SMART City - Clean Energy

“สนุกคิด บิดเมืองให้สมาร์ท”
เพื่อเมืองอัจฉริยะที่ยั่งยืน

Energy Policy
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TGBI

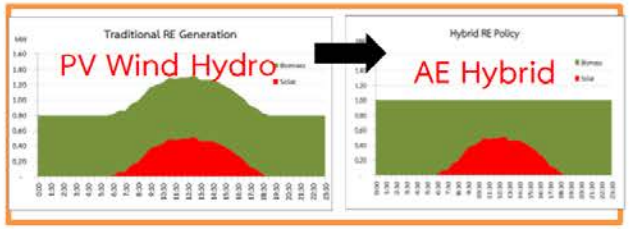
Thailand Integrated Energy Blueprint (TIEB)

TIEB
THAILAND INTEGRATED ENERGY BLUEPRINT

- **PDP** POWER DEVELOPMENT PLAN
- **EEP** ENERGY EFFICIENCY PLAN
- **AEDP** ALTERNATIVE ENERGY DEVELOPMENT PLAN
- **GAS** GAS PLAN
- **OIL** OIL PLAN

ENERGY 4.0

1. **EV** — Electric Vehicle
2. **ESS** — Energy Storage
3. **SPP** — SPP Hybrid Firm
4. **SC** — Smart City - Smart Grid



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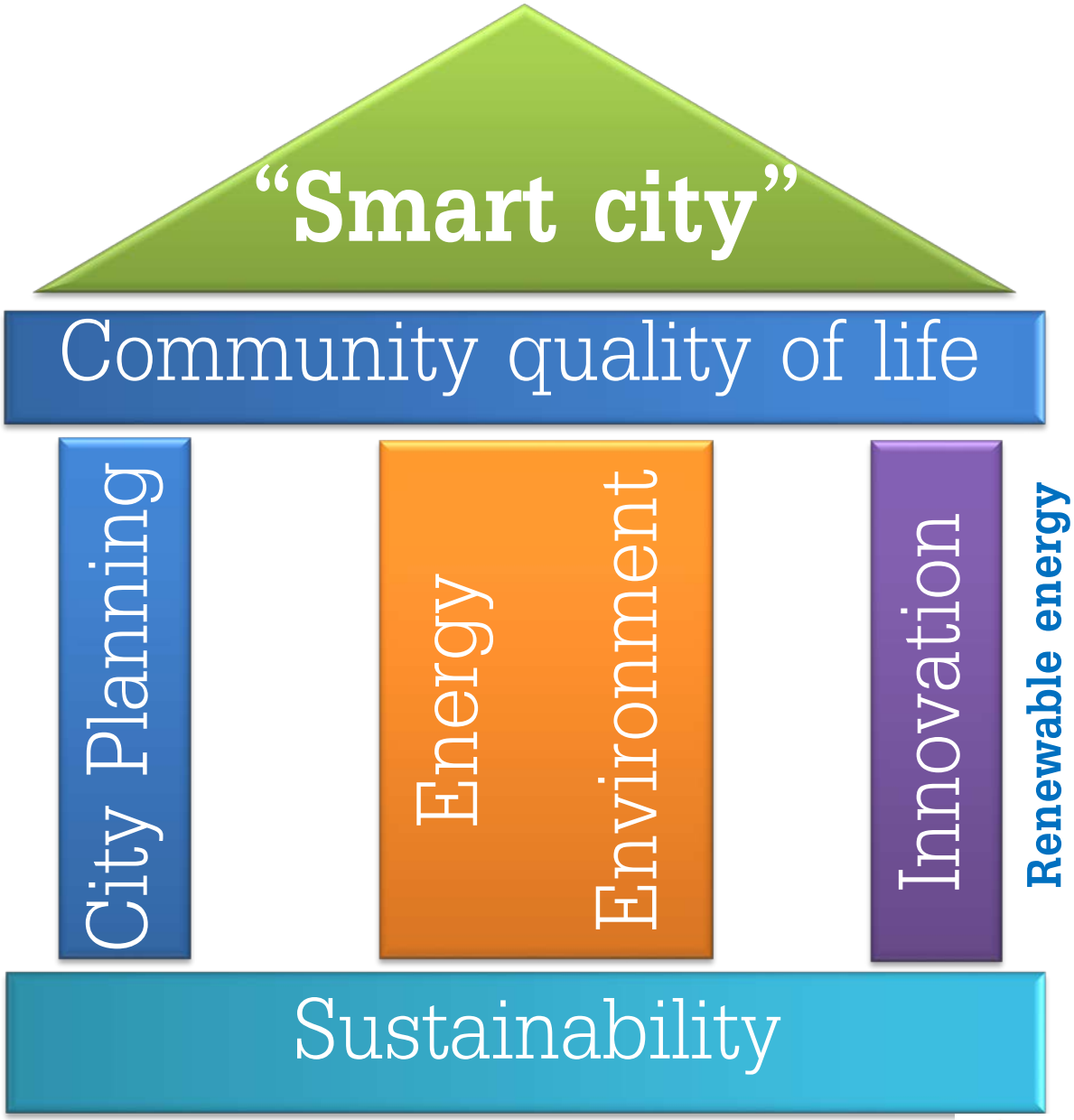

