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Sustainability in PLM

Building a Sustainable Future Together

NIST Workshop
October 15, 2009

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Siemens PLM Software

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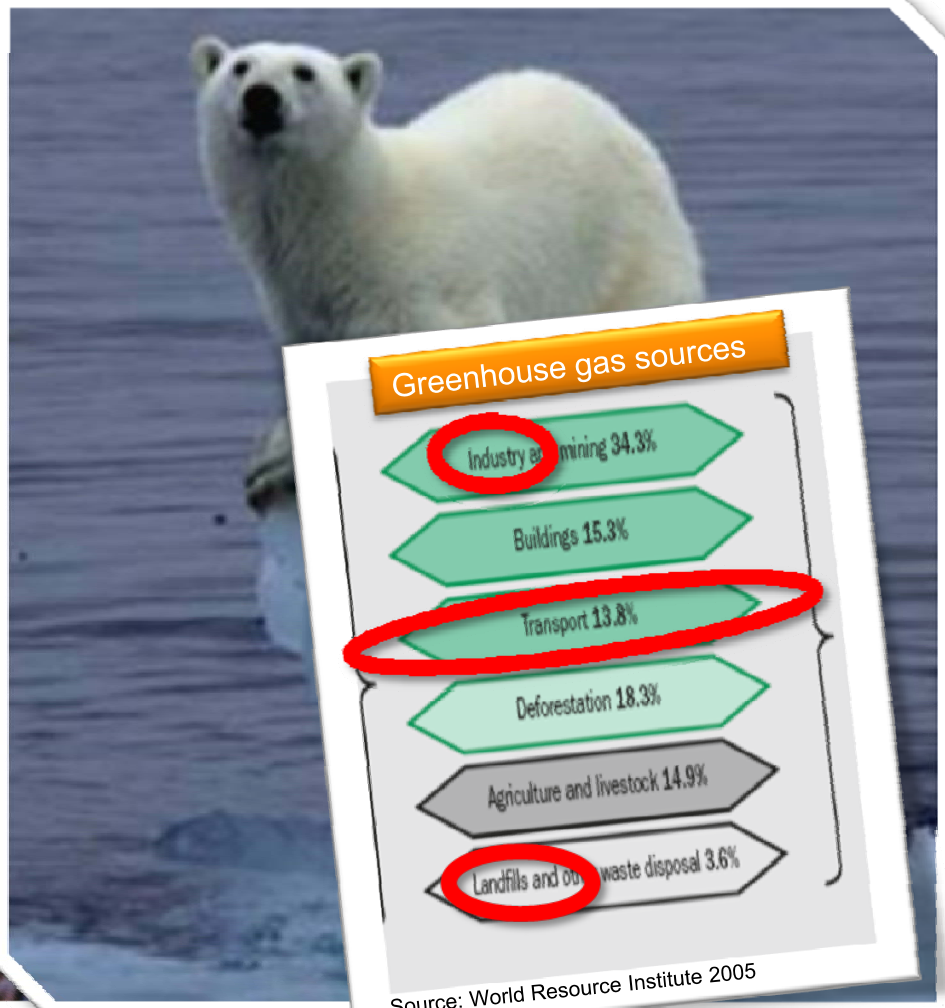

Source: World Resource Institute 2005

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Why Sustainability and Why Now?

Governments

Customers

Competitors

Investors

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Typical Company Sustainability Initiatives

Compliance

Sustainable Product Portfolio

Sustainable Business Practices
Sustainable Brand Image

Sustainable Manufacturing
Supply Chain Efficiency
Waste Reduction

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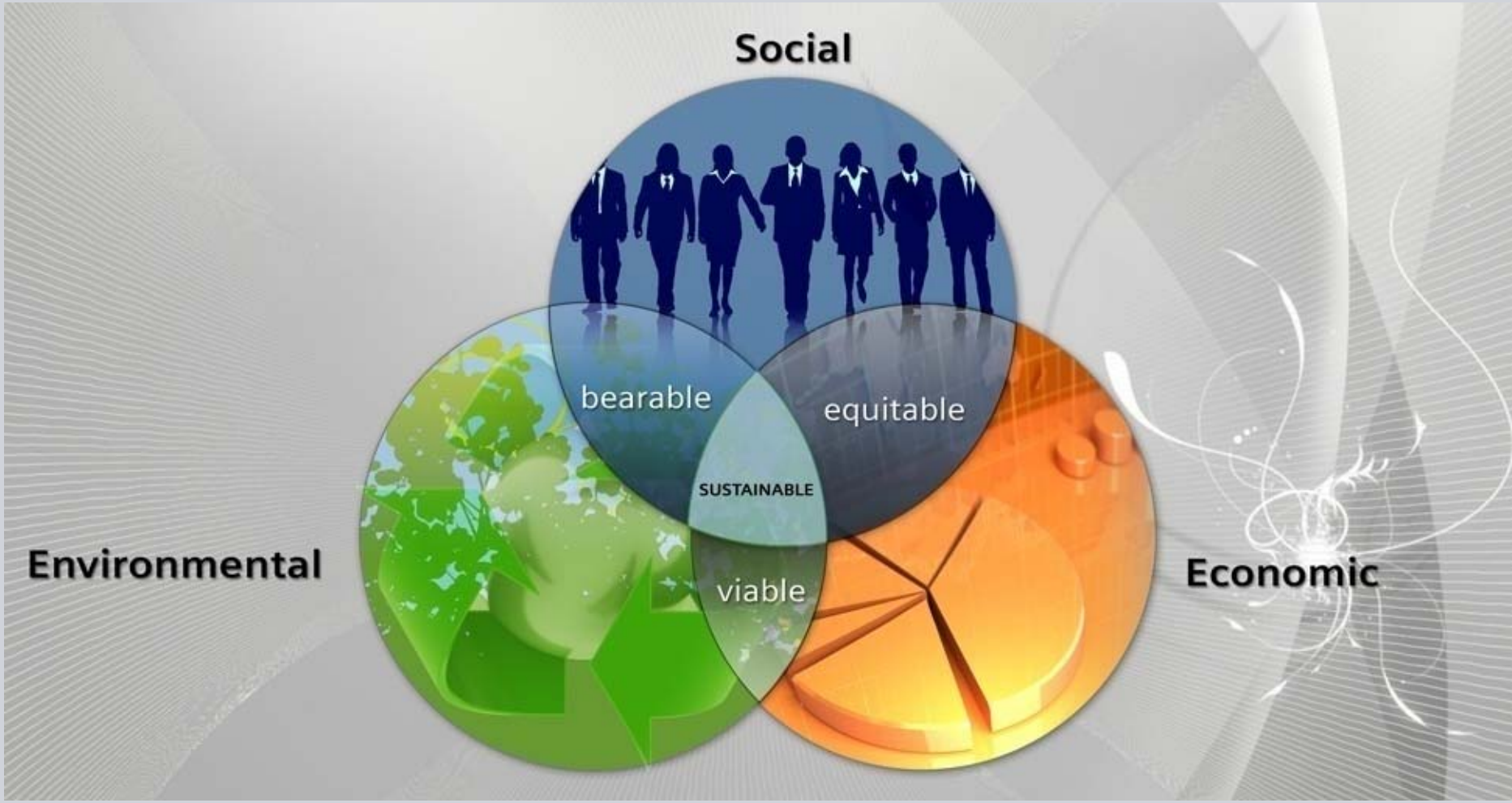
Building sustainable products and processes requires balance…



