



# *Sustainable Operations Management*

## *- An Overview*

*17<sup>th</sup> December, 2011*

***Shekar Viswanathan***

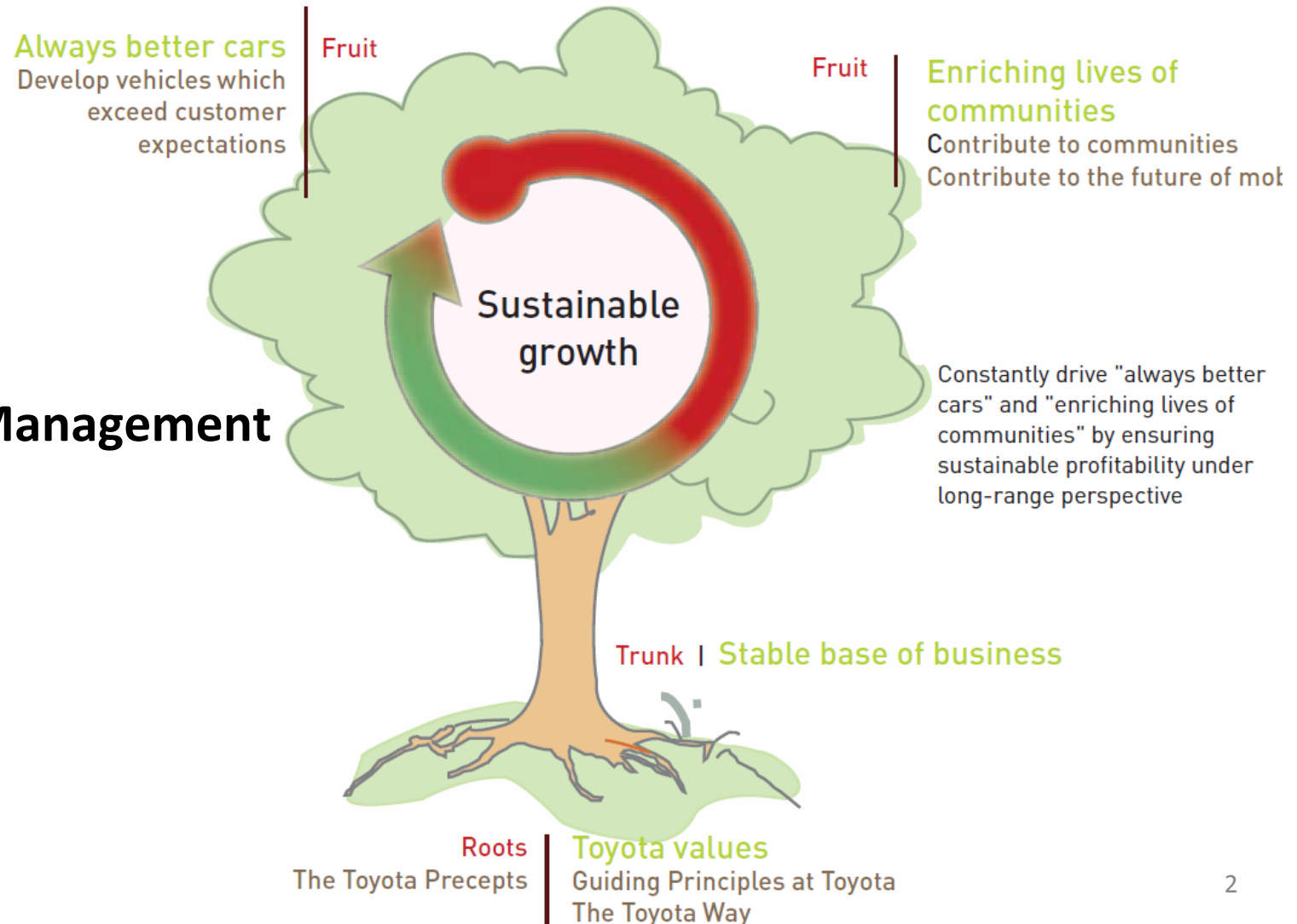
*Deputy Managing Director  
TOYOTA KIRLOSKAR PVT. LTD.*

# 1. Toyota Global Vision



**REWARDED WITH A SMILE** by exceeding your expectations

## Visionary Management





*Toyota in India:*  
***Toyota Kirloskar***  
***Motor***  
***[TKM]***



# 2. Toyota Kirloskar Motor: Background

## Toyota Kirloskar Motor (TKM) Outline

1. Incorporation : October 1997
2. Location : Bidadi - Bangalore
3. Employees : 6,200
4. Capacity : 210,000 Units/Year
5. No of Dealers : 162 (As on Aug 2011)
6. Models : Innova ,Corolla , Fortuner & Etios  
(Camry ,Prado , LC 200 & Prius as CBU)





# 2. Toyota Kirloskar Motor: Background

## Plant Facility :

**Press Shop**



**Weld Shop**



**Paint Shop**



**Assembly Shop**



**Quality Inspection**



**PES**



## 2. Toyota Kirloskar Motor: Background

### Toyota Kirloskar Motor : Product profile

#### Product manufactured



#### Product Imported & Marketed



### 3. Business Challenges -Sustainability



- Increased number of multinationals entering India.
- Multi Location , Multi Products, Customer and sourcing bases spread across globe
- Dynamic Market with Global brands & cheaper imports give Indian Consumer multiple choices
- Continuously changing customer expectations
- Need for shorter Product Development Cycle, Cost Competitiveness
- Real Time Production Progress Tracking to Enhance Inventory Management Efficiency

- Ever increasing environmental issues like
  - Environment legislations
  - Social challenges
  - Global warming,
  - Resource depletion etc..

***"Only fittest will sustain"***





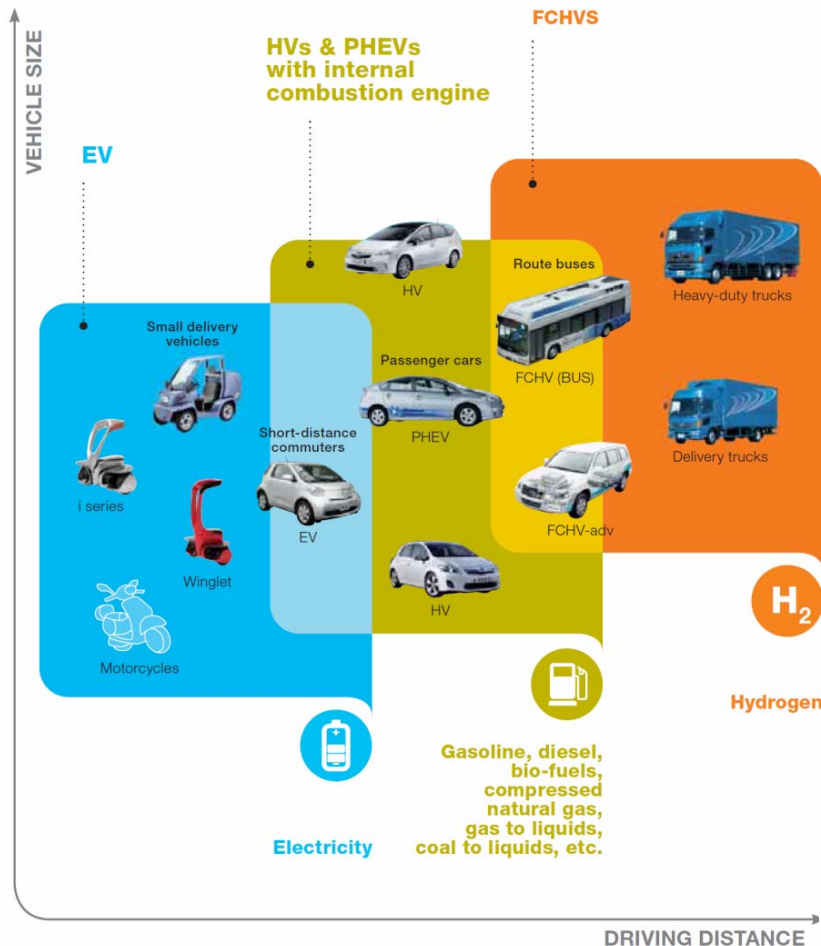
*Toyota Global  
Initiatives towards  
Sustainability*

# 4. Toyota's Vision of Sustainable Mobility



" Without focusing on environmental, energy and safety measures there can be no future for motor vehicles."

-Katsuaki Watanabe,  
Vice-Chairman, Ex-President,  
Toyota Motor Corporation



## Moving towards greener tomorrow - Toyota Prius in India



Third Generation Prius launched in India in Dec 2010

*With over 2.5 Million units sold Globally,  
Prius is the World's Largest Selling Hybrid  
vehicle*

# 5. Sustainability Philosophy

## Contents of the Toyota Global Vision

### Nurturing human resources globally

We will meet challenging goals by engaging the talent and passion of people



### Safety/Earth-conscious/Moving people

Safest and most responsible ways of moving people



### Contributing to economic and social vitality in each region

Enriching lives around the world



### The Toyota Way

We believe there is always a better way

<b>Challenge</b>
We form a long-term vision, meeting challenges with courage and creativity to realize our dreams.
<b>Kaizen</b>
We improve our business operations continuously, always driving for innovation and evolution.
<b>Genchi Genbutsu</b>
We practice genchi genbutsu—go to the source to find the facts to make correct decisions, build consensus and achieve goals at our best speed.



## Rewarded with a smile by exceeding your expectations

We aim to exceed expectations and be rewarded with a smile.



### Amenable, low carbon mobility/ New lifestyles/ Infrastructure for safer mobility/ Preserving environmental quality

Toyota will lead the way to the future of mobility



### Earth-conscious

Respect for the planet



### Reliable quality/Product lineup

Through our commitment to quality, constant innovation





# 6. Relations with Customers



## Active Safety

Support to prevent the occurrence of accidents



## Safer Vehicles

Provide world-class safety to protect lives from accidents



## Passive Safety

Reduce damage by accidents

## A Wide Range of Product Lineup

Provide cars that meet customer needs at affordable prices to be rewarded with the smiles of customers



