



# Adoption & Implementation of Green Chemistry: Learnings & Barriers

**Nitesh H. Mehta**

**Green ChemisTree Foundation**

[nitesh.mehta@industrialgreenchem.co.in](mailto:nitesh.mehta@industrialgreenchem.co.in)

[www.industrialgreenchem.com](http://www.industrialgreenchem.com)



# Indian Chemical Industry: Distance covered

2006

Lack of awareness of GC amongst key stakeholders

Groups working in isolation

Regulatory bodies - governing with policing approach

Hardly any research on GC in Industry / academia

Lack of ecosystem for industrialization of GC&E practices

Approach for Waste Management - dominated by end-of-pipe treatment, CETP

2016

GC being widely accepted & integrated by all stakeholders

Connecting policy makers, industry, global experts, solution providers & all other stakeholders

Regulatory bodies - partnering in resolving environmental challenges

Catalyzing Sharing - enabling Collaborative Learning

Catalyzing Green Chemistry research through Awards

Companies open to Waste reduction at source, catalyzing capacity building in GC&E



# Our Vision:

By 2025, the Indian Chemical Industry will pro-actively implement and industrialize “green” chemistry and engineering inspired practices to impact their triple-bottom line of People, Planet & Profits.

industrial green chemistry

2025

2023

2021

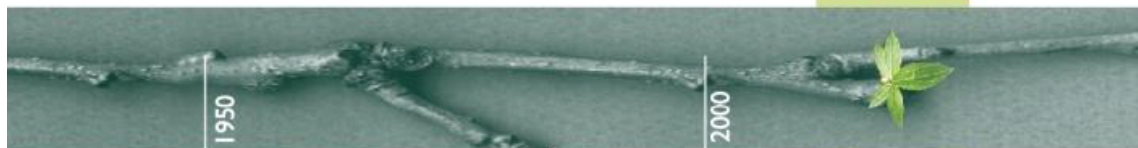
2019

2017

igcw  
2015

igcw  
2013

igcw  
2011



Organizer :

**Green Chemis tree**  
Foundation

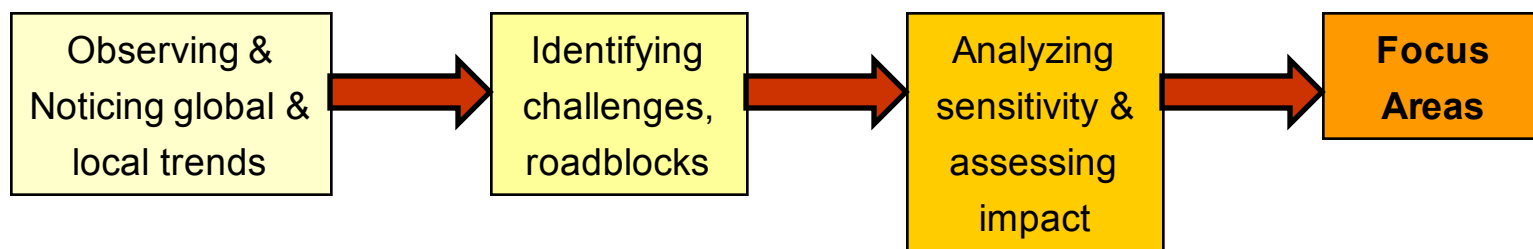
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2009



