



HSE Report 2011

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How we report

The HSE data management system, data collection process and transparent reporting are important elements of corporate responsibility at Novartis.

Novartis reports its HSE performance following Global Reporting Initiative (GRI) guidelines for sustainability reporting. We publish a stand-alone GRI report each year. The Novartis GRI report uses the GRI G3 sustainability reporting guidelines at an application level of A+, checked and confirmed by the GRI.

[Download the 2010 Novartis GRI report >](#)

Novartis sets HSE targets covering at least three years to allow better analysis, planning and implementation. Divisions are involved in target-setting, based on recommendations by functional experts. Progress is reviewed annually with each division.

[Learn more about HSE targets >](#)

Performance of operating units is monitored on a monthly basis. HSE performance data is collected, validated and consolidated with the Novartis HSE data management system. This system provides all management levels throughout the Group with necessary information to take early action if deviations from targets occur. Systems and processes are reviewed by third parties – in addition to corporate and divisional HSE audits – to ensure compliance with legal and Novartis HSE standards.

The 2011 environmental and resource data published in the Novartis Annual Report are actual data for the period from January through September and best estimates for the period from October through December; 2011 data on employees and health/safety are actual from January through December. This section will be updated with actual data for 2011 in the first quarter of 2012 and significant deviations from the Annual Report will be reported.

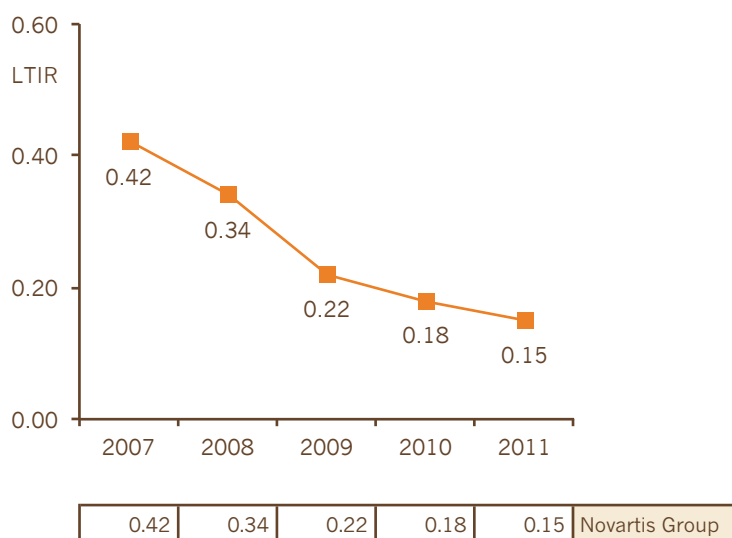
Reporting entity and scope

HSE performance data for 2011 was collected from 267 reporting units owned and managed by Novartis Group companies and includes 25 Alcon reporting units. This covers all sites with relevant HSE impacts – including all production, formulation and research and development sites, as well as major headquarters offices. Our HSE data reporting covers nearly all Novartis employees, third party personnel and contractors, i.e., staff who regularly work on a Novartis site, such as cleaning, catering, security, engineering and maintenance personnel, and a minimum of one month per year for Novartis. Cumulative HSE data for Novartis excludes Alcon unless stated otherwise. Novartis believes the performance data presented in its Annual Report and on its website represents a fair and balanced picture of the company's HSE performance. Performance indicators follow GRI requirements for core environmental and social indicators and for selected additional indicators that we deem relevant.

Reported data describe our major material flows within company boundaries and environmental impacts originating from our own operations (Scope 1), as well as greenhouse gas emissions from the generation of purchased energy (Scope 2). With the exception of specific products (where life-cycle analyses have been carried out) and of dedicated parameters, we do not monitor environmental impacts linked to the manufacturing and delivery of purchased goods and services, or the use of resources and other related emissions for activities outside company boundaries (Scope 3).

Health and safety performance

Lost Time Injury and Illness Rate



HSE data reflects continuing operations, not including Alcon

Novartis reports work-related injuries or illnesses among its Group company associates that have occurred during the year. The Novartis Lost Time Injury and Illness Rate (LTIR) is a key performance indicator, enabling direct comparison between the performance of our units and on a country-by-country basis.

In 2011, the LTIR for continuing operations at Novartis (excluding Alcon) was further reduced to 0.15 per 200,000 hours, from 0.18 the previous year; this represents a 20% reduction. Alcon recorded an LTIR of 0.45 for 2011.

	Target 2010	Achievement 2010	Target 2011	Achievement 2011
Novartis Group*	≤ 0.20	0.18	≤ 0.18	0.15
Pharmaceuticals	≤ 0.20	0.20	≤ 0.18	0.13
Vaccines & Diagnostics	≤ 0.20	0.17	≤ 0.18	0.17
Sandoz	≤ 0.20	0.19	≤ 0.18	0.18
NIBR	≤ 0.20	0.16	≤ 0.18	0.09
OTC	≤ 0.20	0.25	≤ 0.18	0.22
Animal Health	≤ 0.20	0.15	≤ 0.18	0.18
CIBA Vision	≤ 0.20	0.07	≤ 0.18	0.14

*Novartis Group LTIR figures for continuing operations, excluding Alcon

Basis of achievement

Continuing management commitment and rigorous application of safety systems and procedures, combined with ongoing training for Group company associates, have driven progress in injury and illness reduction. Several activities to promote safety awareness, including four key measures, are used by local management and reviewed by divisional HSE teams:

- Walk-through inspections with senior managers on site
- HSE training targeted at 0.1–0.5% of total hours worked yearly, depending on the work area
- Percentage of completed items on incident investigation related to total number of recommendations
- Near misses reported at least 5–10 to 1 versus actual incidents

A significant number of units have introduced safety culture initiatives (behavior-based safety programs) to complement existing measures that provide the backbone for ongoing safety management at sites.

Tailored safety initiatives have been introduced where relevant, e.g., driver safety for fleet or sales organizations and laboratory safety for research and development.

All significant incidents without lost time, accidents with lost time and relevant near misses are investigated. The level and extent of the investigation reflect the seriousness or potential impact of the event. Suitable processes and criteria (e.g., risk/potential consequences, learning potential) are put in place to ensure that investigations are carried out adequately. A systematic method (e.g., TapRoot®) is applied to guarantee a thorough investigation. In 2011, more than 130 associates from sites across the world were trained in the TapRoot® methodology.

In-depth risk analysis – in accordance with the Zurich Hazard Analysis (ZHA) methodology – is fundamental to Novartis operations and contributes substantially to process safety, including the prevention of fires, explosions, releases and spills.

We provide regular training courses globally in hazard analysis, process safety management and systematic incident investigations. In 2011, 110 associates from sites across the world were trained. In addition, extensive on-the-job HSE training is carried out at all sites.

Fatalities

There have been no fatalities during recent years at any Novartis manufacturing or office site. There have been fatalities among Novartis associates as a result of traffic accidents that occurred while traveling on public roads for business.

We deeply regret to report two such work-related fatalities in 2011 caused by traffic accidents. During the past five years, there have been seven fatalities in total, all relating to road traffic incidents. In 2006, two fatalities occurred in Indonesia; in 2008 one fatality occurred in Pakistan; in 2010, two fatalities occurred in Germany and China; and in 2011 two fatalities occurred in Ukraine and the US. In 2007 and 2009, there were no work-related fatalities.

We recognize the importance of safety at work and when an associate is on the road for Novartis. A comprehensive driver safety campaign with guidance on how to reduce the number of traffic-related accidents has been rolled out at relevant Novartis fleet/sales organizations.

Total Recordable Case Rate

Many injury and illness cases without lost time have the potential to lead to lost time. Identifying and managing the circumstances in which these incidents occur ultimately reduces the overall risk of having a serious accident, lost time injuries and illnesses, or even fatalities.

A recordable case includes the following:

- Work-related injury with or without lost time
- Work-related illness with or without lost time
- Work-related loss of consciousness
- Work-related fatality

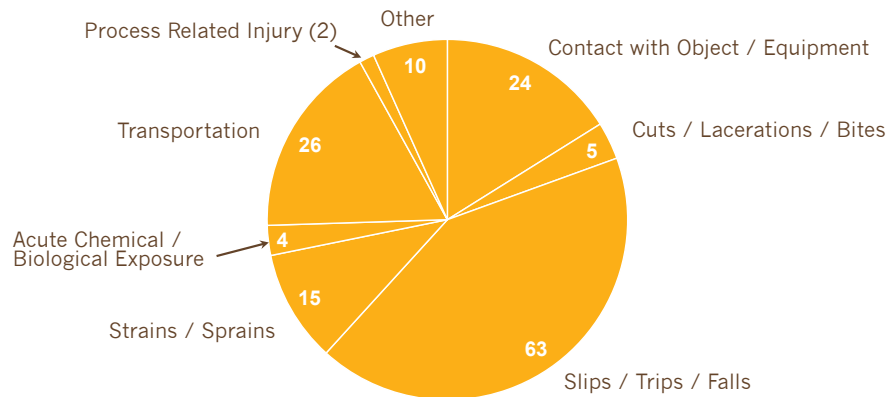
The Total Recordable Case Rate (TRCR) equals the division of all recordable cases by the hours worked, multiplied by 200,000 for standardization. In 2011, the Novartis Group TRCR (excluding Alcon) was 0.54, down from 0.73 in 2010. Alcon reported a TRCR of 1.04 in 2011.

	Achievement 2010	Achievement 2011
Novartis Group*	0.73	0.54
Pharmaceuticals	0.81	0.53
Vaccines & Diagnostics	0.43	0.48
Sandoz	0.64	0.52
NIBR	0.69	0.57
OTC	0.74	0.57
Animal Health	0.66	0.71
CIBA Vision	0.76	0.59

*Novartis Group TRCR figures for continuing operations, excluding Alcon

Occupational injury and illness

Injury with Lost Time Total: 149 associates* (63 associates from Alcon)

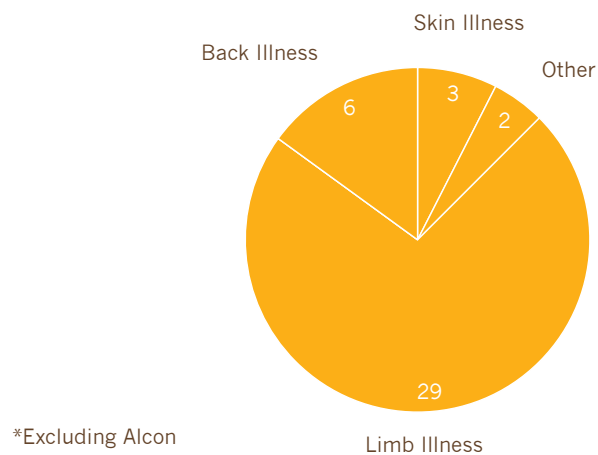


*Excluding Alcon

During 2011, a total of 527 associates (excluding Alcon) suffered work-related injuries. Of these, 149 (2010: 180) led to days off work (integrated into the LTIR).