## Moving People

Provide products that satisfy customers to be rewarded with their smiles



# 7. Product Technologies

## Initiatives for Reducing Size and Weight of Vehicles

【 Six methods by which the world's most compact vehicle was achieved 】



Reverse placement of differential gear



Centered take-off gearbox



Placement of ultra-thin fuel tank under floor



Slimmed backs of car seats



Compact air conditioning unit



Asymmetric installment panel



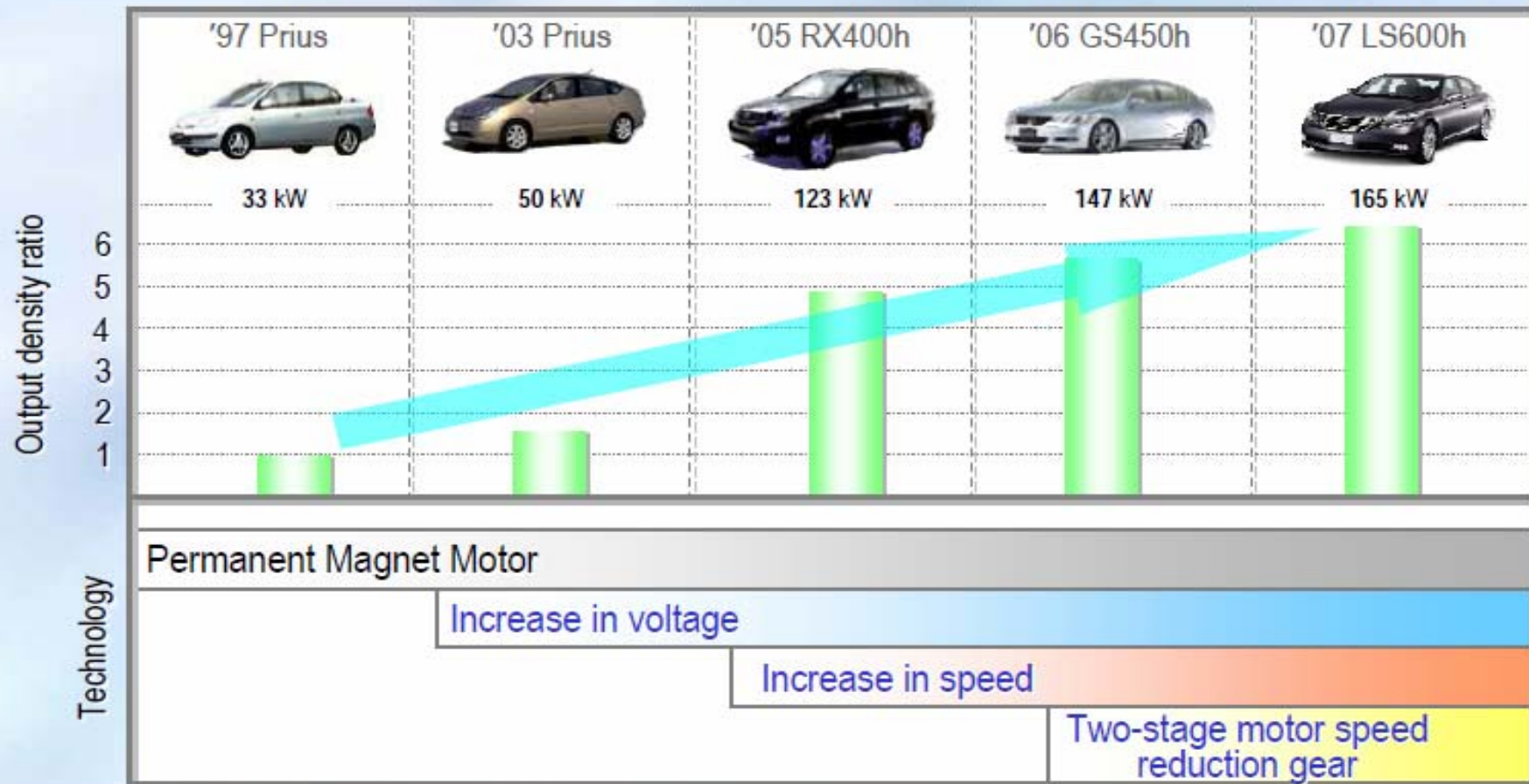
Size and weight reduction is crucial to energy conservation and lower CO<sub>2</sub> emissions

**TOYOTA**



# 7. Product Technologies

## Evolution of Electric Motors for HV



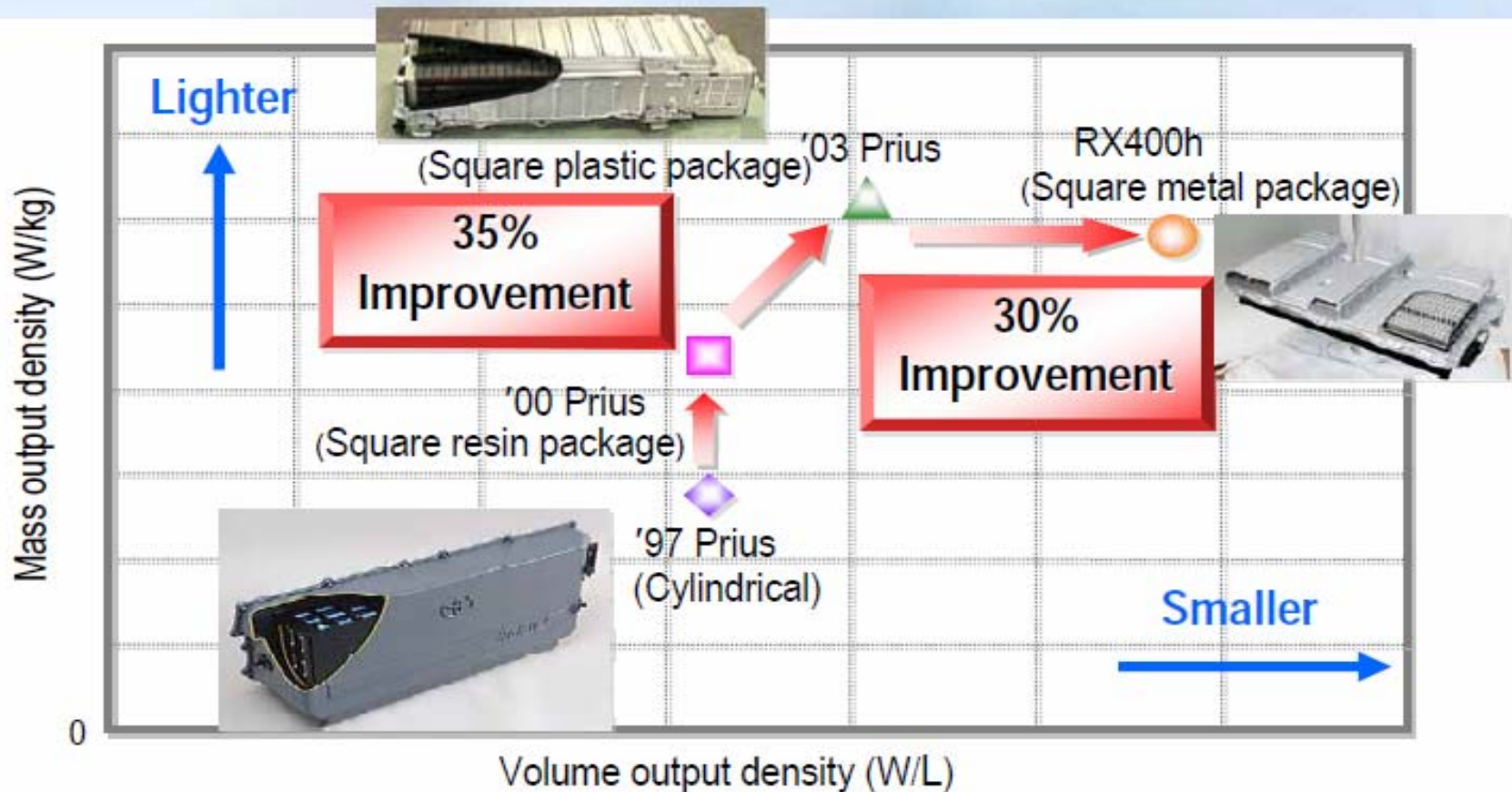
Increase in output density and reduction in size and weight

**TOYOTA**



# 7. Product Technologies

## Evolution of Batteries for HV



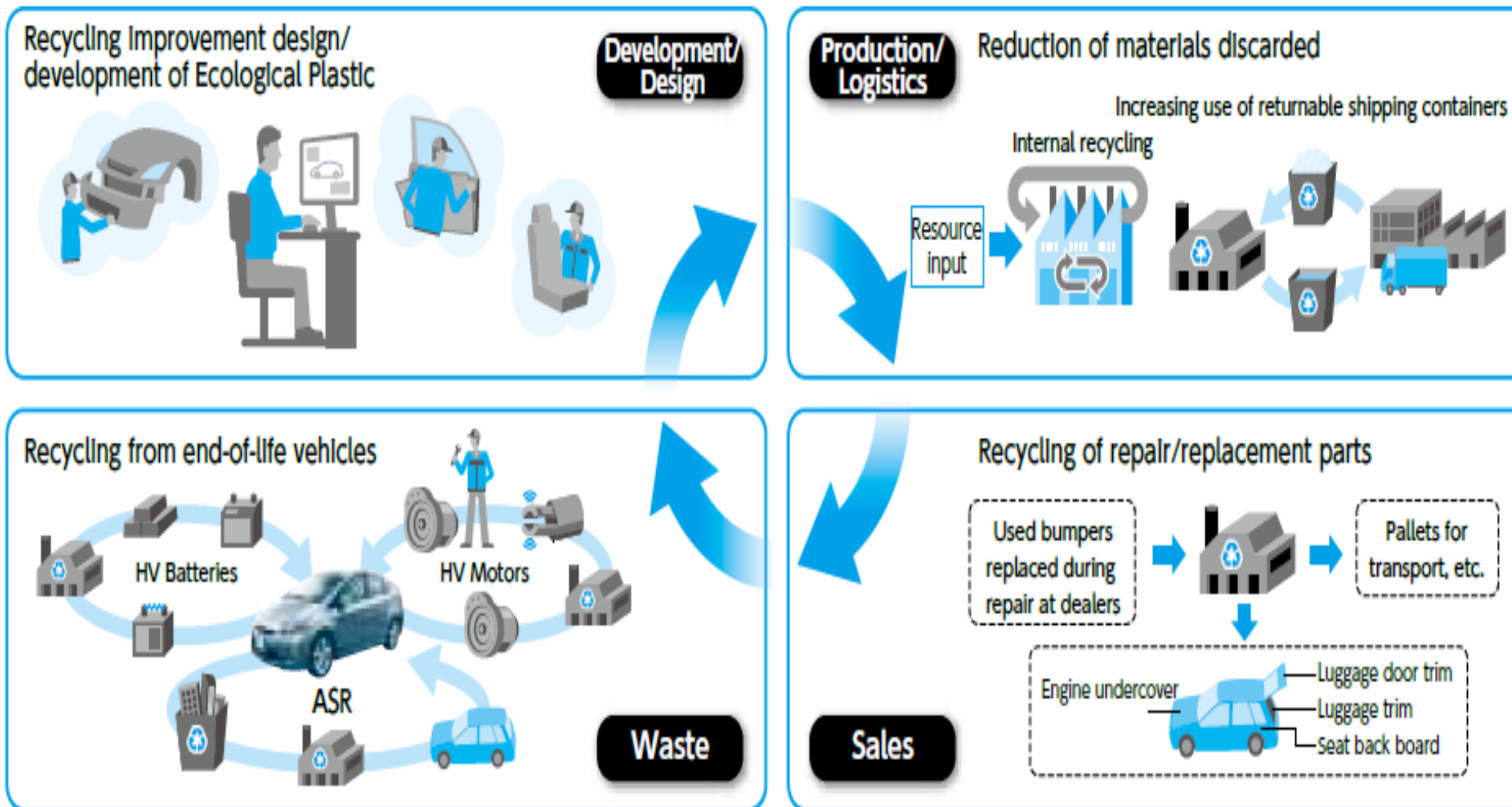
Increase in output density and reduction in size and weight

**TOYOTA**

# 8. Recycling



## Concept of Car-to-car Recycling



# 9. ECO Driving

An e-learning program explains the key throttle control technique on starting and things to keep in mind while driving.