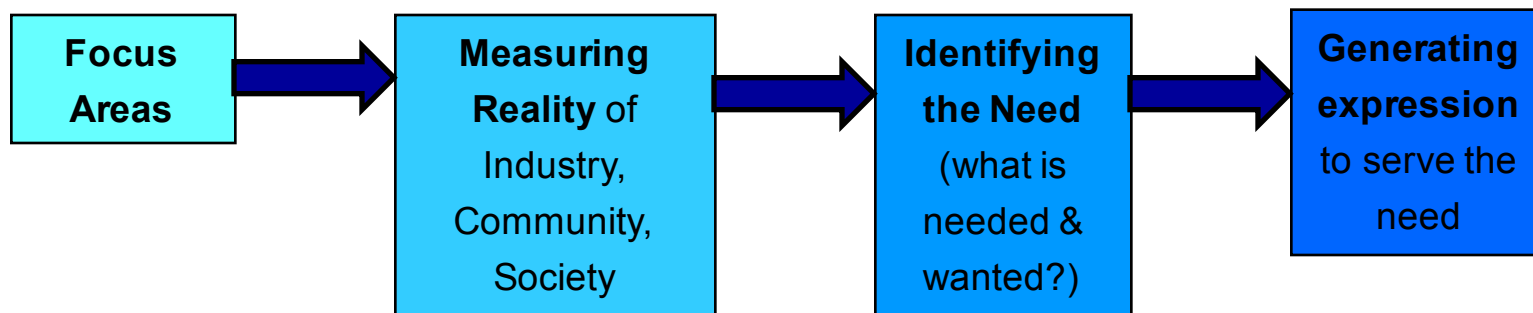


# Our Approach

## Approach followed by us to identify our “Focus Area”

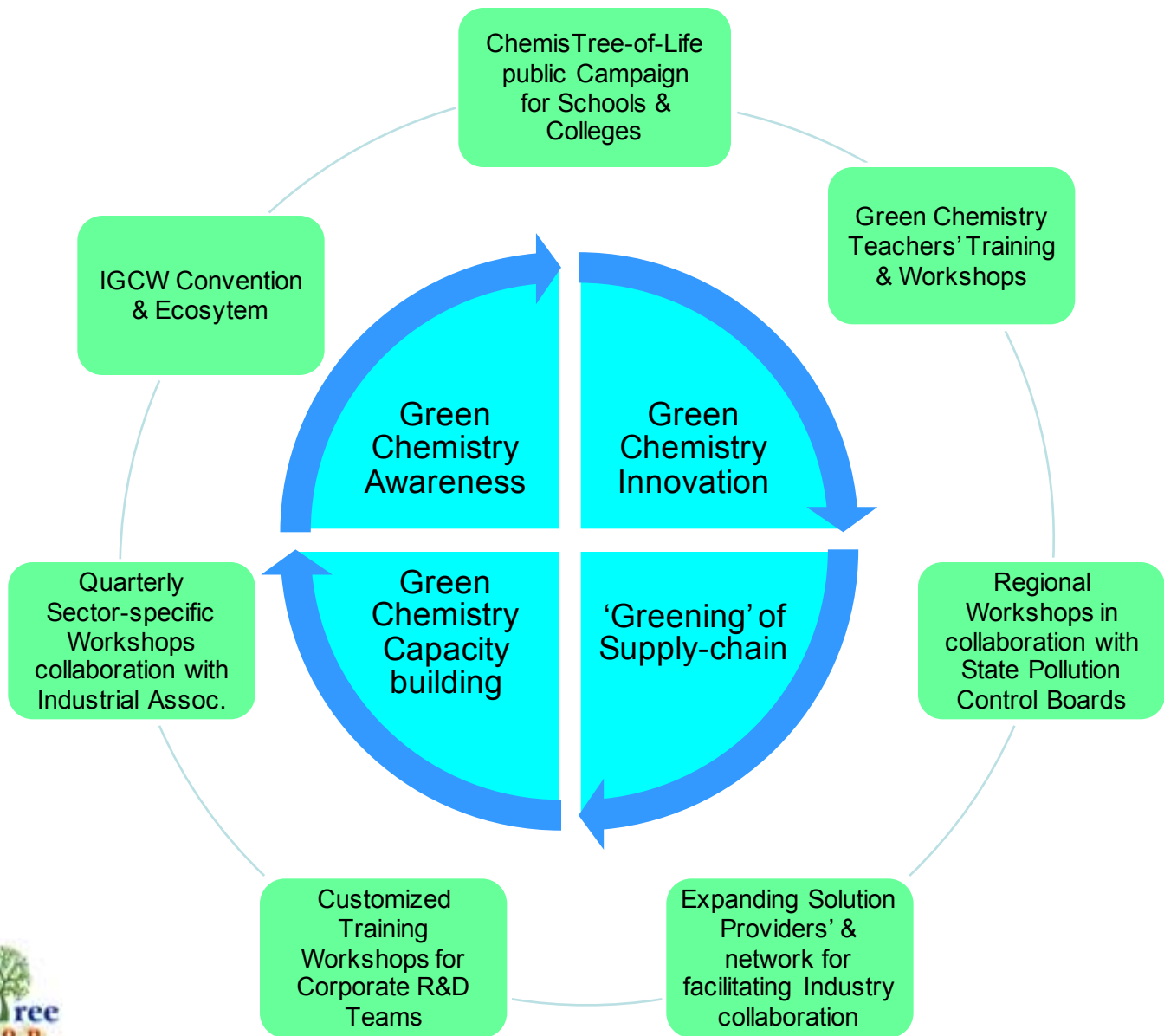


