KMR ENERGY P LTD.

A subsidiary of KMRI Inc. USA

GREEN POWER FOR MOBILE

Supply dependant solution:

how feasible it is for telecom".

SUPPLY DEPENDENT SOLUTIONS

As the name suggests the success is based on logistics and sourcing

Currently in the Telecom scenario there are two solutions which are supply dependent and can totally remove the DG set.

The Fuel Cell
The Bio Mass Gassifiers

Unless and until the DG set is totally removed we cannot get a successful & sustainable solution.

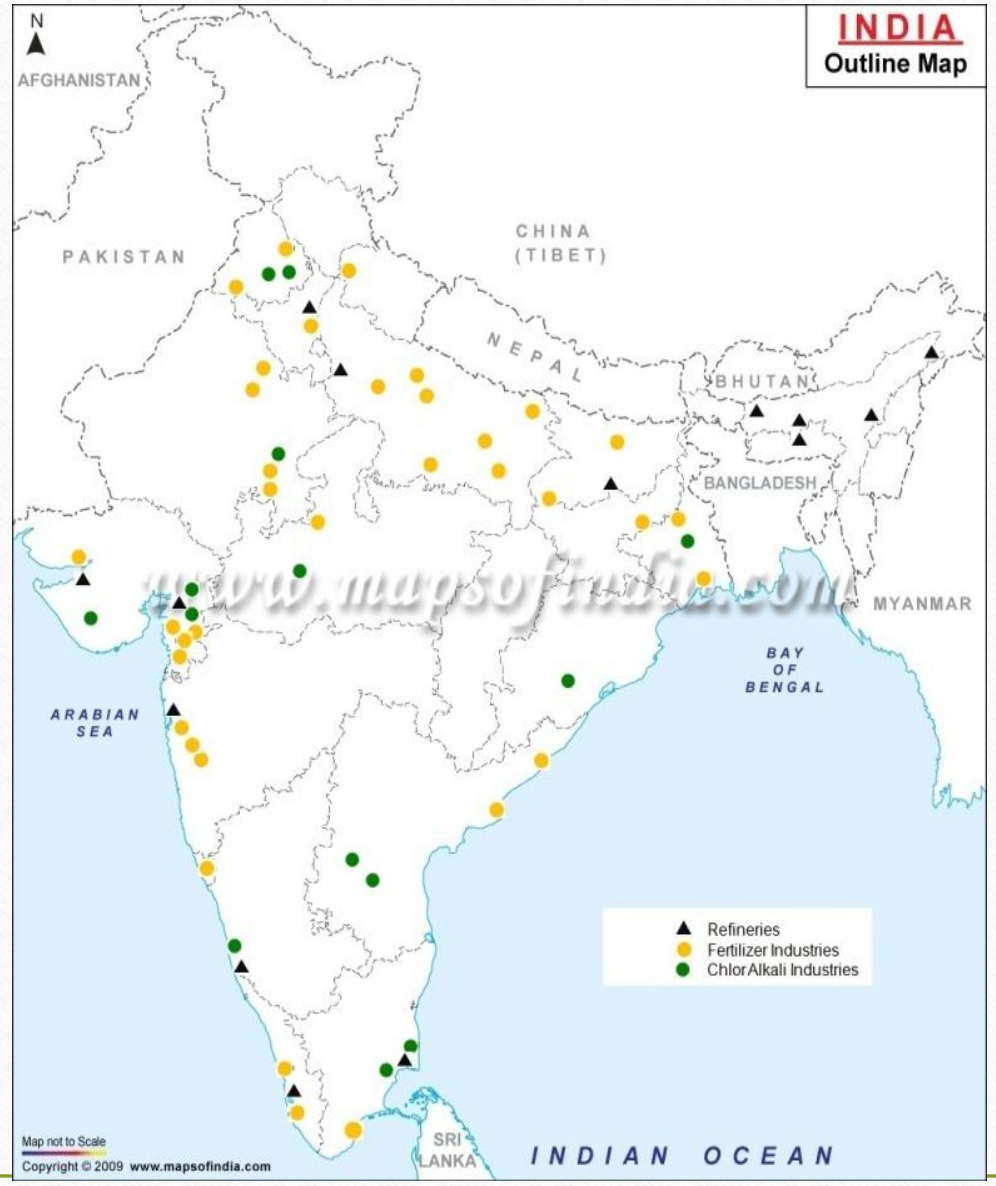
Third party intervention will continue making the task of the ESCO difficult

Fuel Cell

- Two basic sources have been tried
  - Hydrogen in cylinders about 150 Km from source
  - Hydrogen from Methanol which can be within a state having Methanol

Hydrogen in cylinders

- Storage and Transport are big handicaps and hence this can be used in approx. a 150 Km radius of a Hydrogen producing unit



