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Light Water Reactor Sustainability Program

Advanced Instrumentation, Information, and Control Systems Technologies

Digital Technology Business Case Methodology Guide



September 2014

U.S. Department of Energy

Office of Nuclear Energy

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Advanced Instrumentation, Information, and Control Systems Technologies

Digital Technology Business Case Methodology Guide

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LIST OF ACRONYMS

BCM	Business Case Methodology
BCMW	Business Case Methodology Workbook
DOE	Department of Energy
II&C	Instrumentation, Information, and Control
INPO	Institute for Nuclear Power Operations
KPI	Key Performance Indicator
LWR	Light Water Reactor
LWRS	Light Water Reactor Sustainability
NPP	Nuclear Power Plant
NPV	Net Present Value
O&M	Operating and Maintenance
R&D	Research and Development

Program Purpose

The Department of Energy's (DOE's) Light Water Reactor Sustainability Program aims to develop and deploy technologies that will make the existing U.S. nuclear fleet more efficient and competitive. The program has developed a standard methodology for determining the impact of new technologies in order to assist nuclear power plant (NPP) operators in building sound business cases.

Introduction to the Methodology

The Advanced Instrumentation, Information, and Control (II&C) Systems Technologies Pathway is part of the DOE's Light Water Reactor Sustainability (LWRS) Program. It conducts targeted research and development (R&D) to address aging and reliability concerns with the legacy instrumentation and control and related information systems of the U.S. operating light water reactor (LWR) fleet. This work involves two major goals: (1) to ensure that legacy analog II&C systems are not life-limiting issues for the LWR fleet and (2) to implement digital II&C technology in a manner that enables broad innovation and business improvement in the NPP operating model. Resolving long-term operational concerns with the II&C systems contributes to the long-term sustainability of the LWR fleet, which is vital to the nation's energy and environmental security.

The II&C Pathway is conducting a series of pilot projects that enable the development and deployment of new II&C technologies in existing nuclear plants. Through the LWRS program, individual utilities and plants are able to participate in these projects or otherwise leverage the results of projects conducted at demonstration plants.

The pilot projects conducted through this program serve as stepping stones to achieve longer-term outcomes of sustainable II&C technologies. They are designed to emphasize success in some crucial aspect of plant technology refurbishment and sustainable modernization. They provide the opportunity to develop and demonstrate methods to technology development and deployment that can be broadly standardized and leveraged by the commercial nuclear power fleet.

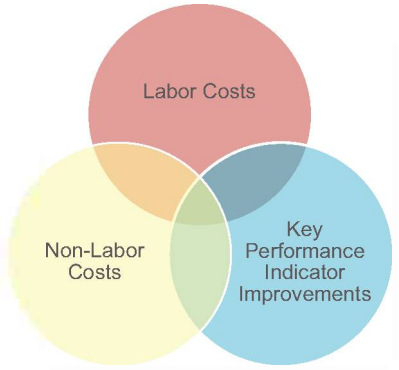
Performance advantages of the new pilot project technologies are widely acknowledged, but it has proven difficult for utilities to derive business cases for justifying investment in these new capabilities. Lack of a business case is often cited by utilities as a barrier to pursuing wide-scale application of digital technologies to nuclear plant work activities. The decision to move forward with funding usually hinges on demonstrating actual cost reductions that can be credited to budgets and thereby truly reduce O&M or capital costs. Technology enhancements, while enhancing work methods and making work more efficient, often fail to eliminate workload such that it changes overall staffing and material cost requirements. It is critical to demonstrate cost reductions or impacts on non-cost performance objectives in order for the business case to justify investment by nuclear operators.

The Business Case Methodology (BCM) addresses the "benefit" side of the analysis—as opposed to the cost side—and how the organization evaluates discretionary projects (net present value (NPV), accounting effects of taxes, discount rates, etc.). The cost and analysis side is not particularly difficult for the organization and can usually be determined with a fair amount of precision (not withstanding

implementation project cost overruns). It is in determining the "benefits" side of the analysis that utilities have more difficulty in technology projects and that is the focus of this methodology. The methodology is presented in the context of the entire process, but the tool provided is limited to determining the organizational benefits only.

This BCM approaches building a business case for a particular technology or suite of technologies by detailing how they impact an operator in one or more of the three following areas: Labor Costs, Non-Labor Costs, and Key Performance Indicators (KPIs). Key to those impacts will be identifying where the savings are "harvestable," meaning they result in an actual reduction in headcount and/or cost.

Figure 1: Key Areas of Impact



Impacts to NPPs in these three areas should be quantified and built into a comprehensive business case for the adoption of a technology.

Methodology Purpose

The purpose of the BCM is to provide a structure for building the business case for adopting pilot project technologies in a manner that captures the total organizational benefits that can be derived from the improved work methods. This includes the direct benefit to the targeted work process, efficiencies gained in related work processes, and avoided costs through the improvement of work quality and reduction of human error.

Specifically, the BCM highlights key questions to ask and guides the utility through, as well as identifies where in the process to employ, the Business Case Methodology Workbook (BCMW) for benefits/cost savings identification. The approach enables collaboration between the II&C Pathway and utility partners in applying new technologies across multiple NPP organizations and their respective work activities, wherever there is opportunity to derive benefit. In this manner, the BCM drives an "economy of scale" that maximizes the value of the technologies relative to the implementation cost.

The BCM leverages the fact that, in spite of what seems to be a wide and disparate array of work activities among an NPP's operational and support organizations, the work activities themselves are largely composed of common tasks. For example, whether the work activities are in Operations, Chemistry, Radiation Protection, or even Security, they have in common such tasks as pre-job briefs, use of procedures, correct component identification, emergent conditions requiring work package alteration,

etc. It is at this task level that the technologies are applied, and therefore the benefits of the technologies can be realized across as many plant activities as can be identified to employ these tasks. In this manner, a much more comprehensive business case can be derived that greatly increases the benefit/cost ratio. This has the added benefit of driving consistency across the NPP organizations, which is a fundamental principle of successful NPP operational and safety management.

Nuclear Power Plant Cost Construct

To understand where a technology might benefit an NPP/utility, the user must understand the overall NPP's cost construct to identify what "line item" in the budget the technology affects. A typical NPP's cost model is broken down into three components:

1. O&M – Online
2. O&M – Outage
3. Capital

Figure 2 illustrates the O&M – Online Cost Construct of an NPP.

