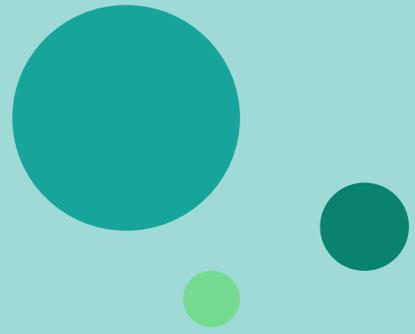




The National Green OR
Network





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Who we are

The National Green OR Network is a collaborative partnership between sixteen professional surgical associations seeking to implement sustainable best practices in their surgeries. The National Network encourages and helps individual surgical medical specialists and healthcare professionals working in ORs to perform surgeries in a more sustainable manner.

About the Green OR

Climate change poses a major threat to our health and the planet we live on. We can see the world around us changing. According to the Lancet Countdown reports, these changes are exponential, and are indirectly also caused by our healthcare system. Healthcare produces 5-7% of the international CO2 footprint. Changes in daily practice to reduce this is therefore mandatory. The National Green OR Network encourages and helps individual OR healthcare professionals by giving them (evidence based) tools to perform their surgeries in a more sustainable manner. We want to make the OR a more sustainable place and to help achieve a carbon-neutral healthcare system.

Our mission

The National Green OR Network seeks to expedite the greening of surgical procedures performed in ORs in the Netherlands. We want to bring about a transition in our ORs in order to reduce our carbon footprint. In addition, we are trailblazers in the greening of the Dutch healthcare system in an evidence-based way.

Sharing good practices

By sharing best practices, we wish to show surgical teams that they can modify their methods without compromising on the quality of the surgeries performed and patient safety. This requires data, a proper business case, communication and interdisciplinary collaboration between surgical medical specialists.

Meetings

We organise meetings for specialists and staff working in ORs and hospitals to encourage initiatives to implement more sustainable practices in surgery.

Network members

Sixteen associations are affiliated with the National Green OR Network:

- NOV (Dutch Orthopaedic Society)
- NVA (Dutch Society of Anaesthesiology)
- NVOG (Dutch Society of Obstetrics and Gynaecology)
- NOG (Dutch Ophthalmological Society)
- NVPC (Dutch Society for Plastic Surgery)
- NVT (Dutch Association for Thoracic Surgery)
- NVU (Dutch Association for Urology)
- NVMKA (Dutch Association for Oral and Maxillofacial Surgery)
- NVvH (Dutch Society for Surgery)
- KNO (Dutch Association for Otorhinolaryngology and Head-and-Neck Surgery)
- NVvN (Dutch Association of Neurosurgeons)
- LVO (National Association of Scrub Nurses)
- NVAM (Dutch Association of Nurse Anaesthetists)
- BRV (Dutch Professional Association of Recovery Nurses)
- NVLO (Dutch Association of OR Managers)
- NeSECC (Dutch Extracorporeal Circulation Society)

Collaborative partnerships

The National Green OR Network collaborates with several parties, including but not limited to:

The Ministry of Health, Welfare and Sport

The Dutch Ministry of Health, Welfare and Sport seeks to make Dutch people healthier, fitter and more resilient. Implementing more sustainable practices in the healthcare industry is a key aim of its policies.

[Meer duurzaamheid in de zorg](#) | [Duurzame zorg](#) | [Rijksoverheid.nl](#)

Collegium Chirurgicum Neerlandicum

The Stichting Collegium Chirurgicum Neerlandicum ('College of Dutch Surgeons Foundation') seeks to promote greater collaboration between medical specialists who perform surgery.

[Collegium Chirurgicum Neerlandicum \(collegiumcn.nl\)](#)

Groene Zorg Alliantie

The Groene Zorg Alliantie ('Green Care Alliance') is an umbrella organisation for healthcare professionals that seeks to implement more sustainable practices in the healthcare industry and to improve the health of our planet.

<https://www.groenezorgalliantie.nl/>

Milieuplatform Zorg

Intramural healthcare institutions such as hospitals have joined the Vereniging Milieuplatform Zorgsector ('Healthcare Industry Environmental Platform Association', MPZ). More than 200 sustainability coordinators are active in a nationwide network. Together, they seek to exchange knowledge about sustainable practices.