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Sustainability
Product and Process Considerations

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Environmental

- Energy
- Water
- Emissions
- Waste reduction
- Recycling
- Re-use
- Packaging
- Product content
- Resource conservation
- End of Life

Social

- Working conditions
- Health
- Safety
- Ergonomics
- Product use and performance
- Brand
- Supply Chain

Economic

- Accountability
- Transparency
- Corporate governance
- Economic performance
- Financial objectives
- Shareholder value

SUSTAINABLE

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Sustainability success means effective life cycle management

Enabling more effective decision making through integrated knowledge across the life cycle

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PLM Platform for Sustainability

Plan for Sustainability

Design for Sustainability

Sustainable Manufacturing

Sustainable Service and End of Life

Governance, Compliance and Reporting

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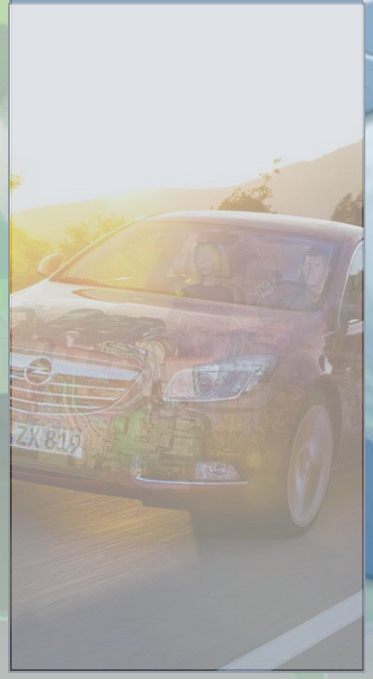
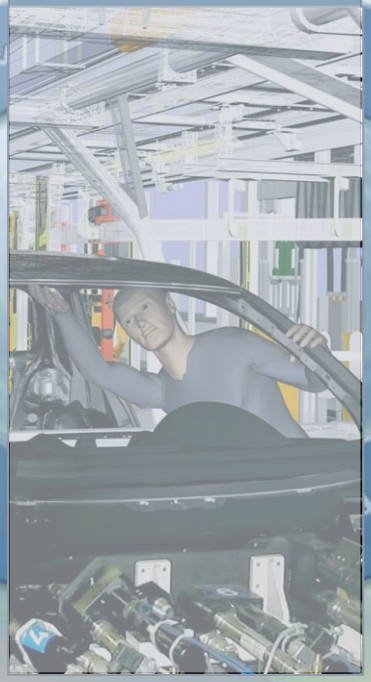
PLM Platform for Sustainability