Figure 2: O&M-Online Cost Construct

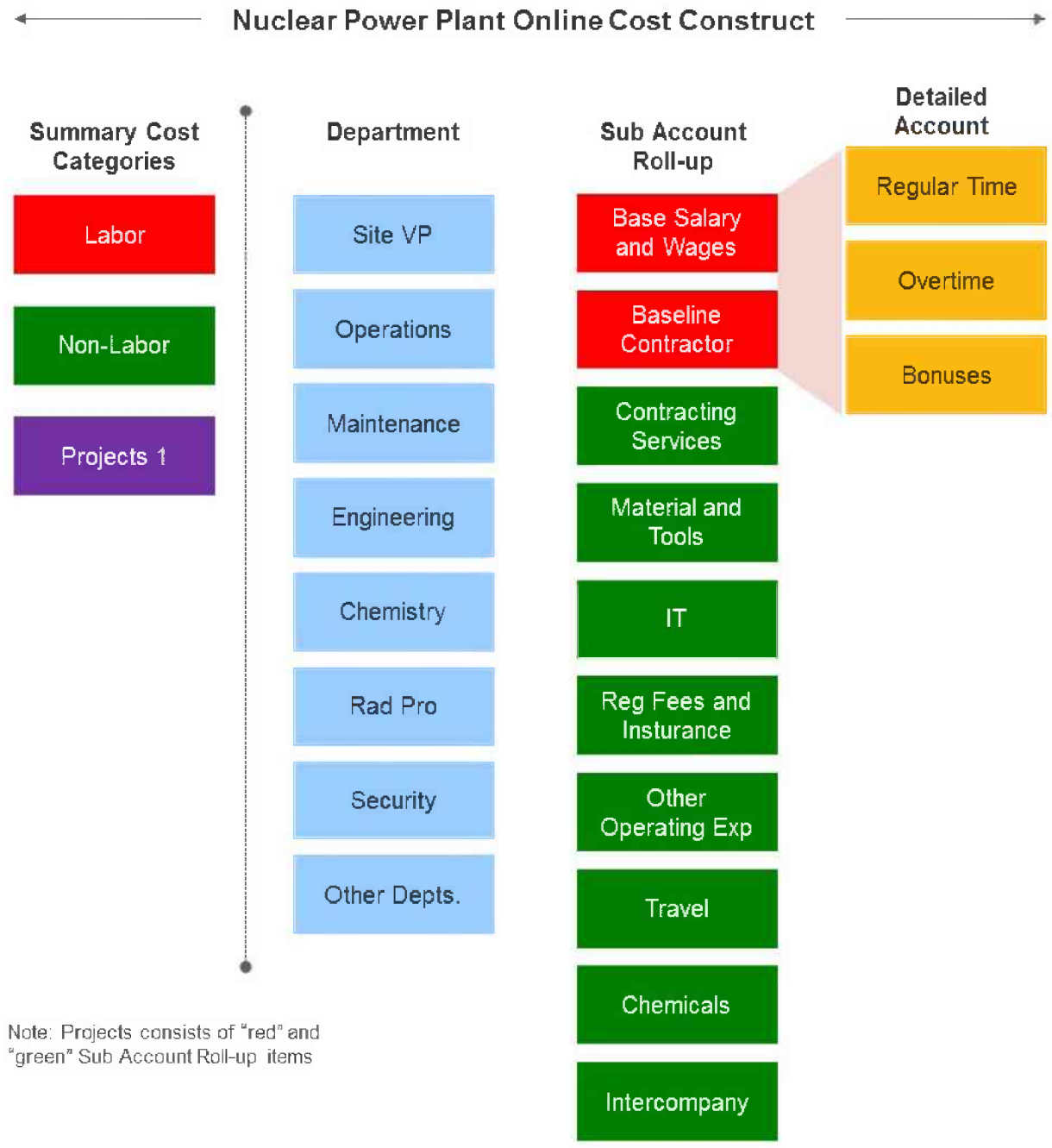


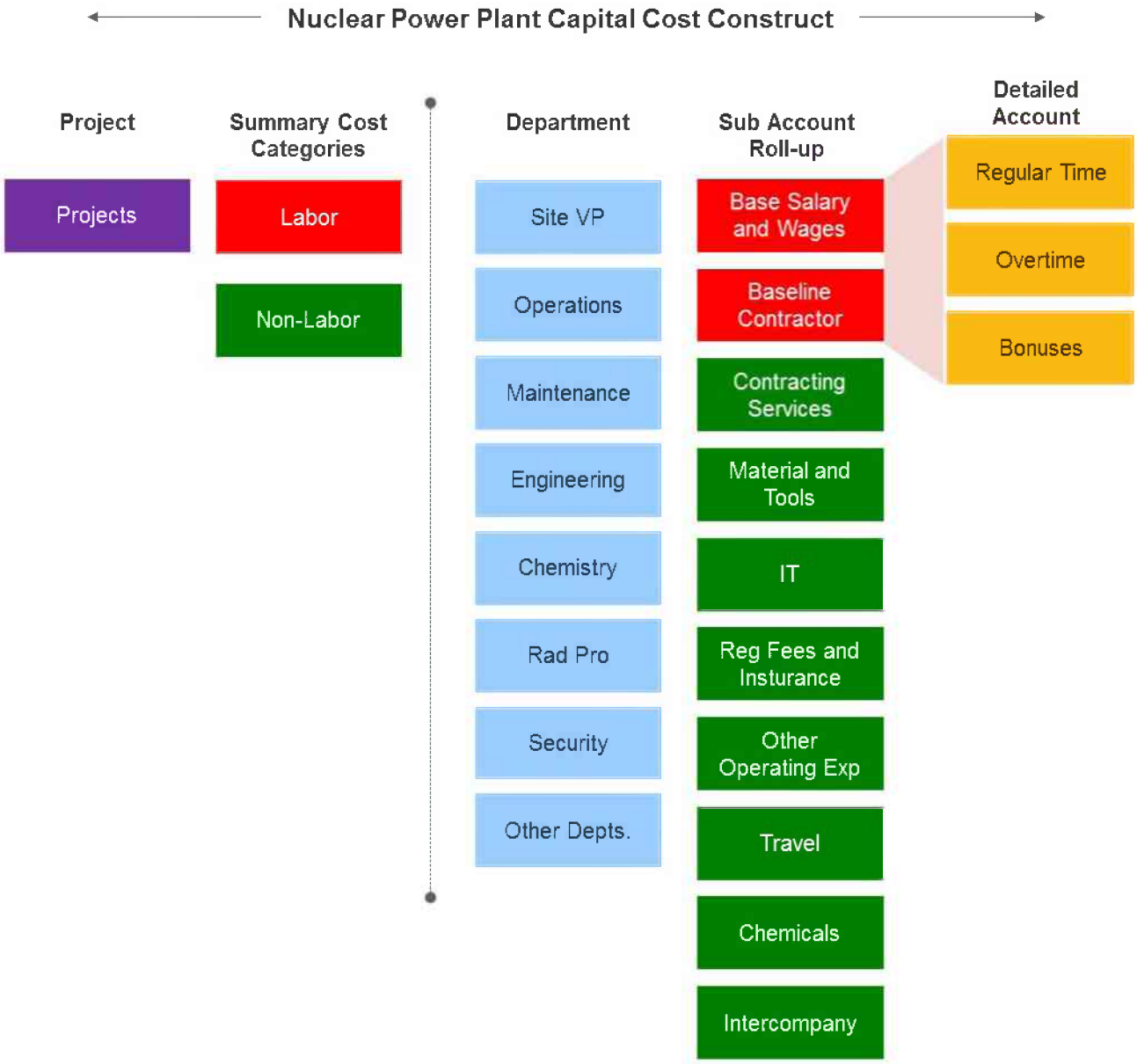
Figure 3 illustrates the O&M – Outage Cost Construct of an NPP.

Figure 3: O&M-Outage Cost Construct



Figure 4 illustrates the Capital Cost Construct of an NPP. Please note this is broken down by project.

Figure 4: Capital Cost Construct



Methodology Overview

The BCM consists of six steps, as follows:

1. Identify Utility Common Practices
2. Define Model Inputs/Variables
3. Determine Key Business Output Measures
4. Build Business Case Model
5. Perform Input/Variable Sensitivity Analysis
6. Present Business Case Ranges

The outcome of the methodology is a robust financial analysis of the costs and benefits associated with the adoption of a new technology on a nuclear site.

Building the Business Case

Step 1: Identify Utility Common Practices

In order to evaluate projects across the organization effectively, utilities may already have a set of business case process requirements that are to be adhered to and leveraged. The BCMW supplements the utility's project evaluation process to determine the value provided by the technology to the utility. The following questions should be explored as part of the first steps of engaging a utility.

Financial Output Measures

- What financial measures are typically used to assess and compare business cases for projects?
  - Net Present Value (NPV)
  - Payback Period
  - Internal Rate of Return (IRR)
  - Others?

Typical Financial Variables

- Does the NPP/utility use certain financial variables for all projects?
  - Corporate-wide discount rate used for all projects?
  - Standard inflation assumption used for all projects?
  - Common payroll/merit increase assumption used for all labor-related projects?

Time Horizon for Investment

- Are projects evaluated on a common time horizon?
  - 5-year time horizon?
  - 10-year time horizon?
- Note: Important to understand upfront as this will impact financial output measures

Business Case Templates/Format

- Are there business case templates/formats that should be used?
- Is there a common business case review process that will need to be followed?

Incremental vs Non-Incremental

- How does the NPP/utility intend to view costs associated with the project?
  - Incremental costs ONLY – new cost directly associated with the implementation of the project
    - Example: Technology implementation would consider costs of the new technology, and any new staff dedicated to the implementation, but current IT personnel allocated to the implementation would not be considered
  - Non-incremental (or total) costs – all costs associated with supporting the implementation of the project
    - Example: Time-value of any personnel helping the project would need to be factored into the overall cost. If a VP is going to spend 5% of their time on the project, their associated cost would be included

One-Time vs. Recurring Costs

- One-time costs (also known as "project implementation" costs) – these can be treated differently related to cost allocation and accounting in the general ledger
- Recurring costs (also known as "running" costs) – these are often compared to current state base cases and can often be incorporated into current general ledger accounts

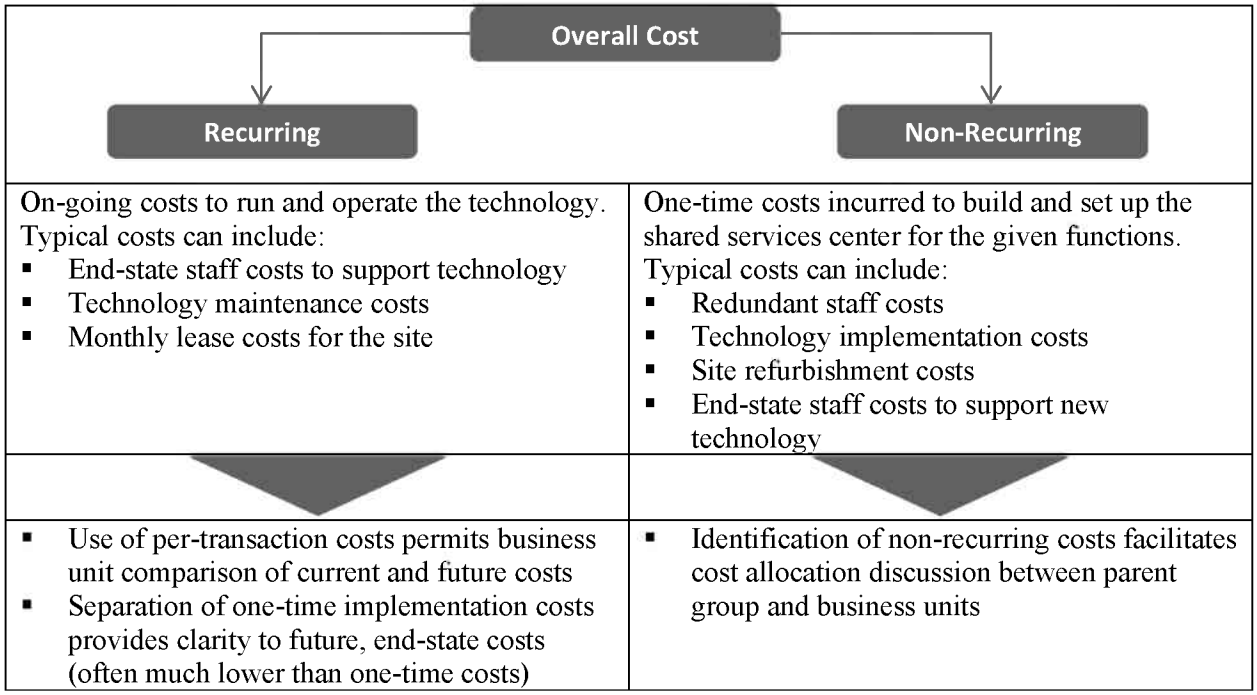
Chargeback Approach/Method

- Does the NPP/utility intend to allocate costs of the project back to various business units/departments or incur all costs centrally?
  - Allocation to business units/departments – identify how costs will be allocated and which costs will have this condition; your business case model will have to be built with this in mind

Differentiating between Recurring and Non-Recurring Costs

Differentiating between recurring and non-recurring costs can facilitate comparison of current and future costs, support any cost-allocation discussions, and help the internal project team sell the nuclear technology concept.

Figure 5: Recurring vs. Non-Recurring Costs



Step 2: Define Model Inputs/Variables

A clear identification of all the business case inputs and variables will facilitate future adjustments and "what if" scenario analyses as well as help utilities review all the assumptions of the model. The cost side of the benefit will be derived by the utility or NPP. The benefits side of the table below can be derived from the BCMW.

Figure 6: Typical Costs/Benefits to Consider

Typical Costs/Benefits to Consider	
COSTS	BENEFITS
Technology	
One-time implementation/setup costs	Sunset of older technologies (saving of ongoing costs)
Ongoing maintenance/service costs	Reduction in licenses or hosted feed for older technologies
License fees or hosted fees	
Equipment	
Labor	
Cost of severance and outplacement	Headcount reduction*
Other	
Consulting and project team	Non-labor cost reduction (materials, etc.)*
Training	Improvements in KPIs*
	Reduction in vendors/optimization of contracts

*Indicates key areas of impact for technology projects. Quantifying these benefits is discussed in Step 4.

Step 3: Determine Key Business Output Measures

Many business cases will typically have several financial metrics which are used as reference points for comparison to other cases and as key "take-away" metrics for the business.

