



# CHANGING THE GAME IN-GAME MANUAL PART 1

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IN-GAME MANUAL PART 1



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# INTRODUCTION

## HOW TO USE THIS MANUAL

This manual will guide you step-by-step through the game. It is structured into elementary tasks, but will leave you and your group to make all the decisions. *Take turns reading out loud* – it is crucial to the outcome of today. Pick the first person to read out loud now.

Please read the instructions carefully, and make sure *everyone* is following the process. Discuss everything. Please *do not* write in this manual.

The red GO! signs  indicate a full stop. When you reach a full stop:

1. Stop and make sure everyone has understood what has just been read.
2. Discuss the part you read to make sure you understand the real world implications of what you are about to do.
3. Do it! GO!
4. Pick a new person to read out loud.

Your group consists of people with different backgrounds and disciplines. Some might have an easier time understanding the procedure at certain times than others, so remember that you are a team and your job is to help each other reach a common goal.

The purpose of Changing the Game is to lay out the opportunities for Europe's energy future. Creating your own future scenario is a learning process. You can choose between solutions that recognize economic, political, cultural and technical barriers.

## PART 1 – DEVELOPING A SOLUTION FOR YOUR REGION.

Your task today is to visualize, plan, and develop a scenario for the energy system in your region. Three other groups will be dealing with the other regions of Europe.

The goal of the first part is to play with and learn about some of the complexities in designing an energy system. We want you to strive for your vision of an ideal energy system. On the way, you will experience dealing with technical limitations and the relative costs of different solutions.

Planning an energy system requires many decisions, each with their own specific consequences. Some consequences can be measured by numbers, others cannot be measured. However, they may be equally important.

Changing the Game only accounts for consequences that can be measured, but we encourage you also to discuss the political, cultural and social dimensions of your decisions. Your reflection on these dimensions will come in handy at a later stage.

All in all, we hope that you will learn, have fun, and feel empowered to change our energy future.



## THE GAME SETUP

All the materials you will need for the rest of the day can be found in your game bag. Don't open the bag now. You will be instructed to take out items when needed.

By now you will have met your facilitator. Make use of your facilitator, (s)he can't wait to help.

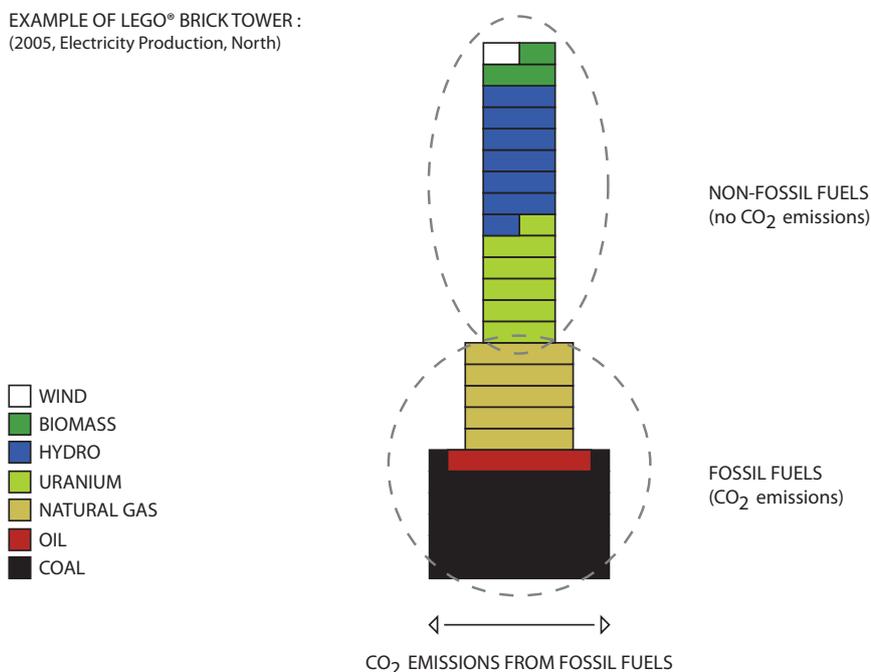
In front of you is a projection of the energy consumption of your region as it will look in 2030 if current trends in economic and technological development continue unchanged. This scenario is called BAU2030 - i.e. Business As Usual. The energy resource use is broken down into five towers: transportation, heat (for buildings), industry, electricity consumption and electricity production. Note that the two electricity towers have the same height.

