# adani

# PROJECTS

# **Process Document**

# Sourcing & Procurement Source & Manage Categories

# **Analyze and Manage Categories**

**Document No: PROC.2.1** 

Issue date: 01-Jul-2012



# Change Authorization History

Document No.	PROC.2.1
Overall Process Owner	Head –Sourcing & Procurement
Process Change Authorization	Head –Sourcing & Procurement
To be Reviewed By	
	HOD Panel
Periodicity of Review of this Document	Annual

# Version Control

Version No.	Prepared by	Reviewed by	Date	Location
1.1	Agile team	HOD panel	05-Mar-2019	Ahmedabad
1.0	Agile team	HOD panel	01-Jul-2012	Ahmedabad

# **Version Control History**

Version No.	Reasons for change		
1.1	As part of updation of SoPs annually (only version change)		
1.0	Original Documents		

Head Sourcing & Procurement	Head Sourcing & Procurement	Head Sourcing & Procurement
(Power)	(Ports)	(Mining)
Date $0803237$ .	Date	Date

# INDEX

Abbreviations
Process Document Structure
Organizational Roles6
Objective and Applicability7
Operating Framework
Process Documentation9
PROC.2.0 Source & Manage Categories9PROC.2.0: Source & Manage Categories - Process map9PROC.2.0: Source & Manage Categories - Process notes10
PROC.2.1.I: Analyze & Manage Categories.13PROC.2.1.I: Analyze & Manage Categories - Spend analysis-Process map.13PROC.2.1.I: Analyze & Manage Categories - Spend analysis- Process notes14PROC.2.1.I: Analyze & Manage Categories - Spend analysis - SIPOC.17PROC.2.1.I: Analyze & Manage Categories - Spend analysis - SIPOC.17PROC.2.1.I: Analyze & Manage Categories - Spend analysis - RASCI.18PROC.2.1.I: Analyze & Manage Categories - Spend analysis - KPI.19PROC.2.1.I: Analyze & Manage Categories - Spend analysis - Templates.20
PROC.2.1: Analyze & Manage Categories.       21         PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - Process map       21         PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - Process notes       21
22 PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - RASCI26 PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - KPI
<ul> <li>PROC.2.1: Analyze &amp; Manage Categories</li></ul>

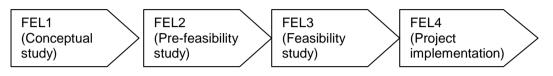


	🔵 TM
2020	
dud	

# Abbreviations

# Standard Abbreviations:

KPI	Key Performance Indicator
SIPOC	Supplier, Input, Process, Output, Customer
RASCI	Responsible, Accountable, Support, Consult, Inform
FEL	Front End Loading



# Process Specific Abbreviations:

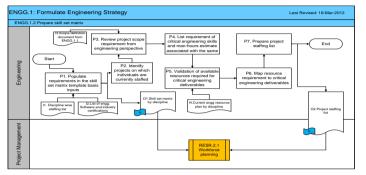
BoQ BU DoA EOI FEED INR LLI NFA P&L RFI RFP ROI TCO T&M UoM	Bill of Quantities Business Unit Delegation of Authority Expression of Interest Front End Engineering & Design India National Rupee Long Lead Item Note for Approval Profit & Loss Request for Information Request for Proposal Return on Investment Total Cost of Ownership Time & Material Unit of Measurement
VAT	Value Added TAX
WACC	Weighted Average Cost of Capital



# **Process Document Structure**

This Level 2 process document comprises of Level 3 sub-processes as separate chapters. Each chapter consists of the following sections:

#### 1. Process Map



The process map details the sub processes highlighting functions/roles involved. It also demonstrates the flow of activities in the process.

The phases of the process are also defined in the process map as separators (vertical line).

Process notes detail out the activities

carried out in each of the process elements.

They also cover additional details required to complete the process, that do not get covered as part of the process map and

#### 2. Process Notes

ENGG.1.1: Prepare engineering scope definition- Process Notes

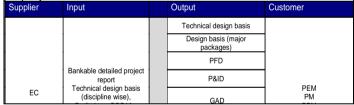
#### Phase I - FEL 3

P1. The Project engineering manager (PEM) collects inputs for scope definition (Bankable detailed project report, technical design basis(discipline wise) and preliminary design basis report(package wise)).Inputs for the engineering scope definition for the execution phase (FEL3,4) are part of the 'Prepare and update Project definition'(FEAS.2.2) process completed as part of the Feasibility Assessment process.
P2. The PEM circulates the technical design basis for review of basic engineering scope

**3.SIPOC** (Supplier, Input, Process, Output, Customer)

SIPOC.

Trigger- Closure of Toll gate 2 Frequency- One time SIPOC



#### 4. RASCI(Responsible, Accountable, Support, Consult, Inform)

Activity	Responsible	Accountable	Support	Consult	Inform
P1. Collect input for Scoping study	PEM	PEM	DL	HE	РМ
P2.Review technical design basis for scope	DL	PEM	PEM,PM,EE,CA	HE	PEM,DL,DE

#### 5. KPI

KPI	Objective	Formula	UoM
Design changes related to scope	Minimize design changes	Number of design changes per packages	No.

# 6. Templates

Number	Name	Template
ENGG.1.2.b	Project staffing list template	Project staffing template

SIPOC tabulates the following:

- Supplier of inputs
- Inputs to the process
- Process\* (and steps involved)
- Output of the process
- Customer of the output
- \* Process gets covered in the process map.

RASCI table maps all activities defined in the process to all roles which participate in the respective activities in various capacity (Responsible, Accountable, Support, Consult, Inform).

The KPI of the process is defined in this table; process efficiency is measured based on KPI.

This table lists the templates that will be used to execute the process.



Page 6 of 46

01-Jul-2012

# Organizational Roles

Function	Roles	Abbreviations	Project/Function Resources
Corporate	Chairman	CMN	Top management
Corporate	Managing Director	MD	Top management
Corporate	Chief Executive Officer	CEO	Top management
Corporate	Chief Operating Officer	C00	Top management
Corporate	Chief Financial Officer	CFO	Top management
Human Resources	Head HR (Business)	HHR	Functional head
Information Technology	Head IT (Business)	HIT	Functional head
Accounts	Head Accounts	HAC	Functional head
Legal	Head Legal	HLL	Functional head
Business Development	Head Business Development	HBD	Functional head
Project Management	Director Projects	DP	Project
Project Management	Project Director	PD	Project
Project Management	Head Contract Administrator	HCA	Functional head
Project Management	Project Contract Administrator	PCA	Project
Project Management	Contract Administrator	CA	Project
Project Management	Risk Analyst	RA	Project
Project Management	Document Controller	DC	Project
Project Control	Head Project Control	HPC	Functional head
Project Control	Project Control Manager	PCM	Project
Project Control	Planning Engineer	PE	Project
Project Control	Cost Controller	CC	Project
Engineering	Head Engineering	HE	Functional head
Engineering	Project Engineering Manager	PEM	Project
Engineering	Discipline Lead	DL	Functional
Engineering	Discipline Engineer	DE	Project
Engineering	Field Engineer	FE	Project
Engineering	Owner's Engineer	OE	Project
Engineering	Other External Consultants	EC	Project
Estimation	Head Estimation	HES	Functional head
Estimation	Estimation Engineer	EE	Functional
Sourcing & Procurement	Head Sourcing & Procurement	HSP	Functional head
Sourcing & Procurement	Category Lead	CL	Functional
Sourcing & Procurement	Category Buyer	CB	Functional
Sourcing & Procurement	Project Procurement Manager	PPM	Project
Sourcing & Procurement	Expeditors	EX	Project
Sourcing & Procurement	Site Procurement Manager	SPM	Project
Sourcing & Procurement	Logistics Manager	LM	Project
Sourcing & Procurement	Stores Manager	SM	Project
Construction	Construction Manager	CM	Project
Construction	Area Manager	AM	Project
Commissioning	Commissioning Manager	COM	Project
Operations & Maintenance	O&M Manager	OMM	Project
HSE	HSE Head	HHS	Functional Head
HSE	HSE Manager	HSM	Project
Quality	Head Quality	HQ	Functional Head
Quality	Quality Manager	QM	Project
Equipment management	Head Equipment Management	HEQ	Functional Head
Equipment management	Equipment Manager	EQM	Project
	Land Acquisition Manager	LAM	Functional
Land Acquisition			FULICUUIIdi

Note: The above defined roles do not correspond to organization level. All functional heads have been referred to as senior management in process note.