	Guidance/Definition	Impacted by…
Net Present Value (NPV)	▪ Dollar value of the initiative for the organization – how much the organization will make on this initiative, accounting for time	▪ Time horizon of business case ▪ Speed of implementation ▪ Size of investment (and benefit) ▪ Discount rate
Payback Period	▪ Time (often in years) it takes for the cumulative benefits to equal the cumulative investments	▪ Speed of implementation ▪ Size of investment (and benefit)
Internal Rate of Return (IRR)	▪ Annual rate (percentage) which is returned by investing in the initiative; essentially provides the yield for the investment	▪ Time horizon of business case ▪ Speed of implementation

Step 4: Build Business Case Model

In addition to the information gathered with the NPP/utility in the first three steps, building the actual business case also involves leveraging the BCMW in order to help the NPP/utility identity the areas of impact and quantify the benefits of the impact. The workbook identifies specific task-level benefits, non-labor cost centers, and KPI improvements that can be quantified and factored into the analysis or presented qualitatively to buttress the quantitative case. The BCMW determines the aggregate cost savings across the organization and across different cost drivers. The BCMW does not account for recurring and non-recurring technology costs and does not apply a financial measure or payback period

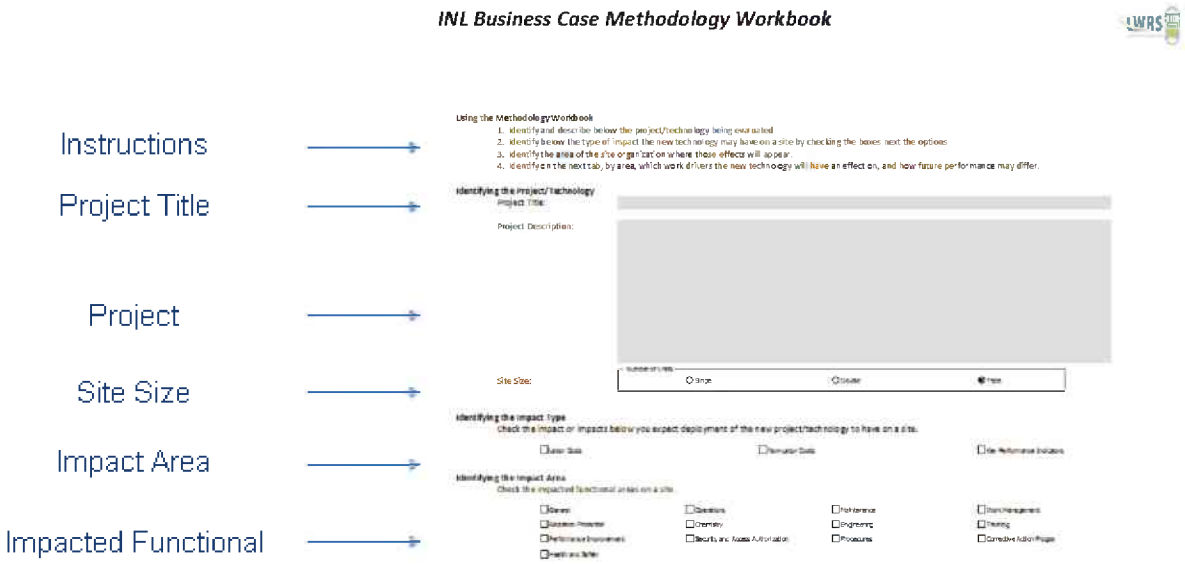
such as an NPV. Any financial measure or payback period would be done by the NPP or utilities project evaluation process.

The BCMW was developed to walk employees and NPP/utility teams through the three key impact areas of labor costs, non-labor costs, and KPIs.

Workbook Overview

The "Overview" tab requires a project title and description and prompts the user to think about the size of the site and which of the three impact areas and functional areas are affected.

Figure 7: Methodology Workbook "Overview" Tab

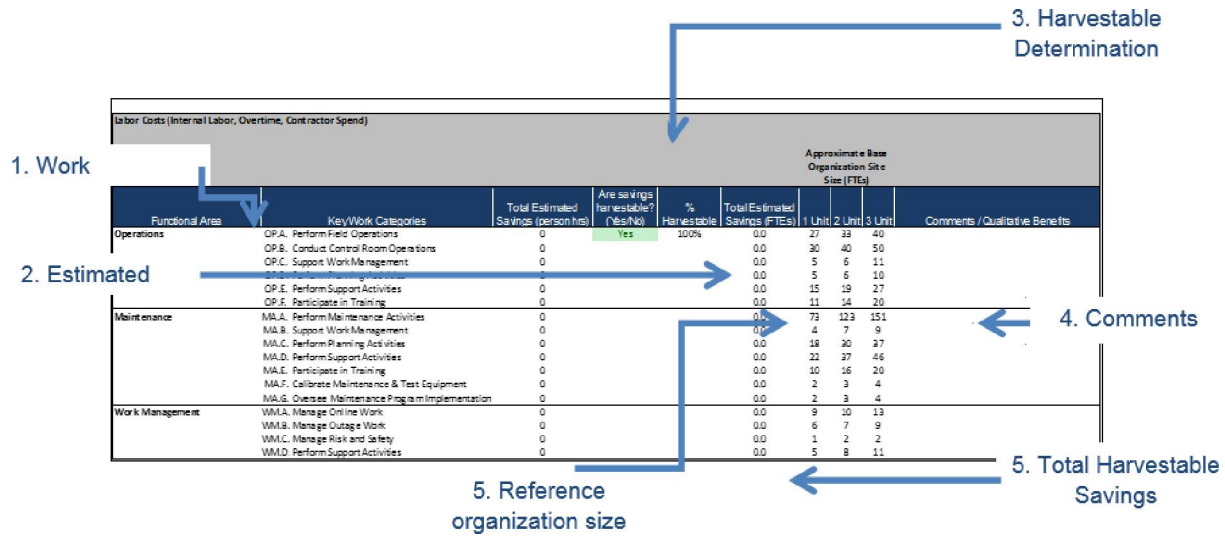


Labor Costs Categories

The Labor Cost Categories tab includes:

1. Key Work Categories by functional area. At a high level, these are the areas of work in each functional area that efficiencies at the task level below will show up in
2. Estimated savings from all of the tasks that make up a work category roll up here
3. Whether or not identified savings are "harvestable"
4. Comments and qualitative benefits can also be noted, and the Total Harvestable Savings in person hours are summed at the bottom
5. Total harvestable savings for the site

Figure 8: Methodology Workbook "Labor Costs Categories" Tab



Labor Costs (Internal Labor, Overtime, Contractor Spend)

Functional Area	Key Work Categories	Total Estimated Savings (person hrs)	Are savings harvestable? (Yes/No)	% Harvestable	Total Estimated Savings (FTEs)	Approximate Base Organization Site Size (FTEs) 1 Unit	2 Unit	3 Unit	Comments / Qualitative Benefits
Operations	OP.A. Perform Field Operations	0	Yes	100%	0.0	27	33	40	
	OP.B. Conduct Control Room Operations	0			0.0	30	40	50	
	OP.C. Support Work Management	0			0.0	5	6	11	
	[illegible]	0			0.0	5	6	10	
	OP.E. Perform Support Activities	0			0.0	15	19	27	
	OP.F. Participate in Training	0			0.0	11	14	20	
Maintenance	MA.A. Perform Maintenance Activities	0			0.0	73	123	151	
	MA.B. Support Work Management	0			0.0	4	7	9	
	MA.C. Perform Planning Activities	0			0.0	18	30	37	
	MA.D. Perform Support Activities	0			0.0	22	37	46	
	MA.E. Participate in Training	0			0.0	10	16	20	
	MA.F. Calibrate Maintenance & Test Equipment	0			0.0	2	3	4	
	MA.G. Oversee Maintenance Program Implementation	0			0.0	2	3	4	
Work Management	WM.A. Manage Online Work	0			0.0	9	10	13	
	WM.B. Manage Outage Work	0			0.0	6	7	9	
	WM.C. Manage Risk and Safety	0			0.0	1	2	2	
	WM.D. Perform Support Activities	0			0.0	5	8	11	

Note: Costs savings in the labor category from avoided problems, for example performing fewer Root Cause Analyses due to a process improvement enabled by technology, should be accounted for in the Corrective Action Program functional area.

Labor Costs Tasks

The Labor Costs Tasks tab is used to identify the specific tasks affected by the adoption of new technology. These tasks are grouped by functional area, as well as linked to the master Task Library (Tab 4). To populate the Labor Costs Tasks tab, work in the following order:

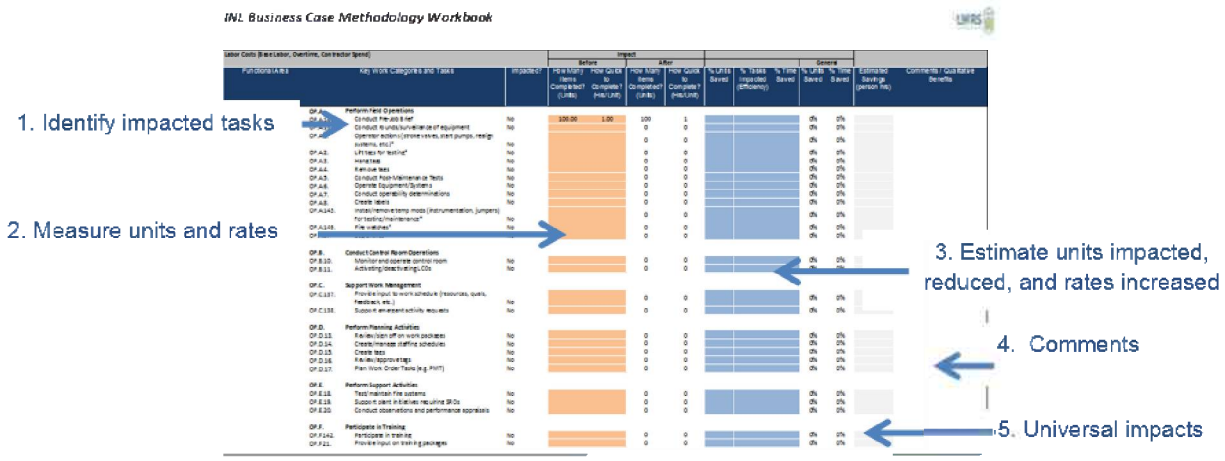
1. Work with the NPP/utility internal team to identify which of the specific tasks will be affected by the adoption of the new technology. Indicate this by selecting "Yes" in the "Impacted?" column (column E). Filter out the "Nos" in order to focus on tasks that need review and data input
2. Again with the NPP/utility internal team, gather data on how many units of the tasks are completed on an annual basis and the rate (i.e., hours per task, 5 minutes per pre-job brief) at which they are completed
3. Using research compiled by DOE as well as insights gleaned from the NPP/utility team, identify the percentage of tasks impacted, percentages of units saved, and the percentage of time saved (definitions and examples shown below). These savings are "task specific," meaning the savings numbers entered here do not affect like tasks in other functional areas

   Percentage of tasks impacted – Technology impacts 100% of Operations pre-job briefs
   Percentage of units saved – Technology reduces the number of Operations pre-job briefs from 100 per year to 50 per year; 50% reduction

   Percentage of time saved – Technology saves Operations Shift Manager 15 minutes from a typical 60-minute pre-job brief; 25% reduction

4. Submit any Comments/Qualitative Benefits for review after the data has been compiled
5. Note any universal impacts on a task from the Task Library

