



# NEW BANGKOK GOVERNMENT CENTER

**"A TURNING POINT OF  
MODERN OFFICE"**

***"A Model of Sustainable  
Development"***

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## NEW STANDARDS

Office tenant has been experienced many inconveniences in today office building, such as standby power supply, operation of air-conditioning system, working overtime, long waiting time at lift lobby during peak hour, Etc. The new Bangkok Government Center has been designed to cater for all the needs at lower cost. Special features include the followings:

- **10 MW Onsite power generation**
- **115 kV MEA dual feed electrical grid connection**
- **Onsite distributed electrical substations with emergency diesel generator sets**
- **Chiller plant by Combined Heat and Power generation (CHP), as well as gas fired absorption chillers and back up electric chillers**

- **Cooling Thermal Storage with building structure and chilled water tank**
- **"Geothermal Heat Sink"**
- **"24 Hr Air-conditioning"**
- **"Individual Control Air-conditioning with terminal air-conditioning unit"**
- **Flexibility for "Add On" air-conditioning unit**
- **Dedicated Indoor Air Quality control system**
- **Demand control ventilation system**
- **Fully automatic water sprinkler system for the whole building**
- **Addressible smoke detection system**
- **Fire smoke control system**
- **Extra high ceiling**
- **Modern office furniture**
- **Executive toilet**
- **"IP Phone and Next Generation Network"**
- **Choices of vertical transport with lifts, escalators and stairs, as well as separate VIP and service lifts**
- **Logical security access control management including CBR standard**
- **Handicap provision**
- **Drinking water, MATV, Master clock, Etc.**

*So far there is no other office building in Bangkok that is compatible to these new standards.*



modern office in town with superior energy efficiency and quality of life within a very tight budget. The project has been designed as “Sustainable Building” with advanced green engineering concept.

Total building area is approximately 917,500 sq.m, and almost 480,000 sq.m.of air-conditioning space. The project will be completed in 2008.

## ABSTRACT

In 2003, the Treasury Department, under the Ministry of Finance who is looking after the government land bank had plan to build government office building to house 28 government agencies. These government agencies were asking for budget to rent or to own office space and to cater for their future need. Instead, the treasury department have raised fund through securitization scheme, build the building and rent to the agencies for 30 years. The development will support the evolution of government management system through modern facilities, IT and co-operation.

Conventional government office is far low quality to private office, and partly air-conditioned due to controlled budget limit. It is the first government office project, where the targeted quality is equivalent to private office.

With combined effort of planner, architects, engineers, interior designer, landscape designer, specialist, the project has been designed to become the most

## INTRODUCTION

“*Innovation*” has been significant part of the design concept. “*Integration*” has been the design process.

The project will be one of the most modern and high quality office, a turning point of modern office. Even, the best private bank head office will be hardly compatible to the new government office, which has less than *half* of the construction budget.

The design is a proof that a good building does not necessarily to be more expensive or an energy efficiency building does not require additional investment.

With this budget, all facilities will be provided so that the office worker can just packed and *simply move in*. All office furniture will be provided, and even telephone hand set.

This paper will described in more detail on advanced engineering system, such as “Green Integrated Energy System (GIES)”, Dedicated External Environmental Control



System (DEECS)", "Chilled Water Storage Plus (CWS+)", which are the key to the engineering system.

## **TRUE SUSTAINABLE DESIGN INTEGRATION**

Dr. SoonThorn Boonyathikarn was the lead architect and was the one who initiated the design concept. Through design team meetings, the design team had come up with innovative ideas as design solutions. Highly qualified professionals had been gathered to craft the design to be distinctive and far beyond present standards. From day one, architects and engineer shared their view, and came up with design solution as "Sustainable Design". The revision of several individual towers to become main single building, the building nodes, the pond concept, the energy center and district cooling concept are among some of the topics during that day.

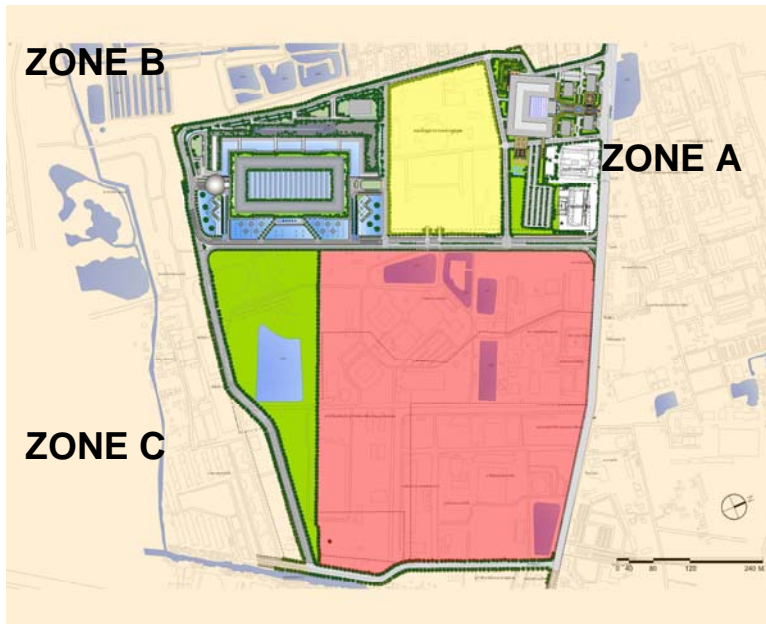
## **REVISE MASTER PLAN**

The site is located at Changwattana road, adjacent to Communication Authority of

Thailand (COT) head office. The land has 2 plots, over 100 rais or 160,000 sq.m along Changwattana road, and almost 300 rais or 480,000 sq.m, and separated between the 2 plots by Supreme Command Head Quarter.

