win Tech

12 R&D Centers, Universities, etc.

KAIST · 한국에너지기술연구원 KOREA INSTITUTE OF ENERGY RESEARCH · 한국전기연구원 KOREA ELECTROTECHNOLOGY RESEARCH INSTITUTE · KERI · ETRI 한국전자통신연구원 · KETI · 국가보안연구소 · 한국산업단지공단 Korea Industrial Complex Corp. · NFRI 국가핵융합연구소

5 Foreign Partners

ARUP · VTT · University of Strathclyde Glasgow · EPRI

삼성물산 · 삼성전자 · 삼성전기 · 삼성종합기술원 · 삼성SDS · 삼성SDI · 삼성에버랜드

Key Players

Value Chain & Global Positioning

Emerging Technology

PE-IGCC

NFRI 국가핵융합연구소 National Fusion Research Institute

- 스팀플라즈마 마이크로 웨이브 토치
- 플라즈마 가스화 발전 기술

DC

- DC 배전망 기술 / 누전차단 접지

SAMSUNG SAMSUNG C&T

- DC 배전 실증

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- DC IDC

Business Planning/ Project Management

SAMSUNG SAMSUNG C&T

- '09년 38억$ 규모의 카자흐스탄 발전사업 및 프로젝트 파이낸싱 성공

삼천리

- '08년 미국 멕시코만 심해 탐사사업 외 다수 자원개발 사업 진행 중
- '10년 14,000세대 규모 광명역세권 집단에너지 사업

Development / Manufacturing

HYOSUNG

- 국내 중전기기 생산 1위
  초고압 변압기 국내 57%
  차단기 (GIS, GCB) 국내 52%
  배전 변압기 국내 48%
- 800kW급 2절점 가스절연 개폐기 세계 최초 개발
- 국내 최초 소형 열병합 발전 시스템 개발

ILJIN 일진전기

- '11년 400kV 초고압 케이블 인증
- '09년 230kV 변압기 국내 최초 KEMA인증

LG이노텍

- 정밀 소재 부품 전문 기업
- 튜너, 정밀모터 분야 세계 1등 제품 생산

KD POWER

YPP

Design/Construction /System Integration

SAMSUNG SAMSUNG C&T

- '11년 2.5GW규모의 캐나다 온타리오주 풍력, 태양광 복합단지 개발 사업 수행

SAMOO Architects & Engineers

- '10년 현재 204,706㎡ 규모의 LEED 인증 빌딩 7개 설계 진행 중

Hanwha S&C

- IT Integration Service

WOOWON M&E

elec power 일렉파워

Win Tech

Operation & Management

olleh kt

- 스마트그리드 실증 운영
- 전국 4,000여개 전화국사 EMS 15년간 운영 중

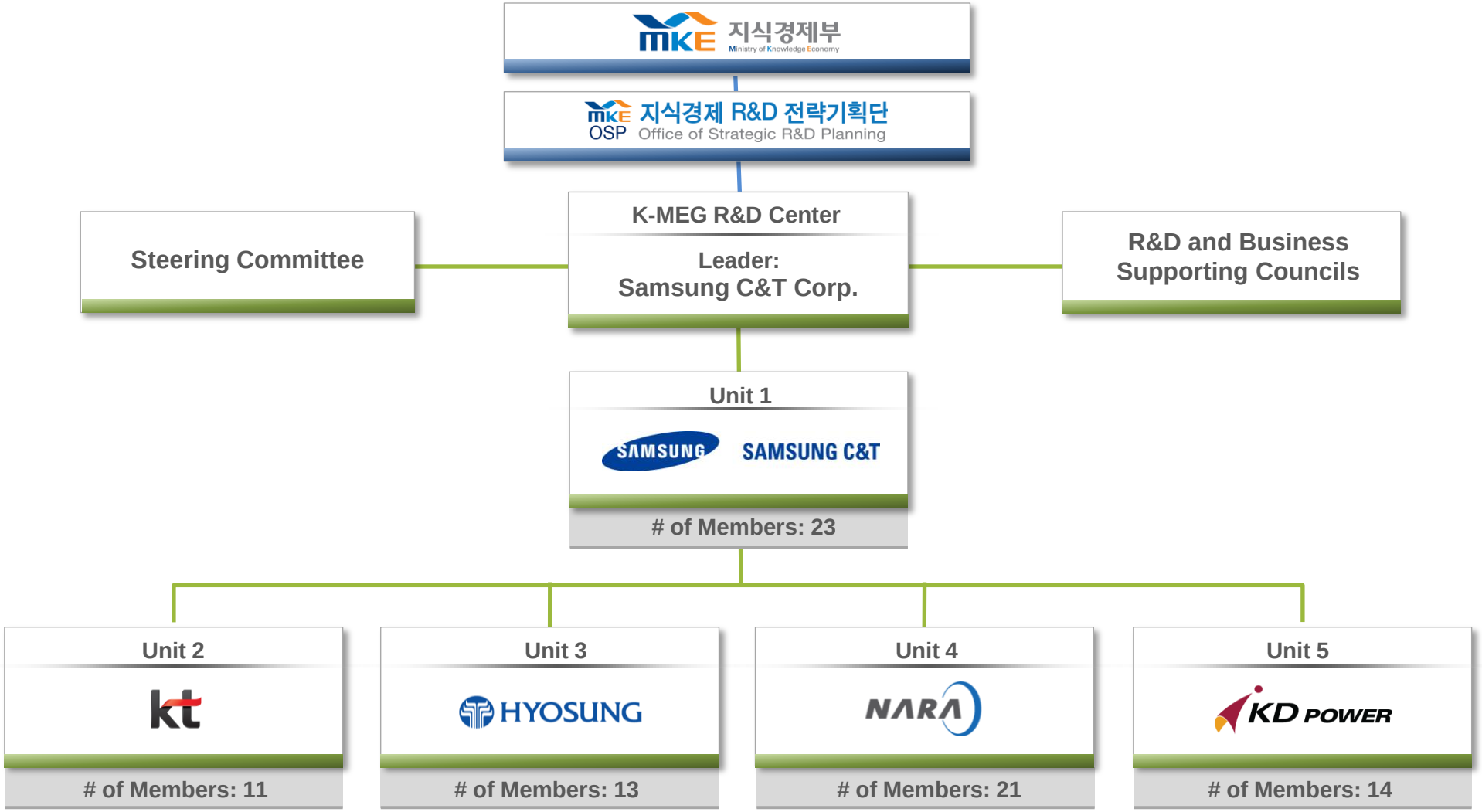
Kdn 한전KDN

- '부천 EMS 실증단지 운영

SAMSUNG 삼성에버랜드

- 반월/시화 지역에너지그리드 실증단지 운영
- 국내 최고의 ESCO사

Organization Chart



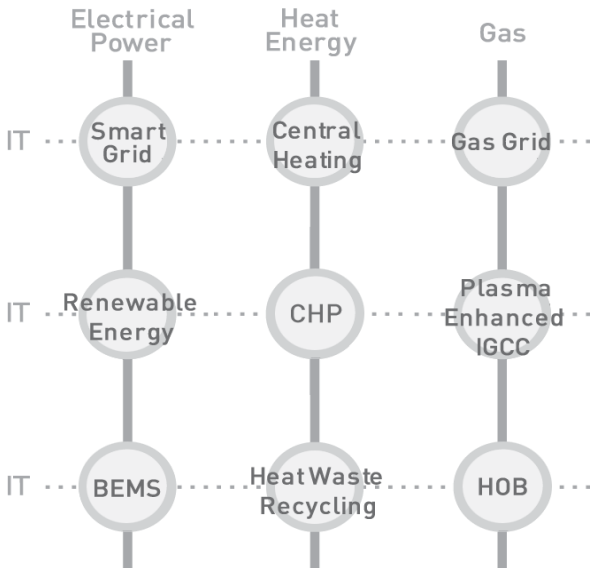
Unit Projects

Unit Project 1	K-MEG Feasibility Test & Business Development
Unit Project 2	K-MEG Energy Total Operation & Management System
Unit Project 3	K-MEG Energy Grid Implementation
Unit Project 4	K-MEG Optimal Energy Management System
Unit Project 5	K-MEG Open-ended Test Bed Established by DC Distribution Grid

