



11 SUSTAINABLE CITIES  
AND COMMUNITIES



To make cities inclusive, safe,  
resilient and sustainable



7 AFFORDABLE AND  
CLEAN ENERGY



To ensure access to affordable  
and sustainable energy for all



12 RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



To ensure sustainable consumption  
and production patterns



9 INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



To build resilient infrastructure,  
promote inclusive and sustainable  
industrialization, and foster innovation



## ENGG103 Materials Group Project Autumn 2023

# SUSTAINABLE DEVELOPMENT GOALS

**Aim: What sustainable material choices can we make to help fulfill the UN SDGs.**

# Project: Important information

- You will be assigned a team in Week 4 on moodle.
- Your project will run from **Week 4 – 8, 9<sup>th</sup> Oct – 10<sup>th</sup> Nov.**

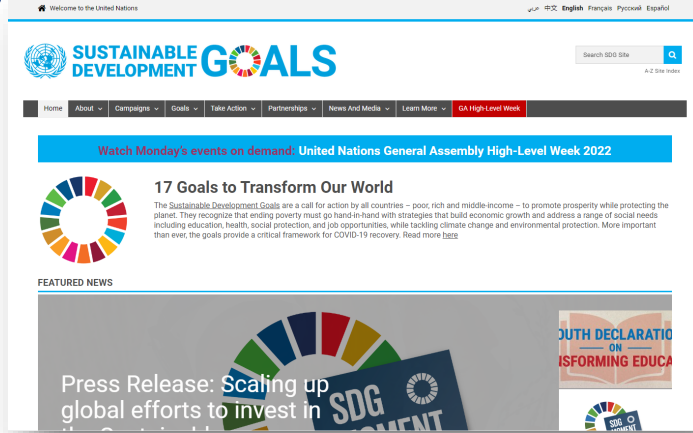
Files for final submission (10<sup>th</sup> Nov)