There was a master plan for 28 government offices on 28 building towers at about 65 m height. The master plan had problem on the height which was over 45 m height limit due to Donmueng Airport restriction. The design team also saw weak point on large road surface and road complexity. The complex could become another concrete jungle with heat island effect. Beside problem on urban traffic and car parking, there would be huge burden on number of lift and internal traffic, as well as security management. Communication between government offices would be inefficient. Building to building interrelation would be almost impossible during rain and hot weather.

*Revising the master plan would turn the critical weakness to new design opportunity.*



Car park building, Hotel and Conference Center across the Supreme Command Head Quarter. 28 government offices have been grouped into building A and B, with shared facilities. The building height is limited 45 m, and conformed to the airport restriction. Road surface has very much reduced with much simpler traffic.

## DESIGN HIGHLIGHTS

Like most government project, there was design competition. Therefore, it was a challenge for the design team to propose a design which was totally changed the previous master plan. More importantly, the new design solutions were so much in advance than layman in the Ministry of Finance might not understand. During design presentation, there were a lot of questions because it was hard to believe that the building could be built with the presented standards at the budget and the energy consumption could be so low. As government, no one normally dare to take such risk.

The followings were major highlights during design competition, which had been later developed to final design:

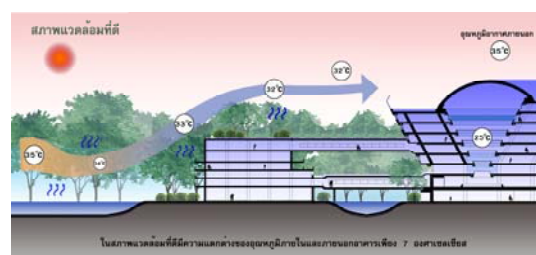
- **MASTER PLAN**

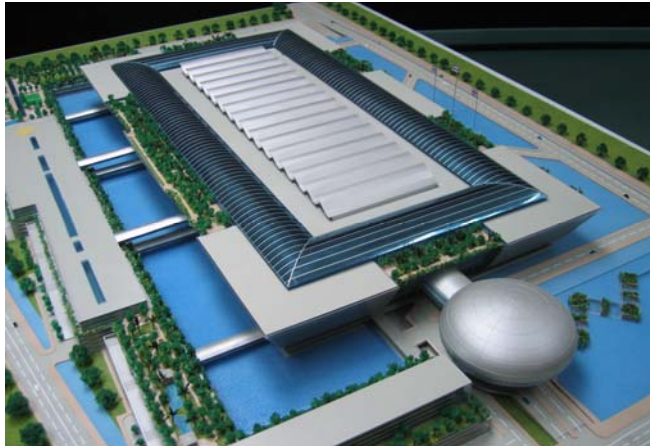
The new master plan has Building A along Changwattana road, Building B,

Building B, which is the major building, has been surrounded by large water pond, and reflecting Thai habitat. Energy center has been located at the back of Building B, and between Building B and A, as a central demand mapping. Internal and external traffic have been carefully analyzed. Public roads will be added and enlarged to accommodate the traffic. Public transport including MRT and bus stations will be later provided. Shuttle bus services will be provided in and around the new complex.

Drainage will be connected to the canal at the back. The large water pond surrounding the building will be used as rain retention pond with flood control station.

- **MICRO CLIMATE DESIGN**





Reducing road surface helps reducing thermal mass and improving micro climate. The large water pond surrounding the building helps reducing surrounding ambient temperature.

Green surface has been created when possible on ground and roof level, with selective of tree to provide lower ambient temperature and shade.

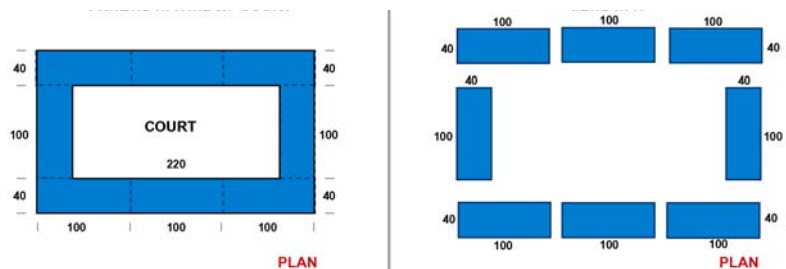
Water pond temperature is 28 C during day time, corresponding to normal ground temperature in Bangkok. Growing tree and its shade produce cooler air than ambient temperature.

Therefore, surrounding temperature of the government center complex could be a few degrees lower than normal ambient temperature during day time of 32 C. The low ambient reduces heat load to the building, as well as providing pleasant landscape for nice walking.

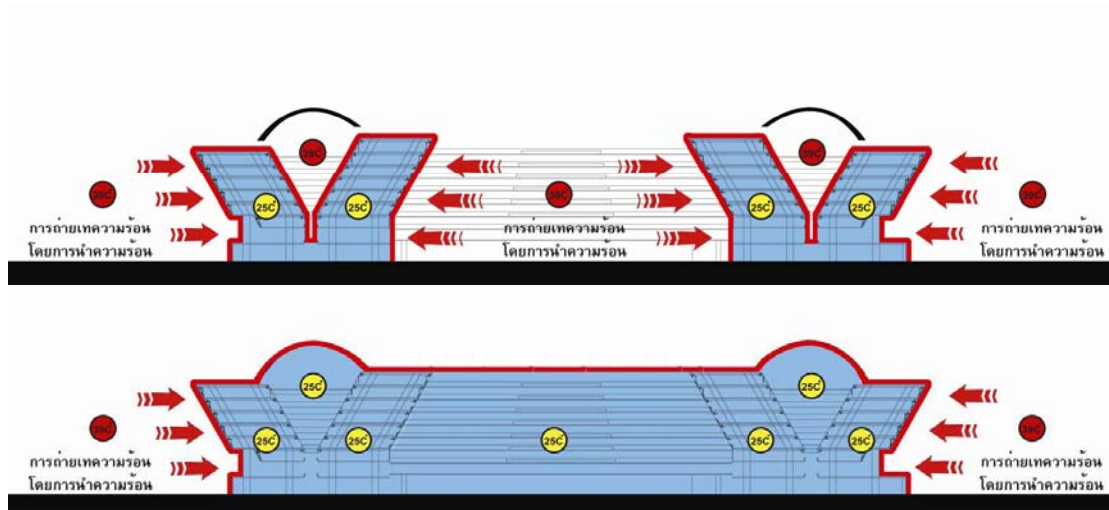
The central chiller plant rejects heat to the water pond by pond cooling, not to building surrounding as most building and does not add on to the heat island effect.

