



# IDEAS





## The essential question:

What benefits are achieved when we understand all the things Australian red meat processors do to bring us juicy, tender cuts of beef, lamb and goat meat, while using and managing water, energy and waste sustainably?

### Step 1: The scenario

The Australian Meat Processor Corporation (AMPC) is searching for schools to discover how Australian meat processors might produce an array of different beef, lamb and goat meat cuts for local, national and international markets, while using and managing water, energy and wastes sustainably.

Become an environmental designer and use your ingenuity and creative thinking to give an older meat processing plant a brand new look, and design sustainable water, energy and waste solutions that can benefit the environment, and meat processors.

AMPC invites you to design systems to manage water, energy and waste and help meat processors reduce impacts on the environment. The water and waste needs to be handled carefully so that it cannot pollute rivers, streams and underground water supplies, or affect animals, plants and humans. The energy used at the plant also needs to be sourced and used sustainably.

In pairs, you are tasked with completing an analysis of the systems and technologies used by meat processors with a specific emphasis on how they use best practice environmental management in the processing plants.

You are then tasked with designing a key that can be applied in a meat processing plant that shows all the on-site sustainability features. In addition to a key, you are required to provide the meat processor with a poster that can be placed near the entrance of the meat processing plant to inform visitors about the best practice environmental management strategies utilised on-site. Additionally, you are required to design a brochure to provide more details about the practical, positive and achievable actions the plant and its staff are making on their journey towards sustainability.

You are also required to give a five minute presentation of your processing plant redesign, poster and brochure, to an audience in which you explain how red meat is processed in Australia using six or more best environmental management practices.

What investigations can assist you to research how Australian meat processors use water and energy? What investigations can assist you to research how they handle and manage waste in their plants? Will you investigate how Australian meat processors currently manage wastewater? Will you investigate how Australian meat processors use water for hand washing, cleaning and disinfecting tools and equipment,

washing carcasses, and in high pressure hoses to wash down areas of the processing plant? Will you investigate whether any Australian meat processors currently use manures or biomass to create electricity? Will you investigate how some Australian meat processors wash out their sheds and recycle the solid waste and wastewater to irrigate surrounding pastures? Will you investigate how some Australian meat processors recycle solid waste that is then processed into products like 'Blood and Bone' fertilisers?

AMPC and other meat processors can help out with lots of information, images and videos on their websites.

<http://www.ampc.com.au/education-training/school-resources/meat-matters>

Your challenge is to use the websites and a range of activities and videos to help understand how Australian meat processors can use and manage water, energy and waste more sustainably in their processing plants. How will you give an older plant a new sustainable look in this project? How will your systems work, and how will it help Australian meat processors reduce impacts on the environment? How might you present your design to others?

Are you up for the challenge?

High, low and no tech options are available.

**High Tech:** You can design and produce your new look processing plant digitally using an app or software to create original graphics. You can also design your identification system, poster and brochure digitally using software to create original graphics.

**Low Tech:** You can design and produce your new look processing plant using a standard computer, graphics provided and editing software. You can also design your identification system, poster and brochure digitally using a standard computer.

**No Tech:** You can design and produce your new look processing plant using art materials, poster board and hand written information and drawings. You can also design your identification system, poster and brochure digitally using art materials, poster board and hand written information and drawings.

What kind of researcher and environmental designer will you be?

How will you give an older meat processing plant a brand new look, with sustainable water, energy and waste solutions that can benefit the environment, and meat processors?





### Discover

#### Begin your research.

Collect and record information about:

- What red meat processing actually involves;
- What red meat processors and butchers might actually do;
- How meat processors and butchers convert beef, lamb and goat meat into a product;
- How and where water is used and managed in the processing plant;
- How and where waste water is generated in the processing plant and how it is treated;
- How and where any effluent is generated in the processing plant and whether any biogas is captured and re-used to generate on-site power;
- How and where energy is used and managed in the processing plant;
- Whether any free sources of energy can be created from the sun or from wind sources; and
- Whether any wastes are generated in the processing plant, and how they might be reused or recycled.