The distribution of injuries by immediate cause indicates that the most prominent safety issues are related to non-operational activities, such as slips, trips and falls at offices and sites, and transport accidents within the sales force, which together account for 60% of occupational injuries with lost time.

Illness Total: 40 associates* (19 associates from Alcon)



Novartis sites (excluding Alcon) reported a total of 40 occupational illnesses in 2011 (2010: 33). Of these, four (2010: four) led to days off work (integrated into the LTIR, this represents 3% of the total lost time cases). There were no recorded chronic poisonings, as a result of the protection measures in place for handling potentially hazardous substances.

The most prominent health issue remains musculoskeletal disease, accounting for 88% (2010: 91%) of the occupational illnesses reported. There were three cases of occupational skin disease due to unspecific irritation of the skin, which did not lead to lost time. There were two cases of occupational mental ill health; one of which resulted in lost time.

Occupational injury to third party personnel

Beyond its associates, Novartis recognizes its responsibility to promote the health and safety of third party personnel.

Third party personnel are those individuals employed by a third party that invoices Novartis for hours completed. They work regularly on Novartis premises and receive day-to-day work assignments from Novartis Group company associates. Some companies refer to these individuals, including sub-contracted workers, as contractors.

Novartis (excluding Alcon) employed an average of 9,600 people as third party personnel during 2011. There were 68 occupational injuries among this group. Of these, 17 resulted in lost time. There were no fatalities among third party personnel in 2011, or for the past five years.

Since 2011, Novartis also records the hours worked for third party personnel in order to calculate an LTIR and a TRCR for this population. This allows comparisons with Novartis associates. As for our own associates, any accident is rigorously investigated in order to reduce the total number of work-related accidents. Please refer to the table below to see third party personnel health and safety performance in previous years.

Year	Number of TPP*	Number of injury cases w/wo lost time*	TPP LTIR*	TPP TRCR*
2007	7,700	111	-	
2008	7,400	103	-	
2009	7,000	117	-	
2010	8,000	123	-	
2011	9,600	68	0.19	0.74

*Novartis Group Third Party Personnel figures for continuing operations, excluding Alcon

Occupational injury to contractors

Beyond its associates and third party personnel, Novartis recognizes its responsibility to promote the health and safety of contractors.

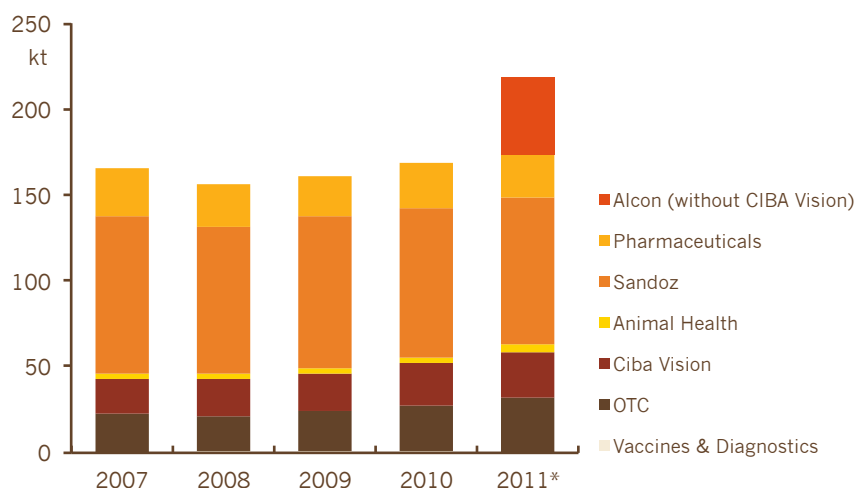
Contractors are those individuals employed by companies undertaking work for Novartis within the terms of a contract or service agreement. As opposed to third party personnel, contractors receive day-to-day work assignments from their companies' management and are hired to complete a job on their own. Novartis only reports health and safety data from contractors who regularly work at a Novartis site, such as cleaning, catering, security, engineering and maintenance personnel. These contractors, known as "fixed" or "nested" contractors, work a minimum of 1 month per year for Novartis.

As of 2011, Novartis reports the Lost Time Incident Rate for contractors, but not the Total Recordable Case Rate for this group. Because we cannot precisely determine the number of cases without lost time for this group on a global level, the rate would be inaccurate and unreliable.

Novartis (excluding Alcon) employed approximately 15,000 contractors during 2011. There were 72 occupational injuries with lost time and no fatalities among this group in 2011.

Resources and environment performance

Production



-	-	-	-	45.19	Alcon (without CIBA Vision)
26.79	24.85	24.10	25.25	24.78	Pharmaceuticals
91.96	84.52	87.69	86.97	85.65	Sandoz
3.57	2.84	2.94	4.04	4.60	Animal Health
19.69	21.90	22.02	24.69	26.81	Ciba Vision
22.80	21.34	24.09	26.87	31.86	OTC
0.31	0.32	0.51	0.39	0.26	Vaccines & Diagnostics
165.12	155.77	161.35	168.20	219.15	Production total [kt]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Novartis monitors and reports total production as the total weight of all products delivered from all Novartis Group companies manufacturing facilities. Total production covers all types of products, including chemical and fermentation products, active pharmaceutical ingredients (APIs) and finished dosage forms, as well as eye care products.

Total production for 2011 (excluding Alcon) was 174kt (2010: 168kt). Biggest contributors to total weight of products are:

Sandoz	86kt
OTC	32kt
CIBA Vision	27kt
Pharmaceuticals	25kt

Alcon accounts for 45 kt.

Certified management systems

A total of 32 Novartis Group company facilities (excluding Alcon) have ISO 14001 or EMAS certification for their environmental management systems.

Pharmaceuticals	11
NIBR	1
Vaccines and Diagnostics	4
Sandoz	15
Animal Health	1

Alcon has ISO 14001 certification covering all 16 global manufacturing operations.

In addition, 27 sites (excluding Alcon) have OHSAS 18001 certification.

Pharmaceuticals	9
Vaccines and Diagnostics	3
Sandoz	13
CIBA Vision	1
Animal Health	1

In Alcon, one site has OHSAS 18001 certification.

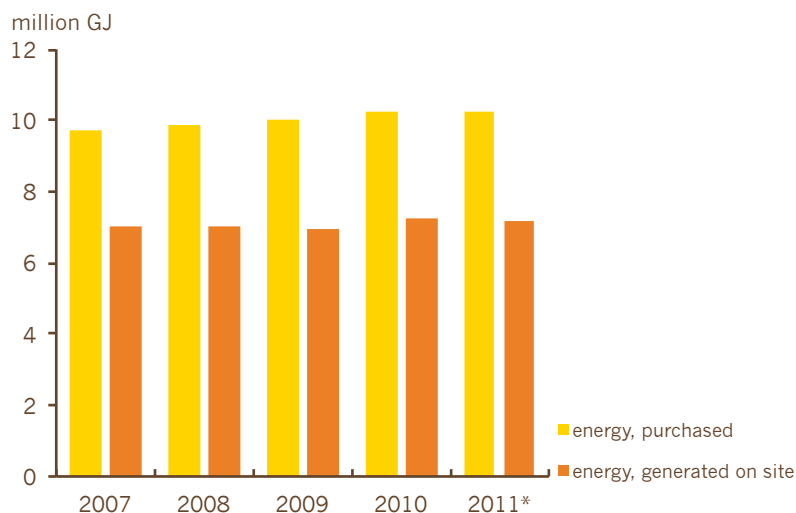
ISO/EMAS certifications cover 88% of the Vaccines & Diagnostics, 78% of the Pharmaceuticals and 75% of Sandoz production. OHSAS certifications cover 84% of the Vaccines & Diagnostics, 53% of Pharmaceuticals and 59% of Sandoz production (in terms of production amounts from certified sites).

Fines

Novartis Group companies around the world (excluding Alcon) paid a total of USD 20,256 in fines for minor HSE violations in 2011. An additional USD 33,468 worth of HSE relevant fines were paid by Alcon in 2011.

Energy use

Energy use (in million GJ)



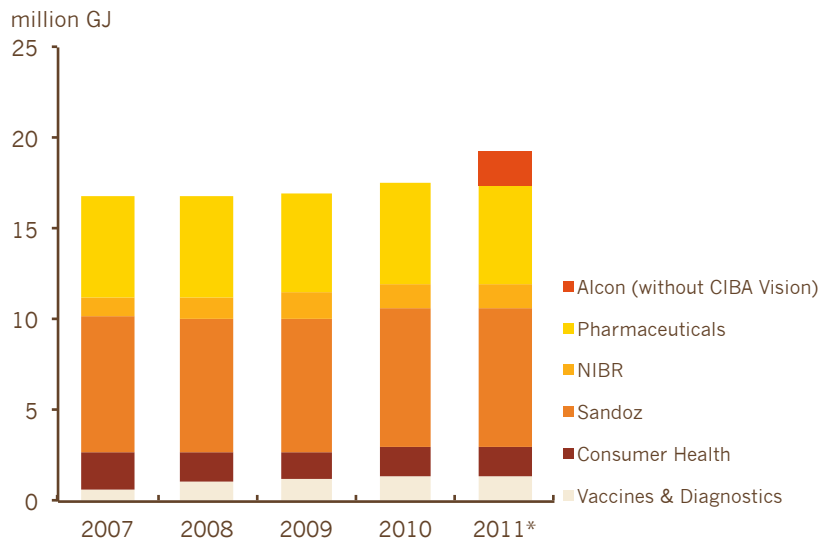
HSE data reflects continuing operations, not including Alcon
* Estimated data for 2011

In 2011, total energy use (excluding Alcon) decreased by 0.9% from 17.56 million GJ in 2010 to 17.40 million GJ.

Total on-site energy (fuels) decreased from 7.28 million GJ to 7.17 million GJ (down 1.5%). Total purchased energy also decreased slightly from 10.28 million GJ in 2010 to 10.23 million GJ (down 0.5%).

Novartis has maintained a high level of less carbon-intensive and renewable energy resources; 90% of on-site energy came from the combustion of natural gas and 2.8% from renewable sources (same as in 2010). Renewable sources account for approximately 40% of purchased energy, including conventional hydroelectric power. Excluding hydroelectric power, the renewable energy portion amounts to 5.9% (up from 4.9% in 2010).

