Micro-Climate Information Platform for Green Building Information Modeling (GreenBIM)

International Climate Development Institute(ICDI)

交通部中央氣象局 Central Weather Bureau

DELTA 台達 台達電子文教基金會

財團法人台灣建築中心 TAIWAN ARCHITECTURE & BUILDING CENTER

ICDI國際氣候發展智庫 International Climate Development Institute

About the website

- Global Warming is getting worse day by day. Urban Hot Island Effect makes people use air-conditioners a lot more to lower the indoor temperature. Due to green awareness rising up recent years, green building has became a new mainstream in building design.
- In order to apply energy saving by using dependable weather information from building design to maintenance. ICDI is able to cooperate with Central Weather Bureau and National Building Centre to execute this program with the DELTA company’ s support.

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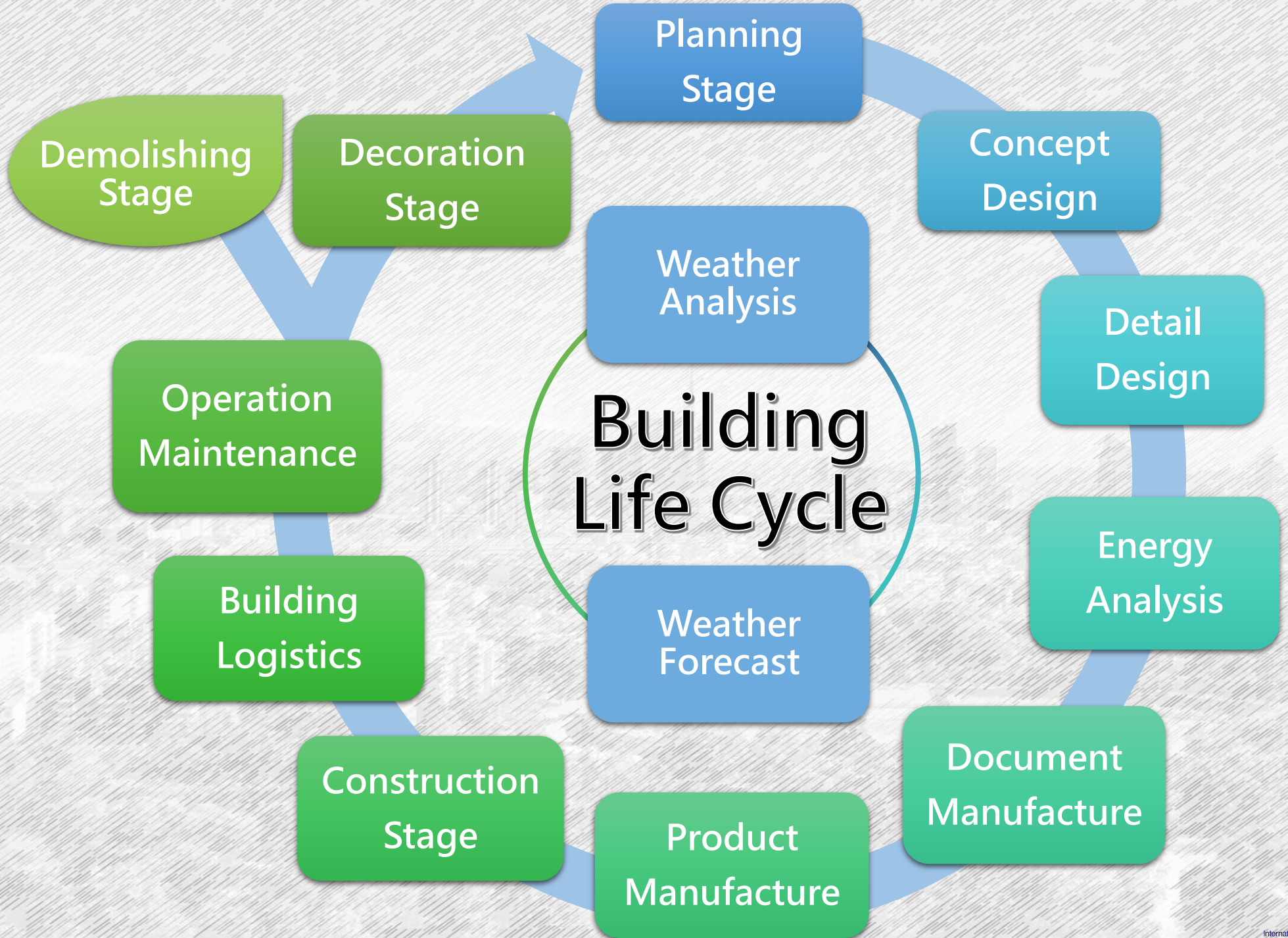
- The main goal of this project is to know the maximum possibility of applying climate information in green building design. Establishing a Green building information modeling climate database can be used for building design .