# Objective and Applicability

#### Objective:

"Source and Manage Categories" is the process of formulating and executing category level strategies to achieve the objectives of cost optimization alongwith timely deliveries of supplies and services. Category strategy is formulated by analyzing both internal and external factors associated with the category.

Process of source & manage categories integrates the process of demand projection - both long term and immediate; analyzing categories based on previous procurement information, supply market evaluation and procurement risk assessment to formulate category strategy. The strategy thus formulated is executed using the strategic sourcing process. This is achieved by executing following sub-processes at category level:

- Spend analysis
- Supply market analysis
- Procurement risk management
- Strategic sourcing and
- Value tracking

The process covering analysis required for formulating category strategy (Spend & supply market analysis) and measuring the success of the category strategy (value tracking) is covered under "Analyze and manage categories" and is documented in this part of the document.

The user should go through the process document in conjunction with below mentioned processes that act as input and output to the process.

Inputs:

- Define long term procurement plan and strategy(PROC.1.1)
- Define annual procurement plan (PROC.1.3)
- Procurement risk management (PROC.2.3)

Output:

• Strategic sourcing (PROC.2.2)

Applicability:

These processes are applicable for sourcing requirements of capital projects covering:

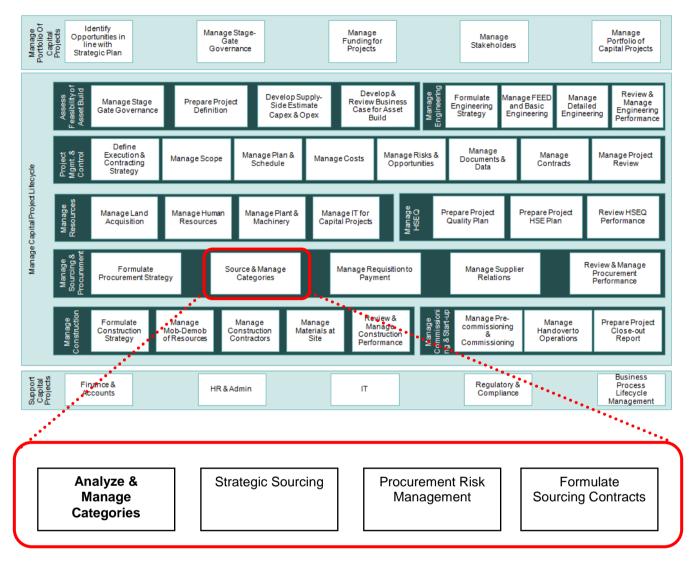
- Engineered packages
- Packages based on BOQ
- Bulks
- Service



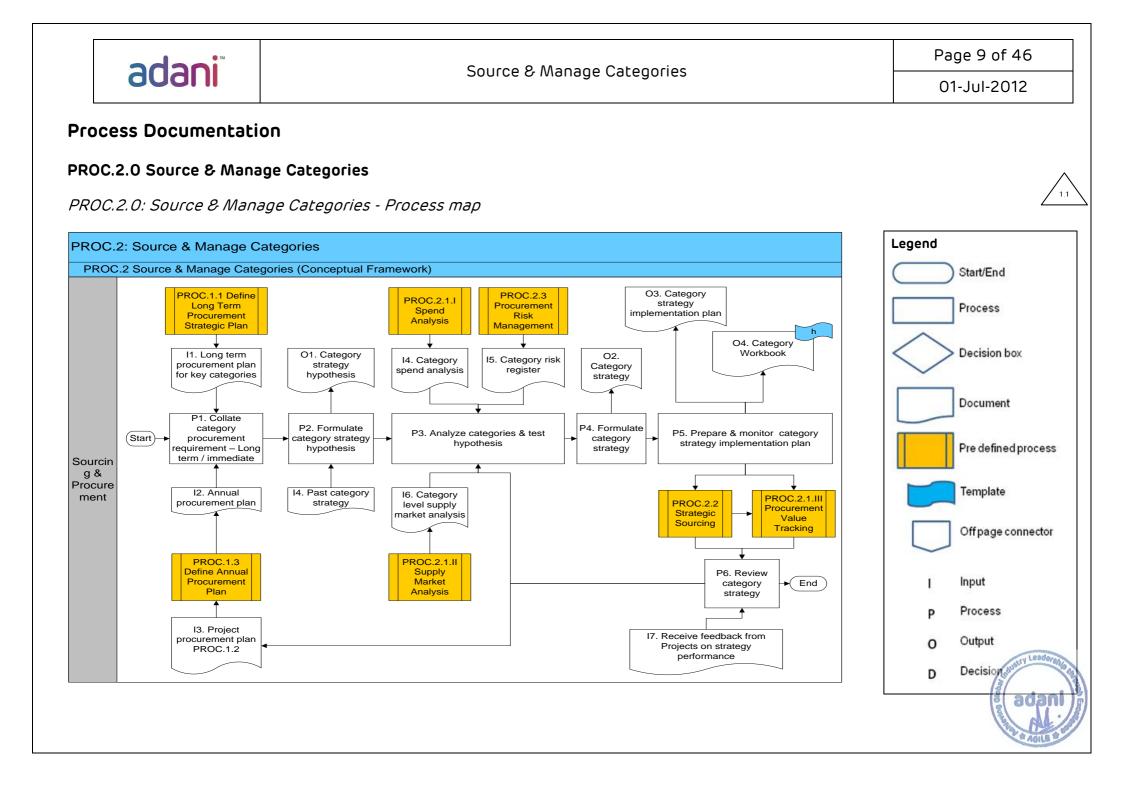
Page 8 of 46

01-Jul-2012

# **Operating Framework**







PROC.2.0: Source & Manage Categories - Process notes

This process provides the end to end overview of formulating, executing and measuring effectiveness of category strategy. The process also defines the interlinkages between:

- Demand projection (*Refer Formulate procurement strategy PROC.1*)
- Spend analysis Detailed as part of this document (*PROC.2.1.l*)
- Supply market analysis Detailed as part of this document (*PROC.2.1.II*)
- Procurement risk management (*Refer Procurement Risk Management PROC.2.3*)
- Procurement value tracking Detailed as part of this document (*PROC.2.1.III*)

To gather all information for one category at one place, Category buyer shall prepare category workbook for identified key categories. CB shall update workbooks once in six months frequency. These workbooks carry following information for respective categories based on guideline mentioned in template .2.1.h:

i) Demand plan

adani

- ii) Category TCO
- iii) Past spend profile
- iv) Key supply market trends
- v) Key risks associated with category
- vi) Key sourcing strategies
- vii) Value/ KPI tracking
- viii) Key Vendors & Vendor performance tracking
- ix) Lesson Learnt
- P1. Category Lead (CL) shall collate long term and immediate category procurement requirements from following sources:
  - Long term procurement plan for key categories as defined in process 'PROC.1.1 Define Long Term Procurement Strategic Plan'. Long term demand projection is created for key categories during the procurement planning and strategy cycle, and generally takes place in the last quarter of previous year.
  - 2. Annual procurement plan for all categories identified in process '*PROC.1.3* Define Annual Procurement Plan'. Annual procurement plan covers procurement requirements of all projects undertaken for execution.
- P2. Based on the procurement requirement plan of respective categories and strategies implemented on past/ongoing projects, CL shall formulate a hypothesis on the applicability of strategic sourcing levers for the category in the immediate future and over long term.Potential strategic levers are listed in *Exhibit 1* below:





#### Procurement savings are derived from three key areas

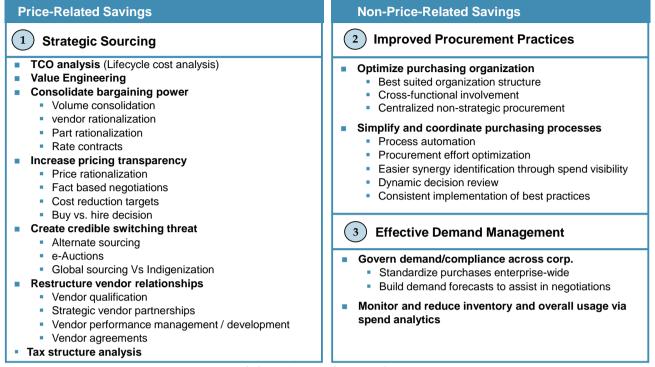


Exhibit 1: Strategic sourcing levers

- P3. Based on inputs from spend analysis<sup>1</sup>, category risk register<sup>2</sup> and supply market analysis<sup>3</sup>, CL shall test the strategy hypothesis created (applicability and effectiveness) in order to select the best strategy for sourcing the respective category. Any available category strategy evaluation report for the strategies implemented in past shall also become an input to this activity.
- P4. Based on the hypothesis test results, CL shall formulate category strategy for the respective category clearly identifying the strategic levers which shall be applied to the category and benefit thereof. Post analysis of spend, supply market and procurement risks, CL may add strategic sourcing levers to the initial hypothesis created. The identified category strategy shall be documented in the category strategy *template PROC.1.1.c.*

Please note that the category strategy document defined in process step P6 of process "PROC.1.1 – Define long term procurement strategic plan" are one and the same and are not to be created twice.

