



Thank you for downloading this PlayDecide game.

The PlayDecide discussion game allows to talk in a simple, respectful and fact-based way about controversial issues.

The game enables players to get familiar with a question, see it from different perspectives and **form or clarify their own opinion**. PlayDecide also invites players to **look at issues as a group**: can you reach a positive consensus? The game **culminates in a vote** on a number of proposed policy positions.

A PlayDecide session lasts approximately **90 minutes** in total. The ideal number of players is 4 to 8: form several parallel groups if there are more than 8 players.

This pdf contains **all the necessary elements for a group of up to 8 people**. Each player needs a placemat and a copy of the visual instructions. The group shares all the other cards.

The game needs a **facilitator** who takes the time to get familiar with the flow and contents of the game before playing. As a facilitator, you'll find instructions at www.playdecide.eu, where you can also use an online tool to plan your session, guide your group while playing, record vote results and compare them with all other sessions of this game played in the world.

You can also create your own games using the PlayDecide template or translate existing games into your own language.

Enjoy!

For any question or information, ask the community via the PlayDecide Facebook page or email info@ecsite.eu.

Instructions

1 / Preparation. You will find step by step online support for facilitators on the PlayDecide website: if you wish to use it, log in at www.playdecide.eu and choose “plan a session”.

Print out your cards and placemats (from p.4 to the end of this pdf) following the print specifications indicated at the bottom of each page.

This pdf contains all the necessary elements for a group of up to 8 players. If you have more participants, divide them into parallel groups and print more copies.

Each player needs a placemat (p.4) and a copy of the visual instructions (p.5). The group shares all other cards. Provide pens and pencils for all.

For best printing results, use 160g/m2 paper. You need:

- One A3 white paper sheet per player for the placemats
- 15-20 white A4 sheets in total for visual instructions, story cards, white cards, cluster mats and vote results sheets
- 3-4 green A4 sheets in total for info cards
- 3-4 blue A4 sheets in total for issue cards
- 2 orange A4 sheets in total for challenge cards
- 1 yellow A4 sheet in total for yellow cards

Cut out the cards.

2 / Getting started. From start to finish, the game will take about 90 minutes to play.

As a facilitator, you can **log onto the www.playdecide.eu website to plan your session** and use the facilitator’s tool during the game. As you press “start”, a timer is launched and instructions take you through the different stages of the game, all the way to recording and sharing the results of your session.

All players have a placemat in front of them. There are **different types of cards** that will gradually **fill up the placemats**.

The facilitator talks the players through the flow of the game and its three main stages using the visual instructions. He or she points out the **aims of the game**.

Before the first phase starts, the facilitator reminds all players about the conversation guidelines (bottom left on their placemat) and hands out the **yellow cards**. Anyone can raise a yellow card to pause the discussion in case they feel someone is not respecting the guidelines. When the issue is solved, the discussion resumes. On the top right of the placement there is a space for personal notes and ‘initial thoughts’.

3 / Game phase 1: Information. This part of the game takes approximately **30 minutes**.

In this stage players get familiar with the issue, see it from different perspectives and **form or clarify a first personal opinion**. At the end of this stage, **each player has one or two of every kind of card on her or his placemat**.

1. All players read the **introduction** (top-left of their placemat).
2. All players read a few **story cards**. They each choose one they find significant and put it on their placemat. Each player briefly summarizes their story card to the group.

3. All players exchange and read **info cards**. They each choose two they find significant and put them on their placemat. Each player briefly summarizes their info cards to the group.
4. All players read **issue cards**. They each choose two they find significant and put them on the placemat. Each player briefly summarizes their issue cards to the group.

Players can use the white cards at any time to add information and issues if needed.

4 / Game phase 2: Discussion. This part of the game takes approximately another **30 minutes**.

In this stage, players **share their first opinion with others and refine their point of view** as they hear different arguments and perspectives. Players use the cards gathered in the first stage to sustain their arguments.

There are **different ways to discuss**. Choose one that fits the character of the group.

- You may use the 'Free form': no restrictions, the discussion flows among the players. Everyone tries to respect the guidelines (if not the yellow cards can be used).
- A more structured way to discuss is to 'talk in rounds'.

If the discussion is difficult or it slows down, **challenge cards** might loosen things up. The facilitator hands them out face down. Players read them aloud and take action.

Players can record the discussion by **making clusters** around the themes that reflect the group's vision. All types of cards can be used to make a cluster. Use the cluster mats provided in this pdf if you choose this option.

5 / Game phase 3: A shared group response. This last part will take approximately **20 minutes**.

This stage invites players to **look at issues as a group**: what opinions are present in your group? Can you reach a positive consensus on a position?

1. Everybody reads the **policy positions** again.
2. Try to look for common ground. Is there a policy position you can all live with? If not, try as a group to formulate your own 'fifth policy'.
3. All players **vote individually** in turn on all policies.
4. **Votes are recorded** on the printed voting sheet or directly online if you're using the facilitator's tool that provides a nice visual summary and allows you to compare your group's results with that of other players around the world.