The electricity consumption tower contains grey bricks only. These bricks come in two sizes, corresponding to *base* electricity and *peak* electricity. These concepts will be dealt with later.

For the colored towers three aspects are important to consider: **color composition**, **height**, and **width**.

- The **color composition** of the towers represents energy consumption of specific energy resources in a particular sector: coal (black), oil (red), natural gas (sand), nuclear (light green), biomass (dark green), hydro (blue), and wind (white).
- The **height** of a tower is a measure of the total energy use in that specific sector. Changing the height by adding or taking out bricks corresponds to changing the total **energy** consumption of that sector. Please note that every layer is composed of *two* bricks.
- The **width** of the fossil fuel bricks (coal, oil and natural gas) represents the amount of CO<sub>2</sub> emitted by using these energy resources. For the non-fossil fuel resources, we assume that CO<sub>2</sub> emissions are negligible. Compare how much CO<sub>2</sub> is produced by these different resources.

EXAMPLE OF LEGO® BRICK TOWER :  
(2005, Electricity Production, North)



On your table you will find an envelope labeled "Quiz". Open it and take a few minutes to complete the quiz *individually*. Once done, compare your answers and help each other to understand the composition of the towers.



## PHASE I: TARGET SETTING

Every energy plan starts with a wish to fulfill certain targets and objectives. Now you should set your own targets for your region.

### TASK A: COMPARE THE 2005 SCENARIO WITH BAU2030 (5 MIN)

Look at the *Target & Result poster* on the wall to compare the towers for 2005 and the BAU2030 scenario. Recall that the BAU2030 towers represent the energy consumption for your region as it will look in 2030 if current trends in economic and technological development are continued unchanged.

Take a few minutes to discuss the different energy resources and make sure you understand the implications of their usage. What does the BAU2030 scenario imply for the future climate, the security of supply and the prosperity of your region?



### TASK B: UNDERSTAND YOUR REGION (10 MIN)

On the wall, you will find a *region fact sheet* with background information on your region including three maps of:

- Europe by night, showing where energy is consumed
- The solar potential for different regions
- The wind potential for different regions

Have a look at these maps - they can give you an idea of the renewable energy production potential and the energy consumption in your region.

Now take a look at the factsheets with *key figures on climate change*, CO<sub>2</sub> emissions and made commitments for 2020. You may use this sheet as an inspiration when completing Task C.

Discuss what aspects are most relevant for your region.



### TASK C: SET YOUR TARGETS (15 MIN)

Now you are going to discuss the targets for your region. In your discussion, keep in mind the materials you looked at in Tasks A and B.

#### CONSIDER THE FOLLOWING QUESTIONS:

- What CO<sub>2</sub> emission level (tonnes per capita per year) do you want to aim for?
- What should the future total energy consumption be? Do you want to aim for energy savings in the future?
- How large a fraction of your energy consumption (%) should come from renewables?
- How much oil and gas should ideally be consumed in 2030?

#### IN YOUR DISCUSSION, INCLUDE ALSO THE MORE QUALITATIVE ELEMENTS OF YOUR TARGETS, FOR EXAMPLE:

- Do you support the use of nuclear power or carbon-capture and storage (CCS) technology?
- How exactly will you change the energy consumption or the CO<sub>2</sub>-emissions in the different sectors?
- How large an impact do you expect from behavioral changes?

Note that the last three questions are merely *suggestions* meant to contribute to a fruitful discussion. You are encouraged to bring up any other issues you consider significant.

When you reach an agreement write down your targets on the *Targets & Results poster* in the spaces provided in the top left box. Write quantitative targets in the four small boxes and qualitative targets in the big box labeled "other targets".

You can always refer to your targets when you make decisions at later stages of the game.