Energy use by division (in million GJ)



-	-	-	-	1.96	Alcon (without CIBA Vision)
5.59	5.71	5.51	5.60	5.47	Pharmaceuticals
1.03	1.16	1.35	1.33	1.29	NIBR
7.37	7.36	7.38	7.66	7.65	Sandoz
2.06	1.55	1.52	1.52	1.53	Consumer Health
0.71	1.09	1.22	1.44	1.46	Vaccines & Diagnostics
16.75	16.88	16.98	17.56	19.36	Total energy consumption [mio GJ]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Sandoz (7.65 million GJ) was the largest energy user in the Novartis Group in 2011, followed by Pharmaceuticals (5.47 million GJ) and Consumer Health, including CIBA Vision (1.53 million GJ). Alcon consumed 1.96 million GJ.

Total energy costs for the Novartis Group (excluding Alcon) were USD 382 million for 2011 (USD 359 million in 2010), of which USD 241 million were spent on electricity.

Energy efficiency target achievement and outlook

Since 2003, the Novartis Group has successfully introduced energy efficiency targets in all its divisions. In 2006, a 10% improvement target was set for the period 2007–2010 (based on 2006 performance). With a performance improvement of 26% in energy efficiency per sales between 2006–2010, this target was overachieved. A new target of 15% improvement of energy efficiency was set for 2011–2015, based on 2010 levels. In 2011, energy efficiency per sales improved by 5%, which is 2% above the annual improvement target.

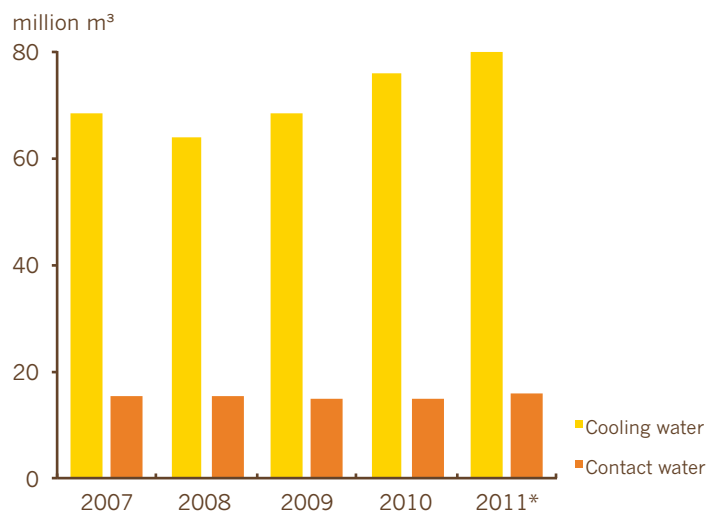
In 2008, the Novartis Group started to report energy savings achieved with energy projects and use this criteria to set energy performance targets for divisions. Each division is expected to implement energy projects for 10% of its 2008 energy consumption by 2015. As of 2011, total energy savings achieved with energy projects amount to USD 40 million in terms of energy costs and 1,650 GJ in terms of energy. This accounts for 9.7% of the 2008 energy consumption.

We believe these significant achievements result from our ongoing energy management programs. We continue our efforts to further improve our energy performance and therewith support the related greenhouse gas emission reduction targets. We expect the trend in improved energy efficiency to continue in future years as a result of our energy efficiency programs spreading throughout the organization.

[Learn more about our GHG emission reduction target >](#)

Water use

Water use (in million m³)



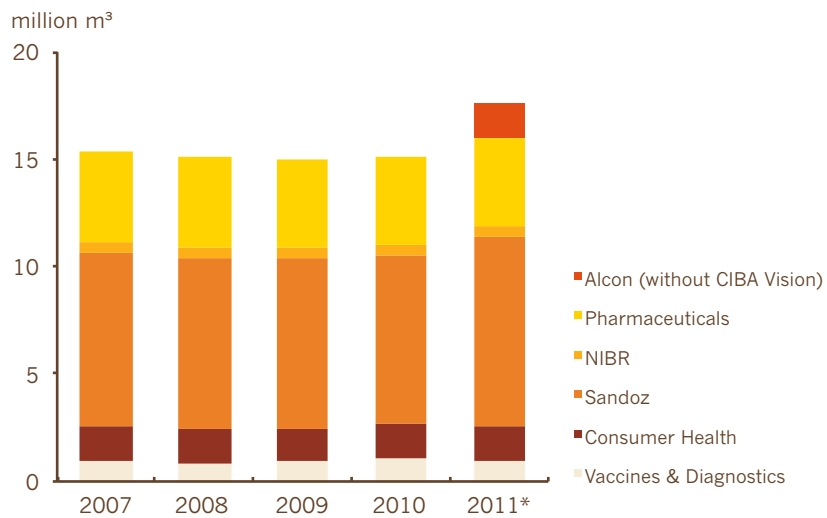
68.16	64.03	68.15	75.84	79.62	Cooling water
15.41	15.11	15.04	15.08	16.03	Contact water
83.57	79.15	83.19	90.92	95.65	Water use total [mio m³]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

In 2011, total water use increased from 90.9 in 2010 to 95.6 million cubic meters. A total of 27.2 million cubic meters (28%) of the total quantity of water (contact and non-contact cooling water) that Novartis uses is purchased from water suppliers, and 68.4 million cubic meters (72%) is abstracted from groundwater wells or surface water bodies (directly from the environment), mainly for cooling purposes.

Contact water use by division (in million m³)



-	-	-	-	1.58	Alcon (without CIBA Vision)
4.33	4.19	4.09	4.05	4.13	Pharmaceuticals
0.42	0.52	0.60	0.55	0.58	NIBR
8.14	7.98	7.84	7.82	8.70	Sandoz
1.60	1.57	1.58	1.63	1.62	Consumer Health
0.92	0.87	0.93	1.02	1.01	Vaccines & Diagnostics
15.41	15.11	15.04	15.08	17.61	Contact water use total [mio m³]

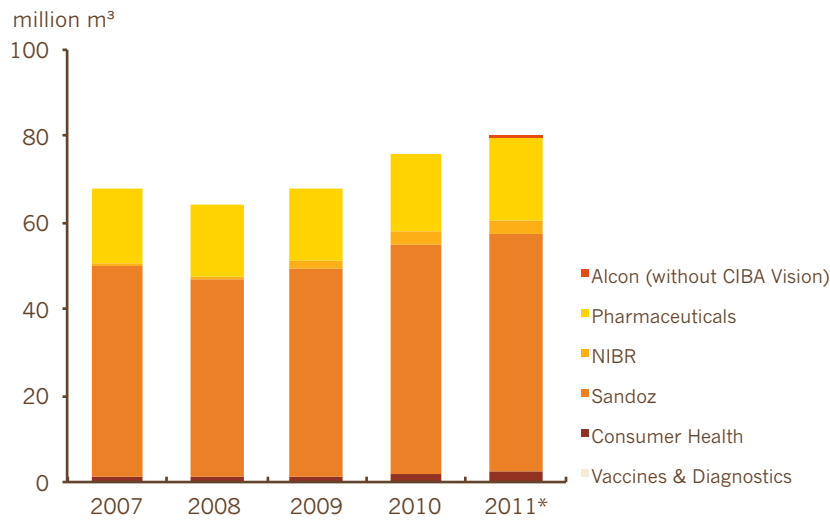
HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

The use of contact water increased in 2011 to 16.0 million cubic meters (up from 15.1 million cubic meters in 2010). Major users of contact water were Sandoz (54%), Pharmaceuticals (26%) and Consumer Health, including CIBA Vision (10%). During 2011, Sandoz increased contact water use by approximately 0.9 million cubic meters. Alcon used 1.56 million cubic meters of contact water.

Cooling water use by division (in million m³)



-	-	-	-	0.46	Alcon (without CIBA Vision)
17.44	16.35	17.07	17.89	19.18	Pharmaceuticals
0.67	0.87	1.73	3.10	2.98	NIBR
48.82	45.74	47.98	53.04	55.29	Sandoz
0.98	0.92	1.20	1.67	1.94	Consumer Health
0.19	0.15	0.17	0.13	0.24	Vaccines & Diagnostics
68.16	64.03	68.15	75.84	80.08	Cooling water use total [mio m³]

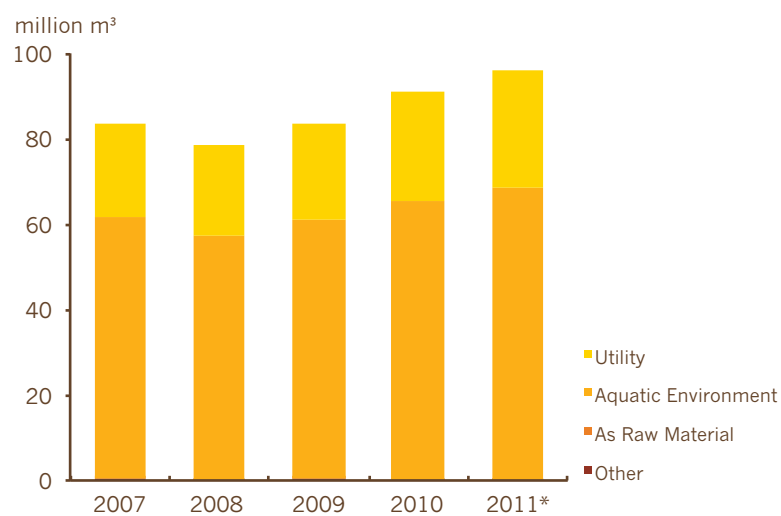
HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Consumption of non-contact water (mainly for cooling purposes) increased by 5% from 75.8 million cubic meters in 2010 to 79.6 million cubic meters in 2011. The main use of cooling water was for the control of fermentation processes and for comfort cooling of office buildings with water instead of energy-consuming mechanical chilling. For these two purposes, Novartis uses water drawn from groundwater sources next to rivers or directly from rivers in areas where large sources of naturally-cold water are available.

Water input by source (in million m³)



22.34	20.97	22.23	25.68	27.25	Utility
61.17	57.33	61.02	65.29	68.39	Aquatic Environment
0.00	0.00	0.00	0.00	0.00	As raw material
0.24	0.09	0.19	0.13	0.14	Other
83.74	78.39	83.44	91.10	95.78	Water input by source [mio m³]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

Water efficiency target achievement and outlook

While strategies on water abstraction and the use of cooling water vary from site to site, we have made concerted efforts to further reduce the use of contact water that requires treatment, both in order to reduce pollutant loads, and because this is a growing environmental and cost factor.

Novartis set an efficiency improvement target on contact water of 10% for the period 2006 to 2010 (based on 2005 performance), translating to an average 2% annual improvement. Novartis defines contact water efficiency as contact water use per sales. This target was extended until 2012 with an additional 4% contact water efficiency improvement for the two additional years (2011 and 2012). While we were able to improve our contact water efficiency by 38% between 2005 and 2010, efficiency decreased by 2% between 2010 and 2011.