Plan for Sustainability

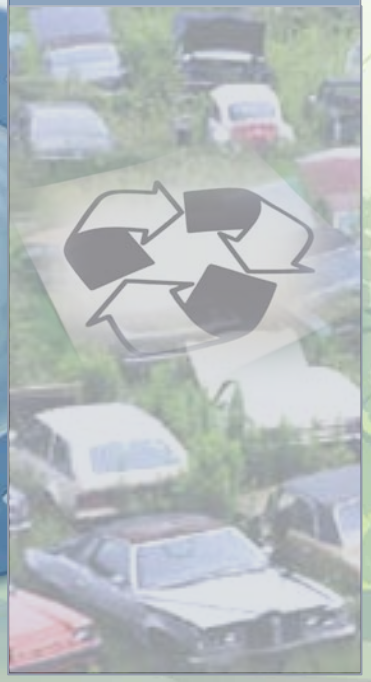
Design for Sustainability



Sustainable Manufacturing



Sustainable Service and End of Life



Governance, Compliance and Reporting

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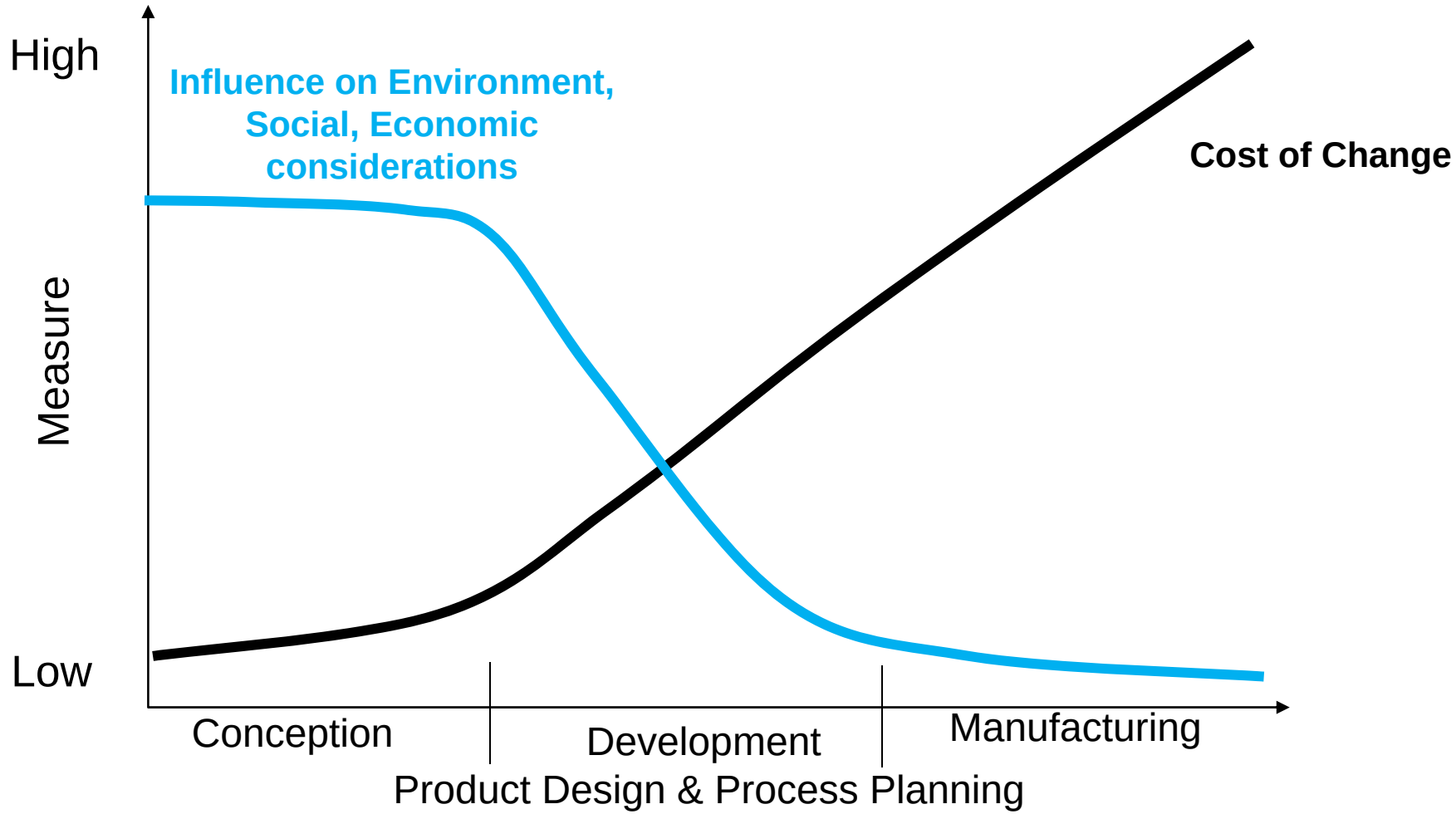
Sustainability Impact



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Plan for Sustainability
Life cycle Requirements Management

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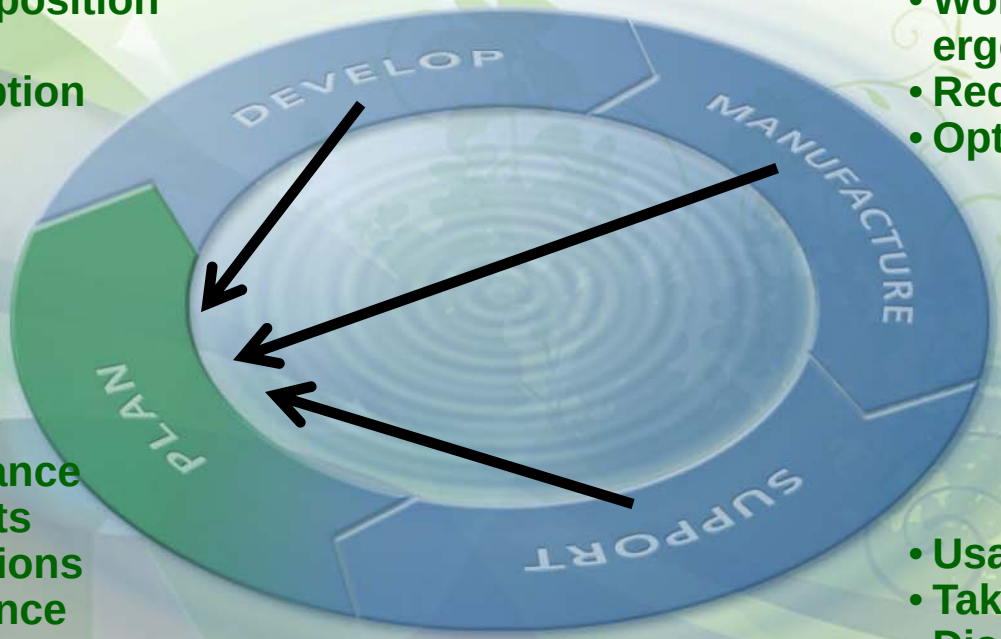
- Material selection
- Performance
- Product usage
- Service & End of Life Disassembly & Disposition
- Reuse
- Resource consumption
- Product packaging

- No hazardous substances
- Minimize resource consumption
- Worker safety and ergonomics
- Reduce packaging
- Optimize logistics



- Regulatory compliance
- Market requirements
- Customer expectations
- Corporate governance
- Program/project status
- Sustainability metrics & targets

- Usage & Maintenance
- Take-back systems
- Disassembly & Disposal
- Recovery & Reuse