[Milieu Platform Zorgsector](#)

Zorg voor Klimaat

Zorg voor Klimaat ('Care for the Climate') is a group of Dutch healthcare professionals who focus on climate change and the healthcare industry, their objective being to achieve a healthy planet and physical environment.

[Zorg voor Klimaat](#)



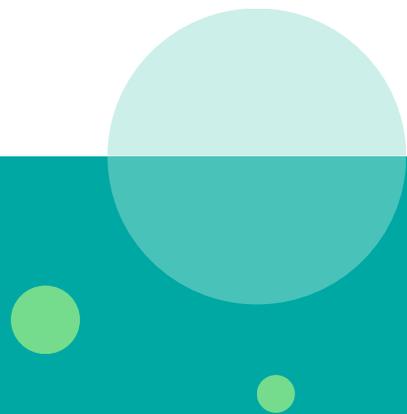
Green Deal

Green Deal 2.0

The healthcare industry contributes 5 to 7 percent of global carbon dioxide emissions. In the Netherlands, this figure is a colossal 8 percent. In healthcare, especially in ORs, this is due to the use of enormous amounts of energy and the use of sterile (disposable) materials and resources. Their practices could do with a significant amount of greening. The healthcare industry's first Green Deal – 'The Netherlands on its way to sustainable care', dating from 2015 – set in motion a widely supported movement. The Green Deal 1.0 motivated many healthcare institutions, healthcare professionals, patients, clients, government agencies and suppliers of services and products to endeavour to implement more sustainable practices in the healthcare industry. On 10 October 2018, Green Deal 2.0 ('Sustainable Care for a Healthy Future') entered into effect. By then, more than 300 parties had joined the programme, including trade associations, health insurance companies, banks and the Ministry of Health, Welfare and Sport.

Green Deal 3.0

Many parties, including the National Green OR Network, have since signed Green Deal 3.0. Green Deal 3.0 builds on the objectives specified in Green Deal 2.0, the major difference being that the signatories are now moving on from raising awareness of what needs changing to actually implementing measures. This constitutes a major step forward. The evaluation of Green Deal 2.0 showed that many parties wished to get the changes under way. All nationwide signatories were in favour of this.



The objective of Green Deal 3.0

The objective of Green Deal 3.0 is to achieve an irreversible transformation of the healthcare industry, in order to establish a healthcare system that has a minimal impact on climate change, the environment and our physical environment by 2050. Since all the signatories are aware of the urgency and intrinsically convinced that the healthcare industry can and must be made more sustainable, the signatories are committing to the following objectives, aimed at bringing about a more sustainable healthcare system:

- Greater focus on health promotion in patients/clients, both in their own homes and in and near healthcare institutions, in terms of their environment, nutrition and lifestyle, as well as a greater focus on health promotion among healthcare professionals themselves, to keep them in good health for longer.
- Boosting awareness and knowledge among healthcare professionals, prospective healthcare professionals, patients, clients and other people about the impact of the healthcare system on climate change and the environment, and how climate change and the environment impact our health.
- A 55% reduction in carbon dioxide emissions by 2030 (compared to 2018-2021 levels) and climate neutrality by 2050.
- A 50% reduction in primary energy consumption by 2030 (compared to 2016 levels) and highly circular waste management by 2050.
- A reduction in the environmental impact of medicines and their use.



Themes

Themes explored by the National Green OR Network

The National Network will address the following causes:

- Anaesthetic vapours and drug residues
- Circular waste management and plastic waste
- Energy consumption
- National Sustainability Guideline
- Green Barometer

Anaesthetic vapours and drug residues

Anaesthetic gases as used in the OR have a tremendous impact on its carbon footprint. We must promote the right choices regarding the types of anaesthetic gases to be used, and encourage anaesthetists to use low-flow anaesthesia rather than high-flow anaesthesia and induction agents rather than inhalational anaesthetics. The Anaesthetic Gases and Residual Drugs Working Group will submit proposals (also with respect to reducing the number of residual drugs in the environment).

Circular waste management and plastic waste

Due to world population growth and increased prosperity, the demand for natural resources is growing at an alarming rate. We must use resources more efficiently and be less wasteful with them, in the healthcare industry and elsewhere. Many people are appalled by the amount of waste generated in ORs, particularly since it is highly visible. At the end of each surgical procedure, several bags of waste are disposed of. This waste largely consists of single-use plastics. The working group seeks to promote circular waste management in the OR and to reduce the amount of plastic waste generated by surgical teams.