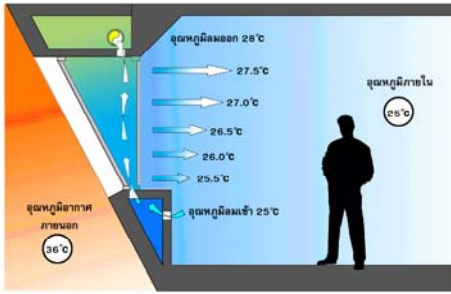
• **SUPER BUILDING SKIN**

The design approach of the building skin or envelope is rather classics. This is



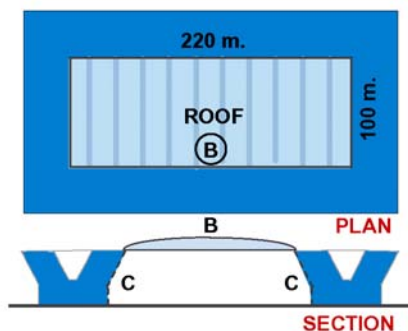
one the most important key to the design when the architect decided to group several office towers into large building. By doing this, it is possible to reduce





building skin surface to floor area ratio from 3-4/1 to 1.7/1. In that case, there will be less heat transfer surface, which will reduce heat load to the building and there will be more budget for better building skin quality.

The building has been designed with “Cold Box” concept. The architect has specified curtain wall system with 100 mm fiberglass insulation and vapor barrier. Airflow window system with double isolated frame has been specified for west and east window. Outer glass is insulated glass with 0.3 SC factor, and low-E coat for inner glass. There is Venetian blind between the outer and inner glass as electromagnetic wave energy to thermal energy converter and warm air will be vented with exhaust air from office space. Window to wall ratio is less than 1/4, with window arrangement to support eye adaptation. OTTV is about 10 w/sq.m, and RTTV is 5 w/sq.m.



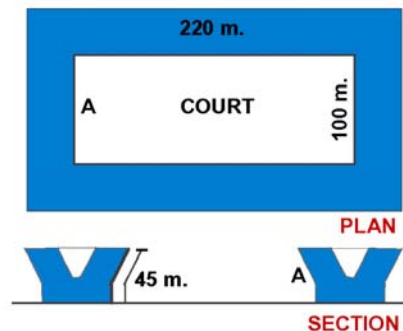
In this case, the long side of the building faces west and east. This has been another challenge to the building orientation principle. However, as a cold box, the impact from building orientation is much less than normal case.

Due to nature of large building, number of entrances has been reduced from several individual buildings, which helps to reduce infiltration to the building. All entrance has been designed as air lock and buffer zone with double door and reception foyer with security control station.

- **EXTRA INNERCOURT**

To group several individual buildings into large building is not that simple. Without a good architect, the building could become a building monster. With interior concept in mind, and office space width limit of say 40 m, the building has been designed in a ring shape that suits the land proportion. The ring shape creates inner court.

The engineer has recommended that the whole inner court should be air-conditioned, and assured that the cooling requirement will be reduced. Comparing the building inner court surface, having



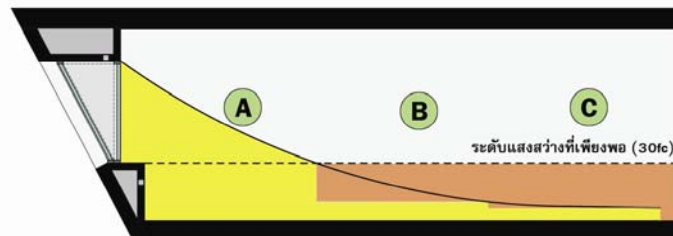
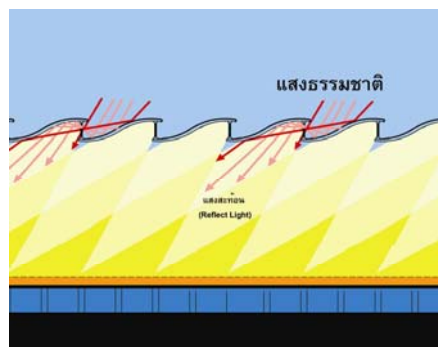
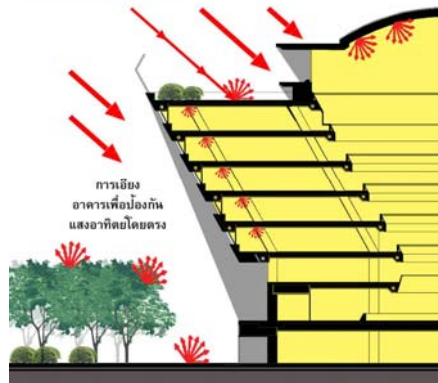
the inner court air-conditioned, will automatically turn the building inner court surface from “External wall” to “Interior wall”. Therefore, the method will reduce heat transfer and infiltration as in case of external wall. The converted interior wall cost much less than external wall, and architect can have as much transparent glass area as they like. No limitation on window to wall ratio in this case. Therefore, the office can make full use of natural light from the inner court.

