



# 14

## ANNUAL REPORT

IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE

FROM ALARM REPORTS TO  
ABATEMENT STRATEGIES

Lifecycle analysis  
has moved into  
the living room

SEEKING OUT THE  
INVISIBLE THREAT  
TO THE OCEANS

Another  
successful year

SUSTAINABLE URBAN  
DEVELOPMENT IN FOCUS

Towards a better  
work environment

NEW FORCES ARE  
EMERGING IN CHINA

# This is IVL

## PURPOSE

IVL Swedish Environmental Research Institute is engaged in applied research and consulting projects aimed at promoting ecologically, economically and socially sustainable growth in the business sector and the rest of society.

## VISION

IVL's vision is a sustainable society. We are driving the transition into a sustainable society by transforming:

- science into reality
- environmental problems into opportunities
- linear processes into a circular economy.

## CORE VALUES

IVL's core values are based on credibility, a holistic and forward-looking approach, commitment and benefit.

## SWEDEN'S FIRST ENVIRONMENTAL RESEARCH INSTITUTE

IVL was jointly established by the Swedish State and the business sector in 1966. IVL has been operated as a public limited company since 1982. It is owned by the Swedish Water and Air Conservation Foundation (SIVL).

## EMPLOYEES AND NATURE AND EXTENT OF EXPERTISE

IVL has just over 240 employees, including 68 per cent graduates and 27 per cent postgraduates. Our expertise is broadly based, extending beyond traditional environmental areas to behavioural science, economics and sociology.

## ALL SECTORS COVERED

Today, IVL operates on a broad basis across the entire spectrum of sustainability. Activities span every sector, and we serve customers in all parts of Swedish society. The Company also conducts wide-ranging international operations, focusing primarily on China and India. IVL regards Europe as its domestic market.

## SIX FOCUS AREAS

The Company is organized into four operating units, plus research, business development and market units. The organization also includes executive staff functions for Finance, HR, IT and Communication.

All units interact in six focus areas that at the same time bring together IVL's offering to the market: *Climate & Energy, Sustainable Building, Air & Transport, Sustainable Production, Resource-Efficient Products & Waste and Water & Soil.*

## RESEARCH AND CONSULTANCY PROJECTS

Just under half of IVL's activities consist of research commissioned directly by external customers. The remainder is made up of research that is either co-funded by the State and the business sector or grant-funded via State-owned research bodies, foundations or the EU.

## PARTNERSHIPS AND NETWORKS

Part of IVL's strategy is to maintain and develop close cooperation with the business sector, international research bodies and institutes of higher education. As a result, IVL plays an active role in several international research networks and other partnerships. In Sweden, IVL cooperates closely with the Chalmers University of Technology in Gothenburg, the University of Lund and KTH, the Swedish Royal Institute of Technology in Stockholm.

## LABORATORIES AND TEST CENTRES

IVL operates its own laboratories for advanced chemical analysis – both organic and inorganic – and an experimental facility where new technology for more resource-efficient production is developed. With KTH, IVL jointly operates Hammarby Sjöstadverk, a unique testing and pilot facility in advanced water treatment technology.

## ENVIRONMENT AND QUALITY

IVL is engaged in environmental and quality management, as well as in work environment issues within the scope of an integrated management system. The system has been environment- and quality-certified under ISO 14001 and ISO 9001:2000.



### The air in Beijing

Today, air pollution problems in the cities of China cannot be ignored, and rising environmental awareness is adding impetus to a new force for change there.



### Invisible threat to the oceans

Micro debris abounds in the oceans and is suspected of being damaging to the ocean fauna, partly because such debris incorporates environmental toxins and heavy metals.

### Sustainable urban development

IVL has established a presence in Malmö and operations there will focus on sustainable urban development. This will now extend not only to technological solutions but what is also sustainable in social terms.

The cover picture is of Gao Si, Head of IVL's office in China.

IVL Swedish Environmental Research Institute  
Annual Report 2014

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# Another successful year

**Environmental issues are becoming increasingly complex and the ability to develop solutions demands a critical mass of expertise.** Against that background, IVL's continued growth is cause for great pleasure, and I would like to start by thanking all IVL personnel who have helped us to go on recording increased turnover and achieve an all-time high for operating income in 2014.

Further on, I will quote a couple of specific examples of current R&D projects showing the way we work in applied research and development in making our contribution to the environmental and development goals of today and tomorrow. And in the pages that follow, a number of IVL personnel highlight examples of important and successful R&D projects that are contributing to sustainable development.

## WHAT WILL HAPPEN IN 2015 AND GOING FORWARD?

Environmental issues will continue to constitute an important aspect of the work on global sustainability. In 2015, the UN's Millennium Development Goals will be followed up and assessed, while new goals for sustainable development will be formulated. While the Millennium Development Goals have been focused on combating poverty in the poorest countries of the world, the task of establishing new goals goes further than that. Economically, socially and environmentally sustainable development is the thread that runs through the new development goals that will be presented for approval to the UN General Assembly in September 2015. The new goals are intended to be more action-focused and, if they are to be achieved, everyone needs to be on board and take responsibility – State, business sector and society.

**I can affirm that not only IVL's purpose – to engage in applied research and consultancy projects aimed at promoting ecologically, economically and socially sustainable growth in the business sector and the rest of society – but also that our vision of a sustainable society is 100 per cent in line with the new goals for global development.**

Our challenge is to contribute by policy formulation and implementation, by initiating, conducting and following up research and consultancy projects that not only benefit the customer but also promote globally sustainable development. This requires us to combine long-termism with concrete short-term actions, to develop new business models and to marry science and technology with behavioural, social and economic knowledge.

Tord Svedberg  
Chief Executive Officer



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Tord Svedberg, CEO

“Projects that contribute to important environmental and development goals.”

Here, Tord Svedberg selects from IVL’s bulky portfolio of projects to illustrate how the Company operates in order to achieve the environmental and development goals of today and tomorrow.

#### NEW BUSINESS MODEL SHRINKS CLIMATE IMPACT

In a project that began in late 2014, IVL is studying how new business models can be used to reduce emissions of greenhouse gases from construction machinery. Construction activities create as big a carbon dioxide footprint as private motoring. Much of this is produced by construction machinery. By designing business models that incorporate accurate lifecycle costs for construction machinery, it is possible to promote the procurement of emission-efficient machinery and emission-efficient ways of using it. The object of the study is to define what is needed to persuade the industry to start employing business models that show up emissions and energy consumption, that include emissions in business calculations and that use accurate calculations of actual emissions in decisions on the use of construction machinery. The project is part of Volvo Construction Equipment’s “Construction Climate Challenge” (CCC) research programme. The initiative aims to establish a

dialogue with industry representatives, academics and politicians. It also intends to support new research and to share existing knowledge in order to promote sustainable development in the construction industry.

#### MORE EFFICIENT WATER TREATMENT

IVL’s water treatment and biogas operations are maintaining their rapid progress. In Stockholm, the world’s biggest membrane system for water treatment is to be built, and IVL has carried out a major development project at its Hammarby Sjöstadsvärk pilot facility. The new treatment technology results in considerably lower emissions of phosphorus and nitrogen than today, and tests performed indicate that it also offers an effective base for further purification to remove pharmaceutical residues.

#### HIGHER LEVEL OF RECYCLING

Guidelines on sorting of plastics at recycling centres, separation of hazardous materials from electrical waste for purer plastic fractions, a common Nordic textile strategy and new business models for textiles, are among the suggestions for a higher level of plastic and textile waste recovery that were presented in a number of new research reports during the year. The reports were produced within the scope of the Council of Nordic Ministers’ project: “Resource-efficient recycling of plastic and textile waste”, part of the Nordic Prime Ministers’ Initiative on Green Growth. The reports are based on a joint Nordic research programme involving IVL and Ostfold Research (Norway), VTT (the Technical Research Centre of Finland), Aalborg University (Denmark) and Environice (Iceland).

#### BETTER AIR IN CHINA

More than a hundred large and medium-sized cities in China are seriously affected by air pollution and many initiatives aim to reverse this trend, not least via innovations and business opportunities. The Chinese are keenly interested in technology to monitor and abate air pollutants. They are also interested in sharing knowledge with other countries and regions. IVL and CRAES (the Chinese Research Academy of Environmental Science) are in the process of establishing a joint air monitoring laboratory in China. In mid-March, IVL, in partnership with Business Sweden and the Swedish government’s coordinator, held seminars in Beijing and Shanghai with the focus on launching Swedish solutions in China. In parallel with these seminars, collaboration between Sweden and China was escalated in order to lower the levels of short-duration climate-impacting air pollutants,



Here, Tord Svedberg, Chief Executive Officer, IVL, has selected a handful of current projects illustrating how the Company is contributing, via research and consultancy to the development of a sustainable society, while working to raise the competitiveness of Swedish industry.

which are an important factor in air quality, health, climate impact and food supply.

#### COMPETITIVE PROCESS INDUSTRY

Sweden’s process industry faces major challenges if it is to retain and reinforce its competitiveness. IVL is coordinating the production of a new research agenda – PI-Nordic – which focuses on how process intensification (PI) is making the process industry more cost- and resource-efficient. PI-Nordic is one of five agenda projects to have been awarded grants from Vinnova (Sweden’s innovation agency), the Swedish Research Council Formas and the Swedish Energy Agency via the Strategic Innovation Areas programme. It today comprises IVL, the Center for Chemical Process Engineering (CPE) at the Chalmers University of Technology, SP Process Development, IKEM (Innovation and Chemical Industries in Sweden), the Swedish Forest Industries Federation, Pers-torp AB, the West Swedish Chemistry Cluster and Alfa Laval AB. //

# 2014 in brief

**Producer's liability can boost recycling of textiles**  
 In 2014, IVL delivered a series of research reports on the collection, recovery and recycling of textiles. Topics included controls to improve performance in the collection of textiles, where Sweden lags behind. According to IVL's researchers, extended producer's liability would provide an effective control in improving collection and recycling.

**Hazardous chemicals in drinking water**  
 In February, PFOS – a chemical commonly used in fire-fighting foam – became a hot issue. This followed the revelation that Ronneby Municipality had been forced to shut down a drinking water source at Kallinge after the source had proved to be highly contaminated with PFOS. As the foremost source of expertise in high-flouride substances, IVL was quickly in the spotlight. Read more on page 22.

**Large number of environmental toxins in seabird eggs**  
 On behalf of the Norwegian Environment Agency, IVL analyzed seabird eggs collected on islands off the north Norwegian coast – islands that should be very little affected by environmental toxins. The eggs proved to contain all of 158 different chemical substances, including totally new environmental toxins – some of which had been intended as preferable alternatives to recently prohibited chemical substances – including new flame retardants.

**Pump capable of oxygenating dead ocean floors**  
 Two years of practical trials in the EU-funded WEBAP project indicate that it is possible to use a wave-operated pump to drive down oxygen-rich surface water to restore dead ocean floors. The technology, which imitates a natural process, has proved capable of pumping down large volumes of water and can be adapted to a variety of conditions. The trials were conducted in Hanöbukten and Kanholmsfjärden in the Stockholm archipelago.

**IVL developing risk assessment processes for new chemicals**  
 IVL is one of 39 partners who, in the EU's five-year Solutions programme, are engaged in developing processes for risk-assessment of new chemicals. The background is that only around 40 chemicals are governed by the EU Water Directive. This is a fraction of all the chemicals used in society – and new chemicals are being developed all the time. See also page 22.

**Consensus in construction sector on LCA**  
 Following a prolonged and complex process led by IVL's Martin Erlandsson, the real heavyweights of the construction sector reached a consensus as to how lifecycle analysis, LCA, is to be applied to construction projects. Previously, individual enterprises and industries have tended to use LCA in a way that favoured their particular product. However, with a common, sector-wide methodology this now belongs to the past. See also page 30.

**IVL expanding – new office in Malmö**  
 In spring 2014, IVL opened a new office in Västra Hamnen, Malmö, under the management of Jeanette Green. Operations will primarily focus on sustainable urban development, an area of long-standing collaboration between IVL and the City of Malmö. To IVL, this represents a strategic venture in a part of the Nordic region that is at the forefront of sustainable social development. See also page 26.

**New technology bringing better wastewater treatment to Stockholm**  
 The world's biggest membrane system for wastewater treatment is being built at the Henriksdal water treatment plant in Stockholm. The technology itself, tested at IVL's Hammarby Sjöstadsverk facility, has proved to produce considerably lower phosphorus and nitrogen emissions than today. The technology enables bigger volumes of water to be treated and the water discharged to be particle-free, which paves the way to greater efficiency in re-processing to separate out pharmaceutical residues.

**IVL takes over EPD system of certified environmental product declarations**  
 On 1 July, IVL took over responsibility for the international EPD® system of certified environmental product declarations, on abolition of the Environmental Governance Council. As a result, the EPD system will acquire additional expertise and experience, as well as increased development resources in the form of IVL's expertise, international operations and network of contacts. To IVL, taking over responsibility for EPD is a logical step in a broadly-based operation in lifecycle analysis (LCA), system analysis and resource-efficient, climate-smart products.

**IVL and KTH extending collaboration on the water treatment of the future.**  
 In September, IVL and KTH signed a new agreement on extended collaboration, above all concerning the Hammarby Sjöstadsverk joint pilot and research centre – a resource without peer anywhere else in Europe. In purely concrete terms, the collaboration will be developed in the global arena, for example in pharmaceutical residues and nanoparticles that current treatment systems cannot deal with.

**Susanne Wetterlin appointed new CEO at Basta**  
 In September, Susanne Wetterlin took over as new CEO at Bastaonline AB, a subsidiary of IVL that is also part-owned by the Swedish Construction Federation. Basta, a well-established system in the market, is designed to help the construction and civil engineering sector towards its goal of toxin-free construction. Today, nearly 20,000 products meeting the stringent environmental requirements of the Basta system are available.

**IVL in full-scale trials for separation of pharmaceutical residues**  
 With finance from the Vinnova Challenge-Driven Innovation programme, IVL is to trial a whole range of wastewater treatment technologies, for example, for removal of pharmaceutical residues, recycling of water and production of energy and phosphorus-based and other nutrients. The full-scale trials are to be conducted at Simrishamn's water treatment plant in southeast Sweden. If the trials are successful, a major Swedish export success is in prospect, says IVL's Staffan Filipsson.

**Hazardous micro debris in discharges from water treatment plants**  
 IVL has carried out a study to investigate how much micro debris is discharged from a number of wastewater treatment plants in Sweden. According to the measurements, large volumes of small plastic particles measuring 0.02 millimetres or more are discharged with effluent into the oceans. The particles cannot be seen by the naked eye but can be harmful to fauna, since they introduce heavy metals and other harmful substances into the tissues of aquatic animals, which therefore also represents a risk to man. See page 38.

**Financial result for the year**  
 The financial result for 2014 was a net profit of SEK 12.5 million after financial items, 17 per cent higher than in the preceding year.

Key indicators	2014	2013	2012	2011	2010
Net turnover (SEK m.)	264	255	248	240	198
Profit after net financial items	12.5	10.4	7.7	12	-3.2
Number of full-year employees (person-years)	224	215	197	186	178
Return on equity (%)	13.0	12.3	9.7	17.7	Neg.
Investments (SEK m.)	7.1	10.8	6.2	3.1	3.3

# IVL is to be an attractive workplace

If IVL is to be able to conduct successful research and consultancy, we must be able to attract and, importantly, retain knowledgeable, creative and committed personnel.

“If there’s anything that sets IVL personnel apart, it’s their commitment. Everyone shows huge commitment and drive; this is partly because most people who find their way to IVL are passionate about making a contribution to solving the major environmental challenges of today and coming up with results that benefit our customers and clients”, says Anna Westberg, Director of HR at IVL.

The Attractive Workplace initiative is a project aimed at making optimal use of our personnel’s commitment to their workplace and capturing what would otherwise fall through the cracks.

“It’s important to emphasize that this group is not replacing our systematic work environment activities. It complements that work and functions as a work party striving to constantly improve IVL as a workplace”, says Anna Westberg.

The group, with broadly-based representation, was established around two years ago after it emerged from an employee survey that several employees stated that they had problems with stress. Since then, the group has delivered a number of concrete proposals for improvements. For example, it recruited a new supplier and developed a new process for our employee surveys, formulated a guideline on attitudes and aspects of well-being and developed an induction process for new IVL personnel. Work environment activities at IVL, conducted via delegations and based on annual work environment plans, are planned and coordinated by work environment committees in Stockholm and Gothenburg.

