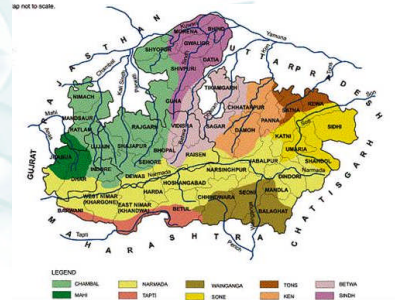


Clean Development Mechanism (CDM) Opportunities for MP Local Governments



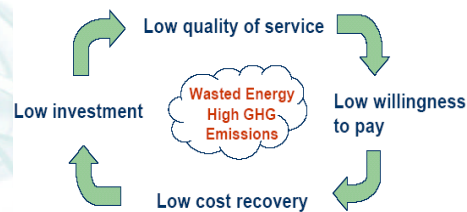
Presentation by
Pawan Kumar Sharma, IAS
Commissioner, Municipal Corporation,
Gwalior, Madhya Pradesh, India.

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CDM Opportunities for local Governments

Present Problems

- ☞ Huge demands for social services and infrastructure development needs
- ☞ Old inefficient systems for water supply and street lighting
- ☞ lack of local capacities and Management system
- ☞ Financial limitations



Present Condition of Municipal Services

Local Governments have opportunities in following sectors

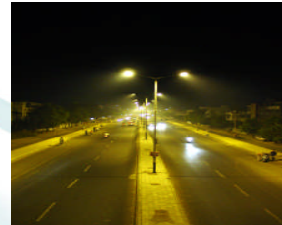
- Street Lighting
- Water/Sewerage Pumping
- Municipal Buildings
- Transportation
- Waste

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Municipal Energy Status



Municipal Service	% of total energy consumed
Water Supply	60 – 70 %
Sewage/Effluent	20 - 25 %
Street Lighting	20 – 30 %
Buildings/Misc.	5 – 10 %

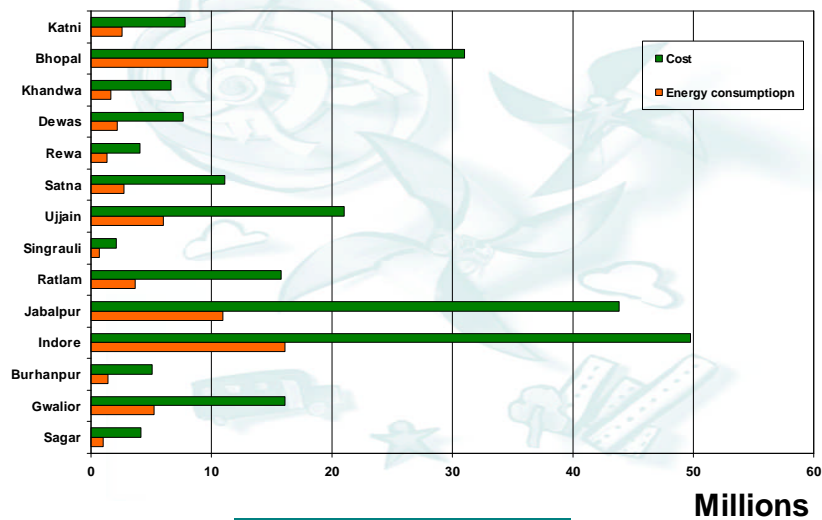


- ☞ Street lighting is **one of the major energy consuming** areas at corporation level
- ☞ Municipal Corporation pays large sum of money towards electricity usage for street lighting services.
- ☞ For e.g. Gwalior Municipal Corporation **spend around \$ 4,00,000 *per annum.**

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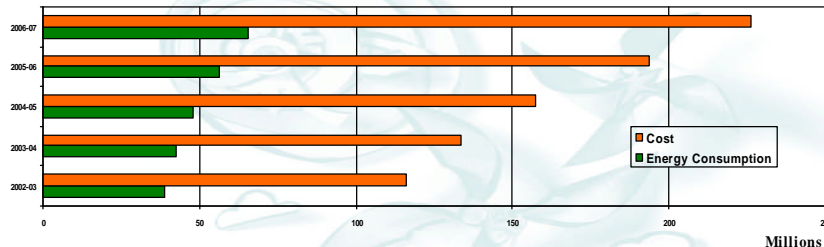
(* \$ 1= Rs. 40)

Existing Condition of Street lighting in 14 cities of M.P



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Total Energy Consumption in 14 M.P Cities in Street Lighting



- ☞ Street lighting energy consumption is gone *up by 68 % in last* five years
- ☞ All 14 cities' annual street lighting energy consumption is *65.33 M KWh* in the year 2006-07 with *total costs \$ 5,560,000*.
- ☞ Street lighting Contribute to *60,108 eCO2 (tonnes)/Year*.

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Major Issues.....



- ☞ **Manual switching** streetlights
- ☞ **Higher Lighting levels** than required standards
- ☞ **Non Uniform distribution** of illumination
- ☞ **Increase in lighting levels during off peak hours** (after 11 pm in night) due to increase in voltage.
- ☞ **Lighting devises are not mounted properly**, thus unnecessarily distributing light to surrounding areas and providing less light on roads and pathways.

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CDM Project in Street lighting A Solution

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About Project.....

- ☞ **To reduce city level street lighting energy consumption by system efficiency**
- ☞ **Up-gradation of inefficient fluorescent tubes, sodium & mercury vapour lamps with more efficient ones**
- ☞ **Improve the power factor & reliability at city level, also reduces the strain on capacity addition of power generation**
- ☞ **Add the CDM benefits, so that the project become more financially viable**

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Technical Description of the Project....

