

MAHINDRA WORLD CITY, JAIPUR CLIMATE POSITIVE ROADMAP SUMMARY



INTRODUCTION

As a pioneer of the concept of an Integrated Business City in India, the Mahindra World City Jaipur (MWCJ) represents a unique ecosystem for working and living; aiming to create sustainable urban communities by establishing integrated business cities which enable the transformation of 'Life, Living and Livelihood'.

The Mahindra World City project in Jaipur is a development project of Mahindra World City Jaipur Limited, a subsidiary of Mahindra Lifespaces. As a Participant in C40's Climate Positive Development Program, Mahindra World City Jaipur strives to be a model urban project, to implement climate change mitigation strategies for a large scale development project and do so in an economically

and environmentally viable manner. In turn, the project shall not only reduce its on-site greenhouse gas emissions but also improve the emission profile of the community at large.

C40's Climate Positive Development Program sets out a framework that helps guide a project's journey to achieve a net-carbon negative outcome, encouraging developers to create a revolutionary new model of ambitious sustainable development. As a founding member of C40's Climate Positive Development Program (CPDP), Mahindra World City Jaipur seeks to plan for, measure and verify this positive environmental impact through tracking and monitoring the development's operational carbon impact and implementing measures to

reduce and offset this impact. At project completion, Mahindra World City Jaipur will have had a net impact of reducing over 60,000 tons of CO₂e per year. Compared with their business as usual baseline of over 800,000 tons of CO₂e, the impact of this development being built is enormous! The social and economic impact of the development of MWCJ and neighbouring communities are also a key concern and will be monitored with the help of periodic social impact assessments at various stages of the development but is not covered in the scope of the Climate Positive Roadmap.

This brief document represents a summary of the Mahindra World City Jaipur Climate Positive Roadmap, which details and quantifies the journey the project will take to achieve net carbon negative outcomes, as required under the Climate Positive Framework.

More detail on each of the strategies and calculations presented in this document can be found in the complete Roadmap located here [LINK].

Two key strategies in Climate Positive to offset emissions:

Efficiency/Impact Reduction measures: These are measures that reduce the carbon impact from Energy, Transport and Waste, thereby reducing the total operational annual carbon emissions on site. These Carbon savings through efficiency measures are necessary to reduce the baseline emissions impact but are not sufficient to achieve a final climate positive outcome.

Credits: These measures often have an impact that extends beyond the boundary of the site. Credits help offset the remaining carbon emissions, resulting in net-negative emissions (Climate Positive Outcome). These measures involve reducing the emissions of the adjacent community or creating additional carbon sinks through carbon sequestration measures.

PROJECT OVERVIEW & CONSTRUCTION TIMELINE

Located just off National Highway 8 (Jaipur-Ajmer Highway) in the North-Western state of Rajasthan, the 3000-acre Mahindra World City in Jaipur (MWCJ) is a joint venture between Mahindra Group and Rajasthan State Industrial Development Corporation (RIICO), an agency of the Government of Rajasthan. When completed, Mahindra World City Jaipur will house and employ nearly 300,000 people. The development is projected to be completed by 2025.

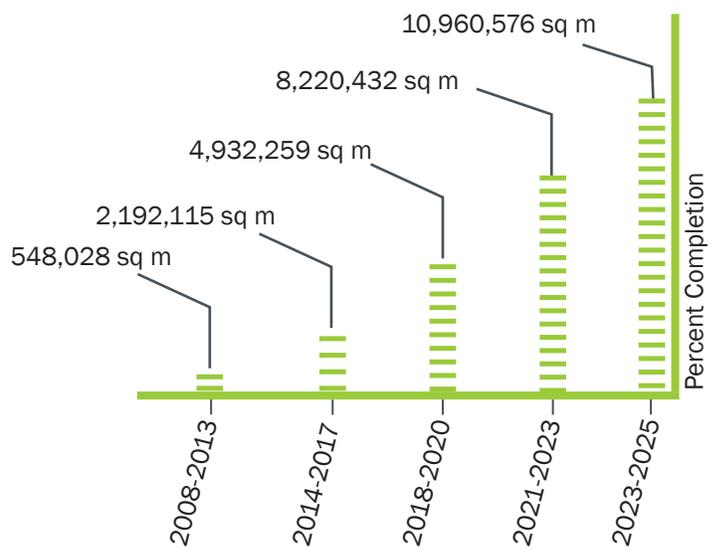


FIGURE 1: CONSTRUCTION TIMELINE

DETERMINING BASELINES

As the first step in setting the strategies for achieving net carbon negative, Mahindra World City determined the annual baseline emissions from operations energy use, transportation and waste generation to determine the Total Baseline Carbon Impact of the project under a business-as-usual scenario where no efficiency measures are put in place.