As an example, at its production facility in Turbhe, India, the Sandoz Division achieved considerable water savings during 2011 by optimizing the boiler system for steam generation. Related annual water savings were 11,000 m³ of supplied fresh water, representing 10% of the site's total water usage. Water is a highly scarce resource in the Mumbai suburban area, where Turbhe is located, and therefore water savings are a priority for Sandoz at these operations. The boiler optimization project was also highly beneficial with respect to energy; with this project Turbhe was a winner of one of five Novartis Energy Excellence Awards for 2011.

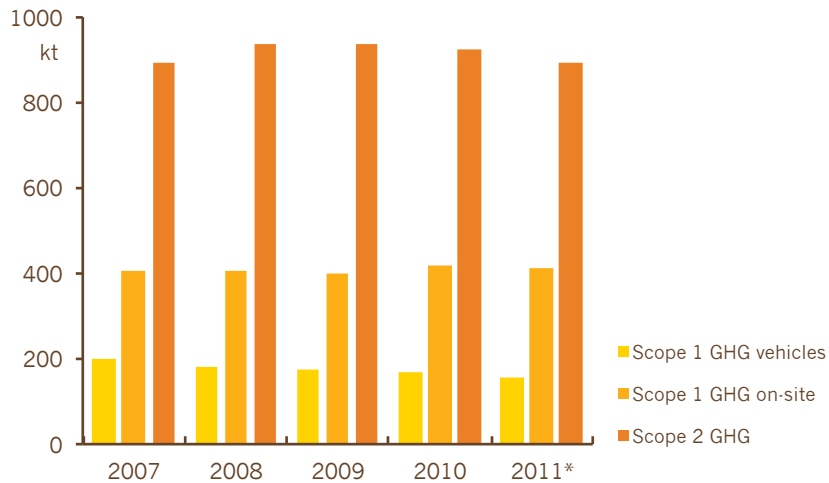
The Sandoz site in Taboão da Serra near São Paulo, Brazil, is recycling rejects from the water purification process instead of potable water as feed water for cooling towers. With that measure the site's annual total water consumption could be reduced by almost 4,900 m³ or about 7%.

The Novartis Institute for Functional Genomics (GNF) in La Jolla, California, also located in a water-scarce area, dramatically reduced consumption of cooling tower water by increasing the cycles of concentration at the cooling tower as a result of using softened water instead of potable city water. Total savings since 2007 from this and several other water projects amount to 13,232 m³ or almost 20% of the site's total water usage.

At its production site in Jamshoro, Pakistan, Novartis OTC provides clean drinking water to neighboring communities. With this free-of-charge service, communities receive between 40 and 65 m³ of clean fresh water every day; representing 20% of what the site is using in its operations. In Jamshoro, where drinking water is a scarce resource, the availability of clean water is a critical issue for people's health and well being.

Greenhouse gas emissions

GHG emissions (in kt)

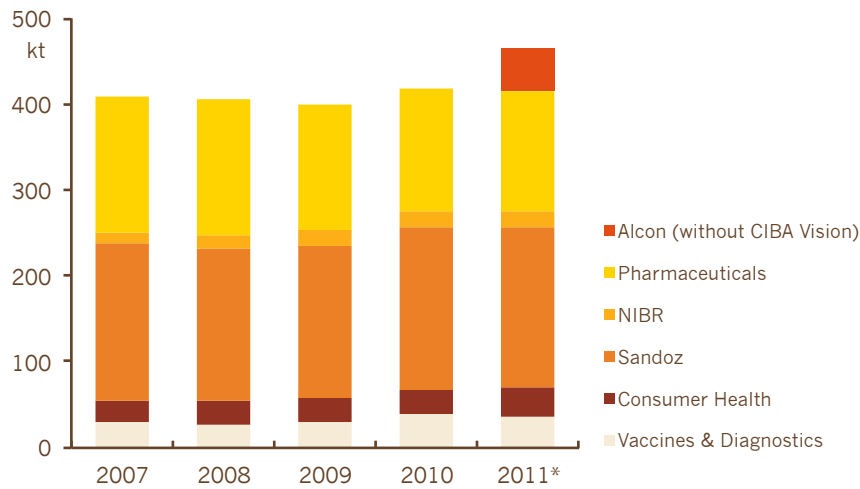


196.84	183.34	175.77	167.85	155.19	Scope 1 GHG Vehicles
407.62	405.42	399.78	417.57	414.27	Scope 1 GHG on-site
893.36	937.64	934.36	921.67	889.81	Scope 2 GHG total [kt]
1,497.82	1,526.39	1,509.91	1,507.09	1,459.27	Total GHG total [kt]

HSE data reflects continuing operations, not including Alcon
 * Estimated data for 2011

For the third consecutive year, the Novartis Group (excluding Alcon) achieved a reduction in total greenhouse gas (GHG) emissions in 2011 from 1,507kt in 2010 to 1,459kt (down 3.2%).

GHG emissions, Scope 1, combustion and process by division (in kt)



-	-	-	-	49.42	Alcon (without CIBA Vision)
157.12	157.52	145.32	142.90	139.13	Pharmaceuticals
11.30	14.69	19.56	18.47	17.28	NIBR
183.50	179.36	177.20	189.68	188.66	Sandoz
25.60	28.04	28.83	28.23	31.97	Consumer Health
30.09	25.81	28.87	38.29	37.23	Vaccines & Diagnostics
407.62	405.42	399.78	417.57	463.69	On-site scope 1 GHG [kt]

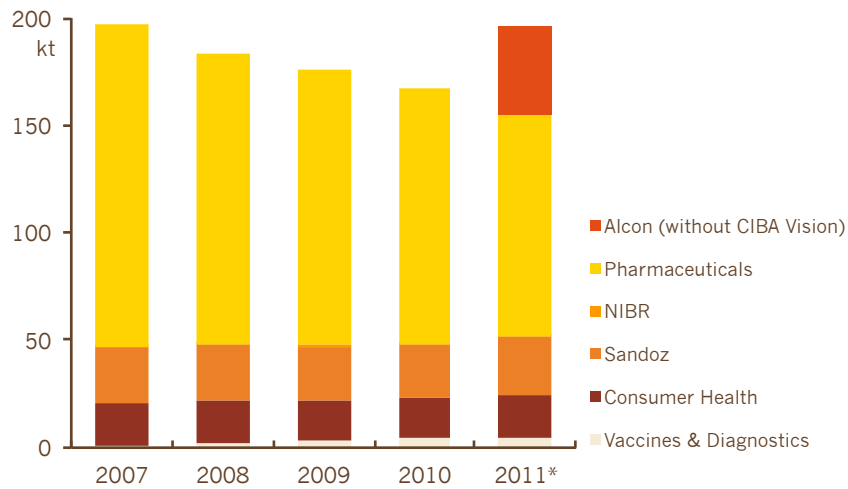
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Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

The total amount (excluding Alcon) of Scope 1 GHGs, mainly carbon dioxide (CO₂) emitted from on-site combustion of fossil fuels in 2011 was 414kt, a 0.8% decrease compared to 2010 (418kt). Emission of other GHGs (hydrofluorocarbons from refrigeration systems), included in the above amount, totaled 10kt. GHG emissions from production processes, also included in the Scope 1 GHG total, amounted to approximately 3kt. GHG emissions of non-Kyoto gases, such as hydrochlorofluorocarbons (HCFCs) and certain chlorinated solvents, totaled approximately 10kt.

GHG emissions, Scope 1 from vehicles (in kt)



-	-	-	-	40.66	Alcon (without CIBA Vision)
150.06	135.42	128.19	120.02	103.44	Pharmaceuticals
0.04	0.12	0.16	0.15	0.15	NIBR
25.86	26.01	25.29	24.78	27.10	Sandoz
19.41	20.10	19.08	18.25	19.96	Consumer Health
1.48	1.68	3.06	4.64	4.54	Vaccines & Diagnostics
196.84	183.34	175.77	167.85	195.85	Vehicle scope 1 GHG [kt]

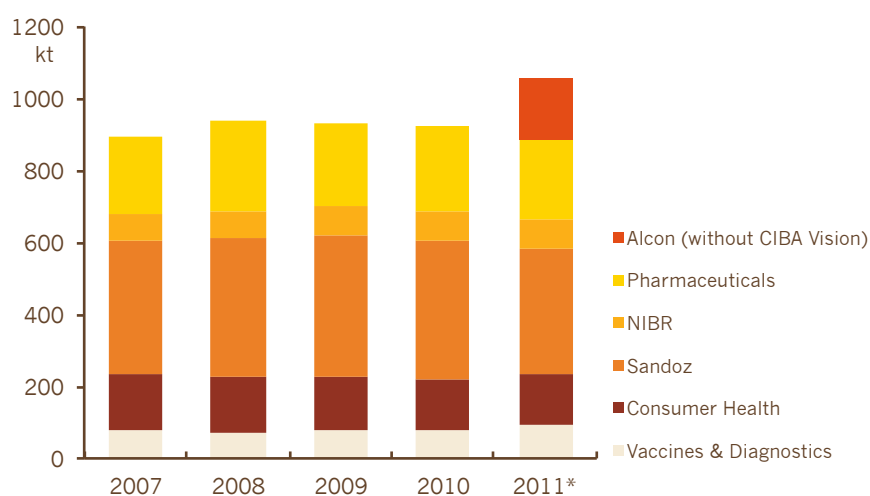
HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Scope 1 GHG emissions from the use of company-owned or leased vehicles are reported separately. In 2011, this totaled 155kt, compared to 168kt in 2010 (a 27.5% decrease). Since 2005, Scope 1 GHG emissions from vehicles have decreased by 22%. This decrease is due to the use of more efficient fleet vehicles.

GHG emissions, Scope 2, by divisions (in kt)



-	-	-	-	164.87	Alcon (without CIBA Vision)
216.66	247.83	229.69	234.96	223.98	Pharmaceuticals
70.06	75.84	83.12	84.05	80.65	NIBR
370.98	390.20	390.76	380.99	354.20	Sandoz
159.24	151.02	148.41	140.24	139.35	Consumer Health
76.13	72.39	82.02	80.87	91.20	Vaccines & Diagnostics
893.36	937.64	934.36	921.67	1,054.68	Scope 2 GHG total [kt]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Scope 2 GHG emissions (mainly from electricity generation) totaled 890kt, which represents a reduction of about 3.5% from 922kt in 2010.

Novartis (excluding Alcon) has reduced its GHG emission intensity (in terms of GHG emissions per sales) by 16% for Scope 1 on-site emissions and by 22% for Scope 2 compared to 2008. On an annual basis, compared to 2009, the respective reduction percentages amount to 5% for Scope 1 on-site emissions and 7% for Scope 2 emissions.

Scope 3 GHG emissions from our global business flights totaled an estimated 274kt. This number is based on more detailed information from our worldwide travel agent, which is not comparable with information from previous years. GHG emissions from the five company-owned or leased aircrafts, totaling 6kt, have been included in the Scope 1 company vehicle fleet reporting.

