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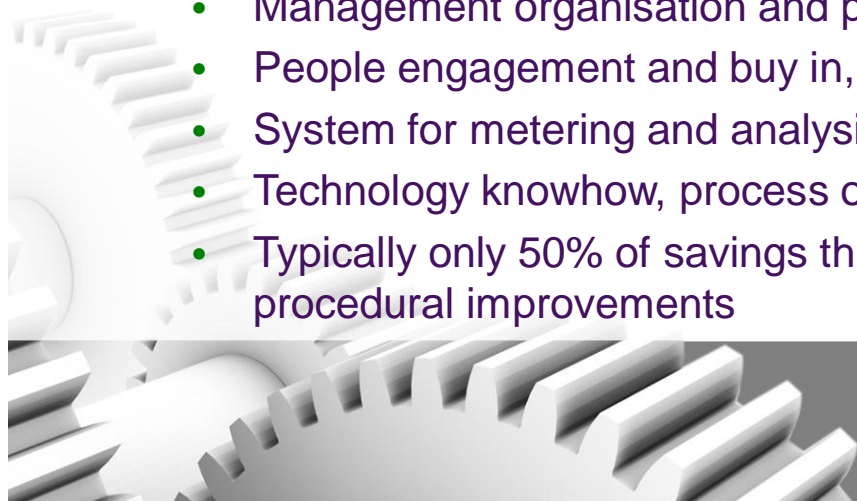
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Holistic Energy Efficiency for Industry for Substantial and Long Term Savings

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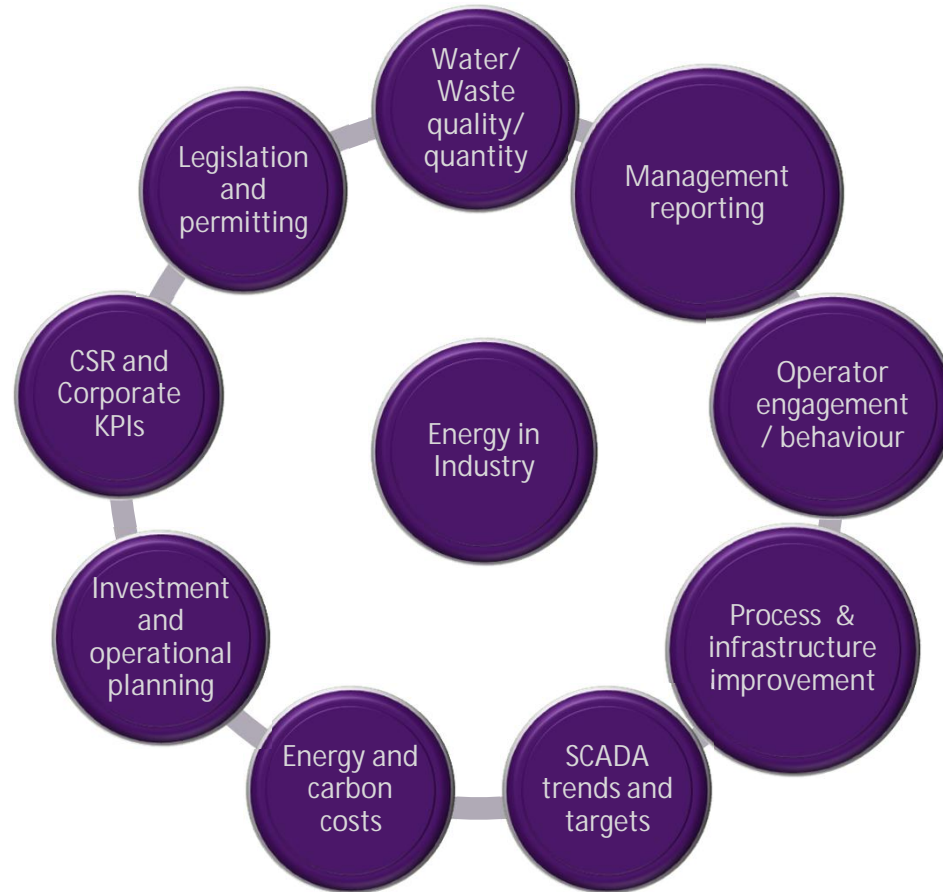
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- **Energy, water and other resource consumption are interdependent**
 - Chemical consumption for water treatment impacts energy consumption and water recovery
 - Resource efficiency and wastage in a process will impact overall energy consumption (it takes energy to create wastage and energy to treat/process)
- **Energy savings realised from many different sources**
 - Consider all aspects of supply and demand side import, export, conversion, renewable, recovery, process
- **Many influencing factors impact savings achieved**
 - Management organisation and processes
 - People engagement and buy in, motivation, skills, training
 - System for metering and analysis
 - Technology knowhow, process optimisation, technical solutions
 - Typically only 50% of savings through technology, rest from operational and procedural improvements