6 / Upload results. If not done during the session, the facilitator logs in at www.playdecide.eu and transfers the results from the voting sheet to the website. Your results will be added to the results of all other sessions played in the world and available to download as a spreadsheet.

Large astronomical observatories:
impact on territory and society



Research in astrophysics has made great strides in recent years, but there are still many fascinating questions that await answers. For example many exoplanets have been discovered, but are any of them habitable or with an atmosphere like Earth's? How did life begin? Also: ordinary matter forms only 5% of the Universe, so what are dark matter and energy, the remaining 95%? To solve these and (many) other scientific problems, it is necessary to investigate with increasingly advanced tools. Large astronomical observatories need a lot of space and stable ground. Optical and infrared ones must be built in places where atmospheric turbulence (which deteriorates the quality of images) and light pollution are minimal: they are generally isolated and high-altitude places with little humidity, such as peaks in the middle of the sea or desert and mountain plateaus. Radio telescopes, on the other hand, need quiet areas from the point of view of radio and microwave interference, such as deserts free from emissions for telecommunications and other human uses. There are not many places on Earth with the right characteristics and if, on the one hand, the advancement of knowledge and technology brings multiple benefits to society, on the other hand, the territories chosen to host large infrastructures for astrophysics, even if not densely populated, are often inhabited (or regularly frequented) by people who will have to change their traditional way of life. Local communities often see the construction as an invasion of lands they have owned or occupied for centuries, which may also have a sacred, religious or cultural value; sometimes environmentalists complain of excessive use of local resources on the territory, which is altered by large buildings, and a modification of the habitat that can endanger native flora and fauna. This game was developed within the working group of the National Institute of Astrophysics (INAF) for inclusion and in particular by: Silvia Casu, Claudia Mignone, Sara Ricciardi, Rachele Toniolo, Stefania Varano and Alessandra Zanazzi.

Positions

1. Scientific-technological development is the engine of the virtuous spiral of progress, it cannot be stopped. Astronomical research requires the construction of large observational infrastructures, which must be built at any cost in the places on the planet chosen by experts via accurate and specific research. Local communities need to understand that they are a small minority; if they do not agree, you have to convince them that it is for the
2. It is essential to build scientific infrastructures to address the questions of modern astronomical research, but compensation and repercussions must also be foreseen to make the project acceptable to the communities that inhabit the places where these great projects are carried out. It is necessary to guarantee employment, training and development opportunities for the local population, together with the achievement of scientific objectives.
3. Respect for local communities and traditional cultures is fundamental, and if a great scientific infrastructure must be built in an inhabited or important area for a certain community, such a community must be involved in the project from its early stages. Observing the cosmos is a practice that unites many peoples and only through dialogue and trust will the knowledge obtained truly be the heritage of all.
4. Scientific-technological progress is only beneficial if it is based on the protection and safeguarding of the environment and local communities. After all, science must be at the service of society, and mainly of the weaker minorities. If a large scientific infrastructure is not well received by the inhabitants of a certain territory, it must be radically rethought and built elsewhere.

Aims of the game

- Get familiar with this question and see it from different perspectives
- Form or clarify your own opinion
- Work towards a shared group vision
- Vote on policy positions, share your results and compare them with the opinions of others who played the same game elsewhere in the world