Discover more about: R Radford and Son at <http://www.abc.net.au/landline/content/2012/s3615247.htm> and focus on the sustainability considerations in which the meat processing company has invested.

Consider the plant upgrades that have included temperature controlled chilling to enhance eating quality, and the investment in water and energy recovery projects to increase plant sustainability.

Discover how this processing plant uses 100,000 litres of water a day. Brainstorm and list all the processes that might use water at the plant and consider ways that any processor might be able to undertake to conserve or re-use water.

Investigate a domestic meat processor in Moruya in NSW <https://youtu.be/y2mPEqluLVY> and find out how this processing plant uses and manages water and energy, and reuses and recycles waste products it produces.

Replay the video taken at the Afflicks processing plant, and investigate where water and energy are used, and where any wastes might be seen.

Find and record any clean energy technologies that can be identified on site.

Look at the use of lagoons and settling ponds that treat the wastewater created by the plant and discover how it is re-used on-site.

Explore the 'Rendering Plant' located on the Afflick's property and investigate the way all solid wastes is recovered and re-used to make tallow for cosmetics and blood and bone products that are on sold.

Focus on the way the Rendering Plant also recovers steam from the Boiler and converts hot water used within the plant to create potable water for use in the processing plant.

Explore how Oakey Beef, in Queensland generate their own energy from their wastewater resources <http://www.ampc.com.au/2016/07/The-Big-Grey-Bubble-Oakey-Beef>.

View the video and discover how the processor demonstrates environmental responsibility and stewardship by using wastewater and bacteria to create electricity.

Delve deeper and discover how a Tasmanian meat processor 'Greenhams' is using a renewable source of briquette as a bio-fuel in its Boilers <https://www.youtube.com/watch?v=cOrBAd7-Pfo&feature=youtu.be>

View and listen to the AMPC video showcasing the views of various stakeholders around the sustainability issues affecting Australia's red meat manufacturing industry <https://youtu.be/L51CoN4P3ZQ>.

Read about what a scientist suggests can be recycled and reused from meat processing plants <http://www.awmc.uq.edu.au/dr-paul-jensen>

Record any ideas that are suggested by the scientist, about resources that can be recovered in meat processing operations.







## Plus, Minus, Interesting

What do you think is really important about the way Australian meat processors use and manage resources in the videos you have viewed?

Use the Pluses, Minuses and Interesting (PMI) chart to evaluate any of their claims. In the Pluses column enter all the advantages of the water, energy or waste systems portrayed in the video, in the Minuses column enter all the problems associated with the water, energy or waste systems and in the third column enter the what you thought was most interesting or any other questions you would like to have answered.

Pluses – or advantages	Minuses – or negatives	Interesting – what you think is interesting
		
		
		
		
		
		
		
		



# Discover a Compass Rose

The compass rose is a framework that encourages a range of questions to be asked about issues in any place or situation. It can be used to help enquiry about any locality, its issues and their relationship to environment, social, economic and political issues.

The four main compass points represent:

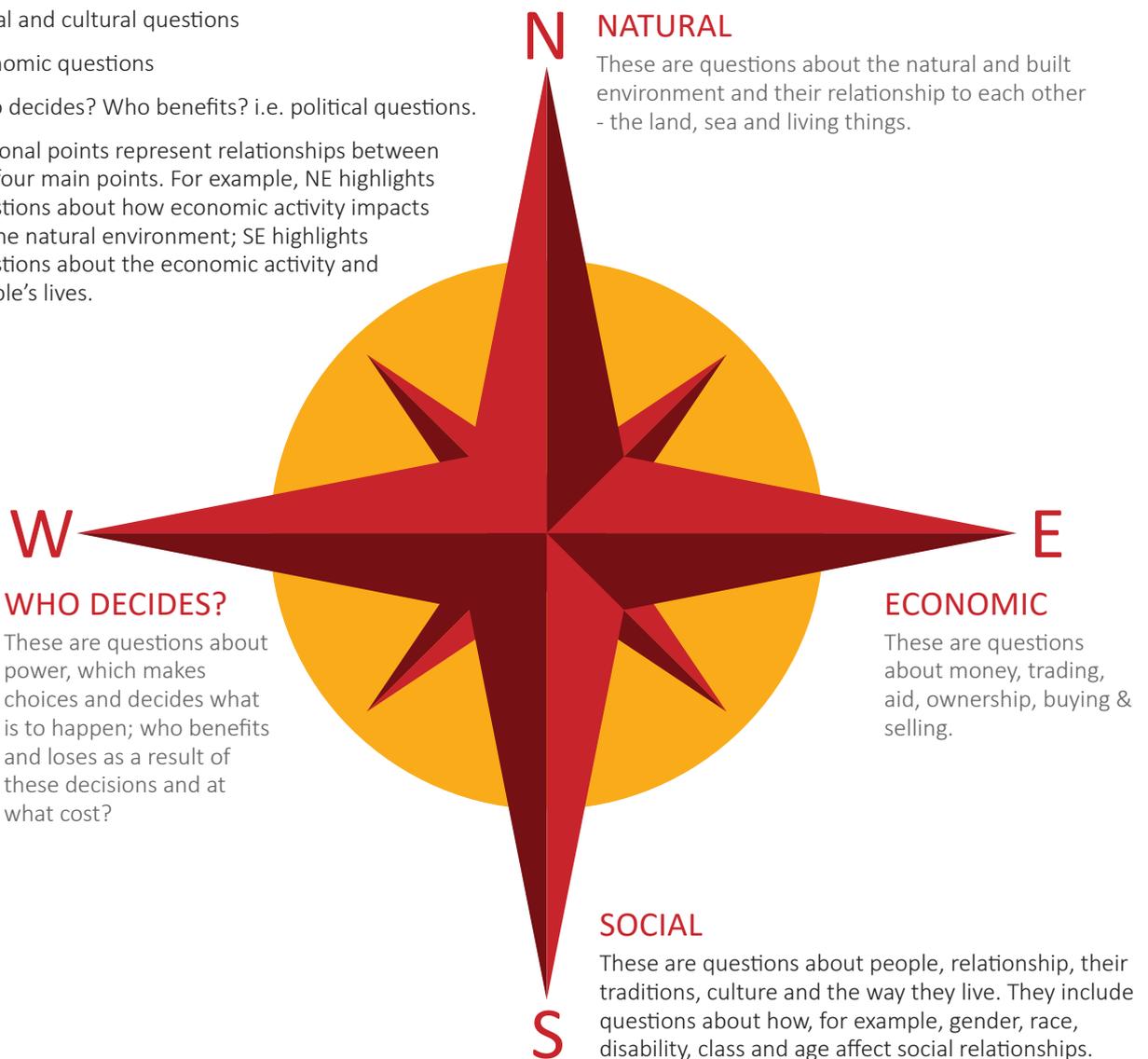
**N**atural and ecological questions

**S**ocial and cultural questions

**E**conomic questions

**W**ho decides? Who benefits? i.e. political questions.

Diagonal points represent relationships between the four main points. For example, NE highlights questions about how economic activity impacts on the natural environment; SE highlights questions about the economic activity and people's lives.



Use the 'Compass Rose' and the questions it can pose to discover and research more about how the Australian meat processors are processing red meat sustainably. Research how their processes that use and manage water, waste, and energy may inform, influence or impact the environment, society, economy and decision-making at local and national levels.

Record new understandings you now have about how Australian meat processors use and manage water, waste and energy sustainably.

Start thinking about how you will incorporate these into your designs!



# Edward de Bono's Six Thinking Hats

Explore the issues you uncovered about the sustainable systems used by meat processors. Use the Six Thinking Hats below to think through the issues according to each coloured hat and the question asked.



## RED HAT Feelings

What are the emotions and feelings associated with meat processing systems?  
How do you feel?