By signing the Green Deal, we seek to achieve a fully circular economy by 2050. This involves reducing our use of certain products, reusing them or maybe stopping using them altogether. Recycling naturally beats simply throwing things away after one single use but is a less sustainable solution. The objective is to ensure that surgical teams in the Netherlands use their instruments more efficiently and in a more sustainable manner. In addition, the Circular Waste Management and Plastic Waste Working Group wishes to take a critical look at what kinds of products don't necessarily need to be used, in order to reduce the amount of waste generated by surgical teams and reuse materials and resources. The working group will issue recommendations on how to replace single-use or disposable instruments with reusable alternatives. The implementation of such changes will require broad cooperation between all parties involved in surgical procedures.

Energy consumption

The Energy Consumption Working Group focuses on how to reduce carbon dioxide emissions and conserve energy in OR complexes. OR complexes consume energy in a way that is markedly different from other parts of hospitals. Here, more than 90% of consumed energy is due to airflow. OR airflow involves heating, humidification and ventilation, with an air change rate that is far higher than that used in other parts of the hospital.

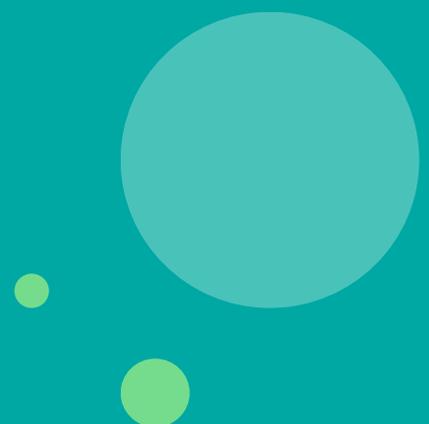
Since energy consumption in OR complexes cannot be considered independently from the rest of the hospital, the working group is choosing to focus on:

OR ventilation

OR complexes in the Netherlands meet Class-1 airflow standards (unidirectional flow) and are constructed in such a way that there are three zones with different air pressure levels from the inside room to the outside room. This system differs from a Class-2 airflow system, in which there are only two zones. Class-1 airflow is further subdivided into Performance Level 1 and Performance Level 2. Only 10 to 15% of surgical procedures need to be performed in Performance Level 1 conditions. Even so, many hospitals choose to use Performance Level 1 as their default OR ventilation setting. Ventilation is the main contributor to high energy consumption levels in ORs (more than 90 percent). In many hospitals, it is left on day and night.

Humidification

It has not yet been established what percentage of hospitals' ventilation energy consumption is due to humidification but it is evidently a substantial contributor. Much depends on how the air is humidified. Is there central humidification in the hospital or are there multiple steam humidifiers? A study is currently being conducted on the necessity of humidification. This study looks set to be completed soon. The conclusion appears to be that adding air humidification to an OR complex is completely unnecessary. It seems that the comfort levels perceived by medical staff and patients mostly depend on what people are used to. In other countries, surgical teams work without humidification without any problems.



Lighting

Did you know that lighting makes up 21% of the carbon footprint of an average hospital? In other words, we should definitely take a critical look at lighting methods. By implementing some relatively obvious modifications, hospitals can conserve a great deal of energy. This will have a positive impact both on the environment and on the hospitals' energy bills. But where to start? Ask yourself the following questions: Are you using LED lighting everywhere? Are lights being left on in rooms at times when no light is needed there – for instance, are lights being left on after hours? Could they be turned off automatically? Such modifications are most cost effective if they are implemented during a refurbishment that was scheduled, anyway.

Equipment

Many hospitals leave their equipment on after hours. In OR complexes, equipment that is generally left on includes anaesthetic machines, computers, warming cabinets or air extraction equipment. All these pieces of equipment can be switched off when an OR is not being used. In many hospitals, this will not be able to be done automatically, meaning it will require a culture of awareness in your team.

Travel to and from the hospital

Travel to and from the hospital constitutes 22% of the average hospital's overall carbon dioxide emissions. This figure includes travel by the hospital's employees, patients and patients' visitors. How can we reduce this percentage? By encouraging people to use public transport and bicycles, and by discouraging them from using their cars. By reducing the amount of travel needed by having meetings, conferences, consultations and meetings with patients conducted online or by phone. This will require an investment in proper telecommunication devices.