Energy Efficiency Influencers and Barriers

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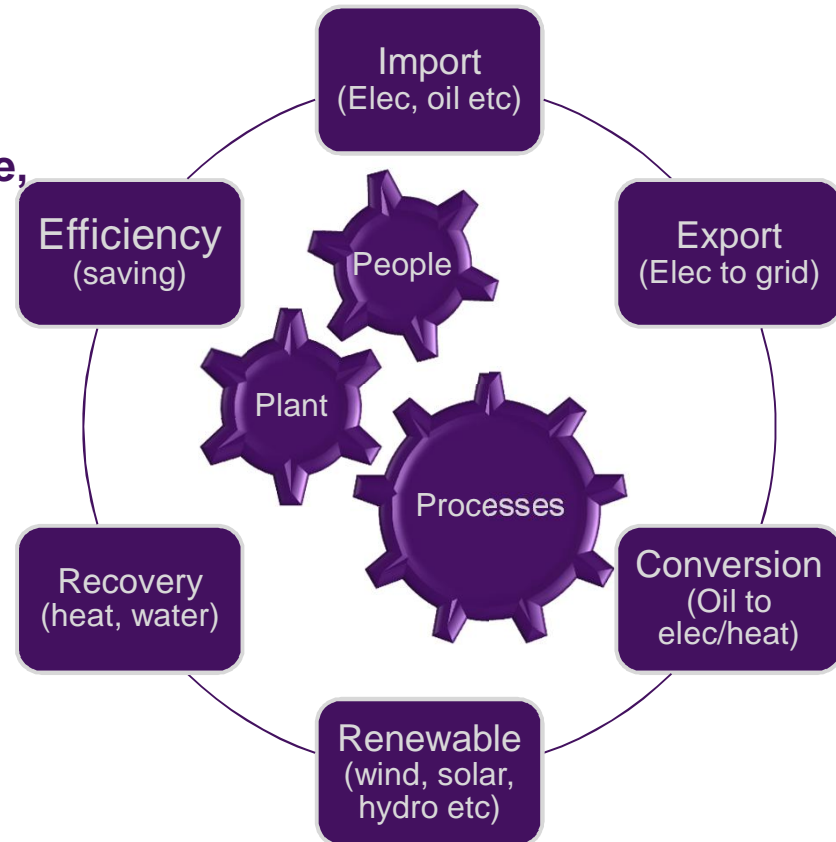
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Holistic Energy Efficiency Considers.....