Figure 9: Methodology Workbook "Labor Costs Tasks" Tab

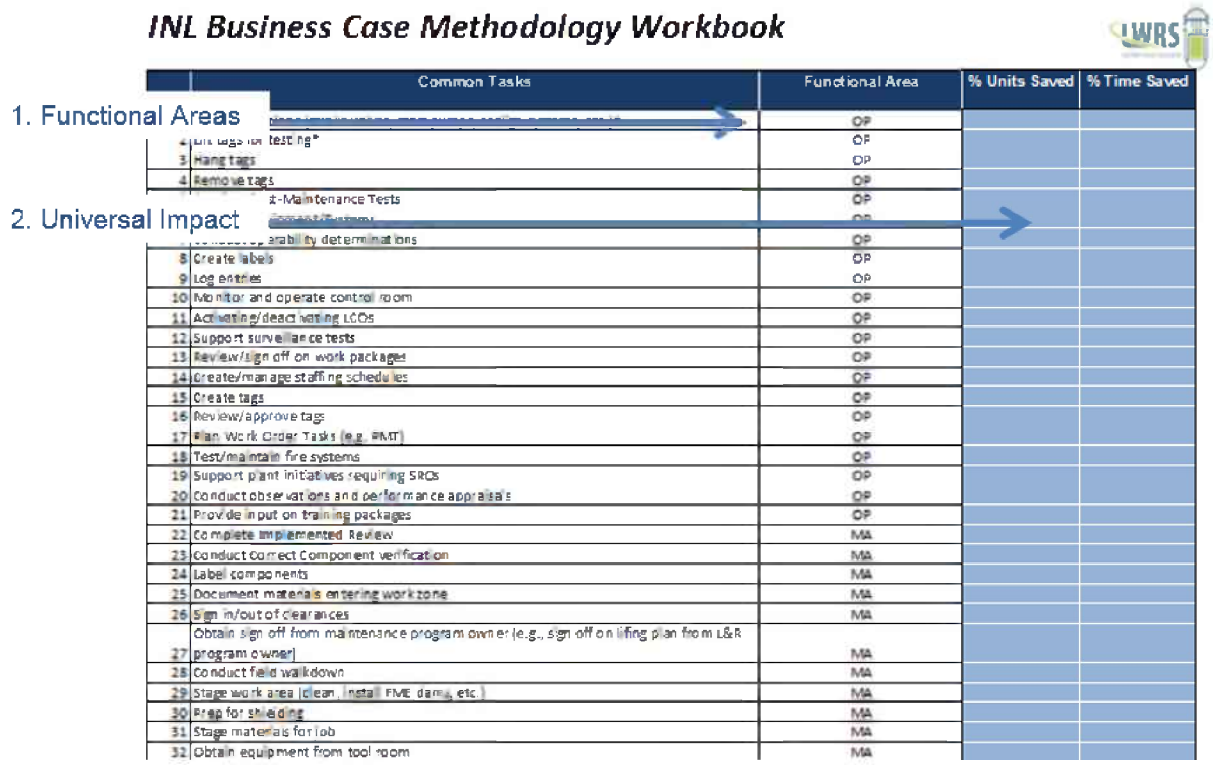


Task Library

The Task Library consists of the entire list of tasks that appear on the Labor Costs Tasks tab.

1. Labor Tasks may impact one or more functional areas
2. If upon examination of a technology it is determined that it will have a universal impact on a common task (i.e. in every instance for every functional area the impact will be the same), the percentage of units reduced or percentage of time saved can be entered on this tab
3. Appendix 1 demonstrates to steps to add new tasks to the Task Library in the workbook

Figure 10: Methodology Workbook "Task Library" Tab



	Common Tasks	Functional Area	% Units Saved	% Time Saved
		OP		
	test ing*	OP		
3	Hang tags	OP		
4	Remove tags	OP		
	±-Maintenance Tests	OP		
		OP		
	ability determinations	OP		
8	Create labels	OP		
9	Log entries	OP		
10	Monitor and operate control room	OP		
11	Activating/deactivating LCOs	OP		
12	Support surveillance tests	OP		
13	Review/sign off on work packages	OP		
14	Create/manage staffing schedules	OP		
15	Create tags	OP		
16	Review/approve tags	OP		
17	Plan Work Order Tasks (e.g. PMT)	OP		
18	Test/maintain fire systems	OP		
19	Support plant initiatives requiring SROs	OP		
20	Conduct observations and performance appraisals	OP		
21	Provide input on training packages	OP		
22	Complete Implemented Review	MA		
23	Conduct Correct Component Verification	MA		
24	Label components	MA		
25	Document materials entering work zone	MA		
26	Sign in/out of clearances	MA		
27	Obtain sign off from maintenance program owner (e.g., sign off on lifing plan from L&R program owner)	MA		
28	Conduct field walkdown	MA		
29	Stage work area (clean, install FME dams, etc.)	MA		
30	Prep for shielding	MA		
31	Stage materials for job	MA		
32	Obtain equipment from tool room	MA		

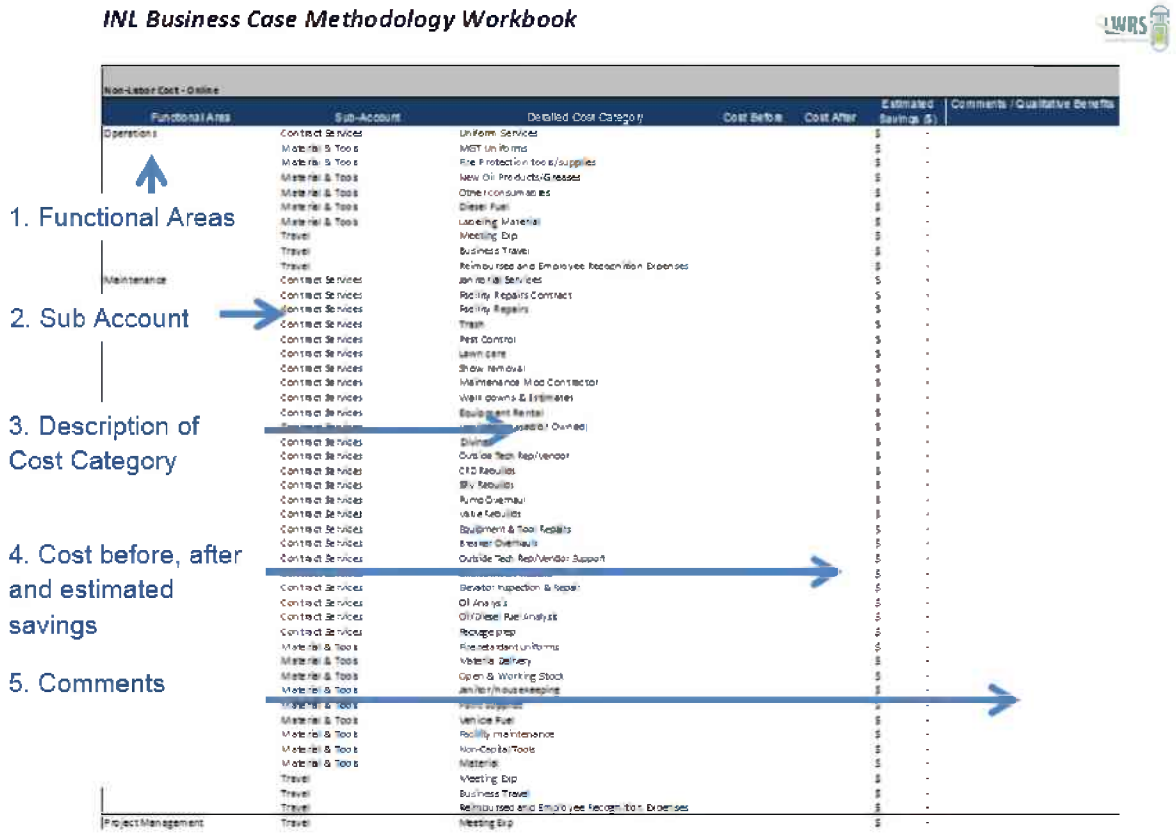
Note: Additional tasks must be first added to the Task Library before being added to the Labor Costs Tasks tab. The Labor Costs Tasks tab uses data validation to ensure the user chooses from a drop down with set options (from the Task Library list).

Appendix 2 illustrates the functional area two-letter acronyms (e.g., OP = Operations)

Non-Labor Costs and Key Performance Indicator Impacts

The first part of the Non-Labor KPI tab walks the user through common non-labor online and outage costs that may be impacted by technology adoption. Identify the cost category and type, and work with the NPP/utility internal team to identify cost deltas.

Figure 11: Methodology Workbook "Non-Labor Costs" Tab

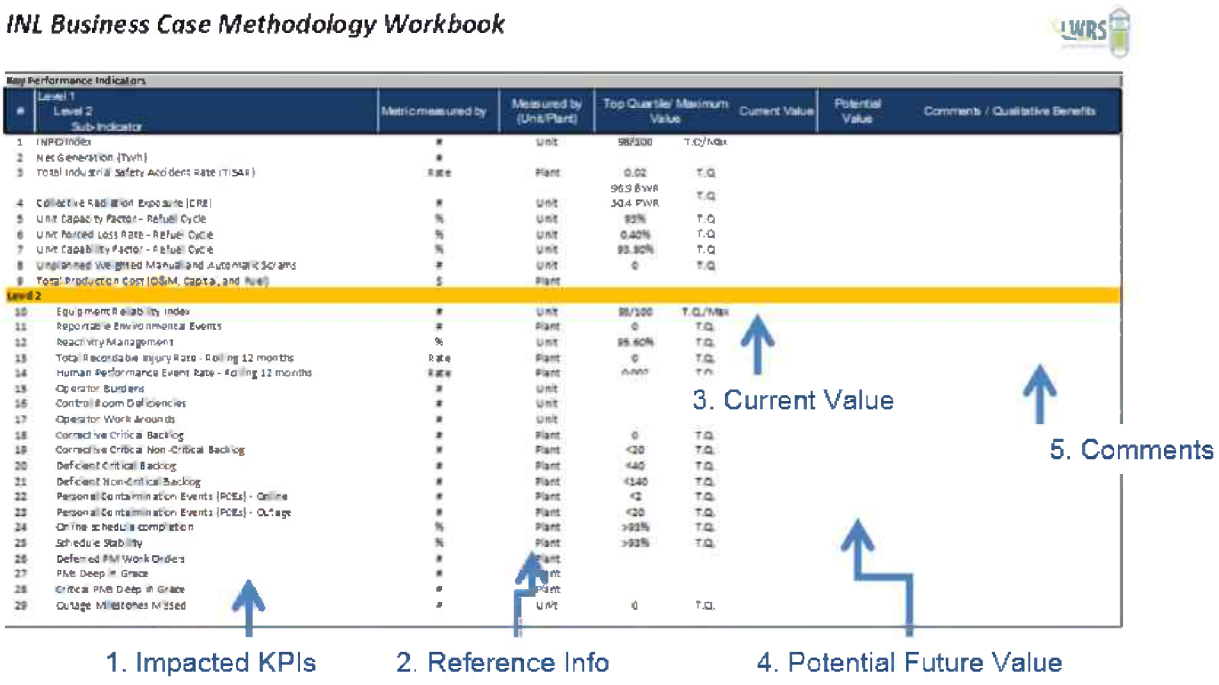


The Non-Labor Cost worksheet is similar for online and outage costs.

Part two of the Non-Labor KPI tab lists KPI metrics that are most likely to be affected by technology adoption. Users should do the following:

1. Identify all impacted KPIs
2. Assess the current value of impacted metrics
3. Identify likely future value after technology adoption
4. Note Comments/Qualitative Benefits

Figure 12: Methodology Workbook "Key Performance Indicator" Tab



Reference

The Reference tab in the BCMW contains reference material about the approximate sizes of functional area staffing in differently sized nuclear plants. This reference material is intended to assist staff with determining size of impact since O&M costs are largely driven by labor/headcount.

