Gwalior City

Action Plan to reduce GHG emissions from Municipal Services'



Pawan K Sharma Commissioner Gwalior Municipal Corporation

GWALIOR CITY

- Gwalior is the fourth largest city in the Madhya Pradesh State.
- o Proximity to Delhi brought it's status as "COUNTER MAGNET" to national capital region.
- Gwalior is an industrial and artisan center.
- Gwalior is an example of palace architecture of the best Hindu period.
- City is also famous as an Educational Centre.
- o GMC is making great efforts to improve civic services and make it "clean and green "city.



CITY AT A GLANCE

Area	166.83 sq. km.
Population (In Lakh)	8.29
Decadal Growth Rate	19.71%
Population Density	201 pph
% of Slum Population	16.34%

Cities for Climate Protection Campaign GWALIOR

- Gwalior Municipal Corporation (GMC) Joined CCP campaign in 2004.
- It completed carbon emission inventory.
- Total carbon emissions coming from activities in Gwalior city amounts to 785,107 T/year. Per capita emissions for Gwalior are 0.90 T/ year or 2.45 Kg per day.
- At corporation level GMC activities contributes 36,209 T e
 Co2 per year. Water supply shares 82% of total carbon emissions of corporate sector
- Action plan to reduce GHG emissions from Municipal Services was developed under CCP program

Actions:

- Energy Efficiency at Motijheel Pumping Station.
- ESCO project for Street lighting.

PRESENT WATER SUPPLY SYSTEM

- About 145 MLD water is supplied in Gwalior city.
- Major proportion of water for the city comes from the Tighra dam and some portion is extracted from 1200 Ground sources through bore wells distributed within the city.

Moti Jheel Water Works

- Moti Jheel is the lone water works operated by Gwalior Municipal Corporation (GMC)
- •it is aptly the lifeline of Gwalior.
- •Established originally in 1938, it comprises of two Plants namely Old & New.

Energy Audit at Moti Jheel Water Works

A. Electricity consumption assessment

Moti Jheel water works consume 67% of total energy used for water pumping in Gwalior city. The analysis of monthly electricity bills shows the trend as;

- **2.64% monthly compounding increase** in units (Kwh) consumed.
- Monthly average consumption shot up from 0.65 to 1.45 million units.
- Maximum Demand (MD) has increased from about 1800 to 2500
 KVA.
- Load factor has also increased from 0.46 to 0.86.

This shows **substantial decreases in energy efficiency** during last two years.

Energy Audit at Moti Jheel Water Works

B. Pure Water Pumps Study (New Plant):

- Pumps are being operated under throttled condition in an attempt to deliver water to all the reservoirs, this implies colossal wastage of energy.
- •The operating point of the pumps in the new plant is mostly at **low efficiency**, this leads to overloading of motors and cavitations of pump internals due to higher Net Positive Suction Head Required (NPSHR) demands.
- Pumps site performance curves when compared to manufacturers performance curves confirm that under all the conditions the pump/s operate much beyond the recommended operating zone.
- They operate mostly in indeterminate zone away from the 'Best Efficiency Point' and do not follow the design calculations.

Energy Audit at Moti Jheel Water Works

C. System Performance Assessment

- •It revealed water supply connections to some consumers/areas have been provided by **tapping the rising mains**.
- •Due to simultaneous water pumping to all reservoirs and direct supply through various tappings done from rising main, the system pressure reduces making pumps to operate at low heads, causing short supply or no supply to some reservoirs/ tappings. In order to increase the system pressure artificially, the valves are throttled, at the cost of low quantity water pumping.
- •The 'C' value of Supply lines have drastically reduced due to ageing leading to significant en-route losses.
- •Currently, the pumps in Moti Jheel are used to convey water directly to all reservoirs. This necessitates operating the pumps at higher than required head for some of the reservoirs. This causes **use of high HP pumpsets & energy consumption**.

