



Energy Management System (EnMS)

2 Day User Training, Day 1
Expert Training Module 1, Day 1.
Context, leadership and support





Topic	Duration (mins)	Exercise	Break duration	Start Time	End Time
DAY 1 - Description of energy management, context, leadership, planning					
Registration			15	08:45	09:00
Welcome and introductions	5	30		09:00	09:35
Overview of UNIDO and EM program	15			09:35	09:50
Why are we here?	10	5		09:50	10:05
Energy Management Overview	20	5		10:05	10:30
Break			15	10:30	10:45
Overview of UNIDO tools	15			10:45	11:00
Context	20	45		11:00	12:05
Leadership	20	15		12:05	12:40
Lunch			60	12:40	13:40
Leadership		30		13:40	14:10
Planning	40	30		14:10	15:20
Break			10	15:20	15:30
Support	30	5		15:30	16:05
Opportunities for your organisation	15	40		16:05	17:00
TOTAL	3.2	3.4	1.7	8.3	





Welcome

- Name
- Organisation
- Energy Management Experience
- What do you expect to learn over these days?





Overview of UNIDO and energy management program





SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



Objectives of the UNIDO IEE Program

Work together with counterparts, stakeholders and partners to:

- **Strengthen policy** and regulatory frameworks for better & sustainable EE performance in industry
- **Accelerate adoption** and wide dissemination of IEE best-available practices and technologies
- **Save energy** and reduce GHG emission of the industrial sector
- **Integrate EE** in industry daily business practices for sustainable increased productivity and competitiveness

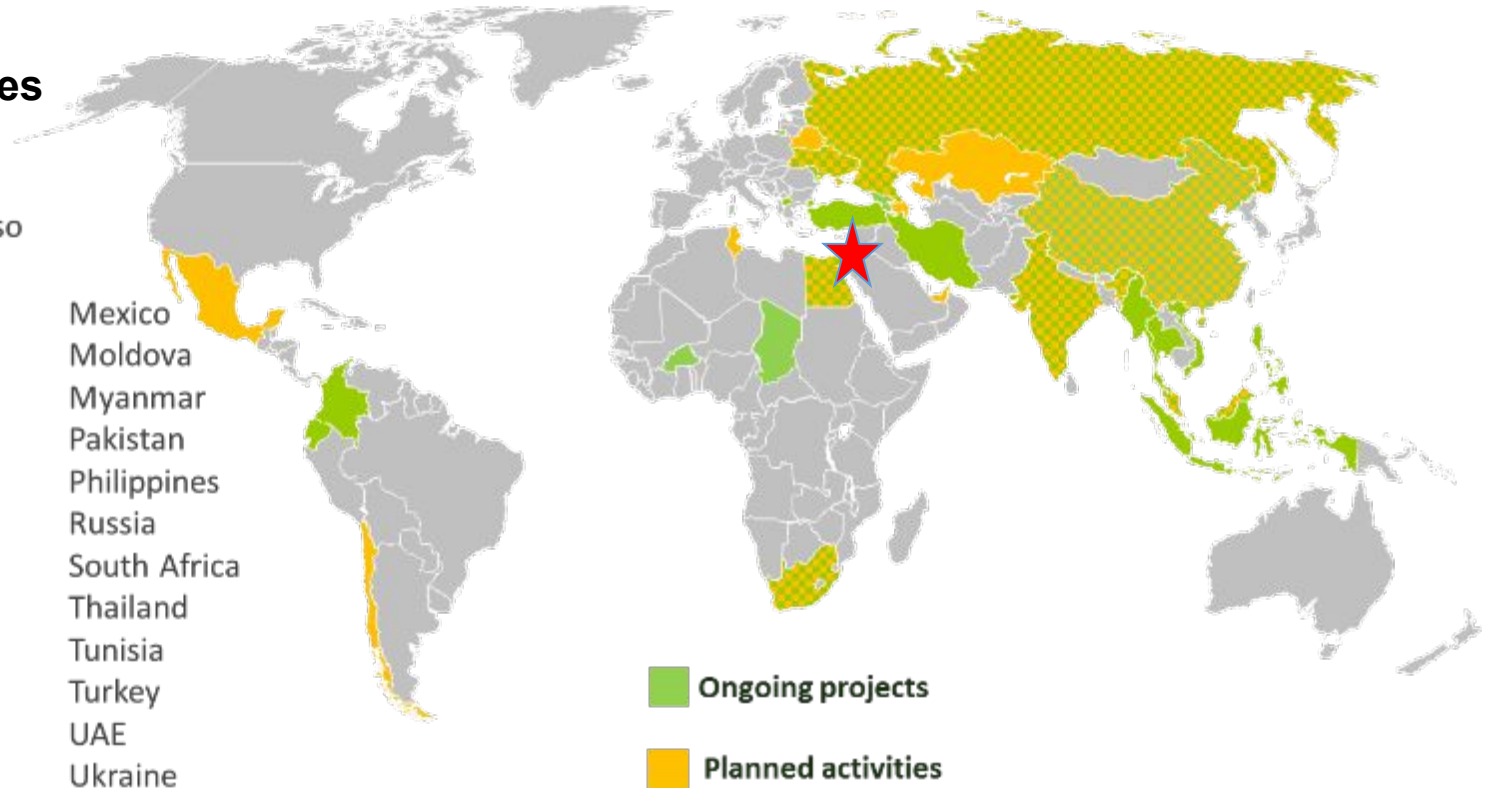


UNIDO Industrial Energy Efficiency Portfolio

30 Countries

- Armenia
- Belarus
- Burkina Faso
- Chad
- Chile
- China
- Colombia
- Ecuador
- Egypt
- Georgia
- Kazakhstan
- India
- Indonesia
- Iran
- Macedonia
- Malaysia
- Maldives
- Mexico
- Moldova
- Myanmar
- Pakistan
- Philippines
- Russia
- South Africa
- Thailand
- Tunisia
- Turkey
- UAE
- Ukraine
- Viet Nam

& Palestine

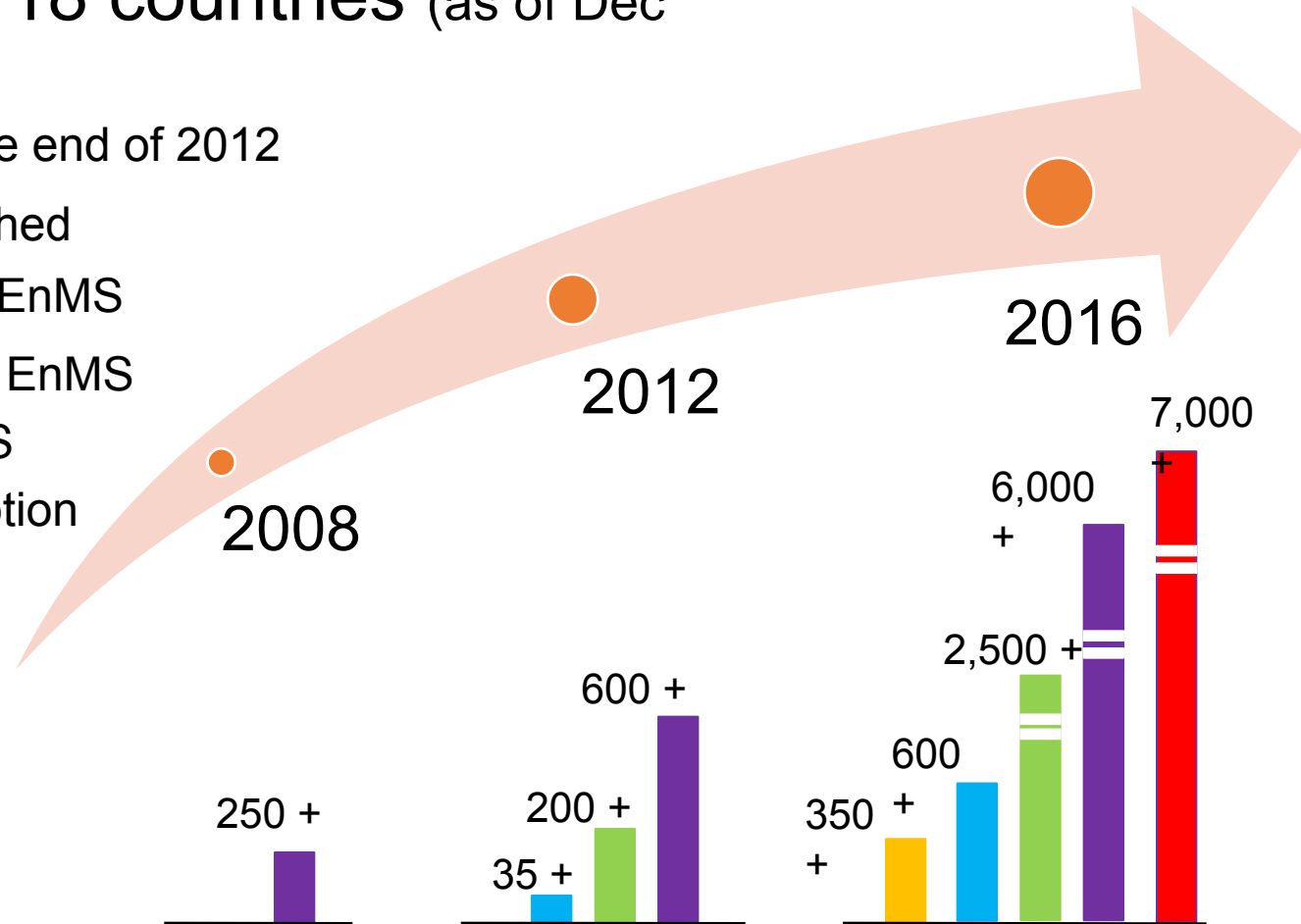


UNIDO Global EnMS-ESO Program

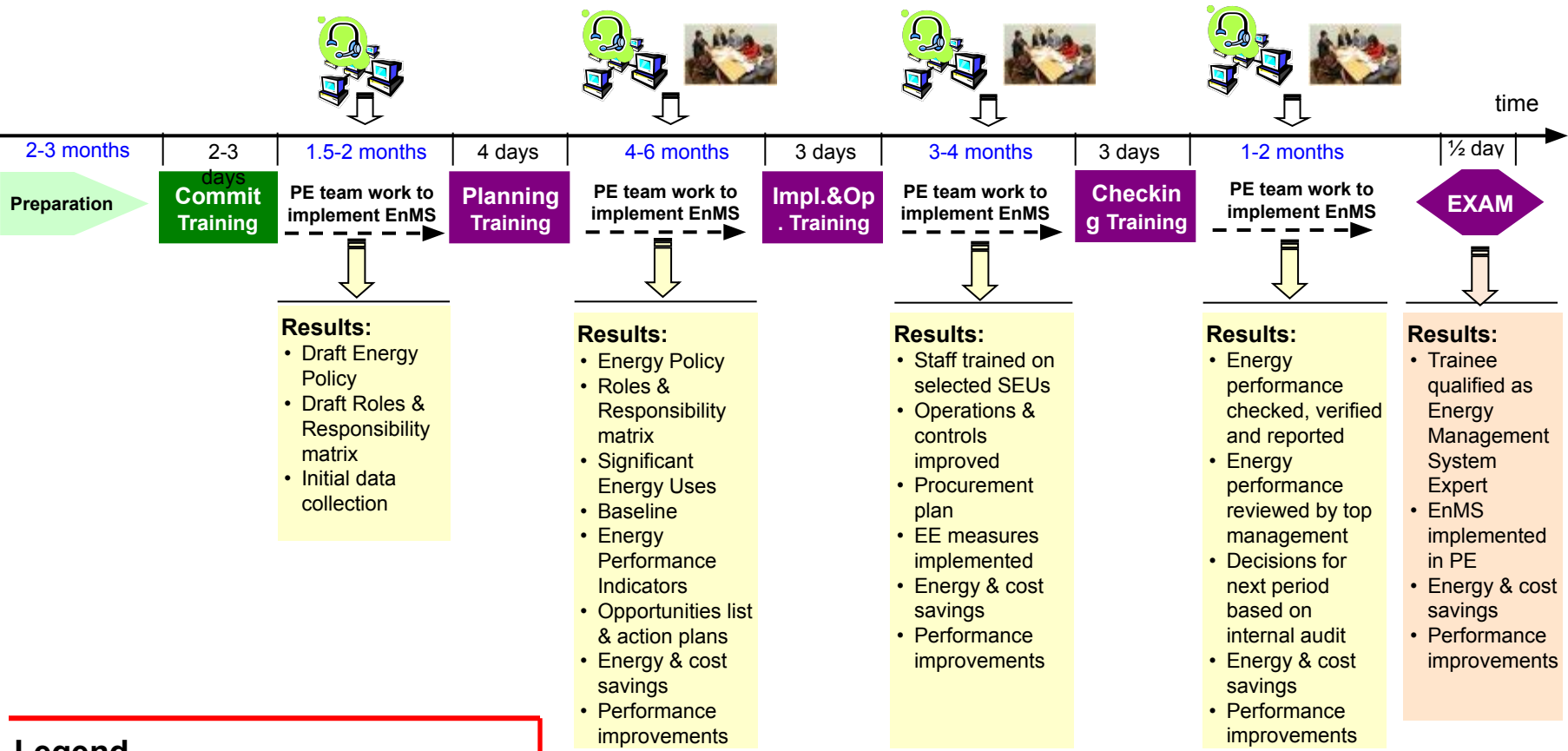
- Operational in 18 countries (as of Dec 2016)

✓ 11 Countries at the end of 2012

- Decision-makers reached
- Enterprises trained in EnMS
- Consultants trained in EnMS
- Enterprises with EnMS
- Final energy consumption savings (GWh)



Combining skills development with results



Legend

PE team A Partner Enterprise (PE) team is formed by the PE's staff participating in the full program plus 1-2 national consultants.

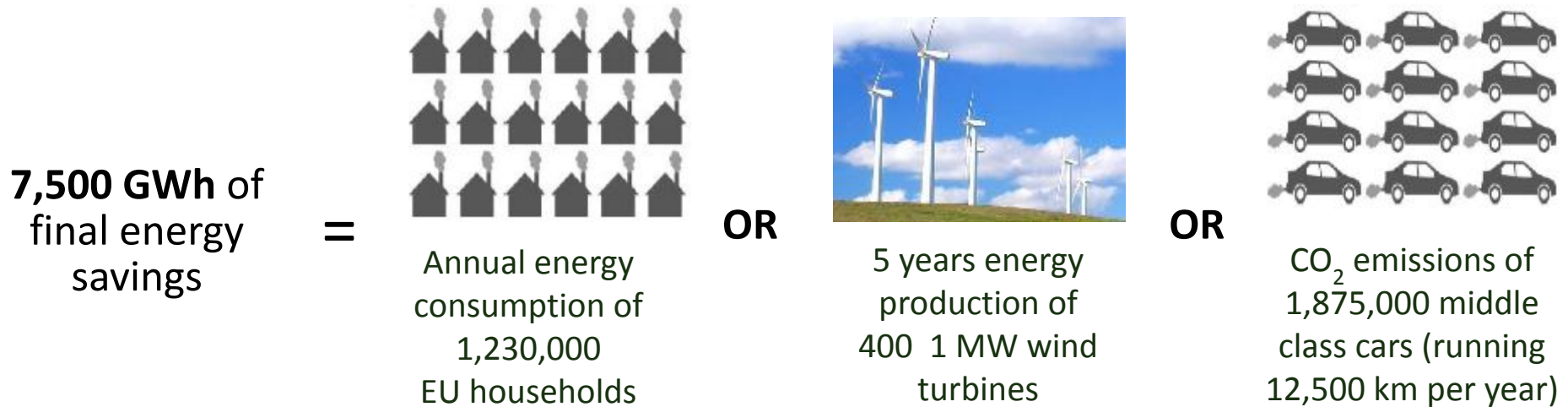


Ongoing and periodic communication through webinars, emails and phone calls between international trainers and PE teams to review progress, discuss issues and provide guidance.