Hydrogen infrastructure exists while not extensive

Sources of By-product hydrogen

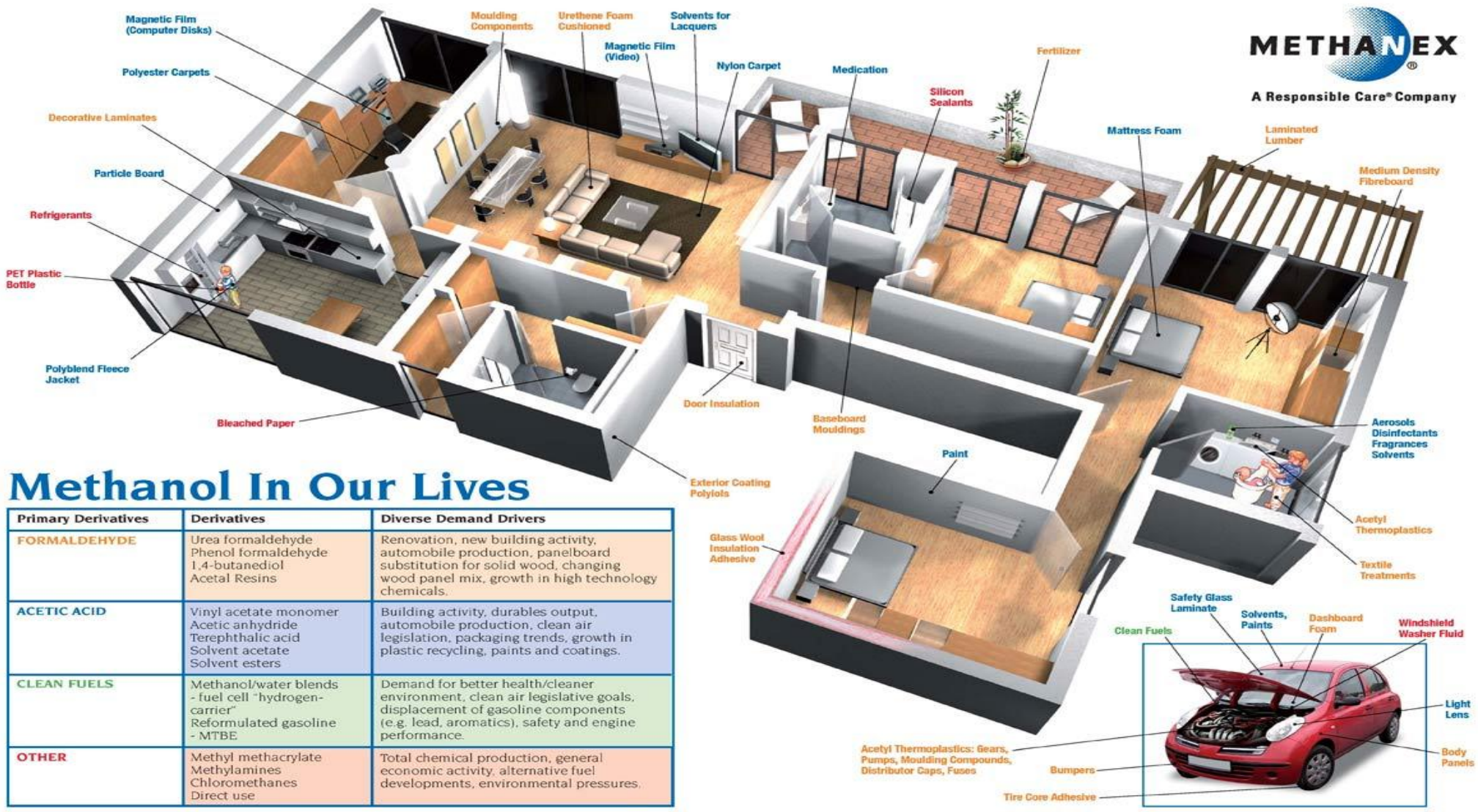
- Chlor-alkali plants
- Refineries
- Captive plants for fertilizer, soap, glass plants, Sugar Industries

Industrial waste Hydrogen available form these plants is sufficient to provide clean power to all telecom sites within the vicinity of 150kms.

Hydrogen from Methanol

- A 65:35 Methanol Water mixture allows for easy on site production of Hydrogen
- In modules of approx. 2.5 KW these fuel cells weigh hardly 250 Kg
- Transport and storage of this fuel is relatively easy and energy is available on demand
- A 100% removal of the DG set is possible

- **Methanol is a common liquid**
  - Global production in 2012 – Over 95 billion liters
  - Methanol, also known as methyl alcohol or wood alcohol, is an ideal hydrogen carrier. With a chemical formula of CH3OH, has more hydrogen atoms in each gallon than any other liquid that is stable in normal conditions.
- **Methanol applications**
  - Windshield washer fluid (up to 50% methanol)
  - Fuel additive – Over 4.5 billion liters in China 2012
  - Solvent
  - Manufacture of plastics and building products
- **Benefits of methanol based fuel**
  - Easily transported liquid fuel
  - Extremely low freezing point < -60° C
  - May be stored for years without degradation
- **Renewable sources of methanol**
  - Produced by crude glycerol in mass production
  - Waste CO_2, wood waste, and others are in development
  - Global production of bio-methanol now greater than 300 million liters annually



