Sustainable Manufacturing Consulting

SALES **CARBON** OPERATIONS PLANNING
A Business Process for the Clean Economy

Building a Clean Global Economy

The age of globalization has ended in a severe global recession, similar to the end of the age of industrialization in the 1920's. Among many, complex causes of this global recession are the assumptions and drivers of globalization:

1. Resources are assumed infinite.
2. Goals for every economy and business entity are maximum growth, maximum productivity, maximum profit, maximum consumption.
3. External costs of economic activity are not assumed to be relevant, therefore not measured in the business performance reporting by businesses and countries.
4. The best use of resources is decided by shareholders and not stakeholders.

What seemed to be, and was measured as such, great performance for the majority of countries and companies, individually, has proven to be a failure at aggregate level for all. **More severe downside risks, more scarce resources and increased constraints are the present realities confronting businesses**.

Disregarding negative externalities is not possible anymore. The age of globalization, which started in the 1950's and intensified in the 1980's coincides with the growing trend in the concentration of CO_2 in the atmosphere (see Fig.1, courtesy of co2now.org). The age of globalization has led to climate change and to a carbon-constrained, unsustainable economy. This trend needs to be reversed to the 350 ppm level, the target level for Earth to remain a life sustaining planet (John Hansen et al., "Target atmospheric CO_2: Where should humanity aim", October 2008).

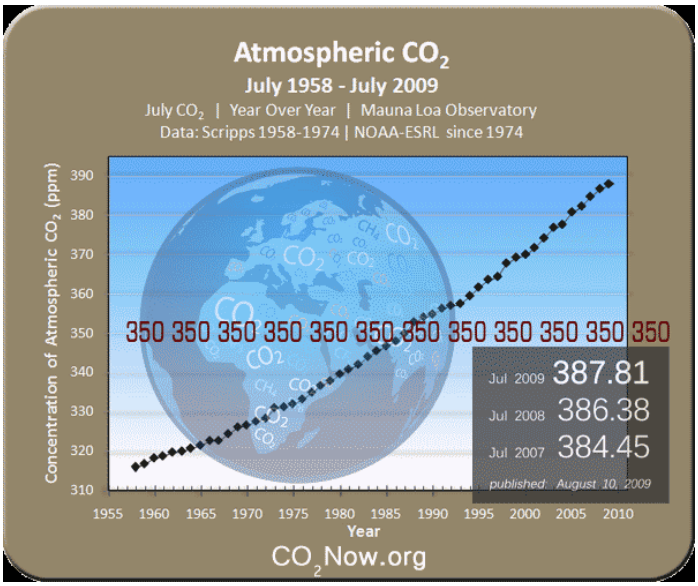

Fig. 1

One of the means of addressing this urgent necessity is **adding carbon management to business processes and business performance measurement**. With the contribution of every company and country, a new age will be built: the age of sustainability, of a clean, carbon-neutral and balanced global economy.

Sales and Operations Planning (SOP) – a Perfect Target for Change

SOP is a business process which informs decision-makers at the executive, strategic level and creates one operational plan for execution at the functional, tactical level.

There are many definitions and levels of sophistication in the adoption and implementation of SOP.

1. SOP is the business process which balances supply and demand.
2. SOP "develops a midrange plan to operations using input from top management. The plan identifies key resources to achieve the firm's strategic objectives and goals and is the basis of all subsequent material and labor resource decisions, as well as the basis for the master production schedule." (APICS)
3. SOP is the collaborative process between multiple functions (sales, marketing, production, procurement, planning, finance) and multiple locations (geographic, business units) which aligns customers' expectations with the company's capacity to serve them profitably.
4. SOP is an essential component of risk management through its continuous focus on variability. From the understanding, prevention, prediction and control of the demand variability to the definition, calculation and control of the supply variability, SOP deals with the sources of risk and the mitigating solutions.
5. SOP is the link between strategic planning, business planning and detailed planning and execution. It insures the successful translation of long-term, strategic objectives into daily, task-level goals and actions.