GREEN BIM 微氣候資訊平台

www.weatherservice.org.tw



ICDI
International Climate Development Institute

Services in GreenBIM website

Services：

- **Providing 26 stations of standard statistical meteorological annual data** 4 kinds of format(csv, tm2, bin, epw)

- **Station data for climate statistic calculation and extreme value**
  745 stations of historical data (Since 1998) from Central Weather Bureau(CWB)

- **Providing ASHRAE Classification for climate design standards**
  450 stations data redesigned their formats according to ASHRAE Handbook 2017

- **3-Days Weather Forecast Data**
  Open data numerical forecast model from Central Weather Bureau(WRF-3KM)
  Including applying API connection for building operation

- **Customizing Sun-tracks**
  Give a specific location with its longitude/latitude and time, we can provide its solar azimuth angle, solar zenith angle…etc.

- **Customizing typical meteorological annual data (single point)**
  Provide csv format for its Typical Meteorological annual data.

Home Page

Releasing latest news

Options

Information

Data Information、Website Information、Q&A

Data Information：

Including statistical information, verification form, and updating timeline

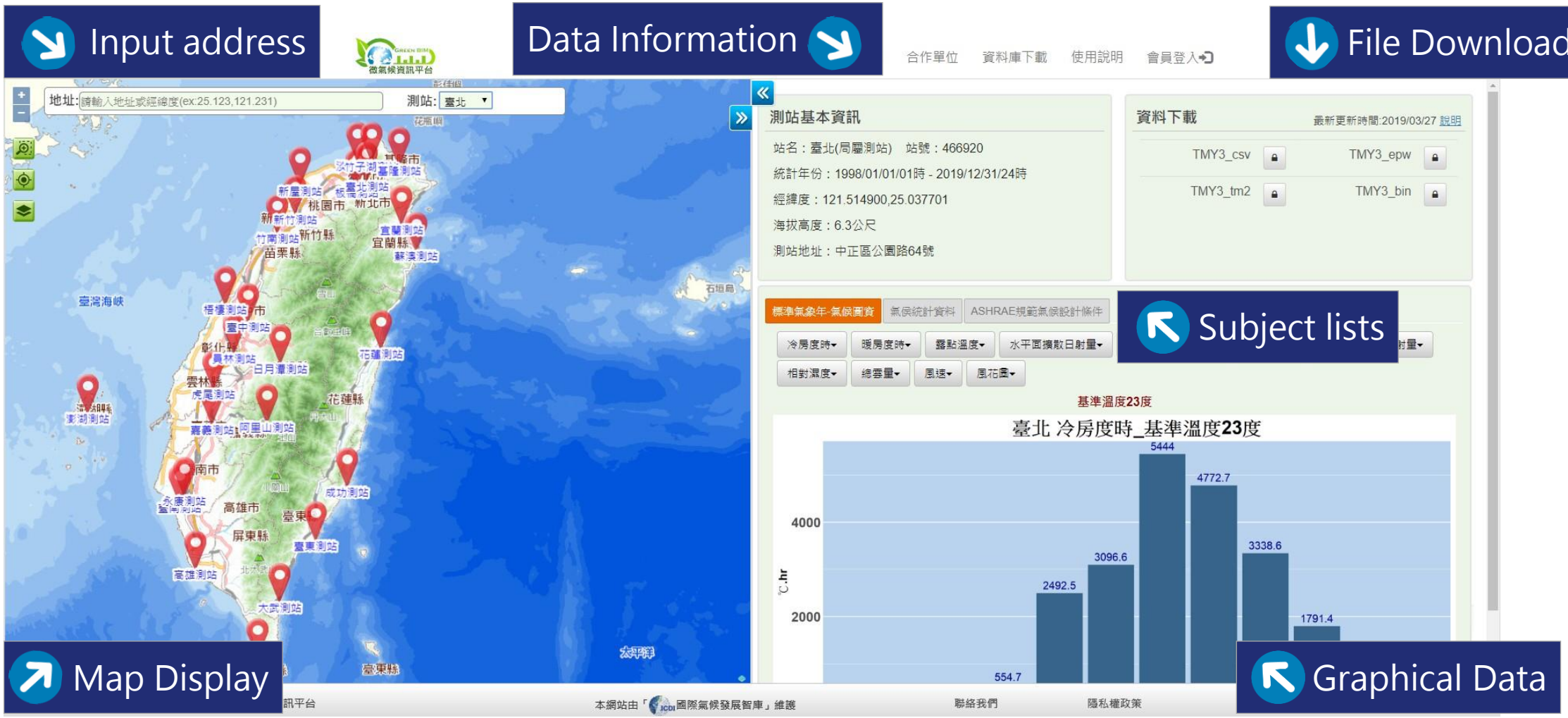
Website Information：

Including registration, logging in, forget password and steps for data downloading

Q&A：

Answers all kinds of questions

Database Introduction

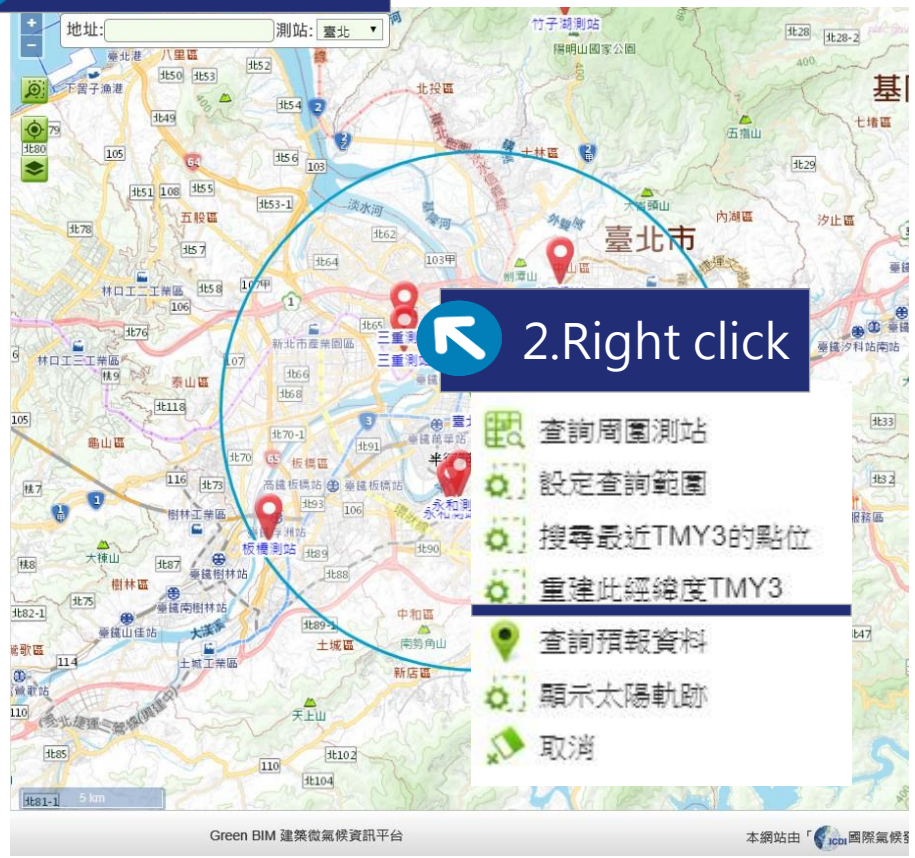


TMY3 typical meteorological year data

Be a member of GreenBIM, and you can access to 26 stations from Meteorological annual data and related graphical data all around Taiwan for free.

Customize typical meteorological year data (single point)

1.Input address



Customize annual Meteorological data

Using the historical data and grid data from CWB stations which are near the location to rebuild your own annual Meteorological data.

Operating Information

Input the address or latitude/longitude, right click the location, rebuild your own annual Meteorological data and it can be chosen on the list.

Data Format

Provides csv format for its annual Meteorological data.

Building Application

The data is also able to fit in many energy consumption monitoring software.