P5. Based on the identified strategies for respective categories and project procurement requirements, CL shall prepare the strategy implementation plan. *Template PROC.1.1.d* as defined in process document "*PROC.1.1 – Define long term procurement strategic plan*" shall be used for preparing the implementation

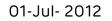


<sup>&</sup>lt;sup>1</sup> Detailed in chapter PROC.2.1.I of this document

<sup>&</sup>lt;sup>2</sup> Detailed as part of the process document PROC.2.3 – Procurement risk management

<sup>&</sup>lt;sup>3</sup> Detailed in chapter 2.1.II of this document

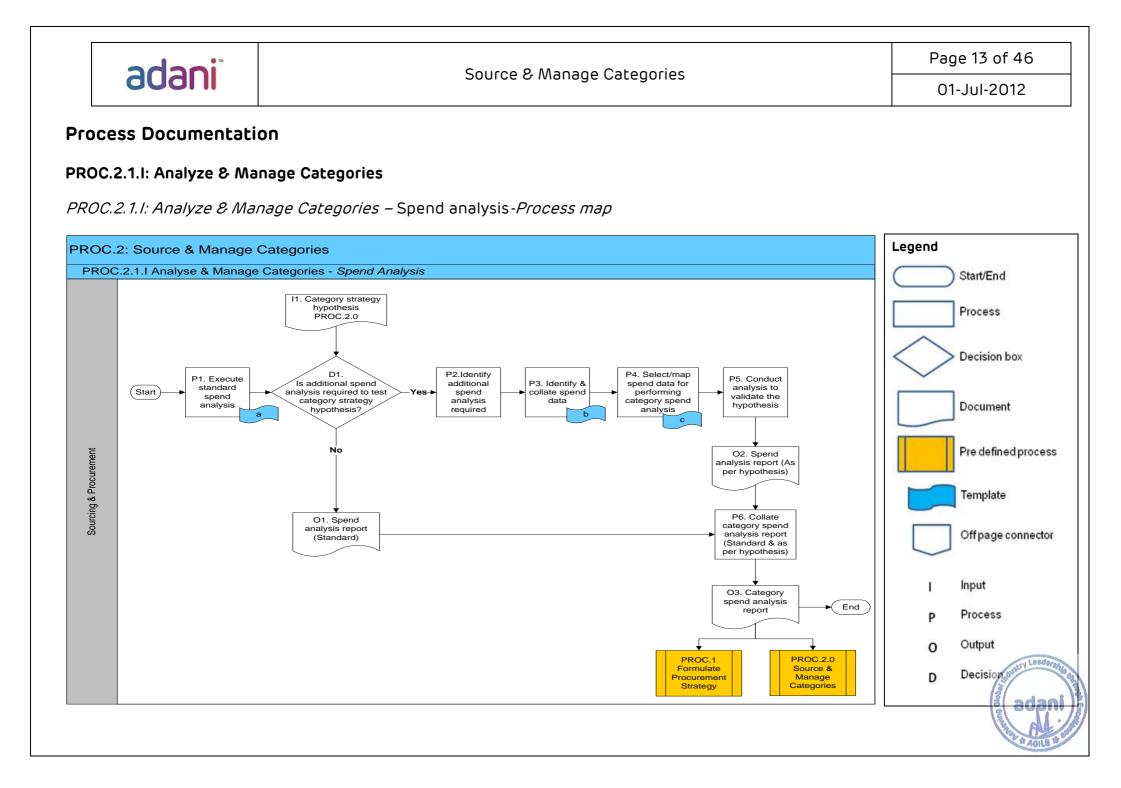
adani<sup>™</sup>



plan and monitoring the category strategy implementation. Implementation of category strategy shall also trigger following processes:

- 1. Strategic Sourcing process (for Packages, bulk materials and services) as detailed in process document *PROC.2.2*).
- 2. Procurement value tracking for benefits realized by planning and implementing various sourcing strategies for respective categories. The process is detailed out in process document *PROC.2.1.III*.
- P6. Based on the report on benefits realized received from '*PROC.2.1.III* Procurement Value Tracking', and project control schedules received from respective Project Control Manager (PCM), CL shall review the category strategy and use the learning further to analyze respective categories, as required.







# PROC.2.1.1: Analyze & Manage Categories – Spend analysis - Process notes

Spend analysis is the systematic review of historical purchase data. The output of spend analysis is a summary of purchases by various variables, such as category, vendor, project, geographical location and/or business unit. The objectives for conducting spend analysis:

- Identify value creation opportunities
- Leverage spend across BU/ Projects
- Develop category specific strategies
- Identify and control areas of maverick spend
- To accelerate ROI on strategic sourcing/ procurement efforts
- P1. Category Buyer (CB) shall execute standard spend analysis in SAP for the category owned by him/her based on guidelines as per *template PROC.2.1.a.* CB shall download the report from SAP and forward it to Category Lead (CL). Following is the lists of the standard spend analysis:
  - Sub-category level analysis:
    - $\circ$   $\,$  Spend value for each sub-category  $\,$
    - Number of items in each sub-category
    - Number of vendors in each sub-category
    - $\circ$   $\,$  Number of sub-categories supplied by each vendor  $\,$
    - o Sub-category level regional distribution
  - Vendor share of business analysis:
    - Share of business at category level
    - Share of business at sub-category level
    - Extent of single sourcing, dual sourcing and multi-sourcing at category level
    - $\circ$   $\,$  Share of domestic vendors vs. global vendors at category and subcategory level
    - Sub-category share of business at project level
  - Project level analysis:
    - Item level price comparison basic & landed prices
    - Vendor share of business comparison across projects
- D1. Based on the standard spend analysis report, CL shall make an assessment whether any further analysis is required to test the 'Category Strategy Hypothesis' created in '*PROC.2.0* Source & Manage Categories'.
- P2. In case standard spend analysis is not sufficient to validate/ test the category strategy hypothesis, CL shall identify and list the additional spend analysis required to test the 'Category Strategy Hypothesis'. CL shall provide the identified list of spend analysis to the CB to carry out the spend analysis.
- P3. CB shall identify and collate the spend data i.e. download the data from SAP providing details as shown in *Exhibit 2* (The same is available in *Template 2010*).

# adani

# Source & Manage Categories

Page 15 of 46

01-Jul-2012

Field	Description	Comments
	Full name of the Business Division /	If using acronyms, use the same
Division	Group	consistently
Document nos.		conclotonity
PR	Purchase Requisition identity no.	
Contract	Contract number (if available)	-
PO	Purchase Order no.	Ensure all of these correlate to the
GR	Goods Receipts identity no.	same invoice / line item therein
Invoice	Invoice number	
Date		
PR		
PO	Pertains to date of creation / date	Ensure all of these correlate to the
GR	mentioned	same invoice / line item therein
Invoice		
Material details		
Code	Purchase Requisition identity no.	
Description	Purchase Order no.	Ensure all of these correlate to the
Category	Goods Receipts identity no.	same invoice / line item therein
Sub-category (if any)	Invoice no.	
	Type of expense such as,	
Nature of Expense	Consumables, Equipment repairs,	
	Spares etc.	
Supplier details		
Code	Supplier id, if any	Within current system
Name	Name of supplier	-
Location	Location of supplier	-
Manufacturer	Name of manufacturer of material	In the event that the supplier is a re-
Oursetitu		seller or, an agent or, distributor
Quantity		Forlympour itoms montion I S /
UOM	Unit of Measurement	For lumpsum items, mention LS / Lot
	Quantity ordered through the purchase	
PO	order	
Received against	Quantity received against a specific	Could be part quantity / full -
invoice	invoice	mention actuals
Cost / price details		
Currency	Currency in which prices were quoted /	
	PO placed	
Exchange rate (INR :	Prevailing exchange rate when payment	
Curr rate)	was made	
PO value	Total cost as indicated in PO	
Price / unit	As indicated in PO / Invoice	Mention two prices, if price changed / discount provided
		Indicate whether on actuals / %-
Freight cost	As charged in invoice	basis
Tax amount	Amount paid as taxes	
Toy type	Type of tax such as, Customs / Excise /	
Tax type	VAT etc.	
Total Invoice Price	Final, total cash outflow through one	
	invoice	
Payment terms (days)	Number of days by which payment	
Fayment terms (days)	should be realized by supplier against	
	the invoice Any specific points that may be	
Comments	highlighted	

Exhibit 2: Details of Spend Data required for Spend Analysis

- P4. CB shall map/ select the data required to conduct the additional spend analysis for validating the category strategy hypothesis as per *template PROC.2.1.c*.
- P5. CB shall conduct the additional spend analysis as identified in process step P2. If the analysis is applicable to other categories also or if the analysis has to be



conducted frequently, CL may send a request to HIT for IT enablement of the same.