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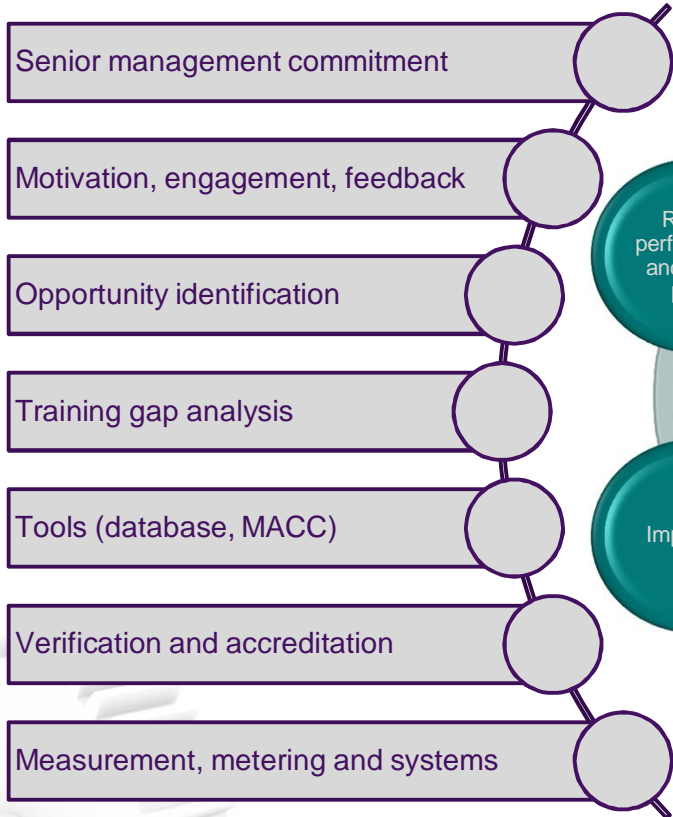
- **Consider: import, renewables, conversion, efficiency, export, recovery**
- **Energy quantity can be impacted by people, plant and processes.**
- **Need structured methodology**
 - To capture all savings opportunities
 - To compare diverse projects