The inner court has become “Extra Inner Space”, with air-conditioning. The space is extra from the TOR, and was later decided to also be used as community mall, as well as for exhibition. The extra inner court on Building B is approx 22,000 sq.m. Occupant can view each government agency location and identity from the inner court easily. Internal walking between offices is promoted through nice walking experience and internal link. The occupant will have no more problems on rain and hot climate

exposure. When people walk in and out of air-conditioned space, they might experience thermal shock syndrome. They will also carry sweat from walking outside, which is additional latent load to the air-conditioning system.

- **TRUE USE OF NATURAL LIGHT**

True natural light is indirect natural light from ceiling. Area such as inner court, atrium, car parking and office perimeter should be able to depend on



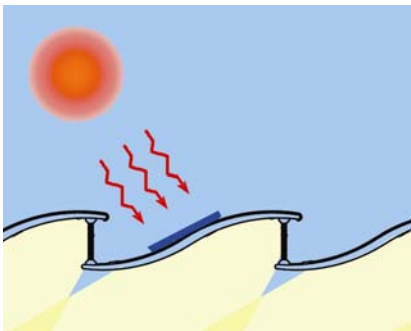
natural light only during day time. General office has been designed as open plan office with high ceiling of 2.7-3.30 m.



Ceiling is generally white color. Therefore, natural light will be promoted deep into the office space. Window, wall and ceiling have been designed with eye adaptation.

The interior wall along the inner court is rather transparent with large glass area, since there is no need to worry about solar heat gain like external window. Therefore, the office can make full use of natural light from the inner court.

- **SOLAR FARM**



Roof of the inner court has been designed to support the installation of "Solar Farm". The roof surface faces south, and the window faces north for natural light. The idea is to turn the roof, which is normally the heat receiving area into the energy "harvesting" farm.

Solar collector could be many options, such as PV cell, hot water collector, and parabolic solar collector.



Meanwhile, the design includes evacuated tube solar collector to produce hot water for 200 room hotel.

When budget is allowed, the solar air-conditioning system of 70 RT with

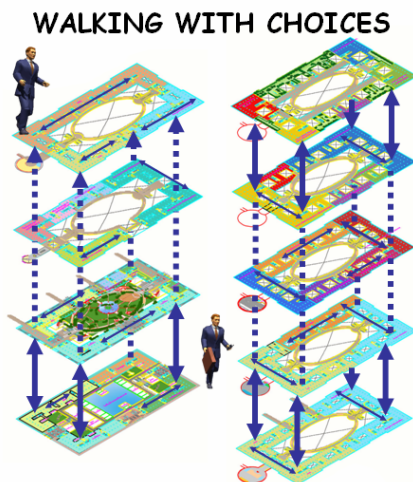
parabolic solar collector and absorption chiller will be added.

- **EFFICIENT INTERNAL TRANSPORTATION**

By grouping several individual buildings into large building, the number of lifts installation and operation will be much less.

The inner court also promotes communication by walking linking bridges on alternate floors. With combination of escalator system, people moving will be more efficient, reduce waiting time and traffic. Productivity is expected to be increased.

Separate VIP lifts, service lifts and fireman lifts are provided.



Reasonable walking also accustom occupant on emergency route and provide healthy exercise.

- **HANDY CAP PROVISION**

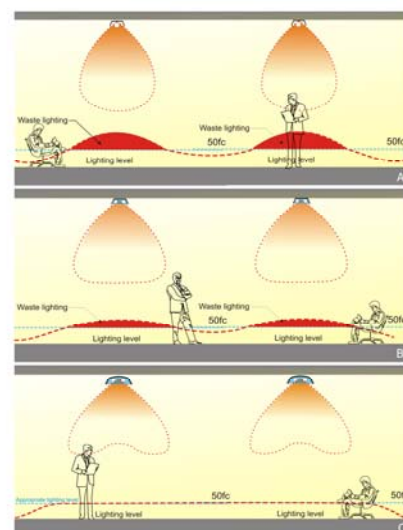
The new government center has been in conformance to latest building code requirement for handicap. That includes handicap toilet, lift, ramp and car parking.

- **GREAT INTERIOR**



Office space is roomy with high ceiling and long span column. Interior design is modern with modern office furniture.

With high ceiling, there has been question on construction cost, air-conditioning and lighting, especially when most people have perception that there will be more need on air-conditioning and lighting. In this case, floor to floor height is 3.60 m, which is normal and not affecting construction cost. High ceiling can be achieved since



open plan office has *no ceiling*. The only ceiling is perforated acoustic metal ceiling along the column to cover fan coil unit, piping and wiring. Bare concrete serves as radiant cooling surface for air-conditioning purpose. With building skin of OTTV10, air-conditioning load is not affected with this ceiling height. Lighting of 7 w/sq.m (lighting load in most office is 22 w/sq.m) can be achieved by better light distribution, and elimination of louver.

Reception lobby, Executive office, Meeting room has been provided, with ceiling, and nice interior setting.

Electrical outlets, IP phone, Wi-Fi, Nice lighting, Individual air-conditioning, which will be able to operate 24 Hr. Proper acoustic treatment.

- **GREAT FACILITIES**

The new government center has been with modern facilities such as Restaurants, Canteens, Convenience stores, Conference center, Fitness center, Day care, Shops, Banks, Etc.

## SUPER LOW COOLING

Total cooling demand for 480,000 sq.m air-conditioning space has been calculated at 4000-6000 RT. Installed cooling capacity including standby at Energy Center will be 9000 RT, which is less than half of today energy efficient building or 1/3 or a quarter of most building.

4 methods have been applied to achieve such super low cooling demand:

1. **Solar Heat Gain**

Having building skin surface area to floor area ratio of 1.7/, and OTTV of 10, RTTV of 5.