Smart Cities Clean Energy

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“สนุกคิด บิดเมืองให้สมาร์ท”
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Mind shift

“Smart city” becomes reality through business model that satisfy investor, developer, community, quality of life and ecology in well balance

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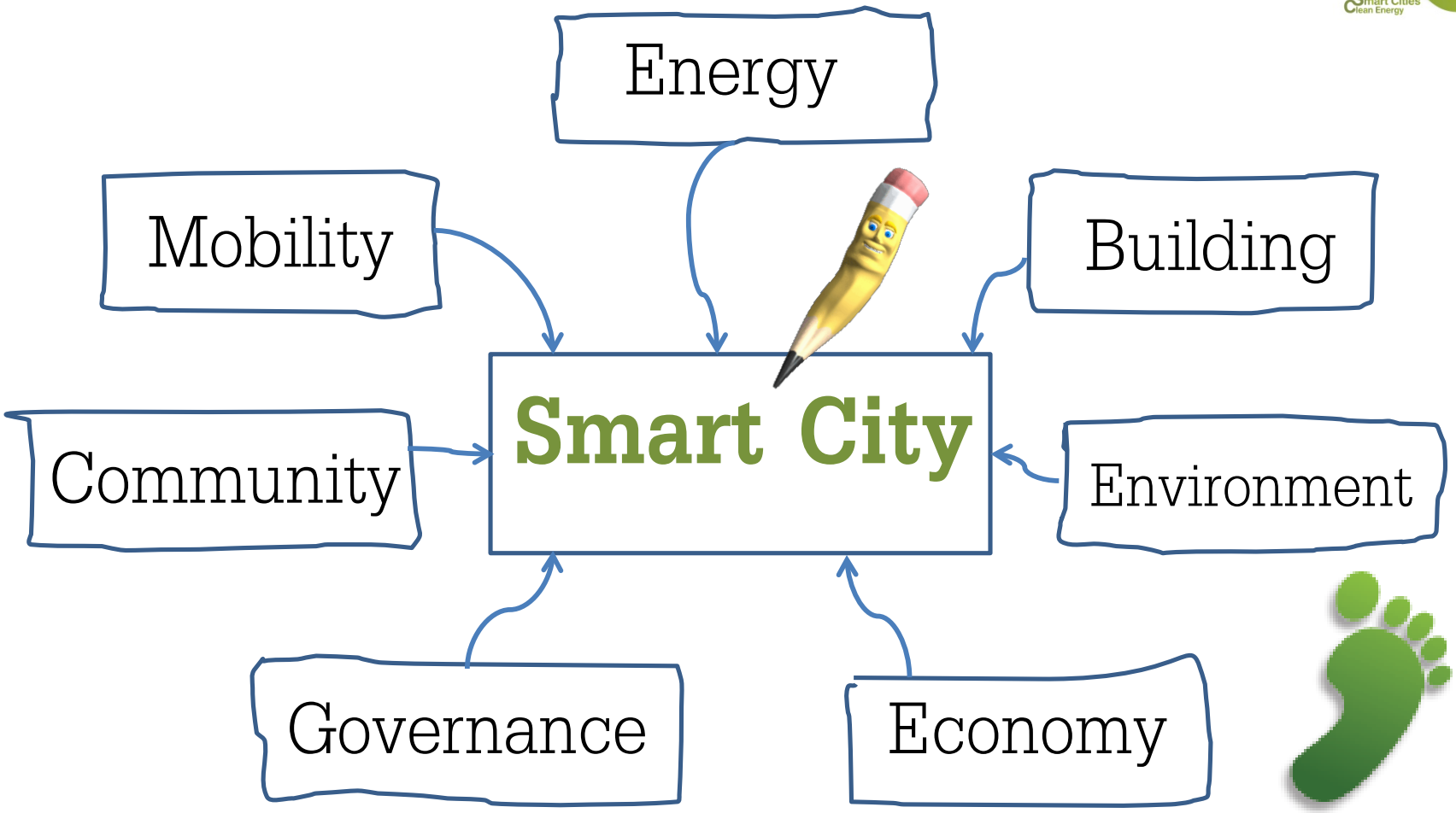