Story Card

Info Card

Info Card

Initial Thoughts

Write down your initial thoughts, use
White cards to add issues

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Issue Card

Issue Card

Challenge Card

Guidelines

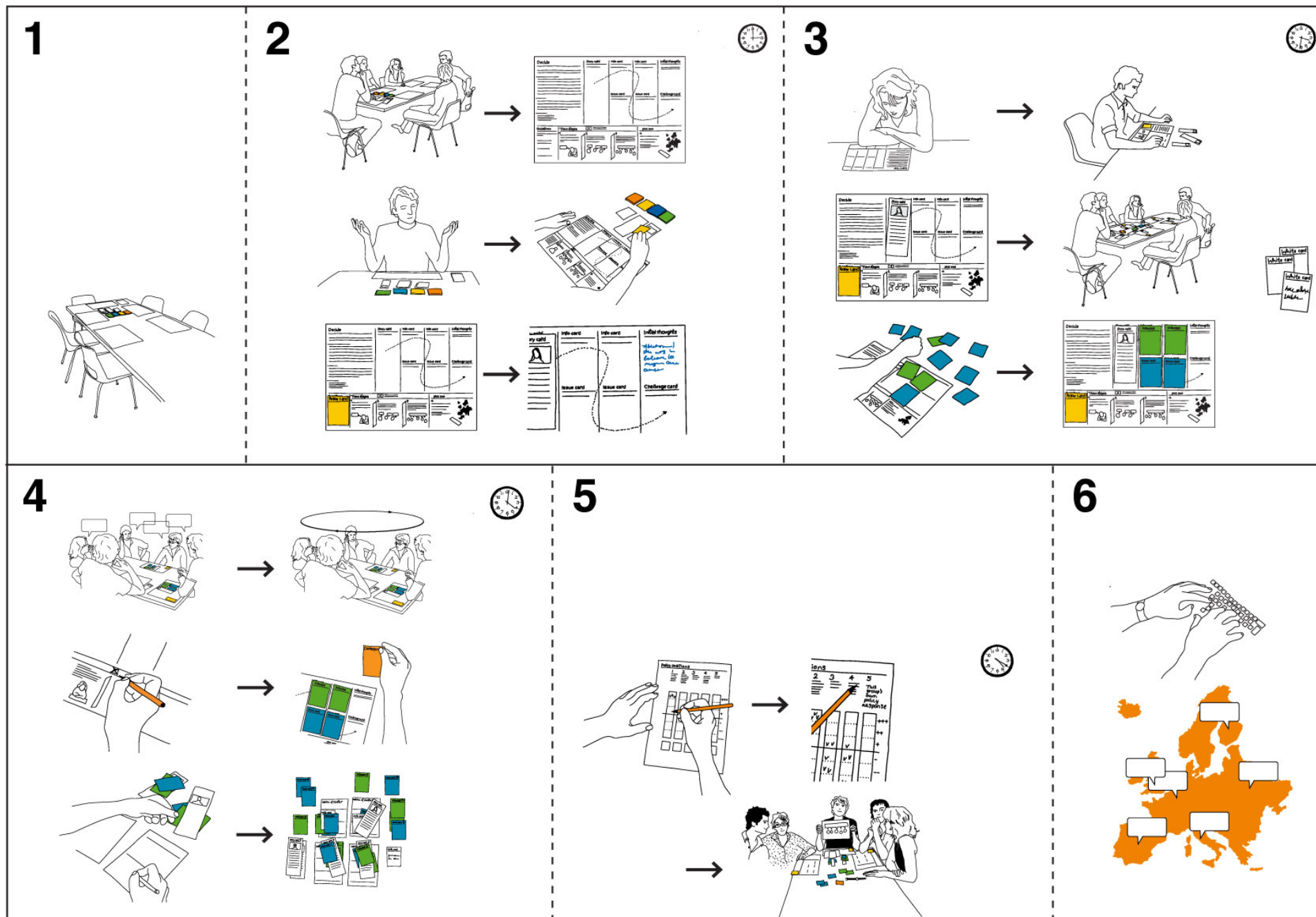
- You have a right to a voice: speak your truth.**
But not the whole truth: don't go on and on.
- Value your life learning. Respect other people.**
Allow them to finish before you speak.
- Delight in diversity.**
Welcome surprise or confusion as a sign that you've let in new thoughts or feelings.
- Look for common ground.**
'But' emphasises difference; 'and' emphasises similarity.

Three stages

- 1. Information.** Clarify your personal view on the subject, reading and selecting the cards which you feel are most important for you. Place your cards on the placemat and then read them aloud to the other players. **± 30 min**
- 2. Discussion.** Together with the other players, start discussing. Everyone gets a chance to speak. Use your cards to provide arguments. As a group, identify one or more larger themes that you all feel relevant. **± 30 min**
- 3. Shared group response.** As a group, go back to the proposed positions. Can you reach a positive consensus? You can formulate a new common policy if you wish. All vote individually on each position. **± 20 min**

. . . plus one

- 4. Sharing.** Go to www.playdecide.eu to share the results of your group and see how other people who played this game voted. You can also download a game to play with your friends or colleagues or create your own game.



Info Card 1

Large telescopes need to be built in isolated places

Optical and infrared telescopes must be built in places where the atmospheric turbulence, which deteriorates image quality, is minimal: high-altitude locations with low humidity and low light pollution, such as peaks in the middle of the sea or plateau deserts. Radio telescopes, on the other hand, need areas with little radio pollution and microwave interference: deserts free from the emissions caused by telecommunications and other human uses.

Info Card 2

Large telescopes need to be built in very large spaces

The construction of large telescope systems requires very large spaces with specific terrain characteristics (e.g., vast plateaus, or rocky deserts). Such vast areas are unlikely to be entirely free of anthropogenic installations, and sometimes they must be expropriated from those who currently occupy them.

Info Card 3

Technologies developed for large telescopes have industrial spin-offs

Cutting-edge instruments for astrophysics often require pioneering technologies that are developed especially for the occasion. The industries involved in the development of these technologies acquire very specific skills, which specialize them in the relevant sector, placing them in a position of leadership, including for future application spin-offs

Info Card 4

Technologies developed for large telescopes have impacts on society - 1

The technologies developed for the construction of a new telescope often have spillovers and applications in other civilian and daily life areas, sometimes generating revolutions in society. One example is the technique developed for the wireless transfer of data in the field of radio astronomy, which paved the way for the use of Wi-Fi for the exchange of information between networks and portable devices.