 - Prioritise objectively
- **Energy consumption also linked to Water consumption**
 - Energy to pump and process
- **Resource efficiency linked to energy**
 - Less wastage
 - Efficient processing
- **Process, Plant, People and Governance**



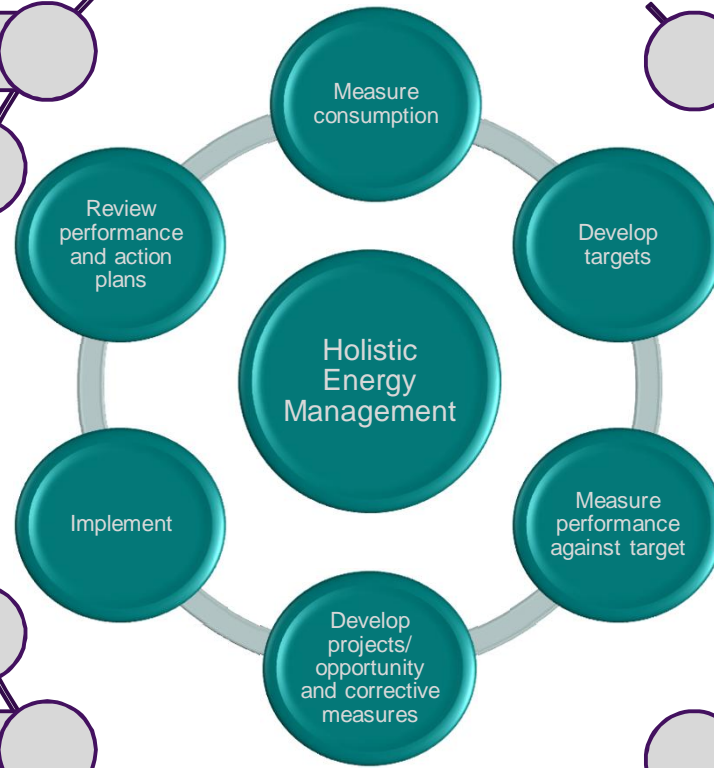
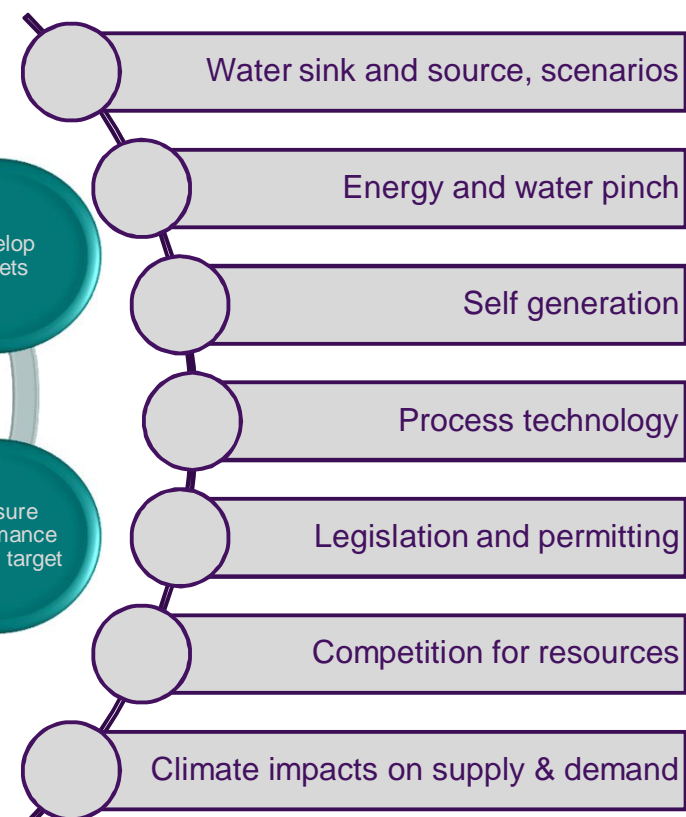
Holistic Approach to Energy Efficiency