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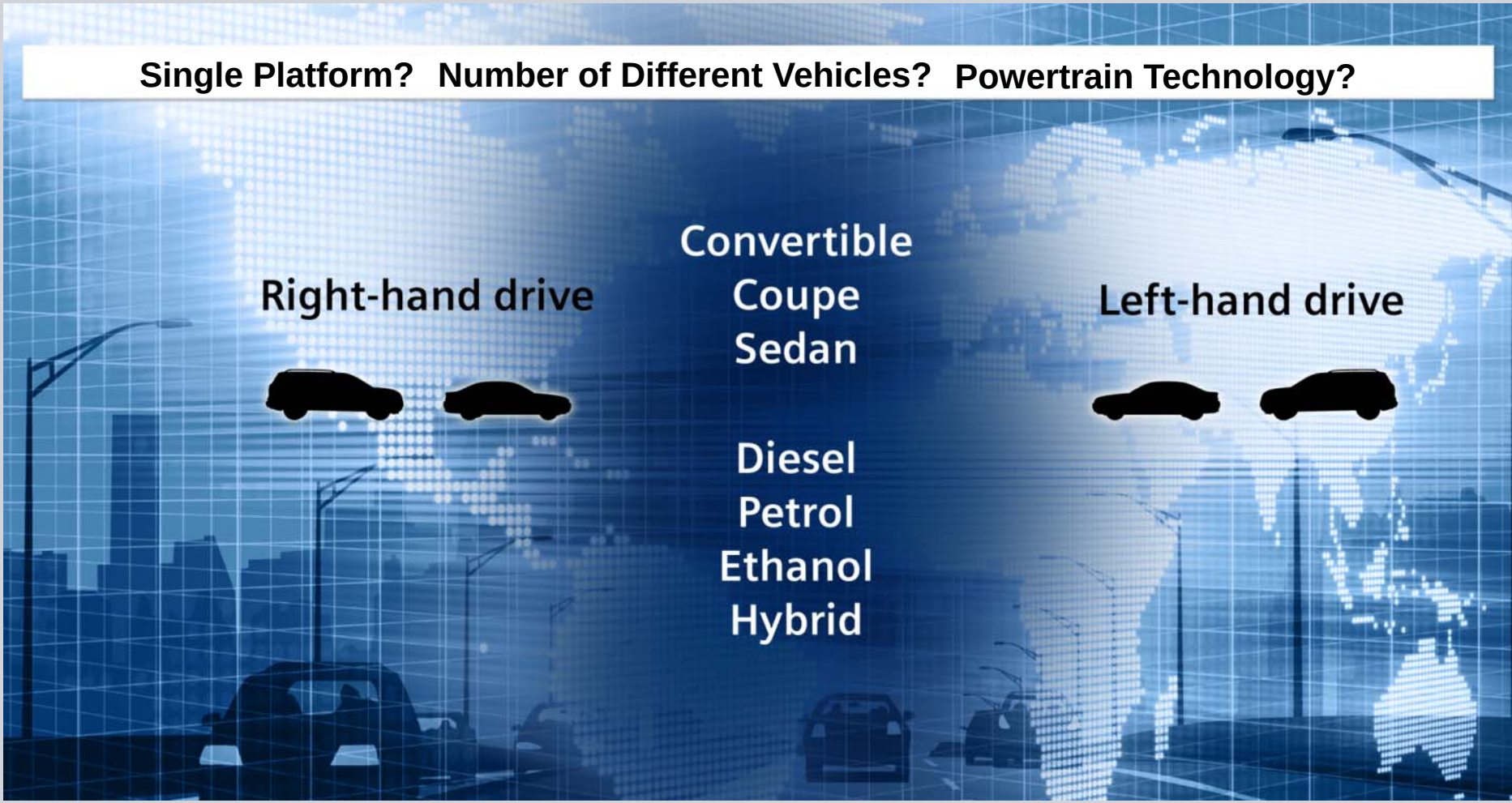
Portfolio Decisions



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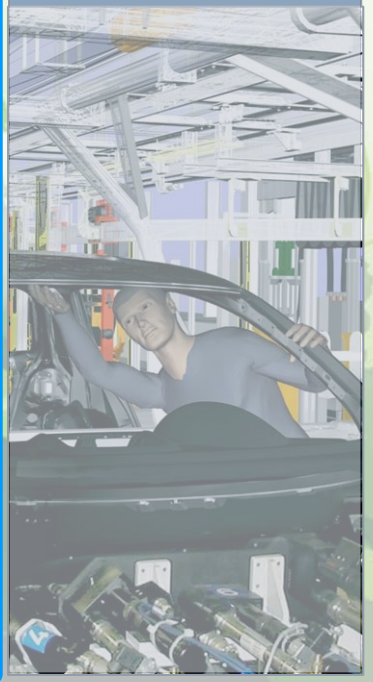
PLM Platform for Sustainability

Plan for Sustainability	Design for Sustainability	Sustainable Manufacturing	Sustainable Service and End of Life	Governance, Compliance and Reporting



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Design Considerations

- *Innovative, attractive design*
- *Meets customer demands*
- *Cost effective*
- *Profitable*
- *Supplier capabilities*

- *Decrease Waste*
- *Reduce contamination*
- *Recycle packaging*
- *Repair/maintenance waste*
- *Part recycling*
- *Part disposal*