An estimate of other Scope 3 GHG emissions, e.g. from raw material generation, transports, waste disposal, waste water treatment, creation of company infrastructure and employee commuting, has shown that amounts could be significant.

GHG emission target achievement and outlook

In 2005, Novartis made a voluntary commitment to reduce Scope 1 on-site GHG emissions to the global average level prescribed in the Kyoto Protocol, i.e. 5% below the 1990 level by 2012. This commitment forms a major part of the Novartis Group environmental targets and programs enacted in 2005. It strongly correlates with the targets that were already in place on energy efficiency improvement and on energy projects.

In relation to the above GHG target, emissions have been assessed for the 1990 reference year, based on the level of Novartis business activities in 1990. Global direct on-site GHG emissions in 1990 have been calculated at 308kt. Taking the continued growth of business as well as energy efficiency and emission reduction initiatives into account, emissions were expected to rise on average by some 2% per year. While this was the case between 1990 and 2005, Scope 1 GHG emissions remained more or less constant since 2005 despite the growth of the business.

With currently 414kt Scope 1 on-site GHG emissions for 2011 Novartis is about 30% above the Kyoto target of 5% below the 1990 levels, i.e. 293kt. Novartis intends to close the expected gap of 120 to 130kt in 2012 with carbon offsets from its own afforestation projects in Argentina and Mali.

Between 2006 and 2010, Novartis has reduced Scope 1 GHG emissions from its owned or leased vehicle fleet by 17%, well above the 10% reduction target set for this period. In 2010, a new 10% reduction target on fleet GHG emissions was set for 2015. Reductions were achieved thanks to more fuel-efficient vehicles through the introduction of hybrid gasoline-electric cars, increased use of diesel engines fitted with particulate filters, and other emission-reduction options such as liquid natural gas or bio-fuels. At the end of 2011, the Novartis vehicle fleet in the US included 638 hybrid and 164 fuel-efficient diesel cars (representing 18% of the US fleet, down from 20% in 2010). Average fuel efficiency of the US fleet is 25.4 miles per gallon (same as in 2010).

In 2010, Novartis set new targets on total GHG emissions for 2015 and 2020, respectively a 15% and 20% reduction compared to 2008. These are in line with targets set by leading countries. We intend to compensate part of our total GHG emissions with carbon offsets in order to achieve our 2015 and 2020 targets.

Between 2008 and 2011, total GHG emissions were reduced by 4.4%. This good performance results from increased energy efficiency and use of renewable energy, as well as other GHG emission reduction measures. We continue to strengthen our efforts and investments in more energy-efficient technology and the use of renewable sources in order to further reduce total GHG emissions in the coming years.

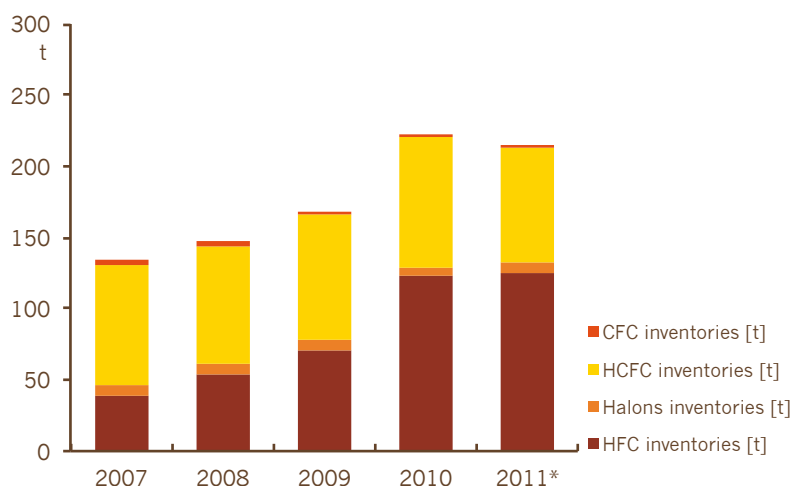
While our main focus is to lower GHG emissions through internal improvement programs, the Novartis Group is also taking advantage of carbon-offset options included in the Kyoto Protocol, such as the United Nations Clean Development Mechanism (CDM) and voluntary offset schemes. These schemes are designed to offset the amount of carbon released into the atmosphere by removing GHGs elsewhere through the use of renewable energy, energy conservation or carbon sequestration into biomass.

We believe carefully selected carbon-offset projects can help to foster long-term economic growth for local populations in developing economies, while also supporting Novartis in meeting its Group GHG reduction target. Novartis has established its own carbon-offset projects in Latin America, Africa and China.

[Learn more about our carbon-offset projects >](#)

Ozone depleting substances

Priority gas inventories (in t)



3.71	2.37	1.91	1.91	1.68	CFC inventories [t]
83.37	83.56	89.30	91.71	81.40	HCFC inventories [t]
7.28	7.16	7.31	6.19	5.99	Halons inventories [t]
39.34	53.92	70.40	122.48	125.95	HFC inventories [t]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

In accordance with the guidelines for sustainability reporting of the Global Reporting Initiative (GRI), Novartis reports on the inventory and emission of ozone depleting substances (ODS).

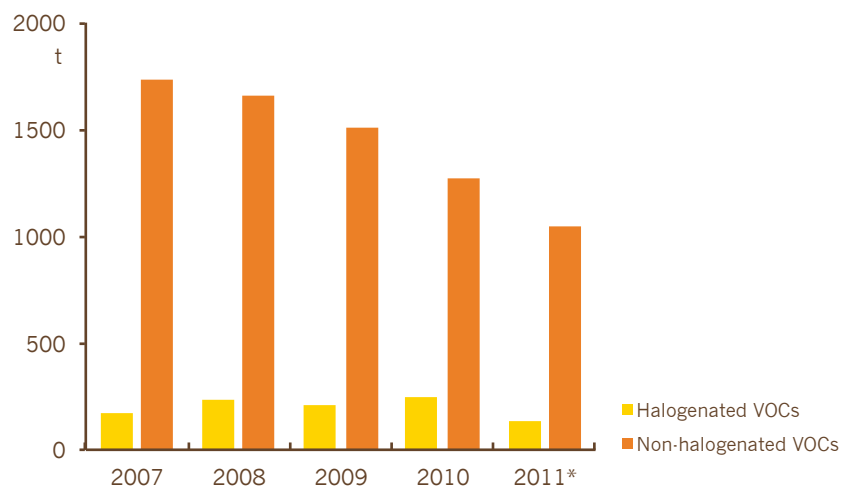
Ozone depleting substances inventory and emissions

For 2011, Novartis sites (excluding Alcon) globally reported a total inventory of approximately 89t of ozone depleting substances (ODS), compared to 100t in 2010. The 2011 figure includes approximately 1.7t of chlorofluorocarbon (CFC), 81t of hydrochlorofluorocarbon (HCFC) refrigerants, and 6t of halons. In 2011, the ODS inventory for Alcon included 32t, mostly HCFCs. Existing CFC and HCFC inventories are continually replaced with chlorine-free hydrofluorocarbons (HFCs) or with natural refrigerants. In 2011, HFCs – which have an ODS factor of zero – amounted to 126t for Novartis and 93t for Alcon.

Emissions in 2011 caused by ODS losses, reported in tons of R11-equivalents, were calculated for the Group at approximately 289kg (400kg in 2010). Since 2008, ODS are no longer included in any Novartis products. In 2011, emissions from ODS losses amounted to 796kg R11-equivalents for Alcon. Novartis intends to minimize the use of synthetic refrigerant materials. These are no longer used in new installations. Natural refrigerant materials are the preferred alternative in new equipment. CFCs used in existing equipment will be eliminated by 2012. HCFCs in existing equipment are being replaced when refilling becomes necessary.

Volatile organic compounds emissions

VOC emissions (in t)

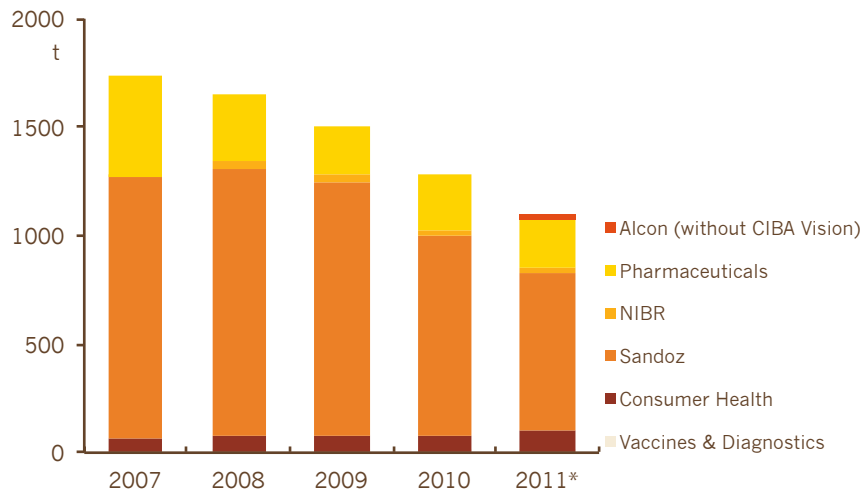


167.69	231.23	215.01	244.14	136.14	Halogenated VOCs [t]
1,735.84	1,655.17	1,507.22	1,276.87	1,049.74	Non-halogenated VOCs [t]
1,903.53	1,886.40	1,722.23	1,521.00	1,185.87	VOCs total [t]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

Non-halogenated VOC emissions by division (in t)



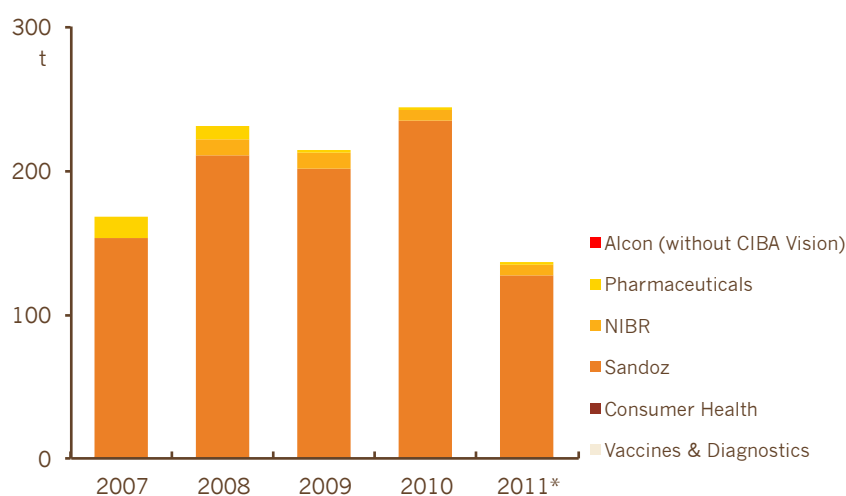
-	-	-	-	21.34	Alcon (without CIBA Vision)
468.60	312.56	230.05	246.75	217.15	Pharmaceuticals
1.30	31.60	33.88	25.58	24.59	NIBR
1,195.93	1,234.62	1,170.26	924.70	722.42	Sandoz
64.47	74.27	70.97	77.98	105.75	Consumer Health
5.55	2.13	2.07	1.86	1.17	Vaccines & Diagnostics
1,735.84	1,655.17	1,507.22	1,276.87	1,071.08	Non-halogenated VOCs [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Halogenated VOC emissions (in t)