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Management system tools and methods



Technical and resource analysis






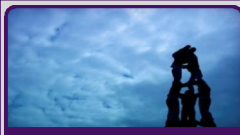





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Process flow

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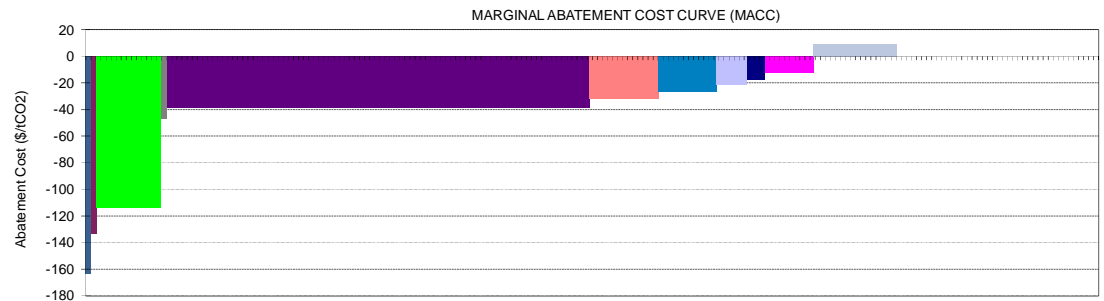
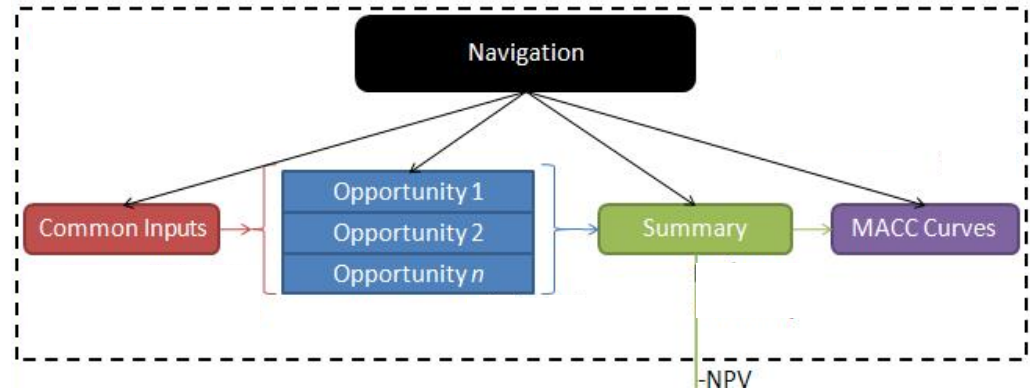
	Commit 	Assess 	Organise 	Implement 	Control 
People 	<ul style="list-style-type: none"> Operational Effectiveness Stakeholder mapping 	<ul style="list-style-type: none"> Management assessment Obstacles to progress 	<ul style="list-style-type: none"> Roles and responsibilities Energy Team Policies/ procedures 	<ul style="list-style-type: none"> Awareness campaign Training Communication 	<ul style="list-style-type: none"> Communication Change management
Systems 	<ul style="list-style-type: none"> Understand energy consumption Financial drivers 	<ul style="list-style-type: none"> Energy data collection Metering gap analysis 	<ul style="list-style-type: none"> Energy account centres Target setting 	<ul style="list-style-type: none"> Performance reporting 	<ul style="list-style-type: none"> Performance data analysis Target reviews
Technology 	<ul style="list-style-type: none"> Resourcing Investment criteria 	<ul style="list-style-type: none"> Detailed plant and equipment studies 	<ul style="list-style-type: none"> Identify lo / no cost plant and equipment improvements 	<ul style="list-style-type: none"> Opportunity implementation Investment projects 	<ul style="list-style-type: none"> Energy auditing Opportunity validation
Governance 	<ul style="list-style-type: none"> Senior management review 	<ul style="list-style-type: none"> Senior management briefings 	<ul style="list-style-type: none"> Identify and train Steering Group 	<ul style="list-style-type: none"> Evaluate opportunities 	<ul style="list-style-type: none"> Manage implementation

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Tools to record, track and prioritise

- Capture all opportunities, track accountability and implementation
- Common tool development
 - Easy to use
 - Aligned with existing systems
- Global action plan integration
- Prioritise implementation by cost and effectiveness