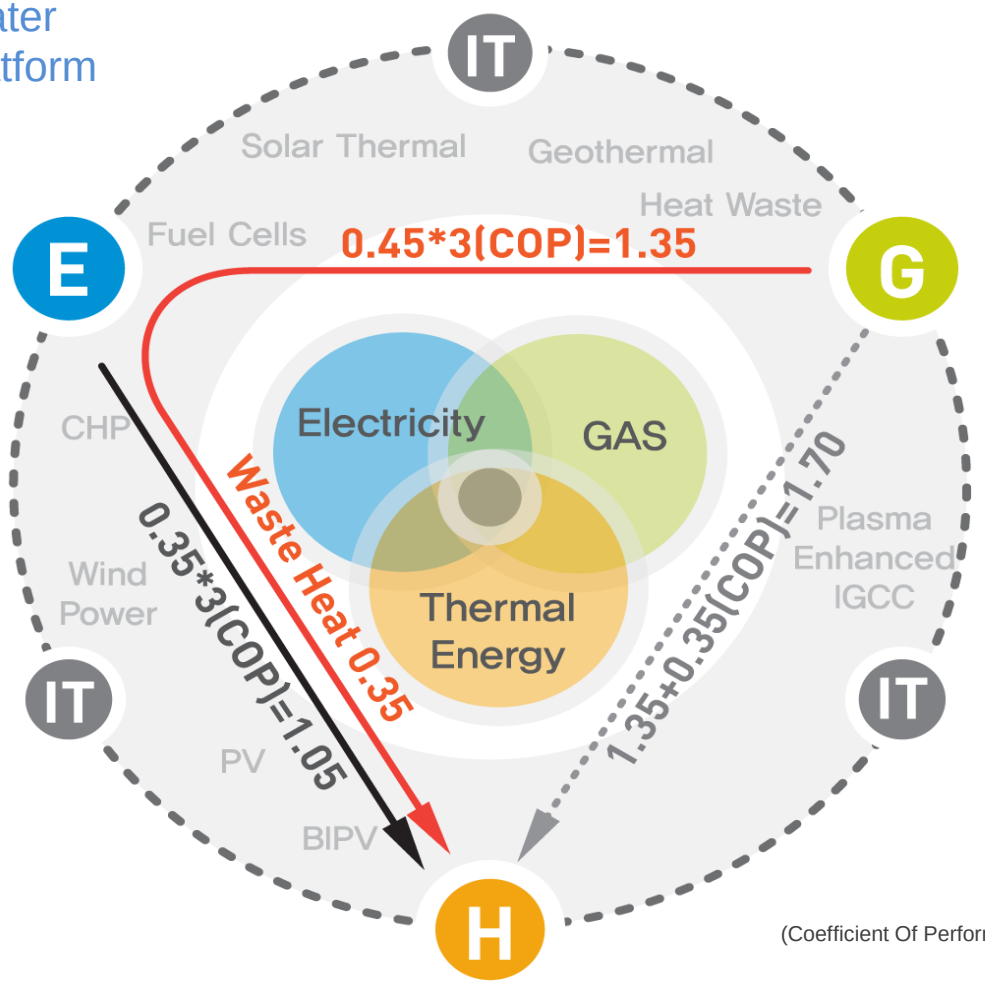
K-MEG Concept

Macro Grid to Micro Grid

Integration of Electric Power, Heat, Gas and Water
w/ an IT Infrastructure on the K-MEG Smart Platform



Integration



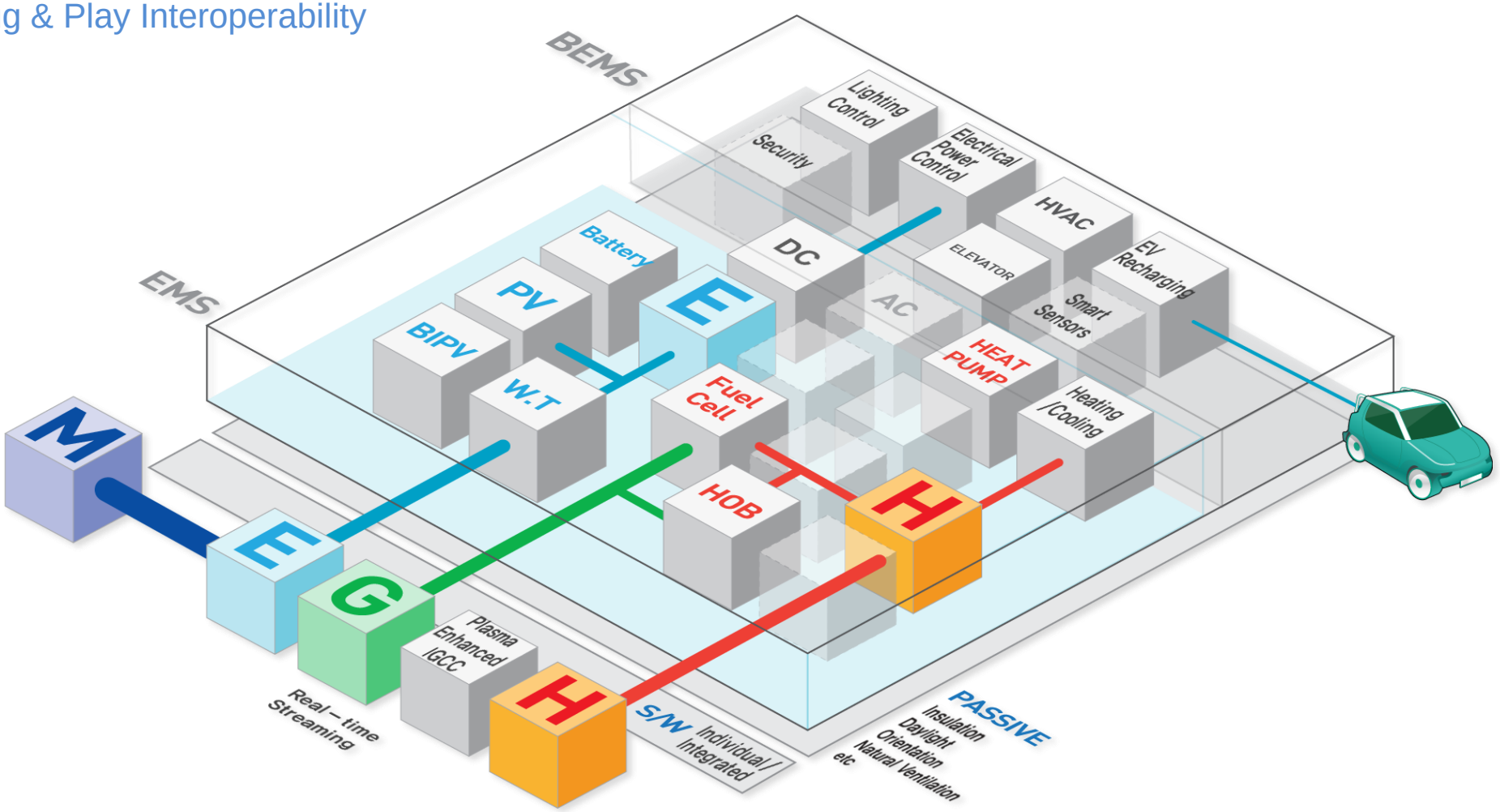
COP
(Coefficient Of Performance)