P6. CB shall collate the spend analysis report from:

- 1. Standard spend analysis executed
- 2. Additional spend analysis performed

CL shall use the collated spend analysis reports results to validate/ test the category strategy hypothesis. CL may add/ modify the hypothesis based on spend analysis results.





11

# PROC.2.1.1: Analyze & Manage Categories – Spend analysis - SIPOC

<b>Trigger</b> –Category procurement requirement (Through long term procurement plan or annual procurement plan)				
Frequency – As and wh	en required for input to 'PR	<u>0C</u>	.2.0 Source & Manage Cate	egories'
Supplier	Input		Output	Customer
HIT	Spend data		Standard spend analysis	
CL	Category strategy hypothesis		reports	CL



# PROC.2.1.1: Analyze & Manage Categories – Spend analysis - RASCI

Activity	Responsible	Accountable	Support	Consult	Inform
P1. Execute					
standard	СВ	CL			
spend analysis					
D1. Is					
additional					
spend analysis					
required to	CL	CL	СВ	PPM	
test category					
strategy					
hypothesis?					
P2. Identify					
additional	CL	CL	СВ		
spend analysis	UL	UL	СВ		
required					
P3. Identify &					
collate spend	СВ	CL			
data					
P4. Select/map					
spend data for					
performing	СВ	CL			
category					
spend analysis					
P5. Conduct					
analysis to	СВ	CL			
validate the	СВ	CL			
hypothesis					
P6. Collate					
category					
spend analysis					
report	СВ	CL			HSP, PPM
(Standard & as					
per					
hypothesis)					





# PROC.2.1.I: Analyze & Manage Categories – Spend analysis - KPI

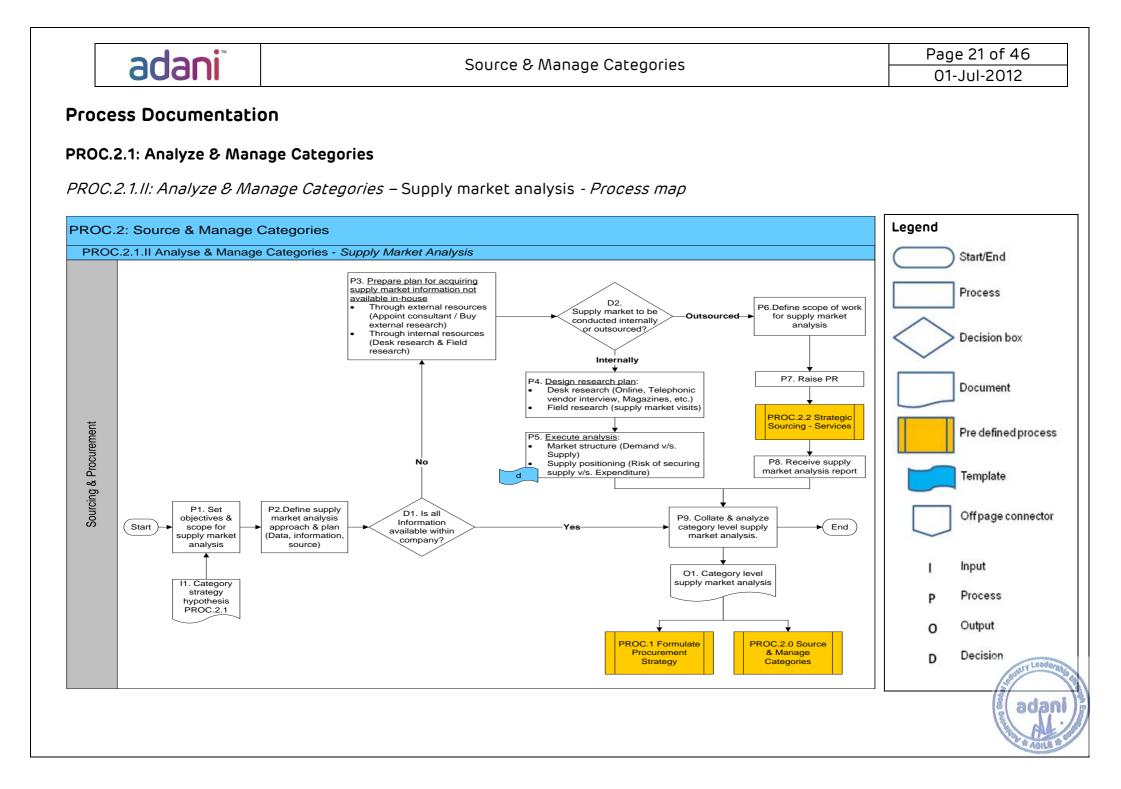
KPI	Objective	Formula	UoM
Adherence to spend analysis schedule	To ensure compliance	Plan vs. actual	%age adherence
Time required to gather data for spend analysis	To measure effectiveness of enablers for spend analysis	Number of days from specifying clear spend data requirements to receipt of complete data	Number of days
Time required to complete spend analysis	To measure efficiency of spend analysis	Number of days from receipt of spend data to completion of spend analysis	Number of days
Percentage of spend analysis reports automated	To measure system enablement of spend analysis reports	Automated spend analysis reports as percentage of spend analysis identified in the spend analysis plan	%age



# PROC.2.1.1: Analyze & Manage Categories – Spend analysis - Templates

Number	Name	Template
PROC.2.1.a	Spend analysis guidelines	PROC.2.1a-Spend Analysis Guidline.xlsx
PROC.2.1.b	Spend data format	PROC.2.1b Spend data.xlsx
PROC.2.1.c	Spend analysis	PROC.2.1c- Spend Analysis.docx







PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - Process notes

Supply market analysis is a technique which enables category lead to understand:

- How supply market works?
- What is the direction in which supply market is heading?
- What is the competitiveness of supply market?
- Who are the key vendors?
- What is the level of rivalry between vendors?
- What is the value that vendors place on the buying organization?

This can help inform, improve and shape the sourcing process leading to improved sourcing outcomes such as better value for money or service, reduced prices and/ or improved delivery. Supply market analysis is an important input to procurement risk assessment and category strategy.

- P1. Based on category strategy hypothesis, demand forecasting and past category strategy, Category Lead (CL) shall set objective and scope for supply market analysis.CL shall also identify the supply market analysis required to understand the supply market dynamics of the category. A typical supply market analysis reports shall include:
  - Vendors in the market
  - Supply market categorization by size, products/ services offered, geographies served
  - Vendor capabilities and positioning<sup>4</sup>
  - Key supply markets<sup>5</sup>
  - Availability of supplies
  - Volatility of prices
  - Vendor consortiums<sup>6</sup> if any
  - Geographic challenges
  - Industry financials
  - Vendor financials
  - Statutory restrictions
  - Cost elements
  - Cost drivers

Basis the identified supply market analysis requirement, CL shall define the data required to perform the necessary supply market analysis.

Supply market analysis shall provide the degree of complexity of supply market and the challenges and opportunities thereof.

