EXECUTIVE SUMMARY

The pace of growth and development in India has pushed the demand for energy and resources in parallel. With more than 30% of the total population in India residing in cities, the need to satiate energy requirements of these burgeoning centers of demand is crucial to sustainable development. The 'Development of Solar Cities' programme by Ministry of New and Renewable Energy (MNRE), Government of India is aimed at creating self-sustaining cities by leveraging the immense solar potential through renewable energy and several other energy efficiency projects in order to curb conventional energy demand by 10% in the next five years. Envisioned as a roadmap for Indian cities to chart their individual path of sustainable development encompassing formulation of renewable energy and energy efficiency strategies, this Master Plan is developed in support from the MNRE to provide a direction for development of solar cities in India.

The master plan begins with the introductory city profiles which encapsulate the city's current energy demands and also the municipal Council services which are intrinsic to the city's growing energy demand.

The 2nd chapter provides the *Current Energy Scenario of Coimbatore*. Detailed analysis of the trend and pattern of electricity, petrol, diesel, kerosene and LPG consumption has been discussed and thoroughly analyzed to base the strategy development of the city. The main sources of energy in the city are electricity, petrol, diesel, LPG and kerosene.

The 3rd Chapter *Energy Demand Forecast of Coimbatore* estimates the future conventional energy demand interpolating the past data of energy consumption as well as population growth data. However other key aspects detrimental to energy demand like city economic growth has also been considered for ascertaining the city's future conventional energy demands.

GOAL FOR YEAR 2016

Studying the historical growth in consumption levels and population growth projections until the year 2021, it has been assessed that the energy consumption in Coimbatore in 2021 can be ascertained under the highest growth scenario as **3832.15 MU**.

This gives the city a 10% reduction goal of **383.22 MU.**

The success of renewable energy technology projects can only be assured with an accurate resource assessment and its potential in the city. Hence the 4th Chapter *Renewable energy and Energy Efficiency Strategies for CMC* begins with the resource availability and intensity of renewable energy resources like solar, wind, hydro- and geothermal in the city. This chapter is the most substantial part of the master plan as it delineates the specific strategies for the city. For ease of study, the city has been divided into **Residential; Commercial & Institutional; Government & Municipal and Industrial sectors** and both renewable energy and energy efficiency initiatives are enlisted within it.

Based on the estimates and ensuing calculations, a reduction through renewable energy initiatives in the city renders an aggregate reduction of 335.80 MU over five years with a substantial contribution towards this reduction from industrial (49.43%) and residential (24.19%) sectors. The savings in energy brought about by energy efficiency programs is 253.71 MU over the same 5 year period with major contributions from initiatives undertaken in residential (40.04%) and industrial (14.72%) sectors. With targeted projects like installation of solar water heaters and replacement of DG sets with PV systems, the city can potentially achieve the prescribed target well within 5 years.

In addition, budgetary requirements and subsidies available are incorporated in the evaluation of expected investment over the five year period. In conclusion, suggestions and recommendations, as per discussions in stakeholder meeting with the city are also outlined. The table below summarizes the year wise energy savings goal with RE and EE strategies in different sectors:

RE and EE Strategy for Coimbatore City	Energy Savings target over 5 years period of implementation					Total Energy Savings (MU)	% of savings target to achieve	Emission reduction / year
	1st Year	2nd year Cumulative	3rd year Cumulative	4th year Cumulative	5th year Cumulative			
RE for Residential Sector	9.27	23.18	41.72	64.90	92.72	92.72	24.19%	63892
RE for Commercial & Inst. Sector	4.41	11.03	19.85	30.88	44.11	44.11	11.51%	37496
RE for Industrial Sector	18.94	47.36	85.25	132.61	189.44	189.44	49.43%	161021
RE for Municipal Sector	0.95	2.38	4.29	6.67	9.53	9.53	2.49%	8051
Total for RE strategy	**33.58**	**83.95**	**151.11**	**235.06**	**335.80**	**335.80**	**87.63%**	**270461**
EE for Residential Sector	15.34	38.36	69.04	107.40	153.43	153.43	40.04%	124280
EE for Commercial Sector	2.82	7.04	12.68	19.72	28.18	28.18	7.35%	22822
EE for Industrial Sector	5.64	14.10	25.38	39.48	56.39	56.39	14.72%	45679
EE for Municipal Sector	1.57	3.93	7.07	11.00	15.71	15.71	4.10%	11651
Total for EE Strategy	**25.37**	**63.43**	**114.17**	**177.60**	**253.71**	**253.71**	**66.20%**	**204432**
RE and EE Combined Strategy	**58.95**	**147.38**	**265.28**	**412.66**	**589.51**	**589.51**		**474893**
	12%	**31%**	**55%**	**86%**	**122%**	**122%**		

FINANCIAL OUTLAY

The total indicative budget for development of Coimbatore as Solar City is estimated at Rs. 1445.30 crore which will be invested over the 5 years of implementation period of solar city development programme. The total budget will be shared by the state government/ City authority, MNRE and the private users. The budget for implementation of RE strategy and EE strategy is estimated at Rs. 953.85 crore and Rs. 491.46 crore respectively. While budget for RE strategy will be shared among MNRE, state/city and private users, private investors and state government will primarily drive EE activities.

	Year 1 (Crore)	Year 2 (Crore)	Year 3 (Crore)	Year 4 (Crore)	Year 5 (Crore)	Total (Crore)
State / City Share	9.03	13.55	18.07	22.58	27.10	90.33
MNRE Share	30.59	45.81	61.04	76.27	91.52	305.23
Private Share	104.97	157.46	209.95	262.44	314.92	1049.75
Total Budget	**144.59**	**216.83**	**289.06**	**361.29**	**433.54**	**1445.30**

GUIDEBOOK FOR DEVELOPMENT OF SOLAR CITY

The "Guidebook for development of Solar City" is an integral part of the Master Plan. The guidebook provides generic information about general energy scenario, renewable energy scenario and energy efficiency initiatives in India, evolution of solar city concept, international solar city initiatives and local renewable network in its first two chapters. The third chapter describes the solar city programme in India and its objectives, targets and guidelines. Indicative renewable energy devices and energy efficiency measures are described in chapter 4 & 5. Financial models have been suggested in the 6th Chapter *Financial Schemes and Business Models* to enable the city to implement the strategies listed here. The implementation phase under this programme will be the key indicator to determine the level of success for this MNRE programme. The 6th Chapter cites numerous schemes available in India as well as various business models which can be emulated for successful implementation of RE & EE projects.

Not only financing but capacity building and awareness generation go hand in hand to ensure sustainability of the MNRE programme. All activities from developing a "Solar City Cell" to workshops and training have been discussed in the 7th Chapter *Implementation Strategy for Solar City Programme*.

8th Chapter *Risk Analysis* describes the risks involved in developing renewable energy projects in the Indian context and suggests mitigation methods for the cities. A generic approach has been taken to provide the preventive measures however risks are city-specific and requires intrinsic detailing for individual projects.

The master plan provides a framework to compare and analyze alternative strategies and policies, in order to facilitate Council's review and the decision-making process. Achieving significant reduction in energy consumption requires collective effort by all City departments, other government departments, businesses, industries and citizens. The City needs to become a bolder leader in its policies, planning, programs, advocacy and its own operations – there is a tremendous opportunity and need to demonstrate Community Leadership. The investigation showed that the biggest energy saving potential is in the residential sector and most significant RE potential is for solar energy projects. It is the responsibility of leaders in all tiers of government, commerce, industry and civil society to promote action towards more efficient and renewable energy use.