



International Institute for Energy Conservation

Partners for Sustainable Energy and Environmental Solutions

India's Emerging Methane to Markets Program

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Outline

- **Indian Dairy Sector**
 - **Potential (Market) Assessment**
 - **Demonstration Projects**
 - **Program Approach**
 - **Institutional Collaboration**
 - **Acknowledgements**
 - **About IIEC**
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Dairy sector in India is fast growing industry

- **Largest milk producer in the world**
 - **Milk production 94.5 million tonnes (2005)**
 - **Annual Growth rate – 4%**
 - **Institutionally - Department of Dairying under Ministry of Agriculture has the country-wide mandate**
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Methane to Market Partnership can impact diverse size of dairies ~ at least 800 dairies are immediate targets

- **Dairy Structure**
 - **Organized sector: Dairy Cooperatives and Private Plants, accounts 13% of total milk production**
 - **Unorganized sector: raw milk and milk product marketing contribute to the rest**
 - **Milk and Milk Product Order (MMPO) of 1992 mandated registration of dairies with capacities 10,000 liters/day or 500 tonnes of milk solids per annum**
 - **800 dairy processing plant registered as on 31 March 2006**
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***Electricity generation potential and
CH₄ emission mitigation in organized sector
alone is very high***

Organized sector milk production	12.3 x 10⁶ tons/year
Biogas generation potential	50 x 10⁶ m³/year
Electricity generation potential	80 MUs/year
Oil equivalent	28,800 tonnes
Methane emission reduction	23,075 tonnes

Electricity generation potential = 80 MUs

CH₄ mitigation = 23,000 tonnes



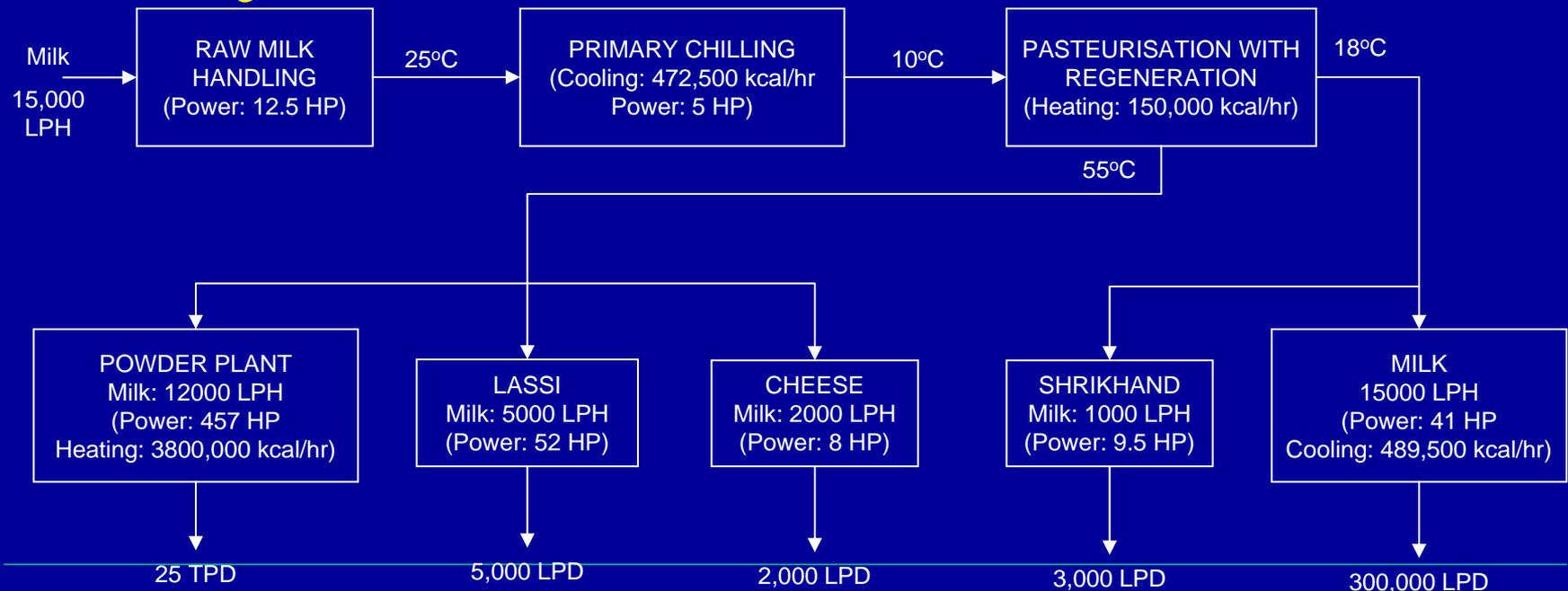
Electricity generation potential even in leading states like Maharashtra still remains untapped

- **Milk production: 6.4 million tonnes/yr**
- **185 registered dairies under MMPO**
- **Wastewater generation and characteristics**
 - **2-4 liters/liter of milk**
 - **COD: 1500 – 3000 mg/lit**
 - **BOD: 1000 – 2500 mg/lit**
- **Most of the dairies have effluent treatment plant used for compliance (permits) alone**
- **Biogas generated generally is flared off**