<sup>&</sup>lt;sup>4</sup>Vendor positioning: Understanding of vendor strength and weaknesses in terms of cost, quality and delivery parameters

 <sup>&</sup>lt;sup>5</sup> Key supply markets: Geographical regions where large vendor capacities exist or concentrated
 <sup>6</sup>Vendor consortium: A formal or informal association of vendors for an industry, meant to leverage combined selling power of the member vendors. For e.g transporter associations at district level



- P2. CL shall prepare supply market analysis approach and identify the data and data sources for conducting the supply market analysis. The probable sources of data could be:
  - Publically available data like company annual reports, balance sheets, P&L, analyst reviews, news articles etc.
  - Data collected from various vendors as part of vendor evaluation and strategic sourcing activities
  - Database vendors (online/ offline)
  - Secondary research through an specialized agency
  - Industry journals Vendor survey
  - Internet
  - Commodity exchanges
- D1. CL shall check for the availability of information within company for conducting the identified supply market analysis.
- P3. If sufficient information is not available in-house, the CL shall evaluate the following options:
  - Through external resources (Appoint consultant/ Buy external research),
  - Through internal resources (Desk research & Field research).
- D2. CL shall finalize approach for supply market analysis, either internally or outsourced. The decision will depend on the effort required for gathering and analyzing the data, ease of gathering the data, availability of resources, existing in-house analytical capabilities and criticality of the analysis required.
- P4. For conducting supply market analysis internally, CL shall prepare plan for conducting desired analysis. The supply market analysis plan should cover following:
  - Data to be gathered
  - Sources of data
  - Analysis to be conducted
  - Time duration
  - Method of research to be adopted:
    - Desk research: data will be gathered from internet, vendor interviews & interactions, industry journals, vendor RFIs etc.
    - Field research : this would involve visiting the vendors, interacting with their top management
- P5. Conducts supply market analysis for respective categories. Various elements of the supply market analysis have been defined in the process step P1. The findings



of the supply market analysis shall be documented in the supply market analysis *template PROC.2.1.d – Supply market analysis.* 

Supply Mar	et Definition	Supply Market Statistics & Trends	
Global/Regional/Local Categories included - SIC codes/UN Is the category global, regional or loc Which geography are covered by the Which type of suppliers? What level in the supply chain? What is excluded as well as what is in	al? analysis?	Supplier market size, growth, etc. Lifecycle (growth, decline, consolidation, fragmented, static, dynamic) Nature of relationships Forces driving market, e.g. technology, environment	
Key Su	ppliers	Market Rivalry – Porter's 5 Forces	
SupplierRevenuesYearARs. MBRs. MCRs. M		Buyer Power High or Low Supplier Power High or Low Threat of Substitute Products High or Low Threat of Substitute Suppliers High or Low Competitiveness High or Low	
Industry Cost Drivers Costs of raw materials Cost of services Cost of design/manufacturer Legislative requirements Cost of labour, etc. Switching Cost (breaking existing contracts, additional training for new equipment) If possible place in sequential order		Supplier Cost Structure & Drivers  Typical category supplier cost structure, best displayed as a graph Or components if not known 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	

Exhibit 3: Summary supply market analysis

- P6. In case of outsourced approach for supply market analysis, CL shall define scope of work for supply market analysis including:
  - Countries to be included in the research
  - Categories & sub-categories
  - Specific analysis required/ key insights required
  - Time period for analysis is required
  - Frequency at which analysis needs to be conducted
  - Format of analysis and data
- P7. CL shall raise PR for supply market analysis outsourcing and performs process as mentioned in *PROC.2.2*-strategic sourcing– (services).
- P8. CL shall receive supply market analysis report from the spend analysis service provider. The spend analysis report should be evaluated for completeness and correctness through a review process.
- P9. CL shall collate the internal supply market analysis and external supply market analysis to prepare a comprehensive supply market analysis report. CL shall analyze collated information to execute category level supply market analysis. Supply market analysis is a critical input to category strategy formulation.



1.1

#### PROC.2.1.II: Analyze & Manage Categories – *Supply market analysis* - SIPOC

**Trigger**–Category procurement requirement (Through long term procurement plan or annual procurement

plan)

**Frequency**- Prepared annually, reviewed quarterly, As and when required for strategic sourcing (PROC.2.2)

Supplier	Input	Output	Customer
CL	Category strategy hypothesis Scope & objectives for supply market analysis Supply market data & information Supply market research	Category level supply market analysis	CL, CB





# PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - RASCI

Activity	Responsible	Accountable	Support	Consult	Inform
P1. Set objectives & scope					
for supply market analysis	CL	CL	CB		
P2. Define supply market					
analysis approach & plan	СВ	CL			
(Data, information, source)					
D1. Is all Information	25	<u></u>			
available within company?	СВ	CL			
P3. Prepare plan for					
acquiring supply market					
information not available in-					
house					
Through external					
resources (Appoint	0.5				
consultant / Buy	СВ	CL			
external research)					
Through internal					
resources (Desk					
research & Field					
research)					
D2. Supply market analysis					
to be conducted internally	CL	HSP	СВ		
or outsourced?					
P4. Design research plan:					
• Desk research (Online,					
Telephonic vendor					
interview, Magazines,	СВ	CL			
etc.)					
Field research (supply					
market visits)					
P5. <u>Execute analysis</u> :					
Market structure					
(Demand v/s. Supply)					
• Supply positioning (Risk	СВ	CL			HSP
of securing supply v/s.					
Expenditure)					
P6.Define scope of work for	00				
supply market analysis	СВ	CL			HSP
P7. Raise PR	СВ	CL			
P8. Receive supply market	00				
analysis report	СВ	CL			HSP
P9. Collate & analyze					
category level supply market	СВ	CL			HSP, HES
analysis.					





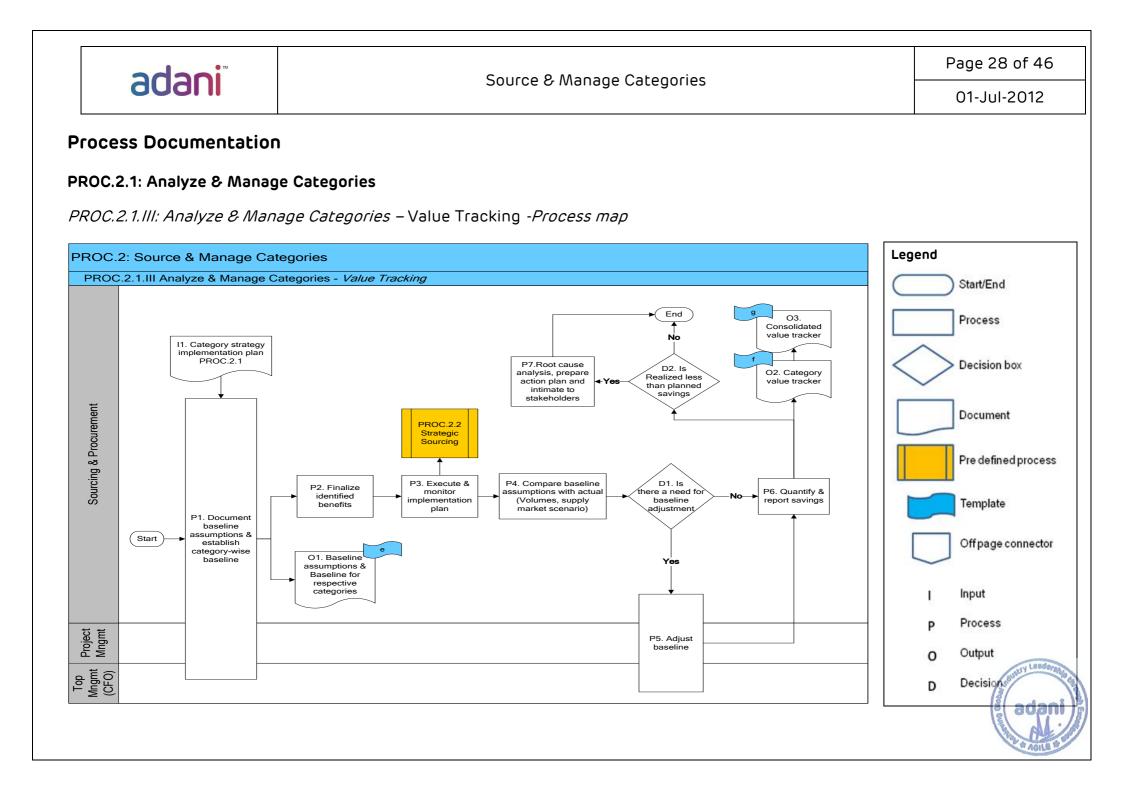
# PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - KPI

KPI	Objective	Formula	UoM
Adherence to supply market analysis schedule	To ensure compliance	Target vs. actual	%age adherence

# PROC.2.1.II: Analyze & Manage Categories – Supply market analysis - Templates

Number	Name	Template
PROC.2.1.d	Supply market analysis	PROC.2.1d -Supply Market analysis.docx





adani	Source & Manage Categories	Page 29 of 46	
dudill	Source & Manage Categories	01-Jul-2012	

PROC.2.1.III: Analyze & Manage Categories – Value Tracking - Process notes

Value tracking is the process for measuring the benefits which are delivered by sourcing and procurement function by executing various category strategies/ initiatives. Benefits are both in terms of hard cash Benefits and time Benefits. Value is tracked with respect to various baselines for the category like budget/ estimate, market price, initial bid price (lowest/ average).