-	-	-	-	0.00	Alcon (without CIBA Vision)
14.90	10.32	3.26	2.07	1.62	Pharmaceuticals
0.00	10.85	10.16	6.86	6.82	NIBR
152.70	210.03	201.56	235.19	127.67	Sandoz
0.09	0.03	0.03	0.03	0.02	Consumer Health
0.00	0.00	0.00	0.00	0.00	Vaccines & Diagnostics
167.69	231.23	215.01	244.14	136.14	Halogenated VOCs [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Emissions of halogenated Volatile Organic Compounds (VOCs) decreased to 136t, from 244t in 2010; while at the same time non-halogenated VOC emissions were reduced from 1,277t in 2010 to 1,050t in 2011. Emissions of halogenated VOCs came predominantly from Sandoz (94%); emissions of non-halogenated VOCs came from Sandoz (69%), Pharmaceuticals (21%) and Consumer Health, including CIBA Vision (6%).

VOC emission target achievement and outlook

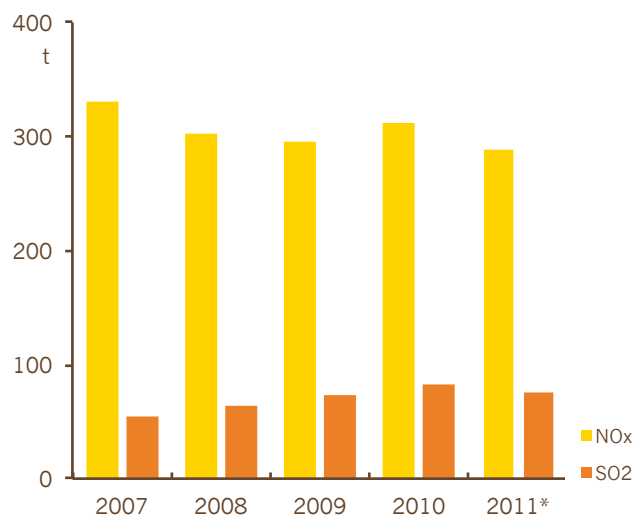
VOCs are the precursors of photochemical (tropospheric) ozone creation that leads to smog and related detrimental effects on health and the environment. Halogenated VOCs can also contribute to emissions of greenhouse gases.

The Novartis Group emphasizes reductions in VOC emissions in operations worldwide and a 15% reduction target was set for both halogenated and non-halogenated VOC emissions for the period 2008–2012. Emissions are strongly influenced by products that require solvents-based production processes and by the significant lead time to change production processes.

Emissions of VOCs overall decreased strongly in 2011, and both targets for reduction of halogenated and non-halogenated VOCs were met, primarily due to the installation of abatement measures in Sandoz.

Inorganic air pollutants

SO₂ and NO_x emissions (in t)

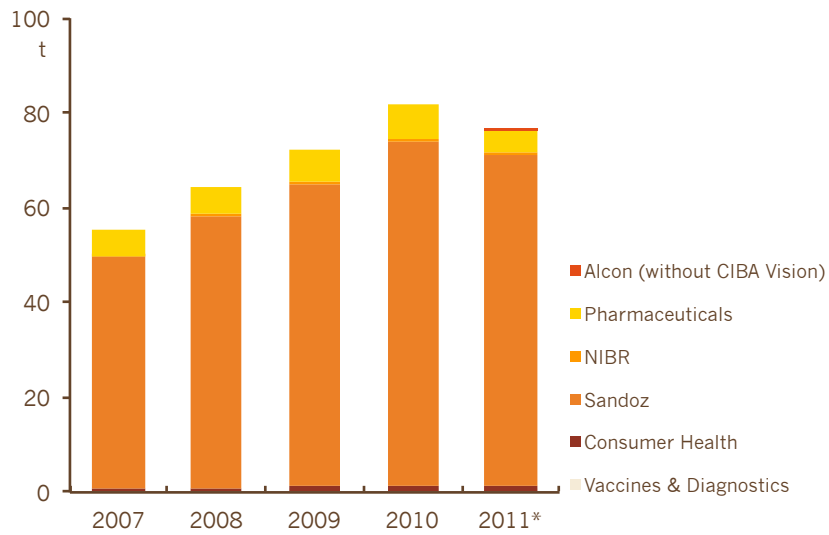


55.55	64.42	72.48	81.86	76.04	SO ₂ total [t]
331.43	302.13	294.56	312.57	287.99	NO _x total [t]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

SO₂ emissions by division (in t)



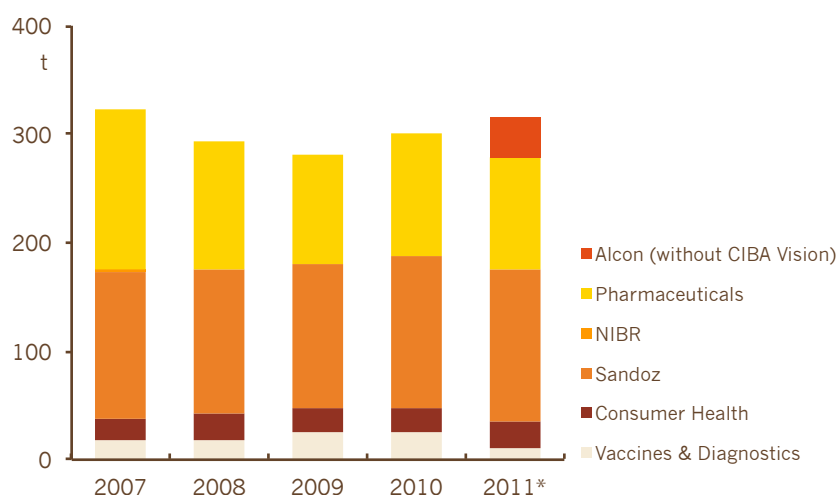
-	-	-	-	0.65	Alcon (without CIBA Vision)
5.71	5.85	6.69	7.28	4.42	Pharmaceuticals
0.34	0.32	1.04	0.52	0.54	NIBR
48.42	57.18	63.31	72.49	69.43	Sandoz
1.00	0.98	1.31	1.47	1.59	Consumer Health
0.08	0.08	0.12	0.10	0.06	Vaccines & Diagnostics
55.55	64.42	72.48	81.86	76.70	Total SO ₂ [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

NO_x emissions by division (in t)



	-	-	-	38.08	Alcon (without CIBA Vision)
149.23	118.62	102.59	113.43	103.40	Pharmaceuticals
8.56	8.18	12.68	12.16	9.96	NIBR
134.81	133.89	130.58	140.51	140.47	Sandoz
21.81	22.37	22.86	22.01	22.99	Consumer Health
17.02	19.06	25.86	24.46	11.18	Vaccines & Diagnostics
331.43	302.13	294.56	312.57	326.07	Total NO _x [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

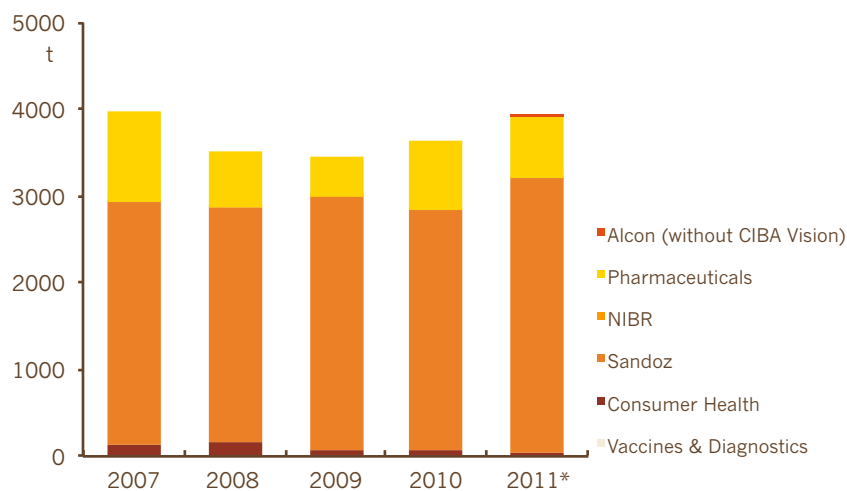
In 2011, inorganic air pollutant emissions for the Novartis Group (excluding Alcon) totaled 76t (82t in 2010) for sulphur dioxide (SO₂) and 288t (313t in 2010) for nitrogen oxide (NO_x). NO_x emission levels from company-owned or leased vehicles are not included in these figures. Major contributors to Group SO₂ emissions were Sandoz (69t) and Pharmaceuticals (4t). The distribution of NO_x emissions is similar to the figure for the consumption of on-site generated energy. Main contributors are Sandoz (49%) and Pharmaceuticals (36%). 2011 inorganic air emissions for Alcon are 0.7t SO₂ and 38.1t NO_x.

Inorganic pollutants targets and outlook

Inorganic air pollutants have long been a focus of environmental improvement at Novartis. Given the measures we have implemented to increase energy efficiency and fuel switches, we do not anticipate inorganic air pollutants, including SO₂, to increase in the coming years.