## WHITE HAT Information

List the facts that you know about meat processing systems and how they affect the environment.



## BLUE HAT What thinking is needed?

What has happened so far?  
What should happen next?  
What questions should we consider?



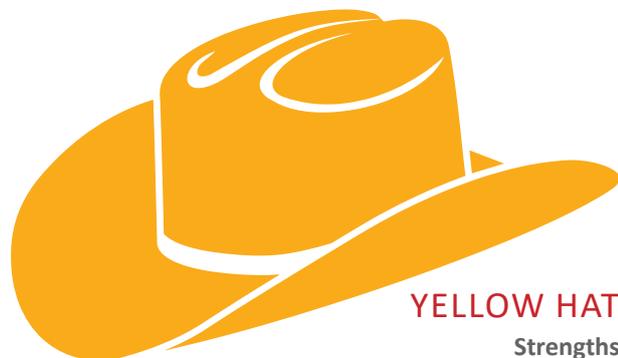
## GREEN HAT New ideas

How could the problems related to meat processing systems be solved?  
What needs to be done?



## BLACK HAT Weaknesses

What are some of the negative aspects and outcomes of meat processing systems?



## YELLOW HAT Strengths

What are some of the positive aspects and outcomes of meat processing systems?



# An Australian Meat Processing Plant

Most of Australia's meat processing plants were built before minimum environmental standards were introduced. Therefore how might you introduce sustainability features without demolishing and starting over?

Assess the plant featured on the graphic below, determine and indicate with arrows and labels:

- Main features of the site;
- Sun angles for summer and winter;
- Prevailing wind direction for summer and winter;
- Flow of any water run-off from hard surface areas; and
- The technological and/or sustainability considerations and solutions you would like to feature on your design.

## Consider technological and sustainability considerations

Locate a section of the meat processing plant and think about the practical, positive and achievable technological and sustainability considerations you might integrate into the meat processing plant or its site.

## Ergonomic considerations

Show how you think things might work and function.

Include your thoughts about how these considerations and solutions might be used by people at the meat processing plant.