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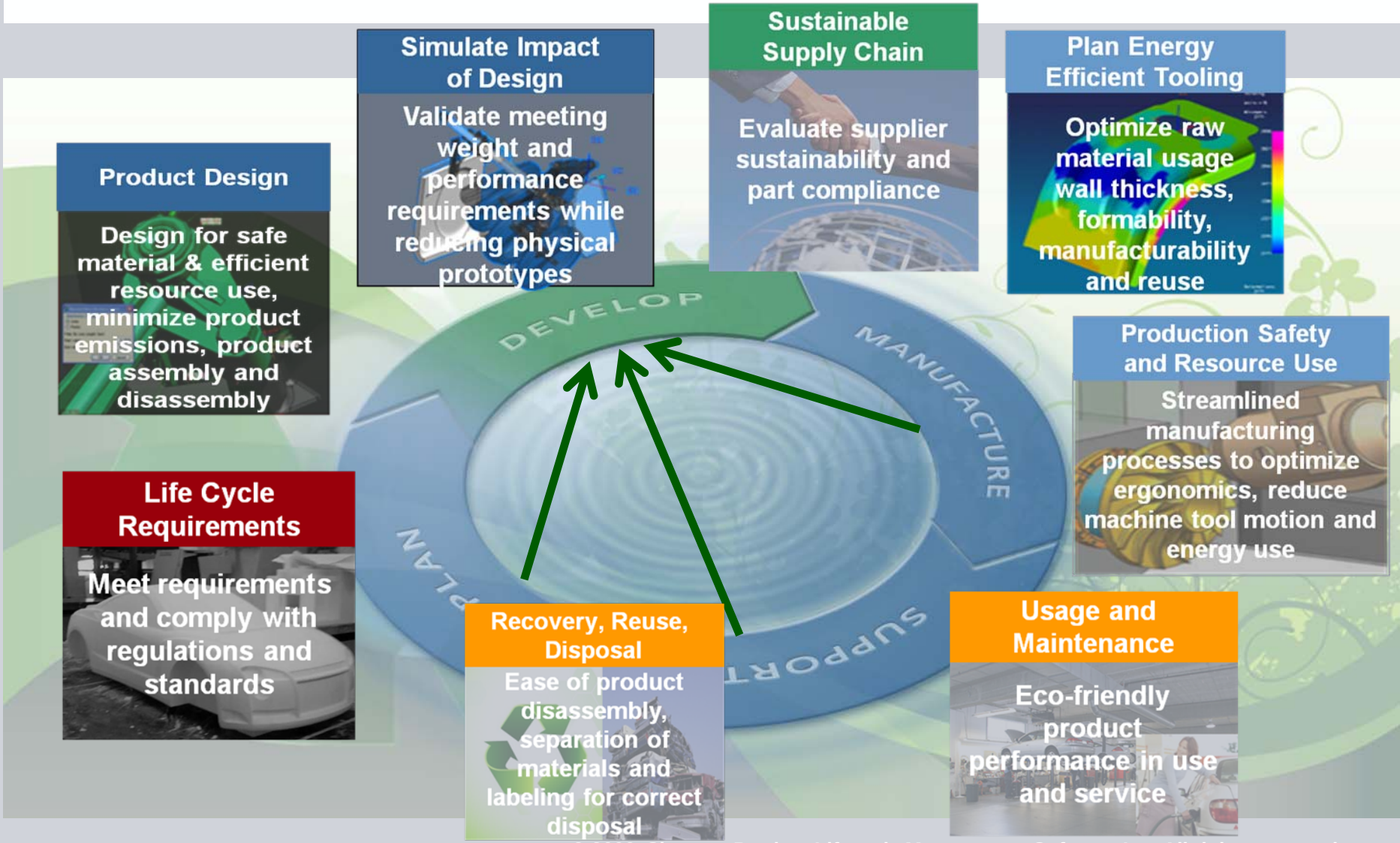
Design for Sustainability



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PLM Platform for Sustainability

Plan for Sustainability	Design for Sustainability	Sustainable Manufacturing	Sustainable Service and End of Life	Governance, Compliance and Reporting

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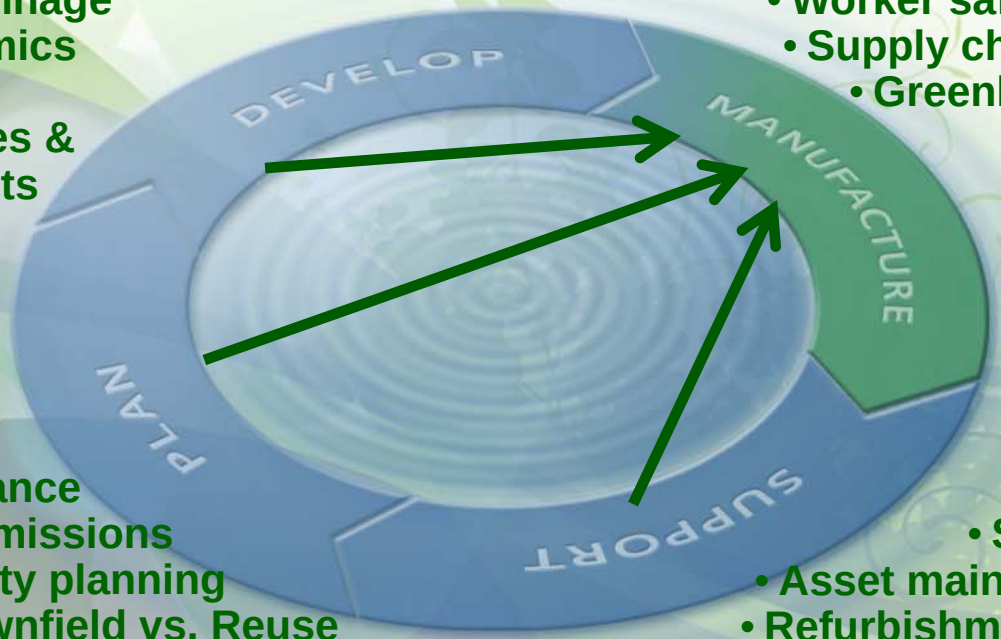
Sustainable Manufacturing

- Manufacturing process planning
- Manufacturing engineering
- In-plant dunnage/packaging
- Reuse (e.g., process, assets)
- Design for zero dunnage
- Design for ergonomics
- Plant Simulation
- Process Alternatives & Environmental Costs

- No hazardous substances/emissions (e.g., VOC's)
- Minimize resource consumption (i.e., energy, water, land use)
- Worker safety and ergonomics
- Supply chain carbon footprint
- Greenhouse gas reduction
- Waste Reduction
- In-plant logistics
- In-bound logistics
- Asset Management



- Regulatory compliance
- Greenhouse Gas emissions
- Facility and Capacity planning
- Greenfield vs. Brownfield vs. Reuse
- Sustainability metrics & target
- Green building, facility and site designs

- Service part strategy
- Asset maintenance and service
- Refurbishment and repurposing
- Asset Obsolescence (e.g., disassembly, disposal, recovery and reuse)

