

Cleantech & Government Policy

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Government Policy Goals

- Regulation
 - To ensure that emissions targets are created and met
- Taxation
 - To raise the private cost of emissions to the level of public costs
- Subsidies
 - To reduce the private costs of creating clean energy

Impact of stage of development - 1

- Developing countries
 - Reducing carbon impact means raising the ratio of electrical energy produced from renewables to total energy produced
 - Policy regime focused on incentivizing large-scale renewables generation
 - Business opportunity in large-scale renewables generation
- Developed countries
 - Reducing carbon impact means reducing the emissions content of thermal power
 - Policy regime focused on caps
 - Business opportunity in measuring, monitoring and mitigation of emissions

Impact of stage of development - 2

- Developing countries
 - Distributed power generation substitute for grid TDG system
 - Policy regime incentivizes community-level clean & reliable DG system
 - Business opportunity in community-level renewables generation and distribution
- Developed countries
 - Distributed power generation substitute for grid generation
 - Policy regime focused on individual-level renewables generation
 - Business opportunity in individual generation systems

Impact of stage of development - 3

- Developing countries
 - Investing in rail as a substitute for road network
 - The carbon impact is measured by the ratio of carbon dioxide per tonne-km of rail to road miles
 - Policy regime incentivizes rail network
- Developed countries
 - Conversion of existing transport systems based on oil into electricity
 - The (gross) carbon impact is measured by the ratio of central station electricity to final energy use
 - Policy regime incentivizes conversion, such as through the development of economical electric cars

National Policy on Incentives - 1

- Suppose that a traditional electric power infrastructure costs 15c/kWh, of which distribution costs are 10c and thermal generation costs are 5c.
- For a new community (developing country case), the opportunity cost of distributed power is, therefore, 15c.
- For an old community (developed country), the opportunity cost is 5c.
- Therefore, developing countries need less incentive
 - Suppose distributed generation (including a renewables component) costs 10c, it will be adopted by the developing country, not by the developed country

National Policy on Incentives - 2

- In general, incentive policy should be carefully designed.
- Another factor is private versus public costs in developed countries
 - Suppose solar power costs 10c at all scales
 - An individual currently paying 15c will switch
 - Problem of irregular supply needs to be solved first
 - The municipality will not switch because T&D costs must be paid regardless of usage.
 - If all individuals switch, community cost rises to 20c from current 15c
- Federal government subsidies on installing solar panel at the home might raise total costs

Cleantech and Silicon Valley

- Cleantech's share of VC rose from 3% to 1Q04 to 27% in 3Q09, exceeding software and matching biotech
- VC is leveraging government support
 - Eg., electric car maker Tesla Motors raised \$82.5 million of VC in 9/09, three months after the U.S. DoE granted Tesla a \$465 million loan guarantee for construction
 - Solar cylinder developer Solyndra raised \$198 million after the DoE granted a \$535 million loan guarantee for mfg
- Leading cleantech sectors in 3Q09 were solar - \$451 m, transportation - \$383 m, and green building - \$310 m

Software & Cleantech

Software	Measure/ Monitor	Platform	Efficiency	Mitigation	Integration	Managed service
CEP	✓	✓	✓	✓	✓	✓
Renewable					✓	✓
T&D		✓	✓	✓	✓	✓
Carbon Exchange		✓				
Urban Planning	✓	✓	✓	✓	✓	✓
Transport	✓	✓	✓	✓	✓	✓