## Then, around each “Focus Area”





# Green ChemisTree Foundation's activity matrix



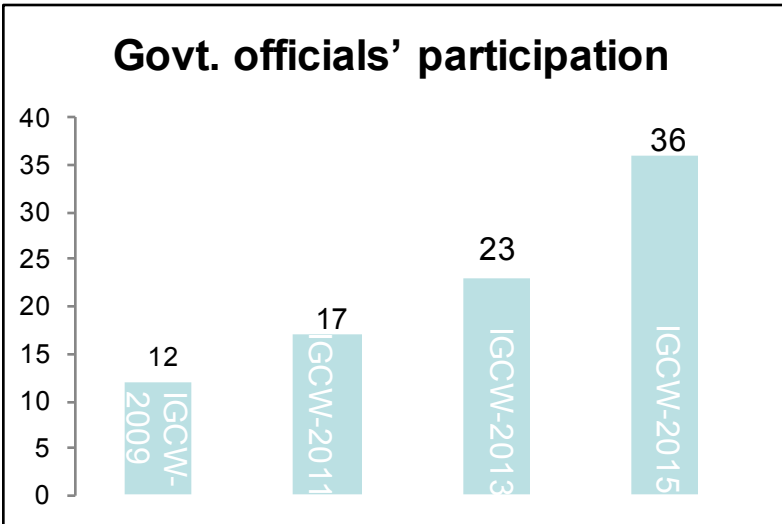