Company healthcare agreements offering regular health checks are in place covering all personnel; treatment facilities are also available to personnel in the event of illness or work-related



As with so many other workplace meetings at IVL, participants in the Attractive Workplace initiative meet via videoconferencing. A video screen from the Gothenburg office shows Magnus Ugander, Director of HR Anna Westberg and Karin Sjöberg in conversation with Lisa Schmidt and Eva Bingel over in Stockholm.

problems. In addition, all personnel benefit from an annual healthcare allowance. As a way of promoting well-being and health, the Company supports IVL’s highly active sports clubs and cultural associations.

## EMPLOYEE SURVEY

Since 2008, we have conducted employee survey with the aid of external organizations. A regular employee survey is conducted every two years, along with smaller follow-up surveys in between. The survey provides index ratings for leadership, working climate and commitment. These are used by all groups within the Company to implement development plans. The overall result of the 2013 survey indicated a high level of commitment among personnel. However, it also emerged that the Company must do more to define objectives and strategies more clearly. This also became a priority area of focus for IVL’s management in 2014.

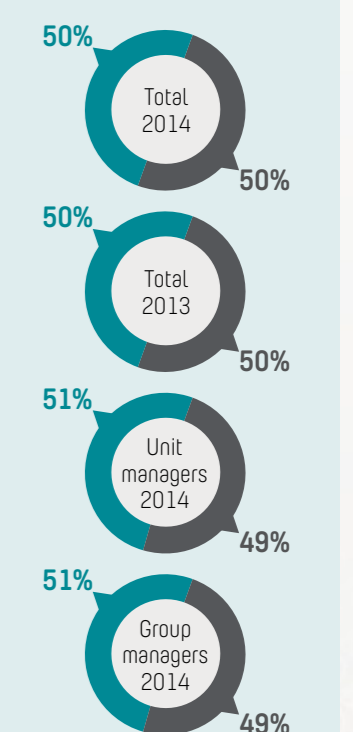
## EQUAL GENDER REPRESENTATION

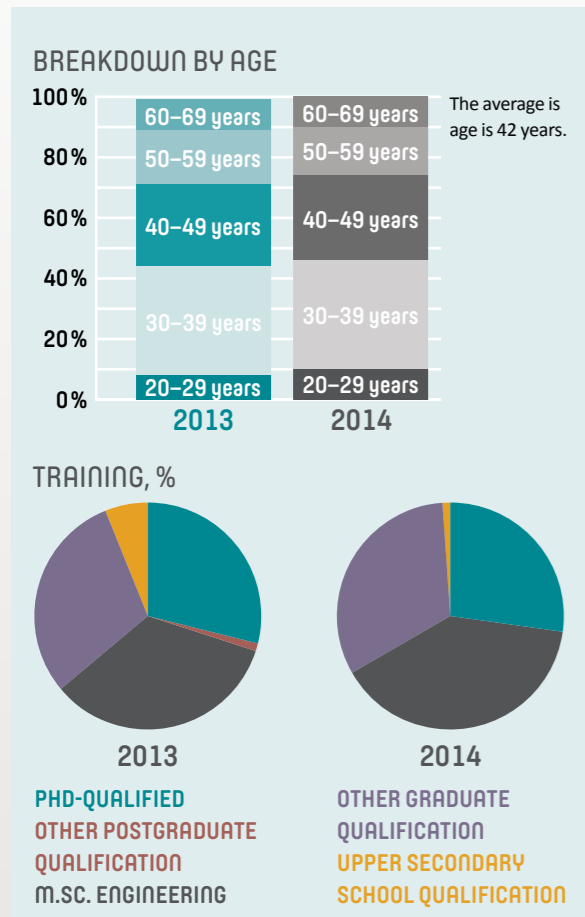
The number of employees, calculated as annualized employees, has over the past five years risen by 26 per cent at the four offices in Stockholm, Gothenburg, Malmö and Beijing.

“Fortunately, we’ve been able to recruit high-skilled employees, and we’ve observed that several have actively sought their way to IVL, and gives us huge satisfaction. We’ve also been able to maintain a very equal gender representation, in fact at every level”, says Anna Westberg.

Work on equal opportunity at IVL is governed by an overarching policy and plan for equal opportunity and equal treatment. In 2014, a new Equal Opportunity Plan was drawn up, establishing that executives, managers and personnel are to strive to ensure that a dimension of diversity and equal treatment characterize IVL’s activities and corporate culture and thus to help promote IVL’s credibility as an advisor on sustainability issues.

## BREAKDOWN BY GENDER





At IVL, which since 1966 has been engaged in analyzing and finding solutions for the environmental problems in businesses and society, environmental and sustainability issues are part of our DNA and are totally integrated into day-to-day activities.

# Sustainability

## SKILLS DEVELOPMENT IS KEY

If we are to be able to deliver leading-edge applied research and consultancy projects, the ability to ensure skills development among our personnel is key. IVL's view of skills development may be summarized in what may be called the "70-20-10 model", in which 70 per cent of skills development takes place in day-to-day operations, 20 per cent through learning from experienced colleagues and 10 per cent via more formal training activities. The aim is that all employees should receive at least two days of skills development training in the form of defined activities per year; in 2014, the average period was three days per employee.

Practically all work at IVL is performed in project form and, in order to improve quality and further professionalize the work of the Company's project managers, we have developed an in-house project manager training programme that is conducted in three stages in association with an external management consultant.

At the same time, a major leadership development project has been carried out for all managers at IVL. The project, which began in 2013 and continued in 2014, includes individual coaching for our managers. //

IVL's research and consultancy activities range all the way from analysis of environmental problems to solutions and abatement measures, including in economic and social areas. As a result, we have extensive capabilities for making a positive impact in sustainability via the advice we can provide to our clients and by ensuring that our research is put to practical use in society.

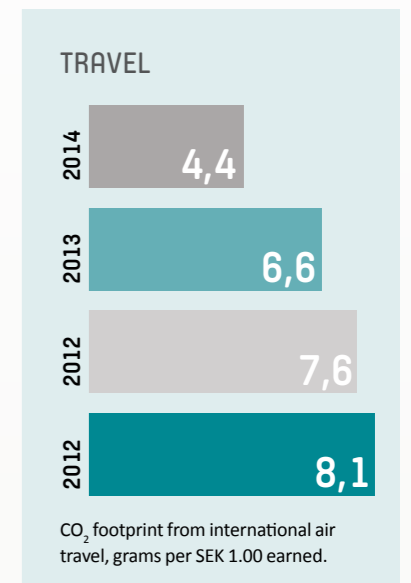
## ENVIRONMENTAL AND QUALITY ACTIVITIES

IVL works on environmental and quality issues within the scope of an integrated management system certified under ISO 14001 and ISO 9001. Goals are established and followed up via an established process within the management system.

Advice to customers, travel and energy consumption have been identified as IVL's most important environmental issues. For advice to customers, an in-house developed tool is used to assess the environmental benefit that is created by the advice, provided that the customer follows the advice. In 2014, 81 assessments were made, of which 66 showed positive changes or a reduced environmental footprint.

## ENVIRONMENTAL IMPACT OF TRAVEL

International travel by air is an unavoidable aspect of operating internationally. IVL uses an index that measures environmental impact in the form of carbon dioxide emissions per SEK 1.00 earned. Over the four-year period 2011-2014, the index rating fell by 46 per cent. In 2014, the environmental impact from domestic air travel



# and Social Responsibility

declined by 6.6 per cent, while the number of business trips by inland rail rose by 11 per cent.

Energy consumption at the Stockholm and Gothenburg offices has been reduced by 6.3 per cent, despite an increase in employee numbers, from 2,233 kWh (2013) to 2,092 kWh per employee (2014).

## SOCIAL RESPONSIBILITY

By far the major share of IVL's work is conducted in Sweden, where the country's system of labour rights regulation, based on legislation and collective agreement, is regarded as a minimum undertaking. We make similar demands of sub-contract suppliers. The same applies to our operation in Beijing.

## CODE OF CONDUCT

IVL has a Code of Conduct that is based on the Company's core values and the UN Global Compact's ten principles in human rights, labour

rights, the environment and anti-corruption. The Code has been adopted by IVL's Board of Directors and governs relationships with personnel, suppliers, business partners and other stakeholders. The Code applies to personnel and members of the Board equally. During assessment of existing and prospective suppliers, the principles contained in the Code of Conduct are applied. The full text of the Code of Conduct is available on the IVL intranet, and via its external website.

## STAKEHOLDER DIALOGUES

In view of IVL's purpose – to promote sustainable development – it is vitally important that we work with all the main actors and advanced stakeholder dialogues are of the essence. We pursue a systematic stakeholder dialogue within what are known as IVL's "theme committees": *Water & Soil, Air & Transport, Resource-Efficient Products & Waste,*

*Sustainable Building, Climate & Energy and Sustainable Production.* The theme committees are made up of representatives of central government, public authorities, companies and sectors of the business community.

The committees have the twin purpose of identifying future research needs and providing information about interesting findings from current R&D projects in progress at IVL. The meetings are often the occasion for committee members to state their views and pose questions about IVL's activities.

Regular customer surveys are carried out in the form of in-depth personal interviews. In the 2014 survey, customers from industry, municipalities and central government authorities were interviewed. The Customer Satisfaction Index for 2014 was 4.5 (4.0) out of a maximum of 5. //

John Munthe, Vice-President, Research:

# Research and development at IVL – challenges and opportunities

IVL's research and development operations can look back on 2014 as a successful year, with an increase in financial volume and wide dissemination of results via scientific publications, reports, seminars and the media. Looking ahead, too, the prospects for our activities are bright. The need for applied research and development in sustainability is rising fast throughout society.

## A CIRCULAR ECONOMY

The term "circular economy" quickly gained widespread use and became one of the most-quoted buzzwords last year. The circular economy incorporates already well-known concepts such as recycling, closed loop and waste minimization, but adds the goal of building our economy on a circular use of natural resources. As a result, there will be a need for major readjustment and a higher level of ambition that will in turn necessitate changes in how goods are designed, produced, consumed and recycled; the business models will also have to be developed. This presents great challenges and opportunities for research and development at IVL.

The presence of undesirable chemicals in the materials cycle is a particular area that is likely to require both analysis and the development of measures to limit the risks of propagation and exposure. In future, circular thinking may provide an effective framework for managing flows and any risks presented by the use of chemicals in society.

## THE SUSTAINABLE CITIES OF THE FUTURE

Growing urbanization combined with increasing pressure for long-term sustainability in our cities will create new challenges. Future transport needs, a growing housing shortage and rising demands on how we are to build new homes and renovate the existing stock at reasonable cost are some of the important issues that IVL is addressing today, and are likely to remain on the agenda going forward.

## SUPPLY OF CLEAN WATER

In Sweden, we are privileged to have a good supply of clean water. This does not mean that we do not have problems: The burden of nutrient salts and environmental toxins affecting the Baltic Sea is a chronic problem for which research and international collaboration is under way to bring about improvements. However, great challenges remain here before any substantial improvement in the sea's condition can be achieved.

Fresh water supplies for people's daily needs, for agriculture and for industry is already a huge problem today in many parts of the world, and the situation is likely to get worse going forward. As result, recycling of water from both households and industry will be essential to sustainable development.

Translating the concept of a circular economy into reality for a commodity that is as essential to man as water should perhaps be a priority focus area for research, the business sector and politicians.

## COLLABORATION AND MULTI-DISCIPLINARITY

To solve all these challenges both multi-disciplinary research and broadly-based collaboration with all actors concerned in society will be required if we are to create a shared knowledge base and vision for the future. We can also see that IVL's expertise is developing into a broader profile to enable the organization to meet challenges in all three areas of sustainable development: the environment, the economy and society. We also need to continue developing our international collaboration, not only to resolve problems within Sweden's borders, which often trace their origins to other countries, but also to exchange experience and knowledge of solutions and paths of development towards a sustainable society. //



"We are extending the scope of our research and development expertise so we can meet the needs for solutions for a sustainable society", says John Munthe, IVL's Vice-President, Research.

## Research funding

Open research and development, accounting for more than half of IVL's total operations, consist partly of grant-funded research and partly of "co-funded" research. IVL also conducts research commissioned directly by external customers.

## Unique mode of funding for Swedish companies

IVL's co-funded research is a unique opportunity for Swedish companies to carry out research at IVL with matched funding from central government and the business sector. Co-funded research and development projects must be based on an environmental problem or offer environmental development potential. A common denominator for such research projects is that they must be in the general interests of society and incorporate major elements of research and development.

The Swedish Environmental Protection Agency and the Swedish Research Council Formas administer the central government finance for co-funded research conducted at IVL. In 2014, grants in this category amounted to in all SEK 37 million.

## Grant-funded research

Grant-funded research is financed mainly by the Swedish Environmental Protection Agency, Vinnova, AFA Insurance, Forte, the Swedish Energy Agency and the Mistra Research Foundation.



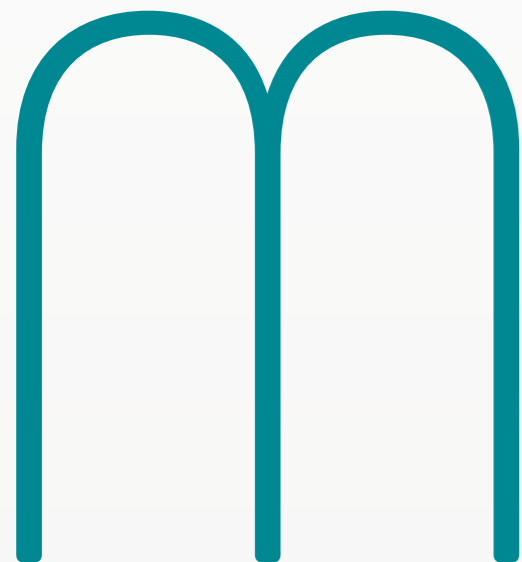
# New forces are emerging in China

O<sub>2</sub>

No country has succeeded in raising itself out of poverty as quickly as China. Millions of people have felt the benefits. But when the sky turns grey again with smog and the air gets difficult to breathe, the environmental problems that rapid growth has entailed can no longer be ignored. Now efforts are being intensified to reverse the trend. Growing environmental awareness, in particular, is blowing new vigour into China.

//In the past, no-one knew what this “haze” contained; today everyone in the street is talking about levels of PM 2.5 particles and poor air quality. People are afraid of getting lung diseases and they don’t know how to protect themselves and their family from air pollution. //

Gao Si, Head of IVL’s  
office in China



More than a hundred cities in China are ranked as severely affected by air pollution. At its worst, the brownish-grey fog created by the air pollution settles like a lid over the cities, hiding the sun.

“In the past, no-one knew what this “haze” contained; today everyone in the street is talking about levels of PM 2.5 particles and poor air quality. People are afraid of getting lung diseases and they don’t know how to protect themselves and their family from air pollution – everyone needs to breathe all the time!”, says Gao Si, Head of IVL’s office in Beijing.

IVL has been operating in China since 1986, working on a large number of different projects ranging from revitalizing polluted lakes to installing advanced water purification technology and surveys of carbon dioxide emissions and other air pollutants. The growing environmental awareness in China has also led to a new type of project. For example, in the Chinese province of Guizhou, IVL is involved in improving people’s environmental rights. The project, part of the EU-China Environmental Governance Programme, is being funded by Europe Aid. One important aspect is to develop awareness of environmental legislation and of the rights that citizens can claim if affected

by environmental damage. Part of the project has been to produce an information film that is being taken to the public via TV and social media. The project has also produced a practical manual with guidance on environmental law and has supported the establishment of the Environmental Damage Assessment centre in Guizhou.

“The project aims to improve the public’s access to environmental justice and to improve environmental governance, which in itself is a big success in China. It’s important – perhaps more important than anything else – to raise awareness and knowledge among the public, as well as among local authorities, lawyers and not-for-profit organizations. I’ve heard many well-informed scholars say that it is only when we have reached a certain level of awareness that we can make a real difference”, says Gao Si.

Östen Ekengren, Executive Vice President at IVL, has been working in China for nearly 30 years. The country’s rapid growth has brought a higher standard of living to many Chinese. At the same time, the environmental damage is huge, with major consequences in terms of health problems.

“Environmental improvements have been made in China, but because growth has, at the same time, been so fast, you don’t notice them. When we started operating in China in the mid-1980s, conditions were very poor – factories with rammed earth floors and pollutants that were just let out. Then, things moved very fast; in just ten years a whole lot happened. You can still see ramshackle old factories, but today they stand alongside ultra-modern facilities”, says Östen Ekengren.



In partnership with Scania and others, IVL is engaged in offering solutions that improve both accessibility and air quality and at the same time produce energy from effluent sludge in the form of biogas.