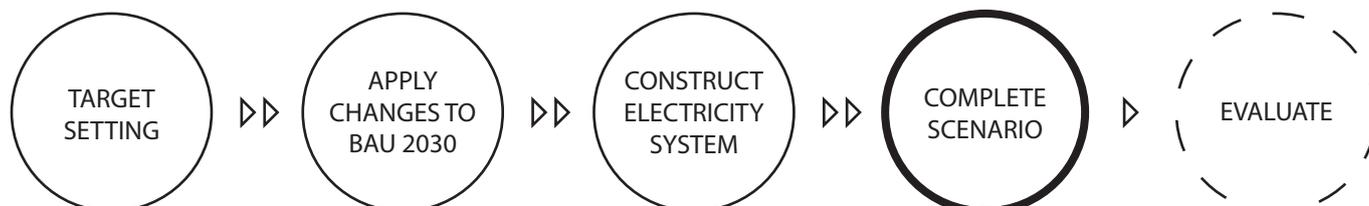


## PHASE II: CHOOSING YOUR PATH

You have now set your targets based on your vision for the future. It is now time to introduce reality.

Keeping your targets in mind, you will now begin to apply changes to the BAU 2030 towers. Think of these changes as choices at the crossroads on the way to 2030.

The figure below illustrates the game process from now and until the end of part 1.



### TAKE OUT THE FOLLOWING FROM YOUR GAME BAG:

- Change cards
- Bag with colored energy resource LEGO® bricks
- Fuel price list
- Accounting sheet
- Savings bucket
- Electricity consumption LEGO® bricks (grey)



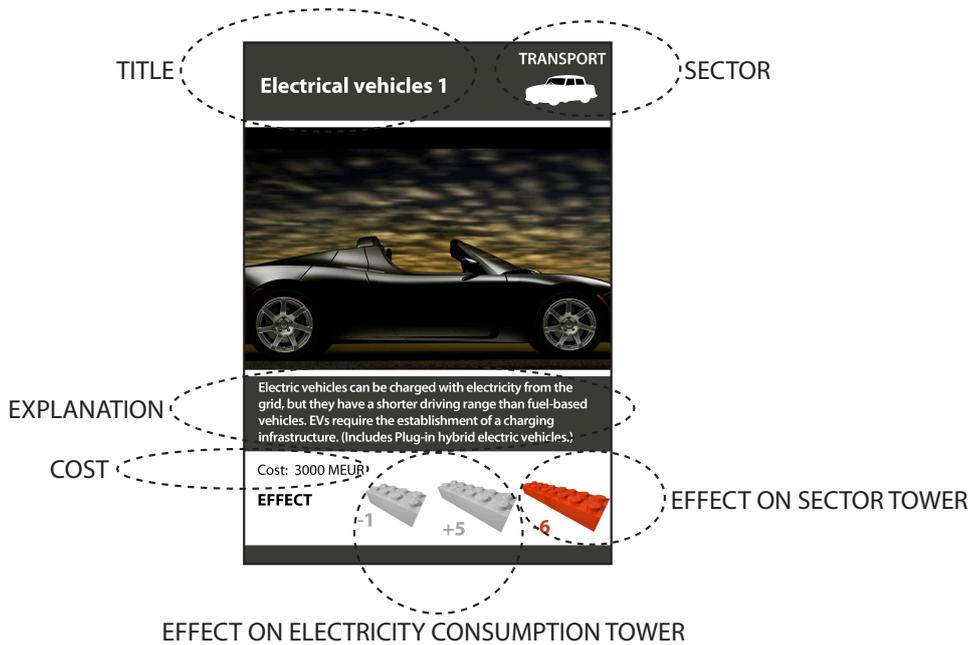
### TASK A: INVITE YOUR FACILITATOR OVER (15 MIN)

Ask your facilitator to give an example of how a change card is built up and works. Make sure you understand the entire process and effect of implementing a change card.

After your facilitator has explained the card you may take a look at the boxes on the following pages. These elaborate on how the change cards work.