- Baseline energy demand is projected to be roughly 875,000 MWH per year; with a CO₂e of 680,000 tons.
- Transportation projections were projected to include a baseline of 214 million KMs traveled by two wheeler; 258 million KMs traveled annually by car; and 10 million KM traveled by bus, calculated to be around 100,000 tCO₂e per annum
- Waste baseline was projected at a total of 13,000 metric tons of waste annually

A complete chart of the calculated projected impact can be found in Figure 2 below. For more detail on the methodologies used to calculate the baselines projections see the Mahindra World City Climate Positive Roadmap.

	ANNUAL PROJECTED IMPACT (tCO ₂ e)
Energy Use	681073.9
Water Supply	3622
Wastewater Treatment	9513.2
Waste Disposal/ Treatment	33583.2
Transport	102465.6
TOTAL	830258

FIGURE 2: ANNUAL PROJECTED BASELINE IMPACT

Note: Emissions from construction activities on site will not be incorporated as part of the Baseline Carbon Impact of the site. Key Impact Reduction Strategies during the construction phase will also be included in the scope of this report but will not be used to offset baseline operational emissions.

STRATEGIES FOR ACHIEVING CLIMATE POSITIVE

With the baseline established, the following section summarizes strategies presented in the Mahindra World City Jaipur Climate Positive Roadmap to maximize efficiency onsite and abate emissions offsite to achieve net carbon negative results in energy, transportation, water and waste. Much more detailed information on each of these strategies can be found in the complete Mahindra World City Jaipur Roadmap.

ENERGY IMPACT REDUCTION

As energy accounts for 82% of the total carbon emissions, the strategies presented work to significantly reduce energy through a wide range of technology and infrastructure strategies. The energy impact reduction strategy for Mahindra World City,

Jaipur focuses on three key initiatives:

- 1) efficient use of energy in buildings (vertical infrastructure),
- 2) efficient use of energy for utilities (horizontal infrastructure)
- 3) use of renewable energy (solar).

These strategies are designed to be flexible in order to accommodate any changes in technology, energy supply and town planning, which are likely in a long-term development project of this scale. A breakdown of the energy strategies is found below and a detailed breakdown on the energy impact and savings from buildings and utilities can be found in Figure 3.

Building strategies for 30% reduction include:

- Optimal insulation and HVAC improvement

measures

- Lighting energy efficiency strategies
- Energy efficiency pumps and motors
- Other strategies including efficient elevators and water controls on water tanks
- Utilities including energy efficient pumps and motors and water supply pumping system provided with variable speed drive to conserve energy
- Use of LED energy efficient street lighting
- At least 50% of all rooftops on buildings on site will be dedicated to rooftop solar, off-site on-grid solar energy solutions and energy efficiency LED street lighting



IMAGE 1: DEUTSCHE BANK BUILDING AT MWCJ

	IMPACT REDUCTION TARGET	ENERGY SAVINGS (MWh)	ENERGY USE AFTER SAVINGS (MWh)	tCO2E IMPACT	tCO2E ABATED ANNUALLY
Buildings	30%	261,951.5	611,220.2	476,751.7	-204,322.2
Utilities	20%	3,358	13,472	166.8	-2627
TOTAL		2,653,19.5	624,692.2	476,918.5	-206,949.2

FIGURE 3: EXPECTED ENERGY IMPACT REDUCTION

in substantial CO2 impact reduction when compared to the current baseline scenario where 87.5% of waste is disposed in landfills.

WASTE IMPACT REDUCTION

The Waste Impact Reduction strategy for Mahindra World City Jaipur addresses the management of the various types of waste (Municipal Solid Waste, Industrial waste, E-waste) generated on site in the most environmentally and economically sustainable way. As the majority of the waste generated on site is expected to be Municipal Solid Waste, reduction strategy for MWCJ therefore focuses on the reduction of MWS and its effective segregation, treatment and disposal. The strategy for MSW includes the following actions:

