Biomass

A sustainable alternative for energy production

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Biomass

A sustainable alternative for energy production

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VICEVERSA

Glosary

1. **Fossil Sources:** Hydrocarbons originating from the decomposition of animal or plant matter over millions of years under high pressures and temperatures. Coal and petroleum are salient examples. [1]

2. **Biomass:** Organic matter originating from sources such as plants or animals. [2]

3. **Sustainable:** This term highlights the importance of economic development guided by the principles of environmental care and social equity. [3]

4. **Paris Agreement:** A treaty created within the framework of the United Nations (UN) aimed at promoting international cooperation to advance the mitigation of climate change and its effects. [4]

5. **Decarbonizing:** It means reducing the use of fossil fuels to mitigate the emission of greenhouse gases (GHGs) associated with climate change. [5]

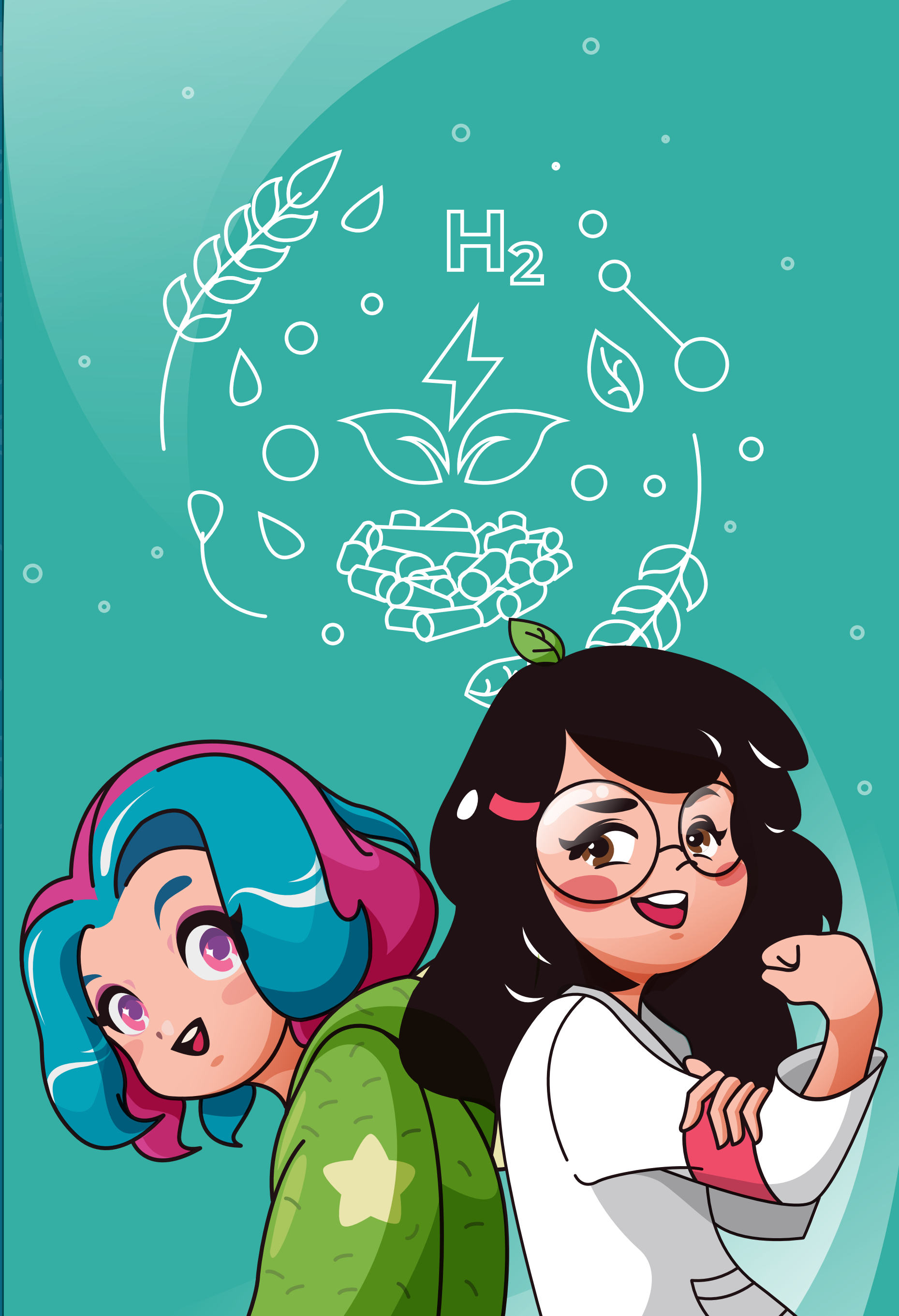
6. **Biofuel:** Fuel that comes from or is made from biological matter. [6]