“It’s important to raise environmental awareness and knowledge in China. It’s only when it’s reached a certain level that we can make a real difference”, says Gao Si, Head of IVL’s office in Beijing.



Awareness that air pollution represents a threat to health has grown rapidly.

//The Chinese government has set up ambitious environmental goals and China's politicians today know that they have to do something about air pollutants, otherwise they won't be left in power. //

The problem is not a lack of environmental laws in China. Environmental legislation is modern and tough regulations are in place in many areas. What is lacking, on the other hand, is supervision and compliance; in many cases there just isn't any", says Östen Ekengren.

"The Chinese government has set up ambitious environmental goals and China's politicians today know that they have to do something about the air, otherwise they won't be left in power." But it is difficult. 75 per cent of China's electricity is generated by coal and as long as demand for electricity rises faster than the pace of expansion in renewable alternatives, things will get worse. To improve the situation, China needs to invest heavily in energy efficiency.

Groundwater resources are dwindling and many of China's watercourses are polluted. A survey recently conducted by IVL indicates that water quality in many drinking water sources is very poor; it is borderline unfit to drink.

So what can a Swedish environmental research company contribute in this huge country with its gigantic environmental problems?

"The main thing is to get them to create holistic solutions. In China, they take a top-down approach – they look at one environmental problem at a time. Our strength in Sweden is not that we have the most leading-edge environmental technology companies but that we take a broader approach when trying to find a solution", says Östen Ekengren.

As an example, he quotes the problem faced by the metropolis Tianjin. With a population of 14 million, Tianjin suffers, just as Beijing does, from notoriously poor air quality. Another serious environmental threat is the city's management of waste. Today, most of the effluent sludge from the city's water treatment plants is sent to landfill, posing major risks of water and soil pollution. A Swedish consortium consisting of IVL, Scania, Xylem and the environmental technology company Malmberg have come up with a proposal as to how Tianjin can convert sludge and organic waste into biogas. The biogas produced can then be used to operate city buses – a solution that can help bring about better air quality, produce a renewable fuel and at the same time solve the waste disposal problem. The solution for improving the air in the city is interesting those responsible in Tianjin, and a demonstration project consisting of 50 buses powered by locally produced biogas has been given the green light by the city's management.

"The Tianjin project is a good example of how we solve several environmental problems at the same time. With the right technology, water treatment plants can both produce reusable water and generate a surplus of energy, biogas and nutrients. We hope that the concept will take off and spread to more cities – that will mean we've sown a seed and so we're playing a part in creating a better environment in China. //



China is in a rapid phase of development and modernization, not least in the field of transport. In China, the old way of transporting goods lives on alongside the new.

## Better water in Tianjin Binhai



Tianjin Binhai New Area (TBNA), is a recently established State-managed growth area in China. The area is located on the coast in Bohai, east of the main urban area of Tianjin. However, growth is being slowed by serious environmental problems such as a shortage of clean water.

The project "Better Water in Tianjin Binhai New Area" is part of the EU-China Environmental Sustainability Program (ESP). It aims to support the development of a sustainable water management system for the coastal cities in the

A survey recently conducted by IVL indicates that water quality in many drinking water sources is very poor, and is borderline unfit to drink.

Hai River's run-off area, via research into and development of appropriate actions. These will consist of policy changes, technical measures to reduce the burden of pollution on the water supply and ecological restoration in order to re-establish ecosystem services for natural water purification. An overall objective is to improve resource management and clean up the water environment, to the benefit of society and the ecosystem.

## IVL becomes environmental advisor to Indian government

Within a four-year Europe Aid project, IVL has been appointed environmental advisor to India's Ministry of Environment. IVL's role is to develop cooperation between the EU and India in environmental technology and to introduce smart, resource-efficient solutions that can help India reduce its emissions and manage limited resources. The focus will primarily be on waste and water management issues.

"Both the technological and the institutional capacity need to be upgraded at India's government agencies if they are to create a favourable environment that promotes renewable energy and clean technology. It's also important to raise awareness of environmental issues, among both public- and private-sector stakeholders, and among the public at large", says Östen Ekengren, Executive Vice President at IVL

The project is being conducted in partnership with India's Shriram Institute for Industrial Research and the Danish Technological Institute. In parallel, IVL is engaged in a number of projects under the auspices of European Business Technology Center (EBTC). This is another major EU venture aimed at increasing the EU's share of India's Clean Tech market. In one of the projects, IVL presents proposals as to how water consumption can be reduced at 1,400 surface treatment businesses in an industrial cluster in Punjab. IVL is also involved in improving waste management in two cities in northern India, and in establishing demonstration facilities for environmental technology solutions in Bangalore.

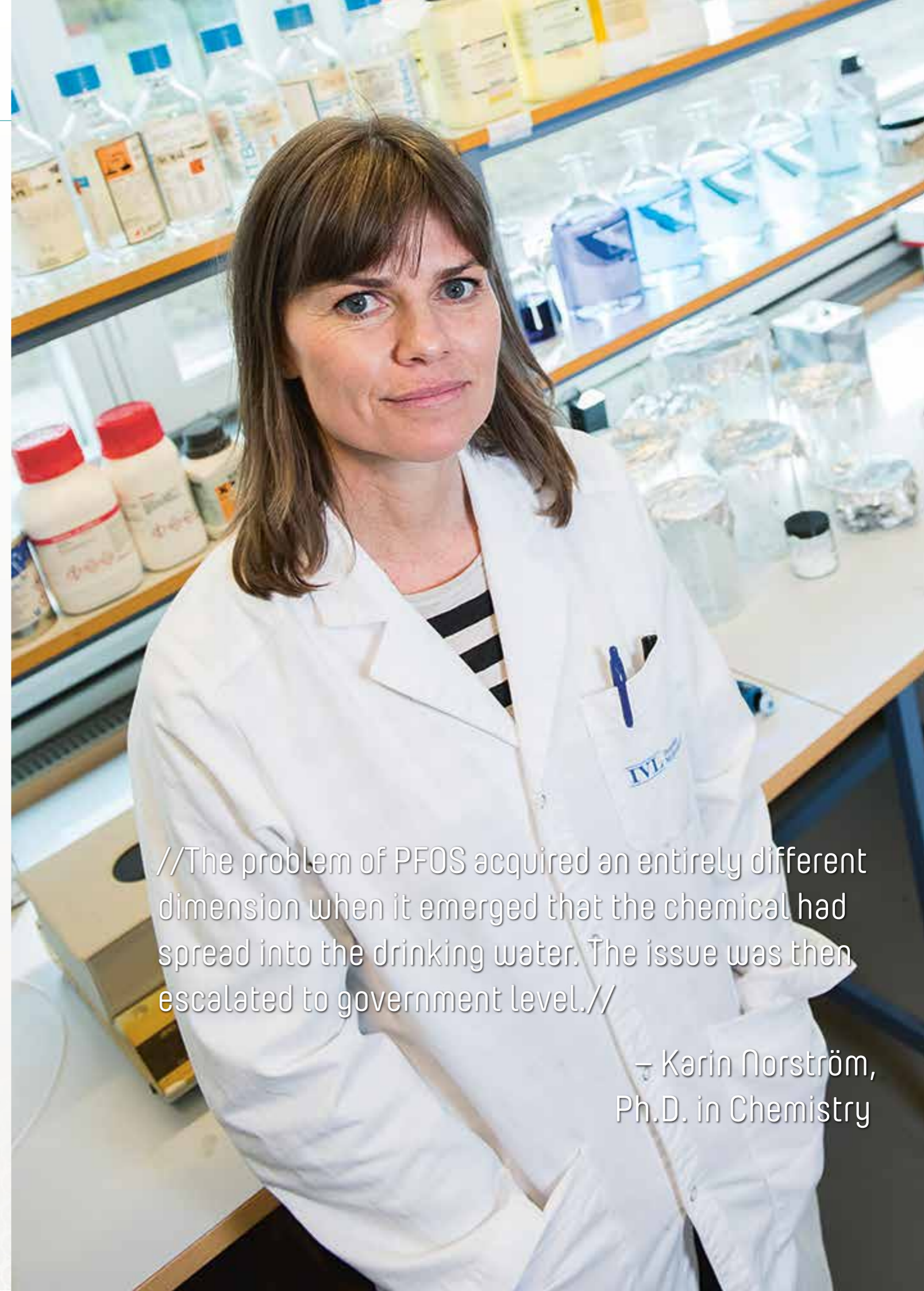


One of the projects headed by IVL in India consists of demonstrating environmental technology solutions in Bangalore.

# From alarm reports to abatement strategies

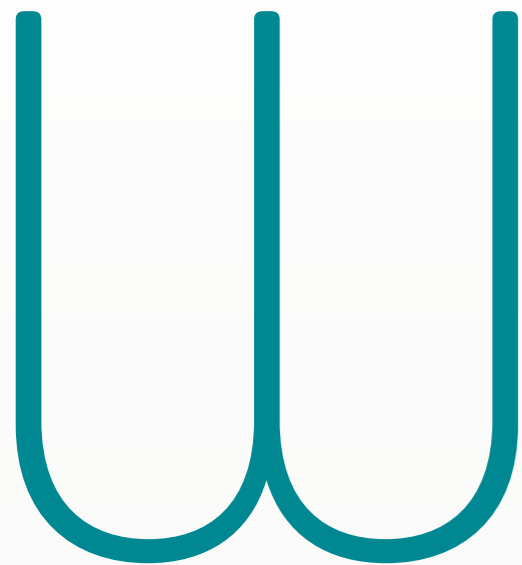


In furniture, clothes, food, hygiene products and electronics – chemicals are all around us. They are part of our prosperous society, but may also represent a threat to our health and the environment. IVL operates on a broad front across the whole range of chemicals – from measuring and analyzing chemicals in different environments and products, to compiling information for decisions on risk assessment and abatement strategies.



//The problem of PFOS acquired an entirely different dimension when it emerged that the chemical had spread into the drinking water. The issue was then escalated to government level.//

– Karin Norström,  
Ph.D. in Chemistry



When in 2014 the fact emerged that the toxic chemical PFOS had polluted drinking water in several locations in Sweden it attracted considerable attention. The industrial chemical used to be employed in fire-retardant foam but has been banned since 2008. It is poorly degradable in nature and accumulates in the food

chain. Worst hit was Kallinge in south Sweden, where very high levels of PFOS were discovered in ordinary drinking water. Since then, it has been shown that children in Kallinge have levels of PFOS in the blood that are between 20 and 50 times higher than normal.

“It’s easy to understand the worry affecting these families. There were very high levels in the drinking water in Kallinge, the highest we’ve recorded in Sweden. The fire drill area is right above the water source”, says Karin Norström, chemist and researcher at IVL.

Karin Norström has been engaged in research into high-fluoridized substances such as PFOS for many years and has been involved in building up the analysis operation IVL. IVL’s laboratory analyzes water and fish on behalf of many municipalities and county administrative boards, and researchers also carry out risk assessments in contaminated areas. In addition, since the widely-reported Kallinge case, many requests for fire retardant foam analysis are being received from emergency response services. Even though PFOS is no longer used in fire retardant foam, it is so toxic that very small residues of the substance left in the tanks of fire engines are enough to contaminate an entire load of new foam.

“The problem of PFOS acquired an entirely different dimension when it emerged that it had spread into the drinking water. The issue was then escalated to government level, leading to an official project in which the Swedish Chemicals Agency was commissioned to produce a national abatement programme to reduce the use of high-fluoridized substances in goods and products. In that way, we hope that something good will come from the situation. The point is to learn

from what happened, to look back and try to understand how it was possible, so that it doesn’t happen again”, says Karin Norström.

#### UNCERTAINTY ABOUT NEW SUBSTANCES

Many issues remain to be tackled. In the case of PFOS, it has been banned in Sweden and Europe and so its use may be assumed to decline over time. But what is the situation with the other high-fluoridized substances that are still allowed in fire retardant foam? Uncertainty surrounds both the new substances, and what they degrade into, according to Karin Norström.

“At the same time, it’s important to have effective, functional fire retardant foam. It’s always about striking a balance. On that basis, it’s a welcome development that we no longer practice with “active” foam and instead use water.

Better control of the flood of chemicals in our environment has become an urgent issue. In 2014, the European research programme Solutions was established to develop a framework for handling chemicals in circulation. IVL, one of 39 partners, has been instructed to devise concepts for future risk assessment and regulation of chemicals.

“One of our tasks is to examine opportunities for coordination between the many EU directives affecting chemicals and to develop tools that will enable possible actions to be identified more readily. One big challenge is to link consumption and emissions to possible actions within existing legislation”, says John Munthe, Head of Research, IVL.

“Reducing the presence of undesirable chemicals in the rivers, lakes and coastal waters of Europe presents major challenges, and we hope our research can forge tools and support to identify which substances are causing problems, so that intelligent decisions can be taken about future actions”, says John Munthe.

#### POLITICAL CONSENSUS ON CHEMICALS

In Sweden, the chemicals issue has started to attract considerable attention, especially in political circles. According to a survey by IVL prior to Sweden’s 2014 general election, a broad political consensus exists for a tougher chemicals policy. In the survey, 95 per cent of the parties’ leading parliamentary candidates replied that industry and commerce should be subject to more stringent requirements regarding product contents.

“Greater openness about product contents would make for easier risk assessment and knowledge transfer, and would in the long run also aid in



IVL’s laboratories are developing processes for analyzing lower and lower levels of various substances.

the development and adaptation of controls and requirements for reducing the impact of chemicals”, says John Munthe.

“There’s also a need for a debate about why so many chemicals are used in society, and about the functions that they serve”, he argues. Over 50 years, world chemical production has risen from around 7 million tons to 400 million tons annually.

“In addition, greater openness from industry and commerce is essential to acceptance and understanding of the benefits offered by safe use of chemicals”.

Karin Norström agrees. It is good that the chemicals issue has been highlighted in recent years, while it is clear that there is a considerable lack of knowledge.

“Chemicals have become an extremely negatively charged issue, few people understand what their function is, what it would mean to do without them. The whole of our prosperous society is built on chemicals. Alarms can be so misleading, we need a complete picture. That’s where I think that there are major benefits of applied research, that we’re in place and using our research out in society and that we’re putting our analysis results into a wider context. We have the whole chain, that’s what I think our big contribution in this area is. //

## Large number of environmental toxins in seabird eggs

Seabird eggs collected on islands in the Norwegian Sea were found to contain a large number of environmental toxins. In a study conducted by IVL in association with the Norwegian Institute for Air Research (NILU), researchers found 158 different substances in the eggs. The discovery of new environmental toxins – some of which had been intended as more desirable alternatives to now prohibited chemical substances – was a particular concern.

The researchers had analyzed eggs from the eider, common shag and lesser black-backed gull, all of which are at the top of the food chain. The eider and lesser black-backed gull are relatively sedentary birds that overwinter along the Norwegian coast. Against that background, the researchers concluded that these species ingested the environmental toxins within Norway’s coastal zones.

“These are locations with little human impact. The findings from the survey indicate once again that environmental toxins spread over a long distance, via water and air”, says Mikael Remberger.

## Emerging substances in the indoor environment

IVL has for many years been a member of the European network NORMAN, which focuses on “new” chemicals, including chemicals that exist today in the environment but are not regulated. The network was set up in 2005 with support from the EU’s 6th Framework Programme and today operates as a permanent network of reference laboratories, research organizations, public authorities and industry. It serves an important function as a link between research and policy.

In 2014, the NORMAN network created a new working group on the indoor environment, which IVL is heading. The group has a key role in identifying which substances and categories of substance should be prioritized in the work of abatement. The objective is to create a comprehensive fund of knowledge about new risk-chemicals in indoor environments, to identify major dispersal routes and to investigate how people and the environment are affected by the chemicals. All products around us give off chemicals into the environment. With certain substances, the indoor environment can be the dominant route of dispersal.

“People spend on average 85-90 per cent of their time indoors, so the indoor environment is extremely important in terms of the amount of chemicals that we are exposed to. Some substances are present at higher levels indoors than outdoors because they are emitted from furniture, electronics and other consumer products that we surround ourselves with. Despite the fact that this is such a major route of exposure to humans, we know far too little about chemicals in the indoor environment and how various construction materials, for example, affect the environment”, says Eva Brorström Lundén, researcher at IVL and project manager of the new working group.