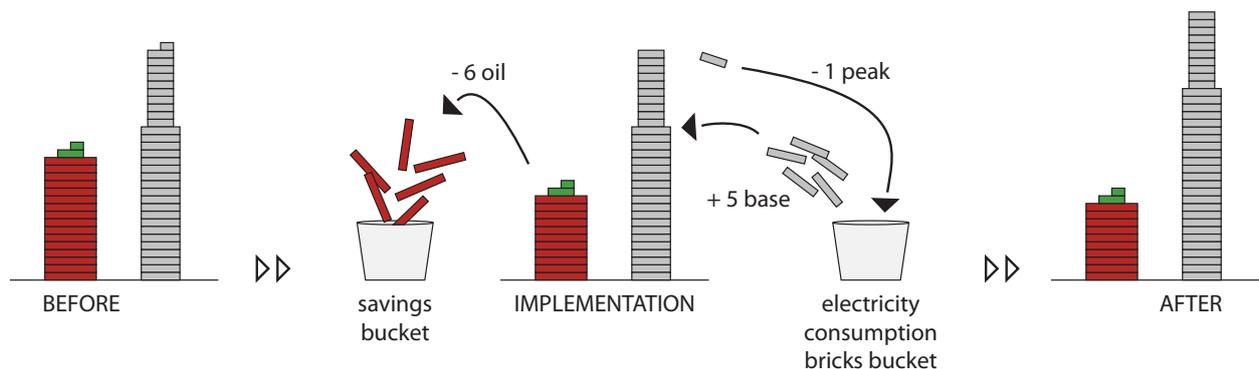
# EXAMPLE: IMPLEMENTING ELECTRICAL VEHICLES 1



Introducing electric vehicles instead of traditional cars will make oil consumption go down (oil savings), since gasoline and diesel comes from oil. Total electricity consumption goes up since vehicles now need to be charged. However, the base electricity consumption *increases*, whereas the peak electricity consumption *decreases*, why this is so is explained in the next page.

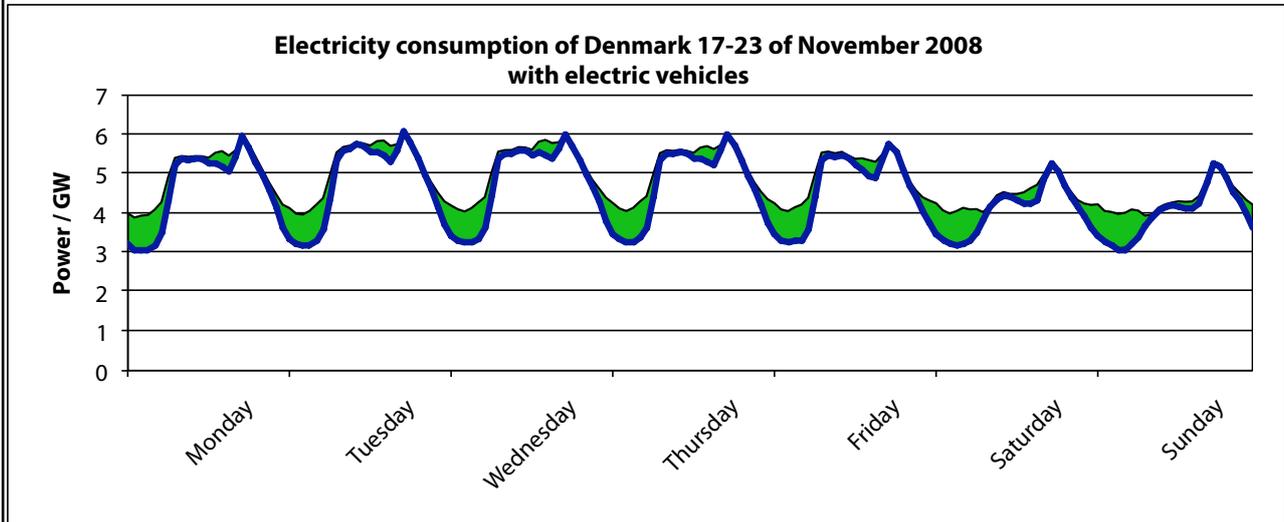
The figure below illustrates how bricks should be moved around when implementing the change card Electrical Vehicles 1.