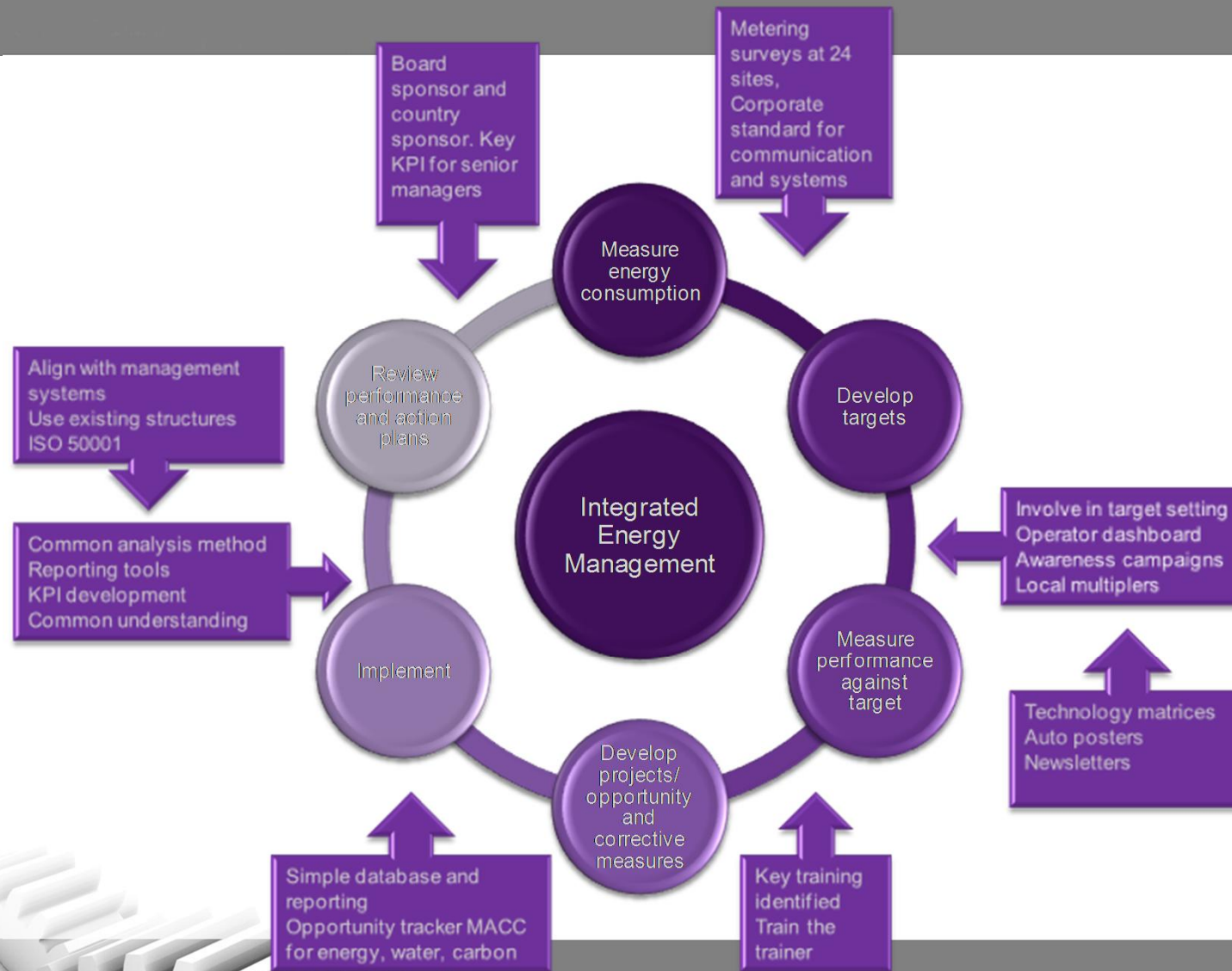


No	Opp ID	Name	Saving, \$/yr	Saving, tCO2/yr	Cost for Implementation, \$	Payback, yrs	NPV, \$	Lifetime, yrs	\$/tCO2 Abated	Risk
1	4	Project 4	17,000	59.3	20,000	1.2	-145,108	10	-163.13	Medium
2	9	Project 9	14,000	67.5	1,000	0.1	-134,971	15	-133.31	Low
3	10	Project 10	133,078	766.8	105,000	0.8	-874,463	0	-114.04	Medium
4	8	Project 8	10,000	67.0	50,000	5.0	-47,122	0	-46.89	Low
5	15	Project 15	320,000	5,000.0	200,000	0.6	-2,907,920	5	-38.77	High
6	6	Project 6	63,000	815.5	200,000	3.2	-263,685	15	-32.33	Low
7	13	Project 13	38,000	686.0	100,000	2.6	-269,065	15	-26.15	Medium
8	2	Project 2	53,000	353.5	400,000	7.5	-114,749	0	-21.64	Low
9	12	Project 12	16,000	214.0	100,000	6.3	-55,396	0	-17.26	Medium
10	3	Project 3	14,000	576.0	30,000	2.1	-105,971	15	-12.27	Low
11	14	Project 14	27,000	984.0	400,000	14.8	137,769	0	9.33	Low
12	7	Project 7	205,000	2,283.0	1,000,000	4.9	136,465	15	11.95	Medium
13	11	Project 11	5,000	43.0	160,000	32.0	84,769	15	49.28	Medium
14	5	Project 5	5,000	61.0	96,000	19.2	47,439	15	51.85	Low