# Sustainable urban development in focus



In 2014, IVL took an important step by establishing an office in Malmö – an initiative applauded by the City of Malmö, a partner of long standing. The office itself is located in the creative and vibrant Västra hamnen district, next to the University of Malmö, among entrepreneurs, business developers and young creative spirits. The venture is part of IVL's plans for growth and for further developing its R&D activities in the area of sustainable urban development. Much of this work will now be based at the Malmö office.

//We must also look to social sustainability if we want our cities to be sustainable and attractive for people to live and exist in.//

– Jeanette Green,  
Head of IVL's new  
Malmö office



IVL

has enjoyed a partnership with the City of Malmö stretching back over many years, in the form of a long series of projects centring on sustainable building. Many have been EU-funded projects aiming to create more energy- and climate-smart cities.

“We hope now to be able to step up the pace of this work and also to establish partnerships with more local and regional partners. Sustainable building is an expanding area in which IVL has a lot to contribute. Our strength lies in our expertise in environmental assessments and a systematic approach that is attractive to our customers”, says Jeanette Green, Head of the recently opened Malmö office.

Her responsibilities include developing IVL’s local operations, and to her the location in Malmö and closeness to Malmö and Lund Universities also provide an extended base for recruitment of



“Interest in green solutions is increasing. Urban cultivation and green roofs are becoming common sights, but the very latest phenomenon is living walls. This can improve the air and climate quality and absorb traffic noise”, says Jeanette Green.

skilled employees, as well as the potential for establishing new projects and relationships.

“There is much value in being on the spot and being visible locally, especially when it comes to working with the municipalities and the various stakeholders in the construction industry”, she says.

Jeanette Green joined IVL from an appointment as environmental expert at a major construction company. But her record also takes in a seven-year spell at IVL’s Stockholm office, including work on projects relating to toxin-free building – before a longing for home in Skåne kicked in.

“It’s a fantastically exciting challenge, to be able to come back to IVL where I’m at home and to get to develop something that’s so close to my heart. And all this in Skåne.”

At present, she is spending much of her time on the EU Cityfied project, where IVL’s partners are the Municipality of Lund, Lunds Kommuns Fastighetsbolag AB (LKF) and Kraftringen. The objective of the project is to achieve a 31 per cent reduction in energy use in the homes in the 1970s-built Linero district, and 93 per cent fossil-free district heating.

#### BUDGET OF SEK 440 MILLION

The budget for Cityfied is around SEK 440 million and the project also includes stakeholders in Spain, Turkey, Belgium and Germany.

“We’re making existing homes energy-efficient in a well thought-out process, primarily to reduce carbon dioxide emissions from the area, without rents having to rise to pay for it. The idea is that we should come up with tools and processes that other cities can use to renovate existing buildings in a climate-smart way”, says Jeanette Green.

The important thing about the project is that work is to be conducted on an all-inclusive system basis. That way, all partners will be able to learn more about how to go about making homes and energy systems more energy-efficient in a cost-efficient way.

#### UNIQUE COLLABORATION

In many ways, Cityfied is unique in that the property owner and energy company are collaborating with both municipality and research organization on a project that focuses on energy supply on the one hand and energy needs on the other.

“A reduction in carbon dioxide emissions must be viewed from a system perspective, otherwise



Now that cities are becoming more energy-efficient, it is becoming increasingly important to create urban environments that are socially sustainable and attractive for people to live and exist in.

the risk is that you fall into using measures that may be sub-optimal in the long run”, says Jeanette Green.

She recounts that sustainable urban development has an interesting development stage that several of IVL’s personnel have started working on.

“Now that cities are becoming more energy-efficient and energy systems more sustainable, the way we people move about and our behaviour are playing an increasingly important role. We have to look at both soft and hard issues at the same time, we must quite simply focus not just on technological solutions but also on social sustainability if we are to ensure that cities become both sustainable and attractive for people to live and exist in.”

IVL is also working on the thematically-related Pocacito (European Post-Carbon Cities of Tomorrow) project. The project is to produce a guide for European cities that is intended to result in cities that are sustainable from 2050 onwards. This establishes a broad view on sustainability that embraces climate and environmental perspectives as well as social and economic sustainability. //



PHOTOGRAPH: JOHNE R/HANS GEIJER

## Mobility for sustainable urban development

In order to resolve the environmental and traffic problems of the cities, solutions of a fundamental, structural nature are needed, where residential, workplace and traffic and transport issues are integrated into long-term urban planning. Against that background, IVL started work in 2014 on building up new expertise and operational capability in this particular area: mobility.


The trend both in Sweden and other parts of the world is of high levels of migration into the cities from rural areas. This represents both opportunities and risks in terms of sustainable social development.

“Urban densification opens up opportunities for creating attractive cities with dynamic labour markets and vibrant meeting places. At the same time, environmental and other problems – such as transport-related congestion – are more clearly highlighted, above all in the major cities. This is because the demand for travel and various modes of goods transport is rising, within, to and from the cities”, says Anders Roth, IVL’s expert in mobility.

# Lifecycle analysis has moved into the living room

LCA

IVL began working in LCA back in the 1990s in the form of a Nordic project that became the forerunner of ISO standards in the lifecycle field. Since then, IVL has been a strong driving force in the international development of ISO standards for lifecycle analysis, environmental product declarations (EPDs) and environmental communication. Today, around 50 IVL employees are working on LCA applications in their day-to-day activities on behalf of businesses and other organizations.



//Why guess when you can  
work it out. //

– Martin Erlandsson,  
researcher and LCA expert



lifecycle analysis has finally moved from the bulky files of researchers to real life and out into the living room. “Now exciting things are starting to happen”, says Martin Erlandsson, researcher and LCA expert at IVL. To him, lifecycle analysis has run like a common thread through his entire professional life, ever since his degree project more than 20 years ago.

What he finds attractive about a lifecycle analysis – done in the right way – is

that you obtain a figure. It is not just an opinion; you can obtain a result in black and white. He often says why guess when you can work it out.

But what is most interesting, according to Martin, is what a LCA is for and how it should be used. Today, there is more and more consensus that there are different ways of using an LCA: comparative LCAs that are used to compare different products internally and externally and LCAs that are used when the aim is to achieve a result that delivers the maximum benefit to society.

A demand has started to emerge for LCAs as a basis for procurement. Under the new EU directive on public procurement, requirements may be made regarding production, delivery chain and third-party certification for a product, service or construction contract. The directive is to be transposed into national legislation by as early as 2016. During the year, IVL worked on support and tools for application of the lifecycle perspective in procurement. Extra points are also available if LCAs are used in the systems for environmental certification of buildings.

Today, ingredients are accurately declared on the packaging of food products. In addition, there are now ways of adding a product's environmental performance data so that we obtain a factual basis for our choice between, for example, chicken and beef.

IVL has been a leading actor from the start in the international and national process and development of the LCA standard, as well as for standards for communication of environmental performance data from a lifecycle perspective.

“We were involved in developing the regulations for EPD and the first EPDs, alongside Sven-Olof

Ryding and the Environmental Governance Council, which went on to establish the International EPD® system. So it seems especially fitting that IVL has now taken over that side of operations. The circle has been closed”, says Martin Erlandsson.

The Environmental Product Declaration (EPD) is based on the ISO 14025 international standard on environmental product declarations, which is based on a lifecycle analysis according to the ISO 14044 standard.

The point of these communication standards on LCAs is that the result should be the same whoever produces an LCA. In the case of EPDs, the point is that they should work well in practice and serve as a bridge from the scientific to the practical application”, he says,

#### ROBUST LCA FOR THE CONSTRUCTION INDUSTRY

In the past year, he himself was involved in several projects focused on making LCA usable for practical purposes. This has meant, for example, designing tools to enable the construction industry to produce simple-to-use lifecycle calculations for various construction projects. According to construction industry representatives, the most pioneering venture has been the “Robust LCA” project, which under Martin's leadership has established consensus among the heavyweight actors of the construction industry on how LCA is to be used in construction projects.

In addition, IVL recently analyzed the environmental impact of various buildings using LCA methodology, partly as a basis for the government's “Control Station 2015” project, which focuses on new energy requirements for “near-zero energy houses”, and partly within the scope of a study into energy use in new buildings. In the latter, it emerged that new buildings nowadays are so energy-efficient that the environmental and climate impact during the construction phase is equal to that of the operational phase.

Apart from Martin Erlandsson, a very long line of IVL personnel have been involved in the development of different LCA-based tools and standards. This work is often performed in partnership with the business sector and via major EU-funded R&D projects. In all, nearly 50 members of IVL personnel are in one way or another involved in LCA and other environment-based system analysis. //



## Calculator for working out an environmental index for shoes

On behalf of the Swedish Shoe Environmental Initiative (SSEI), IVL has created a calculator that can be used to work out a lifecycle-based shoe environmental index. The input data needed are the weight of each material and the total weight of the shoe. The result can then be expressed either as an overall environmental index figure or split into the five categories of environmental impact: material resource, climate, toxicity to humans, ecotoxicity and water. At the same time, a lifecycle analysis for the total consumption of shoes in Sweden is calculated, to serve as benchmark for shoe developers, since it will be possible to obtain an average value for different types of shoe.

## Pioneering LCA for entire trade of EU

On behalf of the EU Commission, IVL's researchers are calculating, with the aid of lifecycle analyses combined with statistical data, the environmental effects of EU's imports and exports. The process of calculating consumption and production on the basis of lifecycle inventories is regarded as pioneering. This is done routinely for individual products but never before for a whole country and even less so for an entire continent. The project is linked to the EU Flagship 2020 Initiative for a resource-efficient Europe.

## EPD – certified environmental product declarations



Elin Eriksson takes part as Swedish expert in the EU's development of the Product Environmental Footprint, which encompasses the environmental footprints of products and organizations.

On 1 July 2014, IVL took over responsibility for the International EPD system of certified environmental product declaration from the Environmental Governance Council, which was then abolished. As a result, IVL further consolidated its position as a leader in lifecycle analysis (LCA), system analysis and environmental product declarations. The International EPD system is operated as a subsidiary, EPD International AB, of IVL.

Demand for EPDs is rising, and this type of information is increasingly in demand in procurement and for answering questions from customers. The EPD has become a standardized way of communicating comparable environmental performance data for products and services in the EU and globally. “IVL's takeover of the EPD system is in line with the Company's strategy of offering science-based solutions and applications in the global market”, says Elin Eriksson, head of unit at IVL.

Companies all over the world are developing EPDs and the international EPD system has local offices in several locations in the world, as well as many international partnerships. EPDs can also be adapted to target group and market, to a simplified carbon footprint/ climate declaration or to an EPD in line with the EU's Environmental Footprint.



## Social aspects increasingly in demand in LCA

In general, traditional lifecycle analysis only takes account of impact on the environment and does not take account of economic costs or social aspects – that is, all three dimensions of sustainability – in a reliable way. IVL has teamed up with international researchers who are developing methodology for a broader sustainability assessment that includes environmental, economic and social issues. This is known as a Life Cycle Sustainability Analysis (LCSA). In 2014, IVL tested the broader analysis method in a study on increased use of residual heat in the district heating networks and in studies of social aspects of fuels.

## Effective tools for environmental calculations

IVL is developing simplified online calculating tools for simple lifecycle analyses in the choice of materials and suppliers for various products. The tools are customized to different product categories, such as packaging, food in public catering and infrastructure and construction projects.

In the construction project application, it is possible, via the estimation of quantities performed anyway for the projects, to calculate the environmental impact of materials production, construction, management and demolition of a building. Several analyses conducted by IVL show that in new constructions, materials production represents an ever-increasing proportion of the total environmental impact, as more energy-efficient systems have reduced operating energy consumption. In energy-efficient buildings, the materials side can account for all of 50 per cent of the total environmental impact over a 50-60 year operating period.

# Towards a better work environment

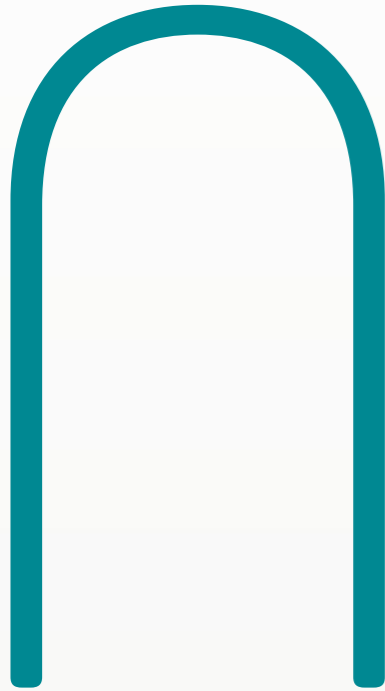


Hazardous welding fumes in the air, cuts at the operating table and neck problems from cleaning work. Some work environments bring greater risks than others. So it is important to identify the right work processes, equipment and knowledge. IVL has long focused on work environment issues with research directly leading to concrete proposals and strategies. This creates the conditions for sustainable development that also take people's health and safety into account.

//We discovered that the actions that were intended to protect the welders rarely worked as intended. //

Ann-Beth Antonsson, adjunct professor and researcher focusing on sustainable working life





early ten years ago, Sweden lowered its hygiene limit values for chromium and manganese, substances that occur in welding fumes. It was then that IVL began in earnest with its research about the work environment, specifically in welding.

“It was in a project examining the levels of air pollutants – manganese and chromium in particular – found in Swedish workplaces that we found that the work of a welder is risky

in many different ways. Welding is heavy work with exposure to vibration, optical and electromagnetic radiation, and with high levels of risk from exposure to chemicals. We also discovered that the measures intended to protect the welders often didn’t work as intended”, says Ann-Beth Antonsson, adjunct professor and researcher with a focus on sustainable working life, at IVL.

The discovery created an opportunity for IVL to help to improve the work environment for welders. As a result, contacts were made with employer organizations and trade unions representing welding companies and their employees.

“We want our projects to help create a better work environment. That means it’s important not just to understand the nature of the work environment but also the industry logic in the sectors where we operate. We’ve known from the past that small businesses – and many welding companies are small – often go to their suppliers to get help with work environment issues, although this is knowledge that is supposed to be available at the workplace. So we interviewed people at companies who sell welding equipment, and it turned out that there was a lack of knowledge about the work environment at both the welding companies and their suppliers”, says Ann-Beth Antonsson.

She and her colleagues applied for and were

awarded grants from AFA Försäkring to establish a knowledge platform for welding companies. The result was a website, Svetsarätt.se, which deals with every aspect, from the individual to the company, premises, location, processes and health risks.

“The website is unique – even internationally – because it covers the entire work environment in welding and describes both health and accident risks, as well as possible ways to reduce these risks. Work environment problems described in words often become abstract. So Svetsarätt.se – like several other similar websites that we’ve developed – has short videos that illustrate the problems but also show how they can be avoided”, says Ann-Beth Antonsson.

#### THE WHOLE PICTURE

Ann-Beth says that the point is to think outside the box and not concentrate too much on what is a far too narrow view of the problem.

“We start from a system perspective in our projects, where we look at the whole picture – man, technology and organization. We don’t just look at how the technology can be developed, how the organization can be made better or how the employee can make his or her workplace safer. The work environment affects everyone at a workplace. Managers’ understanding is just as important as good equipment and how work is organized and controlled”, says Ann-Beth Antonsson.

She asserts that work environment problems can be found in every sector. IVL is currently engaged in several similar projects in other sectors, including healthcare.

“Our attention was drawn to the sharp instruments used and how easy it is to get needle injuries and cuts, with the associated risk of infection with various illnesses such as HIV and hepatitis B and C during the handling of hypodermic needles or when using sharp instruments during surgery. New EU directives also introduced stricter requirements for precautions against needle injuries and cuts in healthcare. We interviewed healthcare employees, for example, who had suffered needle injuries or cuts, in order to get a



The Svetsarätt.se website provides information on health risks, as well as tips and advice on how to create a good work environment.

better understanding of the factors that contribute to the injuries. This enabled us to produce a framework for information material and videos for a web tool that we intend to launch by summer 2015”, says Ann-Beth Antonsson.

This web tool is also based on the whole-picture perspective of man, technology and organization. It offers support to various players at various levels in healthcare – management, heads of department, safety officers and employees, as well as purchasing personnel and training personnel for nursing staff – in how they can help to reduce the risk of injuries. It is research that does not just highlight risks and problems, but also sets out specific remedies. //

IVL has developed several work environment websites, including [www.alltomstad.se](http://www.alltomstad.se), which deals with cleaning, and [www.andningsskydd.nu](http://www.andningsskydd.nu), which focuses on how to use breathing apparatus correctly.