"Smart city" represents further dimension toward sustainable development by green value chain of city planning integration base on smart technology infrastructure. It is a new solution of city development and changes for self-sufficiency.

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Smart City Design Award

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Thai Green Building Institute
สถาบันอาคารเขียวไทย

80 MB Awards

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City Characteristic Criteria

- Joint organization of stake holders
- Land ownership
- Compliances with city planning regulation

Requirement	Micro city	City
Usable area	1 – 5 x100,000 m^2	> 5 x100,000 m^2
Demand (BAU)	3-8 MW	> 8 MW
Population	5,000 – 15,000	> 15,000

Smart Cities-Clean Energy Project

Objective

To support Local Administratives, Private Developers, Government Agencies, State Enterprises, Universities in creative development of Smart City

November 2016 — **Top 20** — **March 2017** — **Top 7**

Proposal → Contest Stage 1 → Contest Stage 2 → Contest Stage 3

Proposal Devlopment

- Clean Energy
- Green City
- Complex e.g. community, residential complex, government complex, school, hospital

Financial support for 20 cities @ 500,000 THB = 10,000,000 THB

Master Plan

- Land use plan, etc.
- Support data on energy demand & supply, energy management, landscape architecture design and related system development design

Financial support for schematic design and financial study max. of 10,000,000 THB/city for 7 cities = 70,000,000 THB