1. Presentation file (power point etc.)
2. 1 page poster file (pdf)

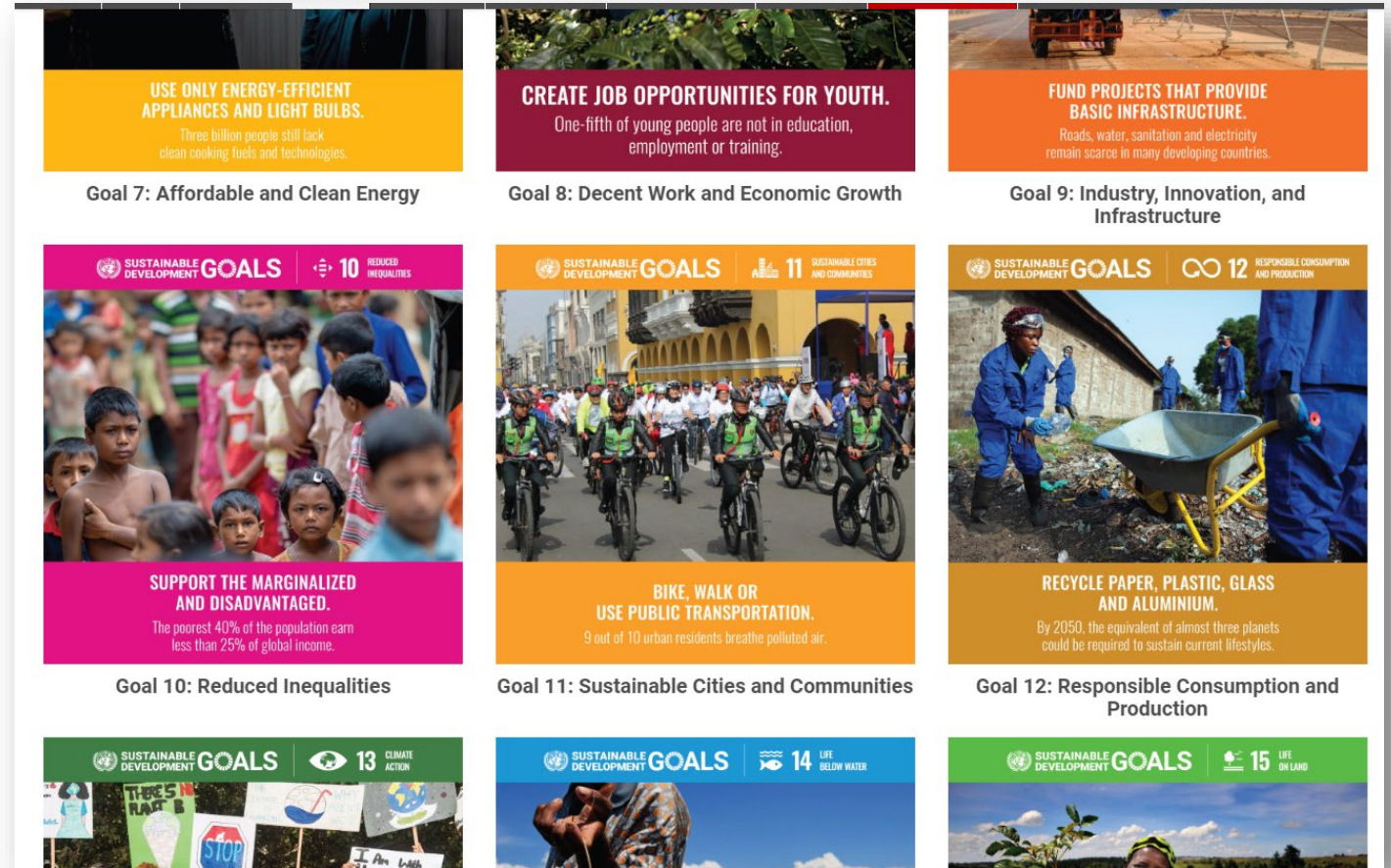
- The **presentation/project file** must be submitted via moodle on **Friday 10<sup>th</sup> Nov.** No changes can be made to the submitted files after that date.
- Your research project findings will be **presented** during your lab class in **week 10.** Schedule will be posted on Moodle.
- Presentations will be **8 minutes max.** All team members must attend presentations. Clearly state contributions of each team member.

# Review UN SDGs and select a project topic

1



2



1. Start by getting to know your team members and discussing the project topics
2. Review project examples on the next few slides
3. Visit UN.org website for further information

<https://www.un.org/sustainabledevelopment/>

1. Discuss topics of interest to each team member. Select a topic with a **clear aim**. Refer to project examples on the next few slides.
2. Projects must have a **material focus**. Such as Goal 12, using recycled materials. **Submit Project Topic by 16<sup>th</sup> Oct via Moodle**
3. **Aim: What sustainable material choices can we make to help fulfill the UN SDGs.**