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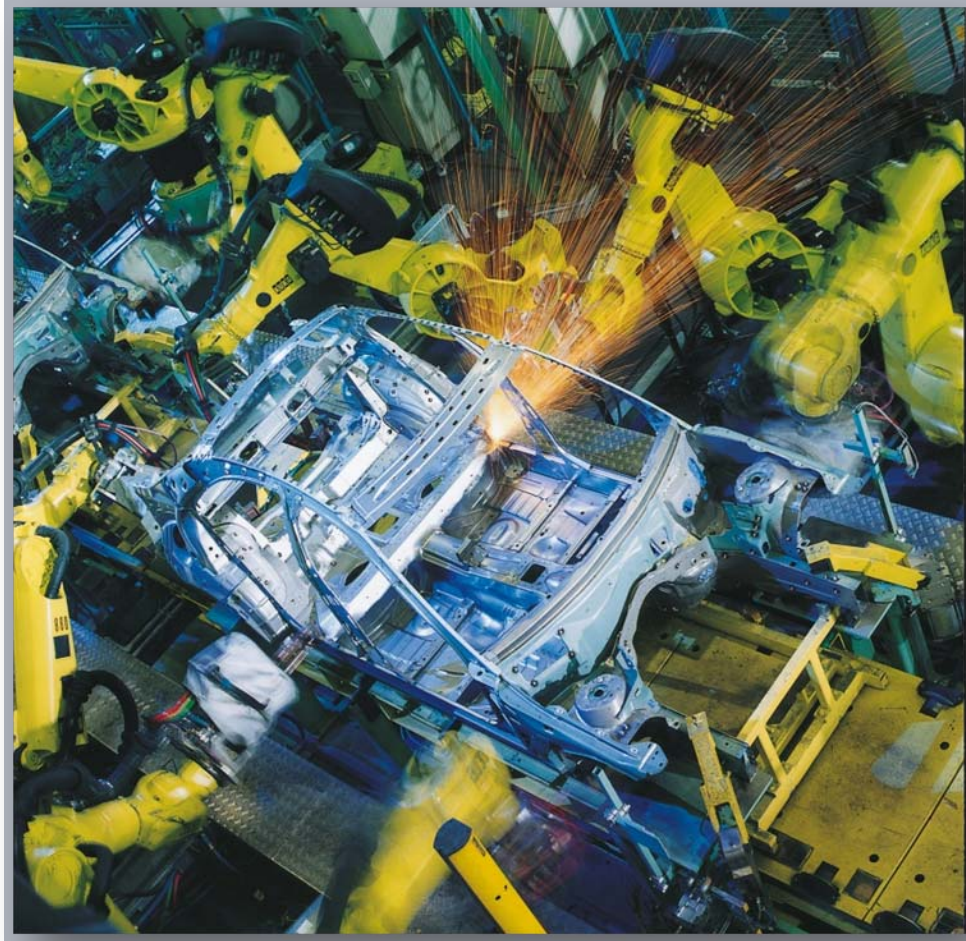
Sustainable Manufacturing Success

- Sustainable Manufacturing Processes
  - Reduce energy use, water consumption, waste and emissions
  - Flexible design for maximizing lifecycle re-use for minimum costs
- Sustainable Plant and Equipment Operations
  - Plant land use and environmental friendliness
  - Re-use/recycle plant equipment
  - Dispose of plant equipment and waste according to regulations and in a safe manner
- Optimized Work Environment
  - Worker safety and ergonomics



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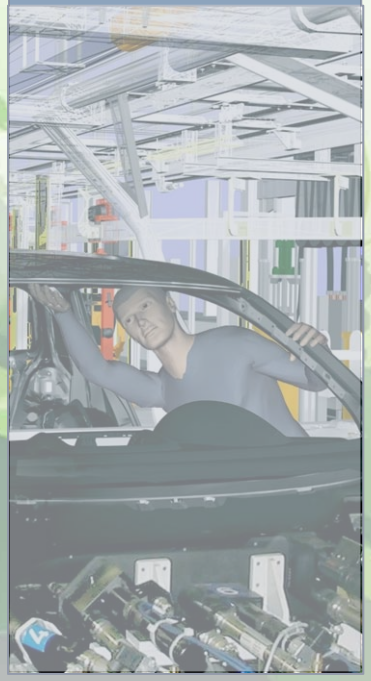
PLM Platform for Sustainability

Plan for Sustainability

Design for Sustainability

Sustainable Manufacturing



Sustainable Service and End of Life

Governance, Compliance and Reporting

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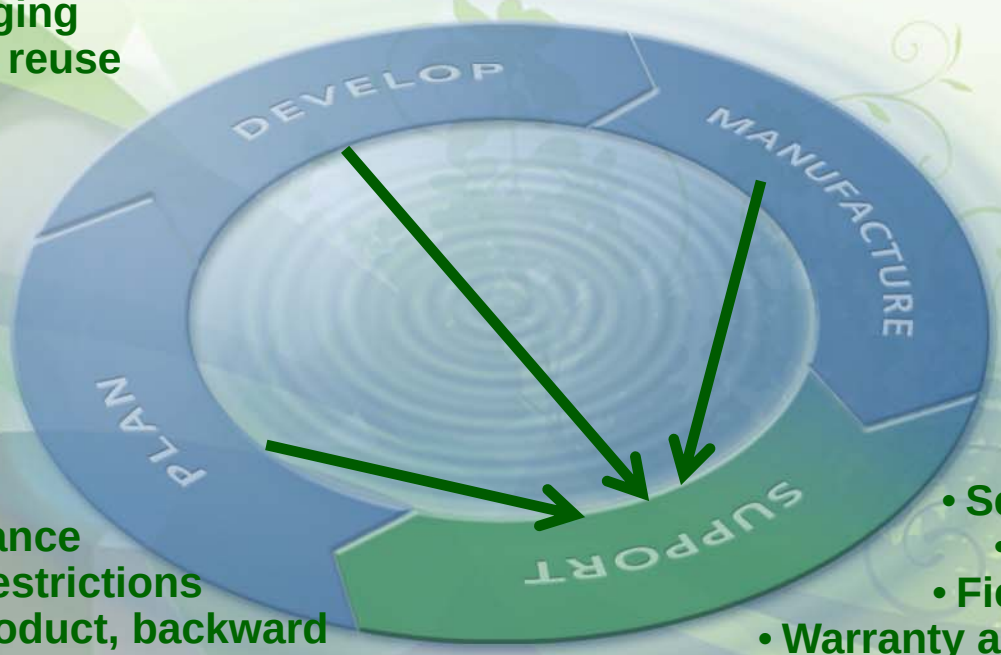
Sustainable Service and End of Life