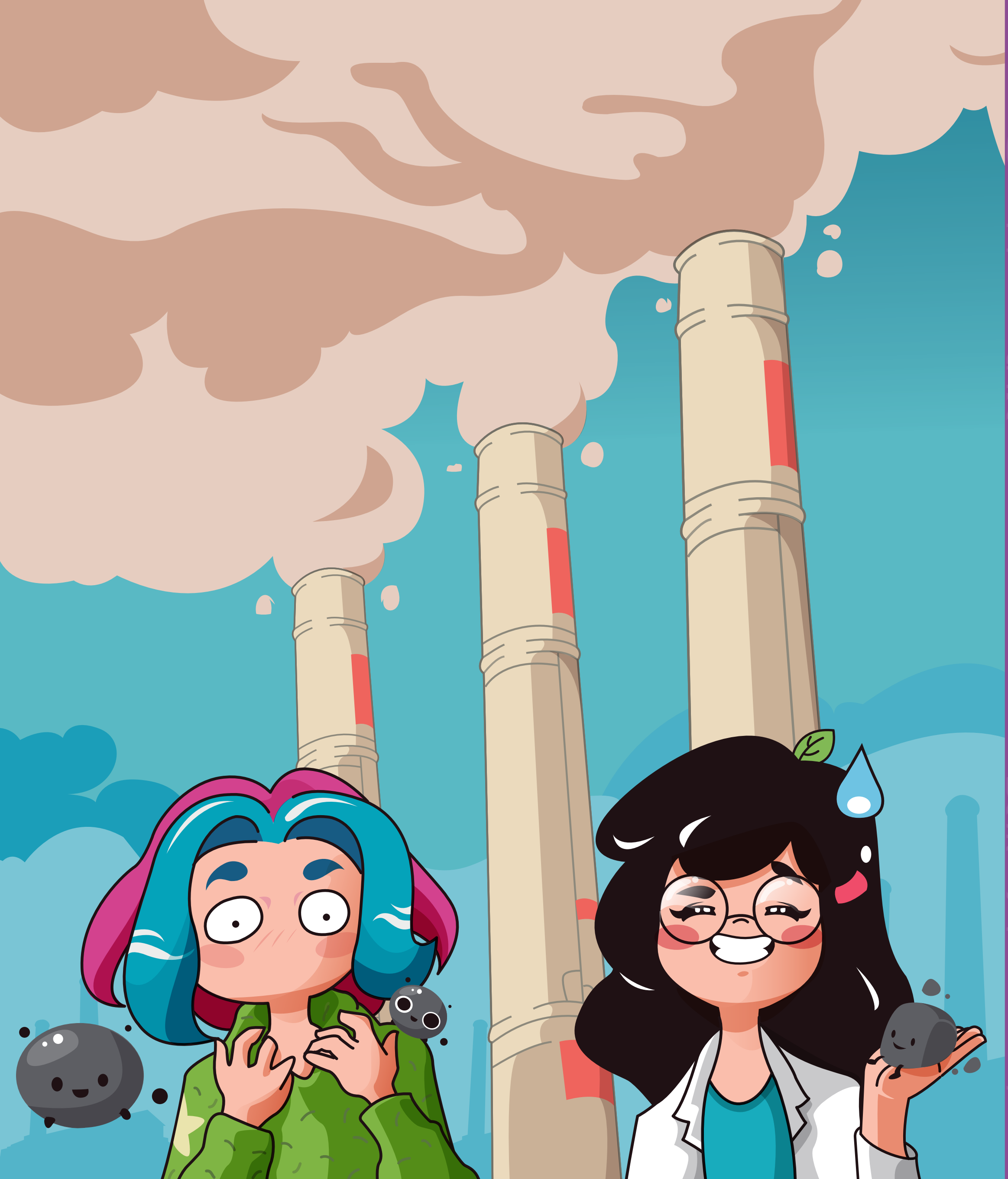
7. **Greenhouse Gases:** Gases like CO_2 (carbon dioxide), CH_4 (methane), and others associated with the rise of global warming. [7]

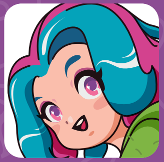
8. **Bioenergy:** Energy obtained from renewable and natural sources—a sustainable alternative for energy generation and use. [8]

9. **Green Chemistry:** This branch of chemistry focuses on the use of natural resources and optimizing the use of energy and other scarce raw materials to develop sustainable and environmentally friendly processes where the participation of stakeholders from industry, academia, and government is essential. [9]

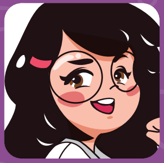
10. **Bioeconomy:** This concept has evolved from an approach to employing knowledge and biological resources in favor of the productive sector to one where innovation in frontier sciences, such as biotechnology, has allowed for cutting-edge solutions in areas like health and energy, among others. [10]



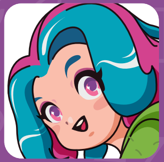




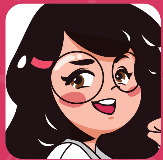
Bionikté:
Did you know that most of the energy we use around the world comes from fossil fuels? Petroleum and coal, for example.



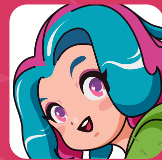
Teknisofi:
Yes. There are renewable energies, like those produced from biomass, which are a sustainable alternative with significant potential in the energy production market.



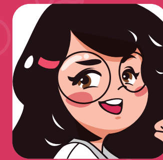
Bionikté:
That's right! Today, renewable energy isn't used to its full potential and could be utilized much more. However, there are technical and political challenges to generating and using it on a larger scale.[11, 12, 13]



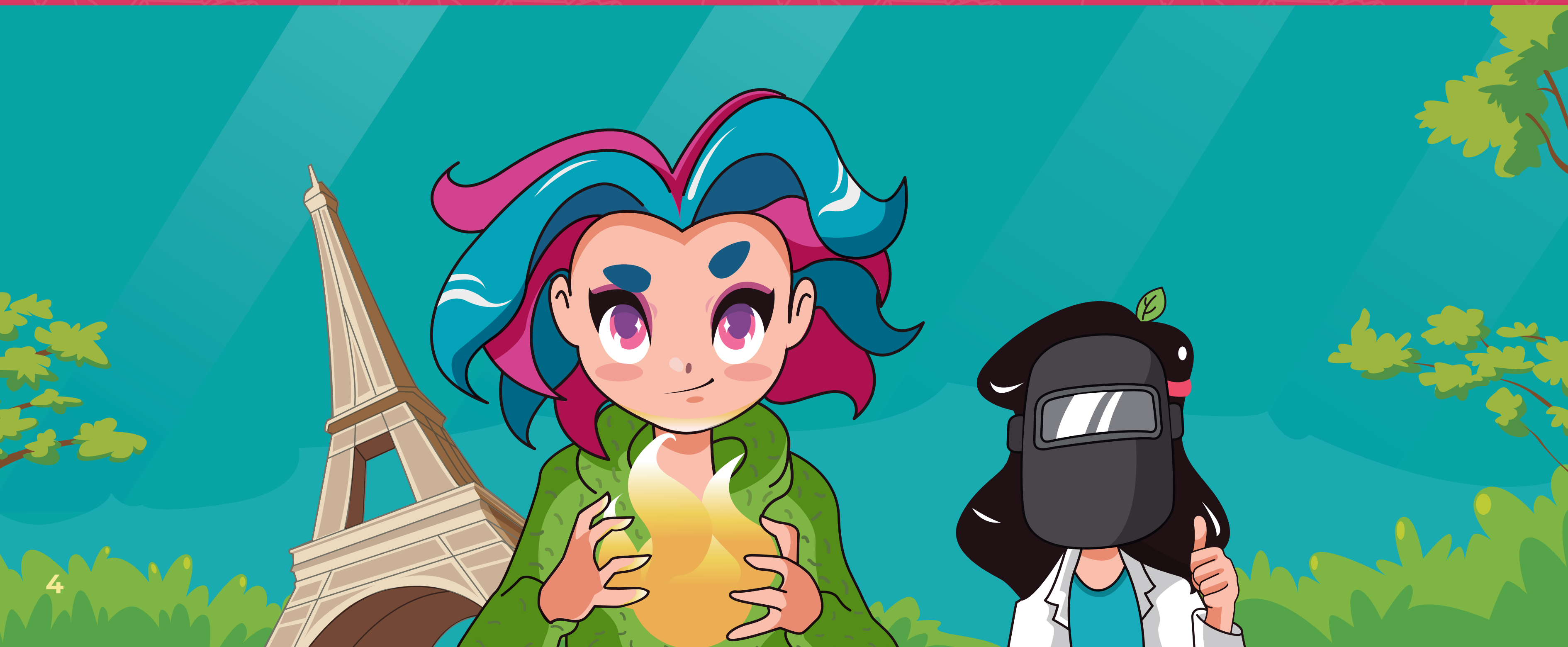
Teknisofi:
But it's important to say that there've been efforts to move towards different types of energy, like the Paris Agreement, which suggests we need to "decarbonize" the way we produce and use energy.