## Project details:

Your presentation should discuss the following

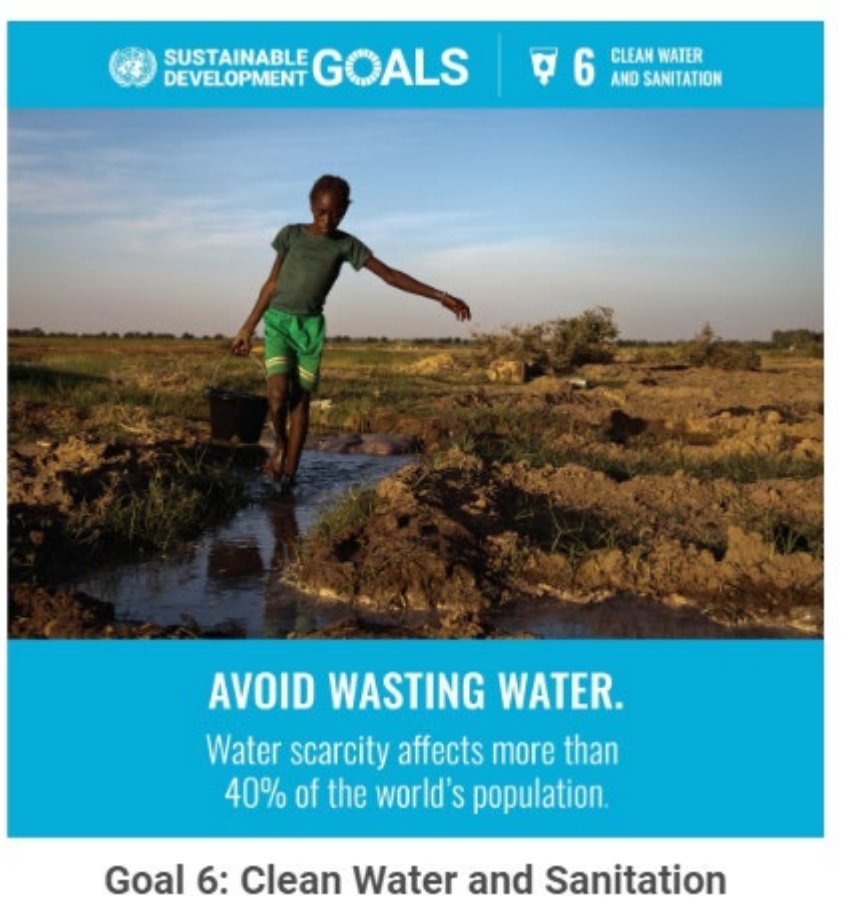
1. **Research:** Conduct research to understand the specific goals, targets, and indicators related to your chosen SDG(s).
2. **Assess current state** (current unsustainable materials): Evaluate the current state of affairs related to your chosen SDG(s) in your chosen project area, such as your community, city, or country.
3. **Identify challenges:** Analyze the barriers that prevent progress towards achieving the chosen SDG(s) in your project area.
4. **Identify materials:** Identify 1 sustainable material options to help achieve the goal.
5. **Assess impact:** Evaluate the potential impact of chosen materials on your chosen UN SDG.
6. **Conclusions:** 3 Key takeaways from your research.

The focus is **materials**: Material properties/Material manufacturing methods/material availability appropriate to the research aim should be discussed