Irrespective of definition, most experts and practitioners agree on the following essential characteristics of SOP process:

1. It is used and supported by executive and senior management.
2. It coalesces multiple functions involved in product portfolio management from introduction, delivery to obsolescence.
3. It reveals sources and consequences of upside and downside risk and creates a responsive organization to mitigate those risks.
4. It is facts and data driven, inducing an organizational culture of
    - realistic commitment to customer service and financial success
    - diminished functional bias and internal politics clouding clarity
    - decisions and actions
5. It creates one operational plan, to which all functional plans are subordinated, improving collaboration, communication and accountability across horizontal and vertical organizational lines.
6. It manages resources and constraints: human, material, financial and informational through the complete value chain; it is an optimization process.
7. It uses a rolling planning window of 12-24 months covering the production and procurement planning needs.

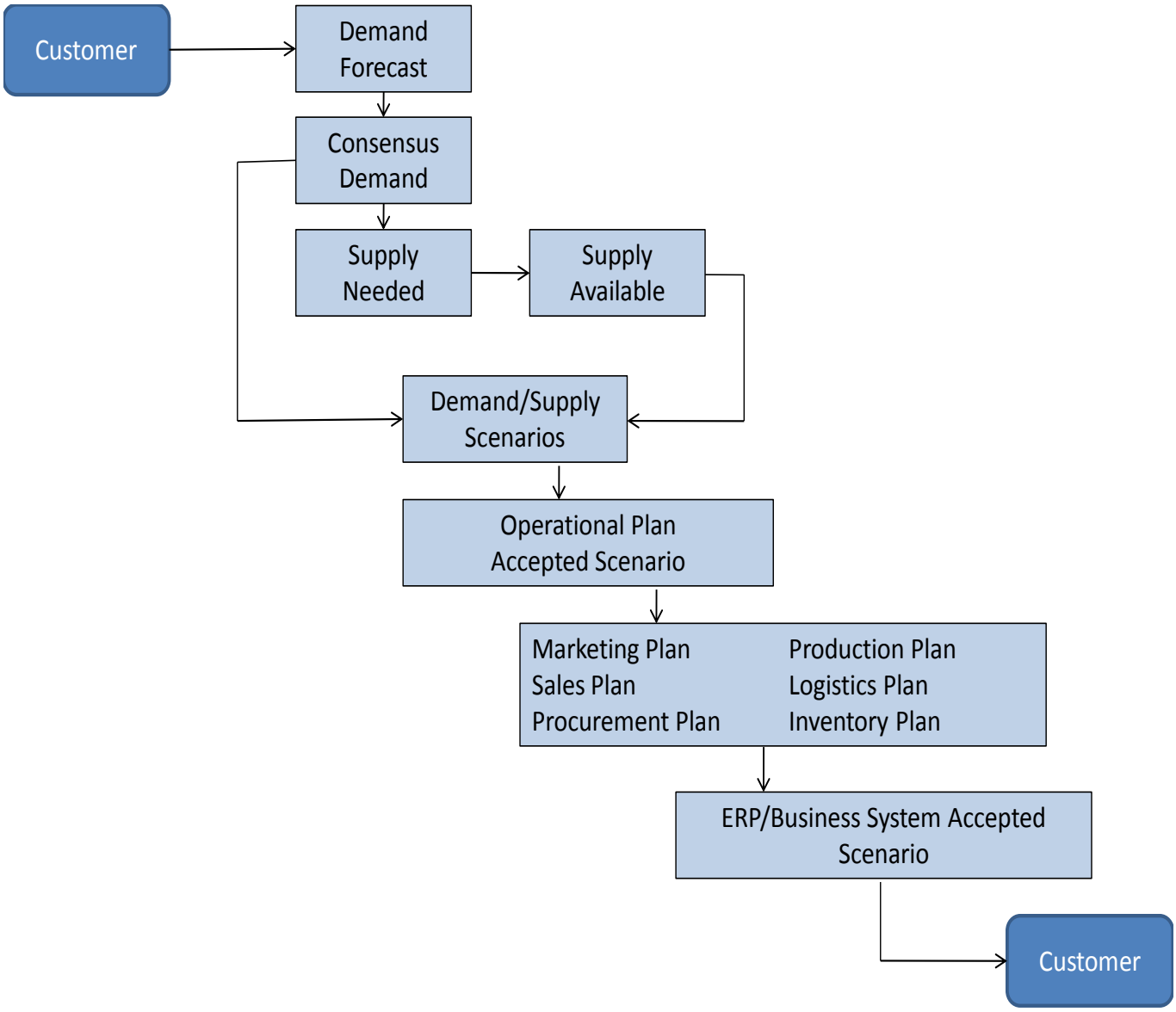

Fig. 2 Typical SOP process flow

Sales CARBON Operations Planning (SCOP) – a Business Process for Sustainability

Whether your company already runs an SOP process or is considering implementing one, adding a new dimension, the company's carbon footprint, is a necessary step towards sustainability. The need to create a SCOP process should become evident based on at least two essential characteristics mentioned above: managing risks and optimizing resources and constraints.

The price of 1 metric ton of CO2-equivalent is estimated to be $13.7 - $21 by 2012. At US average CO2-equivalent emissions per kWh $0.008 - $0.012 will be added to the current price of electricity in the future cap-and-trade system.

Using SCOP avoids added cost by improving forecast accuracy by a few percentage points.