August 2017

Business Model

Achievement Recognition

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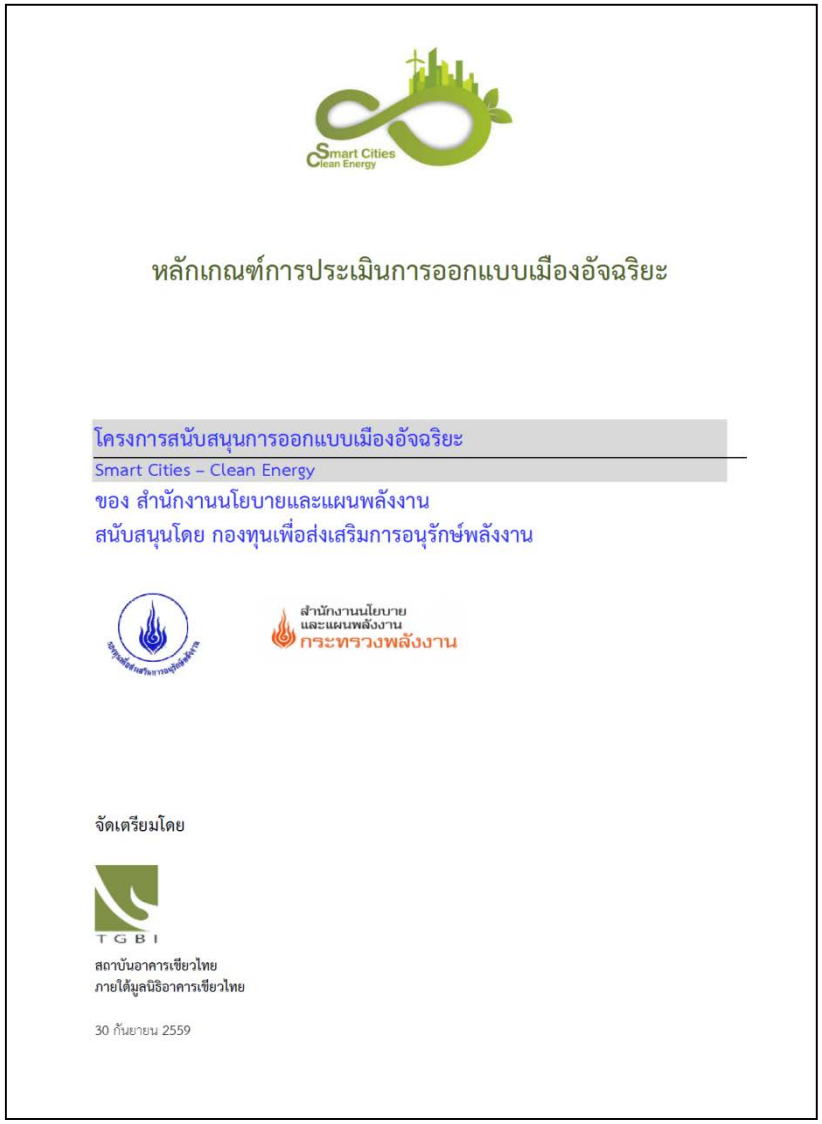
SMART City Criteria

1. SMART **Energy**
2. SMART **Mobility**
3. SMART **Community**
4. SMART **Environment**
5. SMART **Economy**
6. SMART **Building**
7. SMART **Governance**
8. SMART **Innovation**



หลักเกณฑ์การประเมินการออกแบบเมืองอัจฉริยะ

โครงการสนับสนุนการออกแบบเมืองอัจฉริยะ
Smart Cities – Clean Energy
ของ สำนักงานนโยบายและแผนพลังงาน
สนับสนุนโดย กองทุนเพื่อส่งเสริมการอนุรักษ์พลังงาน

สำนักงานนโยบาย
และแผนพลังงาน
กระทรวงพลังงาน

จัดเตรียมโดย

TGBI
สถาบันอาคารเขียวไทย
ภายใต้มูลนิธิอาคารเขียวไทย

30 กันยายน 2559

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SMART City Criteria

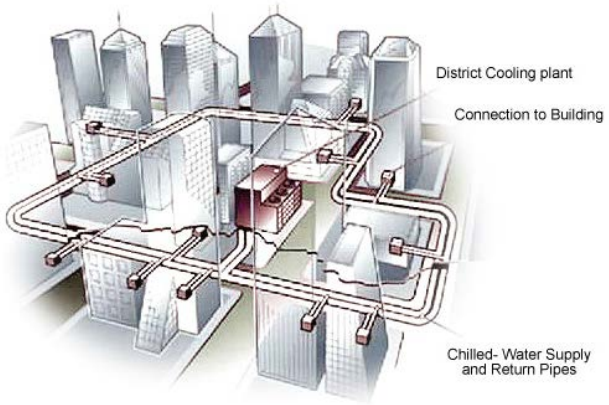
1. SMART Energy

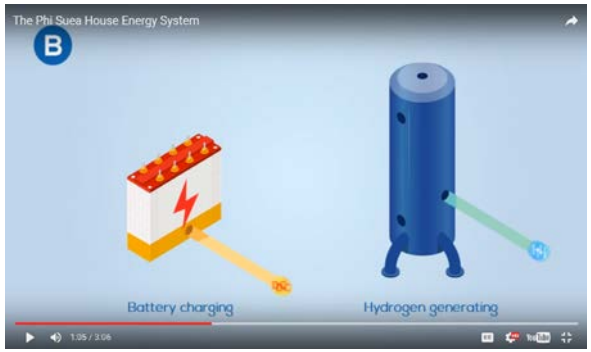
1.1 Energy Generation
- 30% from Renewable Energy
- Onsite power generation
- Energy Storage