| Assessment Component  | High Distinction (85-100)  | Distinction (75-84)  | Credit (65-74)   | Pass (50-64)   | Fail (0-49)  | /100 |
|---|--|--|--|--|--|------|
| <b>Research:</b> Conduct research to understand the specific goals, targets, and indicators related to your chosen SDG(s).  | Aim and scope is clear. <ul style="list-style-type: none"> <li>• Presentation slides are clear, concise and structured flow.</li> <li>• Speakers are clear and professional</li> <li>• Presentation length 8min</li> </ul>         | Aim and scope is clear. <ul style="list-style-type: none"> <li>• Presentation slides are clear, concise and structured flow.</li> <li>• Speakers are clear and professional</li> <li>• Presentation length 8min</li> </ul> | Aim and scope is unclear. <ul style="list-style-type: none"> <li>• Presentation slides are clear.</li> <li>• Speakers are clear and professional</li> <li>• Presentation length &lt; or &gt; 8min</li> </ul> | Aim and scope is unclear. <ul style="list-style-type: none"> <li>• Presentation slides are unclear</li> <li>• Speakers are not prepared and reading from notes</li> <li>• Presentation length &lt; or &gt; 8min</li> </ul> | No aim defined and presentation slides and speakers are unclear<br>Presentation length < or > 8min                                 | /20  |
| <b>Assess current state</b> (current unsustainable materials): Evaluate the current state of affairs related to your chosen SDG(s) in your chosen project area, such as your community, city, or country. | Topic is linked to UN SDGs <ul style="list-style-type: none"> <li>• Current state of affairs related to your chosen SDG stated</li> <li>• 3 unsustainable materials are identified</li> </ul>                                      | <ul style="list-style-type: none"> <li>• Topic is linked to UN SDGs</li> <li>• &lt; 3 unsustainable materials identified</li> </ul>  | <ul style="list-style-type: none"> <li>• Topic not is linked to UN SDGs</li> <li>• &lt; 3 unsustainable materials identified</li> </ul>  | <ul style="list-style-type: none"> <li>• Topic is not linked to UN SDGs</li> <li>• 1 unsustainable materials identified</li> </ul>   | <ul style="list-style-type: none"> <li>• Topic is not linked to UN SDGs</li> <li>• 0 unsustainable materials identified</li> </ul> | /10  |
| <b>Identify challenges:</b> Analyze the barriers that prevent progress towards achieving the chosen SDG(s) in your project area.  | <ul style="list-style-type: none"> <li>• Addresses current barriers/challenges of using the 3 unsustainable materials</li> <li>• Describes the importance of the material selection choice and discusses sustainability</li> </ul> | <ul style="list-style-type: none"> <li>• Addresses current barriers/challenges of using the 2 unsustainable materials</li> </ul>   | <ul style="list-style-type: none"> <li>• Addresses current barriers/challenges of using the 1 unsustainable materials</li> <li>• Does not addresses current barriers</li> </ul>                              | <ul style="list-style-type: none"> <li>• Addresses current barriers/challenges of using the 1 unsustainable materials</li> </ul>   | Does not addresses current barriers/challenges of using the unsustainable materials  | /20  |
| <b>Identify materials:</b> Identify 1 sustainable material options to help achieve the goal.  | 1 sustainable/alternative materials are identified   |  |  |  | 0 sustainable/alternative materials are identified   | /10  |
| <b>Assess impact:</b> Evaluate the potential impact of chosen materials on your chosen UN SDG.  | An action is given for change. Potential impact is evaluated for changing one of the chosen sustainable materials  | An action is given for change. Potential impact is evaluated for changing one of the chosen sustainable materials  | An action is given for change. Or Potential impact is evaluated for changing one of the chosen sustainable materials   | No action is given for change. Potential impact is not evaluated   | No action is given for change. Potential impact is not evaluated   | /30  |
| <b>Conclusions:</b> 3 Key takeaways from your research  | 3 Key takeaways from your research   | 3 Key takeaways from your research   | 2 Key takeaways from your research   | 1 Key takeaways from your research   | 0 Key takeaways from your research   | /10  |

# Examples



- Goal 6 is focused on clean water and avoiding wasting water

Example Project: Water pipe materials

- PVC / CPVC
  - Copper
  - Galvanized Steel or Iron
- Discuss the 3 materials in relation to use as a water pipe material. Discuss accessibility to these materials and cost of material. Discuss the impact of manufacturing with these materials on the environment. Discuss the potential for using new/recycled materials.

Read more:

<https://www.un.org/sustainabledevelopment/water-and-sanitation/>

# Examples



- Goal 7 is focused on affordable and clean energy (Solar/Wind/Thermal)

Example Project: Solar panels

- Aluminium frame
  - Glass
  - Ethylene vinyl acetate (EVA)
  - Silicon
- Discuss the materials in relation to use as a solar panel. Discuss accessibility to these materials and cost of material. Discuss the impact of manufacturing with these materials on the environment. Discuss the potential for using new/recycled materials. Discuss in relation to a traditional energy source.