## Economic considerations

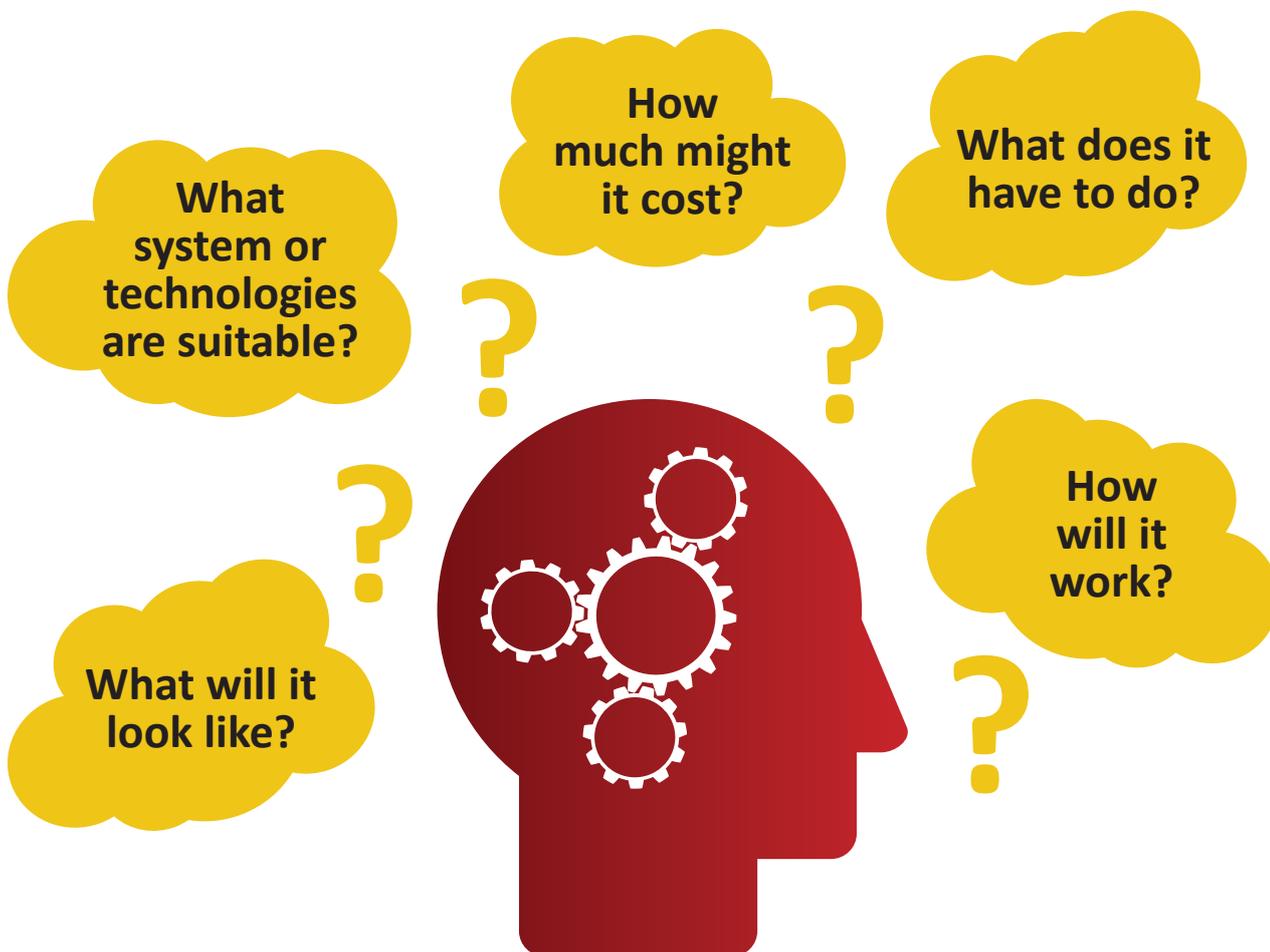
Think about what finances might be available to owners of meat processing plants for sustainability projects and what might limit or constrain the considerations and solutions being proposed.

1 Stock yard 2 Slaughter house 3 Boning room 4 Chilling room 5 Packaging & transport 6 Rendering plant





## Refine your ideas



All of these areas of thought will spark off a whole range of questions to answer, which should be recorded.

You will see there are many different things to think about when designing, which is why it is important to record all of your thoughts. This might involve making up many design sheets.



## Dream

This is where you use the knowledge you've gathered to visualize a creative and appropriate solution.

This is an holistic process where we imagine what the solution will appear like as it would in the future. Instead of asking "why" we ask "why not?" The question of "what's the worst that could happen" becomes "what's the best that could happen?"

**Consider** the many possible ways you can design a sustainable meat processing plant.

**Which** aspects of sustainability do you want to focus on (e.g. energy, waste, water, transport, air quality, etc?)

**How** might you integrate these sustainability considerations in the meat processing plant?

**Are** some solutions or considerations more sustainable than others? Why?

**How** do you want visitors and staff to feel when they read the poster and brochure at the site office of the meat processing plant?

**How** do you want on-site staff members to feel when they read the poster and brochure that identifies the sustainability considerations featured in the plant?

**Visualise** your systems that can manage water, energy and waste productively at a meat processing plant and in a way that reduces impacts on the environment. Where is water used on site and how is it managed, treated or re-used? What types of waste are actually produced? How are they re-used? Where is energy used? Might free energy from the sun or wind be appropriate to consider on-site?

**Develop possible solutions** and brainstorm all possible solutions.

**Visualise** your creative direction for your identification system, poster and brochure.

**Imagine** the steps involved in designing your systems, your identification system, poster and brochure.

**Check out** poster design on Pinterest.

**What types of** materials, tools, and equipment will you need to design your work samples? Will you use digital or non-digital equipment and tools?