Opportunities for Energy Efficiency improvement

Recommendations for Energy Efficiency Improvement and potential greenhouse gas mitigation

Short Term Measure	Energy Saving Kwh/ day	Saving on Energy Bill Rs /Year	Payback period on Investment	Carbon emission reduction (Tonnes/ Yr)
Trim Impeller Diameter of P.W. Pumps to 525mm	3,122	3,098,8 50	2 days	1413
Repair NRVs stopping Reverse Flow@0.5%	102	101,10 5	90 days	46
Repair All the Sluice/ Gate/Butterfly Valves	102	101,10 5	360 days	46
Maintain Suction Tank Level Within 1' of FSL	123	121,54 5	instant	56
Avoid Operation of Pump No 2 an 4	Reduce air Intake & Vibrations	-	-	-

Medium Term Measure	Energy Saving Kwh/ day	Saving on Energy Bill Rs /Year	Payback period on Investment	Carbon emission reduction (Tonnes/ Yr)
Replace Existing Pumps 262LPS,78.5m,85%,5nos	3,600	3,574,0 80	5 months	1629
Replace the Non-Return Valves on Pumps 15% less head loss& no backtrack	13 + 368 CuM water+ revenue	12,872	15 months	6
Raise the Height by 1.5m of Suction Sump Storage	362	359,525	4 months	164
Replace KW meter and Ammeter on Panel	Help close monitoring	-		
Install Air Valves on Header & Rising Main	763 CuM water		5 months	96
Recycling the Filter Back-wash Water	1,006 +3,600 CuM water	994,990	10 months	455

Long Term Measure	Energy Saving Kwh/ day	Saving on Energy Bill Rs /Year	Payback period on Investment	Carbon emission reduction (Tonnes/ Yr)
Change of Pipes, Pumpsets Modifications Required, Valves, Civil Work etc	49.57 Million	13.43 Million	-	6503

MEASURES IMPLIMENTED BY GMC

EXPECTED RESULT

Revamping of both the pumping plants with new pump sets, valves, piping, starter, panels etc.

Increase in plant output (flow rate) = approximately 15% (Increase in 4 MGD). pumping water

Reduction in energy consumption = 10% (Decrease in energy

bills by approximately Rs.3

lacs per month).

Trimming Impeller in Pumps

= 15% reduction in Energy Bills

ABOVE measures for energy efficiency are expected to reduce 1500 T eco2 carbon emissions annually.

STREET LIGHTING ESCO PROJECT

- GMC has initiated street lighting ESCO project with private partnership.
- Initially two pilot projects were taken up to see the efficiency of instruments.
- ESCO company will install Power Savers in whole street lighting system.
- It will reduce 40% energy consumption.
- Monthly energy savings will be distributed between GMC and ESCO in 30:70 basis respectively.
- It will save about 3 Million KWH of electricity each year and 4000 Tones of eco2 annually.

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वचाद

प्रवेशिक तीर पर पुलकार मेंगों पर स्त्री

ग्वालियर, ५ अगस्तः स्टीट लाहे

वसं, मार्वियम्, १ कास्त् ।

नगर निगम प्रशासन विकास की सचत की शतआत येतोडील जनसंधन संदर्भ से करेगा। इसके रेनर समाम कंपनियों की अध्यक्त मंत्राह गह हैं। द्वितीय चरण में गतानगर की स्टीट सहरों को विद्युत ग्रह्मत पर विशेषण धा वार्ष शुरू किया जाएगा यह सं नियुत्त च्यांत को कथ बारते का कार्य इकरवे प्रदेश के सकतीको मार्गदर्शन

में किया का रहा है। इंदौर और उसीन नगर निगम की तर्ज पर ग्लाशियर के निगम प्रशासन ने भी विकासी बचाने का कैसास किया के। प्रशंक रिना हेटर पेशामन सहसंस्थित पार खेवला एन्यायामेंटल इन्वेशियटिय (इनस्पे) संस्था का तसमीकी मार्पदार्शन विकास का रहा है। याद रहे