Independent MACRO Grid

Integrated MICRO Grid

K-MEG System Overall Palette: Energy Block Platform

Plug & Play Interoperability



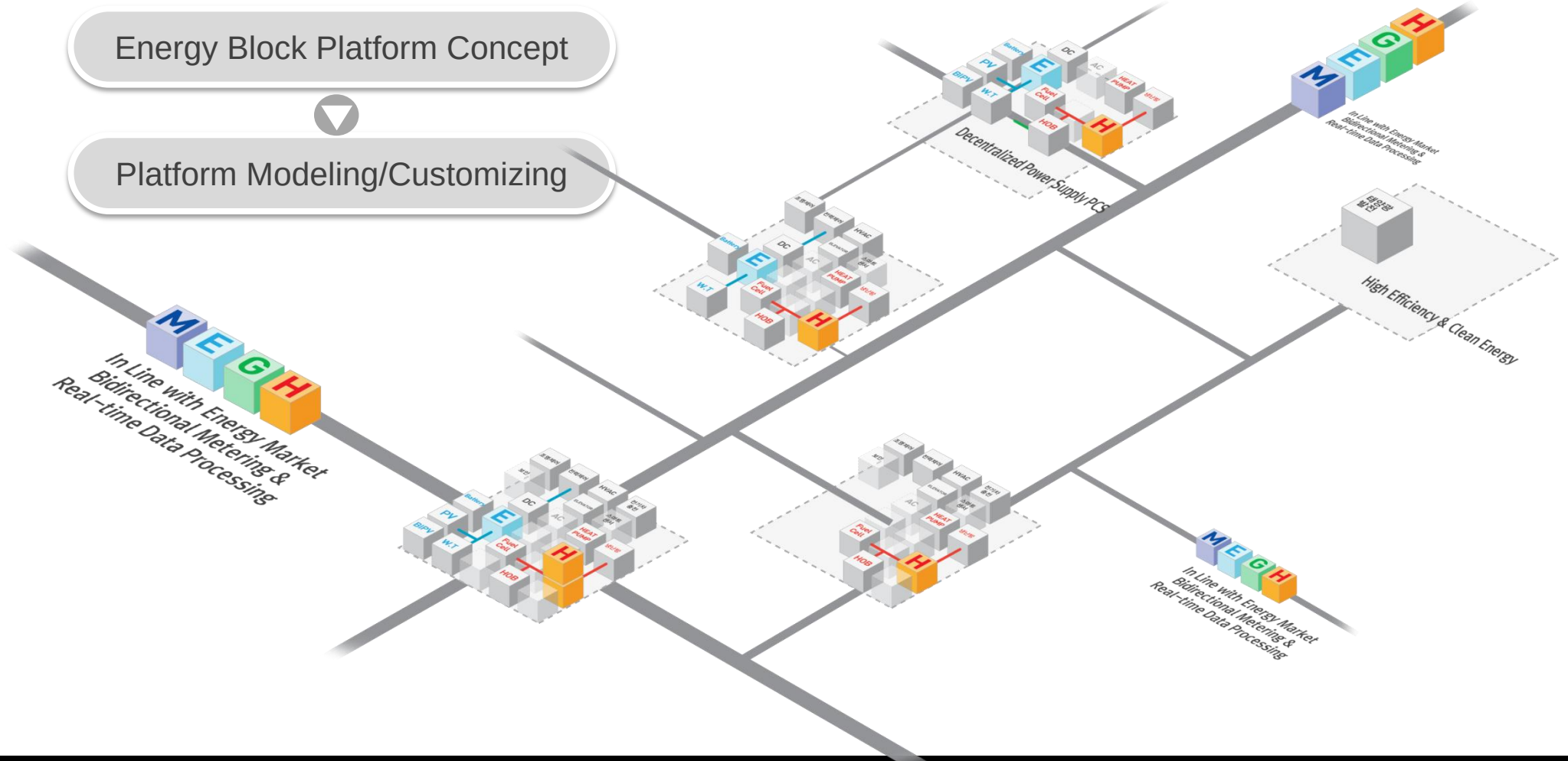
Custom Modeling _ Various Energy Block Platforms

Custom Modeling of Energy Supply/Consumption Systems
Based on Energy Block Platform Concept Interlaced with IT Infrastructure

