List of Table Captions：

Table 1 GWP Values for 100-year time horizons [1]

GWP Value ($GWPV_i$)	CO_2	CH_4	N_2O
AR 2nd 1995	1	21	310
AR 3rd 2001	1	23	296
AR 4th 2007	1	25	298

Note: AR 2nd ,AR 3rd , AR 4th are the second, the third and the fourth Assessment Report of IPCC in 1995, 2001 and 2007 respectively.

Table 2 GHG emissions sources for semi-prefabrication and conventional construction

Construction Methods	Semi-Prefabrication		Conventional
	Part 1: off-site	Part2: on site	
GHG Emission sources	E_1,E_2,E_3,E_4,E_5	E_1,E_2,E_3,E_5	E_1,E_2,E_3,E_5

Table 3 The GHG emissions factors (f_j^b) of the main building materials

Materials	Waste factors ε_i [a]	CO_2 emission Factor (kg CO_2/kg)[b]	GHG emission Factor (f_j^b) (kg $CO_{2\text{-}e}$/kg)[b]
Ready-mixed Concrete	2.5%	0.113	0.120
Cement	2.5%	0.653[c]	0.698
Sand	2.5%	0.0069	0.007
Steel	5.0%	0.352	0.367
Brick	2.5%	0.230	0.246
Glass	0.0%	1.735	1.854

[a] Reference [25]
[b] Reference[35, 36]
[c] Reference[37]

Table 4 GHG emissions factors (f_c) of different transportation methods

Transportation Method	Energy use (MJ/ton km)[a]	Fuel CO_2 emissions factor(g/MJ)[b]	Fuel CH_4 emissions factor (g/MJ) [b]	Fuel N_2O emissions factor (g/MJ) [b]	GHG emissions factor (f_k^t) (kg $CO_{2\text{-}e}$/ton km)[c]
Truck (gas)	3.663	74.8	0.0095	0.012	0.288
Truck (Diesel, GVW>16t)	2.423	74.8	0.0700	0.030	0.207
Train (Diesel)	0.362	74.8	0.0104	0.086	0.036
Ship (Diesel)	0.468	74.8	0.0070	0.002	0.035

[a] Reference[38]
[b] Reference[30]
[c] According to formula (1), Fuel GHG emission factor = Fuel CO_2 emission factor + Fuel CH_4 emission factor ×25 + Fuel N_2O emission factor×298; and GHG emission factor of each transportation method (f_k^t)= Energy use × Fuel GHG emission factor.

Table 5 GHG emissions factor of electricity in difference regional power grids of China (in kg $CO_{2\text{-}e}$/kWh)

Regional Power Grids	GHG emissions factor (kg $CO_{2\text{-}e}$/kWh) [a]
North	0.9803
East	0.8367
South	0.9489
Middle	1.0297
Northeast	1.0852
Northwest	1.0001

[a] Reference [39]

Table 6 GHG emissions factors (f_n^v) of resources consumption of construction equipment

Energy types	CO_2 emissions factor(kg/Unit)	CH_4 emissions factor (kg/unit)	N_2O emissions factor (kg/unit)	GHG emissions factor (f_n^v) (kg $CO_{2\text{-e}}$/unit)
Diesel/Oil: (crane, concrete mixer truck, concrete pump, welder, forklift, elevator)	2.614 (kg/l)[a]	0.0239 (g/l)[a]	0.0074 (g/l) [a]	f_1^v=2.617 (kg $CO_{2\text{-e}}$/l)[b]
Electricity:	0.9489 (kg/kWh)[c]	-	-	f_2^v=1.018 (kg $CO_{2\text{-e}}$/kWh)[d]
Fresh water	-	-	-	f_3^v=0.4137 (kg$CO_{2\text{-e}}$/m^3)[a]

[a] Reference [40]
[b] According to formula (1), f_1^v= 2.614+2.614×0.0239/1000+2.614×0.0074/1000=2.617kg$CO_{2\text{-e}}$/l.
[c] The empirical case is located in south of China, CO_2 emissions factor is valued as 0.9489 kg/kWh.
[d] Reference[41]