METHANEX®

A Responsible Care® Company

Methanol In Our Lives

Primary Derivatives	Derivatives	Diverse Demand Drivers
FORMALDEHYDE	Urea formaldehyde Phenol formaldehyde 1,4-butanediol Acetal Resins	Renovation, new building activity, automobile production, panelboard substitution for solid wood, changing wood panel mix, growth in high technology chemicals.
ACETIC ACID	Vinyl acetate monomer Acetic anhydride Terephthalic acid Solvent acetate Solvent esters	Building activity, durables output, automobile production, clean air legislation, packaging trends, growth in plastic recycling, paints and coatings.
CLEAN FUELS	Methanol/water blends - fuel cell "hydrogen-carrier" Reformulated gasoline - MTBE	Demand for better health/cleaner environment, clean air legislative goals, displacement of gasoline components (e.g. lead, aromatics), safety and engine performance.
OTHER	Methyl methacrylate Methylamines Chloromethanes Direct use	Total chemical production, general economic activity, alternative fuel developments, environmental pressures.

Methanol

- Easy to transport
- Easily available
- Easily converted to hydrogen
- Energy on Demand
- In a typical scenario 1250 Litres of Methanol can power a single operator off grid site for nearly a month

Bio Mass Gassifiers

- Recent past this has been highly discussed
- Basic Technology has been around for years
- For Telecom Applications we need reliable & automatic gassifiers
- Energy to be made available on demand

Twin Challenges

- First
  - To make the gassifiers more robust and sophisticated
  - We have done number of changes after our trials last year
  - Some people are also copying these and speaks for our success
  - Auto Start, Remote Monitoring, Stainless Steel Shells
  - All contribute to gassifiers with
  - STYLE POWER AND PERFORMANCE

Second Challenge

- Fuel
  - Both the type, source and logistics for fuel are difficult
  - But bigger the challenges easier is the differentiator for an ESCO
  - Sum of cost of fuel plus processing plus transportation has to be contained
  - Opportunities are there today to try alternate fuels which are cheaper
  - Easily Processed and easily available

Fuels

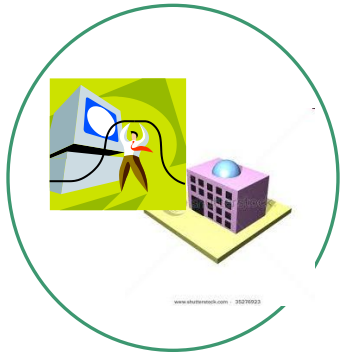
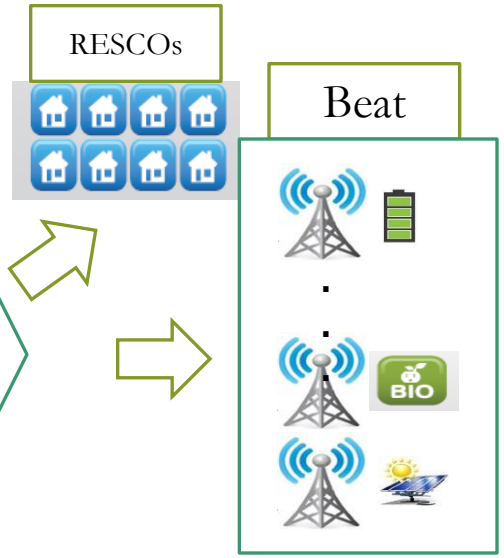
- You need vision perseverance and commitment to have a long term vision for fuel supply
- There are pitfalls in having a short term strategy
- It is easy to run a program for 2/3 months
- It is another to run it for a decade

KMR Vision

- We are here seeing a great potential in Renewable energy
- We are investing heavily into infrastructure for
  - Buying Fuel
  - Processing Fuel
  - Transporting Fuel
  - And last but not the least in growing fuel

What we need

- **Regional infrastructure coordinating a dense network is key to making distributed renewables successful**

Operations Unit	Regional Operating Center	Warehouse	RESCOs / Beat
			
Resources	**500 towers** • Regional office infrastructure • 1 Administrative, • 1 supply chain and • 1 technical manager	**5-7 beats** • Fuel receiving, processing, bagging and transport infrastructure • Backup DG / battery banks • FMS response center	**10 towers** • 1 technical supervisor • 1-3 operators
Function	• Customer & local interface • Monthly reports & billing • Local Procurement function	• Fuel handling • Uptime management	• Site operations • Regular O&M

Small scale, distributed generation biomass systems provides strategic advantages in fuel supply chain management

Distributed Generation enables manageable biomass fuel supply chains

ROC

- About the size of a 1-2 10MW plant with fuel supply distributed across the state



Warehouse
(50 miles radius)

- About 10 tons / day

- About 1 truck per day
- Captive supply from 100-200 acres of nearby land



Fuel Requirement

- About 4-5 tons / month

- About 3 acres dedicated fuel plantation per tower annually

Our Solution

- KMRI will have vertically integrated long term fuel contracts with predictable pricing & supply

1. At-least two-thirds through sustainable plantation crop farming
2. Rest sourced through identified local sources with biomass residues and leftovers

THANK YOU

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