Info Card 5

Technologies developed for large telescopes have impacts on society - 2

The technologies developed for constructing a new telescope often have spillovers and applications in other civilian and daily life areas, sometimes generating revolutions in society. Examples are the systems for storing and analyzing the enormous amount of data (big data) which are generated by large astronomical facilities, which require innovative solutions.

Info Card 6

Technologies developed for large telescopes have impacts on society - 3

The technologies developed for the construction of a new telescope often have spillovers and applications in other civilian and daily life areas, sometimes generating revolutions in society. Examples are the techniques for measuring radiation developed for astrophysics that have found application in various fields of medical imaging, from MRI to Computed Axial Tomography (CT).

Info Card 7

The installation of major infrastructures changes the territory - 1

The installation of large-scale infrastructures modifies the territory both from the point of view of ecosystems and from the point of view of human settlements. The creation of protected zones (radio reserves, protection from light pollution, limited access areas) can safeguard the environment from excessive land urbanization and anthropogenic exploitation of any kind.

Info Card 8

The installation of major infrastructures changes the territory - 2

The installation of large-scale infrastructures modifies the territory both from the point of view of ecosystems and from the point of view of human settlements. It makes it necessary to modify or eliminate human settlements or anthropogenic infrastructure located on that territory.

Info Card 9

The installation of major infrastructures changes the territory - 3

The installation of large-scale infrastructures modifies the territory both from the point of view of ecosystems and from the point of view of human settlements. An untainted territory can be anthropized; this can have an impact, even a major one, on animal species and plants or on entire bio-systems.

Info Card 10

Areas for the construction of large astrophysics facilities have constraints on electromagnetic pollution

Site selection for telescope construction must comply with a set of specific conditions related to electromagnetic interference. To ensure interference mitigation, protocols and agreements are often signed with local communities to prevent the installation of emitting facilities (e.g., lighthouses and/or telephone repeaters) around the telescope site.

Info Card 11

Light pollution protection

Areas involved in the construction of large astronomical infrastructures have constraints on light pollution. The problem of light pollution is strongly felt in urbanized areas, less so in sparsely populated areas, where on the contrary some degree of illumination is often required for the safety of isolated areas. Light pollution not only has only economic significance (energy consumption) but also a strong negative impact on flora and fauna.

Info Card 12

Radio interference protection

Areas involved in the construction of large astronomical infrastructures have constraints on electro-magnetic pollution. Not being able to use electronic devices or to improve the cellular telephone network can be a limitation to activities and safety. The low level of radio interference, however, can be positive for those who associate health problems to the exposure to radio waves transmitted by phones, televisions and satellite systems.

Info Card 13

Ecotourism and astro-tourism

The decrease in light pollution and the creation of protected areas can also have spillover effects in terms of tourism opportunities, for example through the creation of new, unconventional routes for astronomical and nature tourism.

Info Card 14

Impatto su infrastrutture, logistica e trasporti

Telescopes are often placed in remote and difficult-to-reach areas, which are usually not urbanized. This process and the corresponding urbanization of the relevant geographic area carries along a series of infrastructure and mobility changes: new roads, bridges and the corresponding spillover on logistics and transportation.

Info Card 15

Common goods and services

Building large astrophysics infrastructure in isolated territories requires the implementation or modification of common goods and services of first necessity, such as e.g. water or electrical supply networks. It also becomes necessary to develop or build new infrastructure for telecommunications, such as the internet network and Wi-Fi.

Info Card 16

New job opportunities - 1

The creation of a large scientific infrastructure involves important spin-off activities during the construction phase, both in terms of contracts awarded to companies and in terms of jobs and workpower.

Info Card 17

New job opportunities - 2

The creation of a large scientific infrastructure requires personnel to manage and maintain the facility for many years. These include a variety of roles, from technical positions that require specialized education to logistics, administrative, organizational and basic support jobs. In some cases, this can (at least in part) compensate for the loss of jobs in local, traditional sectors caused by the arrival of the new instrument.

Info Card 18

New job opportunities - 3

The new infrastructure can create job opportunities for lecturers and researchers from its host country. These resources, who usually have to migrate, can stay or come back to their home country with a cutting-edge job, contributing to building the country's next generation's human capital.

Info Card 19

Education opportunities

Professionals who work in the facility are potential educators as lecturers, tutors and consultants, inspiring the local youth towards science and technology careers and supporting local school teachers with content linked to innovative research. This can increase the local community's interest in related professions.

Info Card 20

Mobility and relocation

The creation of new infrastructure may cause the relocation of part of the population from rural areas towards urban centres in search of work and study opportunities.

Info Card 21

New research centers and universities

The presence of large infrastructure for astrophysics research can encourage the host country to create new universities with technical and scientific faculties in nearby towns.