Read more:

<https://www.un.org/sustainabledevelopment/energy/>

## 3

# Examples



## Goal 9: Industry, Innovation, and Infrastructure

Read more:

<https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>

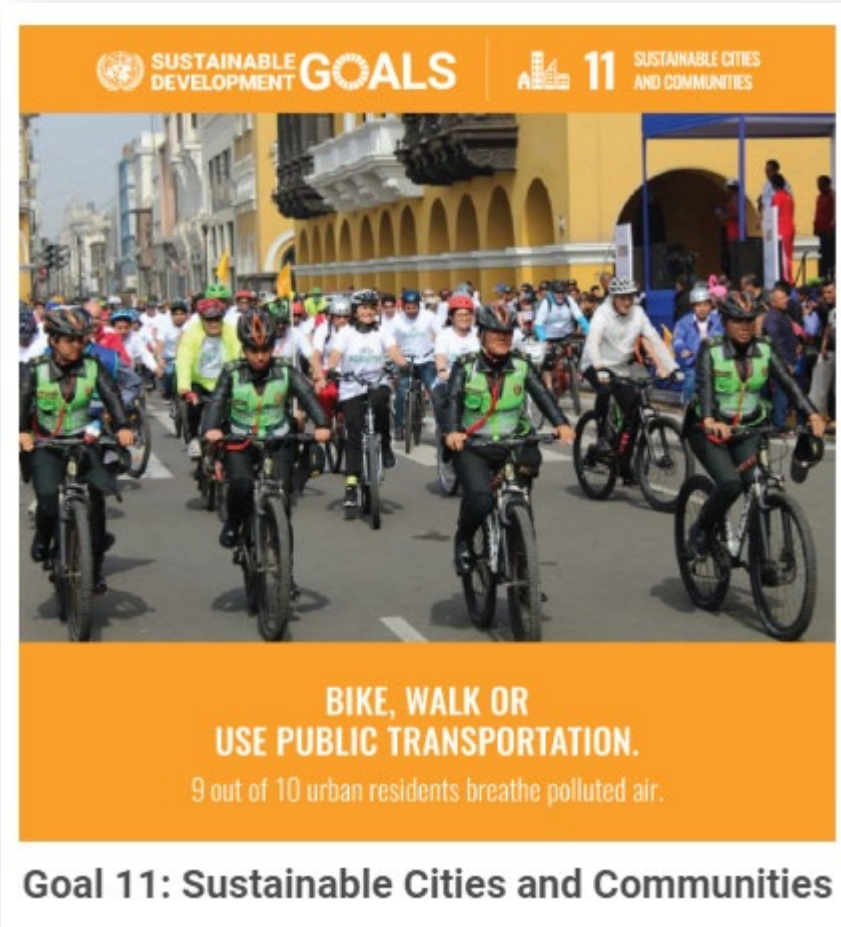
- Goal 9 is focused on infrastructure in developing countries.

### Example Project: Road materials

- Asphalt (made by mixing aggregate with bitumen)
  - Concrete (reinforced/high-strength/pre-cast etc)
  - Waste plastic (recycled plastic)
- Discuss the 3 materials in relation to use as a road material. Discuss accessibility to these materials in developing countries. Discuss cost of material. Discuss the potential for using new/recycled materials.