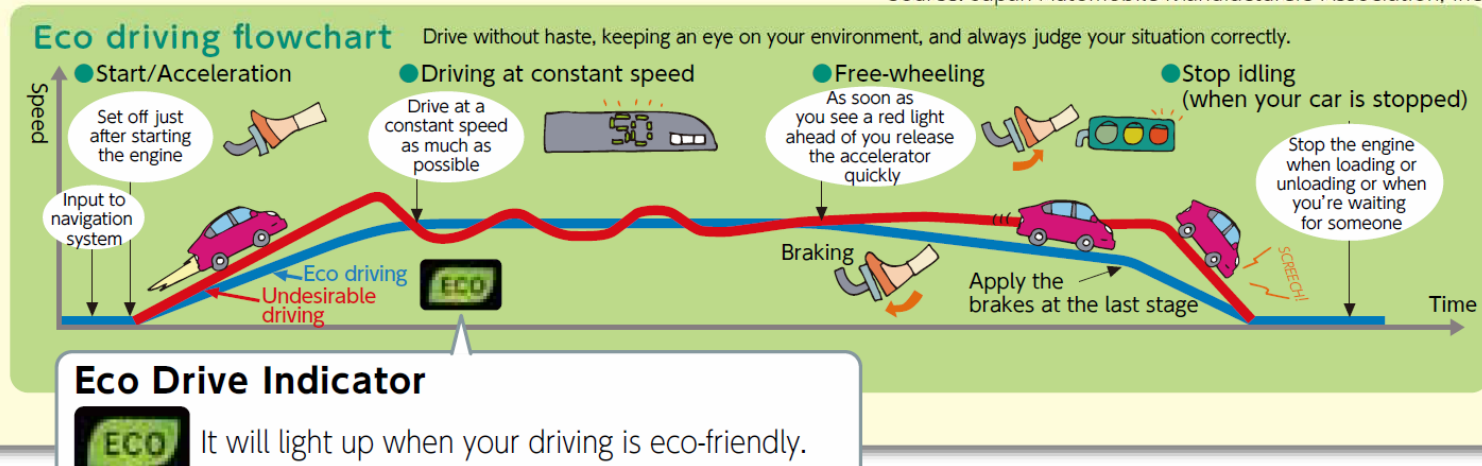
Eco-driving enlightenment activities  
(Photo: Monitor of ESPO installed in SAI and Prius α)

## 10 Tips on Eco Driving can make you an eco driver starting today



- 1 Accelerate gently**
- 2 Keep your speed constant (limit accelerate-decelerate cycles)**  
with ample interval from the car ahead
- 3 Slow down using engine braking**  
Use engine braking to slow down
- 4 Limit air conditioner use**  
Don't set air conditioner temps too low
- 5 Don't idle your engine**  
Don't idle your engine unnecessarily
- 6 Warm up your engine while you drive**  
Start out as soon as you start the engine
- 7 Check and use traffic reports**  
Plan your drive, drive your plan
- 8 Check your tire pressure regularly**  
Check your car daily and have it serviced regularly
- 9 Don't carry unnecessary items (lighten your vehicle)**  
Don't carry things you don't need
- 10 Be careful where you park**  
Don't park illegally, especially where it will cause congestion

Source: Japan Automobile Manufacturers Association, Inc.

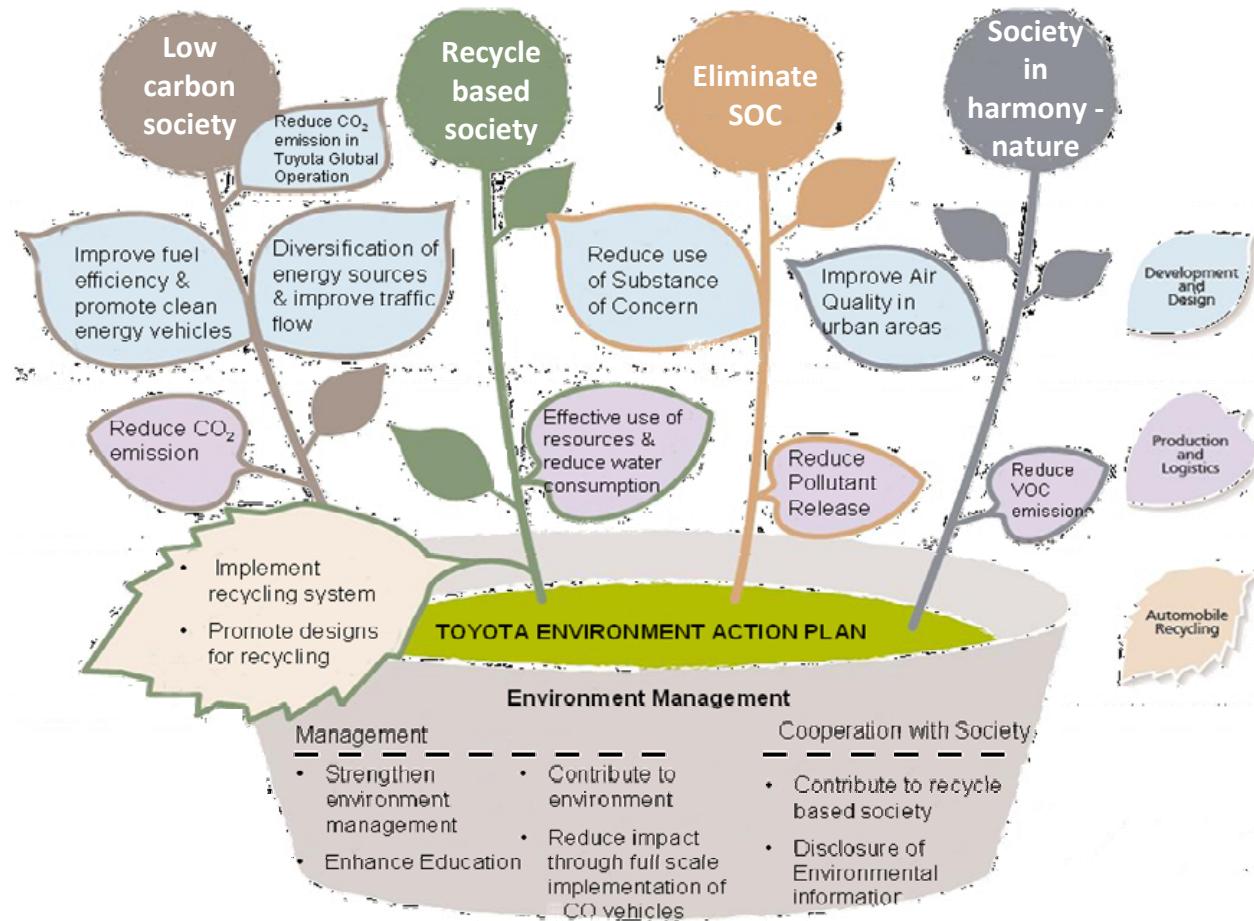




# 11. Sustainable Manufacturing



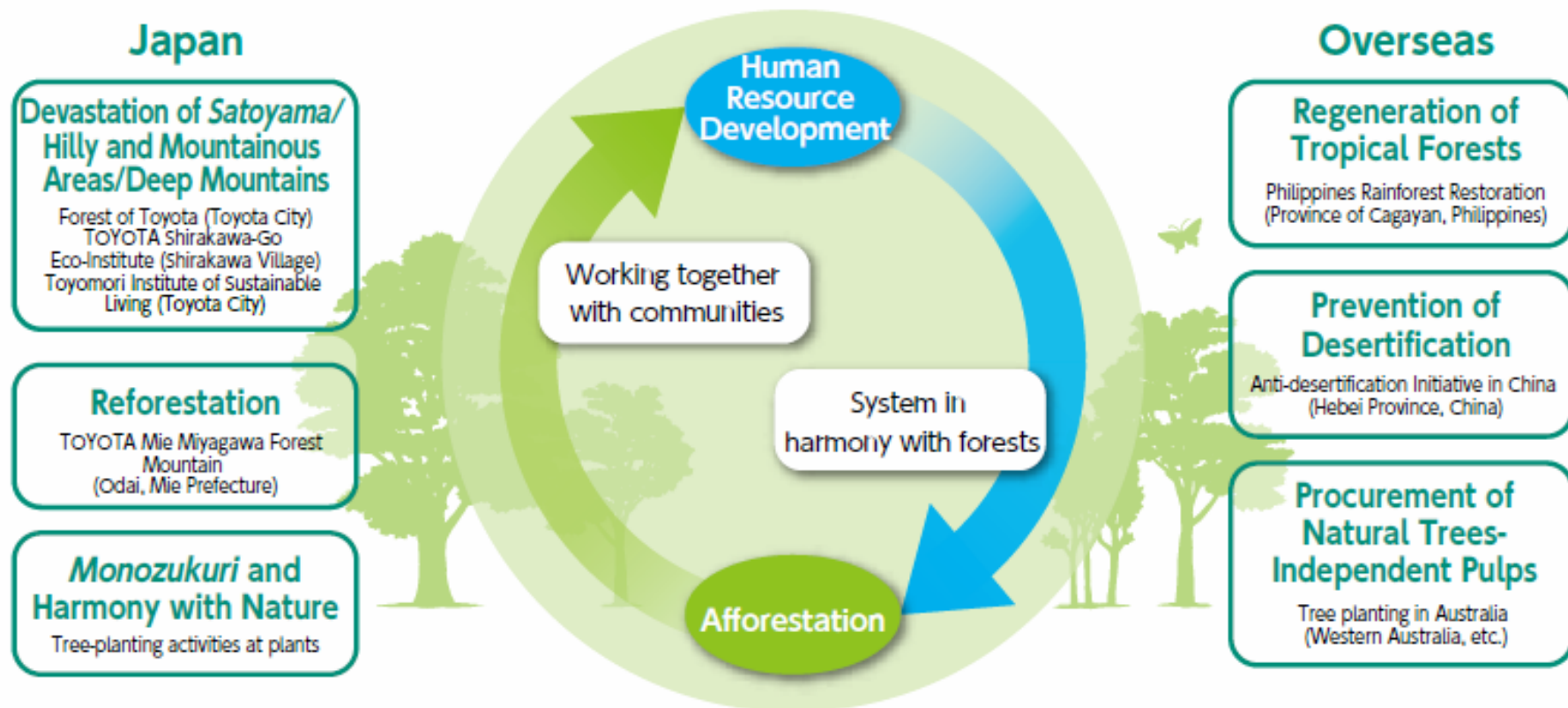
## Five Year Environment Action Plan



# 12. Toyota's Afforestation Activity for a Sustainable Society

## Sustainable Afforestation Activities

Balance the needs of people and forests, continue afforestation independently,  
expand afforestation activities to other areas through human resource development and working together with communities



# 13. Sustainable Manufacturing at TKM

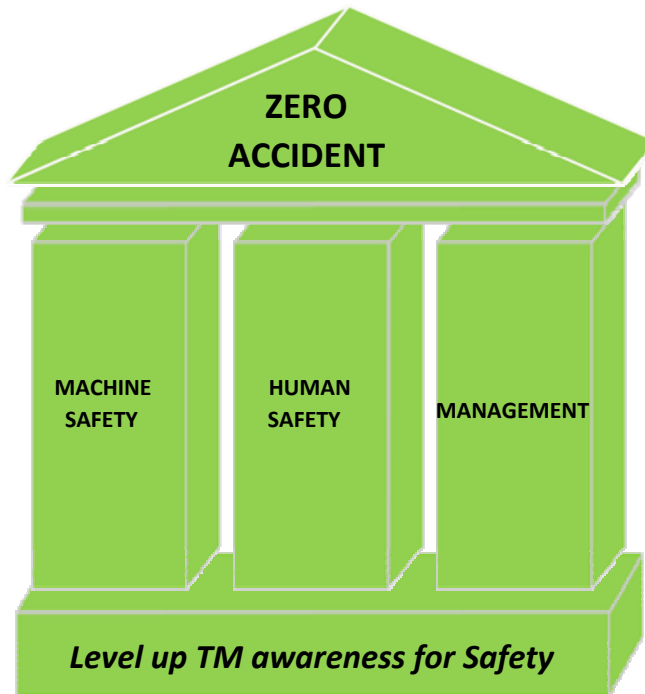




# 14a. Manufacturing Excellence - SAFETY

## Toyota Safety policy

Safety is management itself (Top down approach)