Weather Forecast Data

未來三天氣象預報資料

東經 121.536，北緯 25.034

時間	4/29	4/30	4/30	4/30	4/30	5/1	5/1	5/1	5/1	5/2
	20時	02時	08時	14時	20時	02時	08時	14時	20時	02時
	23.8	22.3	25.3	30.1	25.5	24.7	26.7	31.2	26.5	25.3
(℃)	17	16.1	15.6	18	18.5	18.6	17	13.6	21.5	21.7
(%)	66	68	55	48	65	69	55	34	74	81
)	3.3	0.4	0.7	3.4	2.5	1	0.4	3.3	2.5	1.1
")	139	124	315	133	135	127	326	314	137	185
(%)	0	0	0	0	0	0	0	0	0	0

Data Source

This data is from CWB forecast – region model (WRF-3Km), 6 hours renewing frequency.

Building Application

Provides API connection (JSON format) for connecting to building equipment during the operation.

Customize Sun-tracks

臺北 (東經 121.515686645508 , 北緯 25.040032931919)

		6	7	8	9	10	11	中天	12	13	14	15	16	17	18
	仰角	-1.077	12.565	26.017	38.995	50.92	60.408	64.521	64.517	60.862	51.609	39.786	26.857	13.433	-0.192
	方位	90.091	96.57	103.819	112.976	126.135	147.181	180	178.973	211.27	232.972	246.496	255.84	263.186	269.714
夏至	仰角	10.234	23.18	36.445	49.921	63.528	77.183	88.394	88.092	75.141	61.485	47.893	34.443	21.218	8.332
	方位	68.797	73.892	78.424	82.729	87.33	94.284	180	212.905	267.188	273.419	277.919	282.234	286.829	292.039
秋分	仰角	2.794	16.413	29.82	42.691	54.336	63.023	65.551	65.346	59.79	49.49	37.178	24.013	10.476	-3.185
	方位	90.55	97.134	104.671	114.474	129.086	153.141	180	187.821	218.696	237.973	250.045	258.633	265.615	272.032
冬至	仰角	-8.324	4.052	15.642	26.003	34.431	39.929	41.531	41.487	38.742	32.308	23.247	12.482	0.635	-11.907
	方位	112.033	118.23	125.91	135.737	148.462	164.43	180	182.598	200.362	215.443	227.285	236.431	243.634	249.509

1.Input Address

Data Source

Give a specific location with its longitude/latitude and time, and it will be able to provide its solar azimuth angle, solar zenith angle…etc. All parameters and methods comes from NASA.

Building Application

Physical environmental parameter, building direction, window design…etc.

Climate Statistic Data

標準氣象年-氣候圖資 | 氣候統計資料 | ASHRAE氣候資料

歷史極端值資訊 統計年份:1998/01/01/01時 - 2019/12/31/24時

24小時最大降雨延時日期：2001/09/17 11時	24小時最大降雨延時(mm)：603.5mm
最大時雨量發生時間：2019/07/22 16時	最大時雨量 (mm)：92.9mm
最大平均風風速發生時間：2015/08/08 07時	最大平均風風速(m/s)： 14.9m/s
最大瞬間風風速發生時間： 2015/08/08 07時	最大瞬間風風速(m/s)： 15.9m/s
最高溫度發生時間：2016/06/01 15時	最高溫度(℃)：38.5度
最低溫度發生時間：2016/06/01 15時	最低溫度(℃)：4.2度

風向風速統計 統計時間1998/01/01/01時 - 2019/12/31/24時

	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
最多風向(360°)	90	90	90	90	90	90	90	160	90	80	80	90	90
最多風向比例	12.7%	16.0%	15.4%	13.5%	12.4%	11.4%	7.48%	5.87%	6.85%	12.6%	16.7%	18.2%	17.4%
平均風速(m/s)	2.51	2.74	2.52	2.54	2.45	2.35	1.87	2.12	2.2	2.75	3.03	3.04	2.92
09-18時最多風向(360°)	80	80	90	80	80	80	80	270	90	80	80	80	90
09-18時最多風向比例	12.7%	15.8%	14.3%	13.9%	12.4%	11.6%	7.50%	5.31%	6.78%	13.4%	19.0%	18.0%	16.8%
09-18時平均風速(m/s)	2.9	3.09	2.82	2.82	2.74	2.69	2.29	2.54	2.57	3.16	3.52	3.43	3.28
19-08時最多風向(360°)	90	90	90	90	90	90	160	160	160	90	90	90	90
19-08時最多風向比例	13.6%	16.2%	16.2%	14.7%	13.3%	12.1%	8.92%	9.28%	8.04%	13.0%	16.7%	18.5%	17.9%
19-08時平均風速(m/s)	2.24	2.49	2.31	2.34	2.24	2.09	1.57	1.82	1.93	2.45	2.68	2.76	2.65