The SCOP process will not require expanding significantly the scope and scale of your current SOP process, it only changes the focus to the triple environment sustaining a business: economic, social and natural (Fig. 3).

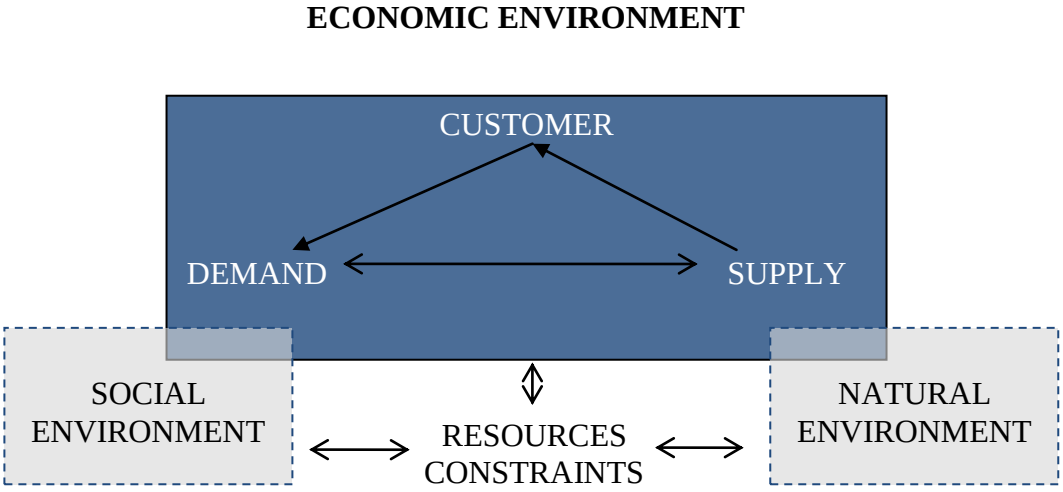

Fig. 3

A summary of the transition towards SCOP by adding new tasks and functions to existing SOP is presented below:

Requirements	SOP	SCOP
DEMAND - PRODUCT MANAGEMENT		
New Product Introduction	• Accurate volume/price forecast • Launch date • Adoption curves	• Life cycle assessment (LCA) during R&D • Identifies environmental impact from design to disposal • Influences production, procurement and logistics decisions before release to production
Existing Products	• Accurate statistical volume/mix/revenue forecast • Event adjustment (promotions, outlier orders)	• Increased focus on forecast bias • Reduce/eliminate waste • Quantify forecast inaccuracy costs
Obsolescence	• Accurate volume/revenue forecast • Timeline, ramp-down rates • Inventory and customer service impact	• Postpone obsolescence • Repair, remanufacture, upgrade • Change the "planned obsolescence" mindset of the past to planned longevity
DEMAND – MARKET INTELLIGENCE		
	• Forecast input and adjustment by Marketing, Sales, Customers for profitability and delivery on-time and on-quality • Accountability for variance of actual demand to forecast on Customer, Supply and Financial performance	• Awareness and responsiveness to customers expectations of a clean, sustainable value chain • Reduce environmental impact of excessive inventory, frequent shipments, excessive production • Identify new sources of revenue from carbon offsets, carbon-trading
SUPPLY – PROCUREMENT		
	• Inventory level and location • Supplier capacity and lead-times • Supply-chain flexibility to respond to actual demand • Trade-offs (expediting vs. shortages) and associated costs	• Supplier selection and localization based on carbon footprint • Logistics and transportation based on carbon footprint • Recycle, reuse, sell excessive inventory