CEP = Conventional Energy Producer
T&D = Transmission & Distribution

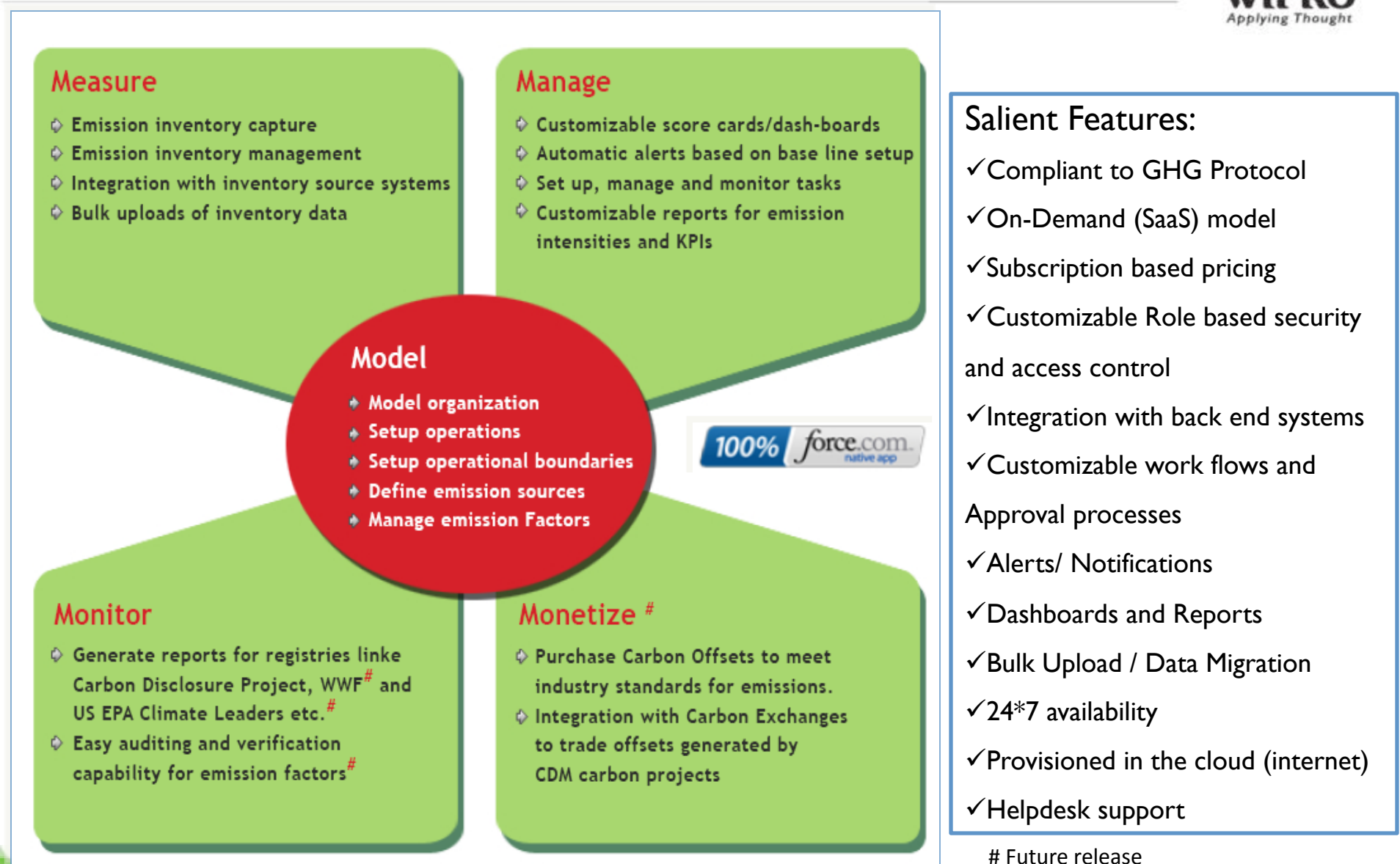
Case Study - Wipro

Sector	Activity
Transportation	Engineering design for aerodynamics Driver information systems Energy management
Water	Measurement of water footprints Ground & Storm water monitoring Water management system
Construction	Campus carbon measurement & certification Efficiency design
Recycling	Recycling management system
Energy Producers	Carbon measurement & certification Efficiency design
Technology	Data center cooling & power systems management Recycling management

Case Study - Wipro

Client Type	Activity
MNCs and Large Firms	<ul style="list-style-type: none">•Managing GHG Emissions•Social performance plans at refineries, major chemical facilities and upstream operations•Enterprise sustainability function for legal and global regulatory compliance
Government	<ul style="list-style-type: none">•Regulatory compliance management systems•Paperless process for government departments like Customs/ Excise/IT/Healthcare – ebilling, efilig, etc•Green building certification for Government buildings
NGOs	<ul style="list-style-type: none">•Preservation of Natural Environment•Consulting in Policy Making•Emission repositories
Technology Firms	<ul style="list-style-type: none">•Carbon Accounting involving invoiced data collection and CO2 calculation from invoiced data•Compliance Management such as ISO 14001 EMS
Insurance Companies	<ul style="list-style-type: none">•Management of Financial Risks•Agent – Customer process optimization

Wipro Carbon Management Solution – 5M



Salient Features:

- ✓ Compliant to GHG Protocol
- ✓ On-Demand (SaaS) model
- ✓ Subscription based pricing
- ✓ Customizable Role based security and access control
- ✓ Integration with back end systems
- ✓ Customizable work flows and Approval processes
- ✓ Alerts/ Notifications
- ✓ Dashboards and Reports
- ✓ Bulk Upload / Data Migration
- ✓ 24*7 availability
- ✓ Provisioned in the cloud (internet)
- ✓ Helpdesk support

Future release