Figure 13: Reference Organization Size

Unit Size Selected:	Number of Units		
2	Single	Double	Triple
Operations	120	200	250
Maintenance	140	250	320
Work Management	20	30	35
Radiation Protection	40	65	75
Chemistry	22	30	40
Engineering	120	160	200
Training	35	45	55
Performance Improvement	10	12	12
Security & Access Authorization	220	250	260
Procedures	12	12	12
Corrective Action Program	10	10	10

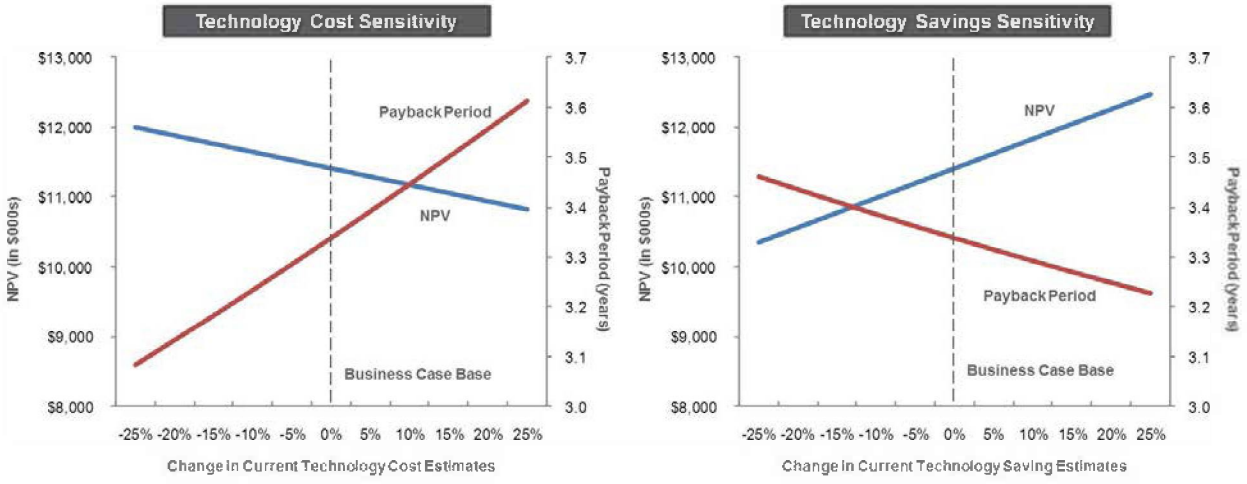
Step 5: Perform Input/Variable Sensitivity Analysis

Work with the NPP/utility to identify those variables or assumptions they are most concerned about in order to identify "what if" scenarios to perform. Likely candidates for sensitivity analysis could include:

- Least degree of current confidence (we just don't know if cost assumptions are accurate)
- Greatest amount of NPP/utility leadership focus (certain variables, like improving outage scheduling)
- Variables with high volatility (e.g., technology implementation costs)
- Biggest potential to affect business case outcome (some variables have significantly higher impact on business case outcome and should be highlighted and understood)

Beyond providing the range of reasonable results, sensitivities also provide leadership with insight into what levers to pull to pursue certain financial goals.

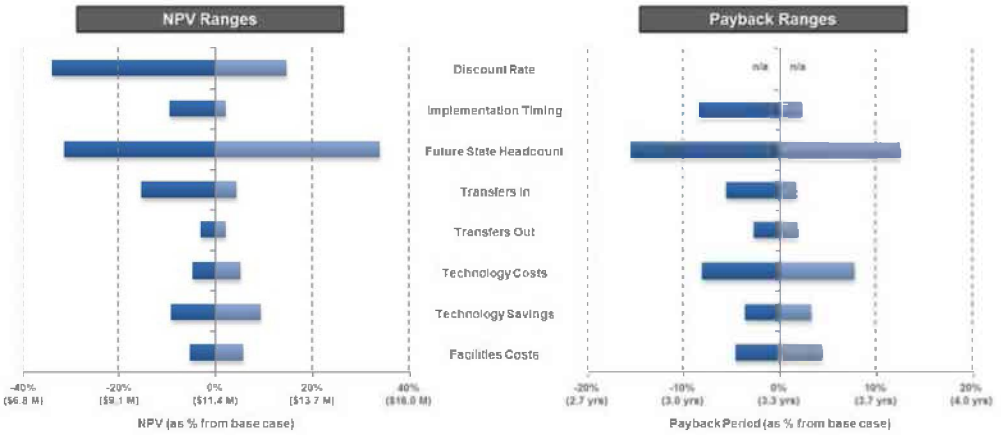
Figure 14: Sensitivity Analysis Graph 1



- Example suggests that technology costs and savings can be adjusted to achieve different financial goals
    - If business is under pressure to break even on cash quickly, focusing on cost will provide greater impact on payback period
    - If business is under pressure to prove long-term value of initiative, focusing on savings will provide greater impact on overall NPV

By depicting the impact of key NPP/utility sensitivities, the project team can instill comfort in the outcome even if the precise details of implementation are not yet finalized.

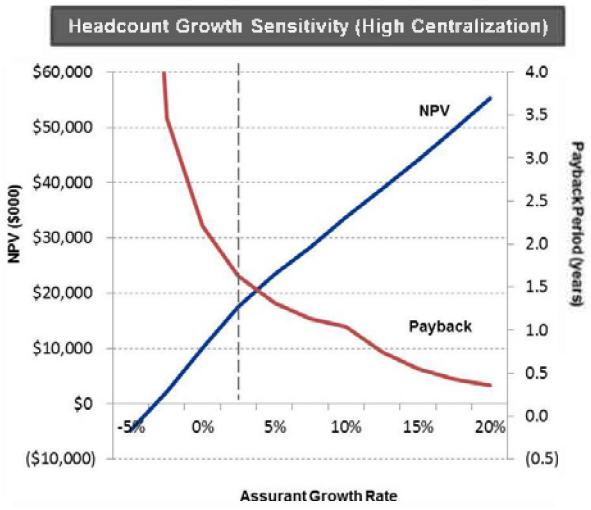
Figure 15: Sensitivity Analysis Graph 2



- Sensitivities provide "guardrails" on outcome
- Figure above identifies those variables that will have largest impact, and therefore will require most of the attention and focus during implementation

Sensitivities can highlight to leadership variables that may be out of their direct control but can still have a major impact on business case results.

Figure 16: Sensitivity Analysis Graph 3

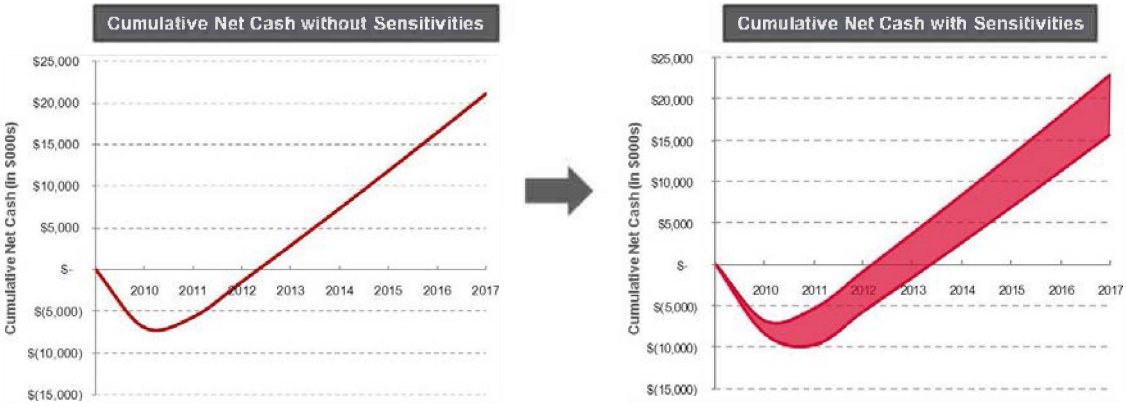


- The model is sensitive to growth rate estimates with NPV ranging from ($5) million to $55 million based on the range of possible growth rates shown here
- Payback ranges from never to 0.4 years depending on the assumed growth rate

Step 6: Present Business Case Ranges

By sharing a business case with ranges, we are able to convey the theoretical exercise inherent in the process and ensure NPP/utility leadership can make an informed, thoughtful decision based on possible outcomes.

Figure 17: Sensitivity Analysis Ranges



- It is easier to disagree and dispute a single dollar-value result and much harder to dispute a range
    - Enough assumptions are made that won`t all result as predicted in the business case
- Sensitivities ensure ranges can be calculated and reviewed to understand the largest areas of risk and gauge what it would take for the business case to no longer be appealing
- Intent is not to give the appearance that all the variables have been figured out
    - Sensitivities help convey that there can still be areas of change

Framing the Case for the Nuclear Utility Executive

Managing costs are crucial for nuclear plant profitability, and in many markets that may now even mean economic survival for a nuclear plant. While technology adoption comes with costs and a learning curve for any organization, the technology improvements proposed by the II&C Pathway for NPP operations represent the best option available for controlling rising costs, reducing cumulative burdens, minimizing human errors, and improving plant systems.

Building the business case for a new technology or suite of technologies as proposed above will result in a clear and concise financial analysis of the impact of adoption. Key elements to the trustworthiness of the analysis will be that it provides:

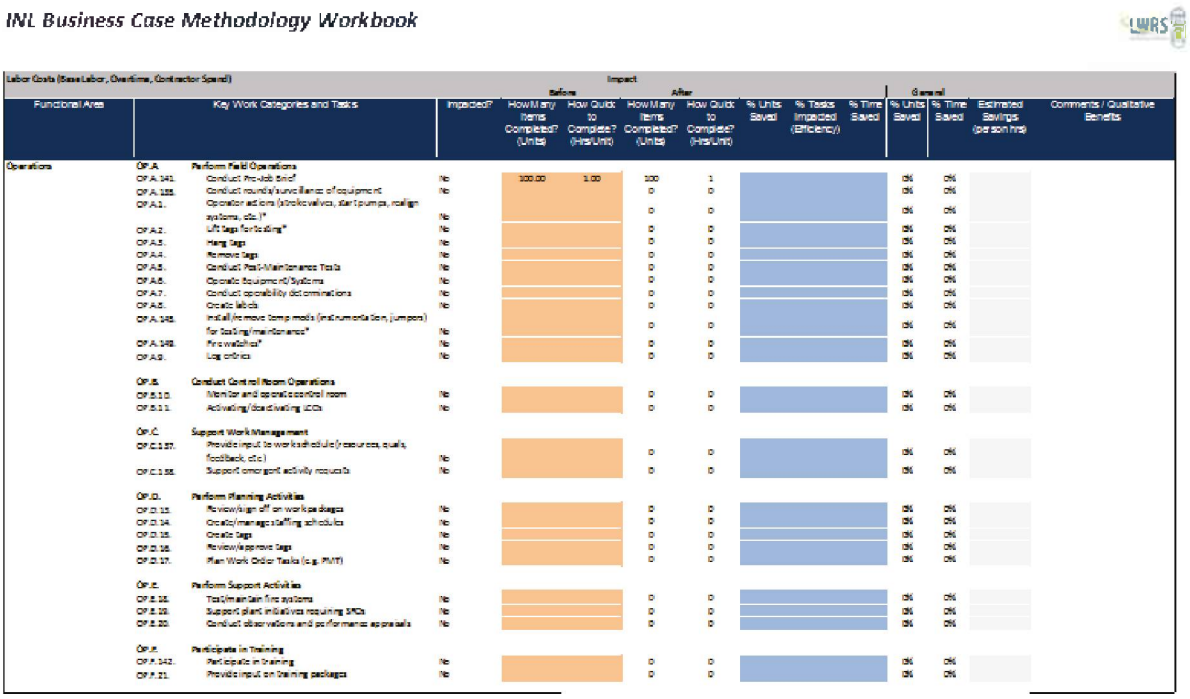
- Direct line of sight to the functional areas and specific task-level improvements resulting from adoption (e.g. verifying worker qualifications electronically)
- Common language and practices from the utility business case methodology
- Sensitivity analyses