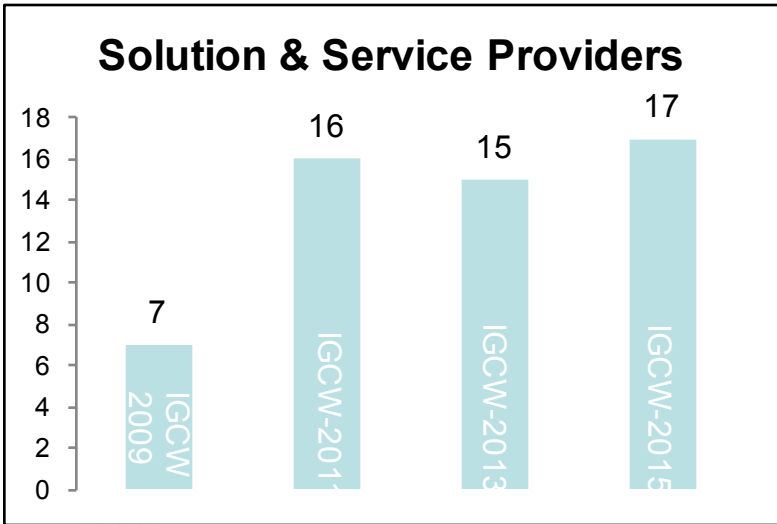
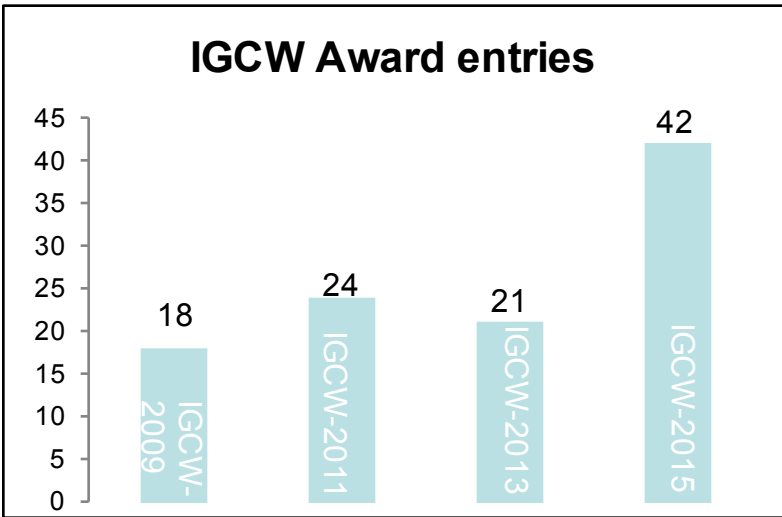
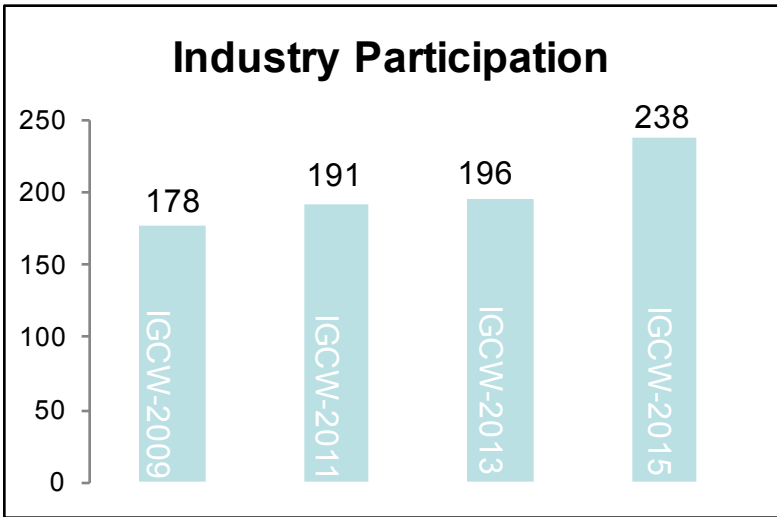