## APPLYING ELECTRICAL VEHICLES 1:



## EXAMPLE: IMPLEMENTING ELECTRICAL VEHICLES 1

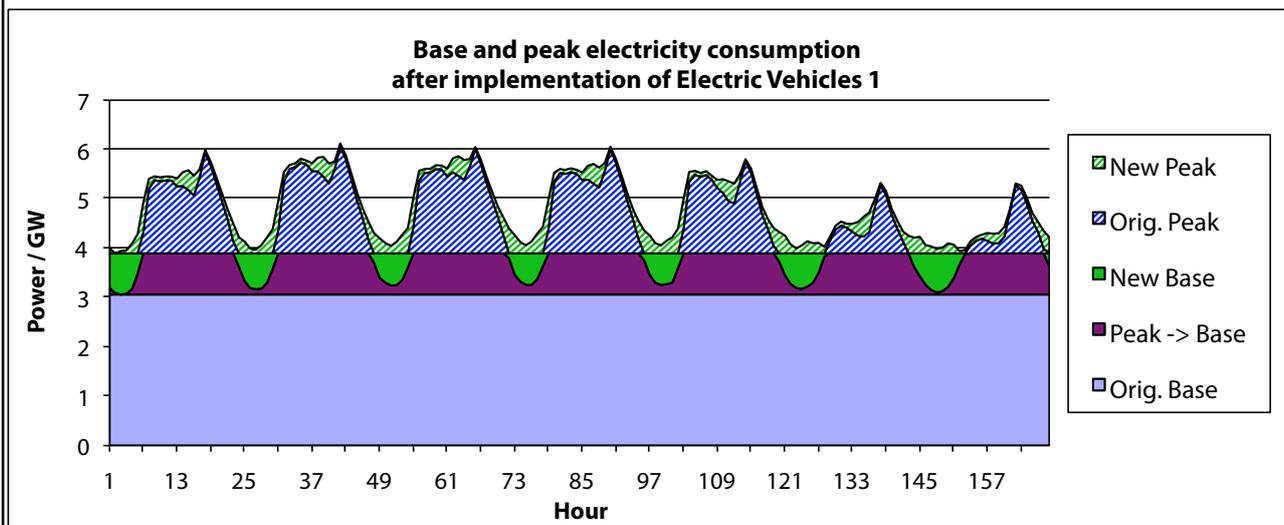
Assuming that charging primarily takes place at night we get the consumption profile below. The dark blue curve is the original curve (similar to the figure in the background material), the green area is the electricity used for charging.



ADDING ELECTRIC VEHICLE CHARGING HAS THREE EFFECTS (AS ILLUSTRATED IN THE FIGURE BELOW):

1. Base electricity consumption goes up (New Base) – Because the vehicles charge at night.
2. Part of what used to be peak electricity demand becomes part of base electricity demand. (Peak → Base) – Because this demand now is part of the continuous base demand.
3. New peak demand is added (New Peak) – Due to day time charging of electric vehicles.

The net effect is an *increase* (+5 bricks) in base electricity consumption, whereas the peak electricity consumption *decreases* (-1 brick). Overall electricity consumption increases (+4 bricks).



## TASK B: SORT THE CHANGE CARDS (45 MIN)

Go through all the change cards one at a time. Show the card and read the *entire* card text and information *aloud* to each other.

For each card make a group decision sorting the cards into three piles.

**Yes** : Changes you definitely want to implement.

**Maybe** : Changes you might want to implement.

**No** : Changes you definitely do not want to implement.

You may choose to implement as many change cards as you want to.

Since YOU HAVE LIMITED TIME TO DO THIS, do not spend too much time discussing each card. When in doubt, put the card in the “maybe”-pile.



## TASK C: PICK A BRICK BANK MANAGER AND A ACCOUNTANT (5 MIN)

Like the good planners you are, keep track of the economics of your solutions. Pick two people for the following roles:

- A **brick bank manager** – as in Monopoly, one player manages the bank but can still participate in the game. The group does not own the energy resources in the bank.
- A **accountant** – keeps track of expenses and savings and deals with the brick bank on behalf of the group.

Give the *Fuel price list* to the brick bank manager and the *Accounting sheet* to the accountant.



## TASK D: IMPLEMENT CHANGES (15 MIN)

Energy systems are expensive and you need to invest money if you want to implement technologies to change your energy consumption. Remember that investing in energy solutions can be at the expense of other welfare services.