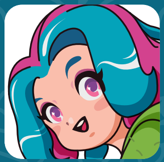


Bionikté:
That's why it's necessary to produce clean energy by promoting research and development (R&D). For example, solar and wind energies are cheaper and more accessible.

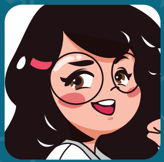


Teknisofi:
Sure, but there are political and market challenges, and also technical ones. Plus, these new ways of producing energy still haven't reached the same results as conventional energy sources.[14, 15, 16]

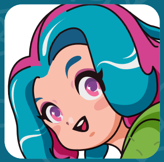




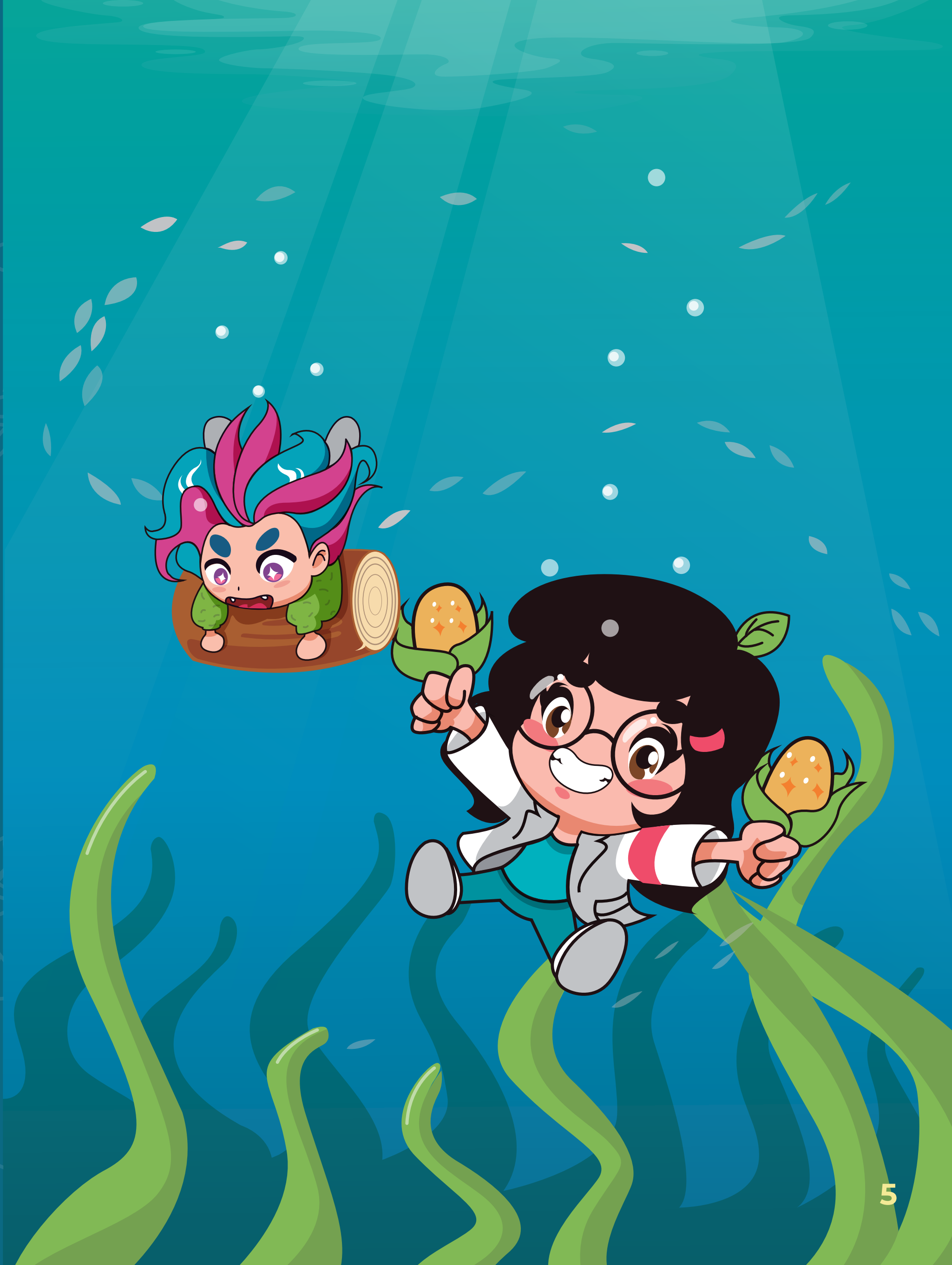
Bionikté:
Even though renewable energy sources like wind and solar still have a small share in total energy production, their potential output is significant.