**How** will you communicate the ways your systems help meat processors reduce impacts on the environment?

**Think about** the questions posed above and record your 'draft' solutions.

**What might you have to do** to make your design ideas possible?

**What might** the design be focussed on?

**How might** the design be created?

**What** are the different ways the design could be created?

This is your chance to design a sustainable meat processing plant and educate others about how their red meat is processed in Australia using best environmental practices.



# Design

Commence by establishing your desired outcome; then visualise the various steps necessary to achieve the visualized solution in measurable, achievable steps.

Prepare a project plan to outline information that needs to be gathered, who is responsible, where you will seek information from, and how it will be gathered. Try and work out the order in which you are going to do things when researching and designing. Knowing what you have to complete, and in which order will help you organise your time better during the project. Write it down as a suggested order of work.

What do I need to do?	How will I gather the information? How will I create my designs?	When will I do this?	How can my products and processes be improved?



Or, consider another type of Project Plan. Consider a plan with the following headings.

What	How	When	Who and what's needed	How will we know if it worked



You may like to sequence an order of work

Step 1	
Step 2	
Step 3	
Step 4	
Step 5	
Step 6	
Step 7	
Step 8	
Step 9	
Step 10	
Step 11	
Step 12	
Step 13	
Step 14	
Step 15	



## Deliver

This stage is the process by which the dream becomes a reality. It's where you actually implement the designs you have created to complete the solution to the problem in two separate steps:

Produce (a design for an older meat processing plant with a key that shows all the on-site sustainability features; a poster and brochure that can inform visitors about the best environmental management practices used on site), and publish (presenting the finished designs in your effort to educate others about how red meat is processed in Australia using best environmental practices).

Use the following prompts to write your presentation explaining your designs and educate others about how red meat is processed in Australia using best environmental practices.

**Write the introduction:**

**Write the body:**

**Write the conclusion:**



# Debrief

## Self-Assessment – Things to improve

You need to be able to judge and measure the success of your designs in addressing the original tasks and achieving your goals.

Refer back to the earlier tasks set by AMPC whether you achieved your goals of creating a design for an older meat processing plant with a key that shows all the on-site sustainability features; a poster and brochure that can inform visitors about the best environmental management practices used on site. Did you present the finished designs and educate others about how red meat is processed in Australia using best environmental practices?

- Review your work samples and see whether you/your partner achieved the goals.
- Reflect on the strengths and any weaknesses in the designs.
- Brainstorm any things that could have been done differently to get a better result.
- Discuss ways you/your team might communicate its success and engage others to try the ideas that worked.
- Write an account of the processes undertaken in the project or develop a flowchart identifying various strengths and weaknesses, opportunities and threats of the strategies used in the final designs.

## Reflect on the learning

Complete the self-assessment activity on the following pages.



# Self-evaluation Meat Matters. We all have a steak in this!

Student name:

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1. What was the most surprising thing you learned about sustainability in red meat processing?	
2. What did you enjoy the most while doing this project?	
3. How well did your group work as a team	<p>POOR  _____  EXCELLENT</p>
4. Make a suggestion on how your team could have done things better to improve your own learning.	
5. How well did your team undertake the research tasks?	<p>POOR  _____  EXCELLENT</p>
6. How well did you work as an individual within your team?	<p>POOR  _____  EXCELLENT</p>



<p>7. Make a comment on how you could have contrivuted better to your team outcome</p>	
<p>8. How well did your team plan the design for the processing plant?</p>	<p>POOR  _____  EXCELLENT</p>
<p>9. How well did your team work together while creating the design?</p>	<p>POOR  _____  EXCELLENT</p>
<p>10. Do you think your design represents the research you did?</p>	<p>POOR  _____  EXCELLENT</p>
<p>11. What could your team have done differently to improve your final outcome?</p>	
<p>12. How well do you think your team used lesson time for the whole topic?</p>	<p>POOR  _____  EXCELLENT</p>
<p>13. What do you think you could do better to use your time more effectively?</p>	
<p>14. Suggest some improvements for studen learning in this whole project (for the developers of the resource).</p>	