Emissions into water

Chemical oxygen demand (COD) load by division



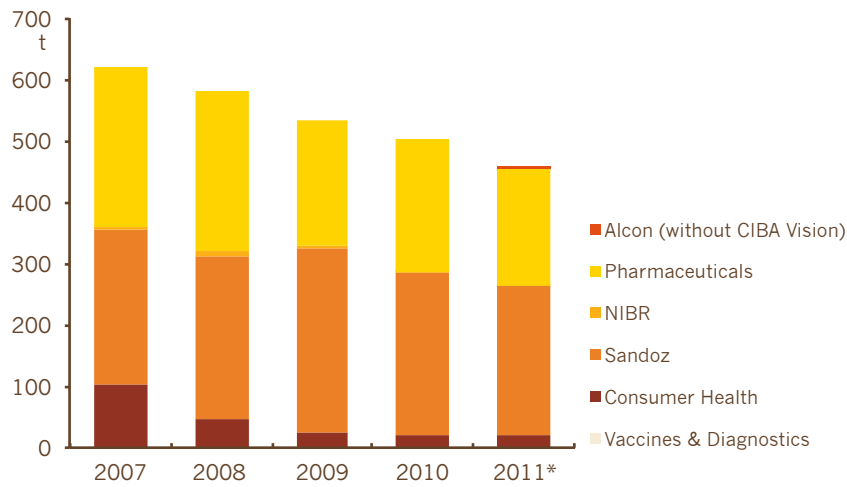
-	-	-	-	24.44	Alcon (without CIBA Vision)
1,047.37	633.47	479.73	817.77	729.63	Pharmaceuticals
0.70	1.40	0.61	0.25	0.26	NIBR
2,777.16	2,711.96	2,904.24	2,766.14	3,137.75	Sandoz
146.36	165.38	83.56	65.22	56.10	Consumer Health
0.00	0.00	0.00	0.00	0.00	Vaccines & Diagnostics
3,971.59	3,512.21	3,468.14	3,649.38	3,948.18	Total COD load [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Total suspended solids (TSS) emissions into water by division (in t)



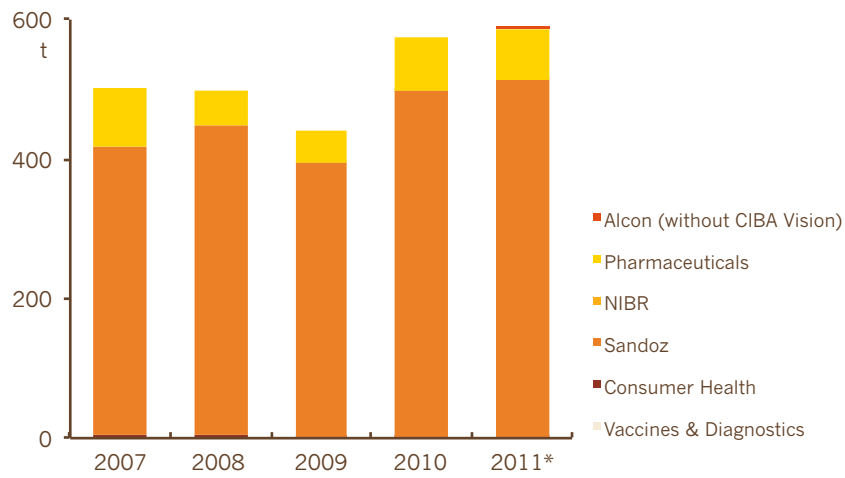
-	-	-	-	0.43	Alcon (without CIBA Vision)
260.86	262.41	206.62	218.54	193.03	Pharmaceuticals
2.50	7.10	3.67	0.04	0.06	NIBR
251.41	265.44	297.73	263.28	242.81	Sandoz
104.02	48.25	25.61	20.85	21.02	Consumer Health
0.00	0.00	0.00	0.00	0.00	Vaccines & Diagnostics
618.80	583.20	533.63	502.71	457.35	Total TSS load [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Nitrogen load by division (in t)



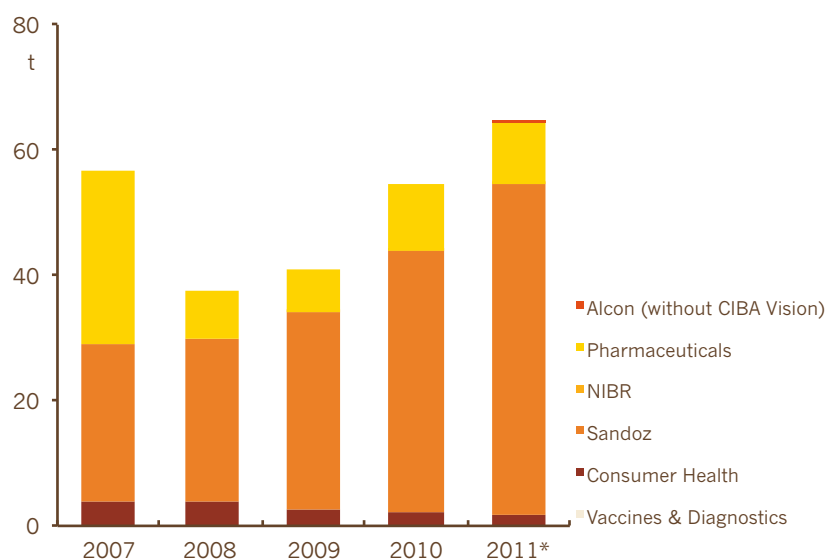
-	-	-	-	0.29	Alcon (without CIBA Vision)
85.31	49.25	47.18	77.86	71.57	Pharmaceuticals
0.00	0.00	0.01	0.01	0.01	NIBR
412.12	444.56	394.45	495.95	512.64	Sandoz
4.93	4.98	0.30	0.31	0.28	Consumer Health
0.00	0.00	0.00	0.00	0.00	Vaccines & Diagnostics
502.35	498.79	441.93	574.13	584.80	Total nitrogen load [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Phosphate load by division (in t)



-	-	-	-	0.06	Alcon (without CIBA Vision)
27.45	7.96	6.90	10.33	9.66	Pharmaceuticals
0.00	0.00	0.19	0.14	0.13	NIBR
25.18	25.78	31.63	41.66	52.70	Sandoz
4.05	4.02	2.41	2.25	1.88	Consumer Health
0.00	0.00	0.00	0.00	0.00	Vaccines & Diagnostics
56.68	37.75	41.12	54.38	64.43	Total phosphate load [t]

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

The chemical oxygen demand (COD) load on the aquatic environment from Novartis Group company operations (excluding Alcon) decreased in 2011, from 3.6kt to 3.9kt. COD loads for 2011 were attributable to:

Pharmaceuticals	18.6%
Sandoz	80.0%
Consumer Health, including CIBA Vision	1.4%

Total suspended solids (TSS) decreased from 0.50kt in 2010 to 0.46kt in 2011. Total nitrogen load increased from 0.57kt in 2010 to 0.58kt in 2011 and phosphate load increased from 0.054kt in 2010 to 0.064kt in 2011.

Novartis did not set a Group target on emissions into water. Effluent water is always treated in state-of-the-art facilities and therefore remaining effluent loads on the above-mentioned parameters from Novartis Group company operations have little relevance for the environmental quality of water bodies near our sites. However, we closely monitor specific parameters, such as the

release of drug substances into water, and take the appropriate mitigation and risk minimization measures when necessary.

Release of drug substances into water

Since 2001, the Novartis Pharmaceuticals Division has conducted a program to reduce the release of active drug substances from production processes into water.

In the past several years, the total amount released to the aquatic environment has been less than 0.05% of the total amount of active pharmaceuticals processed for the Pharmaceuticals Division globally.

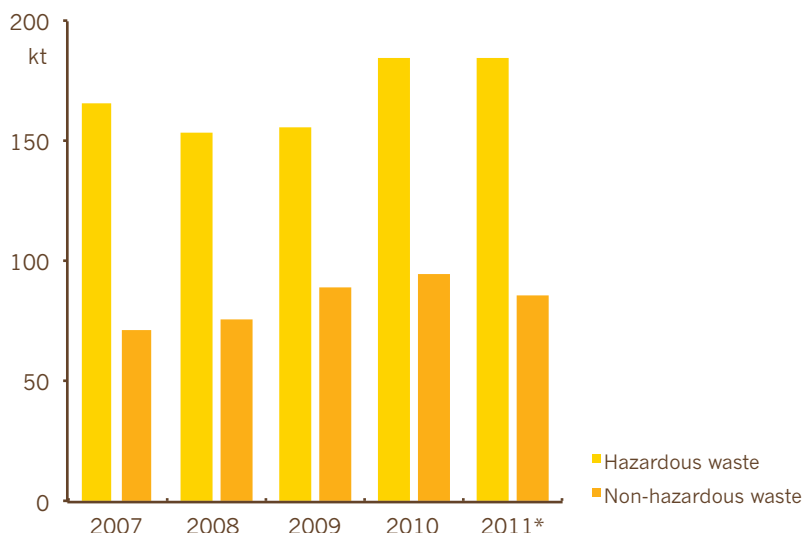
Having reached such low release levels overall, efforts are now focused on the potential environmental risks linked to such releases. To this end, in 2008, the Pharmaceuticals Division rolled out a program to prevent remaining environmental risks associated with individual active drug substances and with the specific situation at each manufacturing location. The program covers all manufacturing sites and combines a science-based, substance-specific risk assessment methodology with an evaluation of process-efficiency improvements and the most stringent international regulatory requirements. Specific targets have been set for sites to achieve further reductions on individual drug substances, if the specific risk assessment indicates a concern, if the release is above 0.3%, or if local environmental effluent concentrations exceed the defined, very low background concentrations (e.g. 10ng/L). At three pharmaceutical production sites, we use advanced wastewater treatment technology to specifically eliminate drug substances from effluents, such as membrane bioreactors, ultra-filtration and activated charcoal filtration.

The Sandoz Division evaluated all its active pharmaceutical ingredient (API) sites for risks related to the emission of pharmaceuticals into treated waste water streams. Specific monitoring programs are under development at Sandoz.

In 2011, we conducted a Group-wide effort to monitor and reduce effluent loads of diclofenac, the API for the anti-inflammatory drug Voltaren from all our operations worldwide that process diclofenac. The release to waste water was below 0.15%.

Total operational waste

Total operational waste (in kt)



Data excludes recycled waste and construction debris
HSE data reflects continuing operations, not including Alcon
* Estimated data for 2011

For Novartis, operational waste – both hazardous and non-hazardous – is an important area of environmental management for Group company manufacturing facilities, as well as for research and administrative sites. Group objectives include the proper management of hazardous waste and risks related to disposal, in particular disposal into landfills.

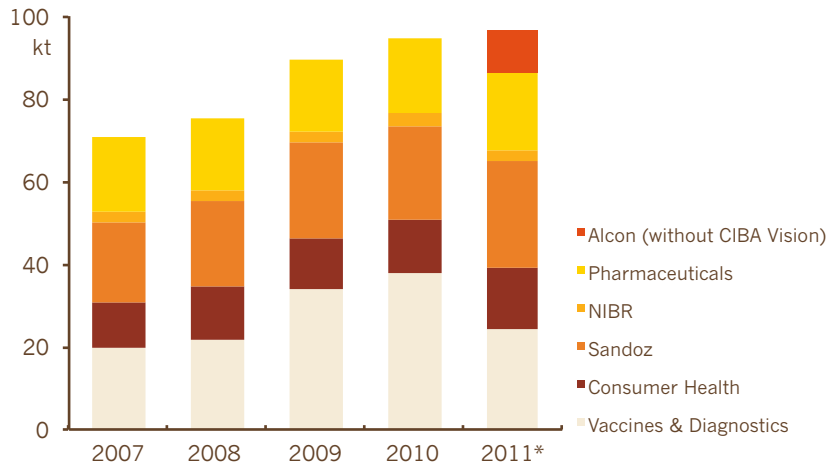
In 2011, the total amount of hazardous waste for the Novartis Group (excluding Alcon) slightly decreased to 184kt (from 185kt in 2010); non-hazardous waste totaled 87kt in 2011, which represents an 8% decrease compared to 2010 (95kt). This decrease is primarily due to smaller volumes of waste from vaccine production at Vaccines and Diagnostics sites. Hazardous waste was generated primarily by Pharmaceuticals (46%) and Sandoz (50%). Non-hazardous waste was generated by:

Pharmaceuticals	22%
NIBR	3%
Vaccines and Diagnostics	28%
Sandoz	30%
Consumer Health, including CIBA Vision	17%

For reporting purposes, waste is classified by type and according to the disposal routes, recycling, treatment, incineration with and without energy recovery, and landfill.