Info Card 22

Rights of Indigenous Peoples

Indigenous peoples, like all other peoples, have the right to self-determination and not to be subjected to forced assimilation or destruction of their culture. They shall not be forcibly removed from their lands without the free, prior and informed consent and after agreement on just and fair compensation and, where possible, with the option of return. (UN Declaration, 2007)

Info Card 23

Size of cutting-edge optical and infrared telescopes

Nowadays, optical- and infrared-band astronomy uses primarily reflector telescopes, with a mirror that collects light from the cosmos. The larger the mirror, the larger the capability to distinguish details and to observe faint and/or distant sources. The largest telescopes have mirrors with an 8-10 meter diameter and for next-generation telescopes they will go up to 30-40 meters

Info Card 24

Size of cutting-edge radiotelescopes

Radioastronomy observes the universe in wavelengths that are much longer than those of visible light, using large radiotelescopes made up of one or more antennas. The larger the collecting area, the larger the instrument sensitivity and resolution. The largest radiotelescopes in operation and in construction also include systems with hundreds of receivers distributed over several hectares of land.

Issue Card 1

Consumption of water and other resources

The construction of a large infrastructure for modern astrophysics implies an additional – and sometimes significant – burden on the use of local resources, such as water or electricity, which can become insufficient for the usual use on the territory.

Issue Card 2

Impacts on land and ecosystems

The establishment of large infrastructures modifies the local ecosystem through the occupation of space or changes such as deforestation, levelling of mountain ranges, reduction of natural spaces, etc. This can result in serious changes or could even compromise the survival of some animals or plant species.

Issue Card 3

Land expropriation

The acquisition of lands to build a large infrastructure may require their expropriation or the change of their designated use. This can have a not negligible impact on the lives of locals. This process must be managed in a very careful and responsible manner and must involve the local communities in order to coordinate as best as possible all decisions on the issue and offer fair compensation.

Issue Card 4

Spin-off effects

The construction of a large infrastructure generates a significant economic spin-off. In the absence of explicit regulation, the natural economic benefits of such projects will not necessarily create advantages for local companies or workers as opposed to external groups (national or international).

Issue Card 5

Impact on the local education system

The establishment of a large research infrastructure research is often integrated with dissemination and educational activities in the territory. However, sometimes their impact is limited and does not achieve the proposed objectives, for example in the absence of dialogue with local communities, if there is a lack of experienced staff and adequate resources, or if the actual needs of the local education system are not taken into account.

Issue Card 6

Impact on the local employment market

If the region hosting the new infrastructure has no qualified personnel for the operation and maintenance of the facility, especially if there is a lack of long-term plans for scientific and technological training, there is a real risk that the local population will not be able to take advantage of many of the new job opportunities offered by the project. If so, the use of non-local experts may be required.

Issue Card 7

Impact on local culture

The arrival of a new scientific infrastructure can have a significant and potentially adverse impact on local culture that has existed there for hundreds or thousands of years. For example, building an observatory on an area considered sacred by the local population undermines the respect for religions and systems of traditional knowledge that should be safeguarded and protected.

Issue Card 8

Instrumentalization of local populations

There is a risk that, in the event of disputes, the various interest groups may exploit the local community, choosing, for example, to speak only with one part of the population (the most accommodating or the most opposed) by presenting, even in the media, a partial version of the story instead of taking into account the requests of the whole community

Issue Card 9

Changes to the local economy

When a community experiences the expropriation of part of their land for the construction of a scientific facility, one of the first concerns is that this will result in the destruction of the local economy, especially if the local economy is essentially agricultural.

Issue Card 10

Mediation is not always easy

The construction of a scientific facility affects multiple instances of different interest groups at local, national and international levels, affecting the corresponding balances. This requires mediation between local communities and national governments, an operation that does not always succeed and can lead to friction between parties in the socio-political-economic sphere.

Issue Card 11

Ban on the use of technological devices

A radio telescope is a telescope built to detect radio waves coming from the universe. The site of a radio telescope must therefore be almost free from artificial radio interference (quiet zone). Therefore, once a particular location is chosen as the construction site of a radio telescope, it will not be possible – within a certain radius from it – to use transmitting devices such as cellular phones or microwave ovens, nor to install repeaters.

Issue Card 12

Dark skies

Ensuring a low level of light pollution around optical telescopes means limiting the installation of light sources. This could lead to problems for the safety of isolated homes or farms.

Issue Card 13

Equity of access to resources

The goods and services produced by the installation of a new infrastructure must be made accessible and useful to the community that has faced hardship or changes to its way of life for their production. Equity of access must always be ensured.

Issue Card 14

Land access

The creation of areas for the exclusive use of the astronomical infrastructure may imply a ban for the local population. Moreover, it could prevent the use by the community of those off-limits areas.

Issue Card 15

Impact of tourism on the territory

The increased visibility and exposure of the area to tourist flows can create problems for both the ordinary activities of the community (agriculture, farming, daily life) and the scientific activity of the infrastructure itself. In addition, any tourism activities may affect the use of local resources, and the induced revenue generated does not always benefit the local population.