P1. CL shall prepare the baseline assumptions along with PD routed through PPM (for volume assumptions) and HES (for price assumptions). CL shall document the baseline assumptions and prepare the baseline documents. The baseline thus arrived will be the basis for value tracking and reporting. These assumptions will be tabulated in template *PROC.2.1.e.* 

Baseline approach	Nature of suitable categories	Examples
Last purchase price or contract price – compare savings with last purchase price of similar items	Categories / items which are regularly procured and have standard specifications.	MS Pipes, Motors, Fittings, material handling equipments, Steel sheets, valves.
Benchmarking by alternate quotes – get quotes (directly or indirectly) from alternate suppliers before starting sourcing exercise	Categories / items which are not regularly procured or are being procured for the first time and have custom specifications	BTG, Cooling towers, Coal handling plant, Ash handling plant. Chimney
Indexing – Track published market prices or link to underlying price trend	Categories whose pricing is linked to an underlying commodity price	Copper, Aluminum, Transformers, Cables, Bitumen
Supply market intelligence – Track the price paid by competition for similar categories	Categories where competitive information is available. Even prices of specific packages can be used as an indicative benchmark	All

Exhibit4: Guidelines for baseline

#### Basic guidelines for establishing baseline are mentioned below:

- The Baseline is the foundation of the benefit calculation. It serves as a benchmark, creating a realistic starting point for a comparable like-for-like benefit calculation. Establishing a baseline is the first step in the measurement process.
- The baseline should be approved and 'signed-off' in accordance with the governance standards of company supply chain. Normally this baseline shall be approved by the HSP during the annual category strategy formulation exercise.
- It is recognized that upon review changes in the baseline may occur. These
  changes should be documented and approved by the HSP/ Top Management
  and if necessary reflected in the opportunity register with a note indication.



the basis for the new scope/ baseline. These changes in baseline may occur due to revision in estimate, external market conditions, changes in the projected volumes or changes in currency exchange rates.

- Procurement value creation is based on "Total Cost of Ownership (TCO)" principles. Total cost of a product/ service over the lifetime of the product from acquisition to final disposal can be described as the "Total Cost of Ownership". The key cost elements involved could be Product acquisition cost, Product life cycle cost and product residual cost. All costs (like acquisition costs, direct material costs, indirect costs i.e. administration, maintenance, transportation costs and ultimately costs related to disposal) related to a purchase should be taken into account to determine the baseline. The baseline is the total of all amounts paid to vendors plus others (like inventory varying cost, transportation cost, transit insurance cost etc.) relevant TCO components. TCO elements can be defined for key categories based on template PROC.2.1.i & PROC.2.1.j.
- A "normalized baseline" excludes effects which supply chain cannot influence, such as exchange rate fluctuations and changes in commodity market prices. The process of excluding these effects from the baseline is referred as normalization (*refer Exhibit 5*).
- The baseline has to be fixed at a detailed level: commodity, scope of supply, business unit and if required province or country level.

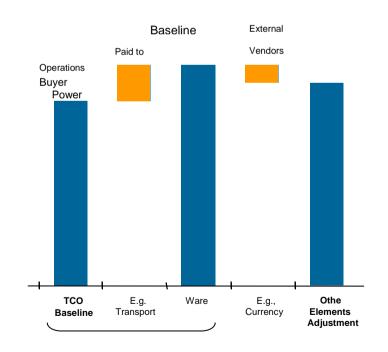


Exhibit 5: illustration of TCO and normalized baseline.





#### <u>Methods to calculate the baseline</u>

A baseline is established generally using future volumes and a past total costs (escalated or deflated) to indicate today's total cost paid by company for services and materials. The next sections describe how to determine these elements.

- **Future Volume:** Long term, project and annual Volume projections as identified in the Formulate procurement strategy process *PROC.1.*
- **Cost:** The baseline fixes a reference cost against which value creation will be calculated. If possible, we use historic data as a reference (either the last known cost, or an average). If it is not possible to establish a historic cost there are alternative methods. The three baseline costs which shall be used for this purpose shall be:
  - Estimate / Budget / Historical cost
  - Current market cost
  - o Initial bid

#### Historic Cost Baseline

If products or services have been purchased before, historic (going back a maximum of 12 months) costs should be used until a new contract is in place.

and when prices are negotiated between ndors and customers, and there is no ternal market influence. prices are set in world (commodity) markets puyers can not influence the levels there are transparent and independent ndexes available examples: natural gas, structural steel, copper prices are set in world markets puyers can not influence the cost there are <u>no</u> transparent and independent	<ol> <li>Last actual price paid in SAP or</li> <li>Contracted price manually corrected if not yet updated in SAP</li> <li>Average price over the past 12 months</li> <li>Average price of the approved initial (i.e. first RFP, Auction round) "like" bids</li> </ol>
buyers can not influence the levels there are transparent and independent ndexes available examples: natural gas, structural steel, copper prices are set in world markets buyers can not influence the cost there are <u>no</u> transparent and independent	months Average price of the approved initial (i.e. first RFP, Auction
ouyers can not influence the cost here are <u>no</u> transparent and independent	initial (i.e. first RFP, Auction
ndexes available Like" bids are available examples: a very volatile market like ocean reight, civil construction services,	
Cost is set thru sole source purchase	Price of the approved initial (i.e. first RFP) "like" bid
Prices set by percentage rebate returned to he company	Rebate times current market price in that area
Costs set by percentage of comparable components where the price is known or the cost of these comparable components, a arget cost, for the new product/service is created for benchmark and baseline. examples: Catalyst	Percentage of known or comparable components.
	rices set by percentage rebate returned to ne company osts set by percentage of comparable omponents where the price is known or the ost of these comparable components, a arget cost, for the new product/service is reated for benchmark and baseline.

Additionally the following rules will apply:



**Baseline Cost Normalization:** Some products or services are affected by exchange rate fluctuations or market effects that are outside the management control of supply chain. Therefore, we normalize the baseline so that we can ascertain the true value creation impact. We do this by removing the impact of factors such as currency exchange rate or market level from the comparison of cost before and after.

**Normalization for Exchange Rate:** Fluctuations (Applicable to purchases in currencies other than INR). The effect of fluctuating exchange rates is isolated and taken out by using exchange rate 'normalization'.

# • Definitions:

The 'Invoice Currency' or 'Document Currency' is the currency in which the goods or services are invoiced (e.g.: a Chinese vendor invoices the BTG components he supplies in EUR for power plant in India).

The 'Benefits Calculation Currency' is the currency in which the Benefits are calculated.

The 'Reporting Currency' is the currency in which Company HQ is consolidating it's reports (INR).

# • Guiding principles:

Sourcing & procurement performance is measured and consolidated across the BU or projects in each of the Benefits Calculation Currencies. These results can then be converted, as needed, into the reporting currency. Currency conversion effects are therefore is taken out of the baseline.

The currency exchange rate we apply to the baseline and Benefits calculation is the average exchange rates over the last 12 months prior to the Benefits calculation.

Baseline Type	Baseline Elements	Baseline Calculation
Historic spend baseline	A = Historic Unit Cost in INR B = Volume	А*В
Normalized historic spend baseline (currency effect)	A = Historic Unit Cost in INR B= Volume E= Exchange rate used for historic spend baseline F = Exchange rate at the time of the value creation calculation	A * (F/E) * B

Exhibit 7: Normalized Baseline Calculation

**Normalization for Market Fluctuations:** The cost of some products fluctuates in correlation with a public market index. This happens when the product contains a significant amount of raw material or when the commodity itself follows an index (e.g.: metals). The change in price which can be attributed to the market is explained by the change in the index. This portion of the cost change has to be taken out of the baseline (*see Exhibit* 7).

The market effect normalization is applied at the time of benefits calculation and applied to *the standard baseline method: (old unit cost – new unit cost) x volume* 

Baseline Type	Baseline Elements	Baseline Calculation
Historic spend baseline	A = Historic Unit Cost in INR B = Volume	A * B
Normalized historic spend baseline (market effect)	A = Historic Unit Cost in INR B = Volume C = Raw Material Component (% of total product cost) D = Raw Material Index Change%	A * [1 + (C * D)] * B

Exhibit 8: Normalized Baseline Calculation

Example:

- Pipe component cost per item (in 2011): INR 2.00
- Raw steel material share (percent of the raw steel component in the total cost): 25%
- Raw steel cost decrease (in 2012): 10%
- Future Volume (# of items in 2012): 10,000,000 units
- Normalized baseline calculation for 2012:

INR.2.00 x [1 + (0.25 x (-0.10))] x 10,000,000 = INR. 19,500,000

- P2. CL shall estimate the potential cost benefits and lead time reduction potential, based on the agreed baseline and baseline assumptions and category strategy. The estimatedbenefits and lead time reduction potential shall be the basis for annual benefits target for the category.
- P3. CL shall execute and monitor implementation plan for respective category strategy using the template *PROC.1.1.e* Category strategy implementation monitoring. The outcome of the negotiation and the rate at which the order is placed shall be used to determine the contracted benefits per category and the baseline that would be used to track these benefits. Please note that the category strategy implementation monitoring template used is one and the same as implementation plan tracking sheet defined in *Define long term procurement plan and strategy process PROC.1.1.*
- P4. CL shall compare baseline assumptions with actual (volumes, supply market scenario, indexes) and evaluate need for baseline normalization.
- D1. CL shall monitor the factors affecting the baseline assumptions. On any suggested change in baseline assumption, CL shall evaluate the need for adjustment in baseline. Some of the reasons requiring change in baseline could be:
  - Change in business volumes
  - Change in market conditions (supply demand scenario)
  - Change in the base commodity price
  - Change in exchange rates



Once the order is placed, the CL shall report status on the implementation to the HSP. HSP shall discuss the normalization required to the baseline to account for the role of external factors.