Regular plant visits by national EE consultants.

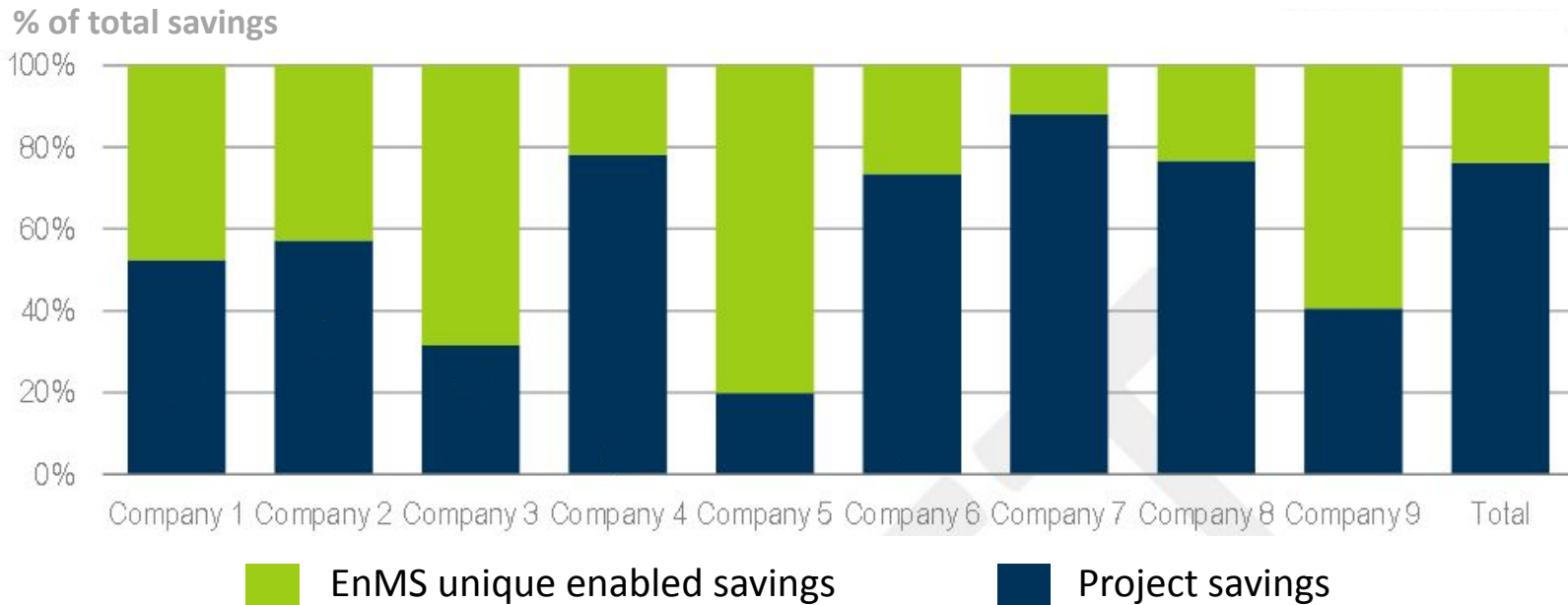
Impact of UNIDO-GEF EnMS-ISO 50001-ESO Program



- Organization-wide energy savings in first 1-2 years range from 4% to 15%, with little or no capital investments
- Cumulative cost savings of beneficiary companies estimated to exceed **USD 250 mio** without considering non-energy benefits
- Direct GHG emission reductions of more than **4.8 million tCO₂**
- Sustainable pipeline of IEE investments generated

Separation of energy savings types

Comparison of project savings and EnMS unique enabled savings



There is evidence that energy management systems unlock energy savings beyond those from technology replacement or process upgrades

Note: Companies 1-9 are medium-sized and large companies from metal processing, chemicals, automotive, construction material and power generation sectors in Egypt, North Macedonia, South Africa and Turkey



Comments from EnMS Early-Adopters

- Main saving today coming from energy management with 0 cost»
- Can not relax even for a moment , there must be permanent involvement of all staff

Silakov Dmitry (chief energy Baltika SPB)

- Before work with UNIDO we are already engaged in energy efficiency but don't thought about the importance of consumers to a more detailed level

Zakharov Vladimir (chief energy Baltika Novosibirsk)

- Grew up employee involvement because we have Roles and Reasonability matrix. Reporting become clearer and understandable.

Evdokimov Alexander (chief energy Samara)



Comments from EnMS Early-Adopters

- “There must be a will to change ~ a “burning platform”.
- There must be a plan.
- There must be resources to implement the plan and
- The resources must be equipped with the requisite skills”

Arcelor Mittal Saldana Works

- “If you don’t care, the savings won’t happen – it’s all about attitude. Awareness and knowledge are key, and attitude is king.”

Superfilm (Packaging) Turkey

- “Awareness and Knowledge are Key and Attitude is King.
- If you don’t know about potential savings opportunities, you won’t look for them!
- If you don’t look for savings you won’t find them.
- If you don’t care – Savings won’t happen.
- It’s all about attitude!”

Johnson Matthey

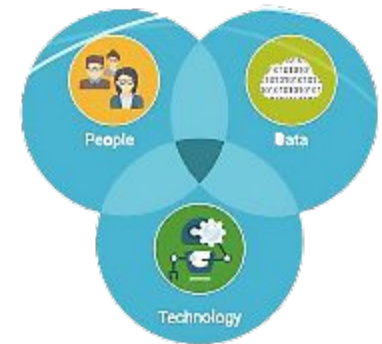
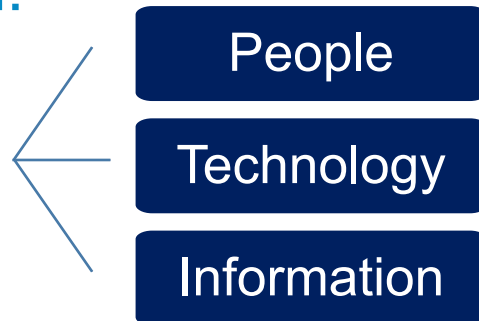
- “ISO 50001 defines “WHAT” to do, UNIDO EnMS program defines “HOW” to do.”

Petkim (Petrochemicals) Turkey



Critical success factors

- You need to be interested and willing to lead and drive this forward
- You need to win ongoing support from top management
- You need to learn how to improve energy performance through:



- You need to learn how to measure energy performance



Why are we here?

Energy costs, pollution, climate change
Better management practices

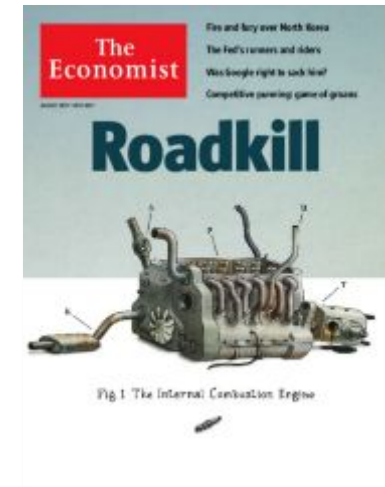
This is part of the overall context for energy management



Context: Climate change



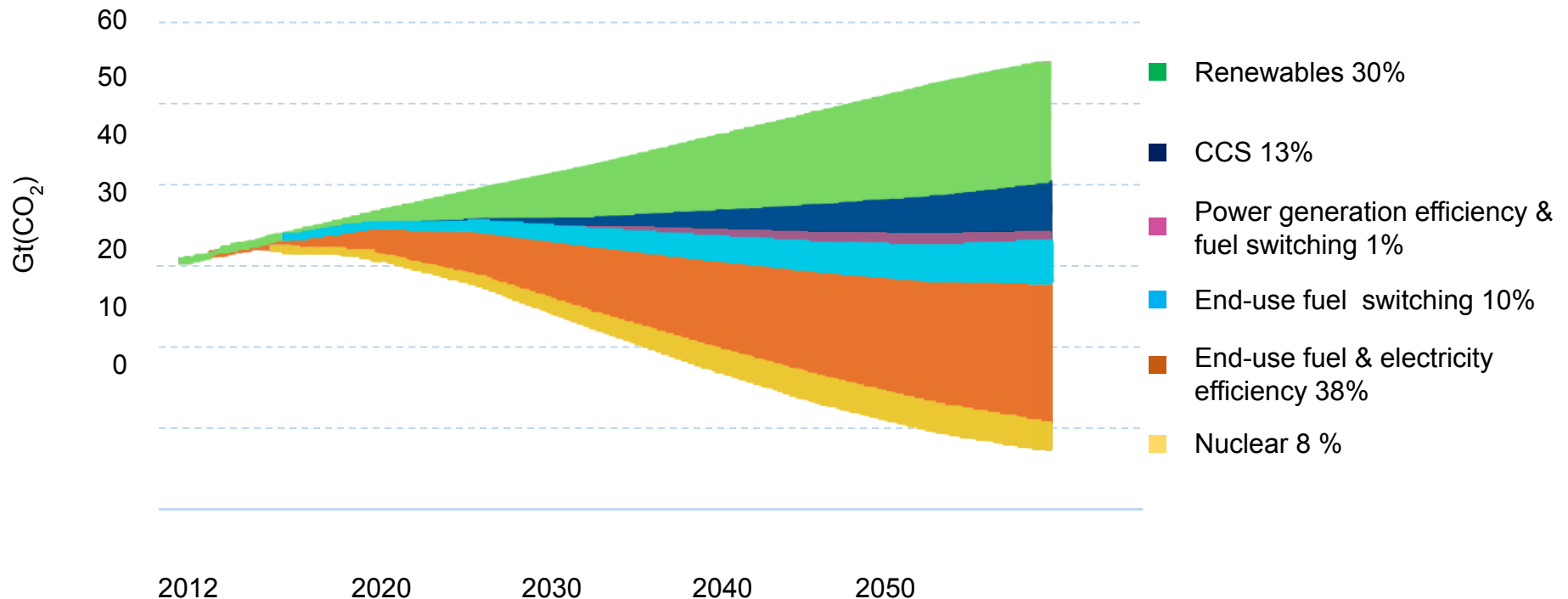
Global environmental trends



Source: Incite S.A.

Climate Change Policy Scenarios

Technologies



Different priorities



Industrial Energy Efficiency Benefits

- Energy efficiency has demonstrated, time and again, that
 - It saves money
 - It reduces production and product costs
 - It increase reliability of operations
 - It has a positive effect on productivity and competitiveness
 - It can offer attractive financial and economic returns
 - Reduces risk/exposure to rising energy prices
 - Increases security of supply
 - Reduces green house gas emissions
 -



Why it is not happening then?

BARRIERS to Energy Efficiency in Industry

- M** • Management focus is on production & volumes, not on EE
- K** • Lack of information and understanding of own energy performance
- K** • Lack of adequate skills for identifying, assessing, developing and implementing EE measures and projects
- K** • Poor or misused monitoring systems and data
- M** • First costs more important than recurring costs disconnection between capital and operating budgets
- M** • Staff behavior and attitude
- F** • Financing constraints
- M** • Production, technological, operational and staff changes over time
- M** • Lack or limited availability of IEE services and product

K Knowledge/competency barrier

M Management/organizational barrier

F Financial barrier

Abatement Potential, Gt CO₂ per year

Gas plant carbon Capture Storage (CCS) retrofit

Iron & Steel CCS new build

Coal CCS new builds

Coal CCS retrofit

Reduced pastureland conversion

Grassland management

Organic soils restoration

Concentrated solar power

Reduced intensive agriculture conversion

High penetration wind

Solar power, Photovoltaic

Degraded forest reforestation

Degraded land restoration

Nuclear

Lighting: switch incandescent to LED (residential)

Appliances, electronics

1st generation biofuels

Cars full hybrid

Waste recycling

Landfill gas electricity generation

Building efficiency new build

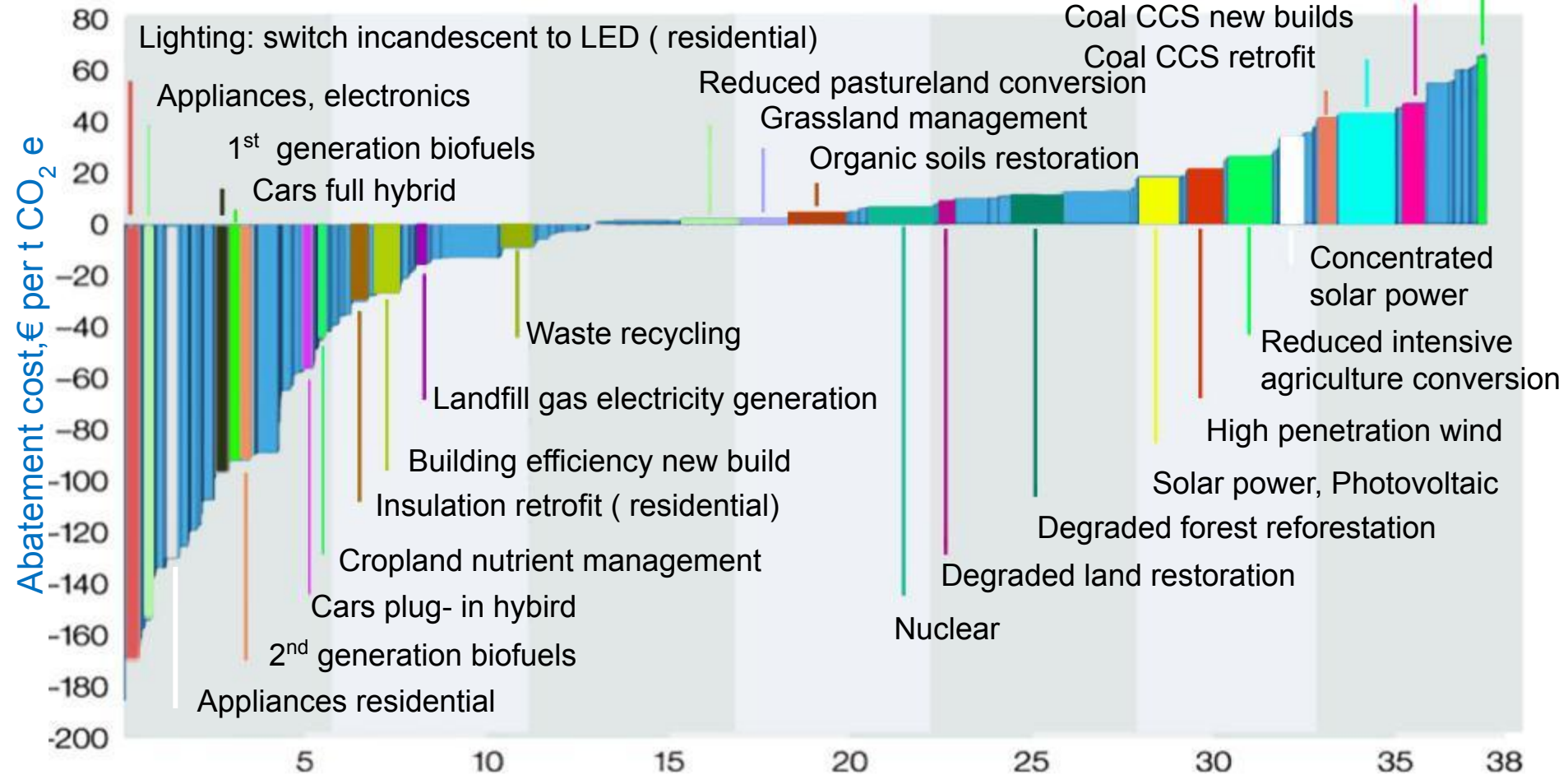
Insulation retrofit (residential)