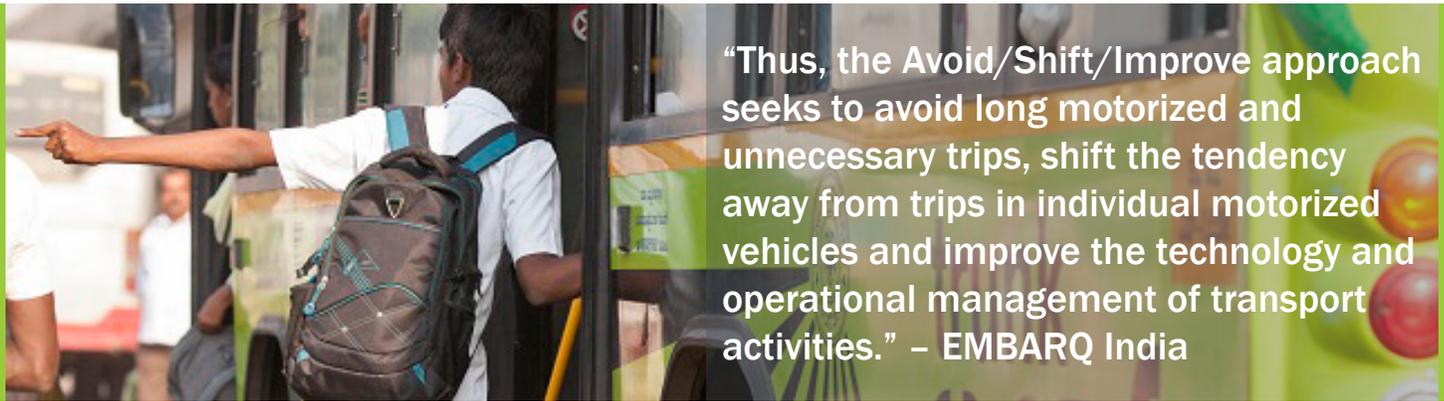
- Implementation of education programmes to promote resident/employees to “Reduce, Reuse, and Recycle’ waste
- Collection/Treatment of Segregated Waster
- Engagement of third party agency for collection of paper, glass, metal and plastics segregated on site for treatment at off-site recycling facilities
- Engagement of third party agency to collect biodegradable waste for treatment in biogas plant and composting - 78% of the MSW is expected to be biodegradable waste. This is a significant improvement which will result

TRANSPORTATION IMPACT REDUCTION

The sustainable transport strategy for Mahindra World City, Jaipur utilises the Avoid, Shift and Improve approach for developing a sustainable transport plan for MWCJ. The sustainable transport strategy incorporates a variety of non-motorised and public modes of transport, thereby reducing the overall CO2 impact from transport on site and focuses on three main strategies:

AVOID/REDUCE

This strategy focuses on the need to improve the efficiency of the transport system. In MWCJ efficiency will be accomplished through integrated transport and land use planning to achieve successful transit oriented development which reduces the need for travel within the district by co-locating housing, jobs and open spaces around transit stops.



SHIFT/MAINTAIN

Shift instruments seek to improve trip efficiency by shifting individuals from an energy consuming mode (i.e. cars) towards more environmentally sustainable modes of transportation. In MWCJ, there are three main strategies to achieve the modal shift: focus on connectivity, walkable neighbourhoods and development of integrated networks of open space, pedestrian walkway and cycling paths. In addition, MWCJ will work with businesses to shift workers away from private transportation and towards sustainable modes of transportation through education, incentives, and targeted sector strategies.

IMPROVE

The improve strategy focuses on vehicle and fuel efficiency along with the optimization of transport infrastructure through the implementation of a Bus Rapid Transit network and the use of low-emission fuel.

ABATING EMISSIONS: SITE-WIDE INITIATIVES & CLIMATE POSITIVE CREDIT PROJECTS

One of the key components of the Climate Positive Development Program is quantifying the project’s ability to reduce carbon emissions in the community.. In addition to all of the efforts to maximize efficiency within the development, the developers are also pursuing the following initiatives as part of their sustainability plan include:

Extension of Jaipur Metro Line

- Expansion of the current rail line under construction by an additional 16 km to reach Mahindra World City Jaipur, providing residents and employees with direct access to Jaipur and the surrounding area through a low carbon transportation option.

Installation of LED bulbs in surrounding community streetlights

- The project will replace street lighting in the surrounding area, reducing the overall energy use of the lighting and helping the community adopt new, more efficient technologies which are currently not used. The LED street light initiative is projected to reduce nearly 10,000 tons of CO₂ per year.

Off-site solar power installation

- Installation of solar plants off-site to provide solar power sold back to regional electrical grid

Carbon Sequestration

- Provision of Green Space and use of Native Plants: The landscaping design in the master plan incorporates the provisions of green space through the development, totaling approximately 10% of the total developed area. The landscaping will include native plants which require less watering.
- Tree Planting Drive: An initiative will support the planting of trees by on-site employees into the adjoining villages. To date, 13,200 trees have been planted in the neighboring community, and over 10,000 trees have been planted within Mahindra World City Jaipur