Safety gate at all shop floor entry points



Safety Audit to confirm equipment & process Safety measures



TMS training for safety management



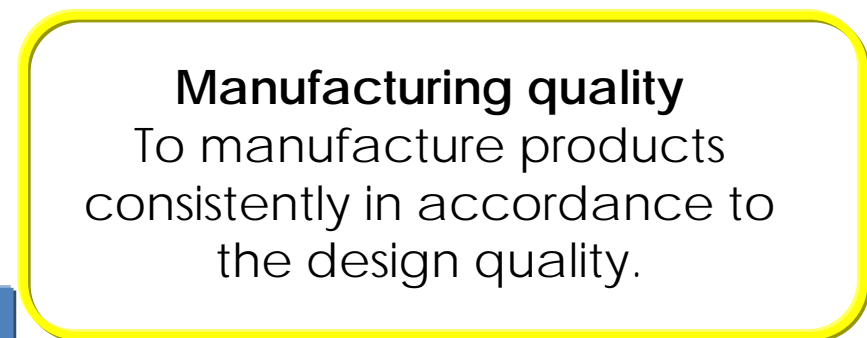
Safety culture campaign companywide (Stop, Look & Go)

**Safe work is Door to all work .**

**Eiji Toyoda**

## 14b. Manufacturing Excellence - Quality :

It should satisfy both intended & un-intended expectations of customer



# 14 c. Manufacturing Excellence -- PRODUCTIVITY

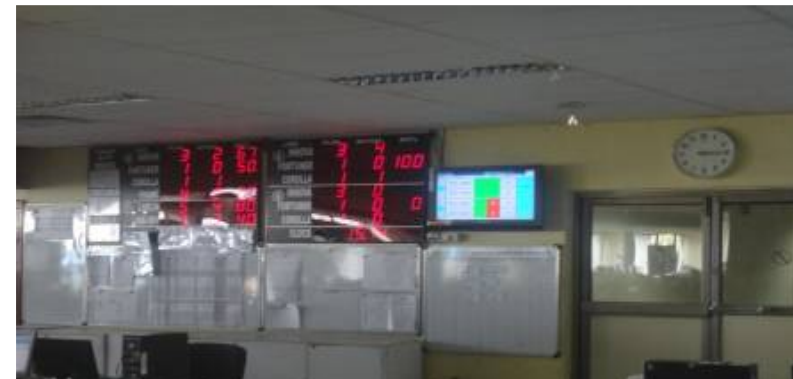
## CCR: *Central Control Room* for Production Control

- Daily efficiency management
- Vehicle Delivery lead time control
- Optimum Resource Utilization by Heijunka (Production Leveling)

Central Control  
(Office)



Work-in-process Display at CCR



Production Status Display at CCR

Shop Control



Process control [Andon] Display at shop

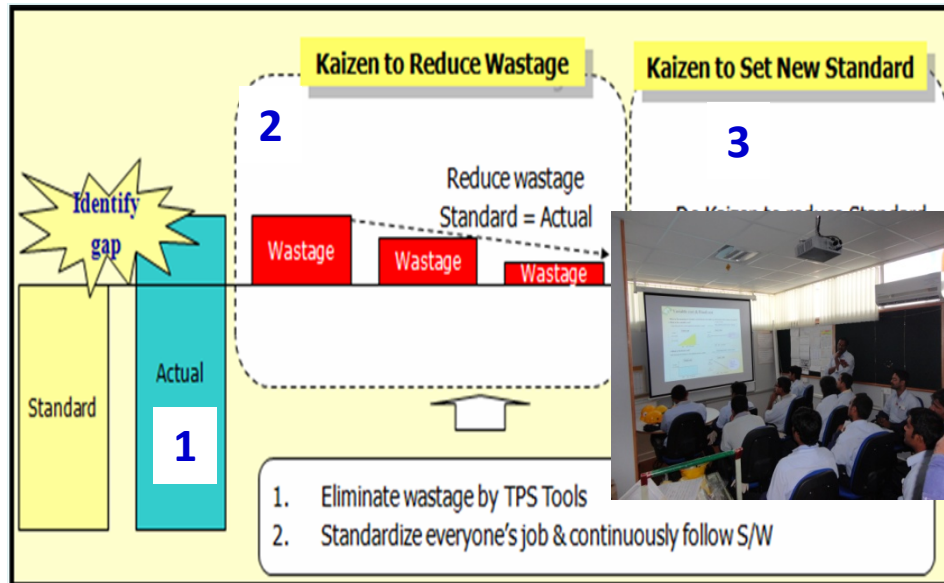


TL/GL/MGR Daily Mgmt. board



# 14 d. Manufacturing Excellence -- COST

Cost reduction thinking way :



Major activities :

1. Daily data grasping & comparing against std.
2. Gap analysis & wastage reduction thru' kaizens.
3. Set new standards thru' following TPS tools.



Wastage reduction Kaizens : Ex.

- a. Paint wastage reduction
- b. Steel yield ratio Improvement

PDCA through review :



Shop cost meeting

Fortnightly review of cost with TMs, GLs & Mgr.  
- Abnormality & support discussion



Plant cost meeting

Monthly review with management  
- Cost status/abnormality updates  
- Receive directions



Periodic cost training

Periodic cost training to TM for cost awareness building

# 14 e. Manufacturing Excellence :Human Development

“Monozukuri” is  
“Hitozukuri (HR Development)”

Develop Toyota  
Person

Gurukul .....

< Home of the Master >

***Right Skill Set***  
***Right Knowledge***  
***Right Attitude***

Achieve  
Perfection



Basic Skill Training

「People make our automobile, nothing get started until we train and educate our people」  
Eiji Toyoda

## 14 e. Manufacturing Excellence :Human Development

Key to survive

Optimum utilization of available resources

Similar Technologies  
Similar Equipments  
Similar Processes  
Common Suppliers

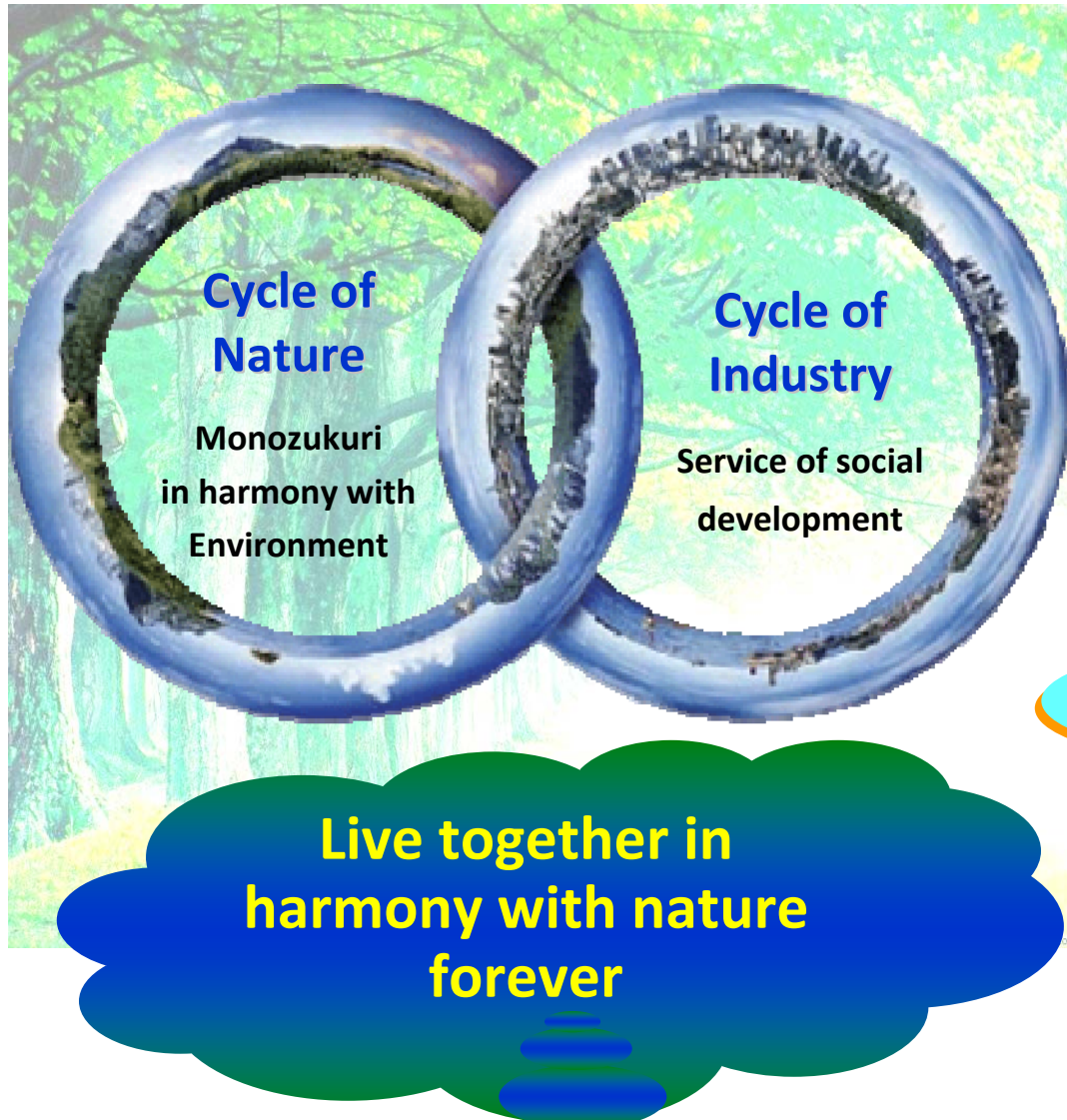
Only  
difference  
is People

***“Only people can make a difference”***



# 15. Environment Management

## Sustainability Policy



## TKM Vision & Mission

### VISION

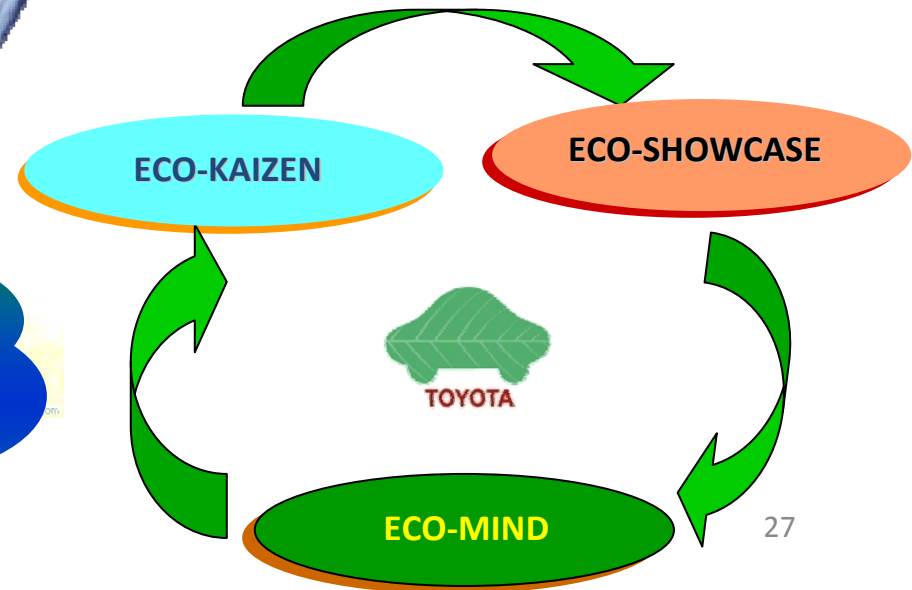
BECOME THE MOST ADMIRABLE AND RESPECTED COMPANY IN INDIA BY FOLLOWING THE TOYOTA