Have a look at your region’s fact sheet to get an idea of the number of people who will be paying for and benefitting or possibly suffering from your solution.

Now, take the change cards from the “Yes” pile and go through them one at a time.

1. Apply the changes to your towers
  - Note that the electricity consumption bricks have their own bucket.
2. Update the accounting sheet to keep track of the expenses.
3. Place all savings (i.e. bricks removed from the towers) in your energy savings bucket.

Make sure everyone in your group understands the real world implications of implementing each change card!



### TASK E: GET MONEY FOR THE SAVINGS (5 MIN)

Once you've finished implementing changes, you should find out how much money you will be saving on fuels relative to the BAU2030 scenario.

Take the bricks in your savings bucket and "sell" them back to the bank. Consult the fuel price list.

The money you will receive in return corresponds to money not spent on fuels in 2030, compared to the BAU2030 scenario.



### TASK F: MIDWAY EVALUATION (5 MIN)

You have now taken the first big step in changing the future of your region's energy system. It's time to do a midway evaluation before proceeding to transforming the electricity system.

Do you have a positive or negative balance after implementing changes and cashing in savings?

Do you use more or less electricity than in the BAU2030 scenario?



## PHASE III: POWER YOUR FUTURE

In this phase you will take a look at the electricity sector and transform it to fit your future vision.

The BAU2030 electricity *production tower* is the electricity system that will be built if we continue with business as usual. You will probably agree that this future scenario is not optimal. By rejecting this future you once again find yourself standing at the crossroads on the way to 2030. You now need to make a choice of which way to go.

### TASK A: SELL THE BAU2030 ELECTRICITY PRODUCTION TOWER (5 MIN)

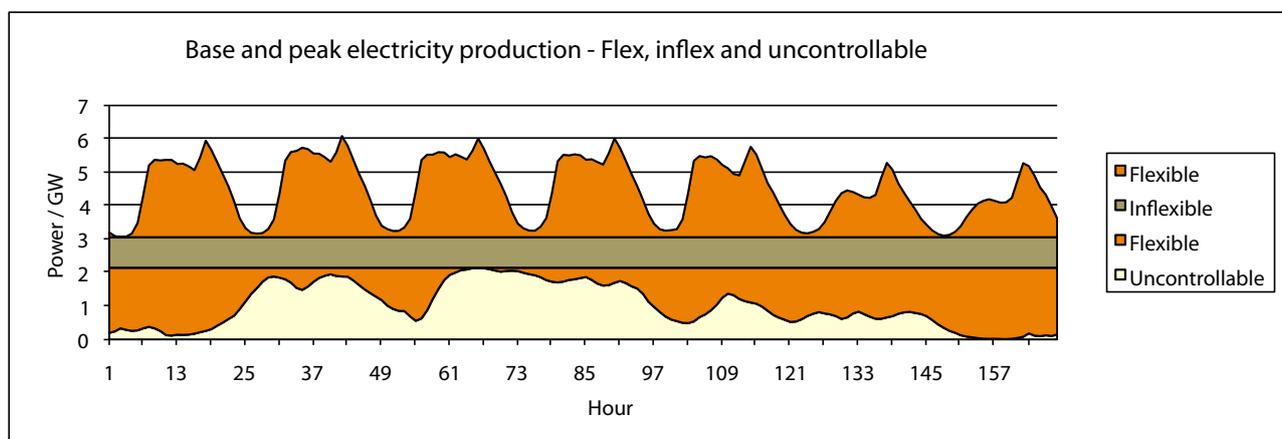
Ask your facilitator for the value of the BAU2030 electricity *production tower*. This amount is set to be spent on both building power plants and fuelling them in the BAU2030 future. "Selling" the tower to the brick bank corresponds to *not* investing in the *electricity* system in front of you. Instead, you can use the money saved to create your own electricity system.

Break down the electricity production tower and place the bricks in the bank. Note down the value provided by your facilitator in the *accounting sheet*.