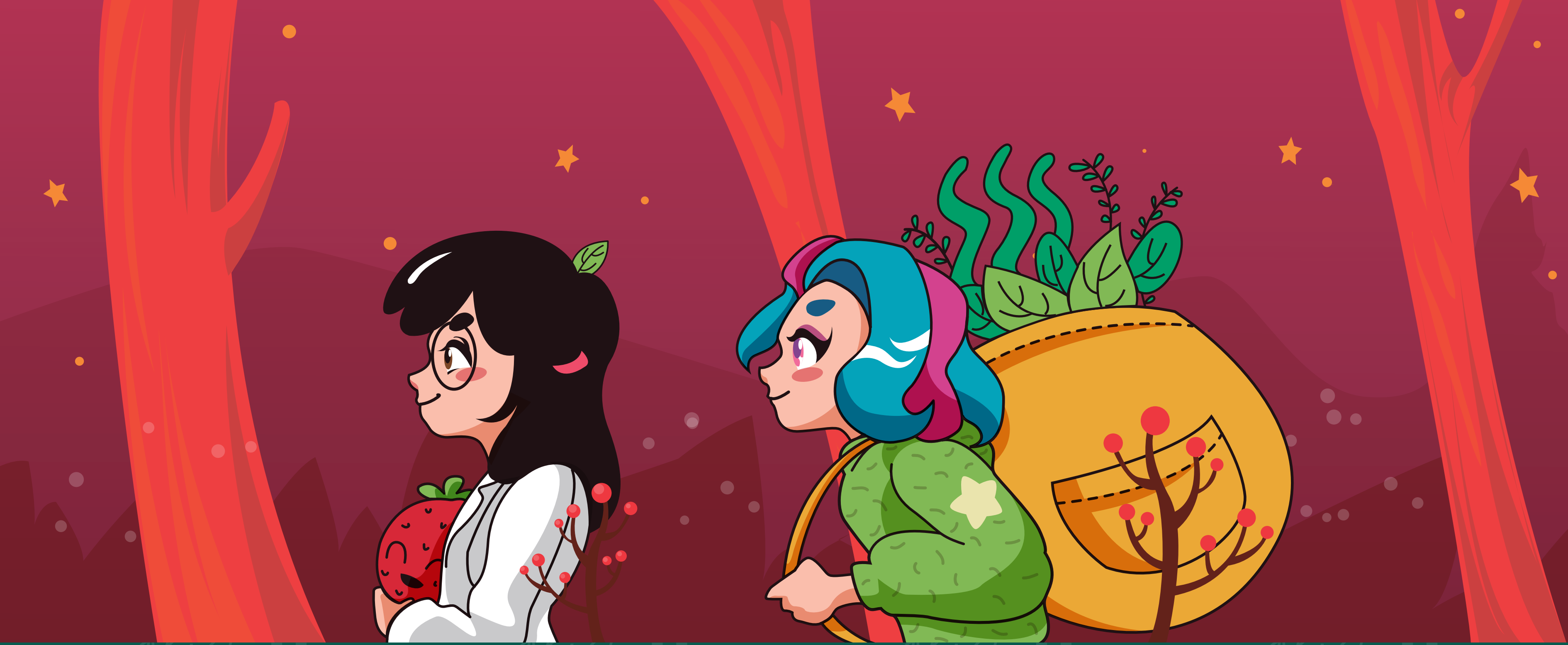


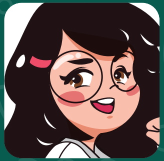
Teknisofi:
The energy produced from biological resources can be used in various ways. These sources include resources from aquatic environments and land resources like firewood, corn, seaweed, and some microorganisms.[17, 18, 19]



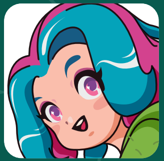
Bionikté:
There are other kinds of eco-friendly technologies, like some that use hydrogen, biofuels, or produce geothermal energy. But there are considerable technical and market challenges in using these, too.[20, 21]