降水量統計 統計時間1998/01/01/01時 - 2019/12/31/24時

	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
累積最大降水量(mm)	4438.05	744	696	744	720	744	720	744	744	720	744	720	744
累積大雨日數(day)	192	0	0	0	4	20	38	11	53	46	15	5	0
累積豪雨日數(day)	334	0	0	0	0	26	25	10	73	118	64	18	0
累積大豪雨日數(day)	57	0	0	0	0	3	0	0	0	43	11	0	0
累積超大豪雨日數(day)	12	0	0	0	0	0	0	0	0	12	0	0	0

Data Source

A total of 745 weather stations historical data from CWB since 1998. Including temperature, wind speed/direction, rainfall..etc..

Building Application

Maximum wind speed and 24 hours rainfall delay will be able to help the wall design and the capacity of storage reservoir.

ASHRAE Classification for climate design

標準氣象年-氣候圖資 | 氣候統計資料 | ASHRAE氣候資料

Lat:25.0377 Long:121.5149 Elev:6.3 StdPrsFac:1011.98 Time Zone:8.00 period:1998-2019 WBAN:99999

Annual Heating and Humidification Design Conditions

Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB	
			99.6%			99%			0.4%		1%			
	99.6%	99.6%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD
1	9.8	11.1	3.7	0.008	11.4	5.2	0.009	12.6	6.8	10.12	6.3	17.51	2.21	90

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

Hottest Month	Hottest Month	Cooling DB/MCWB								Evaporation WB/MCDB				MCWS/PCWD to 0.4% DB	
	DB Range	0.4%		1%		2%		0.4%		1%		2%			
		DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD
7	7.26	35.6	27.54	34.7	27.25	34	27.06	28.3	34.15	27.8	33.47	27.4	33.01	2.83	280

Dehumidification DP/MCDB and HR								Enthalpy/MCDB						Extreme Max WB
0.4%		1%			2%			0.4%		1%		2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	
26.6	29.71	31.26	26.1	29.25	31.05	25.7	28.46	30.61	425.9	35.62	419	34.77	413.4	33.98	30.8

Extreme Annual Design Conditions

Extreme Annual WS				Extreme Annual Temperature				n-Year Return Period Values of Extreme Temperature							
				Mean		Standard deviation		n=5 years		n=10 years		n=20 years		n=50 years	
1%	2.5%	5%		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
6.6	5.9	5.3	DB	8.31	37.29	1.63	0.73	7.1	37.8	6.2	38.2	5.3	38.7	4.1	39.2
			WB	5.58	29.39	1.58	0.48	4.4	29.7	3.5	30	2.6	30.3	1.5	30.6