Issue Card 16

New services can harm the local community

If the scientific infrastructure is located within an area that does not use modern technologies such as the Internet network, the penetration of these services could undermine the social cohesion of the local community.

Issue Card 17

Mobility denaturalizes the economic and cultural traditions of the area

The presence of a large facility for astrophysical research attracts people from rural areas and small towns in the surrounding areas. Whether they move for study or because of the expropriation of land, the result is a demographic change and the loss of identity and culture of the community

Issue Card 18

Hosting a research facility without benefiting from it

Often most of the astronomers and technicians do not come from the local community and sometimes not even from the national one: without a common strategy, the area risks to physically host the observatory without drawing any benefit from it.

Issue Card 19

A strategy for integration in the territory

Local and national astronomers and technicians often do not participate in the observatory's scientific dissemination activities. This leads to a lack of impact on the local area and the difficulty of creating cultural and educational bridges with organisations, schools and the third sector in the region.

Issue Card 20

Without large telescopes, research does not advance

Cutting-edge astrophysical research needs ever-larger telescopes to capture light from faint and distant sources (such as planets around other stars or the first galaxies in the history of the universe) to search for answers to big questions such as: are there other habitable planets? how did life arise? what are dark matter and energy? Without new instruments, it is not possible to collect the necessary data for the advancement of knowledge.

Issue Card 21

Advancement in the knowledge society

Big science' projects such as large astronomical infrastructures enable the development of international collaborations between different sectors that promote the exchange of knowledge and new approaches to problem-solving. Without these projects, a halt is put to the spiral of scientific-technological development that has beneficial spin-offs for all.

Issue Card 22

Risk of radicalisation

Excessive polarization and tightening around strongly opposed positions hamper constructive confrontation and risk leading to a breakdown of the dialogue process and the prevalence of non-shared positions.

Guidelines Yellow Card!

Use the yellow card to help the group stick to the guidelines. Wave it if you feel a guideline is being broken or if you do not understand what is going on.

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Challenge Card

Choose a story card where an opinion is expressed with which you disagree. Explain to the group what you think are the similarities and differences between your opinion and the opinion expressed by the protagonist of the card

Challenge Card

Ask the person to your left what they think. Disagree with their opinion

Challenge Card

Do you think human needs are more important than those of creatures that have no voice of their own - nature, animals?

Challenge Card

How would you justify funding such research, given the inequalities that exist in the world?

Challenge Card

Choose a story card. Present the opinions of the protagonist to the rest of the group as if they were your own.

Challenge Card

Do you think this has an impact on nature? Share your opinion on this with the rest of the group.

Challenge Card

Express all your feelings about the topic in question that you have not yet shared with the rest of the group.

Challenge Card

Do you think the group is avoiding a 'taboo' subject related to this topic out of delicacy? If so, say: "We are not talking about..." and start the conversation.

Challenge Card

Are there risks in this? Think of one risk, tell the rest of the group, and ask two other players to think of another one.

Challenge Card

How do you think the media would react to this?

Challenge Card

Explain to the group who you think is paying (in terms of resources, or consequences) and in what ways.

Challenge Card

Briefly explain to your fellow players what you think the effects on future generations might be.

Challenge Card

Choose the protagonist of a story card who has an opinion contrary to yours. Briefly explain to the rest of the group what their opinion is on what you are discussing.

Challenge Card

Ask the person on your right what they think. Find an argument that confirms their opinion

Challenge Card

What do you think your grandparents would think of this situation?

Story Card 1

Nahuel Huilipàn



I'm the religious leader of the native community here, where they want to build the large telescope. But this place has been sacred for our people for hundreds of years. It's a key place for our spirituality. Astronomers say they need to build this observatory to study the universe. But we also have ties with the universe, and this place is designated for our rituals which, by the way, do not harm the environment. We shall fight so that the observatory will not be built here and the native people will be finally heard. We shall fight so that we don't lose our identity.

(Photo by FrankOWeaver - CC license)

Story Card 2

Ahmale Nkosi



I'm an astronomer and I investigate the first galaxies in the history of the universe. I studied the methodologies and processes of "western" science but I, too, come from an indigenous community whose traditions and values I share. Studying the cosmos is not just my work, it's a passion to which I dedicate all of my time: I know that this infrastructure would be extremely useful to conduct many research projects, including some of mine. But building it here would destroy the local community, a community which, like my own, has already suffered so much hardship. I can't agree with this project, not like this. We must find another way, and make an effort to understand what is really useful to both communities.

Story Card 3

Charles Brown



I'm a scientist from the United States and lead an advanced research group: our goal is to find out whether there are rocky planets, with atmospheres similar to our own, that could potentially host life forms. I am convinced this research is of the utmost interest, not just for the scientific community but for the whole of humankind. The only way to make progress with our research is to build instruments like this telescope: it will be able to answer our questions and this is the best place on planet Earth to host this instrument. The only place. We can't stop now. Without this project, for us it's game over. There is no other way to advance our knowledge.