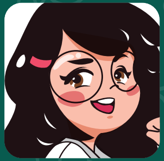




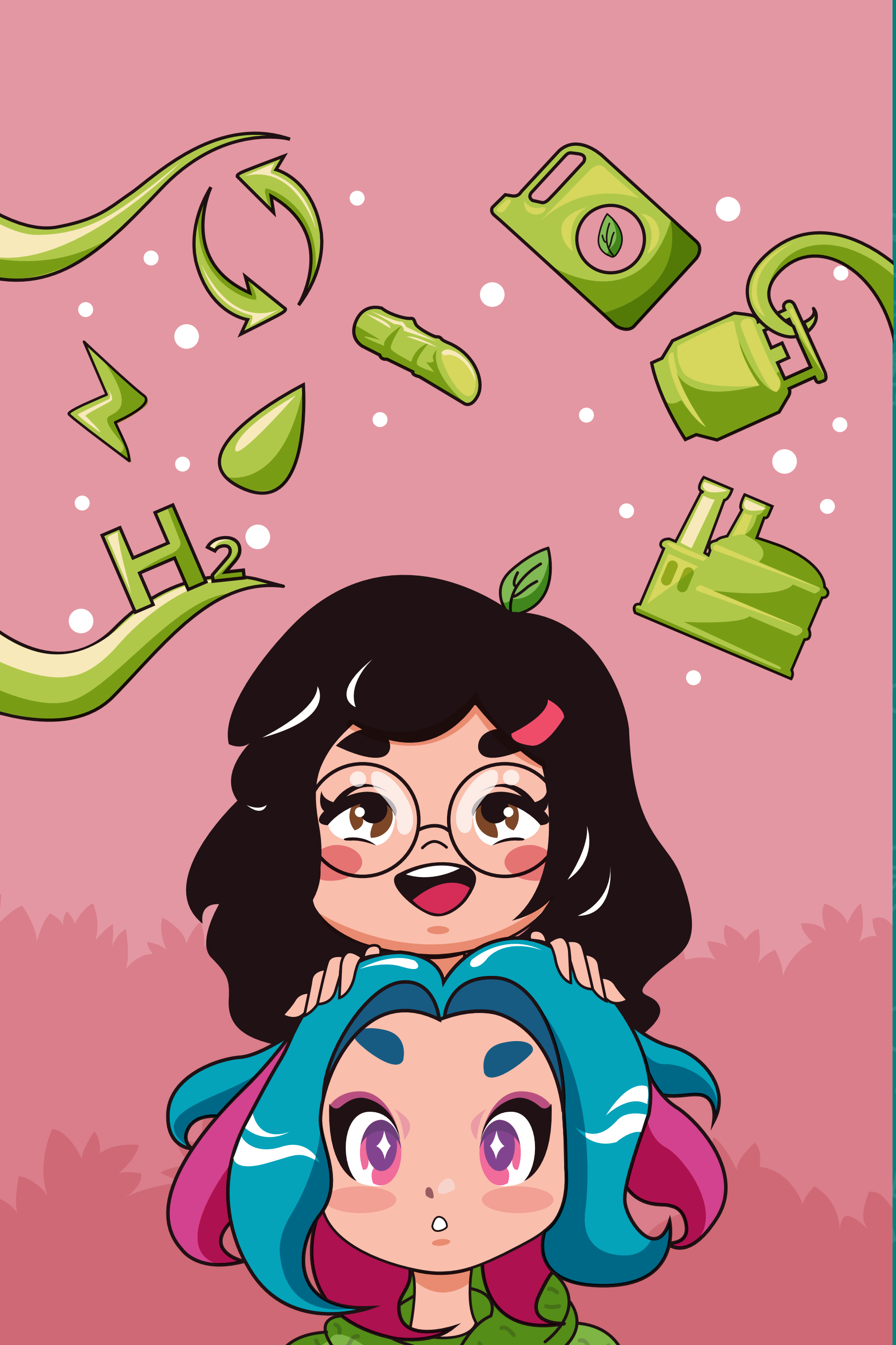
Teknisofi:
There's a huge demand for energy all around the world, so we need to find ways to produce clean and sustainable energy, and we have to take into account society, the environment, and the economy. [22]

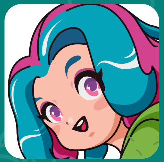


Bionikté:
Generating biomass is a good idea! This is how you can take advantage of food crops, waste, weeds, and other wild growth. [23]

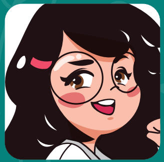


Teknisofi:
Capitalizing on waste is a great idea for producing the energy society and industry need. That's how we can curb greenhouse gas emissions and boost the use of various waste sources. [24]

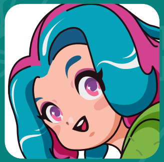




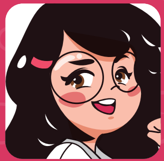
Bionikté:
That's right. Biomass is dynamic and can be applied in lots of ways depending on its sources and uses: from food to agricultural and industrial production. [25]



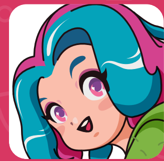
Teknisofi:
In fact, biomass can really boost renewable energy since it can be transformed into biofuels like gas, some of which are used in industry, as well as liquid fuels and other forms of energy.



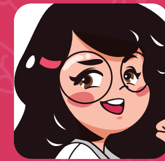
Bionikté:
Yes, and you can also sustainably produce secondary energies, like hydrogen from biomass and its derivatives. [26, 27, 28]



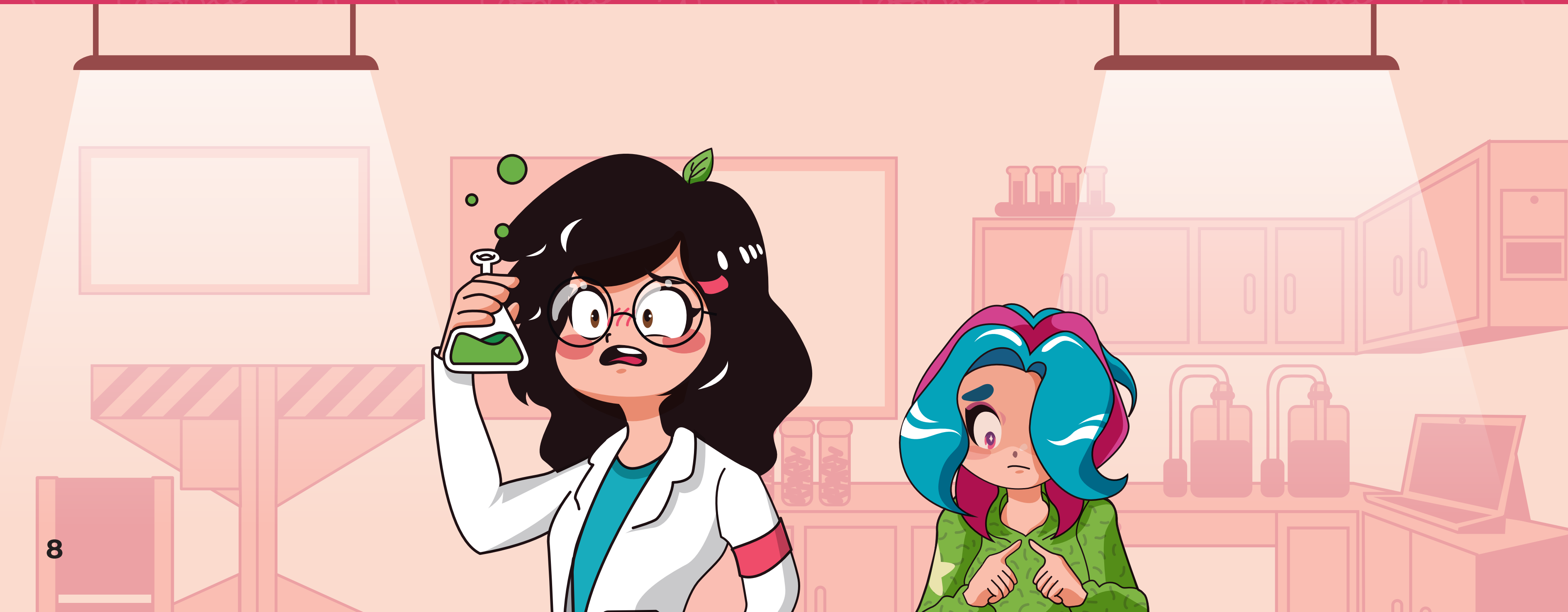
Teknisofi:
But we must keep in mind that producing bioenergy requires following a lot of steps and processes, like harvesting, pre-treatment, and processing. That’s why it’s really important to develop the technology to generate this kind of energy. [29]