### Mission

WAY

CREATE AN ECO-FRIENDLY COMPANY IN HARMONY WITH NATURE AND SOCIETY

### Approach



# 15. TKM – Environment Management System



1. TMAP EM – FIVE YEAR GUIDELINE

2. TKM – FIVE YEAR ACTION PLAN

2. TKM – YEARLY ACTION PLAN

3. DEPARTMENT – YEARLY ACTION PLAN

4. ENVIRONMENT MANAGEMENT PROGRAM

5. MANAGEMENT REVIEW (QUARTERLY)



TOP Management on Genchi to Observe Kaizens



Review of Environment Activities by Management



# 16. Eco-Mind Activities

## Objective:

To Contribute towards Sustainable Society through building ECO-CONCIOUS MIND among TOYOTA MEMBERS

## Concept

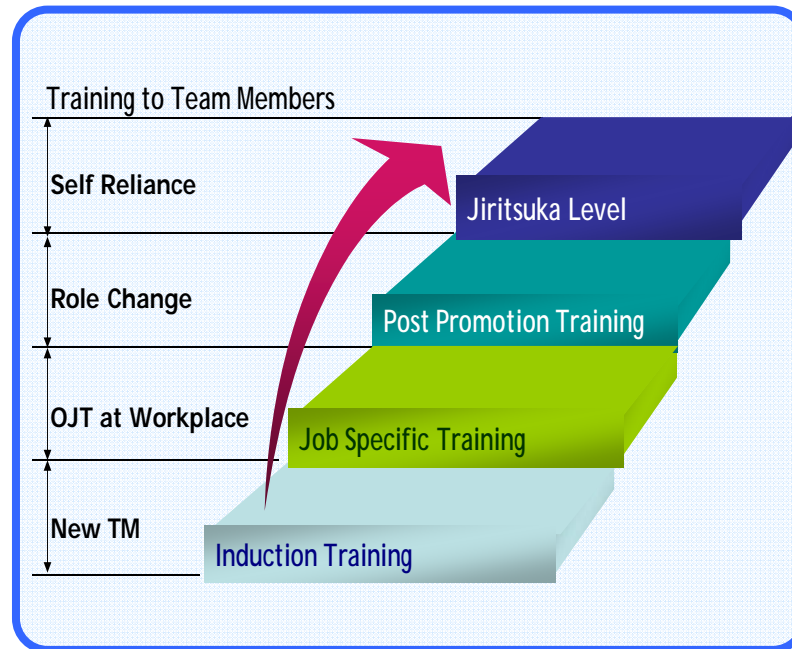


**ECO CITIZENS**

### 1. TRAINING OF TEAM MEMBERS

#### 1b. Training Plan

#### 1c. Trg Method



- 1.Trg at Class
- 2.Trg at Shop
- 3.Trg using DOJO



# 16. Eco-Mind Activities

## Environment Month Celebration

**Purpose:** Creation of Eco Citizens by development. of **Eco Mind** among TM'

**Method:** Adopting **One Special Theme** each year on Key Env. issues

### Activities Taken Up

- Competitions to build awareness
- Family Member Involvement through various competition
- School Children & community awareness program.
- GO CSR - Clean & Green Village Campaign

### International Env. commemorative Days

**World Environment Day:** 5<sup>th</sup> June

**Ozone Layer Protection Day:** 16<sup>th</sup> Sept

**Climate Action Day:** 23<sup>rd</sup> Oct

**World Water Day:** 22<sup>nd</sup> March

Appreciation to TM's Family Members



Paintings by TM's Children



Exhibition of Eco-friendly Tech.



Awareness promotion



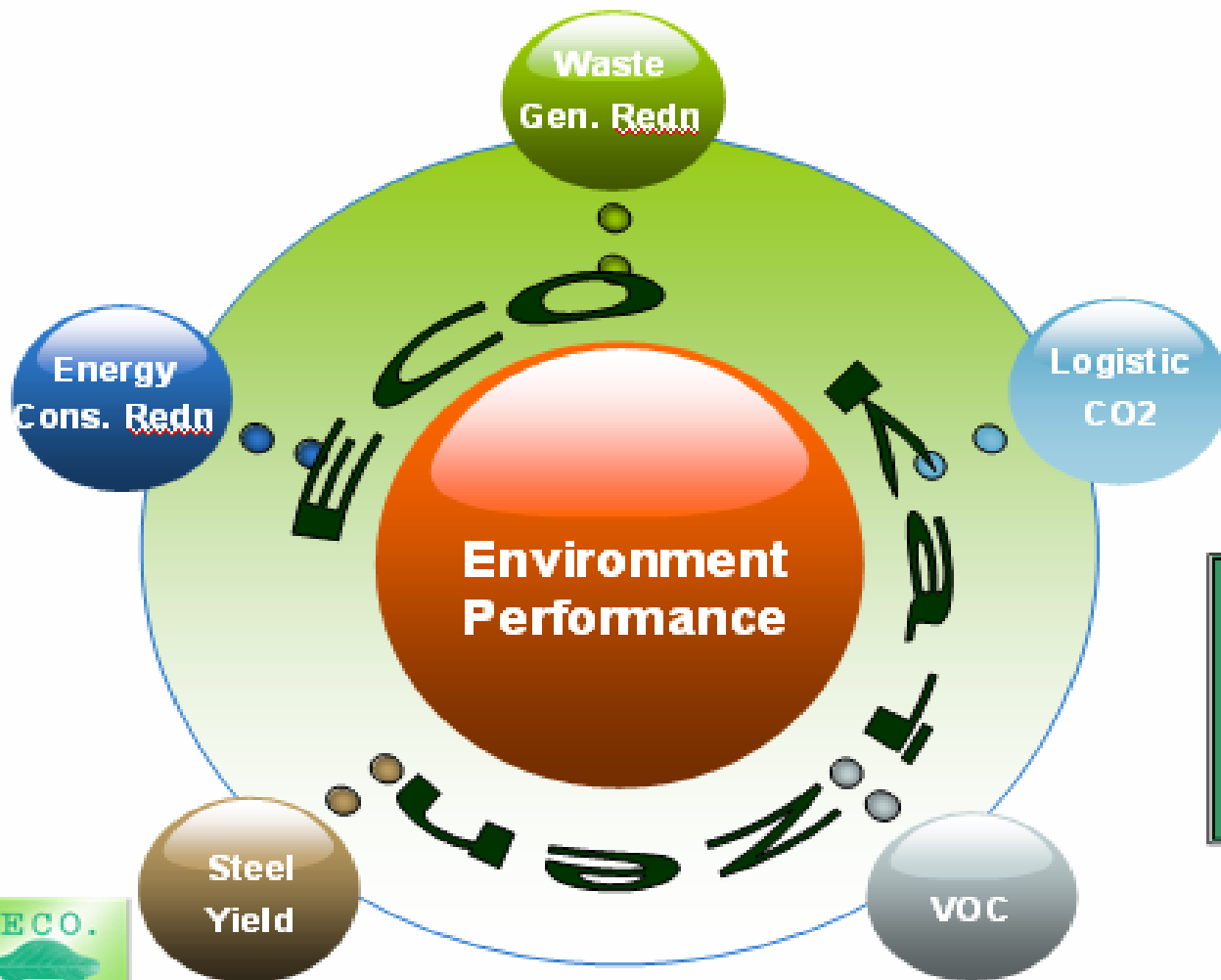
Competition for TM's

# 17. Sustainable Manufacturing



## ECO KAIZEN ACTIVITIES

Objective: To Execute Continuous Kaizen Activities in Key Areas to improve the Overall Environment Performance of TKM



Trigger TM's Eco Mind thro continuous Kaizen promotion to Enhance Environment Performance