White Card

White Card

White Card

Story Card 4

Cindy Hoyles



I'm a telecommunications engineer at the university in the capital city. I went abroad to specialize in radio telescope receivers, now I'm back after many years away from my country and I'm trying to build a small technology research group here, with local students, who will then no longer have to leave the country. With the new telescope, our work could make giant leaps, I've been one of the proposers of the project for years. But I also work so that there are real benefits locally. It's not easy to find time between research and teaching, but I visit the region as soon as I can and talk to the local community members, then I try to pass their requests to scientific and political decision-makers. Everyone must play their part.

Story Card 5

Juri Careddu



I'm a middle school teacher. The astronomers who will work at the observatory had a seminar at our school on the history of the universe and our students were very excited about it. To us teachers they showed experiments to run with students: unfortunately, we can't repeat them right now because we do not have enough computers but in coming years, thanks to funding from the observatory, we shall be able to purchase IT equipment for the school. Many students tend to drop out and go to work immediately. We try to fight against that but, with the lack of great perspectives, what can we do? We really hope that the presence of such an important science facility can inspire them to stay in school!

Story Card 6

Aza Anenih



I'm a political representative and I'm much worried about the local economy, which is based on traditional, rural products. Life here is ruled by farm work, the cycle of nature, the relationship with the environment and the territory, respecting ancestral rhythms. Without access to this land, our community will not recover and families will be forced to migrate. I'm afraid they will take our lands, giving us in return something that only contributes to erasing our traditional way of life. Some have been offered free use of the ultrafast wi-fi network they will install for the telescope. But we live in the midst of the desert: the internet connection is the last of our needs, and we don't even have the means to exploit it! I carry the voice of my community, who is really opposing the project.

White Card

White Card

White Card

Story Card 7

Rudolph Kalama



I own a business located in another region that will be involved in producing components for this great observatory. Building such cutting-edge infrastructure will be a flagship project for our country. There will be many opportunities for economic growth thanks to the investment of foreign capital and I'm sure also the local industry will experience a boom. I already secured funding and plan to open a branch of our company in the region where the project will be built: I will do anything to benefit from this progress opportunity.

Story Card 8

Tulay Guzman



I know they plan to turn the entire area into a radio reserve and I'm really worried we'll have to sell our land and our farm. They say there will be compensation, but I'm afraid it won't be enough for us to survive. They say there will be new job opportunities, but I'm not sure these will be for the poor people, for farmers and breeders... What kind of work can we do in an observatory?

Story Card 9

Adele Lanhupuy



My husband is worried about our farm. One of our friends who lives near another large radio telescope told me they can't even use their cell phone or wi-fi because the emission would interfere with science observations. There is no satellite TV signal, you can't even install automatic gates or microwave ovens. It's a big inconvenience, but I don't care, because in turn, the Observatory attracts lots of tourists, also from abroad, in addition to scientists. They go to the restaurant, stay at hotels, pay for tickets to visit the telescope, so it makes a lot of money and it's become one of the largest employers for local people!

(Photo by Steve Evans, Wikimedia Commons)

White Card

White Card

White Card

Story Card 10

Fred Smith



I'm a father and a family man. What myself and my wife care most about is the health of our children. I'm afraid these devilish receivers will harm the people and animals in the surroundings. They told us it's safe, but some people say that the radio waves used by cell phones and the wi-fi aren't good for you either... You never know who to trust anymore these days. Better to keep up with the old life that always worked well.

Story Card 11

Kylie Dingo



I own a restaurant next to where they will build the offices to manage the telescope. It sure is a big opportunity. They will build roads, and a lot of foreign scientists will come, bringing money. Maybe even tourists. But we'll have to fight so that the big multinational companies of food don't arrive along with them. I've owned a small business my entire life, I'm not afraid to stay small and not even to grow, but here there is a risk of disappearing.

Story Card 12

Jonas Arendsson



I'm a sociologist at the capital university. I've been studying the interactions between cultures in colonization and inequality contexts like this one for years. Some people think that sociology is opposing science, but we are also scientists and our knowledge is important to analyze all the different aspects of this question in a critical manner and find a solution. In fact, there are round tables with the various groups involved, this is a great good thing, I'm sure the project can be handled in a sustainable fashion for all stakeholders and the local communities.

White Card

White Card

White Card

Story Card 13

Alice Simons



I'm a tourist guide and I'm really happy about this project. Nobody used to come here before, but thanks to publicity around the telescope, finally the tourists are coming and my work is going great! Initially, they were very skeptical even at the tourist office, but thanks to the collaboration with the telescope staff, we were able to organize many events linked to the night sky. Tourists and enthusiasts love it, they are coming in large numbers!