- Service & End of Life Disassembly & Disposition
- Service procedure ergonomics
- Service manuals
- Service part packaging
- Service knowledge reuse

- Service part manufacturing
- Service planning and execution
- Service part core return and refurbishment



- Regulatory compliance
- Material disposal restrictions
- Upgradability of product, backward compatibility
- Sustainability targets & metrics

- Service part inventory
- Service procedures
- Fielded configurations
- Warranty and recall traceability
- Part Obsolescence (e.g., disassembly, disposal, recovery and reuse)

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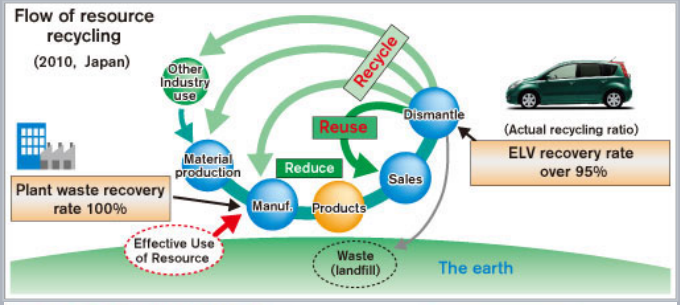
Sustainable Service and End of Life

- After sales vehicle service and maintenance
  - Service parts/obsolescence
  - Repair procedures, disassembly/installation instructions, part/fluid recycle/disposal
- Develop an EOL Plan for every part (recycle, refurbish, repurpose, reuse, and disposal)
  - Identify components and materials which are suitable for reuse and recovery
  - Provide dismantling instructions for each type of new vehicle & storage and testing information for components which can be reused

Source: edmunds.com



Source: Nissan Green Program

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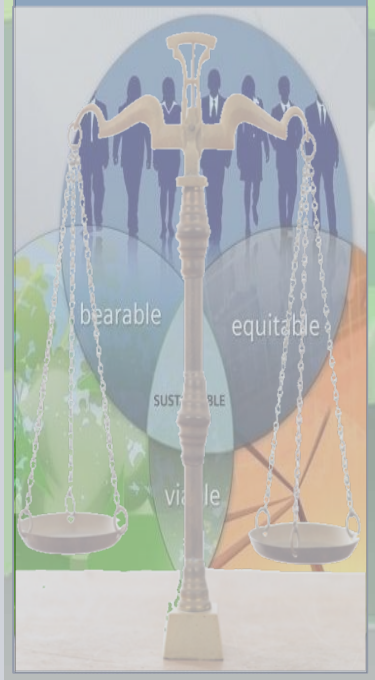
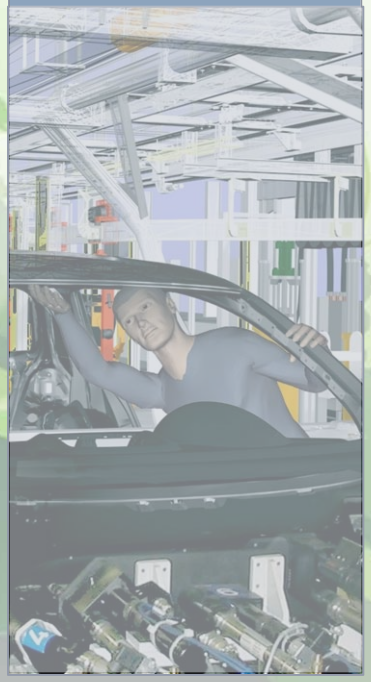
PLM Platform for Sustainability

Plan for Sustainability	Design for Sustainability	Sustainable Manufacturing	Sustainable Service and End of Life	Governance, Compliance and Reporting





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Governance, Compliance and Reporting
Today

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- Regulatory compliance and reporting requirements increasing at rapid pace
- Liability issues for non-compliance
- Oversight of supply chain compliance
- Company sustainability policies and objectives

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Governance, Compliance and Reporting