- P5. If required, CL, respective PPM, PD shall normalize the baseline. This baseline normalization would be approved by appropriate authority:
  - Estimate / Budget / Historical cost CEO / CMN
  - o Current market cost HSP
- P6. CL shall quantify benefits against baseline in the Benefits monitoring template *PROC.2.1.f is* Category strategy implementation monitoring. In case any normalization not required, CL shall quantify & report saving. The benefits shall be reported against three baselines:

Capital Project illustration of Benefit Tracking

- Savings against Budget / Estimate
- Savings against market price
- Savings against pre-negotiated price

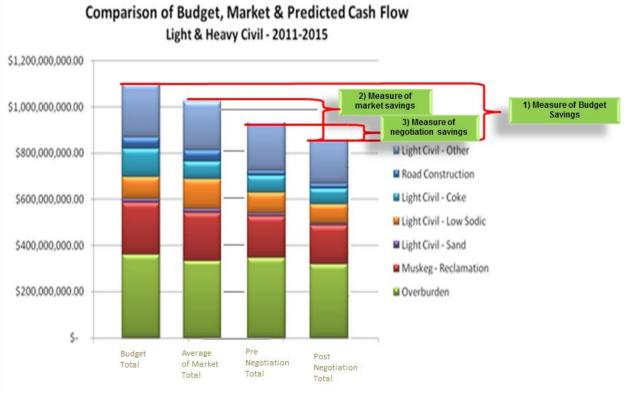


Exhibit 9: Value creation against baseline

# Methods of value creation scenario with illustration are as mentioned below:

# Standard Method

Situation: The standard calculation method is used when the baseline can be determined with the standard method and when benefits come from cost difference. For example, when vendors are changed or greater quantities are bought or when similar goods/services are bundled under conditions that are otherwise the same, resulting in a more economical cost per item, labour cost / unit etc.

Benefits Calculation: The benefits are based on the difference between the old unit cost and the new unit cost.

Benefits = (Last price cost - negotiated cost) x expected volume

Example:

The product cost is reduced starting Q1 of Benefits year by INR 20. The expected quantity is 150 units.

Benefits = (INR 100-INR 80) \* 150 = INR 3000





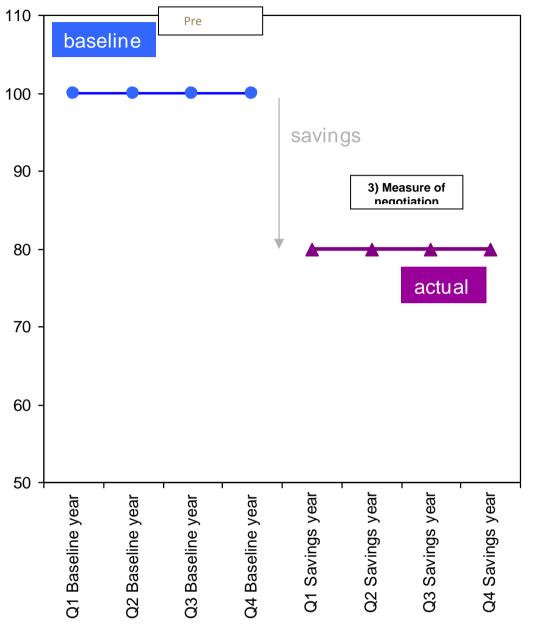


Exhibit 10: Standard Method





# Free-of-charges Extras

Situation: Negotiated contract with vendor includes free of charge extras which are not included in the cost/ specifications, and have not been part of the product/ service offering of past purchases. Value added Items required in the original RFQ should be excluded from this value creation measure.

Benefits Calculation: Benefits = Value of free of charge extra x Volume

Example:

CL has been able to negotiate additional spares or warranty terms, FOC, which were not part of the historical price data or RFP.

# Fluctuating market cost with market index

Situation: This method of calculation is used when the cost Benefits can be attributed to a changed market cost (Tied to an Index) that results in a better future cost in relation to the market price.

Benefits Calculation: The Benefits are calculated as the difference between the amount Company would pay this year while keeping the historical delta (%) with market and the amount Company would pay with the new negotiated delta with market.

Spend with historical delta = (Forecasted average index cost x Forecasted volume) x (1 - historical delta).

Spend with new contract = (Forecasted average index cost x Forecasted volume) x (1 - new delta).

Benefits = Forecasted spend with historical index delta – Forecasted spend with new index delta.

If there is visibility on the fee paid to the vendor, the Achieved Benefits can be divided into Fee Benefits and Price Benefits.

Fee Benefits = (Old fee – New fee) x New cost x Expected volume

Example:

Index 12 months rolling forward INR. 25

Year O

Index 12 months rolling forward INR. 15

Year 1

Average cost paid Year 0 INR. 24

Cost contracted Year 1 INR. 12

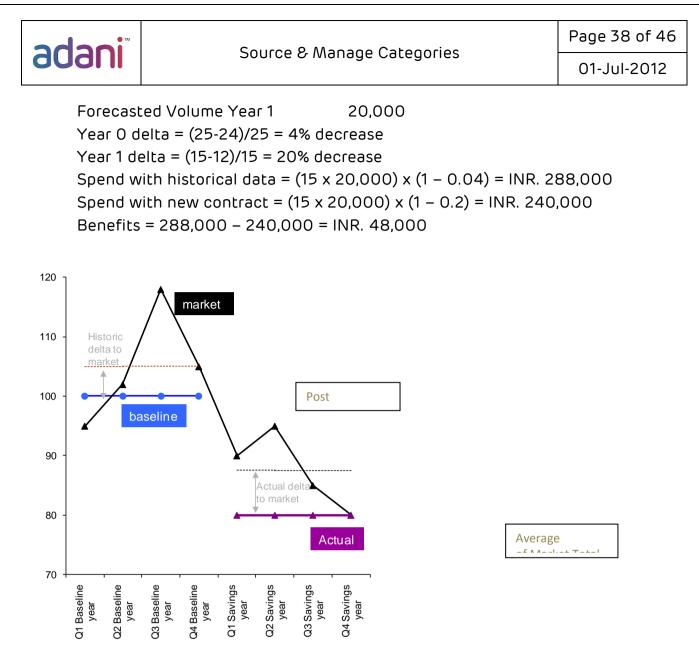


Exhibit 11: Fluctuating market cost with market index

# Fluctuating market cost without market index

Situation: This method of calculation is used when cost Benefits cannot be attributed to a changing market due to lack of a transparent and broadly accepted market index. There is no good benchmark to indicate the delta with the market.

This method is applicable for materials and services.

# Benefits Calculation:

There is no possibility to benchmark past and present costs against a market reference. However the market has a great effect on the direction costs are going. Therefore the only objective way to have an indication of the costs is to get quotes from the vendors. If the eventual cost is below those bids, the company has established Benefits.





Benefits = (Initial bid – New cost) x Expected Volume

Example:

The cost in Q4 was INR 70. There is no (good) market index, therefore this cannot be benchmarked. The average of the bids thru an EOI was INR 60. After negotiation the costs were agreed at INR 50 for the new year. The expected quantity is 150.

Benefits = (INR 60-INR 50) x 150 = INR1500.