National Sustainability Guideline

In early 2021, the National Green OR Network applied to the Stichting Kwaliteitsgelden Medisch Specialisten ('Medical Specialists Quality Foundation Fund', SKMS) for funding for the development of a 'Guideline for the Addition to National Guidelines of a Section on Sustainability'. The Network has now received funding for this project. The guideline will be able to be used to ensure that the subject of sustainability is incorporated into newly drafted surgical guidelines and revisions of existing guidelines in the long term. The guideline is expected to be finalised at the end of 2023, after which it will be submitted for approval to the academic associations of surgeons affiliated with the Network.

Green Barometer

RadboudUMC, Radboud University Nijmegen, the Leiden Academic Medical Centre (LUMC) and Gupta Strategists are jointly developing the so-called 'Green Barometer', which has been designed to give hospitals an insight into the environmental impact generated by their ORs. The Barometer will allow us to compare the results obtained by the various Dutch hospitals against each other at the national level, by means of benchmarking. This will give us a better understanding of the current situation in ORs in the Netherlands and to identify opportunities for improvement.



Implementing measures, yourself

How do you go about making the OR in your hospital more sustainable? Establish a Green Team and start working on it together, step by step. That's basically what it boils down to.

1. Implementing measures together

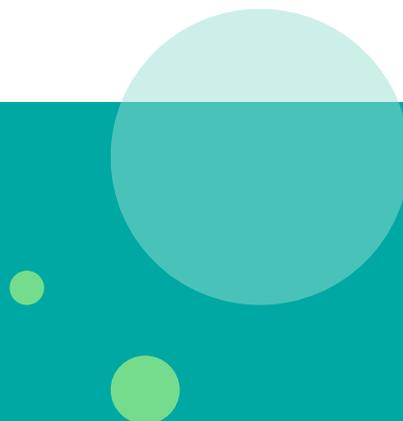
Making the ORs in your hospital more sustainable is not something you can do on your own. If you want your mission to be successful, you will have to join forces with others. We are sure that you will find colleagues willing to join you in this endeavour! So go ahead, talk to people, and if you have any colleagues who are as keen to make changes as yourself, establish a Green OR Green Team. When you are a team, you can divide tasks among your members. Moreover, it's a good way to gain support, and the more supporters you have, the more likely the various initiatives will be successful.

Who should join a Green Team?

If you wish to implement more green practices in your OR, it is essential to include people who represent different disciplines in your team. You will need medical specialists as well as all the other people you find in and around an OR (surgical assistants, anaesthetist assistants and recovery nurses). To a large extent, the specialists will be the ones deciding what kinds of disposables and instruments are needed, and what kinds of procedures will be followed. Try to involve some OR managers in your team as well. You will need support at management level if you are to successfully bring about any changes.

In addition, you will find it useful to include people working in your hospital's central sterile services, logistics and waste management departments in your Green Team. After all, waste sorting not only affects staff working in the OR. It requires a different approach to waste management in various places in the hospital's organisation.

If your hospital has appointed a Sustainability Coordinator whose remit covers the entire hospital, it is a good idea to get them involved too. This will give you a better understanding of things that are being done in other parts of the hospital and will allow you to coordinate various departments' actions.



2. Step by step: select a target – come up with an idea – work out the idea – keep improving matters

Select a target (1)

Identify areas for improvement

Once you've established a team, it's time to get started and identify things that can be improved. In most cases, you will already have a pretty good idea of what issues you wish to tackle. These are things that you've been discussing for a while or that annoy many people.

You may find it useful to objectively assess the choices made. In such cases, it's a good idea to perform a baseline measurement. You can do so, for instance, by applying the Green OR Barometer.

Prioritise and decide on action plans

Even when you first start out, you will generally have a good idea of the many things that can be improved. Remember that you can't improve everything at once. You will need to choose where to start. You may wish to decide where to begin based on an estimation of the impact (reduction of your carbon footprint) on the one hand and an estimation of the feasibility of the plan on the other. Certain small projects may not have the greatest impact on your carbon footprint, but are highly visible, and may help you achieve more significant goals in the long term.