Energy Block Platform Concept

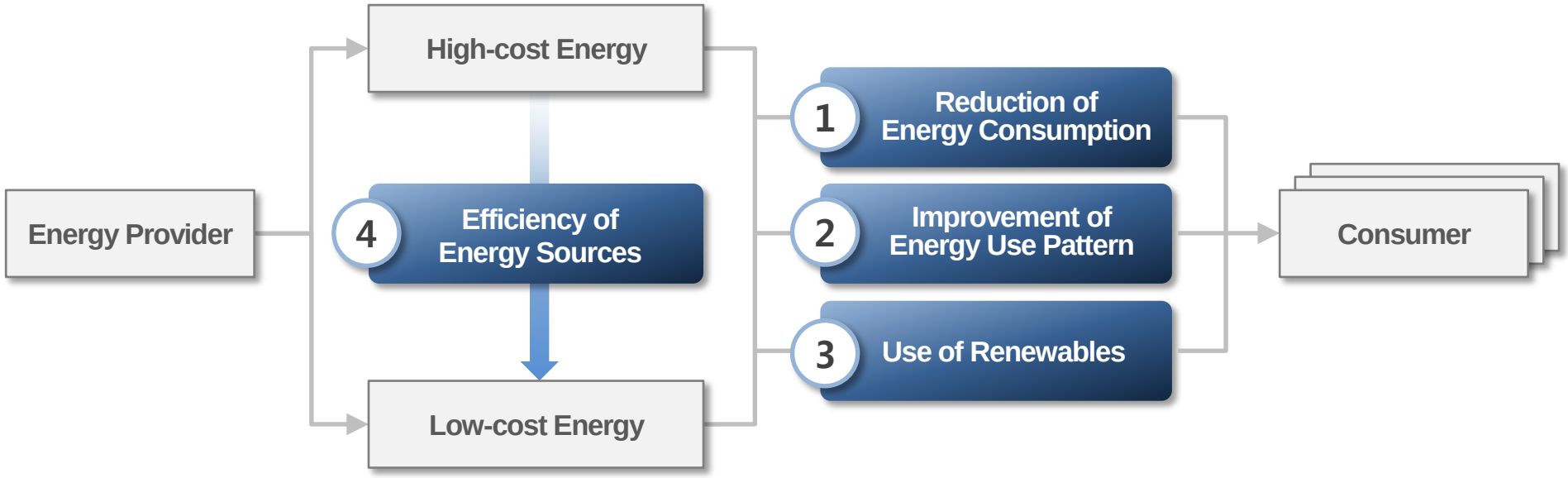
▼

Platform Modeling/Customizing

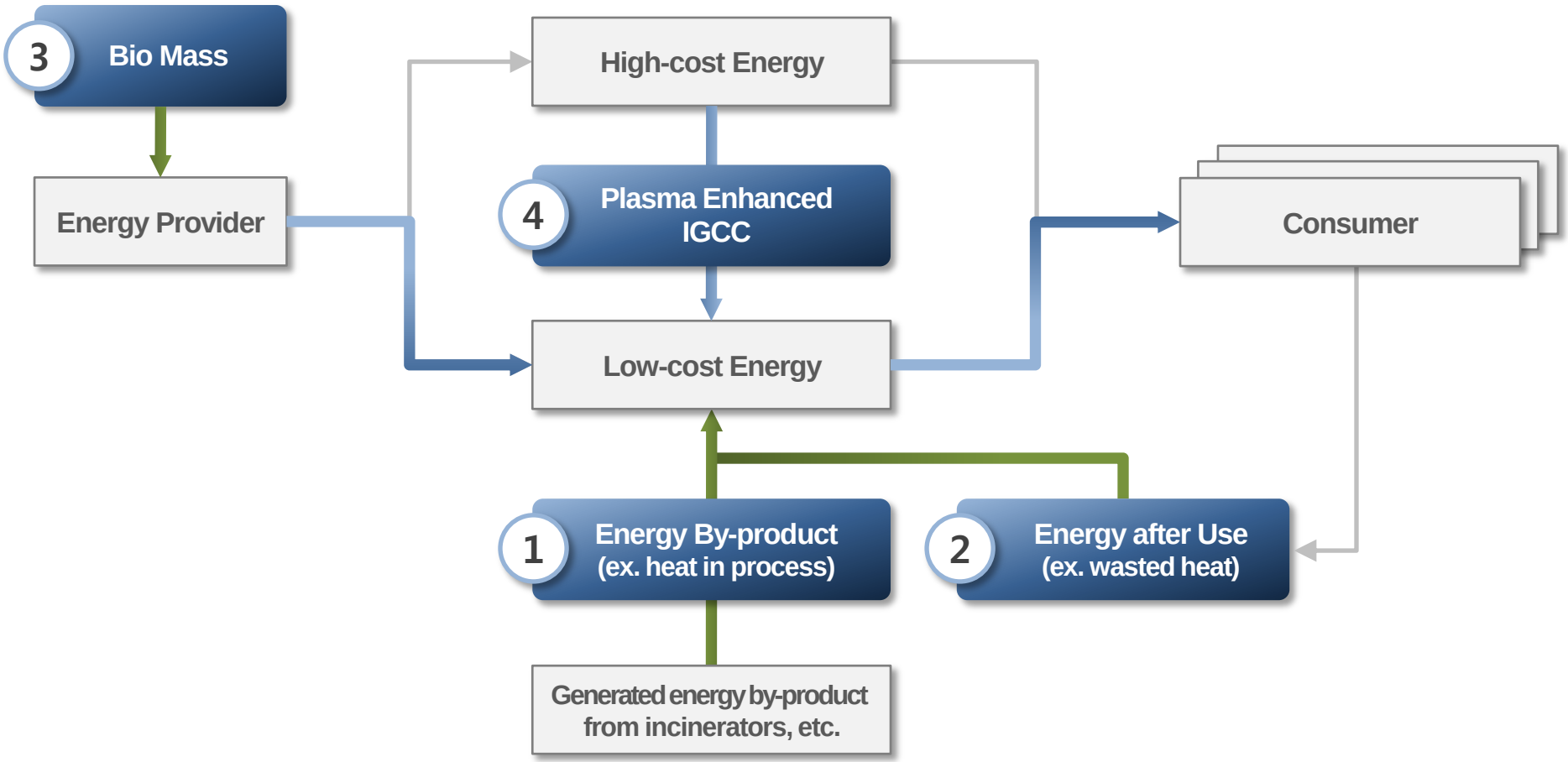


Biz Modeling

Biz Points _ Demand Side



Biz Points _ Supply Side

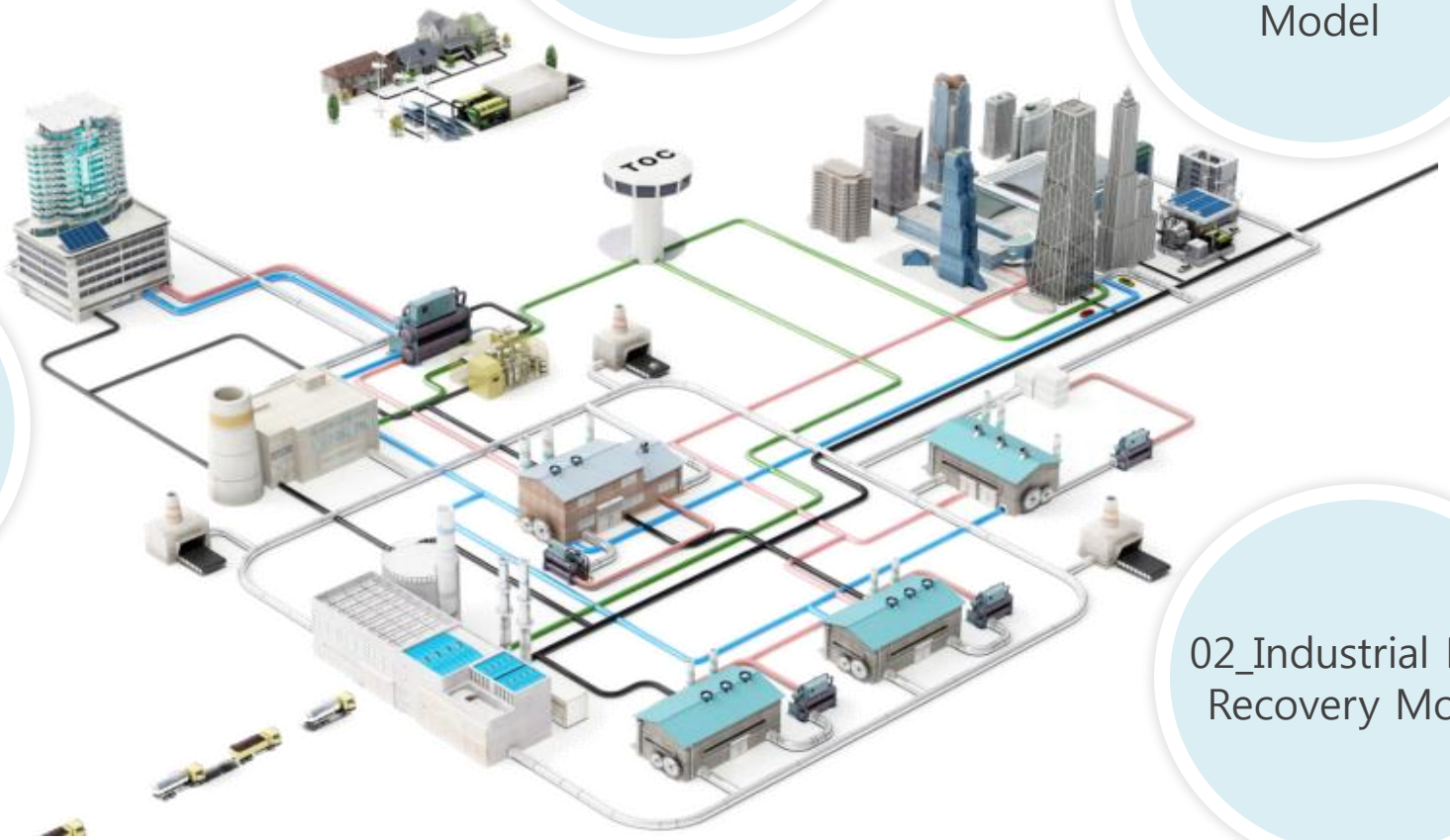


Biz Models

Energy Efficient Biz Models

03_Energy Independent Off Grid Model

01_Building Energy Efficiency Model



04_Mixed-use Energy Saving Model

02_Industrial Heat Recovery Model

Strategies

Approach


Technology Convergence
G2G
Nation's Top Small Business
Investment & Funding

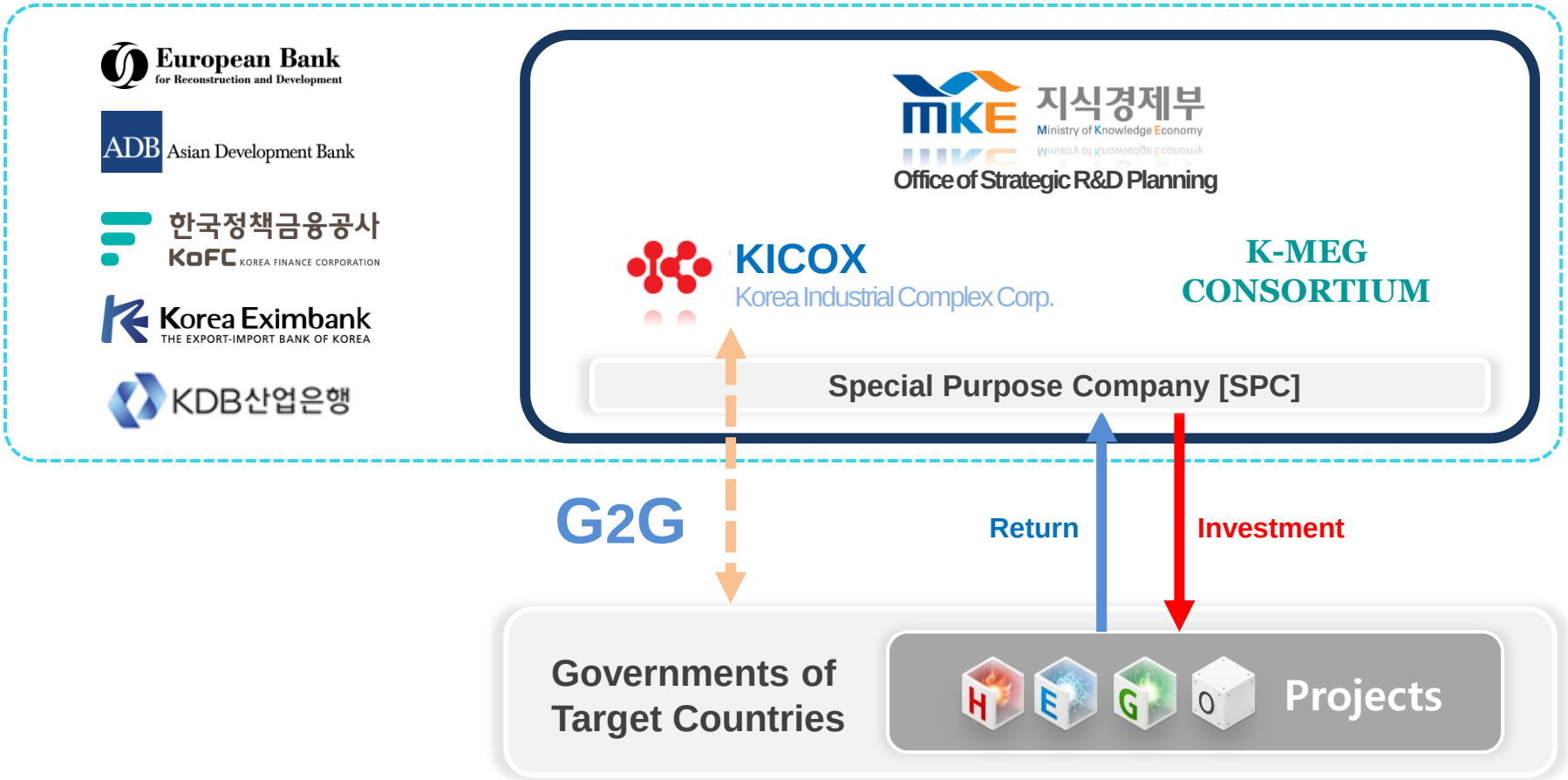
First Global References

Diverse K-MEG Solution Packages

Global Validation

Biz Models	Domestic Demo Sites	Overseas Demo Sites
1_Building Energy Efficiency	· G-Valley · COEX · Seoul Nat'l University	· AIG Tower, NY, USA · CITRIS HQ, CA, USA · VTT Tech. Research Ctr., Finland · Aalto Univ. Library, Finland · St. Petersburg State Univ., Russia
2_Industrial Heat Recovery	· Banwol/Shihwa Industrial Complex	
3_Mixed-use Energy Saving	· Bucheon Mixed-use	
4_Off Grid Energy Independent	· Gunjang Industrial Complex - PE-IGCC Plant	· PE-IGCC Plant, India · Solar Power Plant, Indonesia · Wind Power Plant, Australia