Cropland nutrient management

Cars plug- in hybrid

2nd generation biofuels

Appliances residential



Source: McKinsey & Company



Why are we here? - menti.com

Purpose	Importance
Stop climate change	
Reduce energy cost	
Use less energy	
Improve energy performance	
“My boss sent me”	
Other	

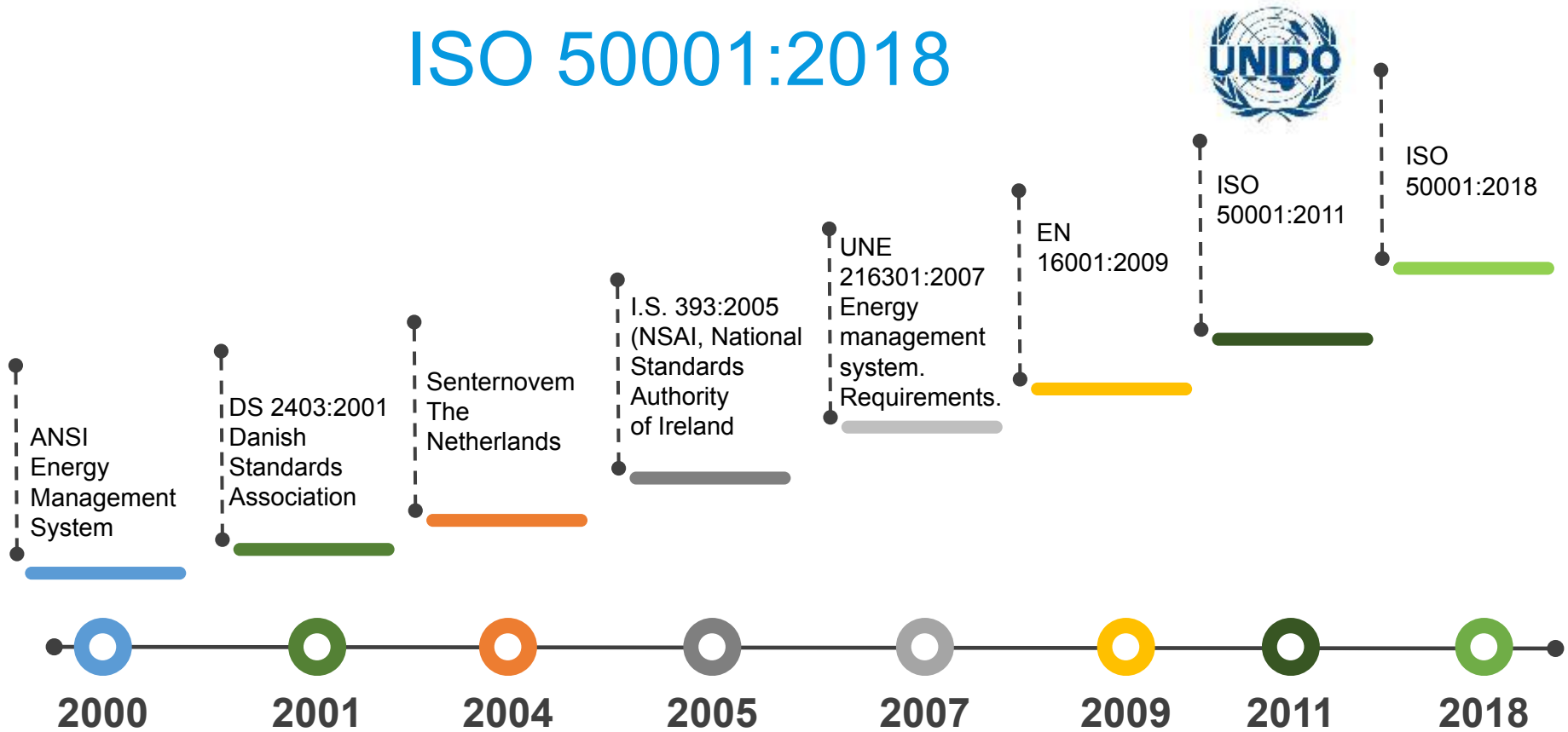




Energy management overview



ISO 50001:2018





Commit
(4 Context, 5 Leaders)



Improve
(9 Performance evaluation,
10 Improvement)

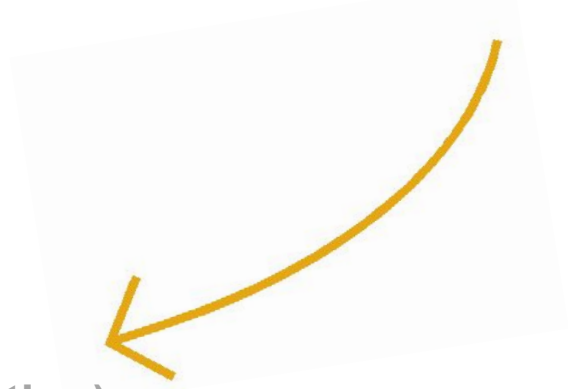
kWh
(\$ + CO₂)



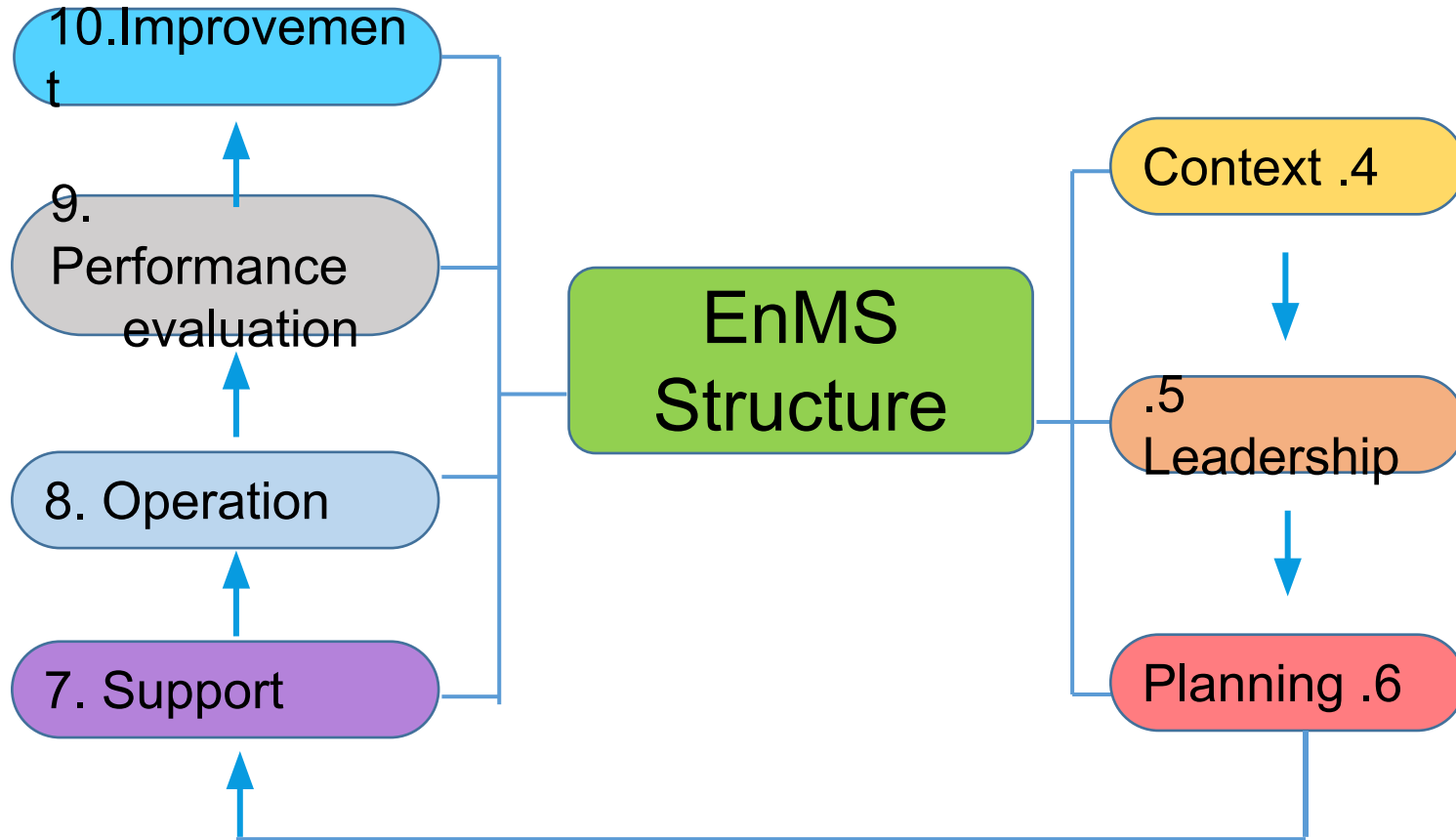
Plan
(6 Planning)



Do
(7 Support, 8 Operation)



Structure of ISO 50001:2018 (EnMS)





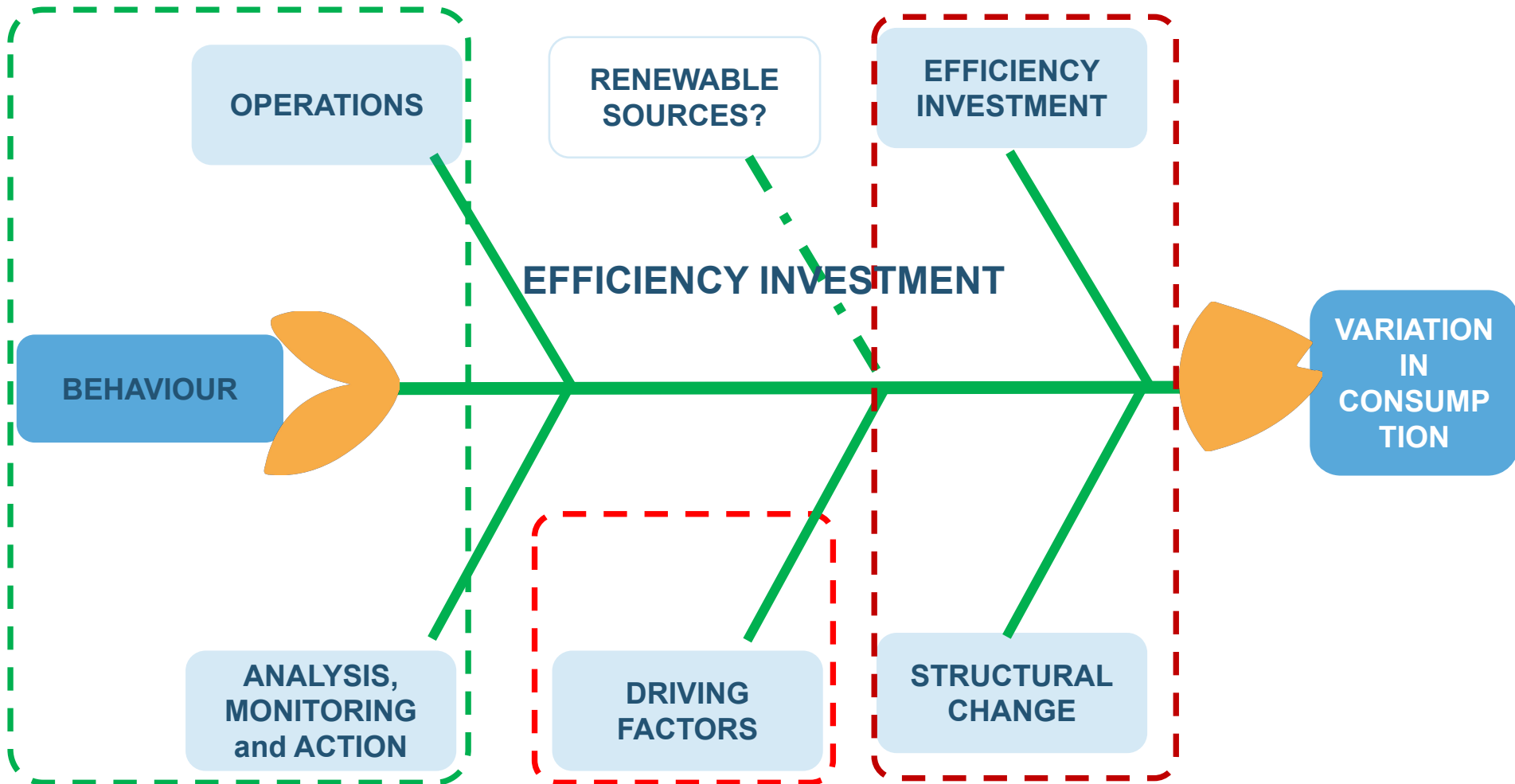
Structure of ISO 50001:2018

1	Scope	1
2	Normative references	1
3	Terms and definitions	1
3.1	Terms related to organization.....	1
3.2	Terms related to management system.....	2
3.3	Terms related to requirement.....	3
3.4	Terms related to performance.....	4
3.5	Terms related to energy.....	6
4	Context of the organization	7
4.1	Understanding the organization and its context.....	7
4.2	Understanding the needs and expectations of interested parties.....	7
4.3	Determining the scope of the energy management system.....	8
4.4	Energy management system.....	8
5	Leadership	8
5.1	Leadership and commitment.....	8
5.2	Energy policy.....	9
5.3	Organization roles, responsibilities and authorities.....	9
6	Planning	10
6.1	Actions to address risks and opportunities.....	10
6.2	Objectives, energy targets and planning to achieve them.....	10
6.3	Energy review.....	11
6.4	Energy performance indicators.....	11
6.5	Energy baseline.....	12
6.6	Planning for collection of energy data.....	12
7	Support	12
7.1	Resources.....	12
7.2	Competence.....	13
7.3	Awareness.....	13
7.4	Communication.....	13
7.5	Documented information.....	13
7.5.1	General.....	13
7.5.2	Creating and updating.....	14
7.5.3	Control of documented information.....	14