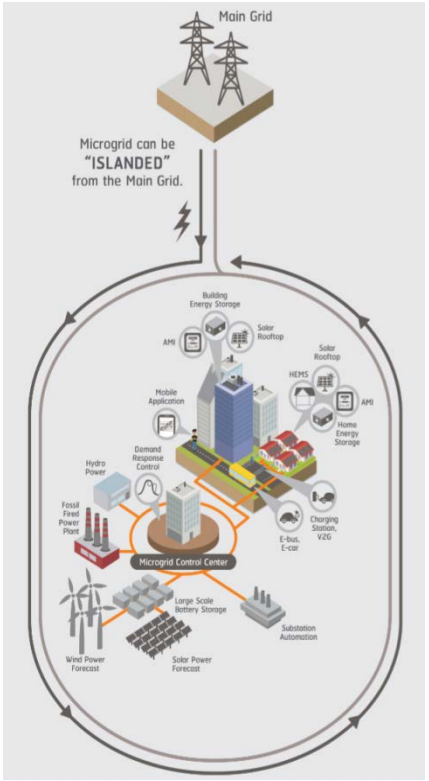
1.2 Energy Distribution
- District Cooling/Heating
- Eco-Vehicle (EV,PHEV,FCV,HV)

1.3 Green House Gas Reduction
- 30 % CO_2 Reduction

1.4 SMART Grid
- Area Energy Management System
- SMART Meters (AMI)
- Micro Grid
- Distribution Management System







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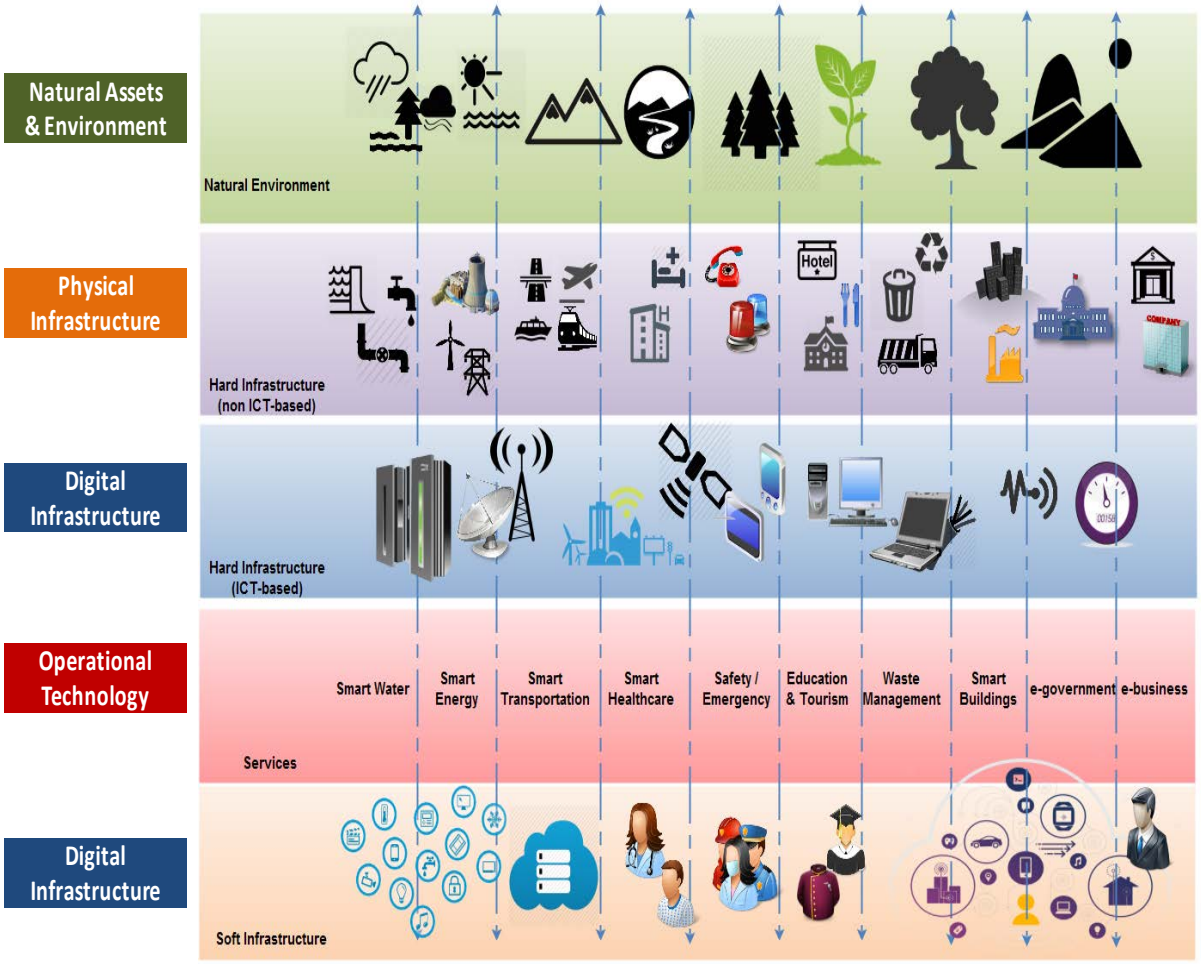
SMART City Criteria