Two Days, 8 Dimensions, 40+ global experts,  
Over 300 chemical community stakeholder's participation



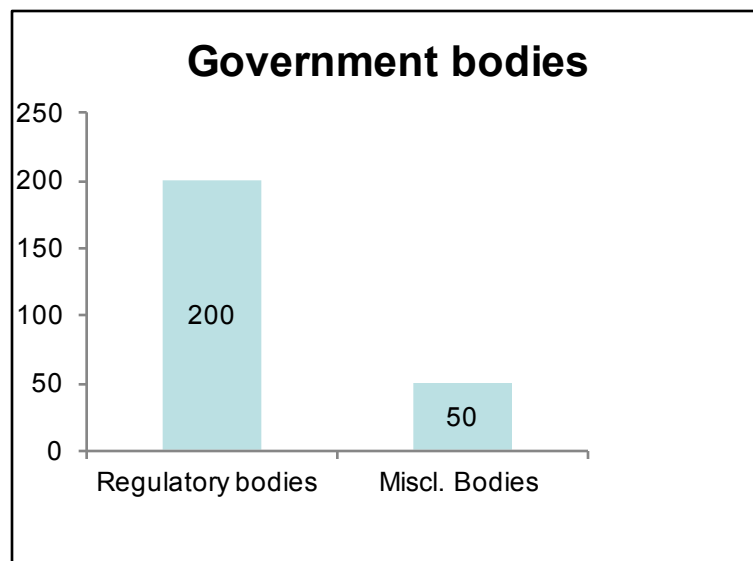
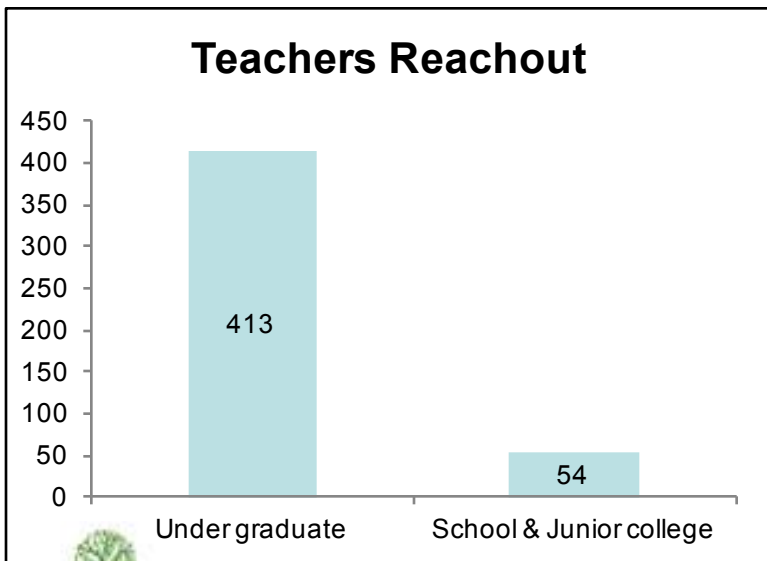
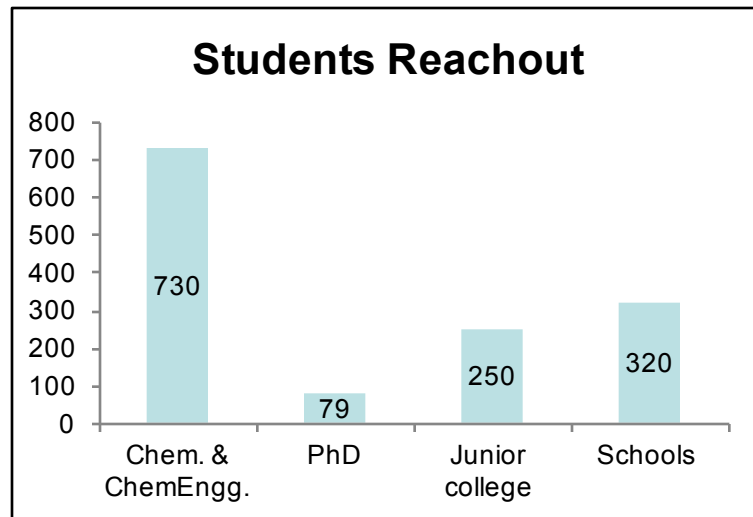
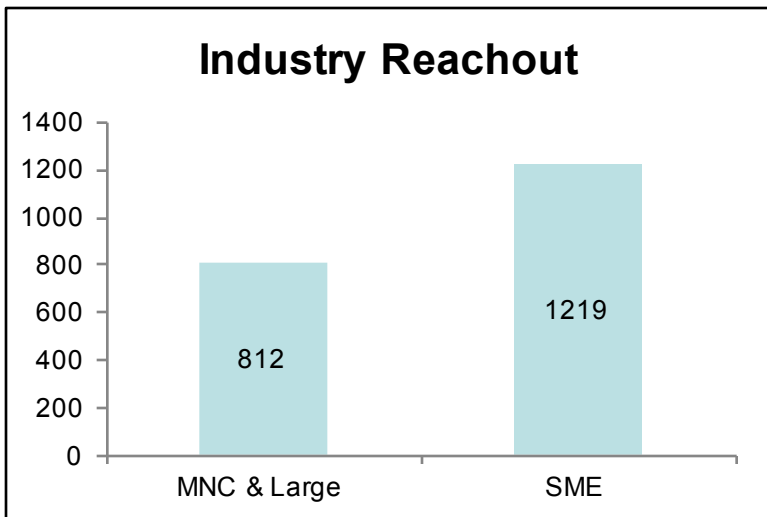