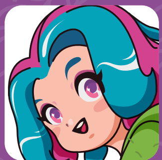


Bionikté:
Biomass is definitely an alternative input for producing hydrogen and ethanol sustainably. [30,31]

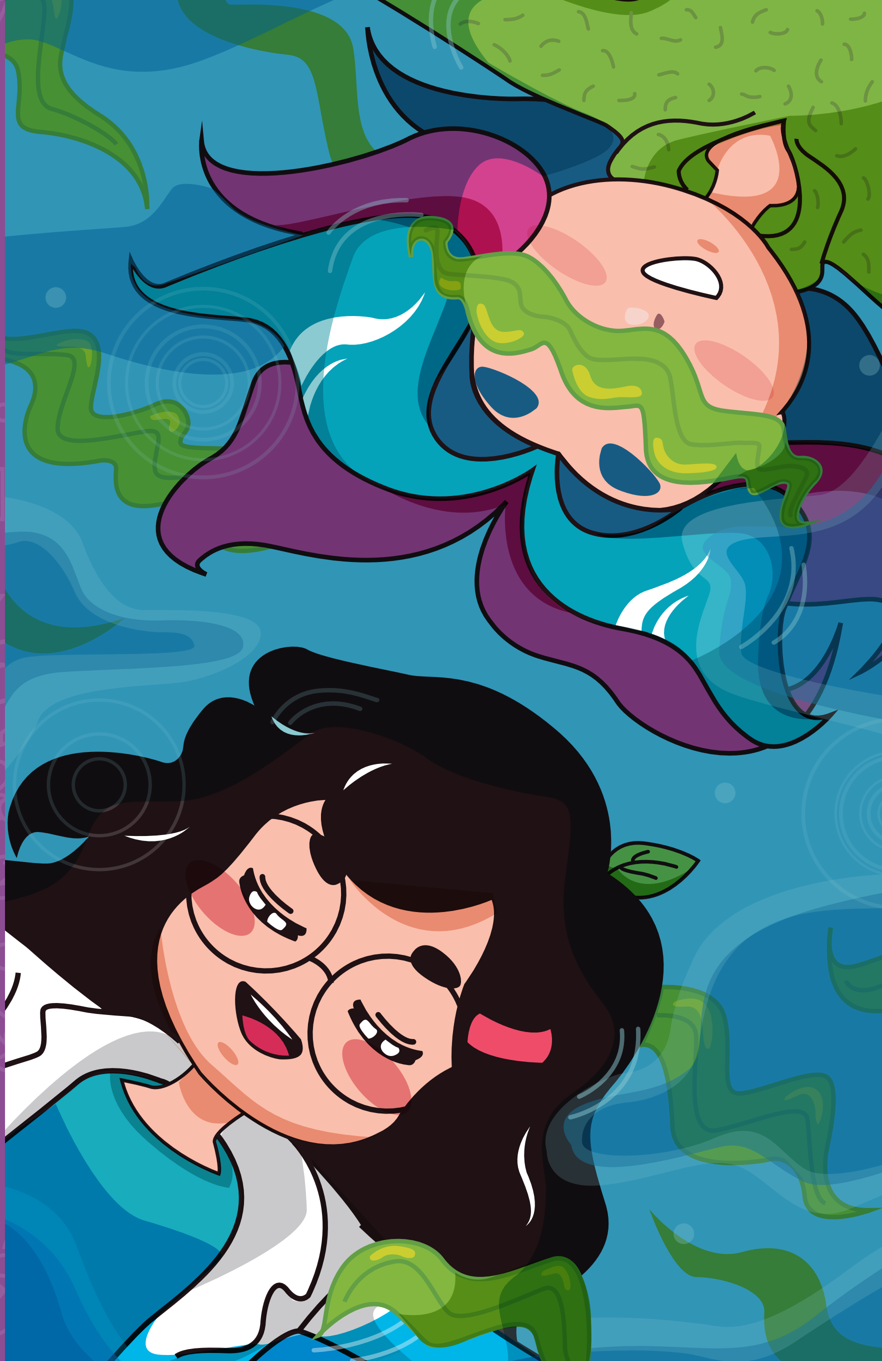


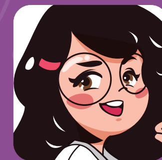
Teknisofi:
We´ve said that processes are really important because, for example, using first-generation bioethanol made from products like corn or sugarcane would be really costly and would also put those foods at risk. On the other hand, a potentially cheaper and more sustainable process would be obtaining second-generation bioethanol from lignocellulosic biomass, for example, from wood and vegetation waste. Although this still isn’t efficient because it’s really hard to process. [32]