NPP/utility executives will be looking to the business case to answer critical questions about the costs and benefits of adopting a new technology. Examples of questions to prepare for include:

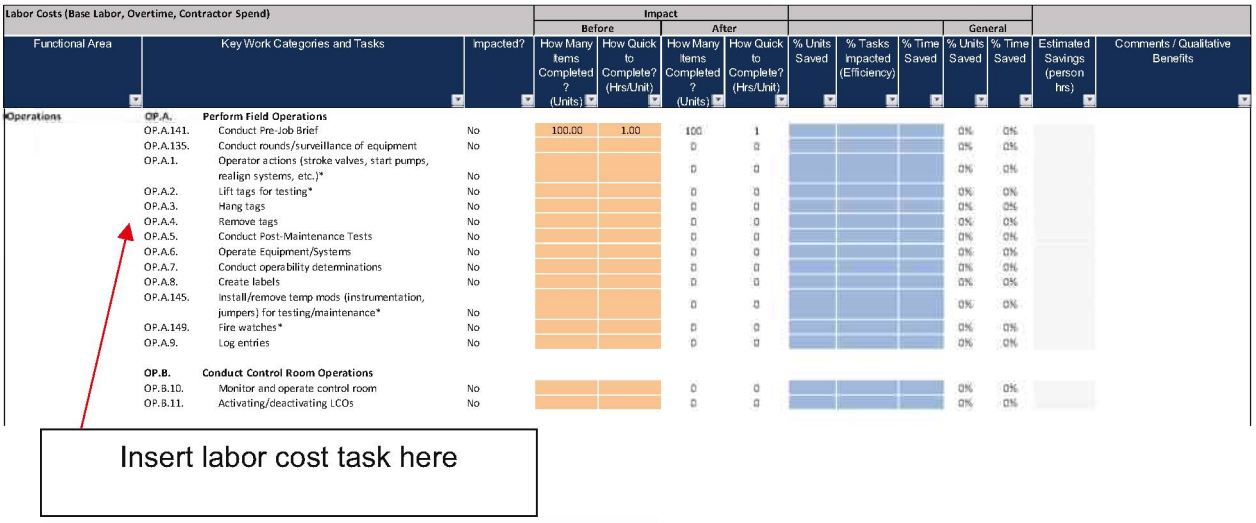
- What functional areas are affected?
- What processes are improved?
- In what labor cost categories do I see savings? (e.g., overtime)
- In what non-labor cost categories do I see savings?
- Are the savings truly harvestable?
- When will these savings be realized?
- In what performance indicators do I improve?

Appendix 1: How to Add Labor Tasks

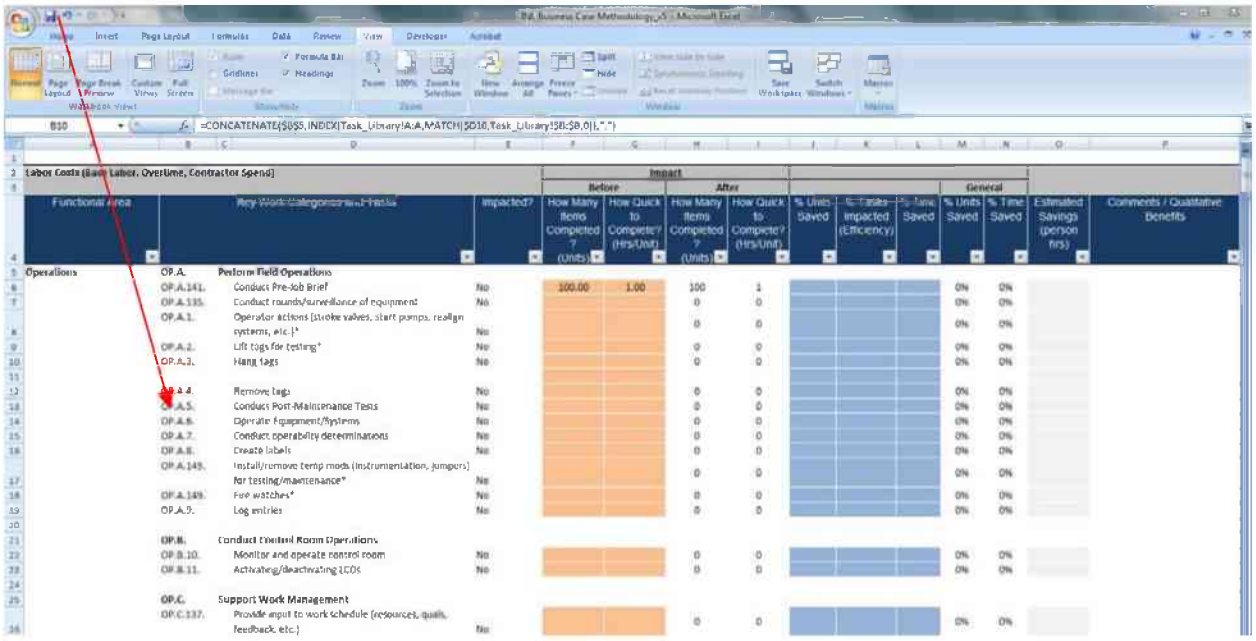
Open Labor Costs Tasks worksheet in the workbook



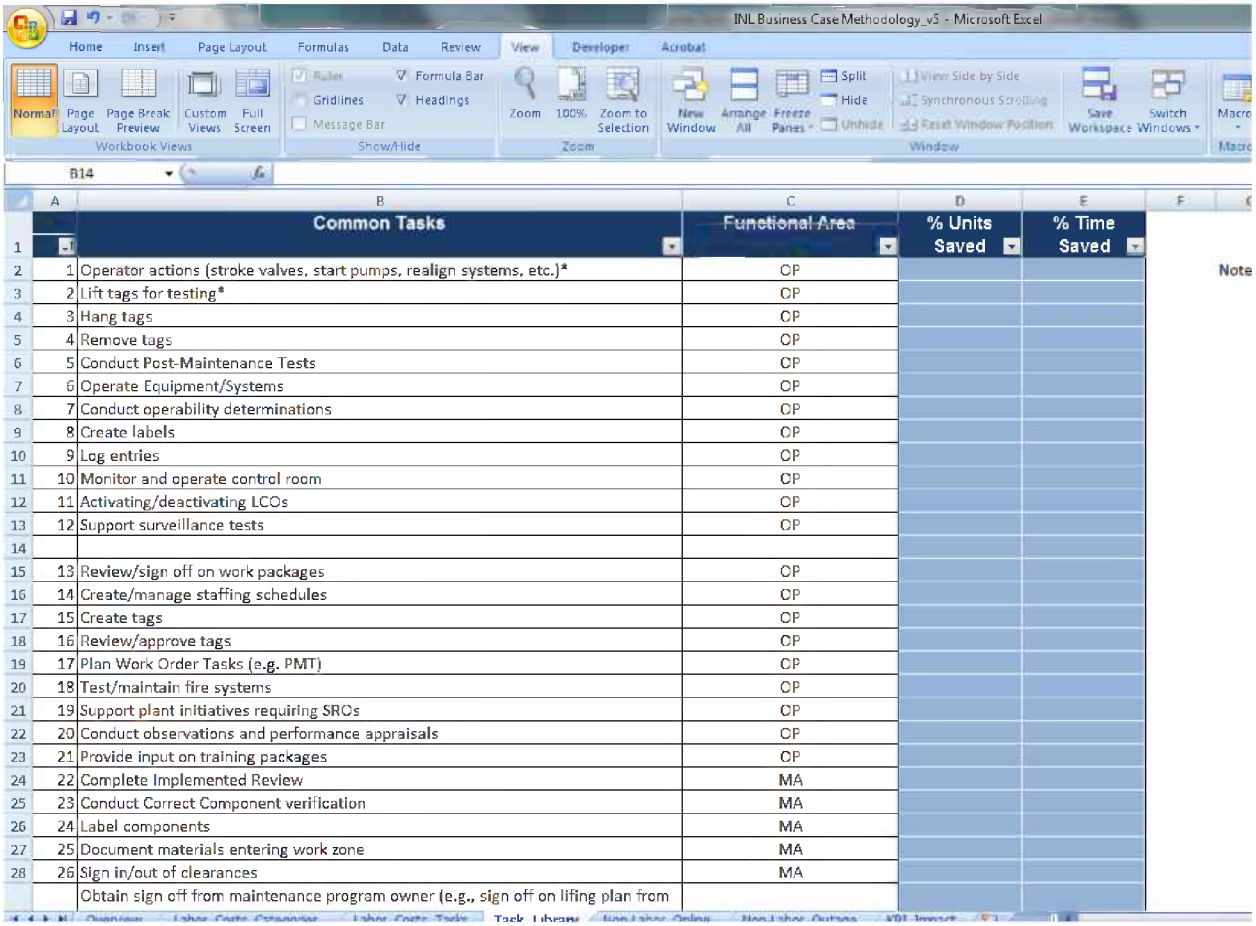
Identify which key work category (bold header) that you want to insert the new labor cost task under



Insert a new row (click Alt key, then “I” key, then “r” key)