### TASK B: UNDERSTANDING ELECTRICITY SYSTEMS (10 MIN)

Make sure everyone in the group has understood the physical constraints on the electricity system and the rules for satisfying the base and peak electricity consumption. Does everyone understand the figure below? (If not help each other and consult the background material)



The **base electricity** target can be met with:

1. Inflexible electricity production *or*
2. Uncontrollable *and* Flexible electricity production.  
Each uncontrollable electricity production brick must be put with a flexible electricity production brick. This corresponds to the flexible technology taking over when the uncontrollable source is not producing; thus producing a stable electricity output (i.e. wind backed by gas turbines).

The **peak electricity** target can only be met by flexible technologies.



### TASK C: PICK UP THE CAPACITY CARDS FROM THE BAG (15 MIN)

The capacity cards contain information on the costs, advantages and drawback of the various technologies to produce electricity. The costs on the cards include both the capacity cost (i.e. the cost to build the power plant) and the fuel cost (i.e. the cost to run it).

Go through the capacity cards one at a time reading the information on each card out loud.

Are there any technologies you definitely do not want to use?



### TASK D: START CONSTRUCTING! (30 MIN)

You will now begin to rebuild your electricity system for 2030 (i.e. the electricity *production* tower). This is to satisfy the electricity demand represented by the electricity *consumption* tower.

The electricity *consumption* tower shows how much *base* and *peak* electricity you need to provide.

Discuss and decide on which mix of energy resources should make up your electricity production tower. Use the information on the capacity cards for assistance. The prices given on the capacity cards are prices per brick.

Start out by satisfying the base electricity demand. Build the electricity *production* tower as high as the *base* part of the electricity *consumption* tower.

Once you are done with the *base* electricity production, continue by satisfying *peak* electricity demand. The bricks used for peak electricity should be put on top of the base electricity production bricks.

Take the colored bricks from the bank and update the *accounting sheet* accordingly.

While building keep in mind that a negative balance will be at the expense of other welfare services.



### TASK E: REACHING YOUR DREAM (10 MIN)

Did you reach your targets? If you are not happy with your results, you can modify them now.

You may choose to implement more change cards or undo some of the changes you have implemented.

Phase II included only a selection of common changes. You might find many other relevant. Therefore you now have the *opportunity* to DESIGN AND APPLY YOUR OWN CHANGE CARD as you strive to reach your targets. Your facilitator will check your new change card to determine price and effect. Once they have been approved, you can apply them to your energy system.

Keep in mind that implementing new cards might change peak and base electricity consumption. You should sell/buy bricks for the electricity tower accordingly.



## PHASE IV: WRAP UP

In order to save today's results, please fill out the **Targets & Results poster** on the wall.

1. Outline and color your 4 realized energy resource towers (electricity *production*, transport, heating, industry) on the result poster in the designated spaces. Write the number of bricks of each resource in or next to the outlined areas.
2. Write the base and peak electricity consumption targets in the boxes provided.
3. Write the total financial surplus/deficit of your scenario (your balance).
4. Tick off all the change cards you have applied.
5. Use the *Wrap up sheet* to calculate the CO<sub>2</sub> emissions, energy consumption, renewables and oil & gas consumption.



### FACILITATOR FEEDBACK

Call your facilitator over to give feedback on your scenario. Now is the time to ask any remaining questions you may have about the energy planning process you have been through today.



### EVALUATE

Finally, please spend a little time with your group to evaluate today's results through a quick group discussion! Take a round for every member of the group to explain:

- What did you learn from playing the game?
- What did you find particularly difficult?
- What did you find most interesting?



Well done! You have now finished the first vital part of creating your own energy system.

Thank you for your effort!

## RESET WORK SPACE

As a last effort we kindly ask you to reconstruct everything as it was in the beginning – so that future participants can also benefit from Changing the Game.

Please leave all your material on your table! Your facilitator will do the final packing, but you could greatly help her/him by:

- Rebuild the BAU2030 towers (use poster for assistance)
- Put all remaining *coloured bricks* back into the brick bank.
- Put all remaining *grey bricks* back into the bucket.
- Place all the cards in three separate piles:
  - All capacity cards
  - Implemented change cards
  - Non-implemented change cards
- Collect all papers in a separate pile.
- Leave everything, including your empty game bag, on the table.

***Thank you very much for your help!***