## Better work environment in treatment plants and supply networks

People who are employed in municipal wastewater treatment networks are exposed to risks in their work environment, in the form of microorganisms, viruses and high levels of gases such as hydrogen sulphide and methane. Work on the inside of tunnels also has its risks. To do a good job, people need a good work environment that enables the work to be done under safe conditions. Against that background, IVL has developed a website (ArbetsmiljöVA) to provide support for work environment activities.

The website describes various tasks and environments in detail, along with tips and advice on what to bear in mind while performing the particular task, and during planning of, for example, new water treatment plants or supply networks.

## IVL investigating possible presence of nanoparticles in workplaces

The use of materials containing nanoparticles is accelerating in many workplaces, such as the construction and manufacturing industries. Nanoparticles are also found in products such as pharmaceuticals and hygiene articles. In one project, IVL is developing processes and strategies to measure the presence and dispersal of nanoparticles in workplaces and to evaluate possible measures to reduce the exposure of employees to these materials. New limit values are being defined in the EU for different types of nanoparticle, and IVL will evaluate the consequences of the proposed new limit values, relative to the existing ones. The aim of the project is to measure and, where necessary, reduce the exposure of employees to nanoparticles in workplaces. The knowledge gained from the project is to be incorporated into the training of work environment engineers.

## Ventilation can cause poor indoor air quality

A study by IVL indicates that ventilation systems that are not maintained and cleaned can cause problems in indoor air quality. Dirt and damp in the systems allow microorganisms to grow and irritants can build up and then be dispersed via the air indoors. In the study, researchers investigated how air changes when it is transported through four ventilation systems in office buildings. These were ordinary offices without reported problems with the indoor environment. The measurements show that the filters used to clean the supply air to the offices are less efficient in separating particles than expected, and irritants such as organic acids and formaldehyde are produced. In two of the ventilation systems, the researchers also found mould.

It is estimated that around 70 per cent of the health problems affecting people in connection with the indoor environment in offices is fully or partly a result of inadequacies in operating or maintaining the ventilation system.

# Seeking out the invisible threat to the oceans

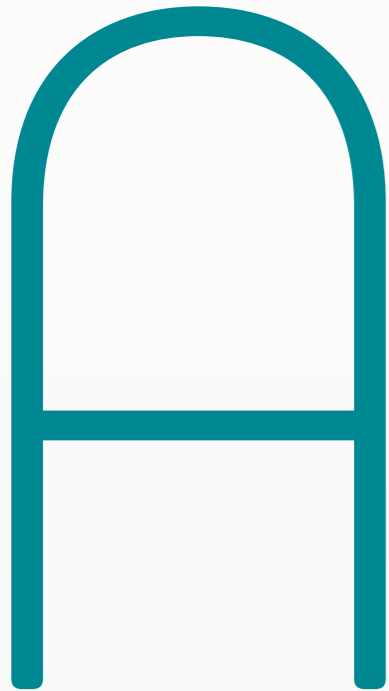


Microscopically small particles of debris in the oceans – a nearly invisible yet growing and serious environmental problem. Research into micro debris in the ocean, which has been part of IVL's marine research programme since 2013, attracted considerable attention over the past year.



//If the levels of micro debris are to be brought down, the technology used for treatment of wastewater and rainwater must be improved. We must also develop technology for removing combustion particles from chimneys and exhaust pipes, and we must cut down on the use of antifouling paint on boats and ships. //

– Kerstin Magnusson,  
ecotoxicologist



Although public interest in micro debris in the ocean is relatively new, it is nearly ten years since our researchers at the Sven Lovén Centre for Marine Sciences, just outside Fiskebäckskil, first took an interest in and started measuring the levels of micro debris in the waters off Sweden's west coast.

The starting signal for a broader interest in micro debris in the oceans came when particles of debris were observed in plankton surveys forming part of a programme of international monitoring of the oceans. At the time, the main hypothesis was that the source of micro debris was larger pieces of rubbish in the water that had become brittle and fragmented when exposed to sun and water. So says, Fredrik Norén, marine biologist at IVL, who with colleagues Katja Norén and Kerstin Magnusson pioneered the development of methods to detect and collect micro debris.

#### SYSTEMATIC SAMPLING

Since then, systematic sampling has taken place at fourteen locations ranging from Gothenburg in the south to Smögen in the north. The findings indicate that a good deal of debris in fact already exists as microparticles when it reaches the oceans. This includes, for example, large items of rubbish that are dropped in streets, crushed by traffic and pedestrians and then washed out into the ocean via the rainwater. So here, too, fragmentation has taken place, although not in the ocean.

The findings show – perhaps unsurprisingly – that the highest levels of micro debris are found near cities and industrial areas.

Micro debris are particles of plastic and textiles, as well as particles from combustion, plus other waste, all measuring less than 5 millimetres. A



Kerstin Magnusson and Katja Norén, with their colleague Fredrik Norén at Fiskebäckskil, have pioneered the development of processes to detect, collect and analyze micro debris.

large proportion is not visible to the naked eye, but there are suspicions that these may be more damaging to the fauna than larger pieces, partly because the microscopically small particles serve as carriers of organic environmental toxins and heavy metals. These substances are dispersed further in our ecosystem by aquatic animals who ingest the debris and in turn are eaten by animals further up the food chain. As a result, the micro debris also represents a risk to man.

What the major sources of micro debris in the marine environment consist of, has up to now been largely unknown. The investigations by the researchers at Lysekil point to possible sources of the debris, based on regional differences in levels, plus materials analysis. The samples taken along the west coast indicate that levels are highest in

the Gothenburg region, followed by Uddevalla, Stenungsund and Lysekil. Along the Bohus coast, an average of around 30 plastic and textile particles per litre of water are found, plus approximately 300 potential combustion particles per litre. The biggest source of the debris is not boating but urban life. It is what we drop on streets and roads that is carried away by the run-off water when it rains. The problem exists in all coastal cities where the currents concentrate the debris along the water's edge. In addition, because of the ocean currents, the west coast receives debris from the cities of Europe and from rivers that flow out into the sea.

“The results show that cities and ports are potential sources of the debris particles, from rainwater, municipal wastewater and various forms of combustion”, says Fredrik Norén.

Shipping may also be a major source of microscopic debris in the form of flakes of toxic antifouling paint and the com-

bustion of fuel. The level of particles that are likely to originate from combustion was very high in the Gothenburg region and in the other industrial port areas.

“If the particles are from antifouling paint, there is a considerable risk that they are damaging to the marine ecosystems, since most antifouling paints have very high levels of toxins”, says Fredrik Norén.

#### NEW ENVIRONMENTAL TECHNOLOGY NEEDED

One overall objective of IVL's research into micro debris is to obtain data to provide a framework for developing effective treatment technology. Actions have to be taken to develop technology for treatment of wastewater and rainwater, for more effective removal of combustion particles from chimneys and exhaust pipes, and to cut down on the use of antifouling paint.

The EU Marine Directive, which entered into force in 2008, is one of the most powerful measures, incorporating



The levels of micro debris in the ocean are rising, and the problem is exacerbated by the fact that the plastic degrades very slowly.

//No individual is “hung out to dry”, everyone can embrace the problem because, quite simply, it is a consequence of the society that we live in.//

binding regulations, that have been adopted to preserve the marine environment in the EU. The goal is to achieve a satisfactory ecological status in the oceans by 2020 at the latest. The judgement of what constitutes a satisfactory environmental status is made on the basis of eleven standard criteria that define what can be required for a good ecological status.

The eco-toxicological effects of micro debris in the oceans have not yet been scientifically proven. Much remains to be done. What makes microplastic particles in particular a serious problem compared to other micro debris is that emissions are increasing while plastic degrades very slowly, according to Kerstin Magnusson, ecotoxicologist at IVL.

She goes on to explain that because this is a relatively new area of research, there are many factors to take into account in order to



Systematic sampling has taken place at fourteen locations on the west coast, from Gothenburg in the south to Smögen in the north.

arrive at reliable results. Are the samples being taken at the right places? Today, most samples are taken in the surface water, while sampling in seabed sediment as yet is quite rarely done. Kerstin Magnusson and her colleagues believe that part of the explanation for the rising attention being paid to micro debris is that it is a “non-controversial” problem, there is no guilty party to single out – it is you, I, everyone who contributes to the problem of litter.

“No individual is “hung out to dry”, everyone can embrace the problem because, quite simply, it is a consequence of the society that we live in. But what we do is not research for its own sake – we want to play a part in changes that result in a reduction of micro debris in the oceans. It might be a cliché, but it really is about saving the oceans and our environment for the generations to come”, says Kerstin Magnusson.

And there is much that can be done here, for example, developing the processes at the wastewater treatment plants, or ensuring that enough rubbish bins are provided in cities and along beaches to prevent rubbish being washed out with the rainwater.” //

## Full-scale separation of pharmaceutical residues

Fish by-products will be turned into biogas and wastewater made so pure that it is fit for drinking. These are the plans for Simrishamn’s wastewater treatment plant, where IVL is engaged in full-scale trials of a range of purification technologies.

The development project, which received funding the Vinnova Challenge-Driven Innovation programme, aims at purifying all water discharged from the wastewater treatment plant in Simrishamn. This will be based on an innovative system incorporating several separate purification technologies – disc filtering, ozone purification and sand filters or active carbon. On discharge, the water will be so pure that at a later stage it may be reintroduced into the cycle by infiltration into the groundwater.

“A big advantage is that we can remove pharmaceutical residues from the water, which can benefit the environment hugely”, says Staffan Filipsson at IVL.

By composting sludge from the wastewater treatment plant with fish by-products, we will produce biogas – which in turn will generate electricity for the fish freezing facility in Simrishamn”.

The research project, entitled “The municipal water treatment of tomorrow – a production facility with multiple benefits”, is being conducted in close cooperation with Simrishamn Municipality, several cleantech companies and universities and colleges. The project is part-funded by Vinnova and Region Skåne.

## Analyzing potential fuel savings in shipping

Marine transport is expected to increase sharply, while shipping is having to meet increasingly stringent environmental demands. Within a project funded by Sweden’s Energy Agency, IVL is analyzing the total consumption of energy by shipping to and from Sweden, as well as potential ways of making fuel savings for different types of vessel.

Around 90 per cent of all goods exported from or imported into Sweden will, at least in part, have been carried by ship, and in addition a political desire has been expressed in the EU to increasingly move goods from road to sea. This is to be done at the same time as carbon dioxide emissions from shipping are to be drastically reduced.

Much is to be done in terms of reductions in emissions from all types of ship. One common, and simple, way of doing this is to lower the speed at sea, which results in a considerable fuel saving. This project also focuses on cost-efficient measures while the ship is in port.

For example, today, major bulk carriers often lie waiting – in some cases for several days – for notification of their ultimate destination. With improved logistics and communication, vessels could reduce this period, and time spent in port. The time-saving would enable the ship instead to allow itself a lower speed during the voyage and so avoid unnecessary consumption of fuel.

“In our view, communication between all stakeholders concerned – shipping company, port, shipbroker and goods owner, to name just a few – plays an important part in saving time and energy. It’s also in everyone’s interests to trim unnecessary costs”, says Hulda Winnes, IVL’s manager for the project.

# Directors' Report



The Board of Directors and the Chief Executive Officer of IVL Swedish Environmental Research Institute, hereby present their annual report for the year of operations 1 January 2014–31 December 2014, the Company's thirty-third fiscal year.

## Group operations

IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE (CIN 556116-2446) CONDUCTS RESEARCH AND CONSULTANCY WORK in all aspects of the environment and sustainability. We serve a clientele drawn from all sectors of industry, government agencies and other organizations. Our operations are based in Sweden and Europe, but we have customers throughout the world, particularly in China, where IVL has been active for more than 25 years.

IVL, which was established in 1966, is owned by the Swedish Institute of Water and Air Conservation Research Foundation (SIVL). The Boards of Directors of the Company and the Foundation are appointed by the Swedish government and representatives of the Swedish business sector. IVL has operated in public limited company form since 1982.

In addition to the Parent Company, IVL, the Group consists of subsidiaries Bastaonline AB, EPD International AB, IVL Environmental Technologies (Beijing) Company Ltd and the joint venture company SEC in China. Operations are essentially conducted within the Parent Company.

### PARENT COMPANY

The purpose of IVL's operations is, via applied research and consultancy work, to promote ecologically, financially and socially sustainable growth in the business sector and the rest of society. Activities are organized into four operating units, accompanied by a business development and market units and a research unit that operate laterally across the organization. IVL's research activities are defined in a long-term plan that is updated on an ongoing basis by a research council. All units interact in a matrix organization covering six thematic areas: *Climate & Energy, Water & Soil, Air & Transport, Sustainable Building, Sustainable Production and Resource-Efficient Products & Waste.*

IVL's working methodology is characterized by an inter-disciplinary and holistic approach. The Company works broadly across the entire area of sustainability and so, in addition to its traditional environmental expertise, IVL now also has know-how in behavioural science, economics, communication and social science.

Activities span every sector, and we serve customers in all parts of Swedish society, from small and medium-sized enterprises to large multinationals, industry and trade associations, government agencies – of which the Swedish EPA is the biggest single client – local authorities and other organizations.

### International operations

IVL is engaged in extensive international operations. Europe is regarded as the Company's domestic market, while else-

where the main focus is on China and India, plus to a certain degree South America, especially Brazil and Chile. In the past year, the former collaboration and project activities in Russia and the EECA countries were halted.

### Communication, training and seminars

Communication, along with seminar and conference organization, falls within the scope of the Business Development & Market unit. Consequently, communication is an integral part of the Company's business development.

Communication has become increasingly important, as a component of research programmes and in general terms as a means of disseminating information about IVL's activities. In this regard seminars play a significant role, not least as a means to consolidate IVL's role as an arena for meetings for representatives of the worlds of research, business, government and politics, above all via conferences such as *The State of the Environment, The Road to Non-Toxic Building, the annual Baltic Seminar and Sustainable Transport.*

### PARTNERSHIPS WITH UNIVERSITIES AND COLLEGES

Part of IVL's strategy is to maintain and develop close cooperation with the business sector, international research bodies and institutes of higher education. As part of this policy, IVL also works via formalized partnerships with, for example, KTH, the Royal Institute of Technology, Chalmers University of Technology, (CTH) and the Faculty of Engineering at Lund University (LTH).

In 2014, IVL and KTH signed a new partnership agreement on development and expansion of their activities relating to the joint Hammarby Sjöstadsværk research and development facility.

CTH and IVL are jointly developing an infrastructure for long-term skills development and research in transport and logistics. IVL's role here is above all to develop a database and a support function for long-term data processing. It is also charged with working with CTH on initiating and driving forward transport research.

IVL today has four members of personnel holding adjunct professorships at KTH, CTH and Gothenburg University, while another holds a VINNMER Fellowship and is engaged in the Chalmers Energy Initiative.

### Hammarby Sjöstadsværk

IVL and KTH are joint owners of the Hammarby Sjöstadsværk R&D facility, a national resource for the development of water purification technology. The facility is used by IVL and

KTH for their own research, but also by external stakeholders for testing of new purification technology on different types of wastewater. International operations in particular are conducted under the auspices of the Sweden Water Innovation Center (SWIC). The initiative is backed by Xylem, the Swedish Association of Graduate Engineers, the Swedish Water and Wastewater Association (SWWA), Stockholm Water, SYVAB, the Käppala Association, Stockholm Cleantech, VA-kluster Mälardalen, Mercatus and Cerlic, alongside IVL and KTH.

A high proportion of the activities at Hammarby Sjöstadsværk centre on the Vinnova-funded project "The municipal water treatment of tomorrow – a production facility with multiple benefits". The project also incorporates a four-year research project, conducted by IVL in conjunction with Xylem and the Swedish Association of Graduate Engineers, which is valued at around SEK 47 million.

With KTH, the University of Uppsala, the Swedish University of Agricultural Sciences (SLU) and Mälardalen University College, Hammarby Sjöstadsværk forms part of VA-kluster Mälardalen, a centre for municipal water purification funded by the Swedish Water and Wastewater Association and municipal water treatment plants in the Mälardal region.

### Other partnerships and important networks

Part of IVL's role is to serve as a bridge between research and the business sector and to create arenas for cooperation between various stakeholders in society. This is one of the reasons why IVL leads or actively participates in different types of network and other partnerships, some of which are highlighted above. Others include:

- **ENERO** – the European Network of Environmental Research Organisations – is an association of European research institutes within the European Research Area (ERA). IVL is an active member.
- **EurAqua** – the European Network of Freshwater Research Organizations. IVL is Sweden's representative in the network.