2. **Ventilation and Infiltration Control**

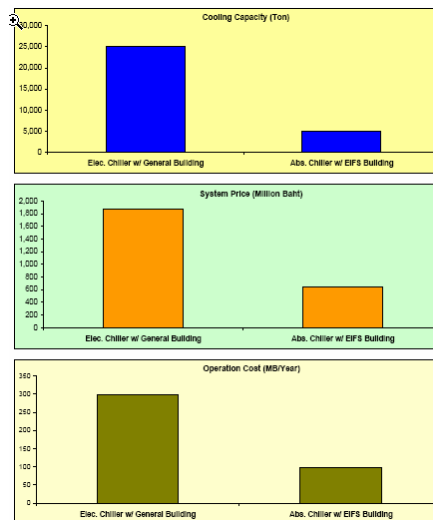
Ventilation control by DEECS and Infiltration control by cold box concept and air lock entrances.

3. **Thermal Storage**

Use building structure as thermal storage, and having chilled water tank CWS+ to store chilled water.

4. **Internal Heat Gain**

Reduce lighting load down to 7 w/sq.m while maintaining 500 lux in general open plan office. Use LCD for office computer. Locate copying machine and pantry at service station.



## 24 HR AIRCONDITIONING

The DEECS will be running 24 Hr. maintaining Indoor Air Quality. At night, the system alone might be able to provide comfort level for light office activity. However, when more activity require more cooling, the

individual fan coil or terminal unit in that area can be turn on.

Individual fan coil unit or terminal unit can be on-off by office worker any time day and night. The A/C switch will have low-medium-high speed fan control to satisfy each area. Valve connection at 50 m interval has been provided for additional fan coil or terminal unit.

There is no need for additional split type unit, and there is no need to request for overtime air-conditioning. There will be no extra charge.

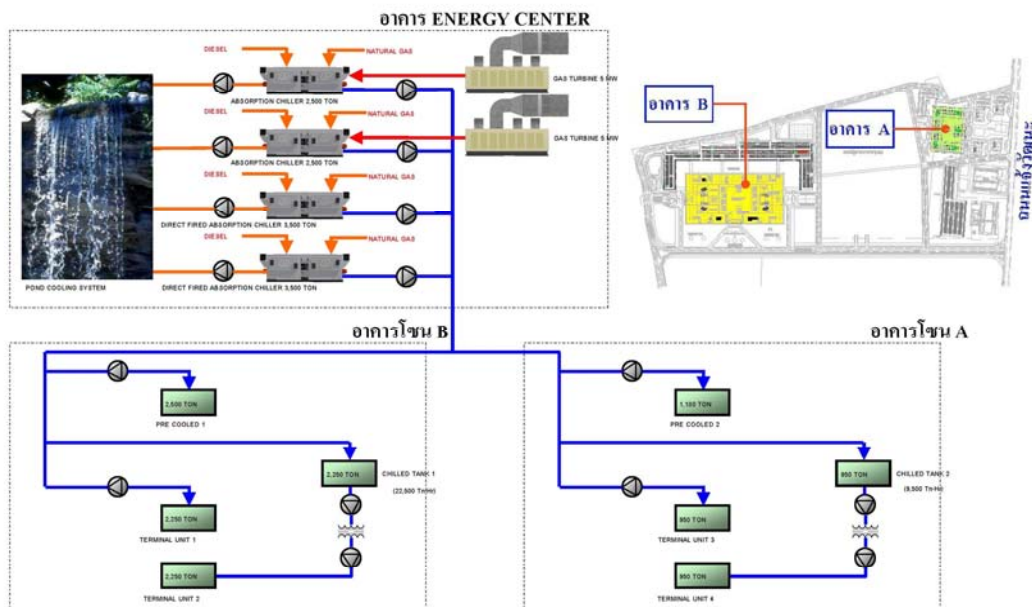
### SUPER LOW ENERGY

It was calculated that the Energy Efficiency Index (EEI) when the building is fully occupied will be around 100 kWh/sq.m/year. However, the facility manager used 130 kWh/sq.m/year for their calculation to be conservative. The figure includes any electrical consumption to the complex,

including water pump, drain pump, water feature, landscape and external lighting.

### BUILDING SUPER HEART

The Energy Center acts as the heart to the government center complex. The Energy Center is a Distributed Power Generation (DG) and Combined Heat and Power (CHP) plant. The CHP has been designed as “Green Integrated Energy System (GIES)” using gas turbine engine and coupled with exhaust gas fired absorption chiller. By generation of 10 MW electricity, the exhaust waste heat will be able to produce 6000 RT chilled water at 6 C by using exhaust gas fired absorption chiller at 80% total plant efficiency, which is much higher than conventional power generation and make better use of fuel. The plant use natural gas as clean fuel. There will be 2 units of 5 MW gas turbine with lean mixed low NOX and suitable for city environment. MEA 115 KV



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substation is adjacent to the Energy Center with 2 incoming feeders. The CHP has been designed to run as base load and connect to the MEA supply grid, which also provide back up in case of plant shut down.

Chilled water supply with high delta T of 6 C supply and 14 C return reduce chilled water supply pumping energy by 37.5% from conventional 7 c supply and 12 C return.

Each government agency will be provided with BTU meter so that they can pay cost of air-conditioning directly to the service provider individually.

## **NO BLACK OUT SYSTEM**

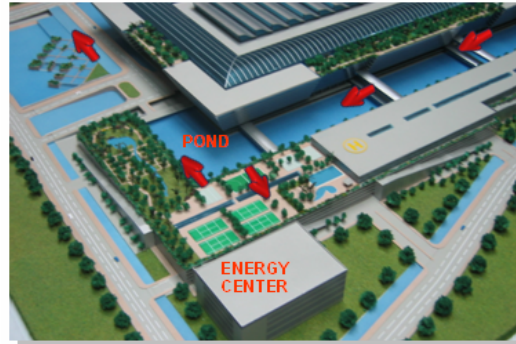
In this case, the 2 gas turbine units also act as essential power supply to the government center in case of MEA supply fail or black out. Reliability of electricity supply has been confirmed as the best in Bangkok. Therefore, there will be no interruption to government office operation in the government center complex. Further than that, emergency diesel generating sets have been provided for all life safety system.