For instance, in the Amsterdam Academic Medical Centre (Amsterdam UMC), the anaesthesiologists now wear washable headwear. In terms of reducing the hospital's carbon dioxide emissions, this change only had a minor impact, but it did do an amazing job of raising awareness. Now, every time someone sees the washable headwear, they get a tiny reminder that sustainability matters. This sort of thing will help you gain more support for tricky modifications, even if it requires people to make a bit of an effort.



Come up with an idea (2)

Now that you have determined which issue(s) you wish to tackle, it's time to draw up a plan. This is something else you should do with others. Get those colleagues involved who will be dealing with the ramifications of the changes in the line of duty. For instance, you can do so by asking your colleagues at team meetings to give feedback on the plan and its implementation.

When you formulate your plan is vital to try and be as specific as possible about the consequences of the changes you are seeking to bring about. What will the changes entail for your colleagues in practical terms? What kind of role and responsibility do you intend to assign to your colleagues in the implementation of the plan? Are they willing to play that role and assume that responsibility, and if not, what will convince them? Are there any procedures or protocols that will need revising? How do you plan to communicate about any progress made? Would it be a good idea to conduct a pilot study before definitively revising the procedure?

For instance, if you want people to start separating paper waste in the instrument prep room, there must be a bin at the waste station where paper can be disposed of separately. However, the logistics department must also be able to do something with it at the waste station. It involves having paper waste picked up separately by the waste-processing plant. There is nothing more frustrating than seeing that your project come to nothing – to see your carefully separated waste end up in exactly the same wheelie bin as all the other waste at the hospital's back door.

In drawing up your plans, it is vital that you carefully consider the consequences of your plans for how things are done in daily practice, in different places in the hospital; what the intended change will entail in practical terms for your colleagues, for the procedures that are in place and for your communication about the various steps being taken. Don't forget to consult the hospital's Environmental Coordinator or Communications department at this stage. They will be a great help at this stage!



Work out your idea (3)

Now that you have worked out your plans, it's time to implement them – step by step, and in association with others. Naturally, you will come across a few issues that you hadn't anticipated or counted on. Don't sweat it when that happens – a bit of a challenge is fun! Try to view any problem you encounter as another opportunity to improve how things are done on the work floor in your hospital ever so slightly. Of course, it is vital at this stage, too, that you regularly consult your fellow Green Team members, as well as your other colleagues, for example about the progress being made. Discuss the things that have gone well, too – be sure to celebrate success!

Keep improving matters (4)

Give things enough tender loving care and they will grow. The same is true for your efforts to implement sustainable practices in the OR. This being the case, you should regularly evaluate the projects you're working on. Are you getting the results you had in mind? Are things going well in other parts of the hospital, as well? Are you encountering any issues on the work floor? You will find it useful to regularly request feedback from your colleagues during team meetings. This will help you identify problems quickly and resolve them together.



Get started yourself: 7 tips!



Low-hanging fruit

Start by implementing some actions that will quickly generate a result. This will energise your team and show others that your efforts were not in vain.



Colleagues who are committed

Try to implement changes with colleagues who are already committed to making the OR in your hospital more sustainable. Nothing will kill a project more quickly than having to work and collaborate with colleagues who do not believe in what you are trying to achieve.



Get others to commit

OR complexes are not worlds unto themselves. They are part of the overarching hospital organisation. Make sure that your plans are supported by those persons and departments that you deal with a lot.



Celebrate success

We are all busy – we run from one job to the next and have far too much on our plates. Even so, it's good to take the time to acknowledge the success you have achieved. Celebrate your success and share it with all the other staff and specialists working in the OR! Nothing is more infectious than success. People like to help others achieve success.



Make sure you're visible

Be seen and be heard. Let your colleagues know that there is a Green Team that is seeking to make the OR in your hospital more sustainable. Use every opportunity you get, and all means of communication you have at your disposal to tell others what you're doing and what kinds of results you have already obtained.



Measuring is knowledge

Not everything can be expressed as a number or measure. However, you may find it helpful to be able to substantiate certain results you have obtained. So, where possible, perform a baseline measurement, followed by a comparative measurement, so that you will have a better idea of the results of your efforts.



Baby steps count, too

ORs cannot be made more sustainable in a day. Be aware that small steps count, too, and that it may take you several years to achieve most of your ambitions.

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