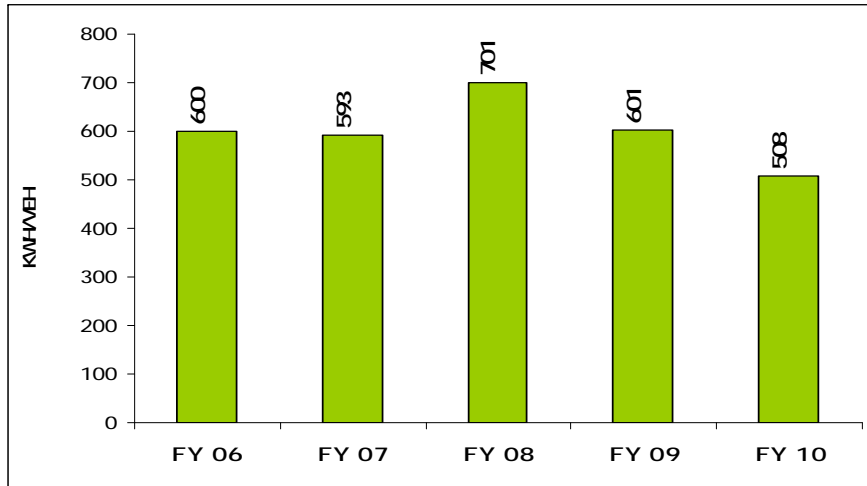


# 17 a. Sustainable Manufacturing

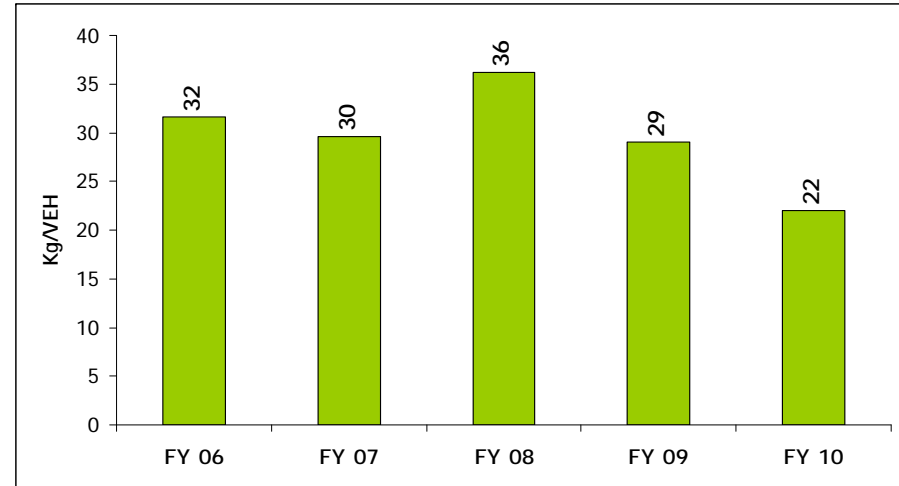


## Energy Management

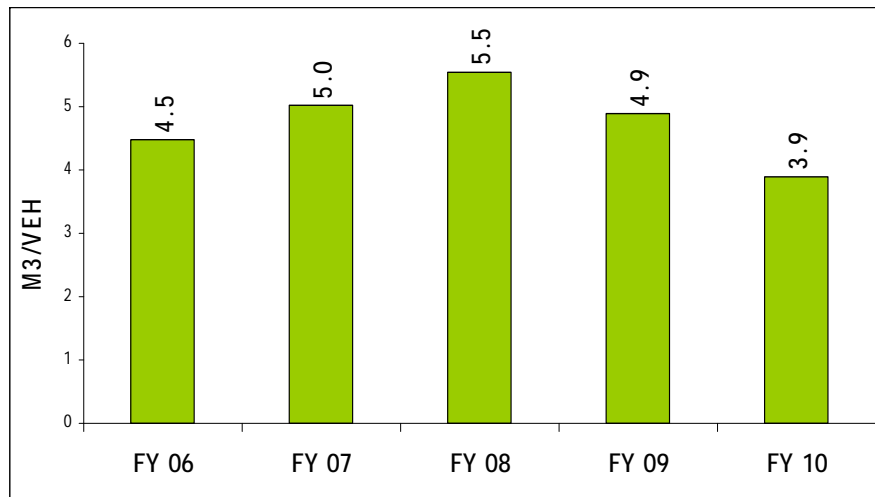
### a. Electricity Consumption



### b. LPG Consumption



### c. Water Consumption



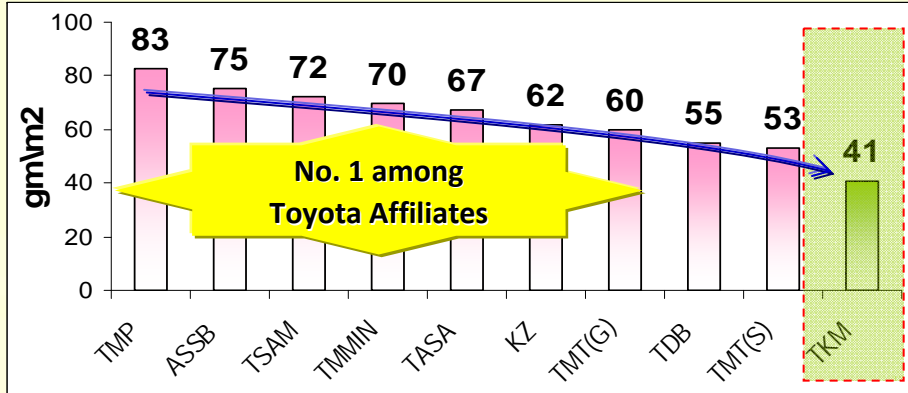
Major Initiatives Taken	Results
1. VFD Installation at Significant areas Paint shop	23% Redn
2. Standard Switch ON/OFF of compressor & lights	12% Redn
3. Oven run time optimization	10% Redn
4. Continuous Training to TM	NA



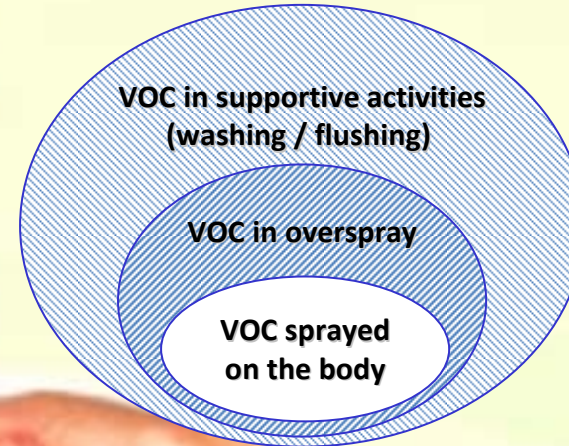
# 17 a. Sustainable Manufacturing

## VOC Emission Reduction

### VOC Reduction - Toyota Affiliates

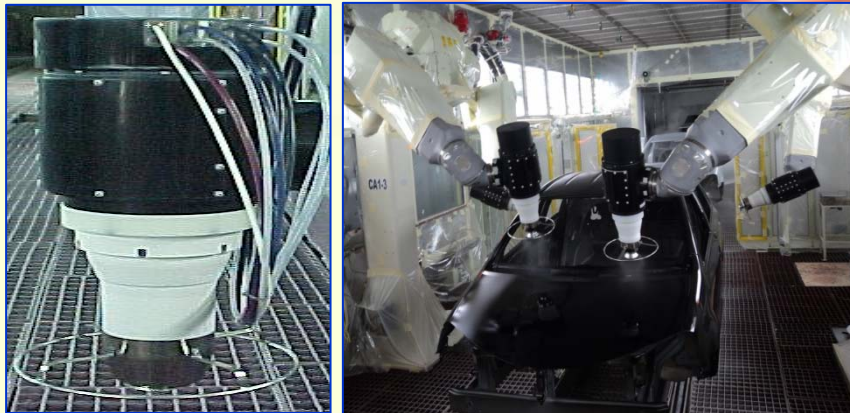


### Approach - "ONE DROP SAVING"



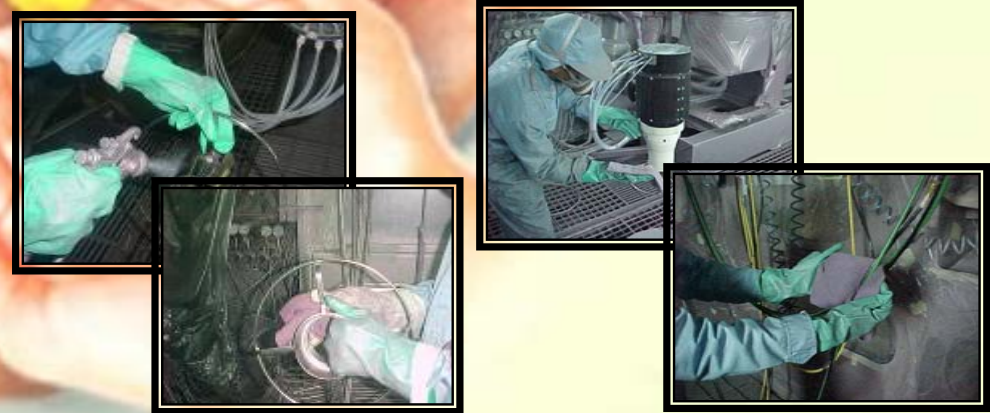
### VOC Reduction - Kaizens

#### Spray & Overspray Kaizens



Multifeed Bell & Distance Redn Kaizen

#### Washing & Flushing Kaizens

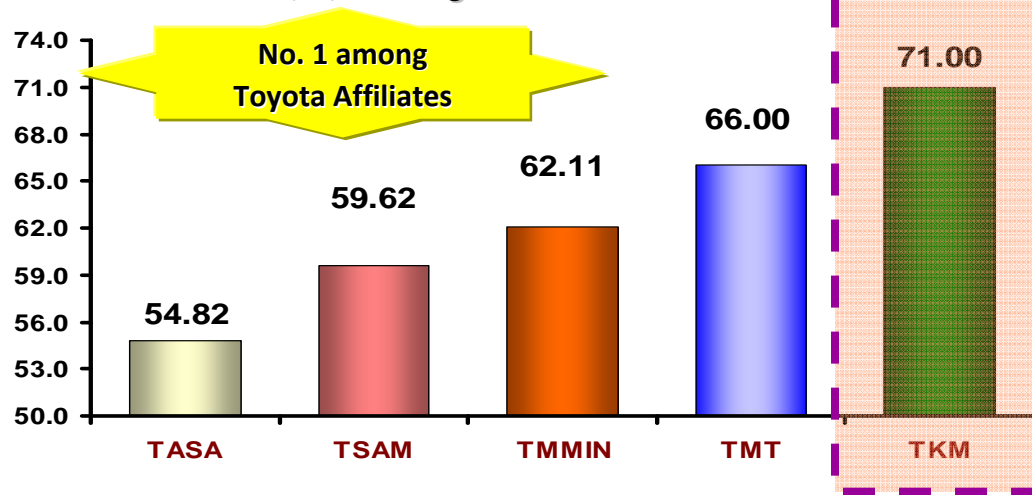


Reduction of Thinner - Washing & Flushing

# 17 b. Sustainable Manufacturing

## Steel Yield Improvement Activity

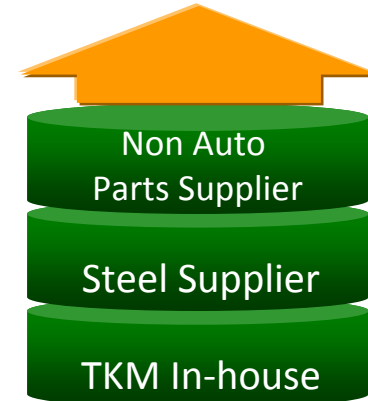
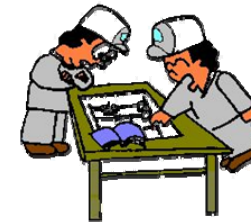
Yield Ratio (%) - Toyota Affiliates