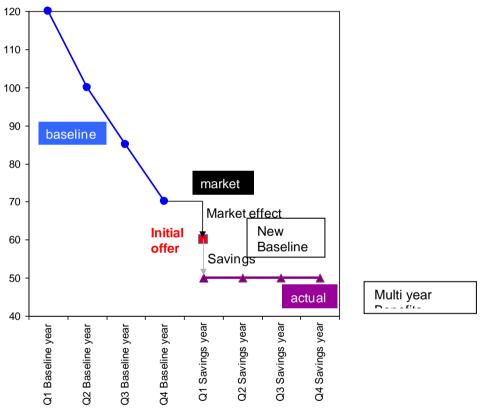


Exhibit 12: Fluctuating Market cost without market index

Note: In this case the market effect was not counted as value creation because CL did not take any action in anticipation of the change. Therefore higher costs were paid by Company. There was INR 10 of market value adjustment from INR 70 to INR 60 that is not accounted for in Value Creation. 9974563228

Volume Rebate

Situation: Negotiated contract with vendor with rebates on volume or similar incentives. Rebate/incentive granted in new contract has not been included in previous buy.







# Benefits Calculation:

Benefits = (Rebate/ incentive per purchased unit new contract - Rebate/ incentive per purchased unit old contract) x Volume.

#### Example:

Airlines rebate x% of spend back at end of year, if at least y flights are done.

# Re-engineered specifications / SKU rationalization / Value Engineering

Situation: For some products/services the specification can be changed so that the cost can be reduced.

Benefits Calculation:

Benefits = (Cost for product with old specifications – Cost for product with new specifications) x Volume

Benefits = (Cost for old SKU – Cost for new SKU) x Volume

# Example:

The category manager of Personal Computer (PCs) realizes that almost nobody is using floppy drives anymore. She/he decides to work with the corporate services IT group to change the specifications of PCs by canceling floppy drives from the specification list. Due to the change of the specification the cost for the 500 PC's can be reduced by 3% from a base price of INR 500. Benefits = 1000 units x INR (500x.97).

The category manager of MRO in working with the BU decided to reduce the total number of types of gloves. He managed to reduce the total number of SKU's from 60 to 25. SKU A has been removed from the list and replaced by SKU BO01, the cost is reduced by 7% due to the high volume of the new SKU BO01.

#### Lease versus Buy

Situation: For some categories lease of products might be a viable alternative to buying (or vice versa). To compare the value creation between lease or buy of a product the cost per one unit (e.g. kilometer) need to be calculated and compared.

#### Value Creation Calculation:

Value Creation = (Cost of purchasing per unit (Including the cost of capital) -Leasing cost per unit) x Volume



Respectively: Achieved Benefits = (Cost of leasing per unit - Purchase cost per unit) x Volume

# Alternate Pricing structure

Situation: For some categories the pricing structure will need to be changed to account for total cost of ownership costs or to reflect new pricing structures. (e.g. Moving from T&M to Unit rates, moving from lump sum to lump sum plus a performance bonus).

Value Creation Calculation:

Value Creation = (New pricing model) – (Estimated total cost of ownership in the new model using the old pricing data) x volume

The same period must be compared (e.g. buy for 5 years and lease for 5 years)

# Sales of surplus / obsolete material

Situation: Sourcing & procurement involvement kicks off an inventory reduction, and results in the sale of surplus/obsolete material.

Benefits Calculation:

Benefits = (Sales price for surplus material – Handling costs) – Book value

Example:

Pipe from the Montreal Coker is sold to a third party. The original price of a random lengths of pipe is INR 10,000 with a sale of 1000 lengths. The sale price is INR 5,000 per random length. The handling costs will be paid by the buyer. The value creation is INR 5,000 x times 1000 = INR 500,000. (It should be noted that the project was cancelled and internal use of the material is not possible. The alternative to disposal is to store it forever. Note: The costs of long term storage were deemed as unacceptable by site management. A financial right off the project was made separately).

#### Inventory Reduction

Situation: Due to active involvement of S&P the inventories (e.g. stock) can be reduced, (Consolidated or standardized) which results in significant cost Benefits.



Benefits Calculation:



Benefits = (Historic book value of company owned inventory – New book value of reduced inventory) x WACC (Weighted average cost of capital) + (Old warehouse handling cost – New warehouse handling cost).

Example:

The category manager of Protective Equipment and Uniforms finds out that on average there are more than 5,000 uniforms in stock. By improving the ordering cycle she/he is able to cut down the number to 2500 uniforms. The cost of a uniform is INR100. The cost of capital is 10%. Reduction of warehouse cost is INR 1000.

2,500 x INR 100=INR 250,000 x .10 =INR 25,000 + INR 1,000 = INR 26,000

# Payment terms extension

Situation: Supply chain involvement results in a change of payment terms leading to working capital improvement.

Benefits Calculation:

Benefits = Working Capital Improvement = Average monthly invoice from vendor (VAT included) \* Payment terms improvement (in days)/ 30 \* WACC (Weighted average cost of capital)

Example:

The category manager for steel fabrications is able to negotiate with an incumbent vendor a new contract containing new payment terms: Company will now take pay 90 days after date of invoice instead of 60 days after date of invoice.

The benefits reported by all CL shall be collated and consolidated value tracker for S&P shall be created.

- D2. CL shall monitor the benefits achieved against planned benefits for the category. HSP shall review the benefits achieved on a quarterly basis, baseline assumption and validity of any changes in baseline. HSP shall check the difference between realized and planned saving.
- P7. In case there is a shortfall in the realized benefits as compared to planned benefits, CL shall discuss it with HSP and finalize an action plan. HSP shall conduct root cause analysis and prepare action plan which may require a change in implementation plan. CL shall intimate learning to all stake holders.



PROC.2.1.III: Analyze & Manage Categories – Value Tracking - SIPOC

Trigger – Category procurement requirement (Through long term procurement plan or annual procurement

plan)

Frequency – Quarterly, As and when required for input to 'PROC.2.0 Source & Manage Categories'

Supplier	Input	Output Customer
CL	Category strategy implementation plan	Baseline assumption & baseline for respective CL, HSP category
CL	Strategic sourcing	Category value tracker CL, HSP Consolidated value tracker CL, HSP
		LIBCKEI



# PROC.2.1.III: Analyze & Manage Categories – Value Tracking - RASCI

Activity	Responsible	Accountable	Support	Consult	Inform
P1. Document					
baseline					
assumptions &	CL	HSP	PPM, PD	HES	
establish	CL	TISE	FF/M, FD	TILS	
category-wise					
baseline					
P2. Finalize					
identified	CL	HSP	PPM, CB		
benefits					
P3. Execute &					
monitor	СВ	CL	PPM, HSP		
implementation	00	02			
plan					
P4. Compare					
baseline					
assumptions					
with actual	СВ	CL	PPM		HSP
(Volumes,					
supply market					
scenario)					
D1. Is					
there a need	CL	HSP	РРМ, СВ		PD, CEO (if
for baseline	-	_	· -		required)
adjustment					
P5. Adjust	CL	HSP	PD, PPM		CEO (if
baseline	02				required)
P6. Quantify &	CL	HSP	PPM,CB		CEO
report savings					
D2. Is					
Realized less	СВ	CL	PPM, HSP		
than planned	-	_	· -		
savings					
P7. Root cause					
analysis,					
prepare action	СВ	CL	PPM, HSP		
plan and			,		
intimate to					
stakeholders					



# PROC.2.1.III: Analyze & Manage Categories – Value Tracking - KPI

KPI	Objective	Formula	UoM
Benefits potential	To measure effectiveness of	Percentage Benefits	%age
identified over current	category strategy in reducing	identified over	
baseline cost	cost	baseline cost	
Reduction in	To measure effectiveness of	Reduction in PR to	%age
procurement lead time	category strategy in reducing	PO lead time from	
	lead times	baseline /	
		benchmark lead time	
		Adherence to	%age
		delivery timelines as	
		per project schedule	
Realized Benefits as	To measure implementation	Contracted Benefits	%age
compared to target	effectiveness of	as percentage of	
Benefits	implementation plan	identified Benefits	
		(Viz budget, market	
		price, initial quote)	
		Accrued Benefits	%age
		percentage of	
		identified Benefits	
		(Viz budget, market	
		price, initial quote)	



# PROC.2.1.III: Analyze & Manage Categories – Value Tracking - Templates

Number	Name	Template
PROC.2.1.e	Baseline assumptions and baseline	PROC.2. 1e Baseline assumption.xlsx
PROC.2.1.f	Category value tracker	PROC.2.1.3f Value tracker.xlsx
PROC.2.1.g	Procurement value tracker	PROC.2.1.3g Value tracker.xlsx
PROC.2.1.h	Category Workbook	PROC.2.1.h Category Workbook.
PROC.2.1.i	TCO Brief	PROC.2.1.i TCO Presentation .pdf
PROC.2.1.j	TCO Definition	PROC.2.1.j TCO definition.xlsx