2. SMART Mobility

2.1 Physical Infrastructure
- Infrastructure
- Vehicle Network
- Pedestrian and bicycle network
- Waste transport logistic

2.2 Digital Infrastructure
- Information accessibility
- Telecommunication

2.3 Operation Technologies
- Traffic Management
- Security & Safety Management

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SMART City Criteria

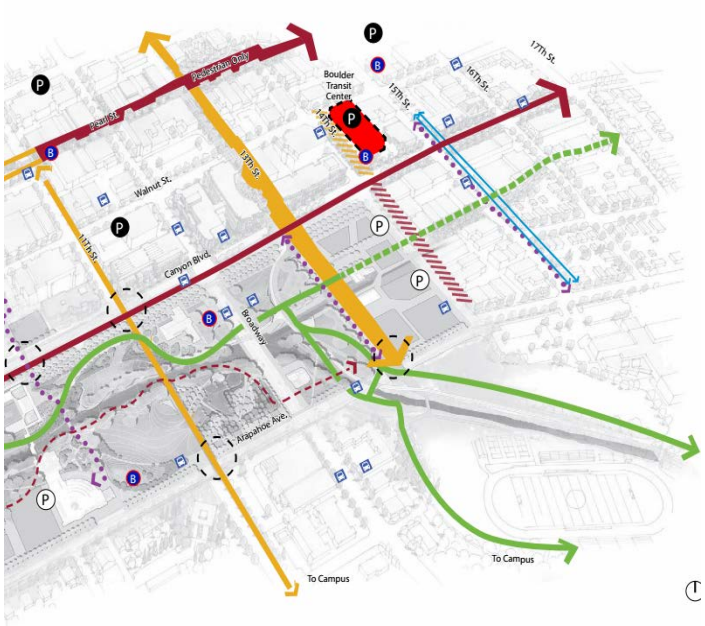
3. SMART Community

3.1 Social Inclusion and welfare
- Participation Channel
- Participation Campaign
- Universal Design
- Civic Area

3.2 Education
- Life long learning channel
- Learning Center

3.3 Security & Safety
- Physical Security & Safety Planning
- Disaster Management

3.4 Health
- Healthcare
- Well-being



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SMART City Criteria

4. SMART Environment

4.1 Natural Environment
- Preservation and Protection
- Natural Trail
- Sustainable Use of Natural Resources
- Reduction of garbage dump