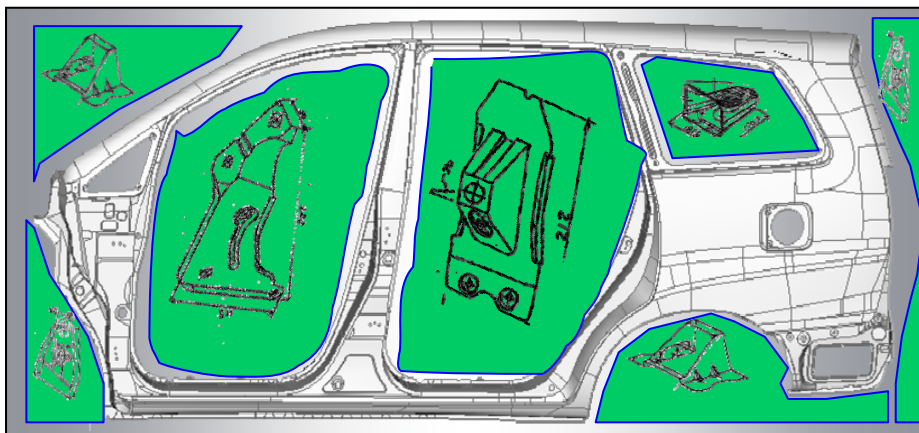
A Three Tier Activity

No. 1

Global Leader in Yield Ratio



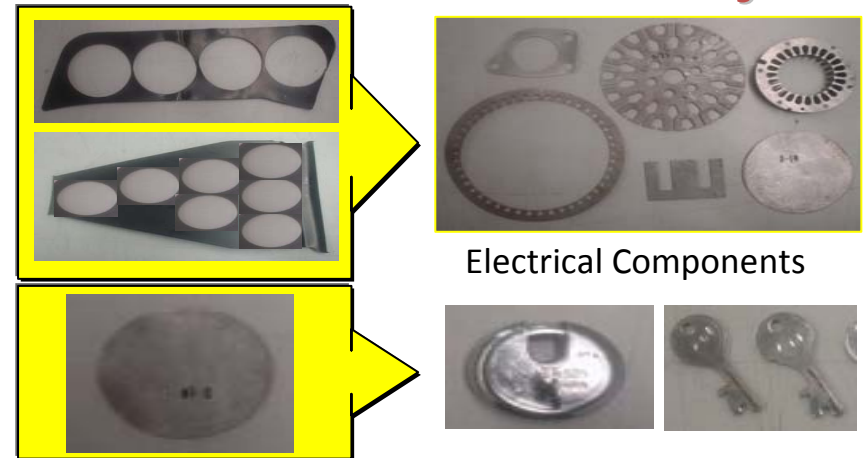
### Inhouse Reduce & Reuse



Reduce

Reuse

### Outhouse Reduce, Reuse, Recycle



Reduce

Reuse

Recycle



# 18. The Eco Factory Concept



## Innovative Technologies



**Press Shop: Energy efficient SERVO PRESS**  
Advanced technology for higher energy savings



**Weld Shop: Energy Efficient Global Body Line**  
Flexibility without additional equipment or energy requirements



**Paint Shop: Water based paint-Zero solvent usage**  
Lesser Solvent means Lesser VOC Emissions



**Paint Shop: Zero VOC Emission**  
Regenerative Thermal Oxidizers [RTO] eliminate all VOCs in Exhausts



**Utilities: Treated Water Recycling Technology**  
We Recycle upto 40% of water

## Sustainable Plant Activities



**Greenery Development: Afforestation Activity**  
Our Aim: 5 lakh trees in 5 years



**Clean Energy: Wind mills**  
Harnessing Clean energy – Reducing our CO<sub>2</sub> footprint



**Eco-mind promotion: Renewable Energy Theme park**  
Showcasing best energy practices



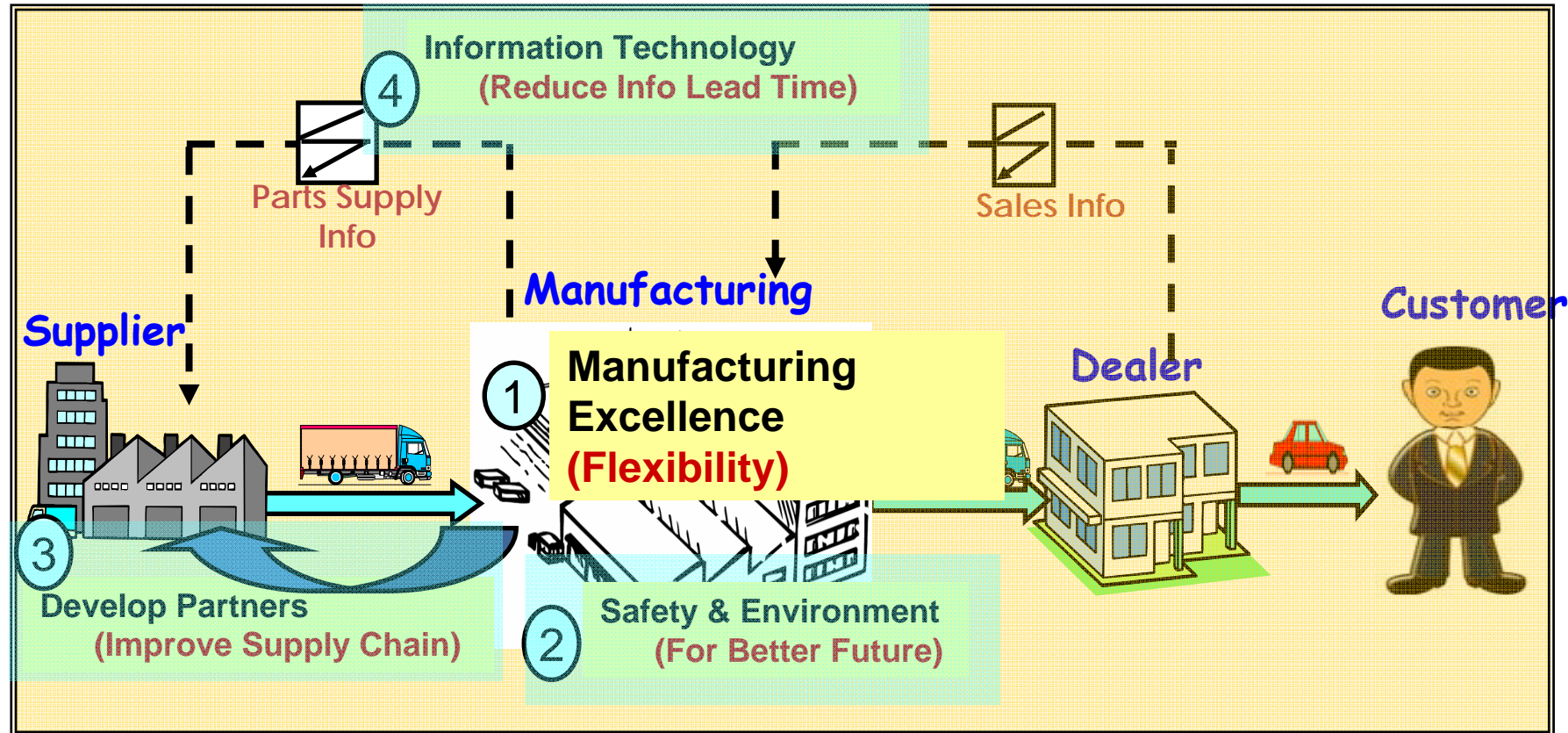
**Eco-mind promotion: Eco zone**  
Showcasing best environment sustainability practices



**Eco-mind promotion: Eco Training center**  
Best environment practices education centre



# 19. Supply Chain outline



- > **Built in flexibility**
- > **Information lead time reduction**
- > **Suppliers as partners**
- > **Safety & environment focus**

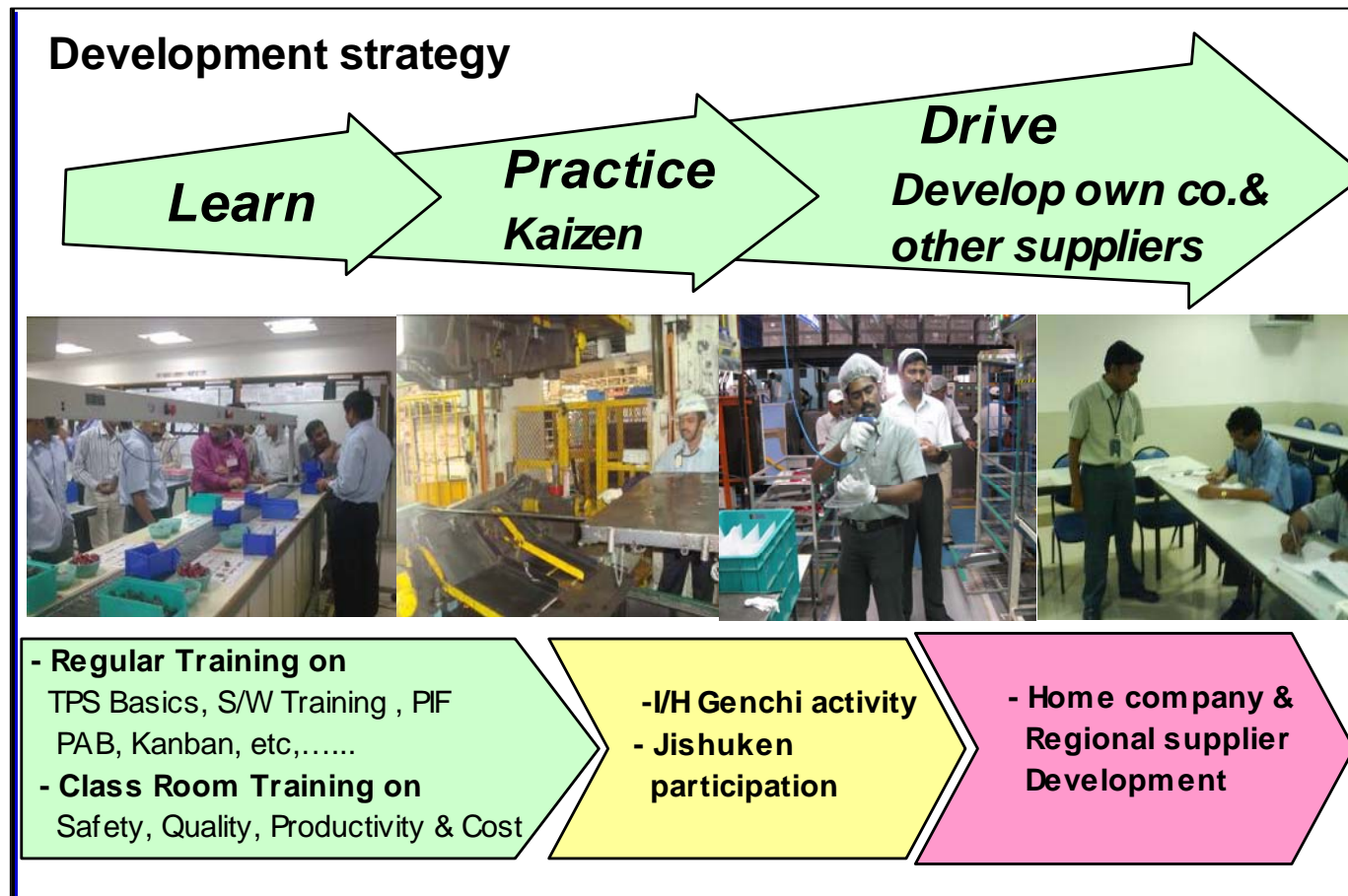
# 19a. Vendor Development



Suppliers as partners

*Develop suppliers to implement Toyota production system at their facilities.*

**One year** training to Supplier members @ TKM to spread Toyota culture.



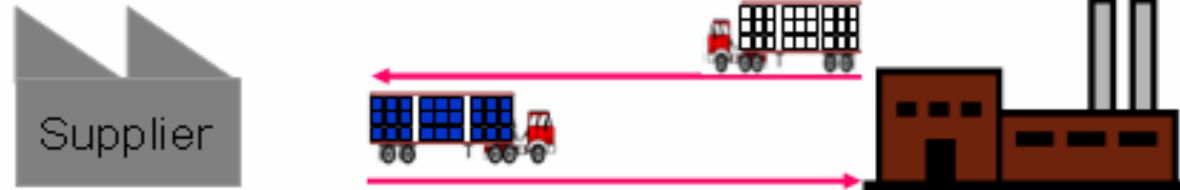
# 19a. Sustainable Logistics



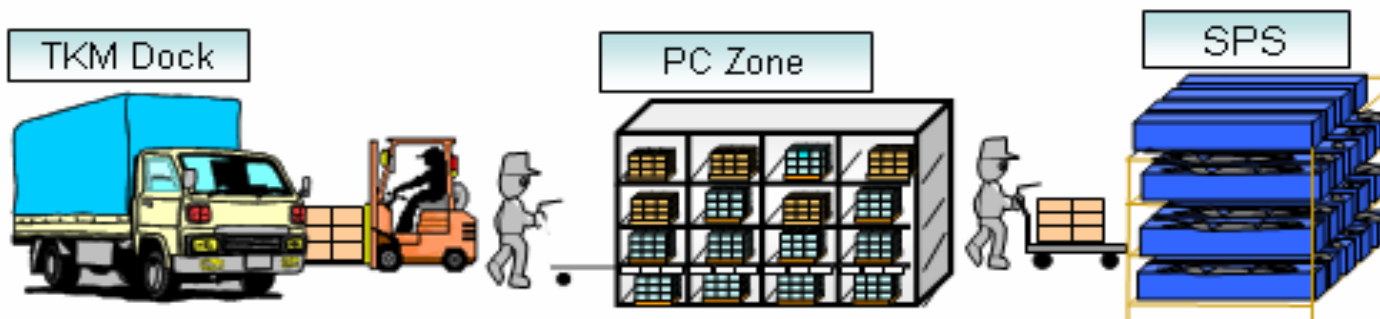
## Logistics CO2 Management

### Types of Logistics

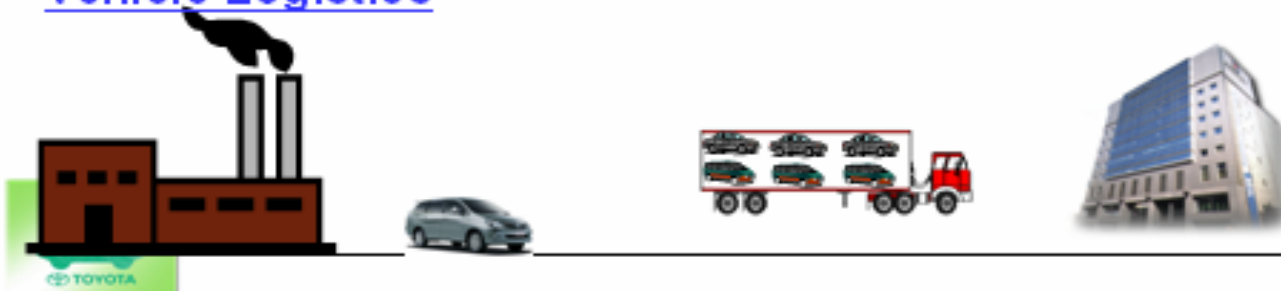
#### External Logistics



#### Internal Logistics



#### Vehicle Logistics



#### Activities considered

01. Distance reduction

02. Fuel Efficiency

03. Loading Efficiency optimization

04. Mixed logistics

05. Milk run

06. Driving skill enhancement

07. Periodic Maintenance

08. Alternate Fuel



# 19a. Sustainable Logistics



## INHOUSE LOGISTICS IMPROVEMENTS

### 100% Returnable packing Material

#### BEFORE KAIZEN

Use of Disposable Packing



#### AFTER KAIZEN

Use of Returnable Packing



Increase in the Cycle Time by 12

### CO<sub>2</sub> Reduction Kaizens



Use of Battery Operated Forklift - Zero CO<sub>2</sub>



Use of Battery Operated Tow Motor

# 19a. Sustainable Supplier

## ECO SHOWCASE ACTIVITIES

### Supplier Support Activities



**GREEN PURCHASING GUIDELINE** released during  
**ANNUAL SUPPLIER MEET** - Apr 2007.

#### Key Points

1. **ISO 14001 Certification**
2. **Elimination of SOC**
3. **Elimination of Banned chemicals**
4. **Manufacturing CO<sub>2</sub> reduction.**
5. **Logistics CO<sub>2</sub> reduction.**
6. **Packing material reduction**