उक्त संस्था न देश का आह मान्त्रपटी को अपने कार्य के डिवर् चुना है। एनपर्टि सीयन । को श्रेयदान स्थान रोक्सो के निर्मा द्वीरात द्वारा के क्षेत्र में अपर्व म्बालिया tipe

RICHE लवलीन काम कर के हैं।

वक जानकारी देते हुए सिटी प्लनार एसके बुद्दान ने बताया कि दमती सेतिंग को प्रथम कर रहा निगम प्रशासन, देश की विभिन्न एनजी सीचंद नंपनियों से बाहर चरिंग एकड़ी सेविन मिसटम सामाने के दिनए निविद्ध अव्यक्ति कर छ। है।

वारेखनीय है कि मोतीबील प्लाट प्रतिमाह संगंधन ३०-३२ माणु स्पर् विकास के जिल के रूप में भूगतन कर रहा है। वर्षभर में संबंध को विद्युत ब्रायत स्नामध्य पहर क्लोड्ड रुपए की है। क्षामें अधने के विच् एनवीं सीधन कंपनियों से बीओटी (बिन्ह आयेट एक हो सदस्य (प्रथम) है एका अनुबंध किया जाएगा। शिसके अनुसार कंपनी द्वारा बचाई गई लिहत खपत श्री परि अनुबंध अधिः एक कंपना को

अक् करने होते। असेता आह उत्तर सिक्टम निगम के पारित्रकाम सक्त में होता और अधिप्य में नाफी अचन नहें जा सक्ताः अगल सामग्र हक्त कंपनियो प्हीर सहरो में आहे हहामा मिलन के आपन मेंगना क्षांच्या गण था। इससे एक बाद में | इसर बादने। अगसी ातका 140 प्रिट सिक्ती को खप्त | चरवा में स्टीट कम से प्रदेश मिटी प्रस्ता की मुद्दाल के असही की विद्या अनुसार इस स्टिट्स की वाले रहते के प्राप्त रोजाने का लिए कंपने के बर्मकरों ही कार करेंगे। जाम किया क्रिका

को रोक्षणे के उन्तर असीत प्रतास आरंप को ना

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बन्ध्य कि बहानस में बन्धे प्रदेशन से प्रशान लेगी हो तातर देन के तथा जह एक अच्छा बदमा समित्र होता. मार में पहले प्रमुख और विराह्ने वर्गामा सहस्य उन्होंने स्वाप कि गांस्य कुए असे एक विकित्त स्वादेश

सभा को पता पेल पता के ले सहामत के प्रकृत और पर्यापन संस्तर मिनदूर के service of the properties of the same and the same WHEN THE THEM WHEN SHE'VE HARRIST

क्षेत्र कर्म क्षेत्र पार का पार की महत्त्वे निर्मा विकार है हम बार्ड के लिए एक इंग्रीनेस को पूछ गर है है वह है है कि इस के मेर अने के मेर है है है है है ह को विकास करने का अपने की है। यह रहे क्षरार्थ के व्याप कर रहा है।

केम ह में बहत हम बहु में किए देश 🔑

म बात आह महानारों की पान गंध है। इंग्रामाई मोतब द्वार शहरी बाह्यप्रमा स्मातम करवेद्धार प्रेर विद्याप में सहस्य 💺

इस संग्रह से यहन बार्ट पर श्रीवत के इंग्लिंग्स सम्बंध क्या ने ब्रह्म कि से सहर के प्राप्तेक विभाग से शंवर्ष में सर्वाध कर जन्मती जुड़ा के हैं।

जा रहा है। इसके सिंह कुलिय के पाने पाने मी देशों का उन्होंने बारावा कि हमारा मुख्य उद्देश्य प्रार्थ जाना करने नवर किया रूप है। भारत के आहे महानानों में स्वाहेनता. यहने सामनों पर स्वान हेन है स्वाहित सर्वीवस प्रदूषण ऐसे

Thanks