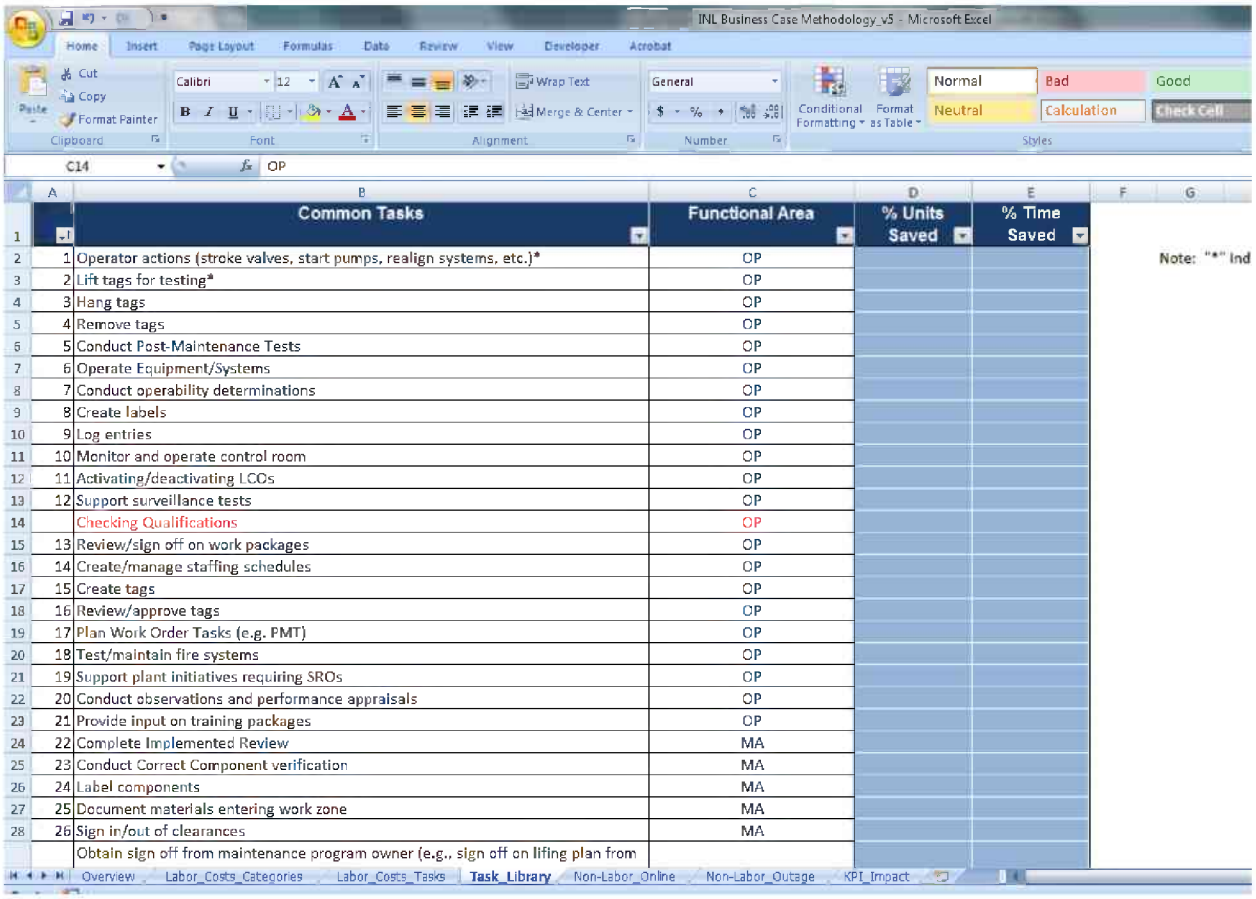
Go to Task Library worksheet; insert a new row for the task you want to add



		Common Tasks	Functional Area	% Units Saved	% Time Saved
2	1	Operator actions (stroke valves, start pumps, realign systems, etc.)*	OP		
3	2	Lift tags for testing*	OP		
4	3	Hang tags	OP		
5	4	Remove tags	OP		
6	5	Conduct Post-Maintenance Tests	OP		
7	6	Operate Equipment/Systems	OP		
8	7	Conduct operability determinations	OP		
9	8	Create labels	OP		
10	9	Log entries	OP		
11	10	Monitor and operate control room	OP		
12	11	Activating/deactivating LCOs	OP		
13	12	Support surveillance tests	OP		
14					
15	13	Review/sign off on work packages	OP		
16	14	Create/manage staffing schedules	OP		
17	15	Create tags	OP		
18	16	Review/approve tags	OP		
19	17	Plan Work Order Tasks (e.g. PMT)	OP		
20	18	Test/maintain fire systems	OP		
21	19	Support plant initiatives requiring SROs	OP		
22	20	Conduct observations and performance appraisals	OP		
23	21	Provide input on training packages	OP		
24	22	Complete Implemented Review	MA		
25	23	Conduct Correct Component verification	MA		
26	24	Label components	MA		
27	25	Document materials entering work zone	MA		
28	26	Sign in/out of clearances	MA		
		Obtain sign off from maintenance program owner (e.g., sign off on lifting plan from			

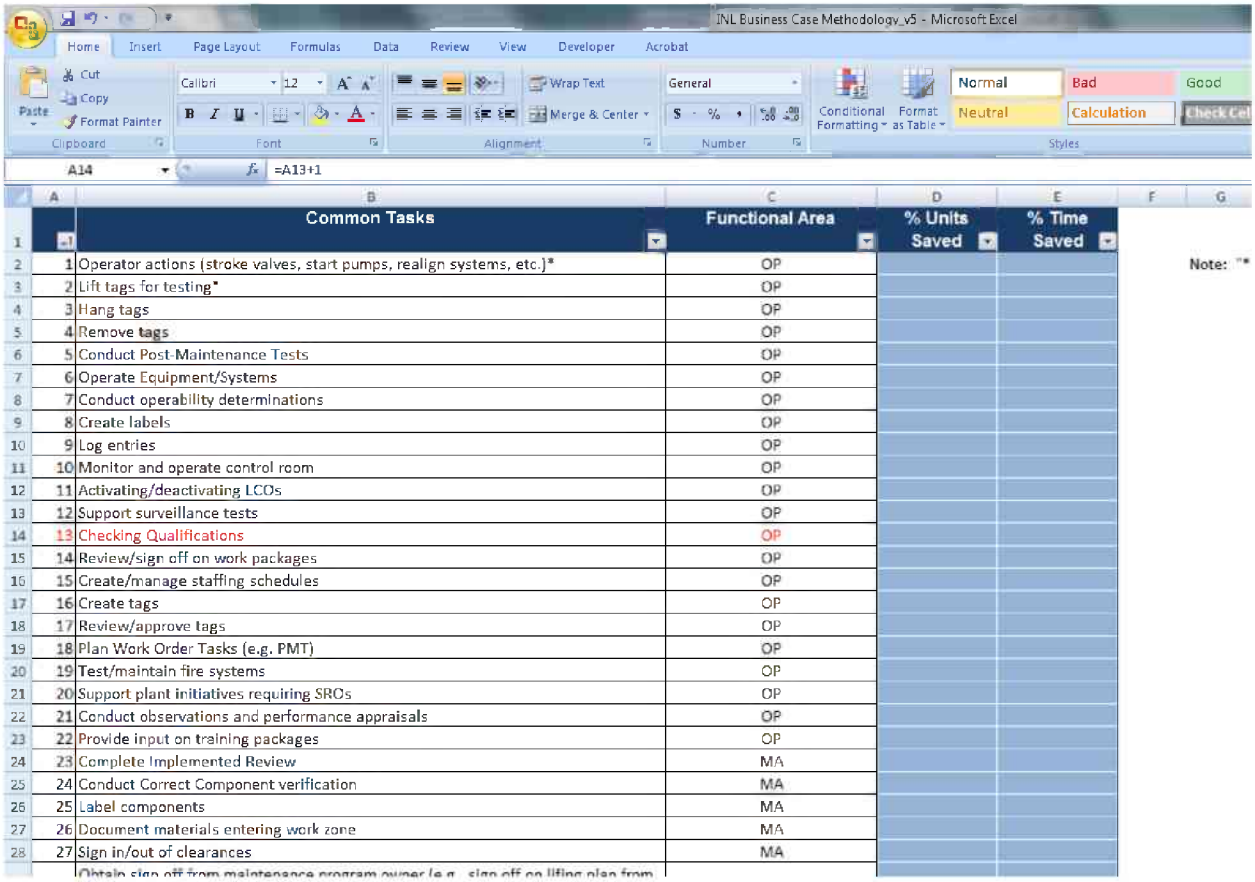
In column B, enter the new tasks

In column C, enter the two letter code for the functional area the task impacts. Shown in red font below



	Common Tasks	Functional Area	% Units Saved	% Time Saved
1	Operator actions (stroke valves, start pumps, realign systems, etc.)*	OP		
2	Lift tags for testing*	OP		
3	Hang tags	OP		
4	Remove tags	OP		
5	Conduct Post-Maintenance Tests	OP		
6	Operate Equipment/Systems	OP		
7	Conduct operability determinations	OP		
8	Create labels	OP		
9	Log entries	OP		
10	Monitor and operate control room	OP		
11	Activating/deactivating LCOs	OP		
12	Support surveillance tests	OP		
	Checking Qualifications	OP		
13	Review/sign off on work packages	OP		
14	Create/manage staffing schedules	OP		
15	Create tags	OP		
16	Review/approve tags	OP		
17	Plan Work Order Tasks (e.g. PMT)	OP		
18	Test/maintain fire systems	OP		
19	Support plant initiatives requiring SROs	OP		
20	Conduct observations and performance appraisals	OP		
21	Provide input on training packages	OP		
22	Complete Implemented Review	MA		
23	Conduct Correct Component verification	MA		
24	Label components	MA		
25	Document materials entering work zone	MA		
26	Sign in/out of clearances	MA		
	Obtain sign off from maintenance program owner (e.g., sign off on lifing plan from			