The project element **"Street Lighting Efficiency Improvements"** consists of the following:

- ☞ Installation of new, more efficient Street light components, ex.: replacement of conventional 40 watt tube light with **T-5 28 watt** (saves 20-25% energy)
- ☞ Computer Models for **mounting design** and selection of luminaries (Improve lighting levels)
- ☞ Programmable **timer switches** (save up to 10% energy)
- ☞ **Power Saver units**, which regulate voltage from 240V to 180 V after 10 pm or stepwise up to 110 V in different time slots (Save 25-40% energy)

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Gwalior City: A comparison between existing and proposed project activity:

Existing Condition

- ☞ Type of Fitting= 40 Watt
- ☞ No. of fittings= 7250
- ☞ Total load= 290 KW
- ☞ Annual Energy Consumption= 11,64,350 KWh
- ☞ Annual Energy Cost= \$ 87326

Recommendation

- ☞ Type of Fittings= 28 watt T-5
- ☞ No. of Fittings=7250
- ☞ Total load = 203 KW
- ☞ **Total Annual Savings = 7,85,936KWh**
- ☞ Saving = \$ 66195/ Year
- ☞ **Initial Investment = \$ 131406**
- ☞ Pay Back Period = 1.98 Years
- ☞ **eCO2 emission reduction = 771 tones/Year**

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Power Saver in Street Lighting- Gwalior



Existing Condition

☞ Annual Energy Consumption
=51,96,413Kwh

☞ Annual Energy Cost =
\$ 402722

Recommendation

☞ Savings = 25 - 40 %

☞ **Total Annual Energy Saving
=12,99,103Kwh**

☞ Annual Saving = **\$ 97432**

☞ Initial Investment = \$ 500000

☞ Pay Back = 5 Years

☞ **eCO2 emission reduction =
1195 t CO2 /Year**

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Switch Timer in Street Lighting- Gwalior



Existing Condition

☞ Annual Energy Consumption
=51,96,413 Kwh

☞ Annual Energy Cost =
\$ 402722

Recommendation

☞ Savings = 5 - 10 %

☞ **Total Annual Energy
Saving =2,59,820Kwh**

☞ **Annual Saving =
\$ 19487**

☞ Initial Investment = \$ 40000

☞ **Pay Back = 2 Years**

☞ **eCO2 emission reduction
= 240 t CO2 /Year**

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Measures with eCO₂ reduction for all cities.....



City	(A) Replacement of 40 watt with 28 watt T-5	(B) Power Saver	(C) Timer	(D) Replacement of Bulb with T-5 28 FTL, eCO ₂ (tonnes)	(E) Replacement of Bulb with CFL	B+C	A+B+C	A+E	A+D
Gwalior	771	1195	240	88.62	184.69	1435	1988.96	955.69	859.62
Indore	NA	350	70	0	0	420	420	0	0
Bhopal	606	2230	446	0	0	2676	3100.05	606	606
Jabalpur	1231	2519	503	0	0	3022	3199.58	547	547
Satna	680	1875	375	0	0	2250	2725.74	680	680
Dewas	720	508	101	14	4.6	609	713.291	324.6	334
Ujjain	591	1390	278	0	0	1668	2081.44	591	591
Rewa	269	301	60	54	55	361	559.378	334	333
Singrauli	62	180	34	0	0	214	232.041	27	27
Katni	238	597	119	61	47	716	922.239	285	299
Burhanpur	250	324	64	3	5	388	562.356	255	253
Khandwa	220	383	76	0	0	459	612.998	220	220
Ratlam	384	900	170	0	0	1070	1119.48	170	170
Sagar	454	241	49	93	130	290	716.131	584	547
Total	6476	12980	2585	313	427	15565	18953.7	5593	5479

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Estimated CER's



☞ Total Investment Required=

\$ 6262481

☞ Savings/year =

\$ 2264572

☞ Pay Back Period = **2.76 Year**

☞ CER's = **18,954**

☞ Total Cost of CER's

= **18954*10 (@\$10/CER's)**

= **\$ 189540/Year**

Year	CO ₂ Reduction (Tonnes)
2007	18954
2008	18954
2009	18954
2010	18954
2011	18954
2012	18954
2013	18954
2014	18954
2015	18954
2016	18954
Total	189540

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CDM Project in Water Supply

Pilot Project

In Gwalior, ICLEI-South Asia, under CCP Project, did water pumping energy audit at Moti Jheel Water works.



Energy Audit at Moti Jheel Water Works

- A. Electricity consumption assessment
- B. Pure Water Pumps Study (New Plant)
- C. System Performance Assessment



Potential of Energy Savings

Short term measures: 1.26 Million KWh and 1,560 T eCO₂ reduction annually.

Medium term measures: 1.83 Million KWh and 2,350 T eCO₂ reduction annually.

Long term measures: 50 Million KWh and 6,500 T eCO₂ reduction annually

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MEASURES IMPLIMENTED BY GMC

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 \$ 7500 per month).

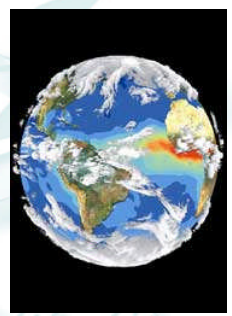
Trimming Impeller in Pumps = 15% reduction in Energy Bills

Above measures for energy efficiency reduced 1500 T eco₂ carbon emissions annually.

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THANK YOU!

*For more information:
<http://www.iclei.org/sa>*



Save the World.....

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