SUPPLY – PRODUCTION		
	• Capacity (equipment and labor) nominal and real • Capacity utilization trend • Capacity localization based on customer delivery and economies of scale • Flexibility to respond to actual demand • Trade-offs (labor overtime vs. late delivery) and associated costs	• Energy use, energy efficiency, sources of energy (fossil or non-fossil based) • Plant localization based on carbon footprint • Recycle, reuse, minimize waste in production processes • Adopt clean technologies • Identify sources of revenue from underutilized plant spaces

The Value of (SCOP) for a Manufacturing Company

SOP has been widely adopted and successfully run by many manufacturing companies, of all sizes. As you prepare to take your SOP to the next level, consider adopting SCOP as the business process best capable to respond to the downside and upside risks of a carbon-constrained economy. A confluence of market drivers - from energy and commodity price volatility to climate policy debates and legislation, at local and global level, to shareholder and other stakeholders' strong demand for sustainable products and processes - make this the perfect time to adopt SCOP. Business software and enterprise/production applications have started to offer sustainability functionality by including carbon management and carbon accounting tools. CAD packages such as SolidWorks' SustainabilityXpress includes LCA and carbon footprint calculation during design. SAP offers the Carbon Impact for carbon management.

Types of Targets chosen by Global 100 Companies

CO^2-e	**62%**
Energy Efficient	9%
Energy Consumption	15%
Other GHC	3%
Sector Specific	5%
Other	6%

Source: Carbon Disclosure Project "The Carbon Chasm" 2008
http://www.cdproject.net

Reported Intensity Measures by Global 100 Companies

Revenue / Sales	33%
Production Unit	**50%**
Employee Related	13%
Floor Space	2%
Other	2%

Source: Carbon Disclosure Project "The Carbon Chasm" 2008
http://www.cdproject.net

Why leave your SOP stagnant? Why not innovate on the business process side, in tandem with the new IT technologies, in order to increase or insure your company's competitiveness in the new clean, carbon-neutral economy?

Your manufacturing company will experience the following immediate and long-term benefits:

- New learning opportunities and incentives for creativity from R&D to production to Logistics

Investments in energy efficiency projects will have an IRR of 17% p.a.
Global industry sector potential for energy efficiency projects is $83 billion per year.

Source: McKinsey Global Institute "The Case for Investing in Energy Productivity" February 2008
http://www.mckinsey.com/mgi/

- New products, technologies or operational processes will capture new customers or avoid loss of customers as SCOP identifies and mitigates the risks associated with increased costs and reduced availability of raw materials, water energy and transportation.

- Attract new capital from sustainability investors

Investors representing $57 trillion in assets have requested disclosure of corporate climate strategies.

Source: Carbon Disclosure Project
http://www.cdproject.net

- Return to a focus on quality, innovation, excellence and craftsmanship from the narrow focus on lowest-cost and fastest time-to-market strategies of the past three decades. Putting your technical people back in charge with driving business decisions from product-portfolio to facilities localization will create a "sustainable-to-market" mindset.

- New revenue from carbon-offsetting projects identified and started through the SCOP process.

- New revenue opportunities from expanding sustainability principles incorporated in your own SCOP to the complete value chain, upstream to supplier's suppliers and downstream to the end-user.

- Ability to predict and adapt to changes in market conditions as science, technology and policies change.