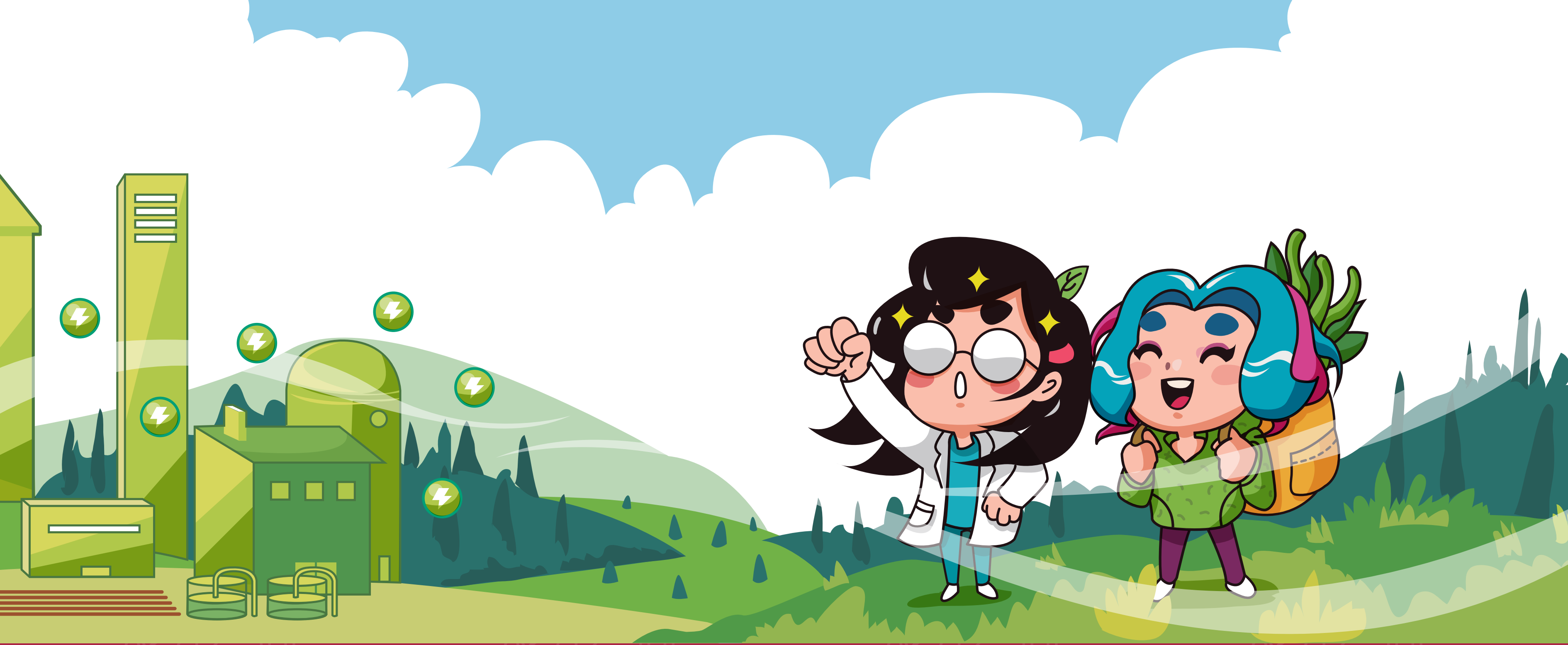


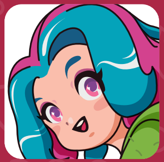
Bionikté:
Bioethanol is the most used liquid biofuel, and it's really important because it helps reduce pollution. It's also an option to traditional fuels, though it still faces various barriers to its marketing. [33, 34]



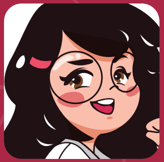


Teknisofi:
Algae is another source of biofuels. They've got many advantages, for example, they can be used for treating wastewater while generating energy.[35] For now, fossil fuels are the most used worldwide, but we shouldn't forget they're a finite and non-renewable resource. [36]

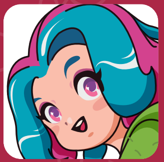




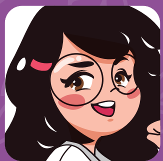
Bionikté:
Energy is essential for society and the economy. [37] That’s why renewable energy is so important for achieving sustainable management. [38]



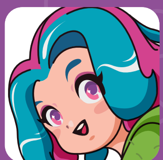
Teknisofi:
There are instruments to assess sustainability when generating electricity from renewable sources. These measure things like prices, pollution emissions, what technology we’ve got, efficiency, resources, and social impact. [39]



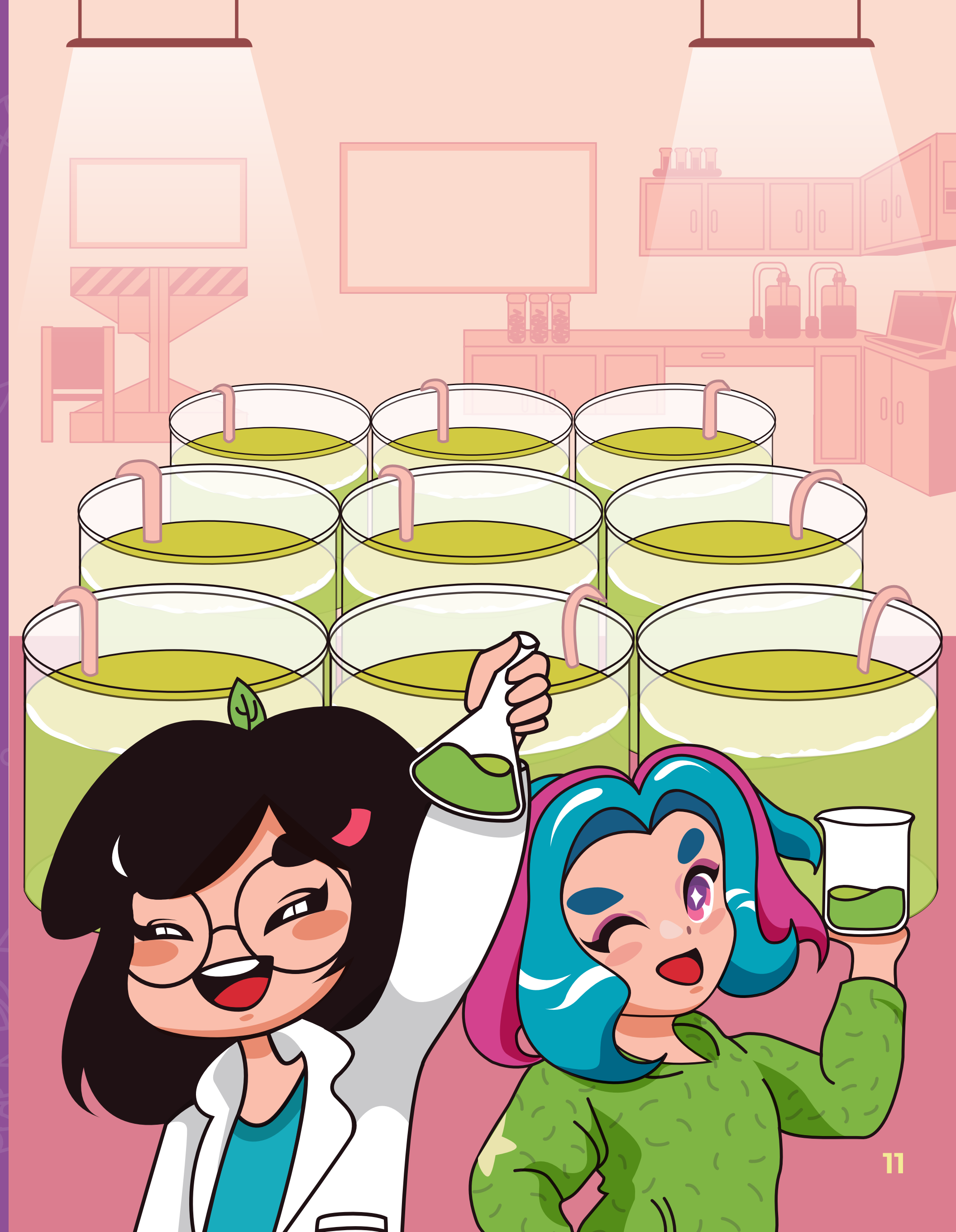
Bionikté:
We also need to consider costs and how profitable it is to produce liquid biofuels like biodiesel and bioethanol. This’ll depend on the geographic location, the availability of biomass, the technology on hand, and the government policies. [40]