## Group companies

### BASTAONLINE AB

Bastaonline AB (CIN 556719-5697) has been a subsidiary of IVL since 2007, with 60 per cent of its shares being owned by IVL. The remaining 40 per cent of the shares are held by the Swedish Construction Federation. Bastaonline AB has its

- **NORMAN** is a network of reference laboratories and research organizations that focuses on the screening of new, environmentally hazardous chemicals. NORMAN was set up in 2005 with support from the EU's 6th Framework Programme and is today a permanent network funded by its membership. IVL has been a "founding member" since 2009.
- **NTM, the Network for Transport Measures.** IVL is a member of the network and has also engaged in formal collaboration with NTM since 2009. The aim is to strengthen the NTM network by placing IVL's expertise at the disposal of NTM's working groups and members
- **SMED** – the Swedish Environmental Emissions Database – is a consortium formed in 2001 by IVL, Statistics Sweden (SCB), the Swedish Meteorological and Hydrological Institute (SMHI) and the Swedish University of Agricultural Sciences (SLU) to bring together and develop long-term Swedish expertise in emission statistics relating to action programmes in air and water pollution, waste management and hazardous substances and chemicals. Since 2006, SMED has delivered all the material required for Sweden's international reporting in these areas. A new framework agreement applies from 1 January 2015 to 2022.
- **Stockholm Cleantech**, a development of the Stockholm Environmental Technology Centre, was established and is administered by IVL. Stockholm Cleantech links visitors, stakeholders, projects, technology, businesses and research in environmental technology in the Stockholm/Mälardal region.
- **The Sweden Green Building Council (SGBC)** is a non-profit organization open to all businesses and organizations in the Swedish construction and property sector that are engaged in developing and influencing work on the environment and sustainability in the industry. SGBC was established by IVL in association with Skanska, NCC, the Swedish Property Federation and Akademiska Hus.

registered office in Stockholm and operates from IVL's headquarters. The company manages and develops the BASTA system for assessing and phasing out particularly hazardous substances in building materials. The number of suppliers who are members of the system rose from 58 at the start of



2014 to 345 at year-end. At that time, 22,000 products – representing more than 90,000 individual items – were registered.

In September 2014, Susanne Wetterlin took over as new CEO at Basta, succeeding Per Löfgren. During the year, four company-specific training courses were carried out, and in March the highly popular seminar *The Road to Non-Toxic Building* was again held in association with IVL.

The strategic partnership with Skanska, the Swedish Transport Administration and IVL concerning the *Build with Basta* development project progressed, for example in the form of a supplier meeting where the findings from one of the sub-projects were presented. Work on BASTA Qualify, a tool to simplify assessment and registration, continues and an initial version was tested towards year-end.

In 2014, collaboration was established with Produktkollen AB, an unrelated company, in order to be able to offer a full-service project tool and a digital logging function.

Net turnover during the financial year rose 7 per cent to SEK 5,102 thousand (4,786) and a profit of SEK 503 thousand (429) was reported.

#### EPD INTERNATIONAL AB

On 1 July 2014, IVL acquired the rights to administer the international EPD system from the Environmental Governance Council, which was then abolished following a government decision. The EPD system is an information system that objectively describes the environmental impact of products and services, in the form of environmental product declarations (EPDs). Operations are conducted in the form of an IVL subsidiary, *EPD International AB*.

EPD International AB (CIN 556975-8286), a wholly owned subsidiary of IVL, has its registered office in Stockholm and operates from IVL's headquarters. The company runs and administers the EPD system, a programme that verifies and

registers environmental product declarations (EPDs). The functions include providing information about the system, administering the work of an international technical committee, registering approved environmental and climate declarations and maintaining a register of such declarations.

In all, more than 500 EPDs have been registered and in 2014, 115 new EPDs were registered from companies in 15 different countries, a 20 per cent increase from the preceding year. Up-to-date product category rules (PCRs) for 78 product categories were published at [www.environdec.com](http://www.environdec.com).

Net turnover during the financial year totalled SEK 1,575 thousand and a profit of SEK 133 thousand after financial items was reported.

#### SINO-SWEDISH ENVIRONMENTAL TECHNOLOGY DEVELOPMENT CENTER LTD (SEC)

For more than ten years, IVL and TAES (the Tianjin Academy of Environmental Sciences), have operated the jointly owned company SEC (Sino-Swedish Environmental Technology Development Center Ltd) company, based in Tianjin. Via SEC, a large number of Swedish environmental companies have received assistance in entering the Chinese market

#### IVL ENVIRONMENTAL TECHNOLOGIES (BEIJING) COMPANY LTD

In 2014, IVL established a wholly owned subsidiary in China, partly in order to make it possible for IVL to tender for Chinese projects, but also to provide a way of transferring funds between the companies. During 2014, two Swedish companies built reference installations in China with the help of IVL. Net turnover for the financial year of May to December totalled SEK 174 thousand, with a net deficit of SEK -183 thousand, through the impact of high start-up costs between December 2013 and April 2014.

The Group's total assets declined to SEK 172,754 thousand (182,359) while equity increased to SEK 79,865 thousand (70,519). Cash flow was negative, at SEK -23,933 thousand (40,579).

Investments during the year in property, plant and equipment and intangible assets totalled SEK 7,074 thousand (10,789). The equity ratio was higher, at 46.2 per cent (38.7). For a more detailed multi-year review and definitions of key ratios, see Note 2.

#### PARENT COMPANY

IVL's net turnover during the financial year rose 4 per cent (3) to SEK 263,272 thousand (254,148) and a profit of SEK 11,972 thousand (11,205) after financial items was reported. The net profit after income taxes totalled SEK 6,300 thousand (6,678).

Total assets amounted to SEK 167,070 thousand (178,084) and equity to SEK 53,939 thousand (47,640). Adjusted equity is calculated at SEK 63,584 (54,800). Cash flow during the year was negative, at SEK -25,299 thousand (15,470). A substantial advance of SEK 22.5 million at year-end 2013 from an EU project for which IVL acts as coordinator accounts for a large part of both the positive cash flow for 2013 and the

negative flow for 2014, as advances to partners were paid in early 2014. The project, which began on 1 January 2014, is IVL's biggest EU project to date, with a budget of EUR 7.7 million. IVL's share is EUR 1.8 million.

Return on adjusted equity was 15.8 per cent (17.4) and the return on total capital 7.0 percent (6.9). The average return on equity over the past five years is 11.1 per cent.

Investments during the year in property, plant and equipment and intangible assets totalled SEK 6,736 thousand (7,264). The equity ratio rose to 38.1 per cent (30.8). For a more detailed multi-year review and definitions of key ratios, see Note 2.

## Organization and corporate Governance

#### OWNERSHIP

IVL has since 2004 been wholly owned by the Swedish Institute of Water and Air Conservation Research Foundation (SIVL), CIN 802006-2611, registered office in Stockholm.

The purpose of the Foundation is to develop long-term conditions for environmental research and, through ownership, to guarantee its independent status.

SIVL is governed by a representative board of directors, of whom the chair and six members are appointed by the Swedish government and seven members by the Swedish business community. SIVL is the sole owner of IVL and proposes members for IVL's Board of Directors, partly by inviting nominations from industry representatives, and partly by inviting nominations from the government.

#### THE WORK OF THE BOARD OF DIRECTORS

During the 2014 financial year, the Board held four ordinary meetings, in addition to a statutory meeting and a strategy meeting, which was held in September. The work of the Board consists primarily of the consideration of strategic issues, year-end accounts and major investments and acquisitions. The Board regularly receives reports on the performance of the Company's operations and finances. On the occasion of ordinary meetings, a presentation is made of one of the Company's operations. The CEO acts in a reporting capacity at the Board meetings.

The Board appoints from among its members a remuneration committee which presents proposals for remuneration and other terms and conditions of employment for the CEO and other members of the Company's executive management.

The remuneration committee shall comprise no less than two members, who are to serve for a term of two years.

#### GROUP MANAGEMENT

IVL's executive management consists of the CEO, an Executive Vice President, Chief Financial Officer (CFO) and Director of Research. The Company's management group also includes four heads of unit, along with the Director of Human Resources, Director of Communication and Director of Quality and Environmental Issues as co-opted members.

#### ORGANIZATION

IVL's operations are organized into four operational units, which are in turn divided into a number of groups with group managers tasked with managing personnel and capacity planning. Other units focus on business development and market and research, which operate laterally across the entire organization. With the aid of a research council, a long-term plan for IVL's research operations is updated on an ongoing basis. All units interact in a matrix organization covering six thematic areas: *Climate & Energy, Water & Soil, Air & Transport, Sustainable Building, Sustainable Production and Resource-Efficient Products & Waste*. At the same time, the thematic areas make up IVL's customer offering and reflect the remit of the "Theme Committees" with external stakeholder representation, established by the owner SIVL.

## Financial performance

#### GROUP

The Group's net turnover during the financial year rose 4 per cent (3) to SEK 264,488 thousand (255,353), with a profit of SEK 12,543 thousand (10,381) after financial items. The net profit after income taxes totalled SEK 9,207 thousand (8,176). Return on equity was 13.0 per cent (12.3) and the return on total capital 7.3 percent (5.7). The average return on equity over the past five years is 9.5 per cent.

## IT

IVL works actively on information security to guarantee that customers can rely on the information provided by the Company and that the information compiled is protected adequately. IT systems are an indispensable and entirely critical resource in the handling of digital material, data, communication and information. IT systems are used in accordance with current policies and IVL's Code of Conduct. IVL restricts access to data and software from unauthorized users via login routines. Backups are taken regularly to ensure that data can be restored with as little loss as possible. Certain

critical systems are designed to enable the business in some measure to continue in the event of a system crash, and also to provide support in crisis management for the Company. In addition to project managers and laboratory personnel, IT resources and personnel also feature in the implementation of a new laboratory system at IVL. Analytical procedures are gradually being phased into the new system. As a result, the period of implementation will extend over three-four years from the start in 2013.

## Environmental and quality management

IVL is engaged in environmental and quality issues within the scope of an integrated management system. The system and its implementation at IVL is ISO-certified for environmental and quality management in accordance with SS-EN ISO 14001 and SS-EN ISO 9001. The certifications are maintained annually and renewed periodically by accredited certification agencies.

The major part of operations comprising sampling, field measurements and analyses are accredited and audited regularly by SWEDAC in accordance with SS-EN ISO/IEC 17025:2005.

## QUALITY

IVL's work on quality focuses on customer relations and for that reason activities are regularly followed up to ensure that customers are satisfied with the Company's work. This is done in the form of telephone interviews with at least two customers per operational unit. The customers are representative of the business sector, municipalities and government agencies. In 2014, the Customer Satisfaction Index (CSI) ranking was 4.6 (4.0) on a scale of 1 to 5. In addition to several suggested improvements, the internal report on the interviews revealed a positive image of IVL as a professional and important partner and supplier. IVL's long-term focus on project manager training made a positive impression on customers.

## Significant events during the year and after year-end

## TAKEOVER OF EPD INTERNATIONAL

On 1 July 2014, IVL took over the operations of EPD International from the Environmental Governance Council, and incorporated them into IVL as a subsidiary. Two members of personnel who were affected by the transfer of operations joined IVL with EPD to assure continuity of operations.

## NEW OFFICE IN MALMÖ

In early December 2014, IVL opened its new office in Västra Hamnen, Malmö. Operations will in large part focus on sustainable urban development, an area in which IVL and the City of Malmö have long worked together. Jeanette Green, formerly technical specialist at NCC, was recruited to build up the organization.

## NEW MANAGERS RECRUITED

Susanne Wetterlin, of Akzo Nobel Casco Adhesives, was recruited as CEO of IVL subsidiary Basta Online AB and Mona Olsson Öberg became the new manager of the Natural Resources and Environmental Impact unit. She was previously serving as manager of the environmental consultants at the consultancy firm Pöry.

## FULL-SCALE SEPARATION OF PHARMACEUTICAL RESIDUES

Via funding from the Vinnova Challenge-Driven Innovation programme, IVL acquired the resources for full-scale trials of purification technologies at the wastewater treatment plant in Simrishamn, southern Sweden. All discharge water will be

treated using several technologies to remove pharmaceutical residues, while recovering phosphorus and other nutrients.

## NEW FINDINGS IN MEMBRANE FILTRATION TECHNOLOGY FROM HAMMARBY SJÖSTADSVERK

Following a successful trial at Hammarby Sjöstadsværk, Stockholm Water decided to expand its Henriksdal Wastewater Treatment Plant and invest in membrane technology. The facility, which is expected to treat 550,000 cubic metres of water per day, is scheduled to be in service in 2020. During 2014, IVL compared the performance of membrane technology compared with the conventional treatment technology used at Henriksdal.

## ADVISOR TO INDIA'S MINISTRY OF ENVIRONMENT

As part of a four-year Europe Aid project, IVL has been appointed environmental advisor to India's Ministry of Environment, Forests & Climate Change. IVL's role is to develop cooperation between the EU and India in environmental technology and to introduce smart solutions that can help India reduce its emissions.

## FOCUS ON LEADERSHIP AND QUALITY

The leadership training programme started in 2013 continued in 2014, but now with a sharper focus on business. In addition, a special project was initiated with the aim of improving the quality of the reports produced within IVL. The focus is on language quality, a more fit-for-purpose arrangement for the reports and more effective writing, in order to make it easier for readers of the reports to take on board the content quickly.

## Anticipated future developments and material risks and uncertainties

## LONG-TERM EXPANSION

IVL's long-term goals, adopted by the Board of Directors, include a specific target for expansion. The target set is a doubling of turnover by 2020 and represents annual growth of 10 per cent. Such growth is to be achieved both organically and via acquisitions, although without any compromise to the quality of research and consultancy work. The expansion is necessary if IVL is to be able to continue contributing to sustainable development in the business sector, as well as in the international market.

## THE MARKET

Europe, and in particular the Nordic region, is IVL's biggest market. Customers are served in a number of industries including the energy, public and industrial sectors, plus the construction and property sectors. As a result, the Company is dependent on stable growth in these areas if it is to achieve its targets and manage the risks arising from economic and structural change, as well as evolving market trends. At the same time, because IVL is active in multiple markets and in sectors and industries susceptible to different business cycles, this lessens the Company's vulnerability to short-term fluctuations. Systematic and periodic assessments of the IVL's

situation relative to external factors create a high degree of readiness to cope with change.

All in all, IVL has therefore been able to face faltering economic growth in Europe without suffering any significant setbacks. Now that the economic situation is slowly beginning to stabilize in several of the crisis-ridden countries of Europe, IVL is in a relatively strong position. It should be noted, however, that many large European research institutions, several of which are IVL partners, been forced to cut back on their activities due to economic constraints.

## COMPETITORS

IVL contends with both major international competitors and small local ones in every market. This poses a risk, as there is fierce competition for the most attractive projects and the most highly-skilled employees. Against this background, continuous assessment of these risks is vital.

To attract and retain highly skilled employees, the Company invests in continuous training, as well as in skills and leadership development. IVL can also offer large, complex international projects, which is attractive to prospective employees.

## FINANCIAL RISKS

By the nature of its business, IVL is exposed to financial risks, consisting of fluctuations in income and cash flow resulting from changes in exchange and interest rates, and credit risk. However, on the whole, the financial risks to the Company are relatively minor. Nevertheless, currency risks arising from fluctuations in anticipated and contracted payment flows in EU projects total EUR 7.3 million. A change of SEK 0.10 in the exchange rate for the SEK will impact income to the extent of SEK 1.0 million, taking project matching into account. The Company continually assesses the need for hedging of payment flows but during 2014 elected not to engage in hedging. During the year, exchange rate gains totalled SEK 1.1 million net.

The Company's credit risks comprise outstanding, not-yet invoiced consultancy projects. IVL's 30 largest customers,

accounting for approximately 75 per cent of turnover, consist exclusively of major international corporations, the European Commission and Swedish and foreign government institutions.

## SENSITIVITY ANALYSIS

IMPACT ON	CHANGE, % (ALL ELSE EQUAL)	IMPACT ON INCOME, SEK th.		
		2014	2013	2012
Chargeability ratio	1	3,130	2,959	2,739
Hourly rate	1	2,076	1,965	1,812
Payroll costs	1	1,399	1,314	1,227
Overheads	1	540	529	532
Number of full-year employees	1	850	844	809

# Research and development

## RESPECTIVE SHARES OF RESEARCH AND CONSULTANCY WORK IN THE BUSINESS

During the year, the shares of fees earned and expenditure incurred in IVL's research and consultancy activities accounted for 55 per cent (57) and 45 per cent (43), respectively. In this context, "research activities" refers to (i) research co-funded by central government and the business sector via SIVL, and (ii) activities that are grant-funded via central government research bodies, research foundations, the EU and the equivalent. Co-funded operations accounted for 22 per cent (24) of fees earned and expenditure incurred, while grant-funded operations represented 33 per cent (33) of the total.