Case Study

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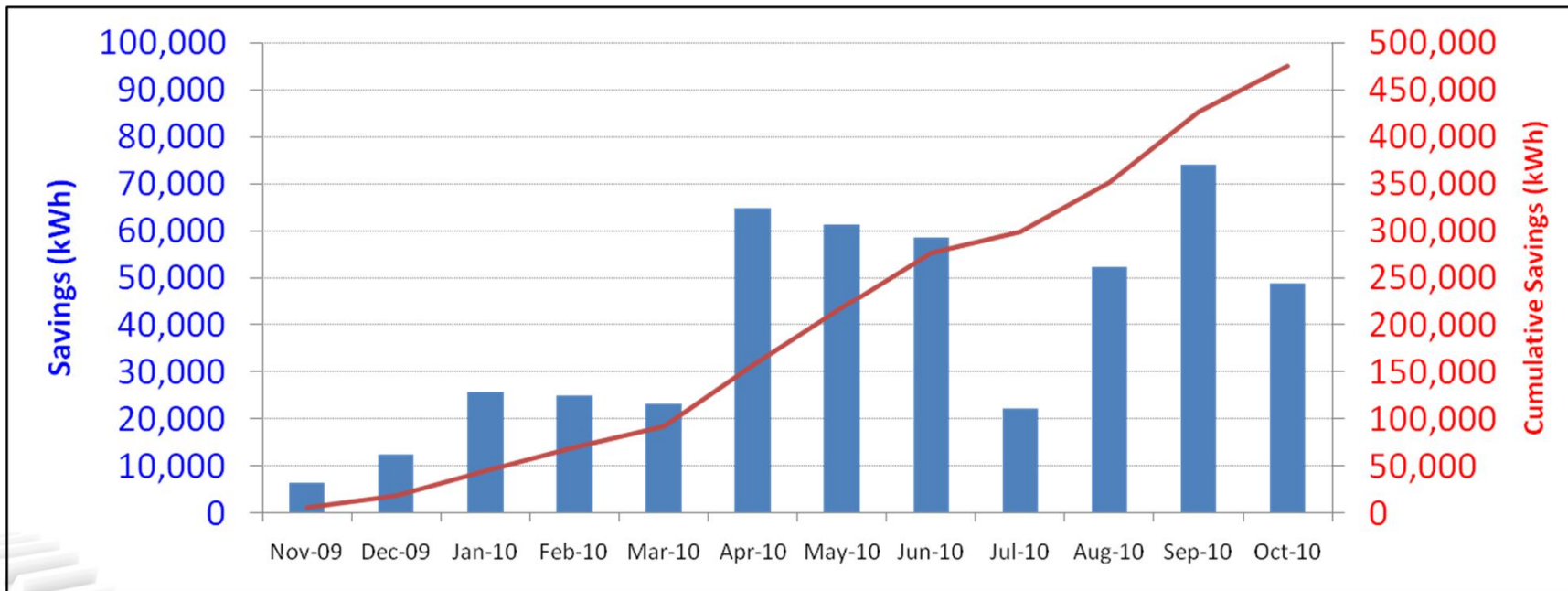


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- Energy Efficiency Trends for Manufacturing Industry in Canada, Energy Institute, March 2009
- European environmental and sustainability, drivers: current trends and future outlook, US Food and Drink Conference 2009
- People – The Critical Jigsaw Piece for Successful Monitoring and Targeting, Energy Metering, Monitoring and Targeting for Industrial Plant, Enbridge Gas Distribution Inc. One Day Workshop, May 2009
- EMIS Audit Guidelines – Efficiency New Brunswick – Guidelines for undertaking energy management information systems audits and developing implementation plans (collaborative project)
- Integrated Energy Efficiency Programs - Making Sustainable Savings, Energy Solutions Centre, Technology and Market Assessment Forum Dallas, 16-18th February 2010



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