Dairies can utilize electricity and thermal energy in a closed loop system

- Mass and energy balance for a typical dairy in Maharashtra**



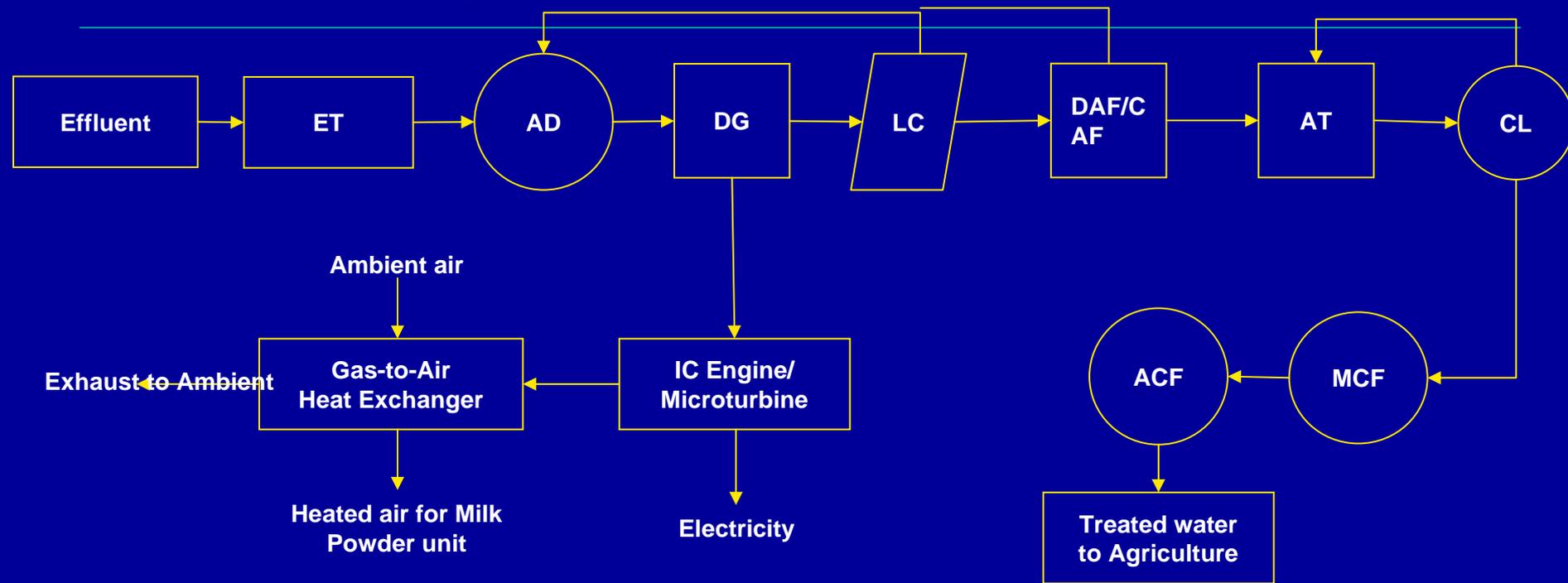


Demonstration project offers attractive payback periods

- **Potential assessment for a typical dairy in Maharashtra**
 - **Waste water generation** 1000 m³/day
 - **COD** 2000-3000 mg/lit
 - **Biogas generation potential** 1372 m³/day
 - **Electricity generation** 2000 units/day
 - **Initial investment** Rs. 1 crore (approx.)
(\$ 250,000)
 - **Saving potential** up to Rs. 45 lacs/yr
(\$ 120,000)
 - **Simple payback** 2.22 years
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Demonstration projects in Maharashtra offer combination of electricity and process heat options



ET: Equalization Tank	AT: Aeration Tank
AD: Anaerobic Digester	CL: Clarifier
DG: Degassifier	MGF: Multigrade Sand Filter
LC: Lamella Clarifier	ACF: Activated Carbon Filter



Country-wide program development Process will follow a logical process

- **Steps in program development**
 - **Finalization of market assessment**
 - **Develop strong Position Paper**
 - **Coordinating industry partnership through dissemination**
 - **Websites**
 - **Best Practices Guide**
 - **Develop Standards & Labeling Program**
 - **Benchmark technologies and practices**
 - **Set-up labeling plan with institutional backing**
 - **Develop strong stakeholder collaboration**
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Stakeholder involvement needs inclusion of National and State-level organizations

- **National Dairy Development Board (NDDB)**
 - **Ministry of Agriculture (Department of Animal Husbandry, Dairying and Fisheries)**
 - **State Renewable Agencies e.g. Maharashtra Energy Development Agency (MEDA)**
 - **Ministry of New and Renewable Energy (MNES)**
 - **Indian Renewable Energy Development Agency (IREDA)**
 - **Bharatiya Agro Industries Foundation (BAIF)**
 - **Other NGOs in India**
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 - **Indian dairy partners from Maharashtra**
 - **Institutional partner – Maharashtra Energy Development Agency**
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About IIEC

- **Global Not for profit NGO**
 - **Established in 1984**
 - **Focus areas**
 - **Renewable Energy**
 - **End-Use Energy Efficiency**
 - **DSM Planning and Evaluation**
 - **Energy Efficiency Standards and Labeling**
 - **Energy Efficiency Finance Design**
 - **Environmental Management**
 - **Water Resource Management**
 - **Climate Change and Energy Policy**
 - **Transport Planning**
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Global Presence by Local Implementation





Thank you!

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