IVL's research is an integral part of the Company's operations and an essential factor in IVL's ability to conduct a consultancy business with leading-edge expertise.

IVL's consultancy activities comprise not only short-term consultancies and analysis projects, but also more substantial research and development projects nationally and internationally.

### Consultancy

In addition to consultancy projects for industry, municipalities and other organizations, IVL also conducts major projects on behalf of the Swedish EPA, including responsibility

for data compiled within the national and regional environmental monitoring programme in air and precipitation chemistry, air quality in built-up regions and levels of environmental toxins and metals in biological materials. IVL also operates a screening database for environmental toxins and metals.

### Current EU projects

During the year, several projects were approved and started, with part-funding from various EU bodies, principally the EU's Seventh Framework Programme for Research and Technological Development, which terminated in 2014.

### EXAMPLES OF RESEARCH PROGRAMMES IN WHICH IVL IS PARTICIPATING AND WHICH WERE STARTED UP IN 2014:

- **Cityfied** – development of strategies for transforming cities with high energy requirements into smart cities.
- **R3 Water** – innovative solutions for municipal water treatment.
- **Optitreat** – environmental optimization of small/individual wastewater treatment facilities.
- **OSIRYS** – development and testing of new, eco-friendly construction materials.
- **Solutions** – development of models, tools and abatement strategies for chemicals, focusing on the EU Water Framework Directive.

At present, IVL is taking part – as coordinator or partner – in more than 30 EU projects.

### Other current research programmes

The Swedish Foundation for Strategic Environmental Research (MISTRA) funds the four-year *Mistra Indigo* programme led by IVL. The programme, which focuses on climate policy regulatory instruments, has a budget of SEK 25 million. IVL is one of the partners in the major MISTRA programme *Mistra Urban Futures*. IVL is also involved in a major research project within MISTRA's *Closing the Loop* programme, and was requested in 2014 to take part as expert advisor in the *Mistra Future Fashion* programme.

IVL is also heading research programmes funded by the Swedish EPA, including *SCAC, the Swedish Clean Air and Climate Research Program*.

AFA Insurance funds several research work environment projects at IVL. In 2014, a total of SEK 9.5 million was granted to a project to investigate slips and trips at work and another on nanoparticles.

## CO-FUNDED RESEARCH

SIVL is the owner of the Company and acts as principal in IVL's co-funded activities.

### IN 2014, RESEARCH WAS CONDUCTED IN SIX THEMATIC AREAS:

- Climate & Energy.
- Air & Transport.
- Water & Soil.
- Resource-Efficient Products & Waste.
- Sustainable Building.
- Sustainable Production.

# International

IVL's operations in China continue to expand. At year-end 2014, the Beijing office had six employees.

Collaboration with the Chinese research institute CRAES, one of the most prominent advisors to China's government, is continuing to develop in the environmental field. IVL and CREAS are working together on measurements of emissions into the air and are building a joint laboratory for air quality monitoring. IVL is collaborating with the University of Gothenburg, the Chalmers University of Technology and a Chinese research institute on research into photochemical smog in Beijing and Hong Kong.

Operations are evaluated annually by having two thematic areas reviewed by an external evaluation team. The 2014 evaluation focused on Sustainable Building and Sustainable Production. The purpose of these reviews is to ensure that IVL's research maintains high quality and is relevant. The evaluations also examine how findings are communicated. During 2014, SIVL had a total of SEK 37 million (37) for co-funded research via government appropriations of SEK 17 million (17) to the EPA and SEK 20 million (20) to Formas. The aggregate volume – SEK 86.4 million – for co-funded research is made up of that amount, plus SEK 23.5 million (25.2) from industry and SEK 25.9 million (16.6) from the EU. Formas supports in-depth scientific research via an extra funding facility (>50 per cent) for scientific publishing. In addition to the finance for co-funded research, SEK 5 million was received in 2014 for core funding of operations.

In 2015, SIVL will have SEK 42 million at its disposal for co-funded research, of which SEK 5 million will be available for core funding.

### Examples of co-funded research

Examples of co-funded research projects approved and/or commenced in 2014 within the respective thematic areas:

- **Climate & Energy** – *Evaluation of Energy Systems in Buildings*.
- **Air & Transport** – *In-Depth Study of "Real World Emissions" from Buses*.
- **Resource-Efficient Products & Waste** – *Knowledge Base for Increased Pre-Sorting of Plastic Packaging*.
- **Sustainable Building** – *Testing of New Building Materials*.
- **Sustainable Production** – *Consequences of an Ozone-Oxidation Stage in Municipal Water Purification*.
- **Water & Soil** – *Optimizing the Benefits of Fatty Fish*.

Two projects funded by EuropeAid were conducted in 2014; one to assist in the development of a sustainable water treatment system in the coastal cities in the run-off region of the Hai-He River, and the other to open up public access to legal examination of environmental offences in Guizhou Province.

During the year, IVL also studied the water situation in the PanDa Reservoir and presented suggestions for improvements based on Swedish technology. In association with Scania and Malmbergs, IVL produced a system for Tianjin City to introduce facilities for biogas production from sludge, to upgrade to CNG for transport and to introduce biogas-driven buses.

## Environmental impact

The Company's operations are not subject to licensing under the Swedish Environmental Code. On the other hand, IVL is licensed to handle asbestos subject to regulations from the Swedish Work Environment Authority. Because neither of the two laboratories in Stockholm and Gothenburg occupies more than 5,000 square metres, the notification requirement under Sweden's environmental inspection regulations does not apply.

Advice to customers, travel and energy use have been identified as the Company's most significant environmental effects. It is therefore considered important to evaluate the environmental impact that may result from IVL's advice to customers; IVL's sustainability assessment following project completion produces a positive index rating, providing that IVL's advice is followed.

## Personnel

### STRUCTURE AND PERSONNEL TURNOVER

The number of employees during the financial year averaged 224 (215), of whom 50 per cent (49) were men and 50 per cent (51) women. The operating units are divided into teams with appointed team managers. Of the total of eight unit managers in 2014, half were women and half men. IVL has 19 team managers, of whom ten are women and nine men.

During the year, 13 (6) permanent employees left the Company to take up other positions. New recruitment totalled 17 employees (21).

### EQUAL OPPORTUNITY AND EQUAL TREATMENT

In 2014, IVL updated its overall policy and its plan for equal opportunity and equal treatment. The plan was developed by a representative group. Executives, managers and personnel are all to strive to ensure that a diversity perspective and equal treatment characterize IVL's activities and corporate culture and thus help promote IVL's credibility as an advisor on sustainability issues.

### CHARGEABILITY RATIO

During the period, the chargeability ratio was 66.3 per cent (66.4). The chargeability ratio is defined as the proportion of attendance time that is charged to the customer. The remaining – in-house – time is made up of time spent on marketing, training, technical maintenance, management and administration.

To encourage travel-free meetings, IVL has invested in video-conferencing equipment in most conference rooms. In 2014, the environmental impact of domestic rail and air travel was 6.5 per cent lower than in 2013. Spread over the total number of employees, the impact fell by 10.2 per cent. However, in view of the international nature of the Company's operations, air travel is unavoidable. Nevertheless, the overall environmental impact in 2014 was 12.2 per cent lower than in 2013. Calculated as grams of carbon dioxide per kilometre, the environmental impact has steadily decreased. However, over the six-year period of 2009-2014, it stabilized at an average of 121 g/km. Older aircraft models have been phased out. At the same time, the flight index calculated as grams of CO<sub>2</sub> per SEK earned fell by 4.6 per cent.

### ABSENCES AND HOLIDAYS

During the year, total absences including holidays accounted for 25.4 per cent (25.8) of working hours. Sick leave represented 2.61 per cent (3.6) and holiday time taken accounted for 8.5 per cent (8.3). Leave of absence totalled 12.0 per cent (11.5), including 9.1 per cent (7.6) parental leave. Working hours are defined as the number of hours worked, including holidays and overtime worked, less absence owing to illness, child's illness, holiday, parental leave or other leave of absence and compensatory leave taken. The same calculation method is used for the figures on the average number of salaried full-year position quoted in Note 7 Personnel expenses.

### SKILLS DEVELOPMENT

An ambition of IVL is to provide its employees with at least two days of skills development a year and to follow up such activities continuously. In 2014, the average time spent on skills development was three days/employee.

The Company's project management programme is conducted by IVL's project department. The programme provided training to, in all, 62 members of personnel on ten occasions in 2014, including two at IVL China in Beijing. Practically all work at IVL takes place in project form, and training is designed to further professionalize project management. Over the year, the project management programme was extended by one training day, in which IVL, in association with the Company's external management consultant,

delivered training in leadership within project management. The project department also conducted five training courses in the Company's CRM system and three courses in MPI.

IVL's leadership programme, which was launched in 2013, continued in the form of development and coaching of IVL's management group, teams and managers. This programme, which involves all managers, builds on IVL's critical success factors for leadership and newly-recruited managers, started its individual leadership programme during the year with the same partner.

### ATTRACTIVE WORKPLACE

The Company has an in-house project team entitled Attractive Workplace. The team is made up of employees from all parts of the organization, plus trade union representatives. During the year, the project team's tasks included developing an updated induction process and a routine to address in-house well-being issues. The team also arranged a lunch seminar on a motivational theme.

In 2014, an employee survey was conducted, including follow-up questions. The regular employee survey is conducted every two years, along with smaller follow-up surveys including follow-up questions in between. The 2014 employee survey indicated improved results for each of the questions. The teams are continuing to follow up the results at team level and on the basis of their own results are developing activities to maintain or improve their workplace.

### WORK ENVIRONMENT

IVL's systematic focus on the work environment is conducted via delegated responsibilities and annual work environment plans approved by the Company's management group. The work environment plan is based on safety inspections carried out twice yearly at the company's facilities. Ergonomic safety inspections are also conducted annually in the presence of an ergonomist from the Company health service. The Company's work environment committees, one for Gothenburg and Lysekil and one for Stockholm and Malmö, meet quarterly. In 2014, a rehabilitation process was also developed in consultation with the safety officers.

## OTHER PERSONNEL INFORMATION

### PERSONNEL TURNOVER, %

	2014	2013
Number of employees terminating employment, as proportion of average number of employees during year	7.6	6.0
– excluding pension	7.6	4.7

### LENGTH OF SERVICE, %

AGE	2014	2013
20–29	10	8
30–39	36	36
40–49	28	27
50–59	16	18
60–69	10	10

Average age – 42 years (42).

### FINANCIAL KEY INDICATORS/EMPLOYEE, SEK th.

	2014	2013
Turnover, excluding expenses	1,010	1,002
Payroll costs	625	611
Income after financial items	53	52

### LENGTH OF SERVICE, %

LENGTH OF SERVICE, YEARS	2014	2013
< 2	18	25
2–10	52	58
> 10	30	17

Average length of service – 10 years (10).

### TRAINING, %

	2014	2013
PhD-qualified	27	29
Other postgraduate qualification	0	1
M.Sc. Engineering	39	34
Other graduate qualification	32	30
Upper secondary school qualification	1	6

# Proposed Appropriation of Profit

AVAILABLE FOR DISTRIBUTION BY THE ANNUAL GENERAL MEETING (SEK):

Retained earnings	39,239,544
Net profit for the year	6,298,654
<b>Total</b>	<b>45,538,198</b>

THE BOARD OF DIRECTORS AND THE CHIEF EXECUTIVE OFFICER PROPOSE THAT THE PROFIT BE DISTRIBUTED THUS:

To be carried forward	45,538,198
<b>Total</b>	<b>45,538,198</b>

For more information on the Company's and the Group's results for the financial year and its financial position on 31 December 2014, see the following Income Statements, Balance Sheets, Statements of Cash Flows and Notes to the Financial Statements.

# Income Statements

SEK th.		GROUP		PARENT COMPANY	
		2014	2013	2014	2013
<b>OPERATING INCOME</b>					
Net turnover	Note 3	264,488	255,353	263,272	254,148
Change in work in progress	Note 4	-22,794	-20,684	-23,095	-19,595
Other operating income		214	918	214	918
		<b>241,908</b>	<b>235,587</b>	<b>240,391</b>	<b>235,471</b>
<b>OPERATING EXPENSES</b>					
Project expenses		-33,207	-35,652	-33,207	-35,652
Other external expenses	Note 6	-49,284	-49,627	-48,863	-48,809
Personnel costs	Note 7	-144,402	-136,004	-143,878	-135,863
Depreciation of intangible and non-current assets	Note 8	-4,130	-4,595	-4,118	-4,592
		<b>-231,023</b>	<b>-225,878</b>	<b>-230,066</b>	<b>-224,916</b>
		<b>10,885</b>	<b>9,709</b>	<b>10,325</b>	<b>10,555</b>
<b>OPERATING PROFIT/LOSS</b>					
<b>NET FINANCIAL ITEMS</b>					
Interest income	Note 9	1,793	751	1,773	728
Interest expense	Note 9	-135	-79	-126	-78
		<b>12,543</b>	<b>10,381</b>	<b>11,972</b>	<b>11,205</b>
<b>PROFIT/LOSS AFTER FINANCIAL ITEMS</b>					
Appropriations	Note 10			-3,186	-2,735
Income taxes on profit for year	Note 11	-3,336	-2,205	-2,486	-1,792
<b>Net profit/loss for year</b>		<b>9,207</b>	<b>8,176</b>	<b>6,299</b>	<b>6,678</b>

# Balance Sheets

SEK th.	GROUP	
	2014	2013
<b>ASSETS</b>		
NON-CURRENT ASSETS		
Intangible non-current assets	Note 12	
Capitalized software development costs		4,712
Goodwill		149
Tangible non-current assets	Note 13	
Machinery and equipment		18,084
Financial non-current assets	Note 14	
Other long-term securities		5
<b>Total non-current assets</b>		<b>22,950</b>
CURRENT ASSETS		
Current receivables		
Accounts receivable		52,370
Receivables from Group companies		9,086
Income taxes recoverable		2,439
Other receivables		951
Income earned but not invoiced	Note 5	4,972
Prepaid expenses	Note 15	5,490
<b>Total current receivables</b>		<b>75,308</b>
<b>Short-term investments</b>	Note 22	<b>26,492</b>
<b>Cash and bank balances</b>		<b>48,004</b>
<b>Total current assets</b>		<b>149,804</b>
<b>TOTAL ASSETS</b>		<b>172,754</b>
Equity	Note 16	
Share capital (7,000 shares)		7,000
Other equity, incl. net profit for the year		72,985
<b>TOTAL EQUITY</b>		<b>79,865</b>
Provisions	Note 18	7,143
Long-term liabilities		
Liabilities to credit institutions	Note 20	1,765
Current liabilities		
Liabilities to credit institutions	Note 20	2,176
Work in progress on behalf of others	Note 4	38,200
Accounts payable		16,810
Other liabilities		11,155
Income invoiced but not earned	Note 5	3,017
Accrued expenses	Note 19	12,623
<b>Total current liabilities</b>		<b>83,981</b>
<b>TOTAL EQUITY AND LIABILITIES</b>		<b>172,754</b>
MEMORANDUM ITEMS		
Pledged assets and contingent liabilities	Note 21	5,000

# Balance Sheets

SEK th.	PARENT COMPANY	
	2014	2013
<b>ASSETS</b>		
NON-CURRENT ASSETS		
Intangible non-current assets	Note 12	
Capitalized software development costs		4,232
Goodwill		149
Tangible non-current assets	Note 13	
Machinery and equipment		14,094
Financial non-current assets		
Group companies	Note 14	1,230
Other long-term securities	Note 14	5
<b>Total non-current assets</b>		<b>19,710</b>
CURRENT ASSETS		
Current receivables		
Accounts receivable		51,065
Receivables from Group companies		11,194
Income taxes recoverable		2,513
Other receivables		166
Prepaid expenses	Note 15	5,483
<b>Total current receivables</b>		<b>75,393</b>
<b>Short-term investments</b>	Note 22	<b>26,492</b>
<b>Cash and bank balances</b>		<b>45,475</b>
<b>Total current assets</b>		<b>147,360</b>
<b>TOTAL ASSETS</b>		<b>167,070</b>
EQUITY AND LIABILITIES		
Equity	Note 17	
Restricted equity		
Share capital (7,000 shares)		7,000
Statutory reserve		1,400
Total restricted equity		8,400
Unrestricted equity		
Retained earnings		39,240
Net profit for the year		6,299
<b>Total unrestricted equity</b>		<b>45,539</b>
<b>Total equity</b>		<b>53,939</b>
<b>Untaxed reserves</b>	Note 10	<b>12,366</b>
Current liabilities		
Work in progress on behalf of others	Note 4	58,028
Accounts payable		16,387
Other liabilities		11,142
Accrued expenses	Note 19	12,191
<b>Total current liabilities</b>		<b>100,765</b>
<b>TOTAL EQUITY AND LIABILITIES</b>		<b>167,070</b>
MEMORANDUM ITEMS		
Pledged assets and contingent liabilities	Note 21	5,000