Impact across the product life cycle

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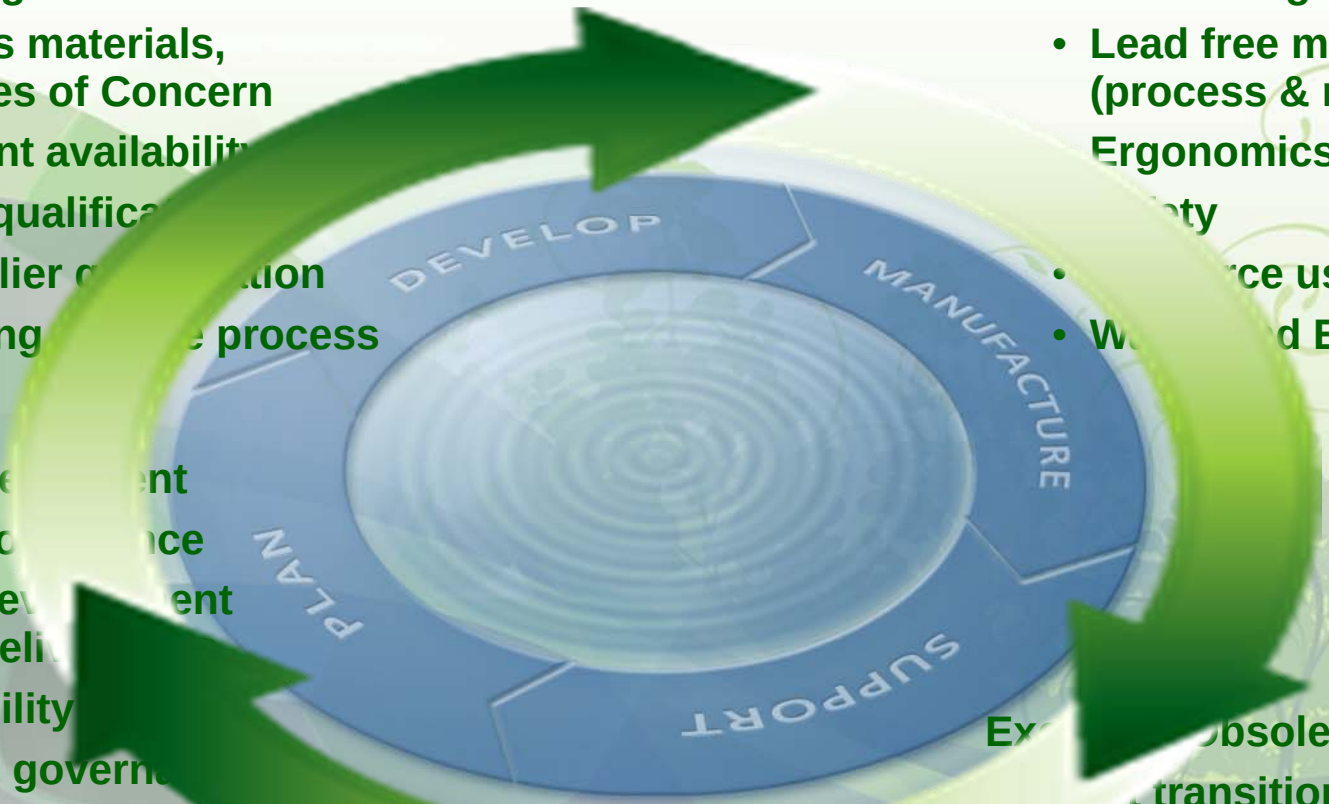
Product Design

- Hazardous materials, Substances of Concern
- Component availabilit
- New part qualifica
- New supplier q tion
- Engineering e process

Strategy Deve nt

- Product co ce
- Product de ent process deli
- Sustainability
- Corporate governa
- Program/project status
- Reporting and Metrics



Manufacturing

- Lead free manufacturing (process & machinery)

Ergonomics

ty

- ce use
- W d Emissions

Ex bsolete Inventory

t transition

Compliant sourcing

g & Disposal

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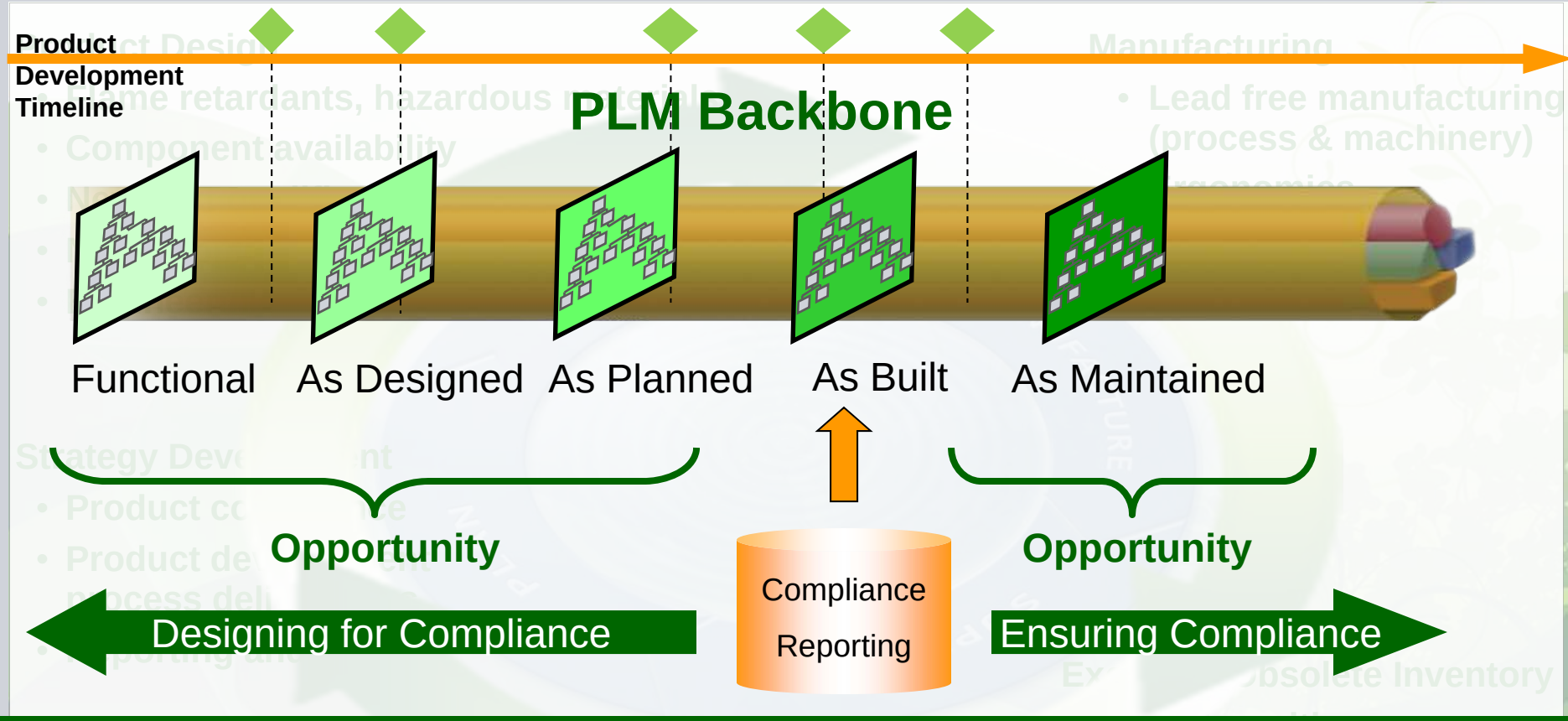
Governance, Compliance and Reporting



Govern sustainability compliance in your PLM backbone!

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Thank you!

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