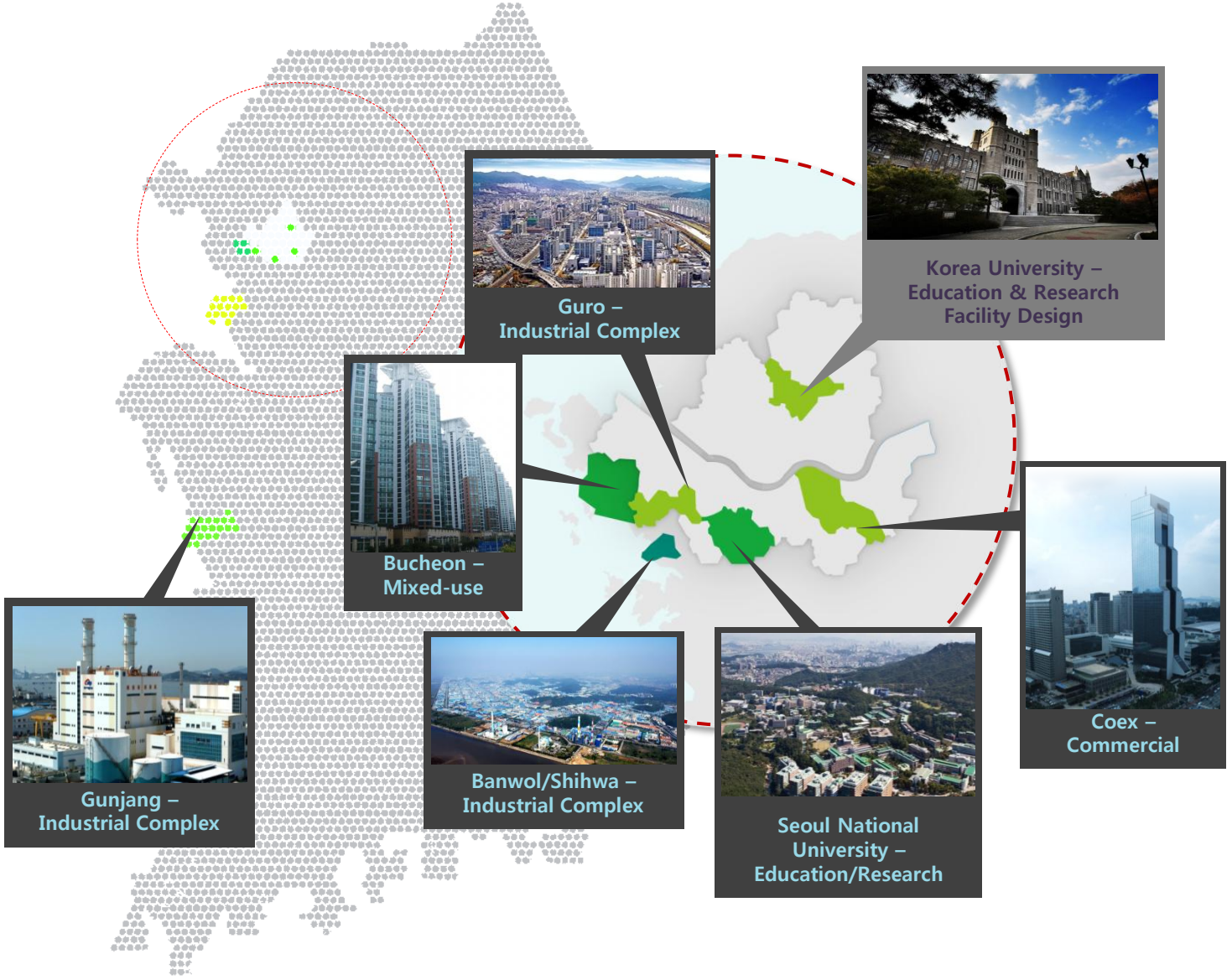
Global Business & Financing Plan



* 유럽부흥개발은행 [European Bank for Reconstruction and Development]
* 아시아개발은행 [ADB ; Asian Development Bank]
* 한국수출입은행[the Export-Import Bank of Korea]
* SPC [Special Purpose Company]

Demonstration Plan

Demo Sites in Korea



Overseas Demo Sites

Finland
Education & Research

Russia
Education/Research

USA
Commercial

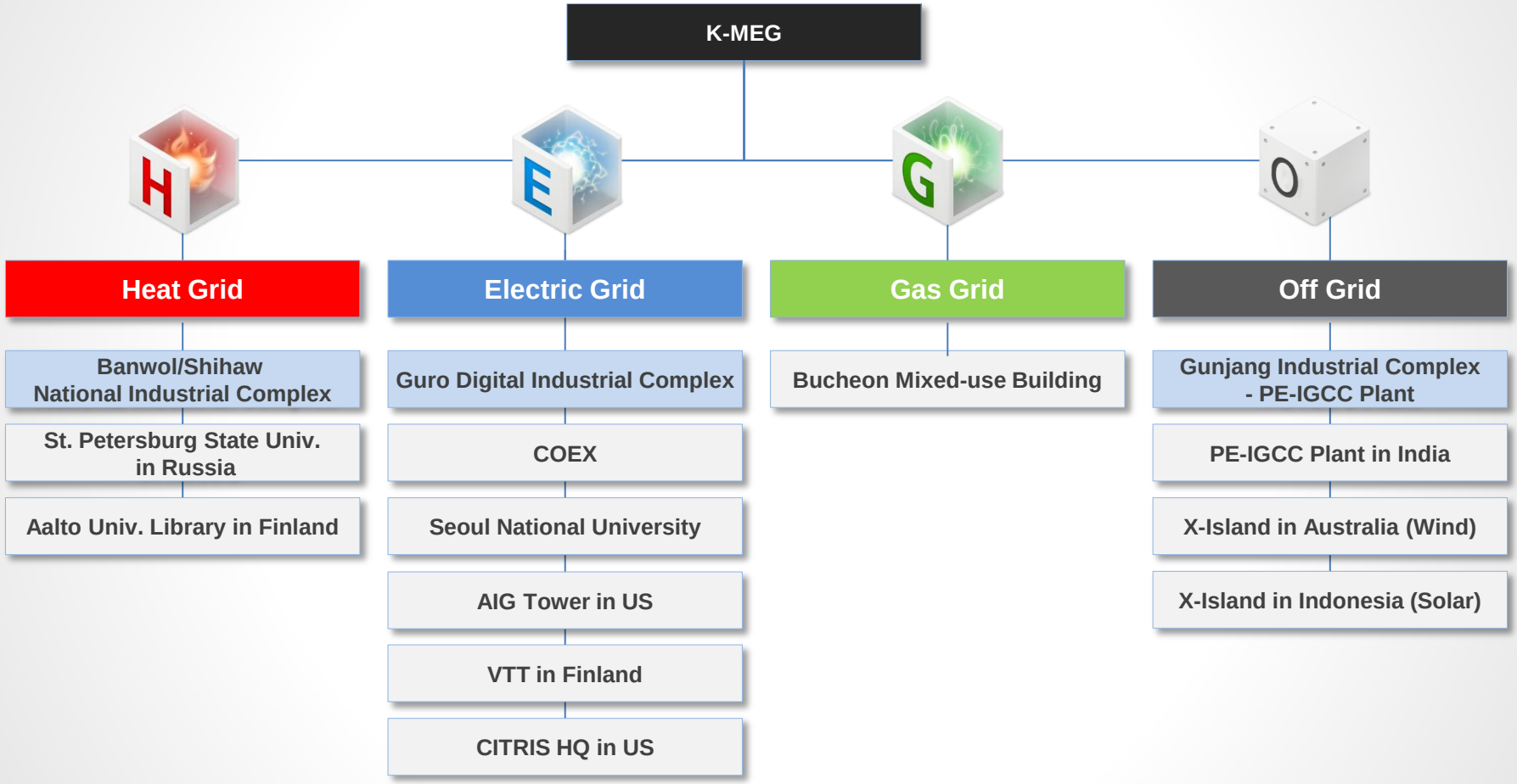
India – Energy
Independence

Indonesia – Energy
Independence

Australia – Energy
Independence

USA
Education/Research

Demo Plan by K-MEG Smart Grids



Banwol/Shihwa Nat'l Industrial Complex
Korea

"The Biggest Industrial Complex in Capital Region Using Variety of Energy Sources"