## **POND COOLING**

Besides being water feature, micro climate control and flood prevention to the government center complex and

surroundings, the water pond also acts as heat sink to the Energy Center. The design team had study the adjacent Rajapruek Golf Course water pond, and found that the water retention and water quality is suitable to be used as cooling pond. Natural water is

### **POND COOLING CREATES WATER FEATURE**



normally cool at 27-28 C with ground as heat sink. By circulating the pond water to cool the water chillers at the Energy Center, the chiller will be run more efficiently than using cooling tower which can only provide 30-32 C cooling water. The water circulation will also create water feature around the building by gravity flow.

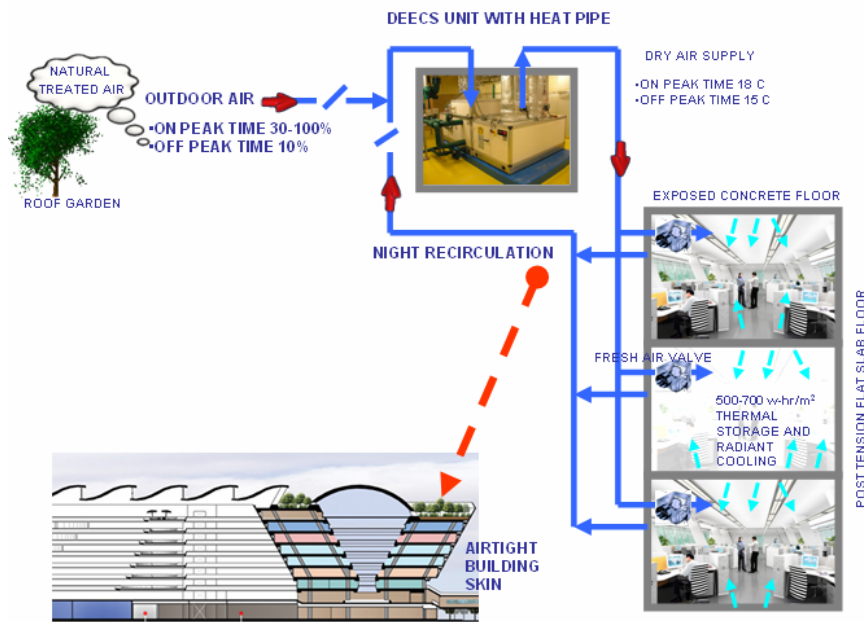
## **BUILDING LUNG**

The Dedicated External Environmental Control System (DEECS) serves as the building lung, which is one of the most important systems of the project.

There is individual DEECS unit for each

government agency. The DEECS unit is located on the roof with garden. The CBR secured air intake will introduce air through the roof garden, which acts as natural air cleaner and natural lung.





operating hour of the CHP plant. CHP plant has high investment and it is hard to meet return on investment for office development which runs on office hour, only 5 days a week. Therefore, it is important to “design” the cooling load profile

Then the DEECS unit will filter the air with high efficiency air filter, cool and dry the air before supply the treated fresh air into “each” office space. “Heat Pipe” has been used for pre-cool and reheat air drying process, and the fresh air will be dryer than room air. In this case, individual fan coil or terminal unit will mostly perform only sensible cooling. The fan coil or terminal unit will mostly perform as dry coil. Therefore, reduce risk of condensation and cleaning of cooling coil.

Volume of fresh air will be controlled by IAQ sensor, which will regulate the DEECS unit by inverter control.

With The DEECS concept which will provide lower humidity level than conventional office, as well as creating “effective temperature” through radiant cooling, the room temperature will be set at 26-27 C, with better comfort level, and energy efficiency.

## THERMAL STORAGE

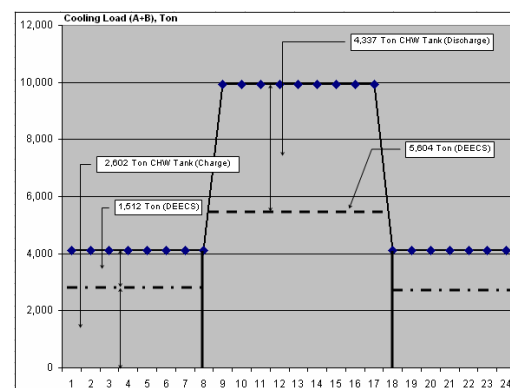
Thermal storage has been applied to shape the cooling load profile and extend the

to support the feasibility of the CHP investment. There are 2 methods of thermal storage techniques for the project as the followings:

### 1. Building Structure

Flat concrete slab of 25 mm thick weigh 560 kg/sq.m. With 0.9 kJ/kg specific heat, that equal to around 500 kJ of heat storage capacity. The building is a huge thermal mass by itself!

During day time, the DEECS unit will supply dry air at 18 C. During night time, off peak, the DEECS unit will shut down outside air intake and become air recirculation unit with supply air temperature at 15 C. The cool



air will then charge cooling storage to the building structure.

During day time, the building structure will provide radiant cooling to the office space and create “effective temperature” which is lower than room temperature.

## 2. Chilled Water Tank



Chilled water for individual fan coil or terminal unit will be stored in large chilled water tank under the inner court plaza.

Therefore, the tank will provide floor cooling effect to the plaza. The CWS+ concept allows chilled water supply temperature from the tank to individual fan coil or terminal unit to float at a certain limit, say 6-10 C. This floating simplifies construction of the tank and reduces the size of the tank. Remember that the individual fan coil or terminal unit is providing mainly sensible cooling.