Story Card 14

Sam Corowa



I'm an elder from the indigenous community. We do not want to be forcibly assimilated. We have the right to preserve our culture and our traditions! Astronomy has always been part of our people's culture: from here, right in this territory, we have been observing the sky for hundreds, thousands of years. We, the elders in the community, tell the stories of the night sky, and our stories talk about the dark regions between the stars. Astronomers study mostly the bright part but have heard that they are actually also interested in the dark regions that we have always observed. Why don't they talk to us? There is not just one way to advance science. Scientists must come down from their podium and listen to people and their emotions! It's important to listen to local culture. If we talked together, perhaps we could write a cosmic story that encompasses both our cultures

Story Card 15

Hanni Berno



I'm a university researcher and I've long been studying how to preserve biodiversity. Does anybody really think that a gigantic structure like this will not harm the environment? That it won't impact on the habitat of birds, insects and all the animals that have so far lived peacefully on the mountain top? There are endemic species here that have no other habitat, nowhere else in the world: arthropods, spiders, butterflies... animals that are small, but no less important! The project will build over hectares of land, including the telescope, parking lots, roads, and office buildings... How can we think that nature won't suffer? Even the geology of this special place would be altered!

White Card

White Card

White Card

Story Card 16

Dudley Smith



I'm an officer in the region where the infrastructure will be built. If on one side, I agree with building it here, on the other side I know it will have a huge impact on our community and benefits won't come for granted. Contracts for such large projects aren't always awarded to local companies or employing local workers. But I shall fight to set constraints so that local folks can work on the construction and also on later stages. If there are companies coming from outside our region, they will have to invest here, even after construction has been completed.

White Card

White Card

White Card

Name of cluster:

Which conclusions does this cluster lead you to?

Cards in this cluster:

Info Card

Issue Card

Story Card

White Card

Name of cluster:

Which conclusions does this cluster lead you to?

Cards in this cluster:

Info Card

Issue Card

Story Card

White Card

Name of cluster:

Which conclusions does this cluster lead you to?

Cards in this cluster:

Info Card

Issue Card

Story Card

White Card

Policy positions for Large astronomical observatories: impact on territory and society

1

Scientific-technological development is the engine of the virtuous spiral of progress, it cannot be stopped. Astronomical research requires the construction of large observational infrastructures, which must be built at any cost in the places on the planet chosen by experts via accurate and specific research. Local communities need to understand that they are a small minority; if they do not agree, you have to convince them that it is for the

2

It is essential to build scientific infrastructures to address the questions of modern astronomical research, but compensation and repercussions must also be foreseen to make the project acceptable to the communities that inhabit the places where these great projects are carried out. It is necessary to guarantee employment, training and development opportunities for the local population, together with the achievement of scientific objectives.

3

Respect for local communities and traditional cultures is fundamental, and if a great scientific infrastructure must be built in an inhabited or important area for a certain community, such a community must be involved in the project from its early stages. Observing the cosmos is a practice that unites many peoples and only through dialogue and trust will the knowledge obtained truly be the heritage of all.

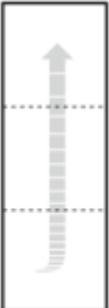
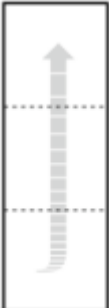
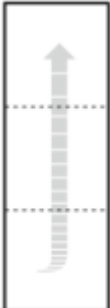
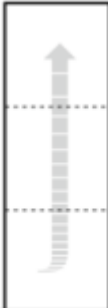
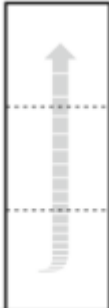
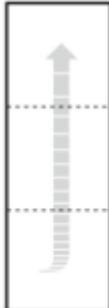
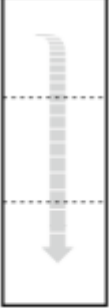
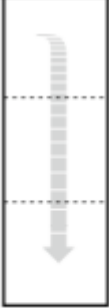
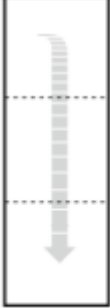
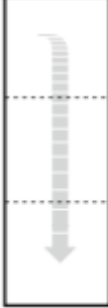
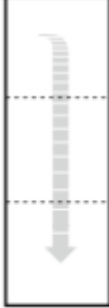
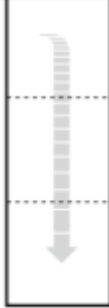
4

Scientific-technological progress is only beneficial if it is based on the protection and safeguarding of the environment and local communities. After all, science must be at the service of society, and mainly of the weaker minorities. If a large scientific infrastructure is not well received by the inhabitants of a certain territory, it must be radically rethought and built elsewhere.

A

B

Policy positions for Large astronomical observatories: impact on territory and society

	1	2	3	4	A	B	
Support							+++
							++
							+
Acceptable							-
							--

Not acceptable							
Abstain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



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