Non-hazardous waste

Non-hazardous waste by division (in kt)



	-	-	-	10.15	Alcon (without CIBA Vision)
17.97	17.41	17.06	17.83	18.84	Pharmaceuticals
2.63	2.62	2.82	3.04	3.00	NIBR
19.34	21.14	23.33	22.80	25.46	Sandoz
11.42	12.71	12.20	13.20	14.81	Consumer Health
19.59	21.58	33.91	37.64	24.41	Vaccines & Diagnostics
71.03	75.45	89.31	94.52	96.67	Non-haz. waste total [kt]

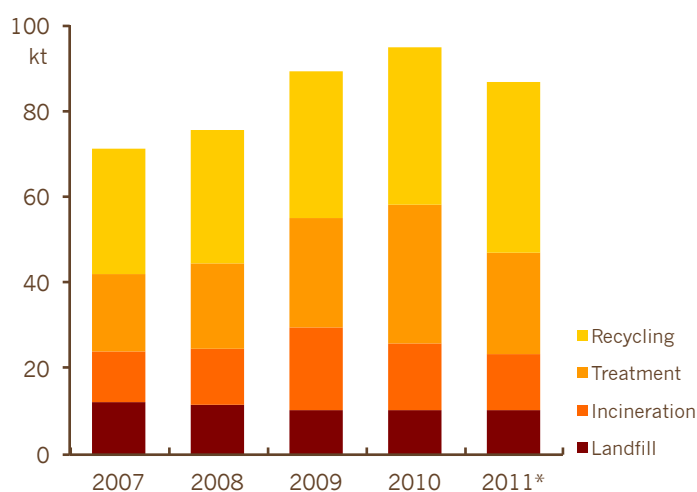
Data excludes recycled waste and construction debris

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Non-hazardous waste by disposal route (in kt)



29.23	30.92	34.13	36.18	39.21	Recycling
17.66	19.62	25.84	32.49	24.14	Treatment
11.59	13.27	18.91	15.33	12.64	Incineration
12.54	11.64	10.43	10.53	10.54	Landfill
71.03	75.45	89.31	94.52	86.51	Non-haz. waste total [kt]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

Non-hazardous waste reported includes mixed or household waste, packaging waste, compostable waste and inert waste.

Total amounts of non-hazardous waste not recycled for the Novartis Group (excluding Alcon) in 2011 were 47.3kt (down from 58.3kt in 2010); an additional 39.2kt included materials collected for recycling. Of the non-hazardous waste not being recycled, disposal routes were:

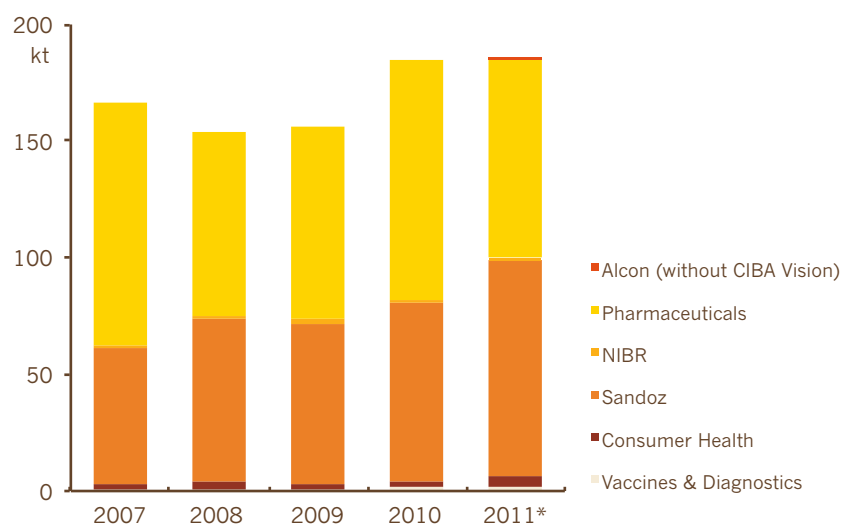
Treatment	51%
Landfill	22%
Incineration	27%

Non-hazardous waste target achievement and outlook

Keeping non-hazardous waste to a minimum and recycling it to a maximum is a constant challenge. Novartis makes ongoing efforts in all areas to minimize non-hazardous waste that cannot be recycled at its operations globally. We are installing waste-segregation programs at many sites that allow better use of recycling routes for materials such as paper, cardboard, glass and plastics – for example from packaging, offices and production processes.

A target was set to reduce the per employee efficiency of non-hazardous waste not being recycled by 20% by 2012, based on 2008 values. In 2011, non-hazardous waste intensity was reduced by 7% compared to 2008 (excluding the Vaccines and Diagnostics Division).

Hazardous waste



-	-	-	-	0.77	Alcon (without CIBA Vision)
104.43	79.14	82.85	103.03	84.33	Pharmaceuticals
0.96	0.89	1.39	1.38	1.22	NIBR
57.90	70.08	69.05	76.73	92.44	Sandoz
2.31	2.72	2.19	2.83	4.93	Consumer Health
0.77	0.90	0.88	1.34	1.37	Vaccines & Diagnostics
166.37	153.73	156.37	185.31	185.07	Haz. waste total [kt]

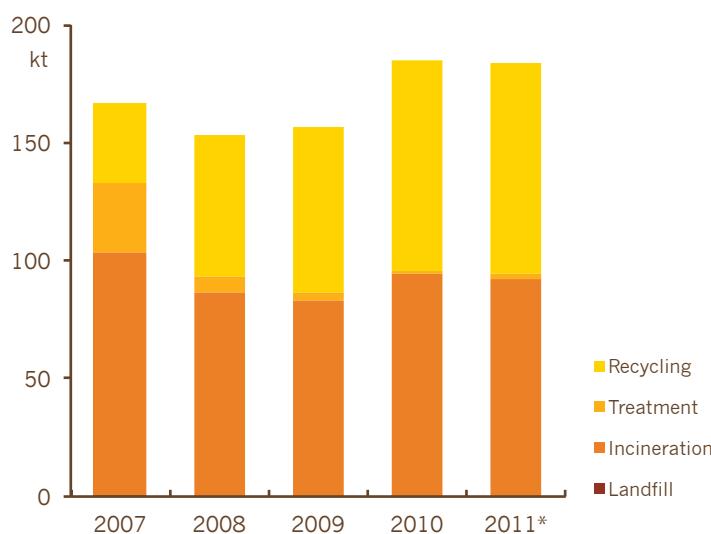
Data excludes recycled waste and construction debris

HSE data reflects continuing operations, including Alcon for 2011

Consumer Health data includes Animal Health, CIBA Vision & OTC

* Estimated data for 2011

Hazardous waste by disposal route (in kt)



33.58	59.91	70.24	89.16	89.63	Recycling
29.24	7.20	3.29	2.12	2.60	Treatment
103.45	86.61	82.83	94.03	92.07	Incineration
0.10	0.00	0.00	0.00	0.00	Landfill
166.37	153.73	156.37	185.31	184.30	Haz. waste total [kt]

HSE data reflects continuing operations, not including Alcon

* Estimated data for 2011

Hazardous waste originates primarily from chemical and pharmaceutical production processes. Total amounts of hazardous waste not recycled in 2011 for the Novartis Group (excluding Alcon) were 94.7kt (96.1kt in 2010); an additional 89.6kt was subject to recycling.

Hazardous waste not recycled for Alcon was 0.7kt. Of the hazardous waste not being recycled in 2011, disposal routes were incineration (97%) and treatment (3%).

Novartis has virtually eliminated disposing of hazardous waste to landfills. In 2011, amounts decreased from 1.2t in 2010 to below 0.1t. Small amounts of some inorganic residues for which no other disposal route exists, such as incinerator ash, will continue to be placed in landfills.

Hazardous waste target achievement and outlook

Globally, the Novartis Group puts a high priority on avoiding hazardous waste. A target has been set to reduce the per production efficiency of hazardous waste not being recycled by 10% by 2012 based on 2008 values. In 2011, hazardous waste intensity was reduced by 9.6% compared to 2008, almost achieving the target set for 2012 a year in advance.

HSE targets 2008–2015

Novartis sets Health, Safety and Environment (HSE) targets covering periods of at least three years to allow better analysis, planning and implementation. For 2008–2015, the following targets have been defined on Group level:

- Halogenated volatile organic compounds (VOCs): decrease to 200 tons in 2011 and 196t in 2012 (–15% compared to 2008)
- Non-halogenated volatile organic compounds (VOCs): decrease to 1,400 tons by 2011 and 2012 (–15% compared to 2008)
- Energy efficiency: improve by 15% by 2015, compared to 2010
- Contact water efficiency: improve by 4% by 2012, compared to 2010
- Intensity of hazardous waste not recycled: reduce by 10% by 2012, compared to 2008
- Intensity of non-hazardous waste not recycled: reduce by 20% by 2012, compared to 2008
- Hazardous waste to landfill: zero
- Carbon dioxide (CO₂) from vehicles: decrease by 10% by 2015, based on 2010 level
- On-site Scope 1 greenhouse gas (GHG) emissions from operations, including carbon offsets: decrease to 293t (5% below 1990 level by 2012)
- Total GHG emissions: reduce by 15% by 2015 and 20% by 2020, including carbon offsets
- LTIR target: Sustain 2011 performance of Novartis Group without former Alcon and improve Alcon performance by 13% based on 2011. 0.19 including Alcon
- TRCR target: Reduce TRCR of Novartis Group without former Alcon by 5% and improve Alcon performance by 7% based on 2011

Furthermore, the Group is pursuing the following goals:

- Behavior-based safety programs initiated at all major Novartis sites
- Waste minimization and water efficiency programs active in all divisions
- Business continuity management program fully implemented worldwide
- Risk reduction measures started and business continuity plans established for all remaining risks (according to risk portfolios)
- Novartis emergency management programs implemented at divisional level as well as in all smaller units