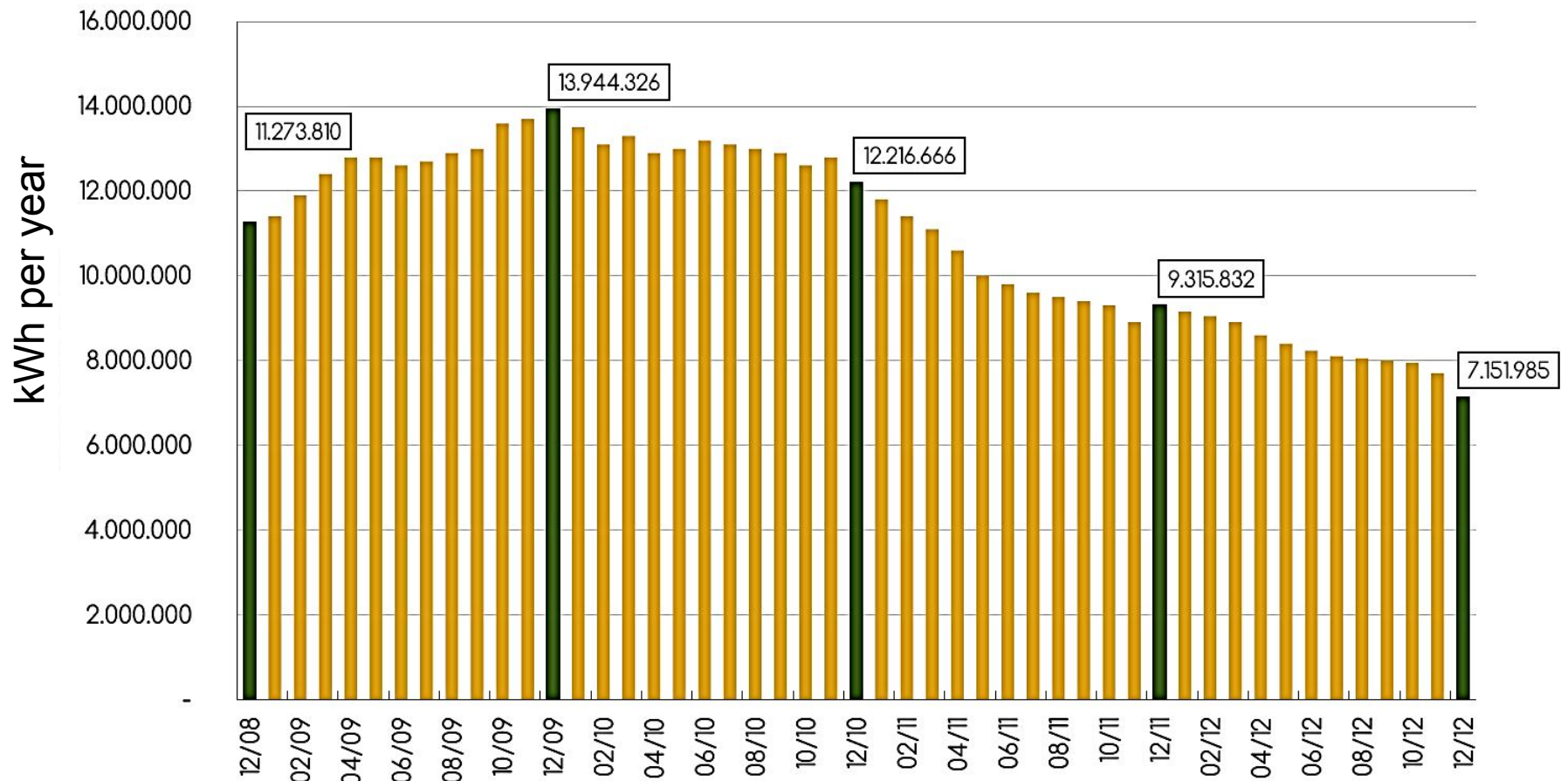
8	Operation	14
8.1	Operational planning and control.....	14
8.2	Design.....	15
8.3	Procurement.....	15
9	Performance evaluation	15
9.1	Monitoring, measurement, analysis and evaluation of energy performance and the EnMS.....	15
9.1.1	General.....	15
9.1.2	Evaluation of compliance with legal requirements and other requirements.....	16
9.2	Internal audit.....	16
9.3	Management review.....	17
10	Improvement	18
10.1	Nonconformity and corrective action.....	18
10.2	Continual improvement.....	18
Annex A (informative) Guidance for use		19



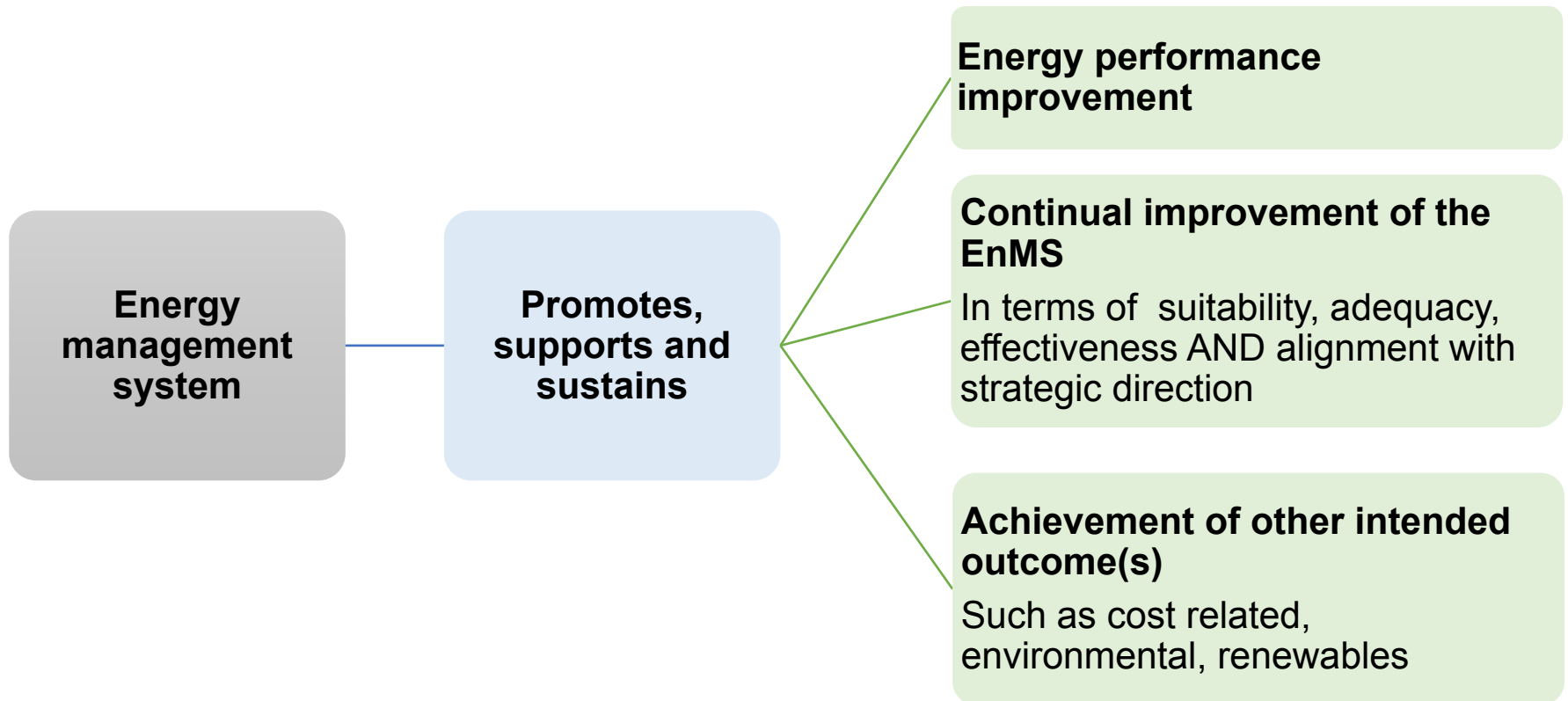
Causes of variation in consumption



What can be achieved?



Relationship between energy performance and the EnMS



Adapted from ISO 50001:2018

!What an EnMS is not

Software

Metering

Monitoring and
targeting

An awareness
campaign

Operations
review and
analysis

Identify, study
and implement
**savings
opportunities**

An engineering
tool

Great energy
efficiency
project

A renewable
energy project



What's new in 2018 version of ISO 50001

- Increased emphasis on the importance of top management commitment
- The need to integrate the EnMS into normal business processes
- Establishment of the external and internal context
 - This can be very powerful in terms of increasing commitment
- Clearer requirement to improve energy performance
- Clear requirement to normalize for relevant variables

These are all very beneficial



See you in 15 minutes!





Overview of the UNIDO EnMS tools

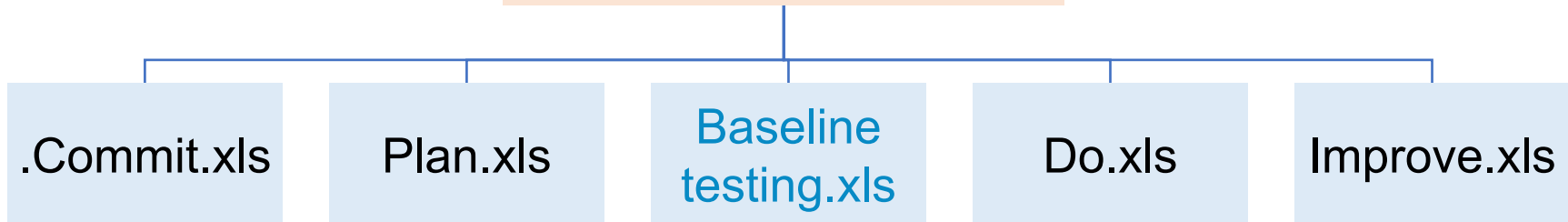
Including the Practical Guide



UNIDO EnMS tools

Open the Excel file UNIDO EnMS tools

There are 5 main Excel
.Files in the tools



- Make copies of all files now and work on your master copy
 - ✓ Delete all our examples from your master copies
 - ✓ Keep the originals for reference

Other tools

EnMS Project plan (ProjectLibre)

Context template (Word)

Internal audit report template (Word)

Management Review presentation
(PPT)

Energy Manual worksheet

- Includes all tasks in the EnMS

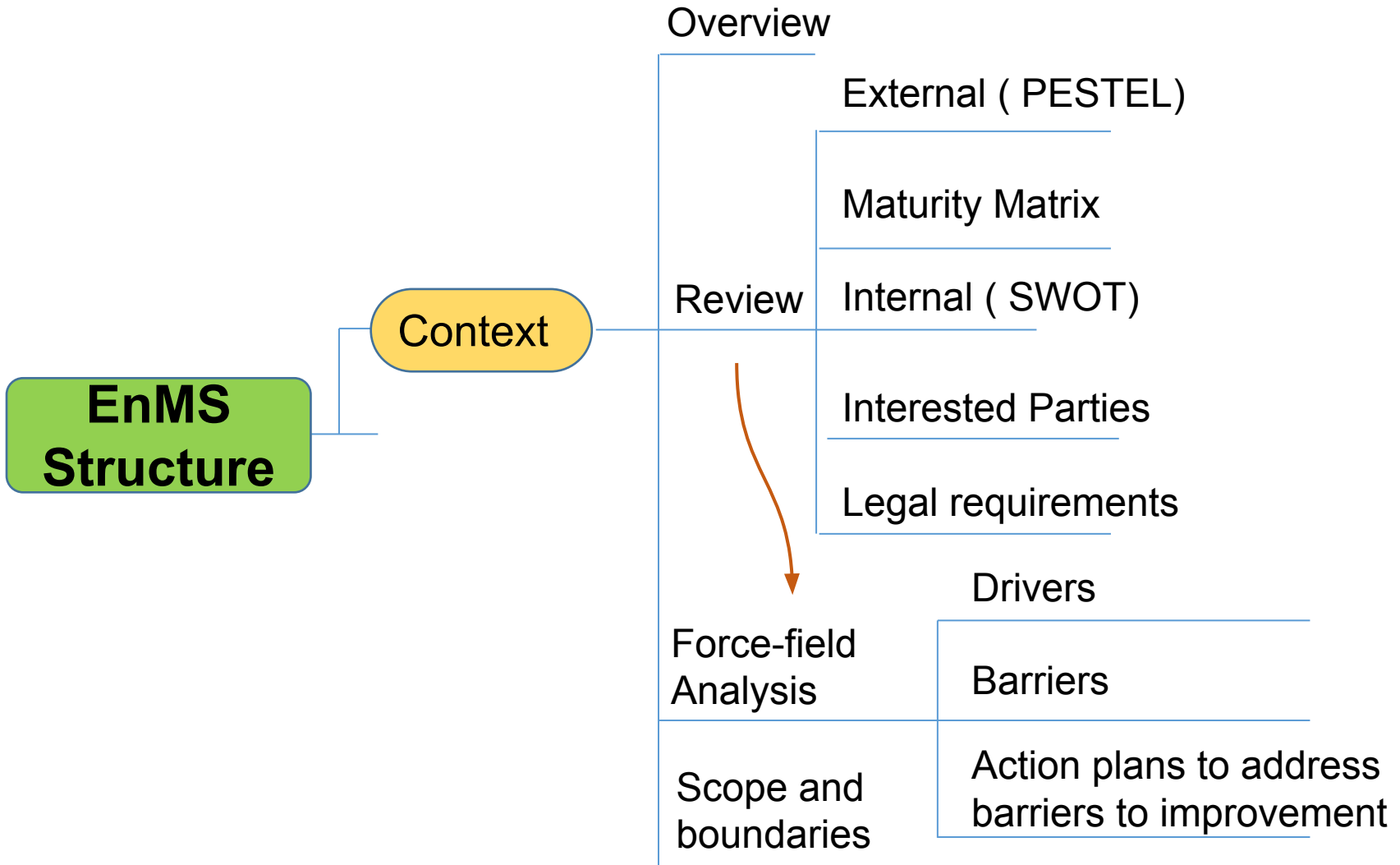
Energy Manual (RnR)						Energy management representative		
R: Responsible A: Accountable S: Support C: Consulted I: Informed						Managing Director	Energy management representative	Energy m
ID	Task	What is required	Frequency	Documents	Communication	Oscar Wilde	Agatha Christie	Charles Dic
4. Context								
1	External Context	Political, Economic, Social, Technological, Legal and Environmental (PESTLE) analysis	Annually	Context tab	Whole organisation			
2	Internal Context	Strengths, Weaknesses, Opportunities and Threat (SWOT) analysis taking account of the results of the PESTLE analysis.	Annually	Context tab	RnR team			
3	Interested Parties	Who, what, needs, expectations, requirements (= other requirements from 2011 version).	Annually	Context tab	RnR team			
4	Risks and Opportunitites	Based on the expernal, internal contexts and the identification of interested partices, identify an dplan for the risks and opportunities related to the use of energy.	Annually	Risks and Opps tab	RnR team			
5	Identify all legal requirements applicable to the organisation's use of energy and comply with them	Review all laws (=L from PESTLE) relevant to the organisations activities and decide which have an impact and plan compliance with those laws.	Quarterly	Legal tab	RnR team			R
6	Define the boundaries of the EnMS	Define the physical or organization limits included in the EnMS and list the exclusions and the reasons for the exclusions	Annually	Scope tab	RnR team	A	R	I
7	Define the scope of the EnMS	Define the activities and processes that are included in the EnMS and list the exclusions and the reasons for the exclusion. Take account of the external and internal context and legal and other requirements. List all energy sources in the EnMS.	Annually	Scope tab	RnR team	A	R	I
5. Leadership								
8	Develop, publish and periodically review the energy policy	The energy policy is signed by the director of the organization	Annually	Policy tab	All staff and contractors	A	S	R



Context

External and internal context





Internal Context: SWOT analysis

What strengths does your organization have related to energy management? E.G. innovative, technical competence.