4.2 Agricultural Environment
- Recovery of peri-urban area
- Zero km production
- Use organic fertilizer
- Industrial composting
- System of constructed wet land
- Food supply chain
- Monitoring of cultivated field
- Innovation system of production,

4.3 Urban Environment
- Waste Management
- Water Management
- Green Area, Public Open Space and Brown Field Site
- Urban parks, gardens, public spaces
- Preservation and Production of cultural heritage
- Efficiency and monitored sewage system
- Multifunctional and interactive urban furniture
- Reduction of pollution and urban heat island effect

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SMART City Criteria

5. SMART Economy

5.1 Sustainability
- Business Plan
  - Revenue Stream, Services incomes
  - Life Cycle Cost Analysis
- Proportion of land use
- Investment Model
  - Partnership Formation
  - Return on Investment
- Social Benefit

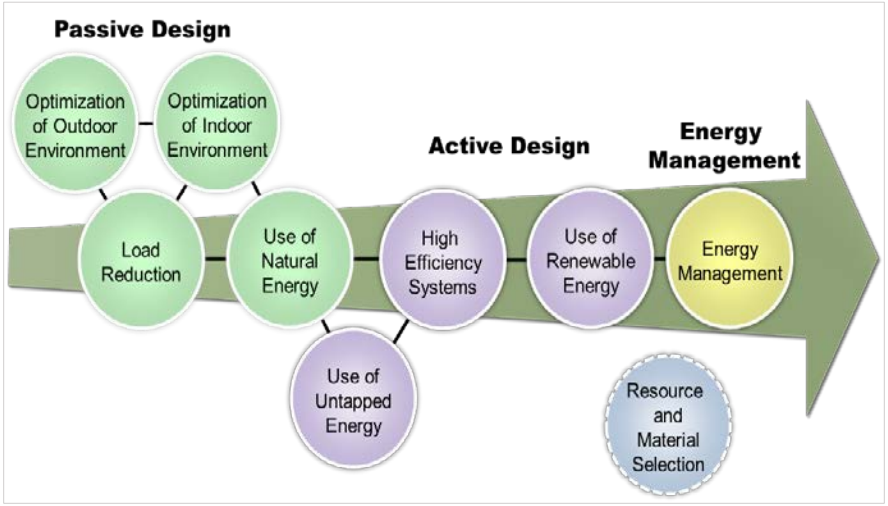
5.2 Innovation
- Enhance competitiveness of the city

5.3 Enhancement of the territory

6. SMART Building

6.1 Green Buildings Policy
- 100% Green Buildings Certified on TREES rating system

6.2 Net Zero Energy Buildings (NZEB)



NZEB

7. SMART Governance

- Leadership
- Specific strategies
- Dedicated organization
- Management process
- SMART City Principle
- Performance Measurement

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SMART Cities – Clean Energy Project

Final Stage : SMART City Business Model Development

No	Project Name
1	NIDA SMART COMPACT CITY
2	KHONKAEN SMART CITY (PHASE 1) : MOBILITY DRIVE CITY
3	NEW TOWN BAN CHANG SMART CITY
4	CMU Smart City-Clean Energy
5	WHIZDOM 101
6	Thammasat @ Rangsit : A Leading Model of Smart Campus
7	CU Smart city

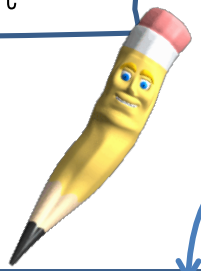
Honorable mention :

1. H.I.P Smart City
2. EGAT ECO PLUS

Advanced Public transport

Smart grid

On-site power generation



District heating and cooling system

Smart ideas

Solar energy

Waste management system

EV

Advanced metering infrastructure - AMI

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