Table 7 A summaries of the profiles of projects under this study

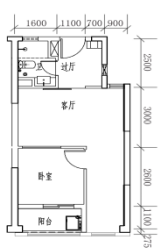
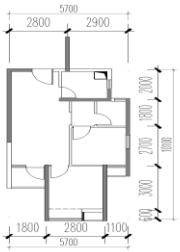
Description Items	Project A: Semi-prefab.	Project B: Conventional	Project B_0: Conventional
Types	Residential building	Residential building	-
Location	Shenzhen	Shenzhen	-
Floor plan			
Size (CFA)	216,000 m^2	187,835.95 m^2	216,000m^2
Floor Area per Unit	50~70 m^2 per Unit	60~80 m^2 per Unit	-
Floor to floor height	3.3m	3.3m	3.3m
Foundations	Bored Pile Foundation	Bored Pile Foundation	Bored Pile Foundation
Basement	2 Floors	2 Floors	2 Floors
Structure system	Frame Share-wall Structure	Frame Share-wall Structure	Frame Share-wall Structure
Height	84m	78m	84m
Seismic intensity	8 level	8 level	8 level
Construction method	Semi-prefabrication	Conventional	Conventional
Precast Level (% by volume)	10.5%	0	0
Structural Frame :Column, Beam, Slabs, Structure wall, Slab	Reinforced concrete , cast in-situ	Reinforced concrete , cast in-situ	Reinforced concrete , cast in-situ
Structural Frame: Staircase, corridor slabs	Reinforced concrete, off-site prefab.	Reinforced concrete , cast in-situ	Reinforced concrete , cast in-situ
External works: Facades	Reinforced concrete, off-site prefab.	Reinforced concrete (cast in-situ) + Aerated concrete brick	Reinforced concrete (cast in-situ) + Aerated concrete brick
External works: Roof	reinforced concrete , cast in-situ	Brick , bricklaying on site	Brick , bricklaying on site
Internal works: Partition wall	Brick , bricklaying on site	Aerated concrete brick	Aerated concrete brick

Table8 Use Amount (UA) and transportation distances of Building Materials (BM) (Unit: 216,000m^2)

Materials	Total UA in Project A: Semi-prefab. (ton)		Total UA in Project B_0: Conventional (ton)	Distances in Project A (km)		Distance L_2^m in Project B_0 (km)
	Off-site	On site		L_1^m	L_2^m	
Concrete	27,980	239,130	256,608	5	80	80

Cement	0	13,067	14,721	-	60	60
Sand	0	77,172	87,364	-	60	60
Steel	1,821	11,380	12,312	50	120	120
Glass	0	439	439	-	15	15
Brick	0	52,695	62,022	-	10	10

Note: Lm1: from BM distribution center to the off-site prefabricated factory;Lm2: from BM distribution center to the project site.

Table 9 Resource usage (RU) of equipment and construction technologies during processing (Unit: 216,000m^2)

Resource	Semi-Prefab.(unit)		Conventional method [a]
	Off-site	On site	
Diesel (l)	11,658	219,638	234,480
Electric (kWh)	106,966	2,139,318	2,470,912
Water (m^3)	29,728	298,331	356,400

[a] Detailed calculation presented in section 4.1.2.

Table 10 Transportation of construction waste, soil, prefabricated components (Unit: 216,000m^2)

Items	Semi-Prefab.(unit)		Conventional method
	Off-site	On site	
Construction Waste (ton)	0	10,121	11,133[a]
Soil (ton)	-	372,024	372,024
Distance for W&S (km)	-	21	21
Prefab. Components (ton)	29,824.67	-	-
Distance for Components (km)	70	-	-

[a] Detailed calculation presented in section 4.1.2.

Table 11 GHG emissions in semi-prefabrication and conventional (Unit: ton/216,000m^2)

Sources	Semi-Prefab. (ton $CO_{2\text{-}e}$)				Conventional method (ton $CO_{2\text{-}e}$)		Reduction of GHG emissions		Percentage of GHG emissions reduction [Z=(T-S)/T] (%)
	Off-site	On site	Total						
			(S)	%	(T)	%	(T-S)	CP (%)	
E_1	4,034	57,862	61,896	85.1	63,985	85.1	2,089	86.5	3.3
E_2	49	5,595	5,644	7.7	6,087	8.1	442	18.3	7.3
E_3	0.00	1,650	1,650	2.3	1,654	2.2	4	0.2	0.2
E_4	370	-	370	0.5	-	-	-370	-15.3	-
E_5	161	3,069	3,230	4.4	3,479	4.6	249	10.3	7.1
TGE			72,790	100.00	75,205	100.00	2,414	100.00	3.2

CP: contribute proportion of each source to the total GHG emissions reduction, CRi= (Ti-Si)÷ 2414×100%.

Table 12 GHG emissions of each material per m^2 in semi-prefabrication and conventional (Unit: kg/m^2)

Materials	Semi-Prefab.		Conventional (kg)	
	UA of material	GHG emissions of material	UA of material	GHG emissions of material
Concrete	1.237	0.1325	1.188	0.1422
Cement	0.061	0.0422	0.068	0.0475
Sand	0.357	0.0027	0.404	0.0030
Steel	0.052	0.0198	0.057	0.0214
Glass	0.002	0.0038	0.002	0.0038
Brick	0.244	0.0599	0.282	0.0705