What weaknesses do you have? E.G. lack of technical knowledge, lack of leadership.

What threats are there to your organization related to energy use? E.G. rising energy costs. These might come from PESTLE analysis



What opportunities exist? These might come from PESTLE analysis.

SWOT

S Strengths

W Weaknesses

O Opportunities

T Threats

PESTLE

P Political

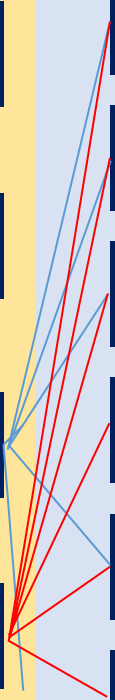
E Economical

S Societal

T Technological

L Legal

E Environmental



External context: PESTLE analysis

Political



What are the political decisions that are likely to affect your use of energy? E.G. Carbon tax.

Economical



What might happen economically? E.G. rising energy prices

Societal



Is society changing related to energy and green house gases (GHGs)?

Technological



Are there technological changes that might help you?

Legal



What are the laws that effect your energy use?

Environmental



Are there environmental issues? E.G. noise, pollution GHGs.



Context analysis Company *****





S Strengths	W Weaknesses
O Opportunities	T Threats





P

Political

E

Economical

S

Societal

T

Technological

L

Legal

E

Environmental



S Strengths

- The things your company does well
- The quality that separates you from your competitors
- Internal resources such as skilled and knowledgeable staff
- Tangible assets such as intellectual property, capital, private technologies, etc.
- The company is in a specialized group

W Weaknesses

- Thing your company lacks
- Things your competitors do better than you
- Resources limitations
- The offers of sale are not clear
- Lack of technical expertise
- Obsolescence of equipment
- Not following up on developments in the industry

O Opportunities

- Underserved markets for specific products
- Few competitors in your area
- Emerging need for your products or services
- Press / media coverage of your company

T Threats

- Emerging competitors
- Change the regulatory environment
- Negative media / press coverage
- Change customer attitudes towards your company



P

Political

- Government policy
- Political stability or instability overseas
- Foreign trade policy
- Tax policy
- Labor laws
- Terrorism and military considerations
- Environmental laws
- Funding grants and initiatives
- Trade restrictions
- Fiscal policy

E

Economical

- Economic Growth
- Interest Rates
- Exchange rates
- Inflation
- Disposable income of consumers
- Disposable income of businesses
- Taxation
- Interstate taxes
- Wages rates
- Financing capabilities

S

Societal

- Population growth
- Age distribution
- Health consciousness
- Career attitudes
- Customer buying trends
- Cultural trends
- Demographics
- Industrial reviews and consumer confidence
- Organisational image

T

Technological

- Producing goods and services
- Emerging technologies
- Maturity of technologies
- Distributing goods and services
- Communicating with target markets
- Potential Copyright infringements
- Increased training to use innovation
- Potential Return on Investment (ROI)

L

Legal

- The decline of raw materials
- Pollution and green house gas emissions
- Promoting positive business ethics and sustainability
- Reduction of their carbon foot print.
- Climate and weather
- Environmental Legislation
- Geographical location (and accessibility)

E

Environmental

- Health & Safety
- Equal Opportunities
- Advertising Standards
- Consumer Rights and laws
- Product Labeling
- Product Safety Standards
- Safety Standards
- Labor Laws
- Future Legislation
- Competitive Legislation

Interested parties

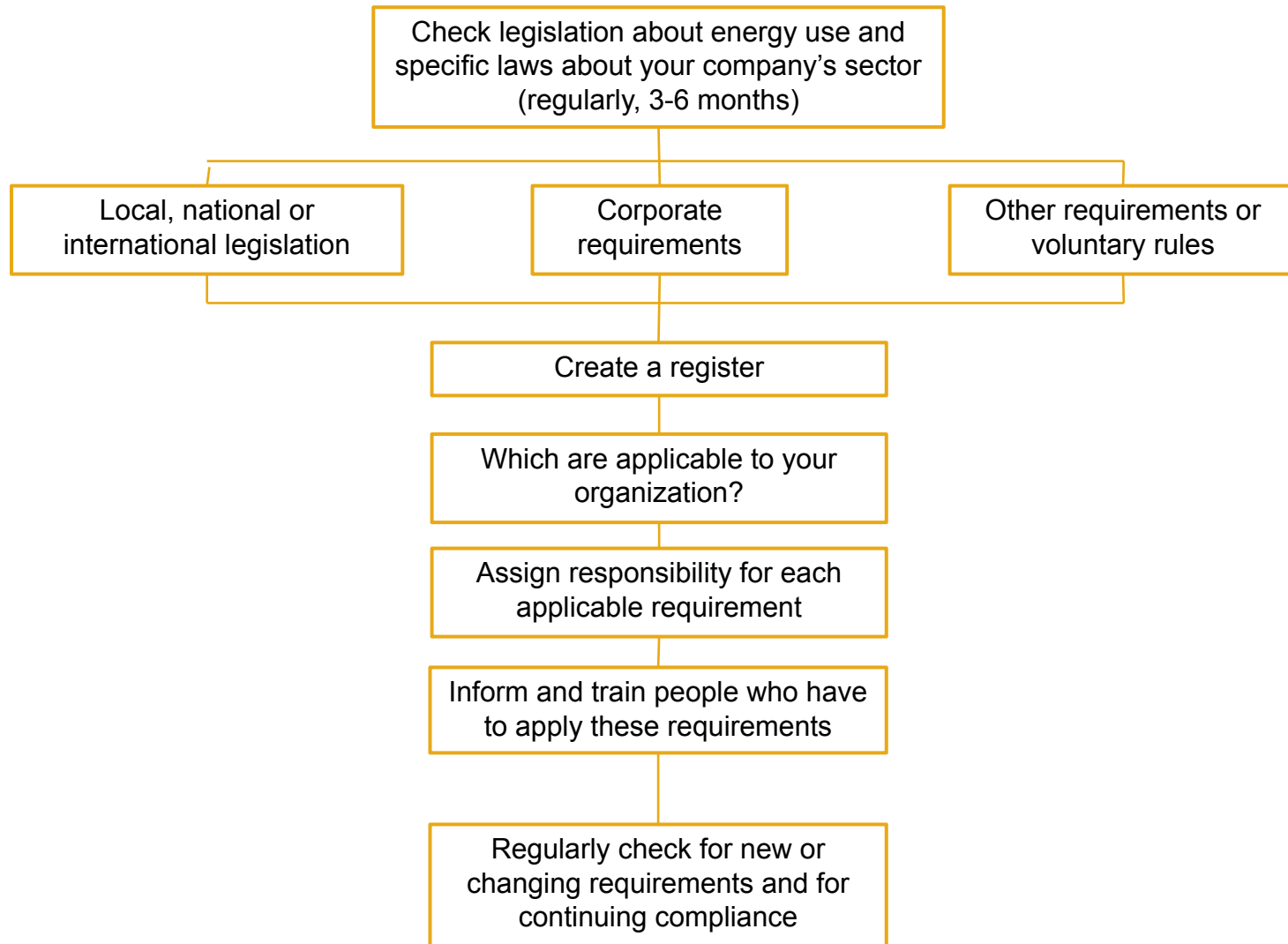
- Who is affected by your energy use or by your EnMS?
 - E.G. Suppliers, customers, neighbours, regulators, employees, society, management, HQ, etc.
- What are their needs and expectations?
 - How are each of them affected and what do they need from you?
- Which are relevant and require action?
- How will you meet these needs and expectations?
 - What will you do?
- Some of the output will be “other requirements”



Legal and other requirements

Legal Requirements

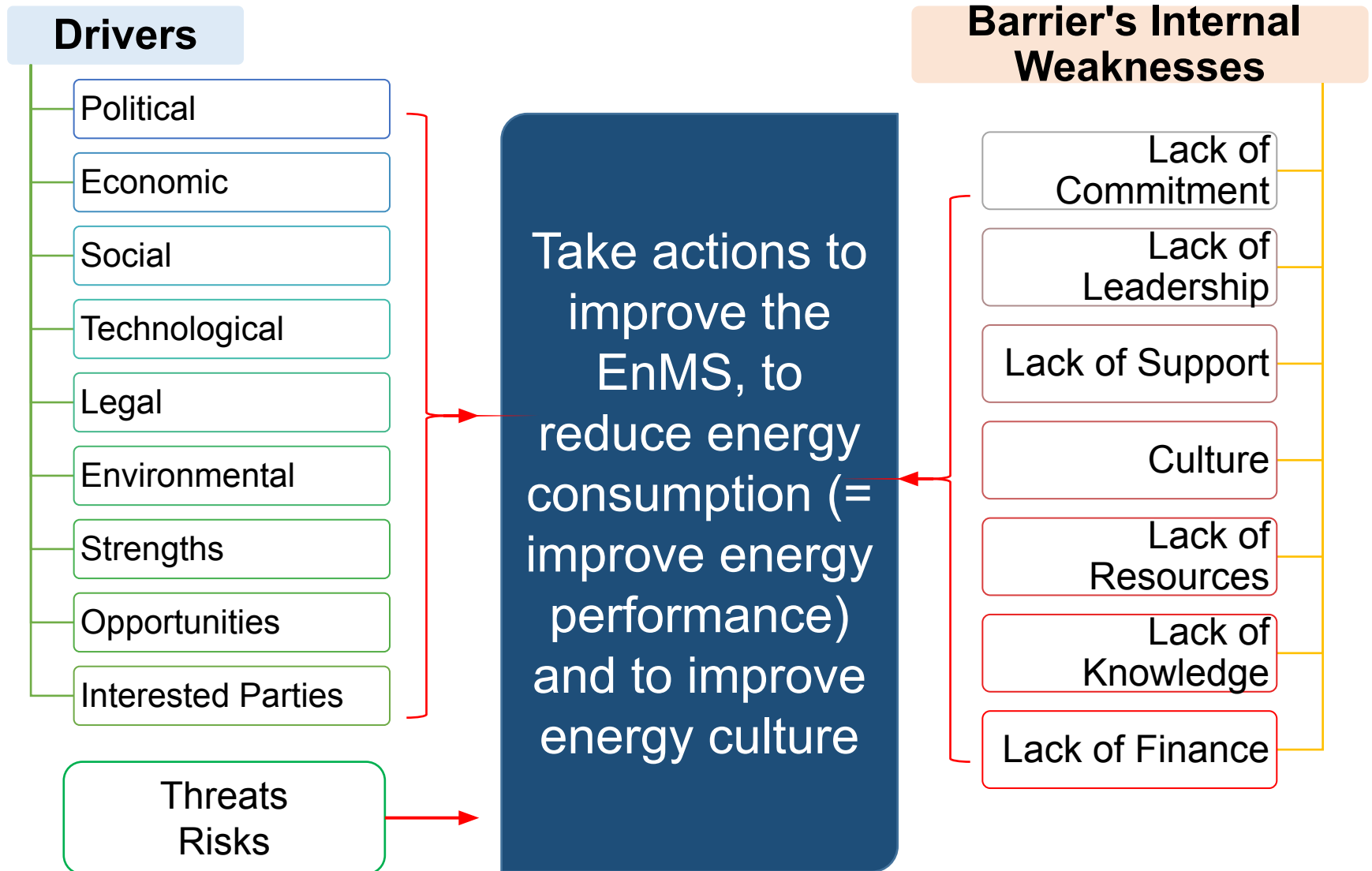
ID	Title of requirement	Reference	Category	Date identified	Relevant (y/n)	What is affected by this requirement?	What action is required	Resp	Reqd date	How often will this be reviewed	Compliance date	Does it require further action?
1	Quarterly energy report		Corporate	01/01/2016	y	All energy data	Generate and deliver	Agatha Chrisitie	Quarterly	Quarterly		N
2	Annual energy agency carbon accounts		Legal	01/01/2016	y	All specified carbon emissions		Umberto Eco				N
3	Boiler emission license limits		Legal	01/01/2016	y	Steam boilers	Monitor and report	Agatha Chrisitie	Continuous	Continuous		N
4	Annual energy budget		Corporate	01/01/2016	y	all purchased energies	Estimate usage and cost	Umberto Eco	01/11/2016			N
5	Emissions trading reporting	EU2012/123	Legal									
6	Energy Efficiency Directive	SI426										
7	Energy Performance of Buildings Directive											
8												
9												
10												



Discussion

- Give examples of PESTLE issues and discuss
 - Give examples of SWOT issues and discuss
 - Examples of interested parties and their needs
 - Legal tab
 - Examples of risks and opportunities
-
- Start to insert ideas in your tools
 - Delete our examples first





Scope and boundaries (What will you manage?)

- Decide your boundary
 - Geographical, is it the fence or wall around the property?
 - Are all departments included?
- Decide your scope
 - List the activities that are included and excluded.
 - Production, Warehousing, Transport, Utilities, Waste management, etc.

List your energy sources

- Electricity
- Natural Gas
- Fuel oil
- LPG
- Water
- Coal
- Acetylene





Leadership

Commitment, policy, roles and resources



EnMS Structure

Leadership

- Policy
- Roles & Responsibilities
- Resource availability
- Top management to communicate the importance of the EnMS
- Integrate into normal business
- Report performance to top management
- The importance of change management
- Establish the structure for EnMS implementation

Leadership

Commitment



- Communication
- Decision making
- Support

Resources (Support



- Personnel time
- Financial
- Knowledge
- Information

Energy Policy



Roles and Responsibilities (Energy Manual



- Who does what and when
- Competence (support)



Roles and Responsibilities

Importance of the topic

Barriers, strengths

What, how, who, how often!

Energy Manual tool

Communication of roles

Competence checking

“Live” document



Important Roles

- Top management support and leadership

Management Representative

Someone at the top level of the organisation to lead the energy management activities

- Direct the activities
- Represent energy management at senior level
- Gain support for energy management

Energy Manager

Someone to run the EnMS on a routine basis

- Know it in detail
- Coordinate its development
- Represent it at external audits

Management representative



- Ensuring that the energy management system is effective
- Reporting to top management on the performance of the energy management system
- Reporting to top management on the energy performance of the organisation
- Formation of an energy management team
- Plan and direct energy management activities
- In a larger organisation, most of the day to day energy work may be completed by others, e.g. energy manager
- Integration into day to day business
- Supports resource allocation

Energy Manager

- Often not a full time job
 - For example, maintenance or engineering
 - Probably a technical person with energy engineering knowledge

Role

- Implements and owns the EnMS
- Manages energy use
- Acts as auditee for the EnMS

Responsibility

- Varies with organisation
- Implementation
- Energy budget
- Reporting



Energy management team

- Decide structure and membership based on size and complexity of your organisation
- Representatives from relevant departments
 - ✓ Production, finance, engineering, operations, senior management representative, energy manager or engineer, etc.
- Cross functional cooperation
- Common and shared goal
- Deliver energy performance improvement



Energy Manual describes roles

- Task
- How to do it?
- How often?
- Where is it documented?
- Who needs to know?
- Who will do it?
- Are they competent?
- What training is required?