Monthly Climatic Design Conditions

			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperatures, Degree-Days and Degree-Hours		DBAvg	23.46	16.58	17.16	18.88	22.55	25.72	28.18	30.02	29.63	27.85	24.8	21.97	18.22
		DBStd	2.48	2.92	3.23	3.34	3.13	2.57	2.11	1.27	1.43	1.93	2.22	2.57	2.99
		HDD10	0.95	0.52	0.28	0.04	0	0	0	0	0	0	0	0	0.11
		HDD18	181.95	61.78	49.91	30.46	3.31	0.04	0	0	0	0	0.83	2.21	34.21
		CDD10	4928.32	264.43	202.31	275.24	376.46	487.24	545.45	620.47	608.41	535.48	458.95	350.01	254.87
		CDD18	2187.5	17.69	26.12	57.05	139.77	239.29	305.45	372.47	360.41	295.48	210.98	121.22	40.97
		CDH24	18718.67	17.75	60.81	187.51	697.48	1728.67	3063.9	4475.5	4186.01	2803.84	1097.6	347.56	52.04
		CDH26	11041.68	1.79	16.39	63.58	326.54	903.28	1839.25	3002.15	2728.22	1567.19	454.66	125.32	13.31
Wind		WSAvg	2.51	2.74	2.52	2.54	2.45	2.35	1.87	2.12	2.2	2.75	3.03	3.04	2.92
Precipitation		PrecAvg	2448.57	99.19	139.12	157.83	158.39	247.32	348.87	222.61	347.47	347.82	180.83	99.8	99.32
		PrecMax	4438.05	260.45	427.15	289.8	401.95	639.5	712.3	439.3	809.85	1494.25	1000.55	296.6	236.45
		PrecMin	1200	22	17.85	37.3	29.25	25.6	107.55	83.35	59.25	38.3	27.1	13.8	2.45
		PrecStd	689.12	67.74	111.7	66.28	101.95	162.92	165.61	77.97	221.26	328.69	201.44	77.54	61.53
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	26	28	29.7	32.9	35	35.8	36.8	36.7	35.3	33	30.9	27.7	
		MCWB	20.4	21.6	23	25.1	26.9	28.1	27.7	27.9	27.6	26.1	25.2	21.3	
	2%	DB	24	25.8	27.8	31	33.4	34.7	35.7	35.4	34	31.4	29	25.4	
		MCWB	18.6	20.4	21.4	24.1	26.2	27.3	27.4	27.3	26.7	25.3	23.2	20.6	
	5%	DB	22.4	24	26.2	29.4	31.8	33.7	34.7	34.5	33	29.9	27.4	23.7	
		MCWB	18	19.4	20.7	23.4	25.4	26.9	27.4	27.3	26.4	24.7	22.5	19.3	
	10%	DB	20.8	22.2	24.4	27.8	30.4	32.6	33.9	33.5	31.7	28.5	26	22.4	
		MCWB	17.7	18.3	20.1	23	24.9	26.6	27	26.8	25.9	23.8	21.9	19	
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	21.1	22	24	25.8	27.7	28.6	29	28.9	28.1	26.7	25.4	22.4	
		MCDB	25	26.2	29.7	31	34.1	34.6	34.9	35.3	33.7	32.7	30.4	25.8	
	2%	WB	19.7	20.6	22.5	25	26.6	27.9	28.3	28.2	27.4	25.9	24.1	21.1	
		MCDB	22.5	24.6	26.6	30.4	32.3	33.9	34.4	34.2	32.9	30.8	28.1	23.6	
	5%	WB	18.7	19.6	21.4	24.2	25.9	27.3	27.8	27.7	26.8	25.1	23.2	20.3	
		MCDB	21.6	23.5	25.3	28.6	31.2	32.5	33.7	33.3	32	28.8	26.4	23.2	
	10%	WB	17.9	18.5	20.4	23.3	25.2	26.8	27.3	27.2	26.2	24.5	22.4	19.3	
		MCDB	20.5	22	23.8	27.3	29.5	32.1	32.9	32.6	31	27.4	25.6	22.2	
Mean Daily Temperature Range		MDBR	4.72	5.4	6.12	6.6	6.48	6.82	7.26	7.01	5.73	4.64	4.54	4.55	
	5% DB	MCDBR	4.4	5	5.8	6.3	6.2	6.6	7.1	6.9	5.5	4.4	4.3	4.3	
		MCWBR	3.5	3.7	4.2	4.2	3.9	3.6	3.6	3.5	3.2	2.9	3.1	3.3	
	5% WB	MCDBR	1	1	1	1	1	1	1	1	1	1	1	1	
		MCWBR	3.3	3.5	3.9	4	3.7	3.5	3.5	3.4	3.1	2.7	2.9	3.1	
Clear Sky Solar Irradiance		taub	/	/	/	/	/	/	/	/	/	/	/	/	
		taud	/	/	/	/	/	/	/	/	/	/	/	/	
		Ebn,noon	/	/	/	/	/	/	/	/	/	/	/	/	
		Edn,noon	/	/	/	/	/	/	/	/	/	/	/	/	
All-Sky Solar Radiation		RadAvg	1.01	1.17	1.41	1.7	1.94	2.09	2.55	2.38	2.12	1.62	1.24	1	
		RadStd	0.8	1	1.11	1.2	1.13	1.08	1.03	1.03	1.15	1.03	0.88	0.77	

Data Source

Redesign the data from CWB weather station according to ASHRAE Handbook 2017

Building Application

Able to calculate the air-conditioning load and the condition of energy saving design.

Sources：http://ashrae-meteo.info/

GreenBIM Website： http://www.weatherservice.org.tw/

Contact us： weatherservice.TW@gmail.com