Location: Gyeonggi-Do Ansan-Si Danwon-Gu, Wonsi-Dong / Siheung-Si, Junwond-Dong | **Use: Banwal (5,099 companies) Shihwa (8,389 Companies)**
Size: Banwal (15,374,000m2), Shihwa (16,568,000m2) | Completed: Banwal(1987), Shihwa(2006)

St. Petersburg State Univ.
Russia

“Russia’s Cultural Assets built in 1789”

Location St. Petersburg, Russia | **Use** Lecture Hall, Research Facility | Completed 1789
Size Below ground 1, Above ground 4 (GFA : 31,800 m2)

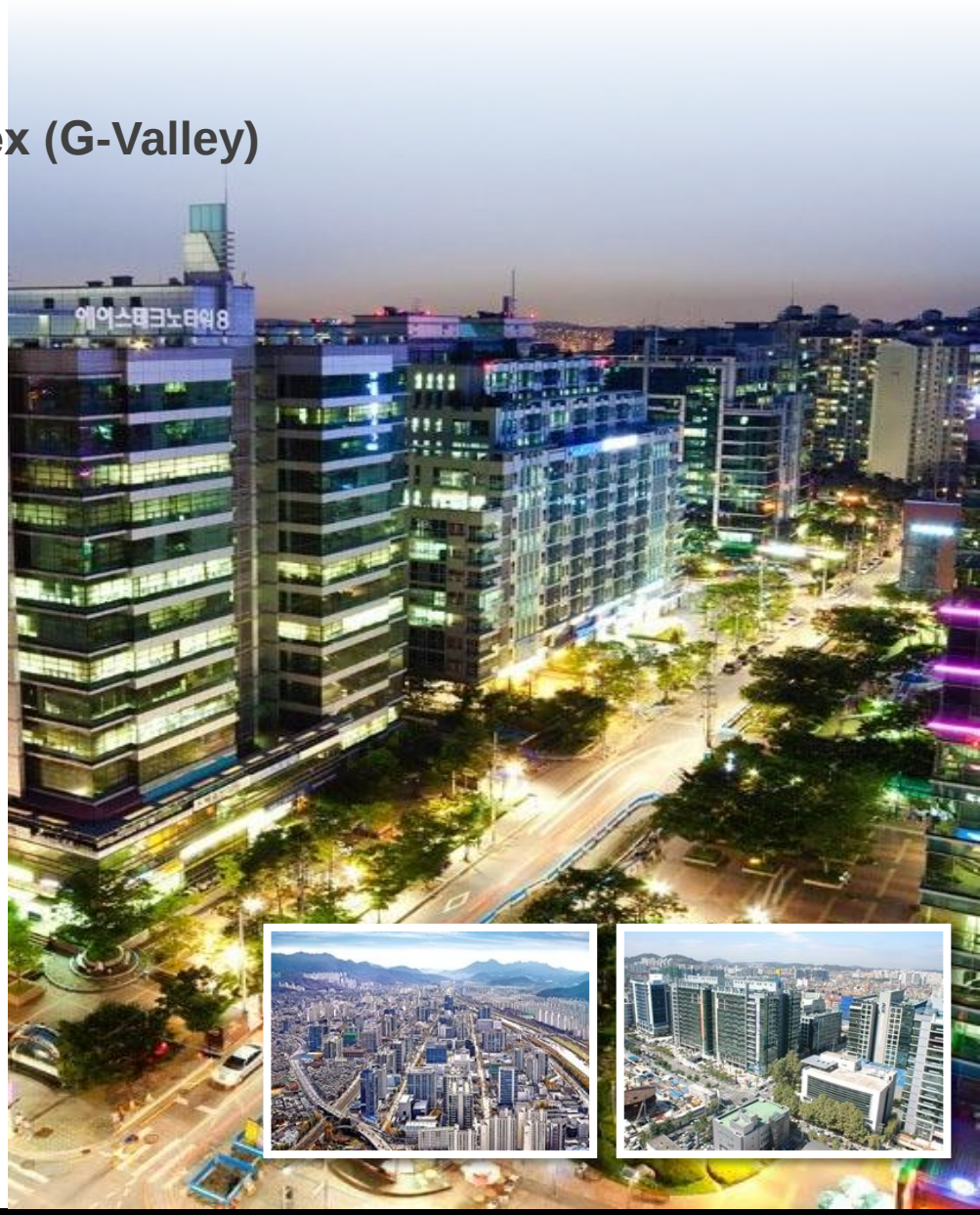
Aalto University Library
Finland

“Representative of Finland’s Famous Architect, Alvar Aalto’s Work”

Location Espoo, Finland | **Use Library, Education/Research** | Completed 1969
Size 5-story (GFA : 9,864 m2)

Guro Digital Nat'l Industrial Complex (G-Valley)
Korea

Toward World First Micro Grid Industrial Complex



"The World Largest Building-type Manufacturing Complex"

Location Guro-Dong, Guro-Gu, Seoul, Korea | **Use** Manufacturers, Offices (4,221)
Size Site Area : 452,647㎡ 32 Buildings 4,100 Companies | **Completed** 1974

COEX Complex
Korea

- Convention & Exhibition Center (COEX)
- Office Building
- Retails

**"Korea's Biggest Mixed-use Complex,
the Hub of
Global Business in Asia,
which held G20"**

Location Samsung-Dong, Gangnam-Gu, Seoul | **Use** Commercial Buildings
Size GFA 1,217,970 m*m (368,436 PY), COEX Area 213,691PY (approx 58%) | **Completed** 1964

Seoul National University
Korea

"The Biggest Energy Consumer per Unit Area among State-run Building Properties in Korea"

Location 56-1 Shinrim-Dong, Kwonak-Gu, Seoul | **Use** Lecture and Research Facility | **Completed** 1974
Size : B1 ~ 4F, GFA 7,500㎡

AIG Tower
NY, United States

"Historical Landmark Building Built in 1932 in Manhattan, NY"

Location 70 Pine Street, New York, NY. US | **Use Office** | **Completed** 1932
Size 66 Floors (GFA 102,193 m^2)

VTT Tech. Research Center
Finland

"The Biggest Non-profit Research Institute in Northern Europe"

Location Espoo, Finland | **Use** Research and Office
Size 12 buildings with 3~4 floors | **Completed** 1970

CITRIS HQ
CA, United States

“The Institute in California Running a Test Bed to Implement ‘Building-to-Grid’ Technology”

Location Berkeley, CA, US | **Use** Office, Research | **Completed** 2009
Size Sutardja Dai Hall GFA : 13,100 m2

Bucheon Joong-Dong Mixed-use Complex
Korea

"Concurrent Validation of a Biz Model w/ Residential & Commercial Units"

Location Jung-Dong, Wonmi-Gu, Bucheon-Si, Gyeonggi-Do | **Use** Commercial / Residential |
Completed 2006 **Size** 225 Units (1~3 Floors Commercial, 4~14 Residential)

Gunjang Nat'l Industrial Complex
Korea

"Off-Grid Model to Validate at the Industrial Complex w/ a Combined Heat & Power Plant in Operation"

Location 53-8 Soryong-Dong Gunsan-Si, Jeonrahbuk-Do | **Use** Plant | **Completed** 2012
Size 2MW PE-IGCC (Plasma Enhanced Integrated Gasification Combined Cycle)