# Examples



- Goal 11 is focused on clean transportation in cities

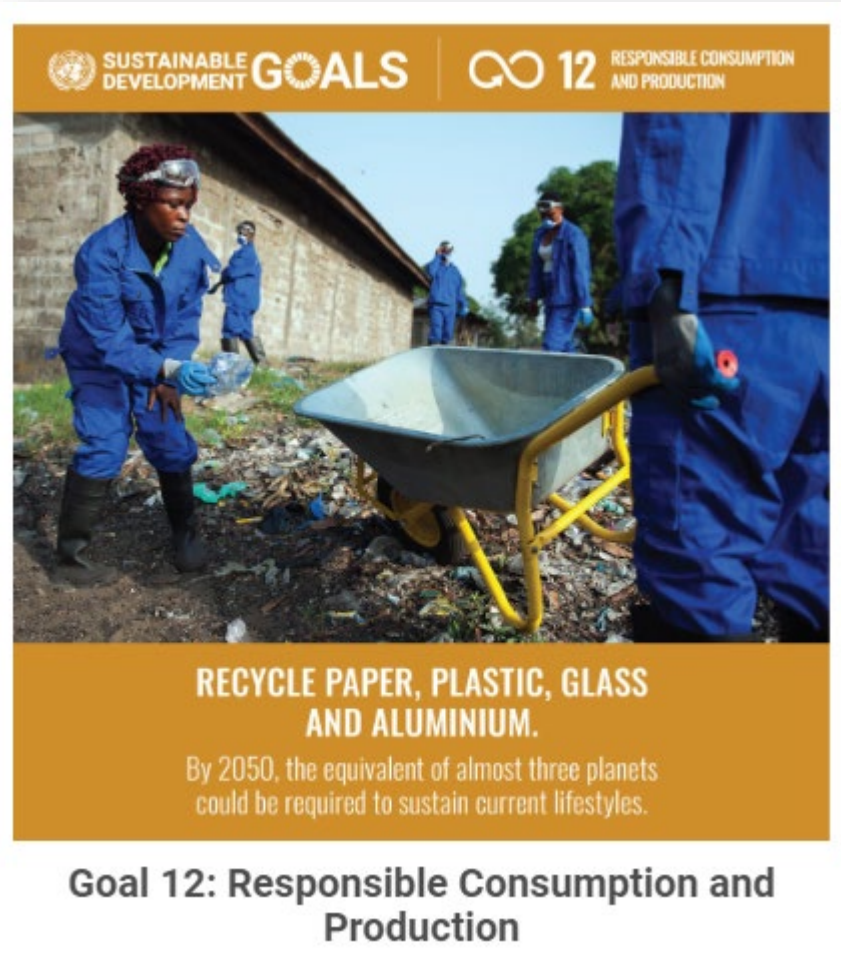
## Example Project: Road bike materials

- Carbon fibre
  - Recycled Plastic
  - Aluminium
- Discuss the 3 materials in relation to use as a bike frame material. Discuss accessibility to these materials and cost of material. Discuss the impact of manufacturing with these materials on the environment. Discuss the potential for using new/recycled materials.

Read more:

<https://www.un.org/sustainabledevelopment/cities/>

# Examples



Read more:

<https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

- Goal 12 is focused on responsible consumption and production

## Example Project: Food containers

- Styrofoam (PS)
- Plastic (PET)
- Glass
- Discuss the 3 materials in relation to use as food container material. Discuss accessibility to these materials and cost of material. Discuss the impact of these materials as single use containers on the environment. Discuss the potential for using biodegradable/recycled materials.

## Example Project: Clothes (Fast fashion)

- Polyester
- Elastane
- Cotton
- Discuss the 3 materials in relation to use as clothes material. Discuss accessibility to these materials and cost of material. Discuss the impact of these materials as 'fast fashion' have on the environment when discarded. Discuss the potential for using biodegradable/recycled materials.

# Examples



Read more:

- Goal 14 is focused on keeping our oceans clean

## Example Project: Bag materials

- Plastic
- Fabric
- Paper
- Discuss the materials in relation to use as a bag material. Discuss accessibility to these materials and cost of material. Discuss the impact of manufacturing with these materials on the environment. Discuss the reuse of the materials as a reusable bag. Discuss the impact on the oceans if the material ends up there. Discuss the potential for using new/recycled materials.

## Example Project: Fishing materials

- Plastic containers
- Fabric nets
- Recycled/repurposed materials

<https://www.un.org/sustainabledevelopment/oceans/>



Vary Your Sources



Evaluate Your Sources



Narrow Your Topic



Organize Your  
Research



Present Your  
Research





# Have a look at just a few of the many things you can do to make an impact!



<https://www.un.org/sustainabledevelopment/takeaction/>

<https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/10/LazyPersonGuide.pdf>

**SUSTAINABLE  
DEVELOPMENT GOALS**



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DEVELOPMENT **GOALS**