## **INDIVIDUAL AIRCONDITIONING**

The individual fan coil or terminal unit provides the office worker with “individual air-conditioning”, which is the ideal goal for large area air-conditioning.

Again, individual fan coil unit or terminal unit can be on-off by office worker any time day and night. The A/C switch will have low-medium-high speed fan control to satisfy each area. Valve connection at 50 m interval has been provided for additional fan coil or terminal unit.

And again, there is no need for additional split type unit, and there is no need to request for overtime air-conditioning.

The method also save energy, since cooling distribution by large air-handling unit requires a lot of air moving energy. Construction of air duct contribute normally contribute about 15% of air-conditioning system and air duct leakage is a major loss of energy. In this case, cooling distribution by chilled water requires less energy, since water is a more effective cooling media to air, while providing more flexibility for additional cooling requirement.

Chilled water supply to individual fan coil or terminal unit comes from chilled water storage tank with variable chilled water supply, controlled by inverter. Chilled water supply can also be adjusted with temperature booster plate heat exchanger. The unit will be mostly operated as “Dry Coil” and provide sensible cooling. The DEECS unit will perform required latent cooling and receiving chilled water directly from the Energy Center. Air supply from DEECS unit will have less than 8 gm per kg dry air moisture level.

## **ADVANCED SAFETY SYSTEM**

The safety standards is more advanced than present building codes,

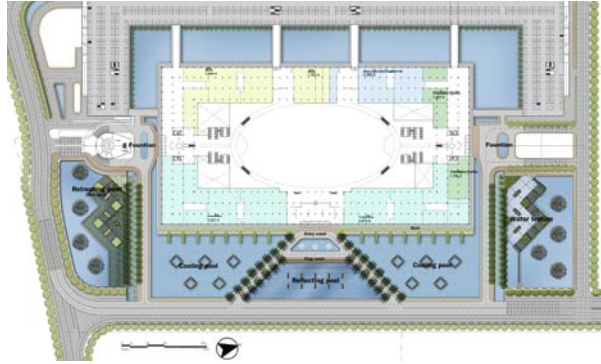
conformed to latest Engineering Institute of Thailand standards (EIT) and National Fire Protection Association standards (NFPA).

The safety systems also include the followings:

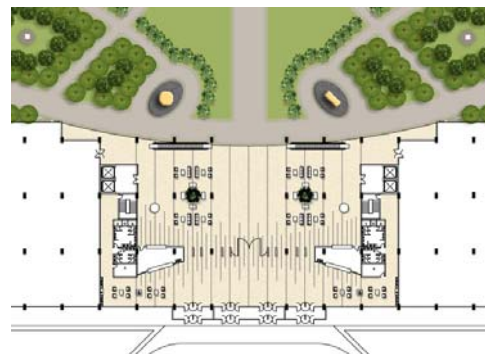
1. **Addressable Smoke Detection system**, where fire can be located precisely and quickly.
2. **Fire Compartment**  
Each fire compartment should not exceed 4500 sq.m. All vertical openings are fire sealed.
3. **Smoke Control system**  
Smoke exhaust for atrium, and outside air supply from DEECS units.
4. **Fully Automatic Water Sprinkler system**
5. **Fire Water Reservoir**  
2 Hr fire water storage tank, with water pond surrounding building as additional fire reservoir.
6. **Fire Stair**  
Enclosed fire stair with pressurizing system or natural ventilated at 60 m max interval.
7. **Fire Command Center**  
There are fire command center at the Energy Center and at each building.

## ADVANCED SECURITY SYSTEM

Passively, there is no visitor car parking in or under the building. Car park building is a separate building with linking bridges to the main Building B. The main Building B is surrounded by water pond which is 40 m width and acts as security fence to the building. The security plan has used the



bull eye concept where higher security zone can not be bypassed both from front and back of house. People have to enter through entrance lobby with security check point. Office worker will be verified by batch and finger print through turnstiles similar to MRT system. Visitor will present their ID and pass through security check or metal detector or x-ray machine. Cleaning services and other services will be checked and recorded. Using service lift with access control and CCTV surveillance system. Government officer will enter the building through access control gate turnstile, and recorded. Visitor will be checked and recorded through metal detection and surveillance system.



Entering each government agency has to go through reception lobby.

By grouping several individual building towers into large building, number of entrance has been reduced from at least 80 entrances to less than 20. Therefore, there will be lesser requirement for security control station, as well as security personal.

## **SUPER IT**

CAT TELECOM was selected as ICT service provider for communication and IT.

The scope of services includes the followings:

- IP – Phone
- Internet Ready
- Leased Line/ ATM/ Frame Relay/ CAT Metro net/ MPLS/ IP VPN
- Point to Point and Point to Multipoint Video Conference
- Next Generation Network (NGN)  
For data, picture and voice on Triple Play as single network.
- Optic Fiber Single Mode 48 Core 10 Gbps
- Individual IT Switch for each government Agency
- Total 30,000 outlets
- Free Internal Call within Government Center

## **LOW CONSTRUCTION COST**

The construction contracted had been awarded to ITD and Sino Thai at approx 13,700 million Baht, which is almost 1000 million Baht, lower than median price. The construction cost is 15% lower than normal cost of general office building. It was a real

proof that “A good building does not have to be always more expensive”.

Analyzing the cost found that structural cost is 17.5% higher due to cost of water pond, 12 m column span and Y-shape, and structural roof over inner court, with less cost on road and drainage. Architectural cost is 6% higher due to cost of building skin, and special oval shape auditorium. Electrical cost is 37% lower due to smaller electrical substation, less cost of interior lighting and street lighting. Air-conditioning system cost is 64% lower due to super low cooling demand, and chiller plant is provided by CHP as service provider. Plumbing cost is 30% lower due to grouping of several individual buildings into large building. Lift and escalator is 37.5% lower also due the grouping of building.

