

PROJECT COST AND EMISSION REDUCTION POTENTIAL

GHG emission reduction

Projection of Energy use and Emission from NHA Project (per year basis for cumulative number of houses built by that year)

YEAR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
No. of constructed units in that year	11,258	10,564	13,582	8,252	14,387	6,938	16,443	8,282	19,158	14,242
Accumulated no. of houses constructed by the year	18,313	28,877	42,459	50,711	65,098	72,036	88,479	96,761	115,919	130,161
Baseline case										
Energy use (MWh)	36,138	56,692	83,232.32	99,657.08	126,826.46	139,605.97	171,590.73	187,003.55	224,844.90	251,584.00
CO2 (ton)	18,846	29,565	43,405.66	51,971.17	66,140.00	72,804.51	89,484.57	97,522.35	117,256.61	131,201.06
Energy Efficiency case										
Energy use (MWh)	20,669	32,795	48,229.10	57,871.26	73,864.76	81,318.70	100,037.34	108,908.31	131,543.21	146,993.58
CO2 (ton)	10,779	17,103	25,151.48	30,179.86	38,520.47	42,407.70	52,169.47	56,795.68	68,599.78	76,657.15
Reduction Potential										
Energy (MWh)	15,467	23,896	35,003.22	41,785.82	52,961.70	58,287.27	71,553.40	78,095.25	93,301.69	104,590.42
CO2 (ton)	8,066	12,461	18,254.18	21,791.30	27,619.52	30,396.81	37,315.10	40,726.67	48,656.83	54,543.91

Note: CO2 calculation based on current TGO Emission factor at 0.5215 kg CO2/kWh

: Project emission reduction calculated from accumulated reduction in Year2027 which the emission reduction per unit is 0.42 tCO2/year or 8.4 tCO2 per 20 year lifetime. Therefore the EE units constructed during 2020-2022 will reduce GHG emission at 304,256 tCO2.

Project cost

HOUSE TPYE	Unit	Year 3				Year 4				Year 5				TOTAL
		no A/C	std A/C	High eff. A/C	Total	no A/C	std A/C	High eff. A/C	Total	no A/C	std A/C	High eff. A/C	Total	
SINGLE HOUSES														
1.Number of units	units	1735	2247	250	4232	717	928	103	1748	1026	1329	148	2502	1735
Base case														
2.Investment cost	MB	2,812	3,642	405	6,859	1,220	1,580	176	2,975	1,833	2,374	264	4,471	14,304
Green house case														
3.Incremental cost														
From LED LAMP	MB	1	2	0	3	1	1	0	1	1	1	0	2	6
From air conditioners	MB			3	3			1	1			2	2	5
From building envelop	MB	23	29	3	55	9	12	1	23	13	17	2	33	111
4.Incremental Cost	MB	23.89	30.94	6.13	60.97	9.87	12.78	2.53	25.18	14.13	18.29	3.63	36.05	122.20
TWIN HOUSES														
1.Number of units	units	550	581	65	1196	313	330	37	680	711	751	83	1546	3422
Base case														
2.Investment cost	MB	756	799	89	1,644	452	477	53	982	1,078	1,139	127	2,343	4,969
Green house case														
3.Incremental cost														
From LED LAMP	MB	0	0	0	1	0	0	0	0	1	1	0	1	2
From air conditioners	MB			1	1			0	0			1	1	2
From building envelop	MB	7	8	1	16	4	4	0	9	9	10	1	20	45
4.Incremental Cost	MB	7.58	8.00	1.59	17.17	4.31	4.55	0.90	9.76	9.79	10.35	2.05	22.19	49.12
ROW HOUSES														
1.Number of units	units	1973	176	20	2168	951	85	9	1045	1643	146	16	1806	5019
Base case														
2.Investment cost	MB	1,797	160	18	1,974	909	81	9	999	1,650	147	16	1,813	4,787

HOUSE TPYE	Unit	Year 3				Year 4				Year 5				TOTAL
		no A/C	std A/C	High eff. A/C	Total	no A/C	std A/C	High eff. A/C	Total	no A/C	std A/C	High eff. A/C	Total	
Green house case														
3.Incremental cost														
From LED LAMP	MB	1	0	0	2	1	0	0	1	1	0	0	1	4
From air conditioners	MB			0	0			0	0			0	0	0
From building envelop	MB	26	2	0	28	12	1	0	14	21	2	0	24	65
4.Incremental Cost	MB	27.17	2.42	0.48	30.06	13.09	1.17	0.23	14.49	22.63	2.01	0.40	25.04	69.60
CONDOMINIUM														
1.Number of units	units	3472	2263	251	5986	2772	1806	201	4779	4949	3225	358	8533	19298
Base case														
2.Investment cost	MB	1,340	873	97	2,310	1,123	732	81	1,936	2,105	1,372	152	3,630	7,876
Green house case														
3.Incremental cost														
From LED LAMP	MB	2	2	0	4	2	1	0	3	4	2	0	6	14
From air conditioners	MB			3	3			2	2			4	4	9
From building envelop	MB	45	30	3	78	36	24	3	62	65	42	5	111	252
4.Incremental Cost	MB	47.81	31.16	6.18	85.14	38.17	24.87	4.93	67.97	68.15	44.41	8.81	121.37	274.49
TOTAL Units	unit	7,730	5,267	585	13,582	4,752	3,150	350	8,252	8,330	5,452	606	14,387	36,221
TOTAL investment cost	MB	6,705	5,474	608	12,787	3,703	2,869	319	6,892	6,666	5,032	559	12,257	31,936
TOTAL incremental cost	MB	106.44	72.52	14.38	193.34	65.44	43.37	8.60	117.41	114.70	75.07	14.88	204.65	515.41

Note: Houses are classified into no Air, Standard Air conditioners and High efficiency Air conditioners.