Practical Guide for Implementing an Energy Management System

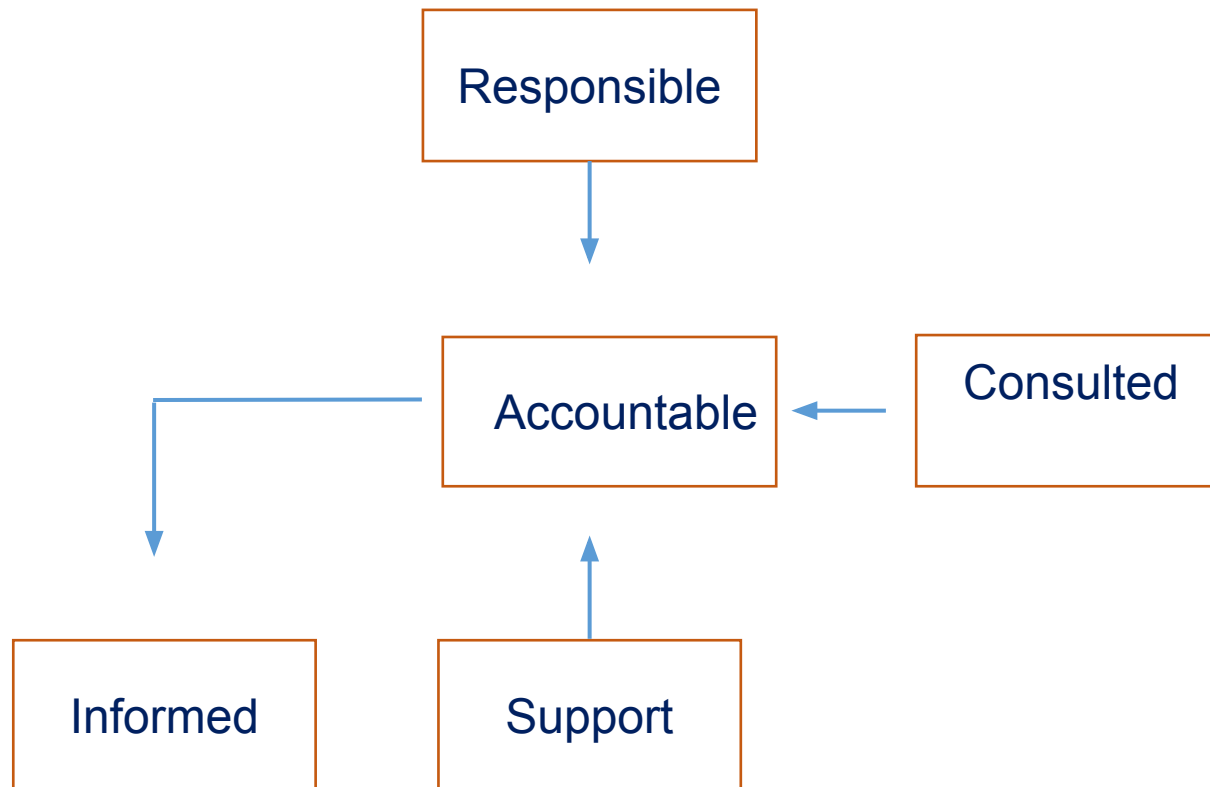
Copyright © United Nations Industrial Development Organization 2016
Energy Management System Tools 2.0

Energy Manual (RnR)					
R: Responsible	A: Accountable	S: Support	C: Consulted	I: Informed	Job Title
ID	Task	What is required	Frequency	Documents	Communication
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1	External Context	Political, Economic, Social, Technological, Legal and Environmental (PESTLE) analysis; Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis taking account of the results of the PESTLE analysis.	Annually	Context tab	Whole organisation
2	Internal Context	Who, what, needs, expectations, requirements (or other requirements from 2011 version)	Annually	Context tab	RnR team
3	Interested Parties	Based on the responses, internal contexts and the identification of interested parties, identify an action plan for the risks and opportunities related to the use of energy.	Annually	Context tab	RnR team
4	Risks and Opportunities	Identify all legal requirements applicable to the organisation's use of energy and comply with them.	Annually	Risks and Opps tab	RnR team
5	Define the boundaries of the EnMS	Define the physical or organization limits included in the EnMS and list the exclusions and the reasons for the exclusions.	Quarterly	Legal tab	RnR team
		Define the activities and processes that are included in the EnMS and list the exclusions and the reasons for the exclusion. Take account of the external and internal context and legal and other requirements. List all energy sources in the EnMS.	Annually	Scope tab	RnR team

Energy Manual | Ministry/Matrix | Context | Risks & Opps | Legal | Scope | Policy | Communication | Training | Procurement



RASCI



Energy team in the RnR tool

- The energy team are the people with important roles in the EnMS.
 - They are listed in the energy manual columns
 - There is typically a core team who do most of the work and others who support with less commitment of time and effort.
- ✓ These are represented in different colours in the tool.



Energy Policy

- Management commitment
- Not just a signature!
- Appropriate to scale
- Must be communicated
- Must be documented
- Reviewed and updated periodically



Energy policy requirements

- a) Is appropriate to the purpose of the organisation
- b) Provides the framework for setting and reviewing energy objectives and targets
- c) Includes a commitment to ensure the availability of information and of necessary resources to achieve objectives and targets
- d) Includes a commitment to comply with applicable legal and other requirements related to energy use, consumption and efficiency
- e) Includes a commitment to continual improvement in energy performance
- f) Supports the purchase of energy efficient products and services
- g) Supports design for energy performance improvement





Example

Our company, in conformance with our commitment to sustainable development and growth, respect for the environment and corporate social responsibility is implementing an energy management system. In doing so, we commit to:

- R**educe energy consumption in all manufacturing operations
- E**nsure continuous improvement of our energy performance
- D**eploy information and resources to achieve our goals and targets
- U**phold legal and other requirements regarding energy
- C**onsider energy performance improvements in design and modification of our facilities, equipment, systems and processes.
- E**ffectively procure and utilize energy efficient products and services

The scope of the EnMS is all activities and all departments of the company except transport activities. It includes all Purchased energy sources and water



Do you have support and leadership?

Question

Evidence

Do top management regularly ask you, how much energy is being saved?

Have top management informed all employees that energy management and energy savings are important to the organisation?

Do top management encourage all departments to integrate energy management in business processes?

Do top management encourage all departments to support energy saving actions?

Do top management push for bigger savings targets?

Do top management make decisions to support increasing energy savings?

Have top management agreed the time availability of all employees with an important role in the EnMS?

Energy Manual (RnR) exercise

The Energy Manual (RnR) tab is where roles and responsibilities are decided, documented and agreed.

- Work on your master copy of the tools
- Update your energy manual with the people who will be involved in tasks 1 to 12
- Frequency
- Documentation
- Communication
- RASCI





See you in 1 hour!





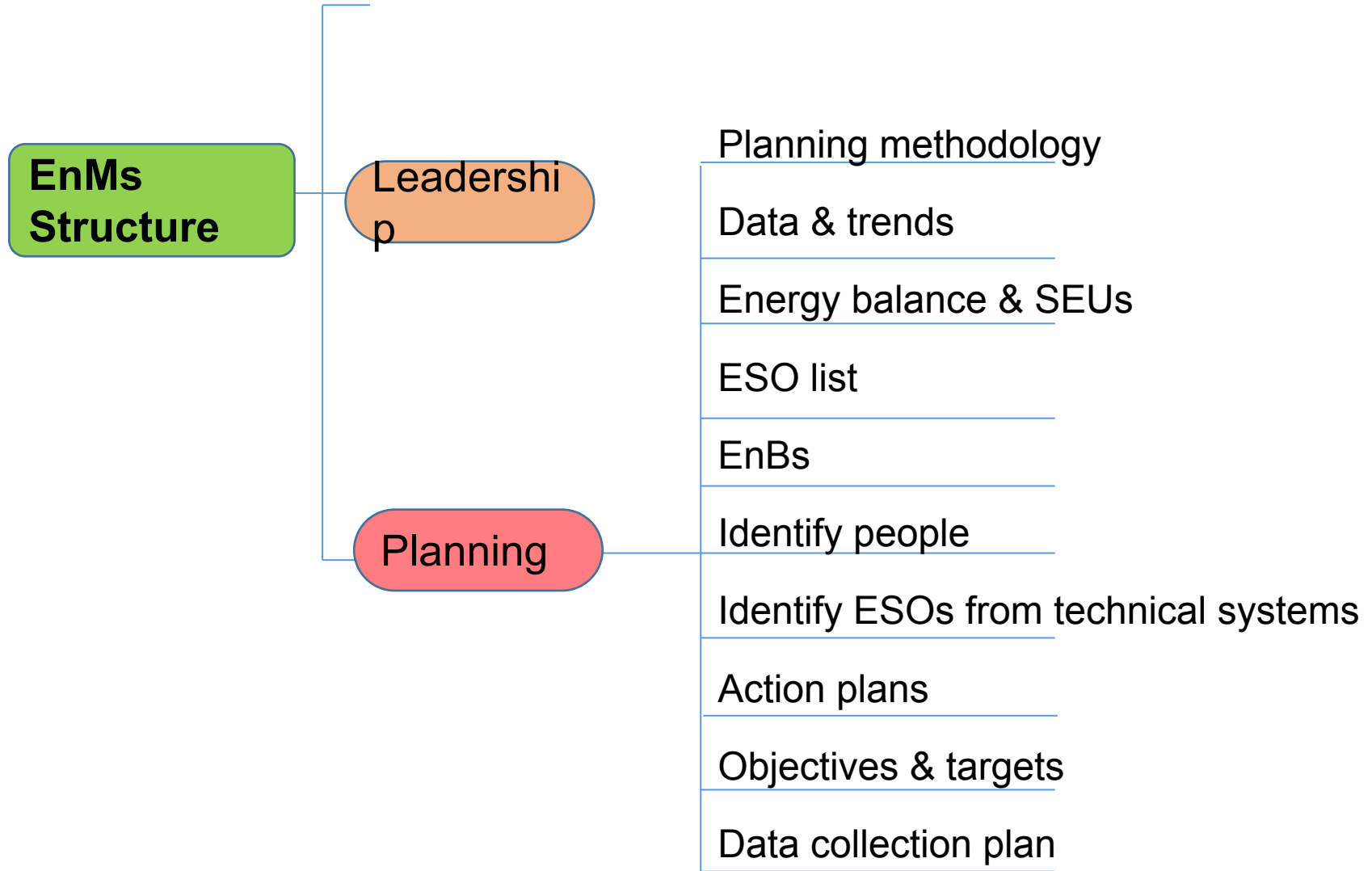
Finish leadership exercise



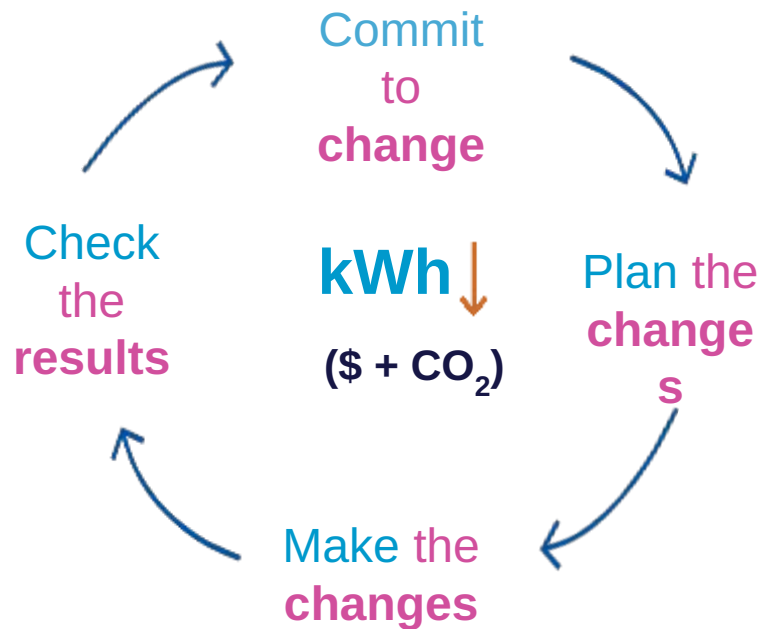


Planning





Planning



What are you going to do?

Translating the commitment and energy policy into objectives, targets and action plans

Planning

How much energy am I using?

Where am I using it?

Which are the largest uses?

What is driving it?

Who is influencing its use?

Do I need to have an energy audit?