## **LOW OPERATING COST**

It has been forecasted that operating cost for the government center will be much less than normal office building. The followings are some examples of such claim:

Cost of energy for air-conditioning in the government center will be 45% lower than other office building, which is normally 44-50 Bath or 1.15-1.3 \$/sq.m/month. The calculation based on electricity charge of 3.5 Baht/kWH or 9 cent, and chilled water charge of 5.7 Baht/RTH. Remember that, normal office building air-conditioning system only run 8 Hr a day, 5 days a week. But the government center is cooled 24 HR 365 days.

Cost of energy for office lighting is 75% less than other office building, with 7 w/sq.m instead of 22 w/sq.m.

Cost of energy for lift and escalator is 60% less than other office building, as well as providing higher efficiency and lesser waiting time.

## **FACILITY MANAGEMENT**

The Treasury Department has set up a new company to look after the project in long term. The company will outsource private companies to provide cleaning services, garbage services, waste water treatment services, security services, gardening services, parking services, hotel services, conference center services, Etc. Several services will also producing income, such parking, conference, shops and restaurants, drinking water, Etc.

Each government center will pay electricity charge, and chilled water charge directly to service provider, which is a joint venture between MEA and PTT. Communication and IT will be provided by CAT TELECOM as another service provider.

Building management system (BMS) has been provided to provide records and control of all common and public facilities as well as safety and security system.

The facility also includes MATV, Master Clock system, Public sound and Address system, Audio/Visual for conference center.

## **SOLID WASTE MANAGEMENT**

Garbage has been classified as followings:

**Recycle** – paper, wood, metal, glass, plastic

**Hazardous** – light bulb, battery

**Wet** – canteen/restaurant/pantry

**Others** – construction waste, Etc.

Sorting area of garbage and garbage truck loading area has been provided at the waste collection center adjacent to the Energy Center.

## **TOTAL REUSE WATER**

Waste water treatment using SBR technology has been selected because of low energy consumption, low maintenance and excellent expected effluent water quality. Treated water will be “*totally reuse*” as irrigation water and make up water of the water pond.

## **INCREASING VALUE**

Unfortunately, there have been some government agencies that changed their mind to come to the government center, and preferred to choose another option. Sorry for them! When that story known, there were several privates who expressed their interest to rent the available space. Renting of the center is 360 Baht/sq.m/month, increment of 5% after 5 years. For such land mark, building quality, location, facilities, and opportunity to work within government agencies, it is a very attractive rate. It is forecasted that the property value for such infrastructure will be appreciated favorably.

## **HEALTHY BUILDING**

People are getting away from “Sick Building”, where indoor environment is bad.

The government center has been designed to be sustainable building and

“Healthy Building”, and excellent indoor environment. For example, “Air” which is the most important human intake and consumption will be clean and fresh. Better air gives better life and higher productivity. May be that will be able to build a new generation of government officers, that is more efficient and energetic.

## **CONCLUSION**

The New Government Center is a new hope of next generation of office building standard. It is a great challenge in itself from the innovative ideas, which most people are not easily to believe or to be convinced. Even, the PMSC which is the project management consultant is reluctant to accept the proposal, and made a lot of questions and detail clarifications.

Nevertheless, the project has been managed professionally by large number of highly qualified and experienced architects and engineers. Construction is on progress and will be completed for move in mid of 2008.

The design team themselves are convinced that the project will be one of the best project internationally, and highly proud to be part of its history.

Therefore, it is reasonable to say that this project will be another top model of “Sustainable Development”.

The energy reduction, comparing with conventional building and energy supply has been estimated to be over 20,000 tons of CO<sub>2</sub> reduction per year.

## **WHO ARE THE DESIGNERS?**

The designers are joined as consortium, “**GCDC**” or Government Center Design Consultants, and comprises of the following companies:

**CASA** – Key architect lead by Prof. Krisada Arunwongse, the very famous senior architect and lecturer, and Mr.Songporn Saisuwan.

**A&A** – Lead architect and project design director, Mr.Boonrueng Junpraparp, and Mr.Ruecha Rachanan.

**D.C.M. 2000** – Key architect on design and production, lovely Ms.Siniratana Pataratamakun.

**VEDA** – Lead architect and great concept designer, Dr.Soonthorn Boonyathikarn, the very famous innovative architect, lecturer and a guru on energy efficiency. Mr.Rawit Kuanprasert, the design manager.

**A7** – Planner and specialist on traffic study, Mr.Vachara Jongsuwat and Teera Singhaneti.

**P49** – Interior Designer, one the best and famous interior designer in Thailand, Ms.Vipavadee Patanapongpibul, and Ms.Chanoknart Tritanawat, who added a lot of mood to the design.

**PL Design** – Landscape designer, one of the best landscape designers in Thailand, Mr.Veerapan Paisarn, and lovely Ms.Chanipat Chavayanon, who also plant tree to produce good air, and create green surrounding.

**ACS** – The main structure engineer that design the Y-shape structure, the oval shape auditorium and the wide span roof over inner

court, Prof.Arun Chaiseri, Dr.Piyawat Chaiseri and Mr.Pisit Karnjanarujiwut.

**EEC** – Mechanical and Electrical engineer, Mr.Kecha Thirakomen, the creation of DEECS, CWS+, and GIES. Mr.Tamanoon Chantaworn, the design manager.

**SEATEC** – Key structural engineer, Dr.Krai Soongsawang and Mr.Santi Sridurongtam.

**INDEX** – Key civil engineer, site drainage and flood control Dr.Amnuayporn Siriaksorn and Mr.Chawalit Athikomnanta.

**AE<sup>3</sup>** – Specialist on acoustic, security system, vertical transportation, lighting, and IT.