PE-IGCC Plant
India

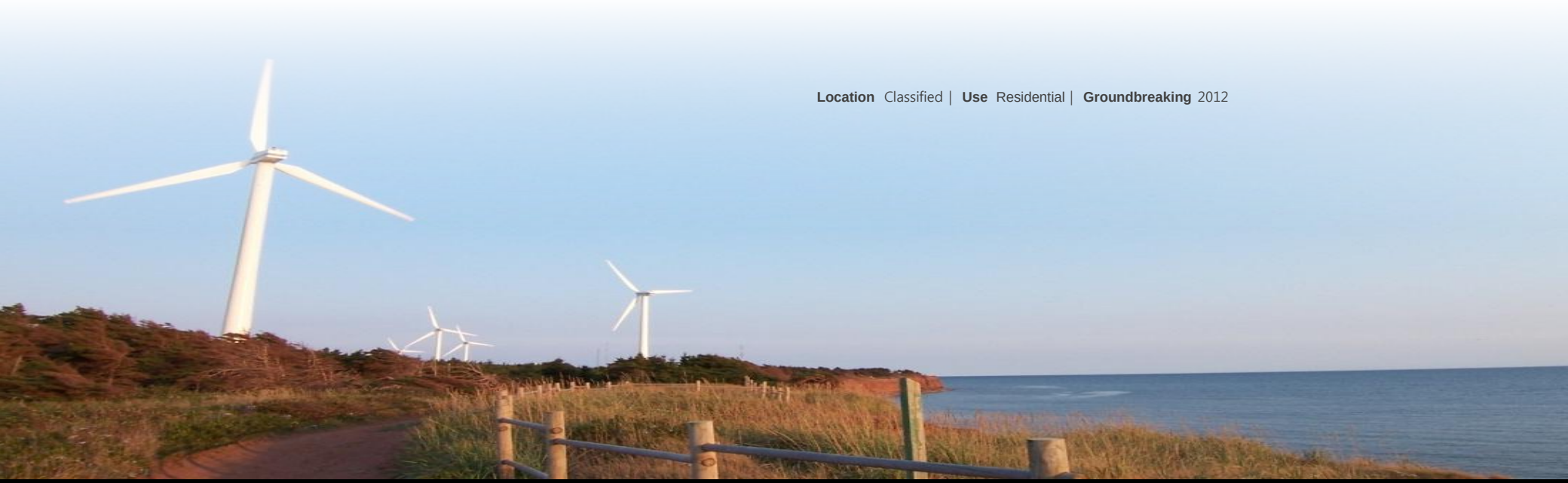
Plasma Enhanced-IGCC can be the solution for power shortage in India.

"More than 100,000 Towns with no Power become our New Market"

Location TBD | **USe** Plant | **Size** 20ton/day, 2MW | **Groundbreaking** 2012

Island Off-Grid
Australia

"Australia's Standard Off-Grid Model, Potentially for its 8,000 Islands"

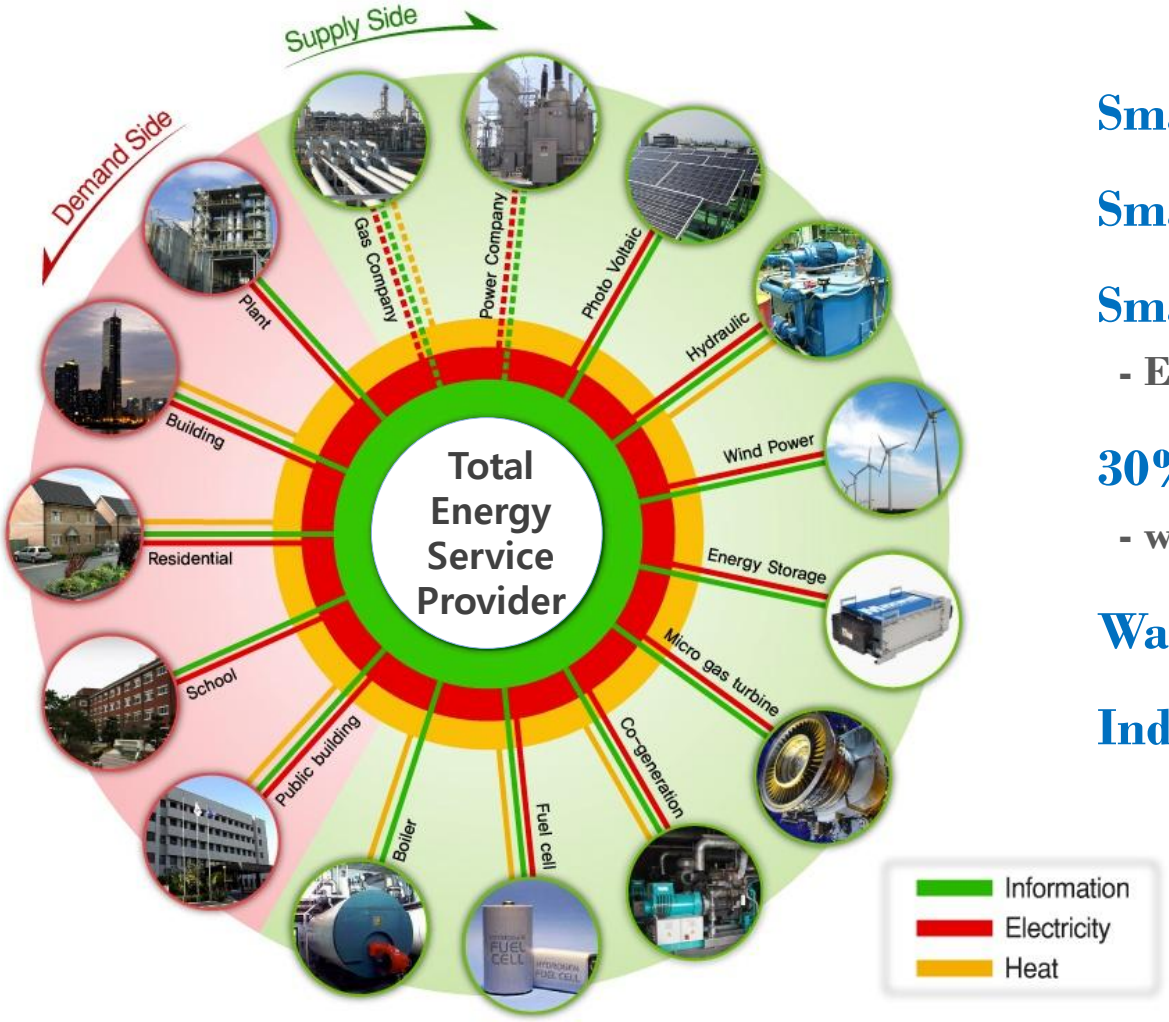


Location Classified | **Use** Residential | **Groundbreaking** 2012

Island Off-Grid
Indonesia

“Indonesia’s Typical Off-Grid Model, Potentially for its 13,700 Islands”

Business Vision



Smart Platform

Smart Energy Grids

Smart Cities

- Easy to Adopt during Urban Planning

30% Building Energy Saving

- w/ Active Systems

Waste Energy (Heat) Recovery

Independent Energy Supply


Global Top
Korea Micro Energy Grid
K-MEG
CONSORTIUM