System Optimization

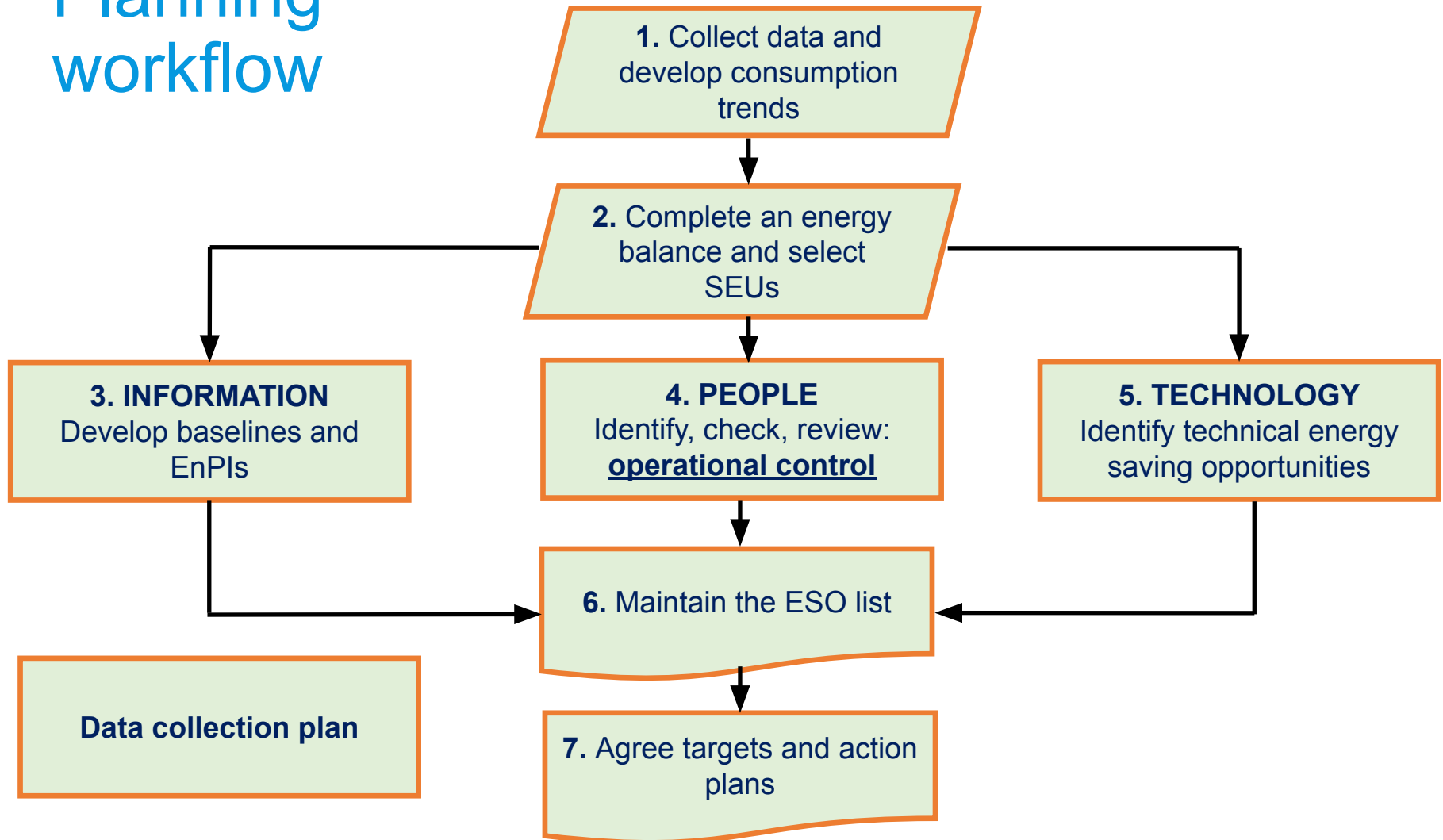
Renewable energy options

Develop baseline & indicators

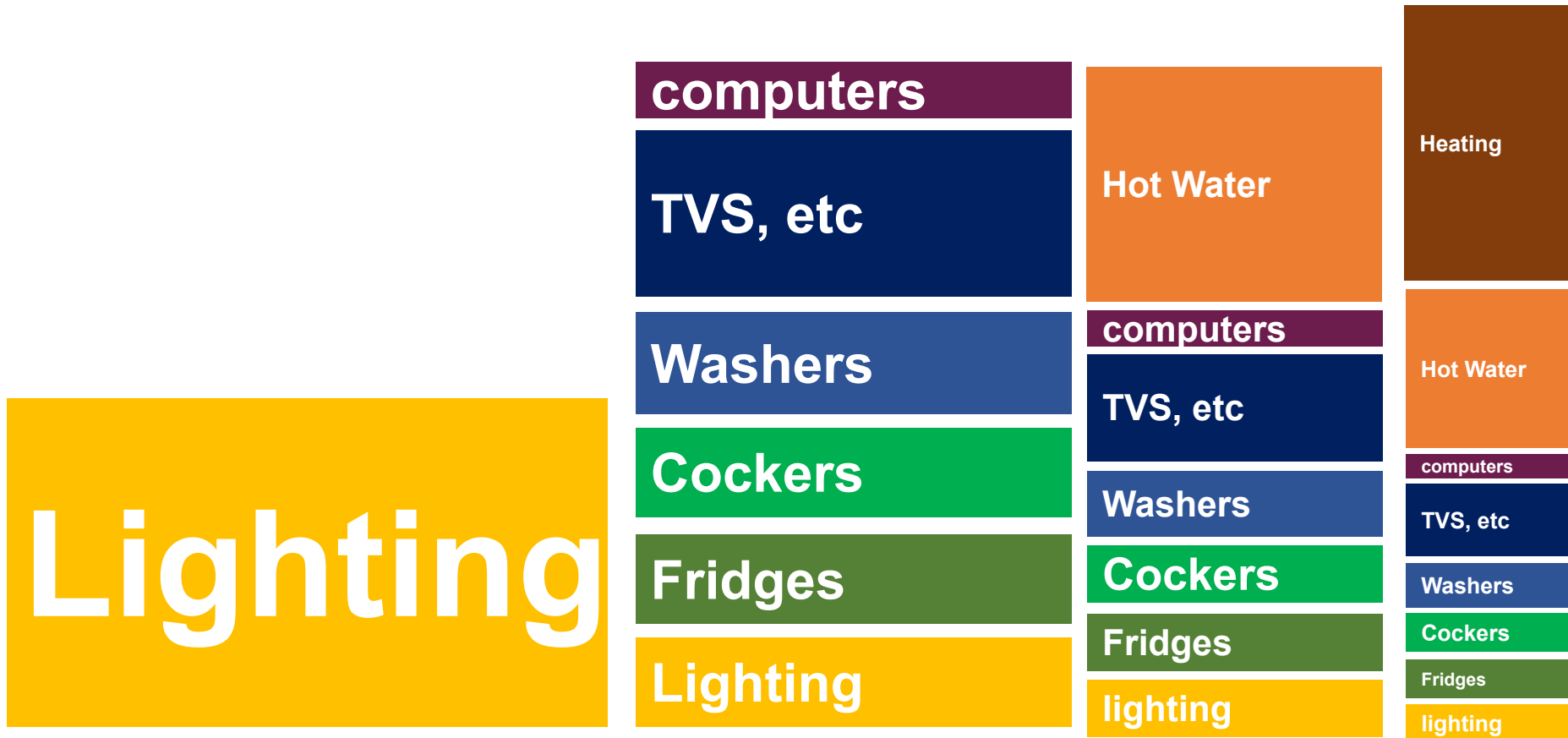
Set objectives and targets

Action Plan

Planning workflow



Should we start with LEDs?



Source:
The British Energy Challenge

How much energy am I using?

- How many people here know how much energy their organisation used in the 12 months ending last month?
- How much did it cost?
- How much did you use last year?
- How much are you going to use next year?
- How are you performing against your budget?
- ✓ Why are there deviations?
- Are you using too much energy?
- ✓ If so, how much should you be using?

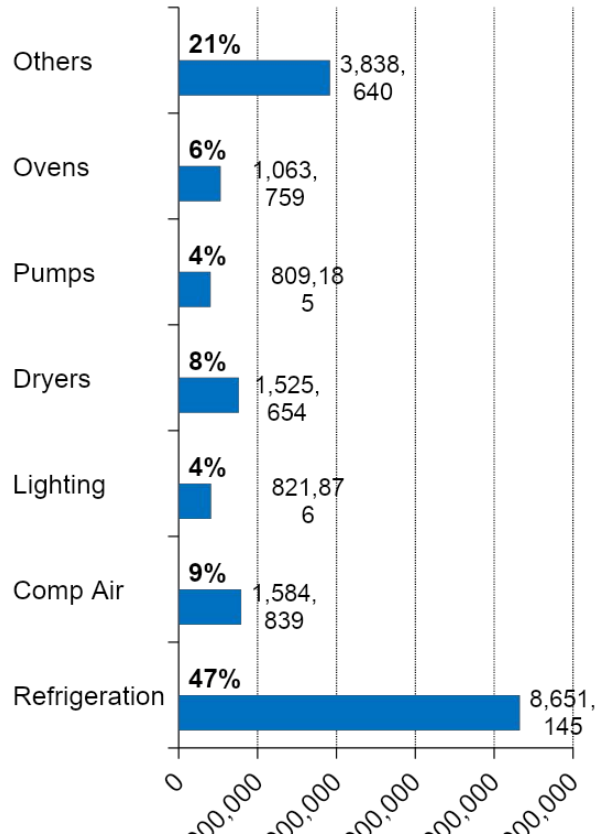
How
Much ?

Develop an Energy Balance for each energy source in the scope

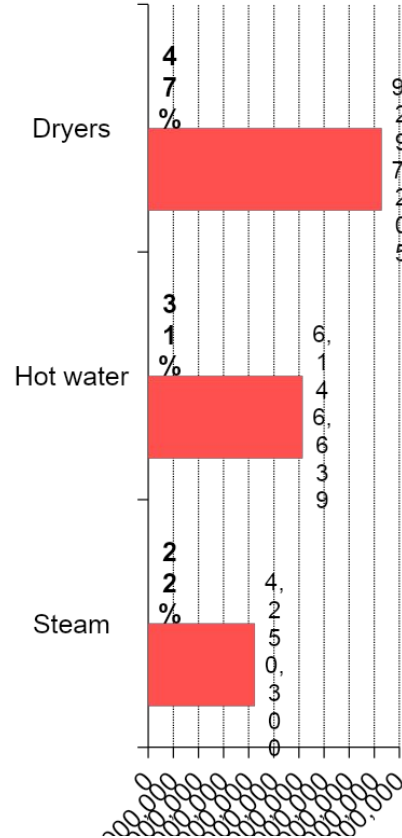
1. List all the uses
 - a. Brainstorm, drawings, etc.
2. For each use, estimate the annual energy consumption
 - a. Not a scientific research project
 - b. Purpose is to focus resources and effort
 - c. Estimation is acceptable if no measurements are available.
 - d. Try to establish where all the energy is consumed.
 - e. "Others" is acceptable for minor uses.
3. Use of Motor list
4. Use of Heat list
5. Use of Lighting list
6. Use of CIT list



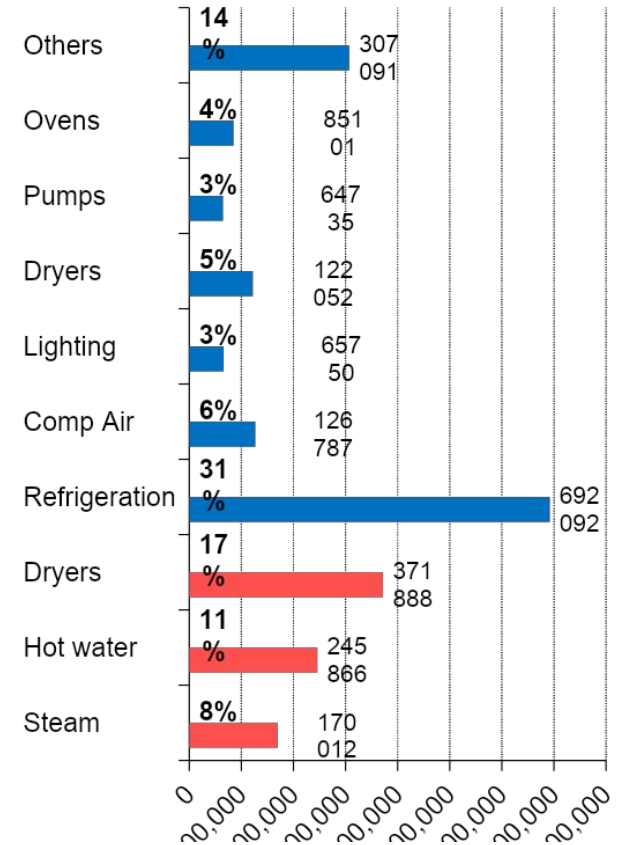
Significant Energy Use (SEU)



Electricity



Heat



Electricity + Heat

Establish energy performance indicators (EnPIs)



- Varying levels of complexity
- Absolute energy consumption
- Simple Ratios
- Regression analysis
- Try to have an EnPI for each SEU if data is available.



Review Operation control



- This is aligned with the review of training needs
 - ✓ It additionally checks operating and maintenance procedures
- Check operating procedures
- Are operators familiar with the energy impact of operations?
- Check maintenance procedures
- Check maintenance frequencies
- Are maintenance staff familiar with the energy impact of their work?
- This review will help to assess training needs

Critical operating parameters

- Each SEU has operating parameters which affect its energy use
- These need to be identified, quantified, recorded and communicated, monitored and controlled

Boiler examples:

Pressure, Total dissolved solids (TDS), stack temperature (variable), stack O₂, condensate return rate, feed water tank temperature

Refrigeration examples:

Delivery temperature, condensing temperature (temperature lift), evaporator and condenser approach temperatures

Compressed air

Pressure, dryness, pressure drops

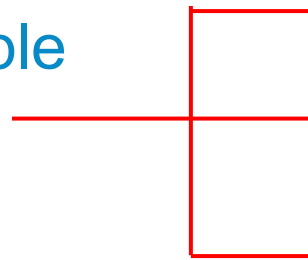
Energy System Optimisation

- Examine the whole system and not individual components
- Establish user requirements and specification
- Examine opportunities with use
- Examine opportunities with distribution
- Examine opportunities with generation last.



Examine potential for renewables and alternative energy sources

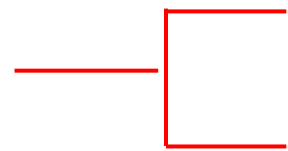
- Which renewable sources are available?



- Solar (thermal or photovoltaic)
- Wind power
- Biomass

Note: these do not typically reduce consumption

- Which renewable technologies are economical with these resources?
- Which alternative energy sources are available ?



- Waste heat recovery
- Fuel switching

- Which might be economical?

Cogeneration (Combined Heat and Power (CHP))

Energy Savings Opportunity (ESO) List

- Develop a list of all potential ideas
- Select items for implementation
 - Prioritisation
- Plan and manage their implementation



Note:

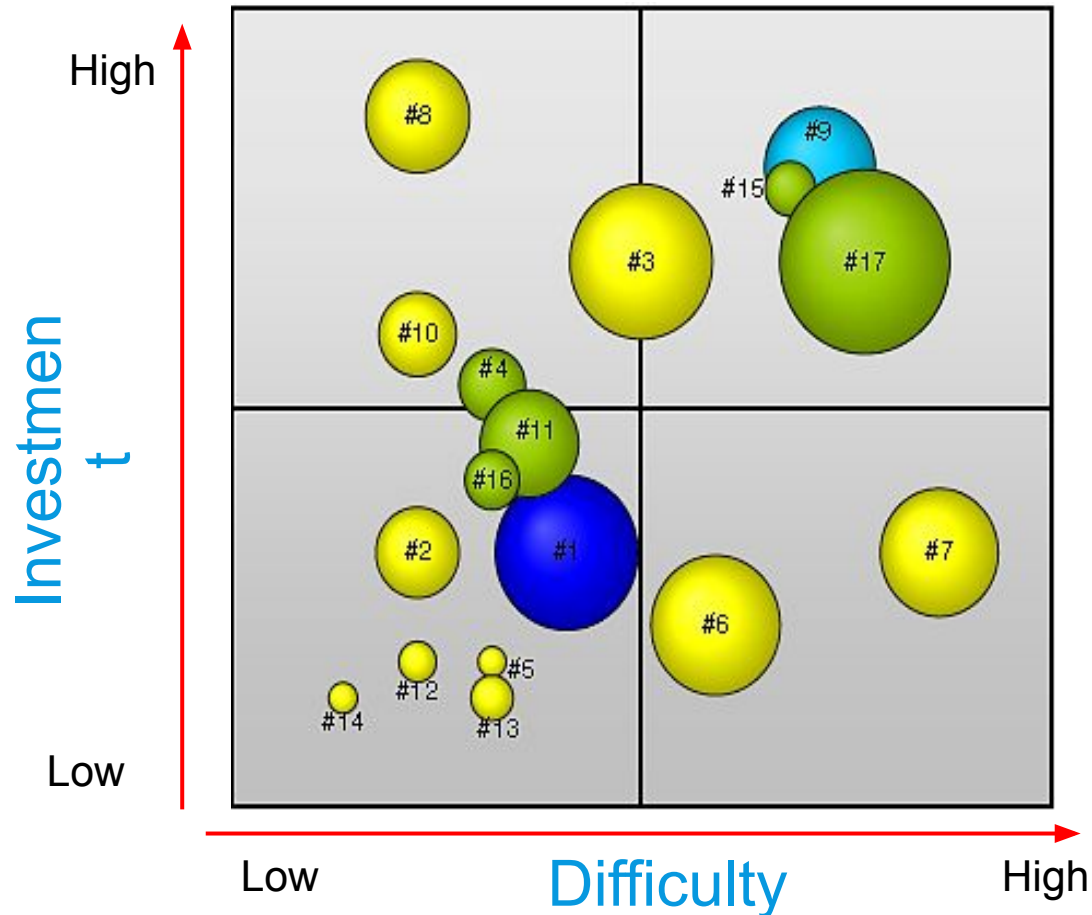
The name of this list doesn't matter alternatives include:

Savings Register

Opportunities list

We will use "ESO List" = Energy Savings Opportunities list.