### Supplier Appreciation



**Appreciation Award for  
ISO- 14001 Certified Company**

### EMS Performance Enhancement



**85% of our Suppliers are  
ISO 14001 Certified**



# 19a. Sustainable Business

## On-site Supplier Park

### Purpose:

1. Improve the quality and efficiency of part sourcing.
2. Bring suppliers close to TKM, thus reducing logistics costs
3. Reduce Packing materials & Logistics CO<sub>2</sub> emission



Onsite suppliers within TKM premises



Oyaku dolly for Just In Time supply of parts



# 19b. Sustainable Dealer

## ECO SHOWCASE ACTIVITIES

### Dealer Support Activities

#### 1. DERAP - Dealer Environment Risk Assessment Program

##### DERAP Self Audit Report by Dealer



**Back ground:** Introduced in Yr 2004 by TMC with the objective of “Creating Awareness & Minimize Environmental Risk” at dealership

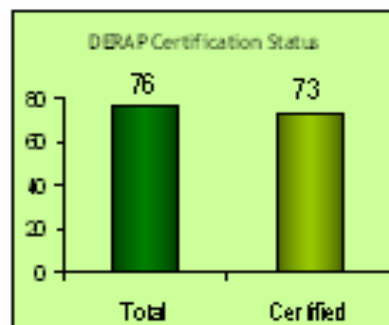
##### 5 Key Parameters in DERAP:

- Assignment of Env Promotion Staff
- Declaration of Abidance to laws
- Proper Treatment of Hazardous wastes
- Proper Treatment of Drainage water
- Proper HFC recovery <Recovery machine>

#### 2. ISO & DERAP Certification Status



89% Dealers Certified



96% Dealers Certified

#### 3. Best Practices at Dealerships



Wastewater Treatment



Waste Segregation

# 20. Eco Showcase



## Eco-CSR Theme: Clean & Green Villages (CSR)

Background: To effectively utilize TKM's non-production days  
Purpose: Spread TKM's ECO SPIRIT among Local Community

Participants : 1850 members  
Places : 8 villages around TKM



Awareness Drive



Clean-up Drive



Say NO to Plastics Campaign



Plantation Drive

## Eco-CSR Theme: Voluntary Eco-CSR Activities by Team Members

Purpose: Spread TKM's ECO SPIRIT among Local Community

Participants : 1400 members



Env. Awareness Campaign



Dustbin installation



Waste Mgmt. Awareness drive



Clean-up drive



# 20. Eco Showcase



**Aim :** To promote Environment awareness & to light billion lives

**Activity:** A 24 hour Live environment awareness campaign

## Greenathon Light a billion lives program

**2009 :** Over Rs. 24 Mil. raised And 67 villages  
(4,000 households) lit up.

**2010 :** Over Rs. 39 Mil raised and 156 villages  
(10,000 households) lit up.

**2011 :** Over Rs. 145 Mil raised  
and 580 villages (40,000 households) lit up...



### Other Events :

#### Clean the Yamuna drive



#### Eco-Marathon



#### 24 hour marathon Telecast for Eco promotion :





A vibrant, sun-dappled forest scene with a path leading through tall, leafy trees. The text is overlaid on this background.

TKM

# Afforestation Activity

*A Step towards "GREEN TKM".....*

# TKM Afforestation

## Afforestation Objective

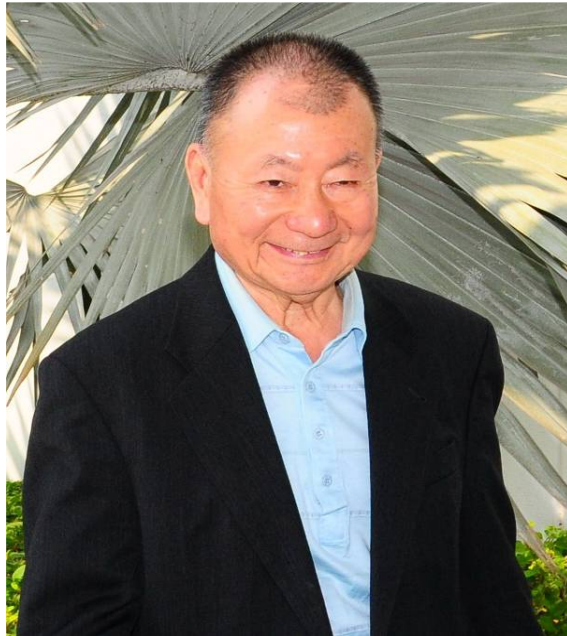
Factory which,

- Can operate **without causing load** on nature,
- Sparks the **ECO-MIND among TM's & Family,**
- Can be **admired by local community**





# Prof. Dr. Akira Miyawaki



Dr. Akira Miyawaki

Emeritus Professor, Yokohama National University

Director, Japanese Center for International Studies in Ecology

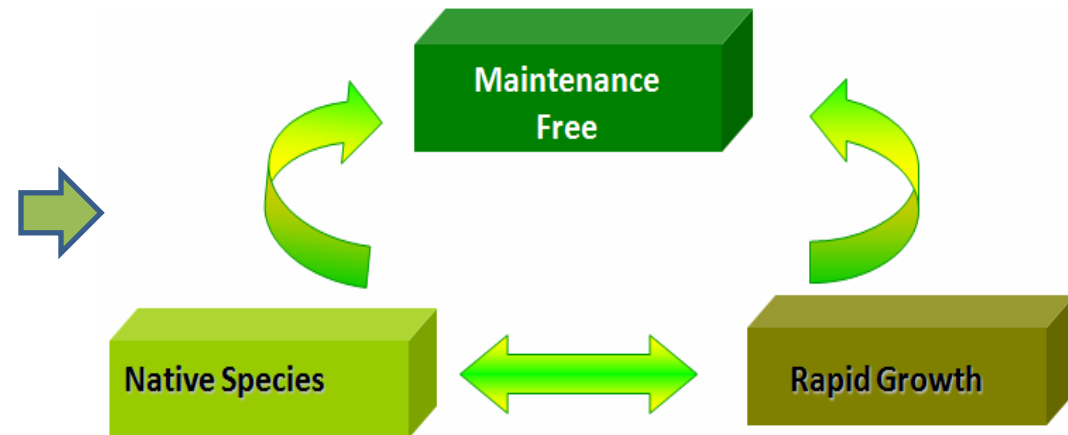
## Awards

2006 Blue Planet Prize

## Miyawaki Method

### Thinking –way

To restore & reconstruct forests  
based on the concept of  
**“Potential Natural Vegetation”**



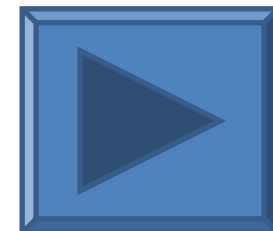
Implemented in more than 1,500 sites





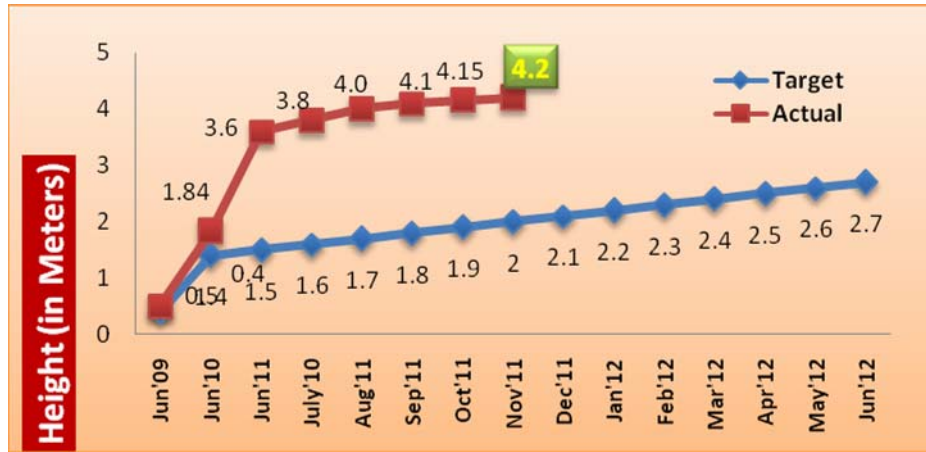
# Approach & Implementation of Afforestation at TKM

Please watch the movie.

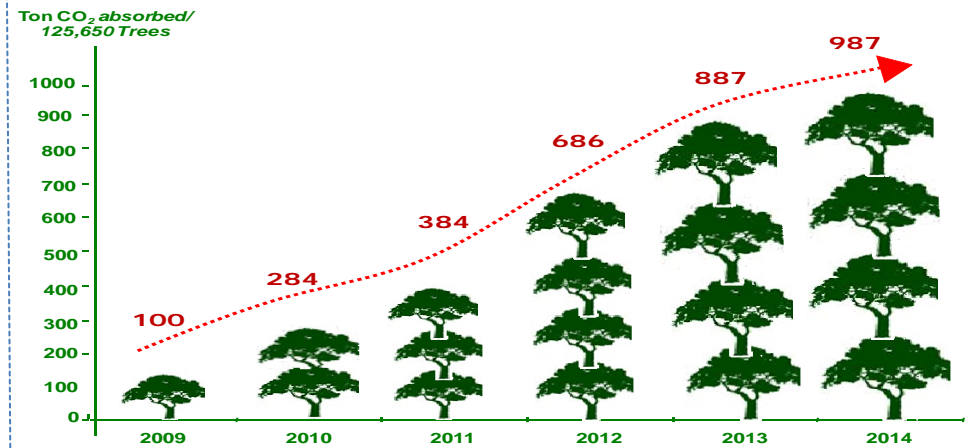


# Afforestation - Status & Future Action

## Afforestation - Growth Rate



## CO<sub>2</sub> Benefit





# Afforestation - Status

## Afforestation Status

21<sup>st</sup> June 2009



21<sup>st</sup> Nov 2011





A silver Toyota Camry is parked on a lush green lawn. The car is positioned in the lower half of the frame, facing left. Above the car, a large, mature tree with thick, dark branches and dense green foliage dominates the upper half of the image. Sunlight filters through the leaves, creating a soft, hazy atmosphere with visible rays of light. The overall scene is peaceful and natural.

*We do not inherit the earth from our  
ancestors, we borrow it from our  
children...*

*Thank You*