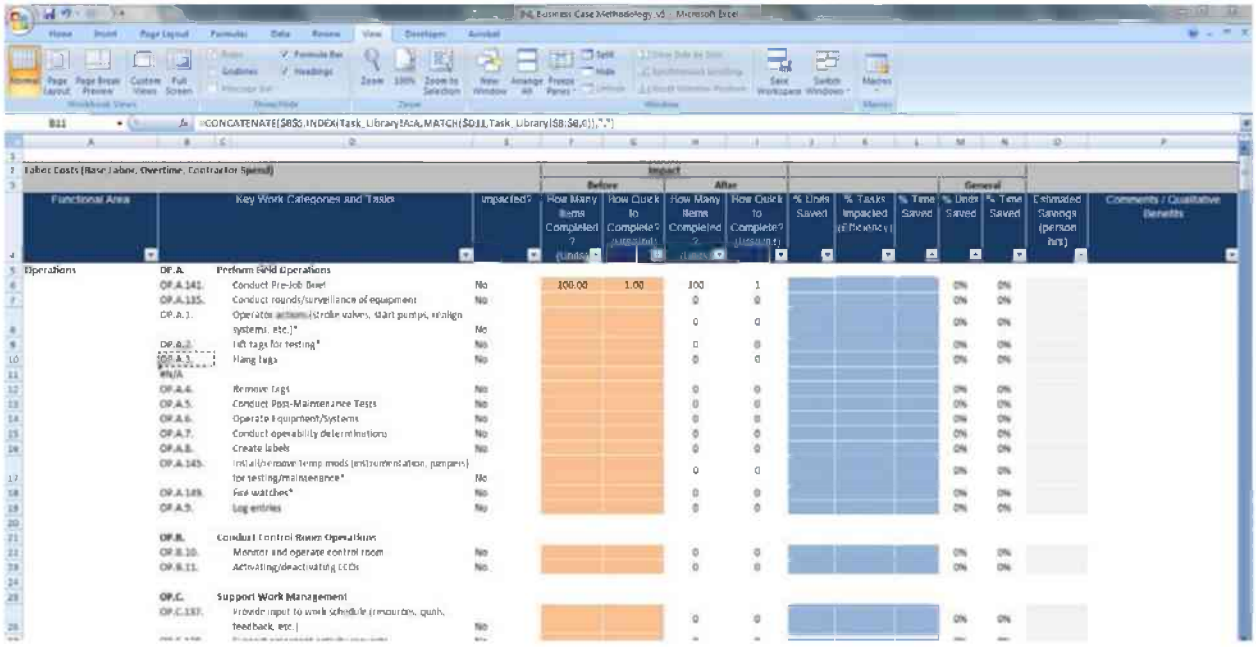
Renumber the numbers in column A



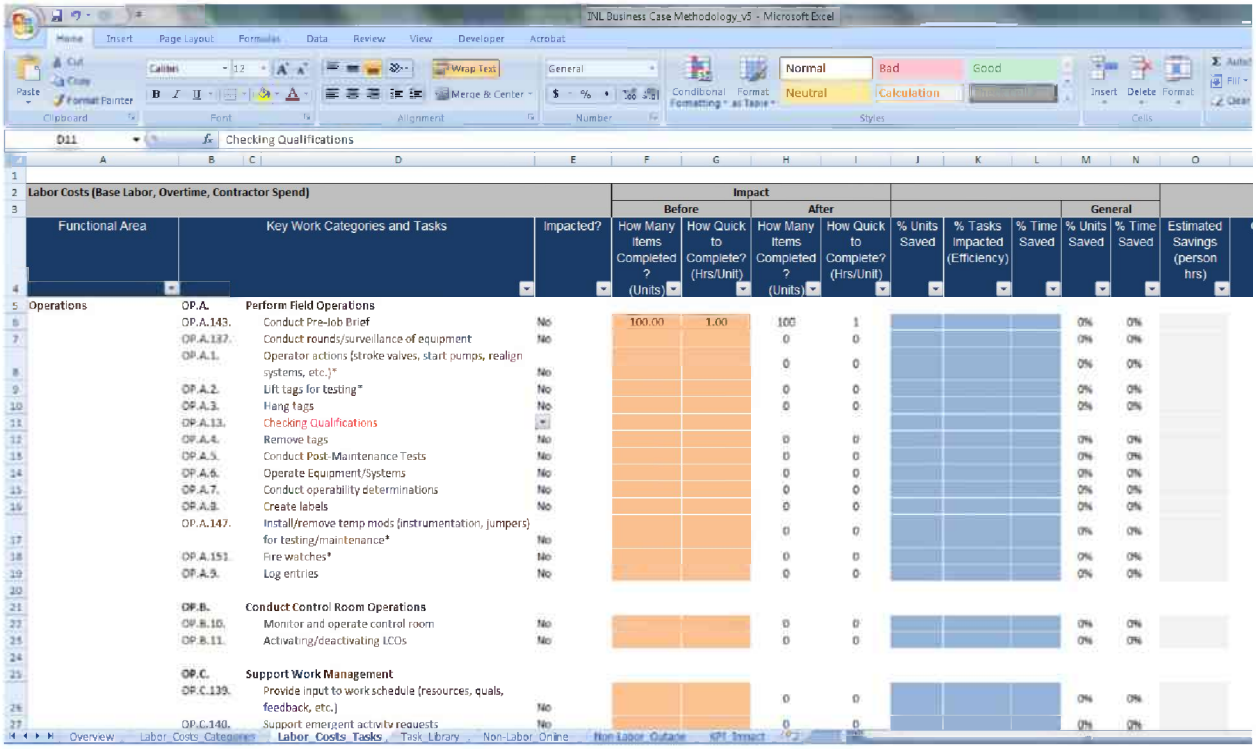
	Common Tasks	Functional Area	% Units Saved	% Time Saved
1	Operator actions (stroke valves, start pumps, realign systems, etc.)*	OP		
2	Lift tags for testing*	OP		
3	Hang tags	OP		
4	Remove tags	OP		
5	Conduct Post-Maintenance Tests	OP		
6	Operate Equipment/Systems	OP		
7	Conduct operability determinations	OP		
8	Create labels	OP		
9	Log entries	OP		
10	Monitor and operate control room	OP		
11	Activating/deactivating LCOs	OP		
12	Support surveillance tests	OP		
13	Checking Qualifications	OP		
14	Review/sign off on work packages	OP		
15	Create/manage staffing schedules	OP		
16	Create tags	OP		
17	Review/approve tags	OP		
18	Plan Work Order Tasks (e.g. PMT)	OP		
19	Test/maintain fire systems	OP		
20	Support plant initiatives requiring SROs	OP		
21	Conduct observations and performance appraisals	OP		
22	Provide input on training packages	OP		
23	Complete Implemented Review	MA		
24	Conduct Correct Component verification	MA		
25	Label components	MA		
26	Document materials entering work zone	MA		
27	Sign in/out of clearances	MA		
	Obtain sign off from maintenance program owner (e.g., sign off on lifting plan from			

Note: "*

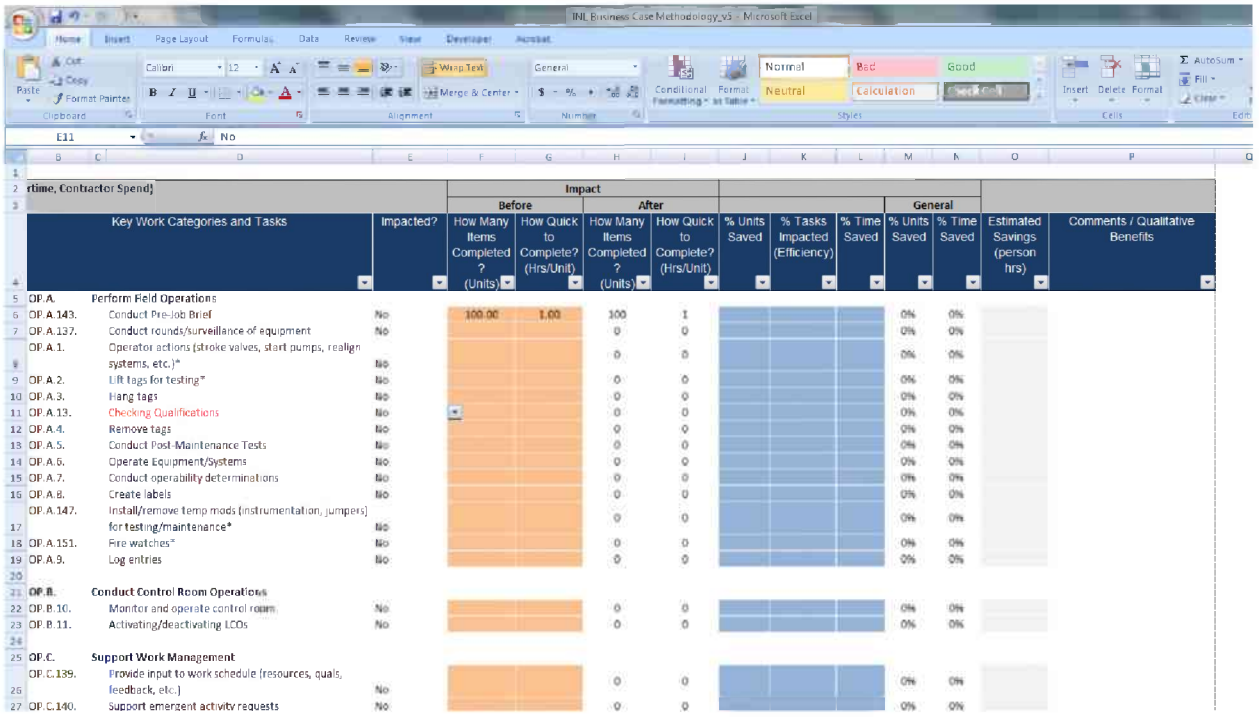
Go to the column B in the "Labor_Cost_Tasks" worksheet and the row above the newly inserted row. Copy the cell down by hitting "Ctrl" + "c"; then go to the blank row; hit "Ctrl" + "v"



Go to the column D in the "Labor_Cost_Tasks" worksheet pick the new labor task from the drop down menu



Go to the row above the newly inserted row and copy the cells from columns E to P into the newly inserted row



	Key Work Categories and Tasks		Impacted?	Impact: Before: How Many Items Completed? (Units)	Impact: Before: How Quick to Complete? (Hrs/Unit)	Impact: After: How Many Items Completed? (Units)	Impact: After: How Quick to Complete? (Hrs/Unit)	% Units Saved	% Tasks Impacted (Efficiency)	% Time Saved	General: % Units Saved	General: % Time Saved	Estimated Savings (person hrs)	Comments / Qualitative Benefits
5	OP.A.	Perform Field Operations												
6	OP.A.143.	Conduct Pre-Job Brief	No	100.00	1.00	100	1				0%	0%		
7	OP.A.137.	Conduct rounds/surveillance of equipment	No			0	0				0%	0%		
8	OP.A.1.	Operator actions (stroke valves, start pumps, realign systems, etc.)*	No			0	0				0%	0%		
9	OP.A.2.	Lift tags for testing*	No			0	0				0%	0%		
10	OP.A.3.	Hang tags	No			0	0				0%	0%		
11	OP.A.13.	Checking Qualifications	No			0	0				0%	0%		
12	OP.A.4.	Remove tags	No			0	0				0%	0%		
13	OP.A.5.	Conduct Post-Maintenance Tests	No			0	0				0%	0%		
14	OP.A.6.	Operate Equipment/Systems	No			0	0				0%	0%		
15	OP.A.7.	Conduct operability determinations	No			0	0				0%	0%		
16	OP.A.8.	Create labels	No			0	0				0%	0%		
17	OP.A.147.	Install/remove temp mods (instrumentation, jumpers) for testing/maintenance*	No			0	0				0%	0%		
18	OP.A.151.	Fire watches*	No			0	0				0%	0%		
19	OP.A.9.	Log entries	No			0	0				0%	0%		
21	OP.B.	Conduct Control Room Operations												
22	OP.B.10.	Monitor and operate control room	No			0	0				0%	0%		
23	OP.B.11.	Activating/deactivating LCOs	No			0	0				0%	0%		
25	OP.C.	Support Work Management												
26	OP.C.139.	Provide input to work schedule (resources, quals, feedback, etc.)	No			0	0				0%	0%		
27	OP.C.140.	Support emergent activity requests	No			0	0				0%	0%		

You have now successfully inserted a new labor task and the worksheet will maintain the formulas and remain dynamic. **Never enter a new labor task at the start or the end of a key work category otherwise the formulas on the roll up worksheet "Labor_Cost_Categories" will not calculate properly.**

Appendix 2: Functional Area Acronyms for Labor Cost Tab

CA	Corrective Action Program
CY	Chemistry
EN	Engineering
EP	Emergency Preparedness/Planning
MA	Maintenance
OP	Operations
OU	Outage
PI	Performance Improvement
PR	Projects/Project Management
RP	Radiation Protection/Health Physics
SY	Security/Access Authorization
TR	Training
WM	Work Management