Which opportunities to implement?



Targets and action plans

EnPis

How we measure if we
are being successful



Action plans
(kWh)

How we are going
to achieve



Target

What we
want to
achieve



Exercise: energy plan for this building

- What are the energy trends of this building?
- What are the SEUs for electricity?
- For one SEU, what are the relevant variables?
- For that SEU, what opportunities exist?
- What would be a good target and plan?





See you in 10 minutes!

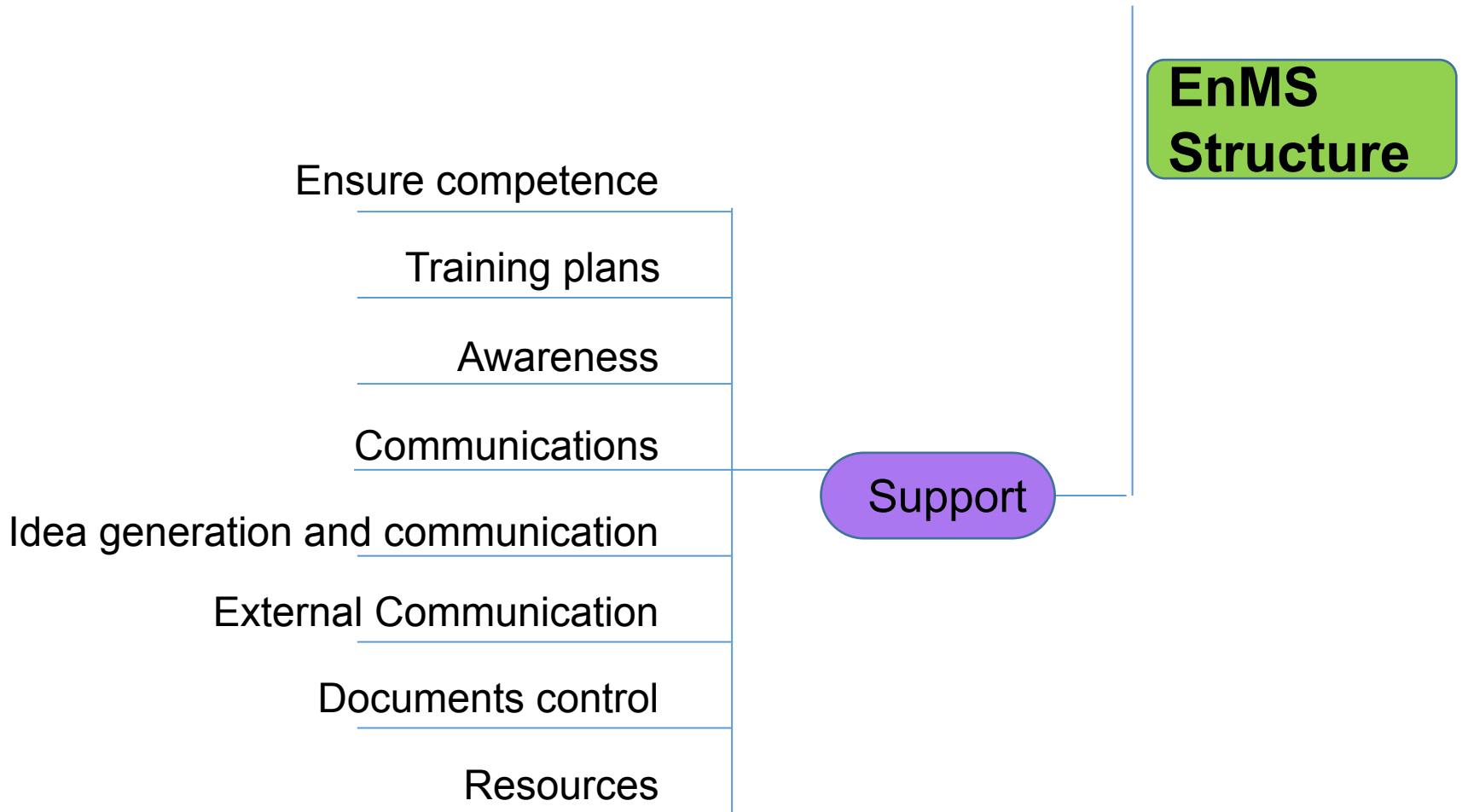




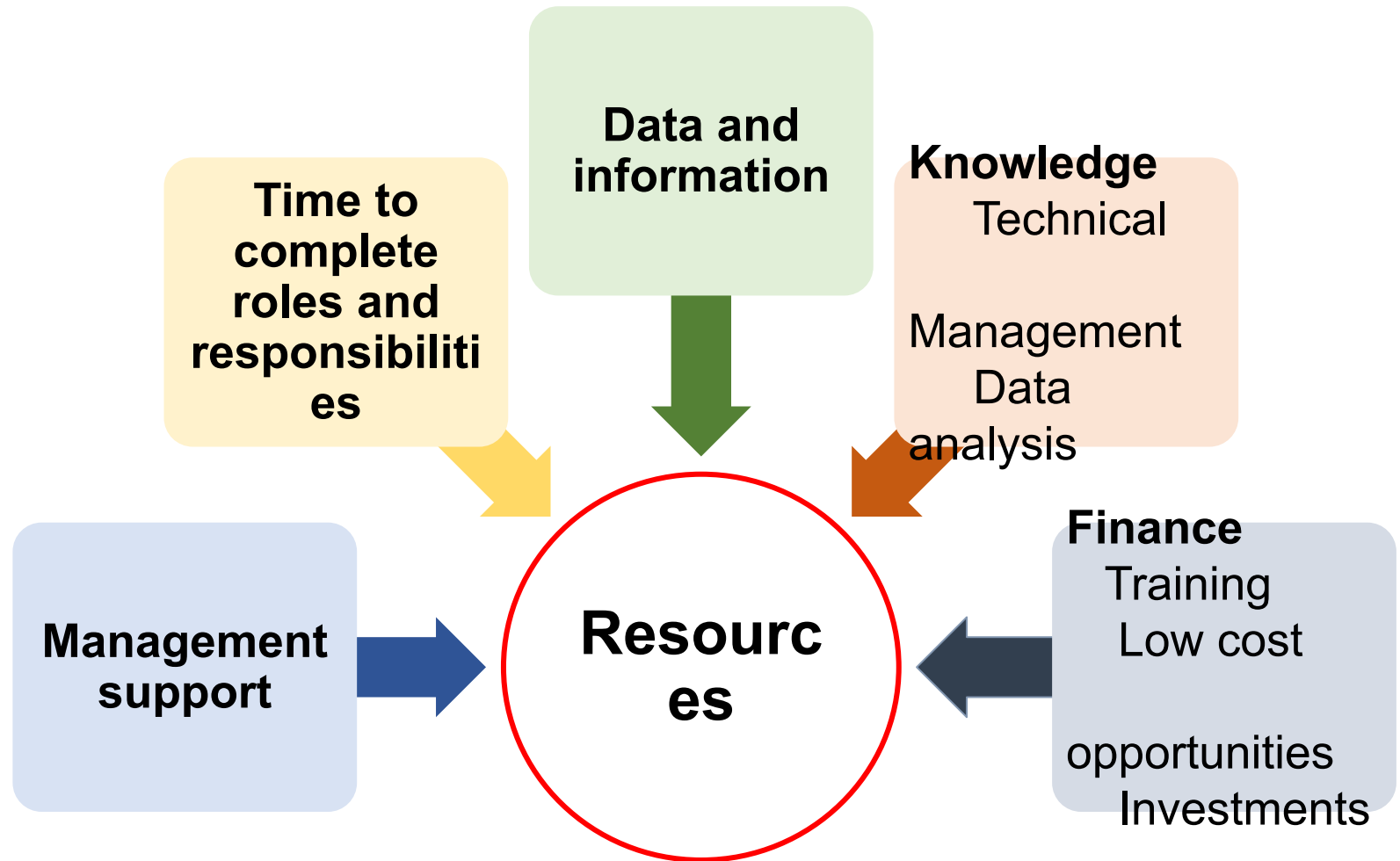
Support

Resources, competence, awareness, communication
and documentation





7. Support					
24	Ensure that relevant personnel understand their roles, responsibilities and are competent for their own role in the EnMS implementation	All personnel who can significantly affect the energy consumption of the organisation need to be competent and to understand their roles. This includes management, technical and operational personnel. The competencies needed are listed in this worksheet	Continuously. This will mainly be reviewed during planning activities but is updated when roles and responsibilities change	Energy Manual - this tab	RnR team
25	Implement training plans and maintain training records	Ensure that all personnel, who may significantly impact the energy performance are competent to carry out their roles through a mixture of education, training, experience and skills	Continuously	Training tab	RnR team
26	Ensure people are aware of EnMS, benefits, roles, impacts, link of behaviour to objectives and targets, consequences of departure from procedures	This includes all staff and contractors. It also includes communicating the energy policy	Continuously	Awareness campaign materials	All staff
27	Ensure energy performance and the EnMS are communicated internally	Routinely communicate energy performance to interested parties	As planned	Communication tab	All staff
28	All personnel need to be given an opportunity to comment and make suggestions to improve the EnMS.	Ensure all staff have an opportunity to suggest energy saving ideas and add to the ESO list as appropriate and also to improve the EnMS itself.	Continuously	Communication tab and ESO list tab	All staff
29	Decide if there will be external communication.	In some instances you may decide to communicate about energy performance externally and this needs to be planned carefully. It is	Annually	Communication tab	RnR team
30	Develop a process to manage and control documented information	<ol style="list-style-type: none"> 1. This spreadsheet together with the planning and baseline spreadsheets and all their tabs are the core of the EnMS. They will be maintained as follows: 2. The energy manager maintains the spreadsheets and is the only one with write access. He/she will update them as required. 3. Every time one of them is updated, its file name is updated to reflect the revision number in the form of YYMMDD, e.g. 160922. 4. Older versions are kept in an archive folder and held for a period of 3 years. 5. This electronic copy is the master copy, any printed versions are superseded by this document on a daily basis, i.e. Any printed version is out of date at the end of the day it is printed. 6. Any tab that is updated as part of a regular review has its date of updating at the top of the sheet. 7. All documents need to be approved prior to use. 	Annually	Specified here in this row	Energy team

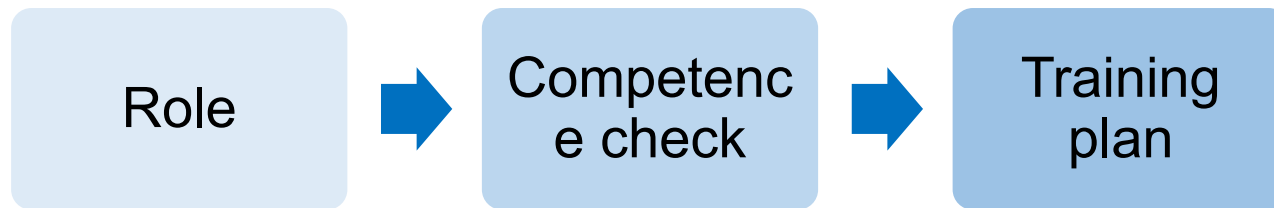


Training & Competence

- Staff with a significant impact on energy use need to be competent
 - Education
 - Training
 - Experience
 - Skills
- Training plans are to be implemented
- Potential consequences of departure from procedures
- Training records must be kept
- Include external service providers where relevant



Training plans



Training										
Name	Job Title/Function	Category	Introduction to EnMS	RnR	Efficient design	Efficient purchasing	EnPIs	LCC	Cooling, heating and HVAC	How to detect saving opportunities
Oscar Wilde	Managing director	Influencer	17/10/16	23/9/16						
Agatha Christie	Energy management representative	Influencer	17/10/16	23/9/16			20/11/16	15/2/17		
Charles Dickens	Energy manager	Influencer	17/10/16	23/9/16						24/11/16
Jane Austen	Maintenance	Influencer	17/10/16	23/9/16						
Ernest Hemingway	Production	Influencer	17/10/16	23/9/16	25/10/16					
Virginia Wolf	Projects	Influencer	17/10/16	23/9/16		25/10/16		15/2/17		
William Shakespeare	Facilities	Influencer	17/10/16	23/9/16						
Mary Shelley	Purchasing	Influencer	17/10/16	23/9/16				15/2/17		
Umberto Eco	Environment	Direct							30/2/17	24/11/16
J.K Rowling	Finance	Direct							30/2/17	24/11/16

Awareness

- All staff need to be aware of the EnMS
- All staff need to be aware of the energy policy
- All staff should be aware of the benefits to the organisation of improved energy performance
- It is usually desirable that all staff are aware of the issues surrounding energy efficiency
 - Context
 - Climate change
 - Energy cost
 - Success stories
 - The organisations interest in these areas
 - Security of supply
- Feel good factor for employees



Awareness – Behaviour Change – Social Norms

Safety Belts in Cars

Smoking in public places

Smoking while Pregnant

Safety glasses

Etc

Etc

Energy Waste?



Documentation



Documentation

Documentation requirements

Paper or electronic

Describe the core elements of the EnMS

Relevant records need to be available and controlled

Control of documents

1

Approval prior to use

2

Periodic review and update

3

Revision control

4

Must be legible and identifiable

5

Readily located

6

Latest versions only in circulation

- Integrate into existing document control if available
- An energy manual is a good idea, electronic or hard copy
 - Overall guide to the system





Document control

This spreadsheet together with the planning and baseline spreadsheets and all their tabs are the core of the EnMS. They will be maintained as follows:

1. The energy manager maintains the spreadsheets and is the only one with write access. He/she will update them as required.
2. Every time one of them is updated, its file name is updated to reflect the revision number in the form of YYMMDD, e.g. 160922.
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5. Any tab that is updated as part of a regular review has its date of updating at the top of the sheet.
6. All documents need to be approved prior to use.





Exercise:



1. Discuss document control
2. Update roles for all the support tasks





Opportunities for your organisation





Exercise: What are the opportunities for your organisation?

- Consider:
 - External context
 - Internal context
 - Interested parties
- Use the Risks and Opps tab
- List the opportunities/benefits to your organisation
 - From improved energy performance
 - From an energy management system
- How will you exploit these opportunities

The purpose of this is to know how to emphasise the importance of the EnMs and get support from all levels





Drivers and Opportunities	Importance	Plans to address opportunities	Resp for opportunity plans	Target date	Completion date	Notes regarding completion
From PESTLE and SWOT analysis results, list the positive factors that will help you to develop an effective EnMS. These will be P,E,S,T,L,E,S,O,Ts	How important is this factor in helping WAJ to develop its EnMS	How will this opportunity be taken?	Who is responsible	When will the plan be completed	When was it actually completed	



Questions?

Good bye

Thanks for your attention

See you tomorrow