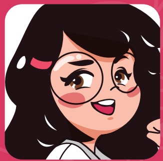


Teknisofi:
Gaseous biofuels are really important for the transportation sector, so their progress will be crucial for providing better prices. [41, 42]

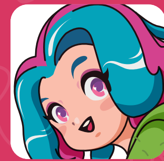


Bionikté:
Sure. To successfully process biomass and obtain biofuels and other biochemical products for the industry, along with value-added products, we need to develop the biorefinery and implement green chemistry techniques and others that have low environmental impact—that's how we'll grow a sustainable bioeconomy. [43, 44, 45]

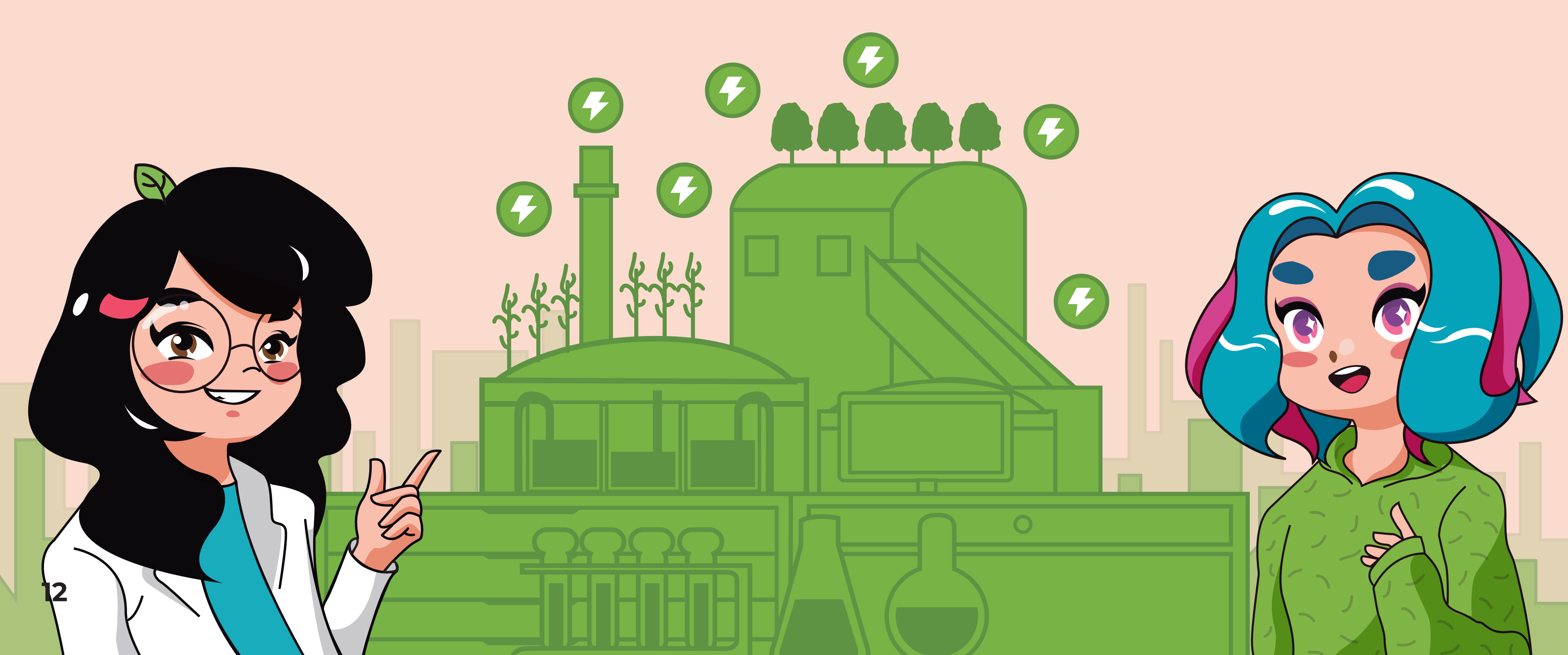




Teknisofi:
And it's very important to know what options there are for producing renewable energy. With the progress of technology, we'll be able to use more and more inventions for social benefit and economic development.



Bionikté:
Right. We must keep talking to figure out how new technologies can really push sustainable development for the benefit of society. We'll see you soon with a new topic!



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