# IGCW Initiative: Growth





# IGCW Initiative: Impact So Far







## IGCW: What has worked for us in India?

- Focus on creating value - Quality of Speakers, Solution Providers, GC Experts,...
- Retaining chemistry-intensive focus
- Creating an ecosystem approach - involving all stakeholders
- Customizing the deliverables based on immediate challenges of Industry
- Passion & Commitment of our Team – Operating like a Social Entrepreneurial Venture
- Creating an exclusive event for Regulatory bodies - expand their awareness on GC & thus creating them as stakeholder in Green Chemistry implementation
- Integrating all stakeholders (Management, R&D & Production) into the structure of the Programme



# IGCW: What has worked for us in India?



## Vision Approach for IGCW Symposium

<b>Ignition</b> <b>Inspiration</b> <b>Initiation</b>	Designed for Chairman, Board of Directors, Founders, President, CEOs and other Senior decision makers
<b>Identification</b> <b>Invention</b> <b>Innovation</b>	Designed for the R&D and Technology Personnel such as President & VPs, CTOs, CSOs, R&D Managers, Inventors, Innovators, Consultants, Technocrats.
<b>Implementation</b> <b>Industrialization</b> <b>Impact</b>	Designed for the Operation & Personnel - Directors, Presidents, VPs, Plant Managers, EHS Managers



# Some Barriers to implementation of Green Chemistry

## ▪ Technology Barriers:

- lack of viable Green alternative (e.g. Nitration, Sulphonation, Friedel Craft, etc.)
- huge opportunity for companies in US/Europe to market potential solutions
- academia not so focused on relevant industrial problems
- Scale-up & Commercialization – many lab scale technologies with Academia, need to unleash this powerful resource, willingness of Industry to take risk

## ▪ Market / Commercial Barriers:

- Industry believes GC is good theory, practically not possible
- difficult & complex, huge resources & long time to develop
- short term business focus rather than long term commitment – serving field (GC) initially, in the long run, it would offer returns & value
- challenge to protect IP (scenario changing now)

## ▪ Education / Training Barriers

- lack of understanding of GC&E Principles, need to introduce in our orientation / training / curriculum



# Some Barriers to implementation of Green Chemistry

- **Policy Barriers:**
  - No incentives to GC Solution Providers or Industry implementing GC
- **Communication & Human Barriers:**
  - communication gap (different geographies, insufficient marketing by solution providers, insufficient efforts by industry)
  - lack of Marketing of Proven solutions - **“low hanging fruits”**
  - inertia to change from old paradigm to New Paradigm
  - decades of shop-floor experience becomes barrier instead of resource
- **SME Participation (over 75% Industries in India are SME)**
  - caught-up in tough competition (locally & China) & in survival all the time
  - they are Supply Chain to MNCs
  - MNCs – can play role of enablers, purchaser’s willingness to pay for “Green”



Thank you for generous contribution from this part of the world:

John, Paul, David (ACS-GCI), Amy, Joe Armstrong (Merck), Pete Myers, James Clark, Roger Sheldon, ....

October 5-6,  
Mumbai, India

**IGCW**  
2017

industrial green chemistry  
world

**Convention  
&  
Ecosystem**

## Invitation to you to Partner for IGCW2017:

**Dates:** 5<sup>th</sup> & 6<sup>th</sup> Oct.'17, **Venue:** Mumbai India

### Open to Collaborations / Partnerships:

MNCs – as Speakers to share case studies, Be a Partner

GC Experts – offer technical expertise

Solution Providers – exploring potential in India by exhibiting

NGO, Media – promoting GC Initiatives in your Network

Join us @ e-IGCW :



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