# Statements of Cash Flows

SEK th. (DIRECT METHOD)	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
<b>OPERATING ACTIVITIES</b>				
Profit/loss after financial items	12,543	10,381	11,972	11,205
Adjustment for non-cash items	4,190	5,630	3,063	6,425
Income taxes paid	-2,425	-1,456	-1,897	-1,997
<b>Cash flow from operating activities before changes in working capital</b>	<b>14,308</b>	<b>14,555</b>	<b>13,138</b>	<b>15,633</b>
<b>CASH FLOW FROM CHANGES IN WORKING CAPITAL</b>				
Increase/decrease in receivables	-9,624	14,881	-9,626	14,754
Decrease/increase in accounts payables	-115	4,732	-500	4,805
Increase/decrease in other liabilities	1,742	-489	1,933	-2,928
Decrease/increase in advance payments for work in progress	-22,324	16,563	22,023	15,477
<b>Cash flow from operating activities</b>	<b>-16,013</b>	<b>50,242</b>	<b>-17,078</b>	<b>47,741</b>
<b>INVESTING ACTIVITIES</b>				
Acquisition of intangible non-current assets	-1,786	-1,177	-1,306	-1,177
Acquisition of tangible non-current assets	-5,293	-9,612	-4,846	-6,087
Acquisition of financial non-current assets	5	-	-584	-
Acquisition of short-term investments	-1,485	-25,007	-1,485	-25,007
<b>Cash flow from investing activities</b>	<b>-8,559</b>	<b>-35,796</b>	<b>-8,221</b>	<b>-32,271</b>
<b>FINANCING ACTIVITIES</b>				
<b>Cash flow from financing activities</b>	<b>639</b>	<b>1,126</b>	<b>-</b>	<b>-</b>
<b>Cash flow for the year</b>	<b>-23,933</b>	<b>15,572</b>	<b>-25,299</b>	<b>15,470</b>
<b>Opening cash and bank balances</b>	<b>71,805</b>	<b>56,290</b>	<b>70,775</b>	<b>55,303</b>
<b>Exchange rate differences in cash and cash equivalents</b>	<b>132</b>	<b>-57</b>	<b>-1</b>	<b>2</b>
<b>Cash in hand and on deposit at year-end</b>	<b>48,004</b>	<b>71,805</b>	<b>45,475</b>	<b>70,775</b>

# Notes

to the financial statements and accounting principles

## NOTE 1 ACCOUNTING PRINCIPLES

### 1.1 Compliance with standards and legislation

The consolidated accounts have been prepared in accordance with BFNAR 2012:1 *Annual Report and Consolidated Accounts (K3)*. The Company opted for voluntary application of K3 for 2013 in order to facilitate the regulatory transition to K3 in 2014.

In cases where guidance is not available from the K3 regulation, it has been obtained from the Swedish Annual Accounts Act (1995:1554).

The Parent Company applies the same accounting policies as the Group, other than is indicated below in the section "Parent Company's accounting policies". Divergences between the Parent Company's and the Group's policies arise from limitations in the applicability of K3 to the Parent Company through the requirements of the Annual Accounts Act and, in some cases, tax considerations.

### 1.2 Basis of preparation of the financial statements of the Parent Company and the Group

The Parent Company's functional currency is the Swedish krona (SEK), which is also the reporting currency for the Parent Company and the Group. The financial statements are therefore presented in SEK. Assets and liabilities are recognized at historical cost, with the exception of certain financial assets and liabilities that are measured at fair value.

The preparation of financial statements under K3 requires the Company management to make judgements, estimates and assumptions that affect application of the accounting principles and the amounts reported for assets, liabilities, income and expenses. The estimates and assumptions are based on historical experience and a number of other factors that in the prevailing circumstances are judged to be reasonable. The results of these estimates and assumptions are then used to assess the carrying amounts for assets and liabilities that are not otherwise revealed clearly from other sources. The actual outcome may differ from these estimates and judgements. Typically, these estimates and assumptions are made during preparation of the year-end and mid-year accounts. As a result of changes at the Company or in its business environment, it may become necessary to revise these estimates and assumptions.

### 1.3 Changes in accounting principles and disclosure requirements

In 2014, no new accounting policies with any impact on the Group entered into force. The regulations state that the K3 regime is to be implemented as of the 2014 financial year. For 2014, short-term investments are accounted for separately from cash and cash equivalents and the figures for the comparison year have been amended accordingly. Short-term investments are measured at fair value on the balance sheet date.

### 1.4 Classification etc.

Non-current assets and financial liabilities of the Parent Company and the Group consist essentially only of amounts expected to be recovered or paid after more than twelve months from the balance sheet date. Current assets and current liabilities of the Parent Company and the Group consist essentially only of amounts expected to be recovered or paid within twelve months from the balance sheet date.

### 1.5 Principles of consolidation

Subsidiaries are entities over which IVL exercises a controlling influence. A controlling influence consists of a right, directly or indirectly, to control the financial and operational strategies of another company in order to gain economic benefits. In establishing whether a controlling influence exists, account shall be taken of shares with potential voting rights that may be used or converted without delay.

Subsidiaries are accounted for using the proportional method. Under this method, as large a proportion as possible of the owned company's income and expenses, and of its assets and liabilities, are recognized in the consolidated financial statements.

The reason for choosing this principle of consolidation is that IVL was involved in the original establishment of Group companies and did not acquire them at a surplus or deficit value.

Intra-Group receivables and liabilities, income and expenses and unrealized gains or losses arising from transactions between Group companies are eliminated in their entirety during preparation of the consolidated financial statements.

## 1.6 Foreign currencies

Foreign currency transactions are translated to the functional currency at the exchange rate prevailing on the transaction date. Monetary assets and liabilities in foreign currencies are translated to the functional currency at the exchange rate prevailing on the balance sheet date.

Exchange rate differences arising on translation are recognized in the income statement. Non-monetary assets and liabilities recognized at historical cost are translated at the exchange rate on the transaction date. Non-monetary assets and liabilities recognized at fair value are translated to the functional currency at the rate prevailing at the time of measurement at fair value; any exchange rate difference is then recognized in the same way as for other changes in value for the asset or liability. The functional currency is the currency of the countries in which the companies included in the Group conduct their operations. The functional and reporting currency of the Parent Company is the Swedish krona. The reporting currency of the Group is the Swedish krona.

Assets and liabilities of foreign operations are translated to Swedish kronor at the exchange rate prevailing on the balance sheet date. Income and expenses in foreign operations are translated to Swedish kronor at an average rate that is an approximation of the rates at the times of the respective transactions. Any translation differences arising during translation of foreign net investments are recognized in other comprehensive income.

## 1.7 Income

The percentage of completion method is used for all projects where the outcome can be calculated reliably. Projects are conducted on an open account basis, in which income is recognized as the work is performed and normally invoiced to the customer the following month. In cases where a fixed price is agreed, the income is recognized in the income statement, based on the percentage of completion on the balance sheet date. The percentage of completion for a project is determined by comparing expense incurred on the balance sheet date with the estimated total expense. If it is probable that the total expense for the project will exceed the total income from the project, the anticipated loss is immediately recognized in its entirety as a cost. Income is not recognized if it appears probable that the economic benefits will not accrue to the Group. If major uncertainty is attached to a payment or associated costs, no income is recognized.

In grant-funded projects in which IVL functions as a contractual partner with the research funder and allocates project funding to other participant in the projects, such funds are not recognized as income but accounted for directly under the heading of work in progress on behalf of others. As a result, the invoicing and costs of expenses are deducted from the funds received, which are then paid out to other project partners.

## 1.8 Operating expenses and financial income and expense

The Parent Company's costs under operating leases are recognized in the income statement on a straight-line basis over the term of the lease. Benefits obtained in connection with the sign-

ing of a lease are recognized in the income statement as part of the total leasing cost. Variable charges are recognized as expense in the periods in which they are incurred.

Minimum lease fees under finance leases in the Group are allocated between interest expense and amortization of the outstanding liability. Interest expense is distributed over the term of the lease so that each accounting period is charged with an amount corresponding to a fixed interest rate for the liability recognized in each period. Variable fees are recognized as expense in the periods they are incurred.

Financial income and expense consist of interest income from bank deposits and receivables and interest expense to suppliers.

## 1.9 Receivables and liabilities

Accounts receivable are recognized in the amounts expected to be received, that is, after deduction of bad debts, which are assessed on a case-by-case basis. Impairments of accounts receivable are recognized under the heading of operating expenses. Other receivables are classified as long-term receivables if outstanding for more than a year and as other receivables if the period is less than that. Cash and cash equivalents consist of cash and demand deposit accounts with banks and similar institutions.

Loans and other financial liabilities, including accounts payable, are measured at accumulated acquisition cost. Accounts payable have a short expected term and are measured undiscounted at the nominal amount. Long-term liabilities have an expected term of more than a year, while current liabilities have a term of less than a year.

## 1.10 Tangible non-current assets

### 1.10.1 OWNED ASSETS

Tangible non-current assets are recognized as assets on the balance sheet if it is probable that future economic benefits will accrue to the Company and that the acquisition cost for the asset may be calculated reliably. Tangible non-current assets are recognized in the Group at acquisition cost after deduction of accumulated depreciation and any impairment losses. Acquisition cost includes the purchase price and costs direct attributable to bringing the asset on to site and into a condition such that it is fit for use in accordance with the intention of the acquisition.

The carrying amount for a property, plant and equipment item is removed from the balance sheet upon scrapping or disposal or when no future economic benefits are expected from the use or the scrapping or disposal of the asset. Any gain or loss arising from disposal or scrapping of an asset is determined as the difference between the selling price and the carrying amount of the asset, less direct costs of sale. Any gain or loss arising is recognized as operating income/expense.

### 1.10.2 LEASED ASSETS

In the consolidated financial statements, leases are classified as either finance or operating leases. A finance lease exists when the economic risks and benefits associated with ownership are substantially transferred to the lessee; where this is not the case,

the lease is an operating lease. Assets leased under finance leases are recognized as assets on the consolidated balance sheet. The obligation to pay future lease fees is recognized under non-current and current liabilities. The leased assets are depreciated according to plan, while the lease fees are recognized as interest and amortization of the liabilities. Under operating leases, the lease fee is recognized as an expense on a straight-line basis over the term of the lease.

## 1.11 Intangible assets

### 1.11.1 GOODWILL

Goodwill is defined as the difference between the acquisition cost of operating acquisitions and the fair value of assets acquired, liabilities assumed and contingent liabilities.

Goodwill is allocated to cash-generating units and groups of cash-generating units and is tested annually for impairments. Goodwill is thus measured as acquisition cost less any accumulated impairments.

### 1.11.2 CAPITALIZED SOFTWARE DEVELOPMENT COSTS

Other intangible assets acquired by the Group are recognized at acquisition cost, less accumulated amortization. Subsequent expenditure on capitalized intangible assets is recognized on the balance sheet only when this results in an increase in future economic benefits associated with the specific asset to which it relates. All other expenses are recognized as costs as incurred.

## 1.12 Impairment of assets and testing for impairments

The carrying amounts for the Group's assets are tested for impairment on every balance sheet date to determine whether there is any indication of impairment. If any such indication is found, the recovery value for the asset is calculated. Any impairment loss is charged to the income statement.

The recoverable amount is the fair value, less costs of sale, and value in use, whichever is the higher. In calculating the value in use, future cash flows are discounted by a discount factor that takes into account the risk-free interest rate and the risk associated with the specific asset. The recoverable value of goodwill and other non-current assets with indeterminable useful lives and intangible assets not yet ready for use is calculated annually.

At each reporting date, the Company assesses whether any objective evidence exists to indicate impairment of any financial assets or group of assets. Objective evidence includes (i) observable events that have occurred and that adversely affect the possibility of recovering the acquisition cost, and (ii) a significant or prolonged decline in the fair value of an investment in a financial investment classified as a financial asset available for sale.

## 1.13 Employee benefits

Obligations relating to defined-contribution pension plans are recognized as an expense in the income statement as they arise. IVL does not operate any defined-benefit pension plans.

Provisions in connection with terminations of employment are recognized only if the Company is demonstrably obligated to terminate employment before the normal date, or when compensation is offered as an incentive to voluntary departure. In the event that the Company is obligated to terminate employment, actions shall include a detailed plan stating, at least, details of workplace, positions affected and the approximate number of employees, together with compensation amounts for each personnel category or position and the time for implementation of the plan.

## 1.14 Provisions

Provisions are recognized in the balance sheet when the Group has an existing obligation (legal or constructive) arising from an event that has occurred and when it is probable that an outflow of financial resources will be required in order to discharge such an obligation, and when the amount can be estimated reliably.

## 1.15 Income taxes

Income taxes consist of current and deferred tax. Income taxes are recognized in the income statement.

Current tax is tax that is to be paid or recovered for the current year, based on the tax rates enacted or in substantively enacted on the balance sheet date, including adjustment of current tax attributable to earlier periods. Deferred tax is calculated using the balance sheet method, which focuses on temporary differences between the carrying amount of an asset or a liability and its taxable amount. Measurement of deferred tax is based on how the underlying assets or liabilities are expected to be capitalized or settled.

Deferred tax is based on the tax rates enacted or in practice substantively enacted on the balance sheet date.

## 1.16 Parent Company's accounting policies

The Parent Company's accounts have been prepared in accordance with BFNAR 2012:1 Annual Report and Consolidated Accounts (K3) and the Swedish Annual Accounts Act (1995:1554).

### DIFFERENCES BETWEEN THE ACCOUNTING POLICIES OF THE GROUP AND THE PARENT COMPANY:

In the Parent Company, participations in subsidiaries and associated companies are recognized using the cost method. Dividends received are recognized as income. In the Parent Company, all leases are accounted for in accordance with the rules on operating leases. In the Parent Company, untaxed reserves are recognized including deferred tax liability. In the consolidated financial statements, on the other hand, untaxed reserves are divided into income tax liability and equity.



NOTE  
2

## SUMMARY OF FINANCIAL POSITION AND KEY RATIOS

SEK th.	GROUP					PARENT COMPANY				
	2014	2013	2012	2011	2010	2014	2013	2012	2011	2010
<b>TURNOVER AND PROFIT/LOSS</b>										
Net turnover	264,488	255,353	247,827	239,924	193,986	263,272	254,200	247,139	239,014	193,022
Operating profit/loss after depreciation	10,885	9,709	7,529	11,308	-3,322	10,325	10,555	7,874	5,527	-1,965
Operating profit/loss after net financial items	12,543	10,381	7,692	12,053	-3,322	11,972	11,205	8,009	6,270	-1,822
Profit margin, %	4.7	4.1	3.1	5.0	Neg.	4.5	4.4	3.2	2.6	Neg.
<b>CAPITAL STRUCTURE</b>										
Non-current assets	22,950	19,999	13,803	12,564	14,233	19,709	17,092	14,420	13,182	14,837
Current assets	149,804	162,360	137,396	128,116	111,329	147,360	160,992	136,322	127,074	110,247
Equity	79,865	70,519	61,171	55,889	45,527	53,939	47,640	40,962	36,696	30,642
Untaxed reserves						12,366	9,180	6,444	4,717	4,666
Current liabilities	83,981	104,369	82,883	78,000	73,857	100,765	121,264	103,336	98,843	88,892
Long-term liabilities	1,765	1,126								
Provisions	7,143	6,355	7,145	6,791	6,178	-	-	-	-	884
Total assets	172,754	182,359	155,199	140,680	125,562	167,070	178,084	150,744	140,256	125,084
Adjusted equity						63,584	54,800	45,711	40,172	34,081
Equity, mean value for year	75,192	65,845	58,530	50,708	47,803	59,192	50,226	42,292	37,127	35,828
Total capital, mean value for year	177,557	168,779	147,940	133,121	134,344	172,577	164,414	145,500	132,670	134,044
Equity ratio, %	46.2	38.7	39.4	39.7	36.3	38.1	30.8	30.3	28.6	27.2
Current ratio, mult.	1.78	1.56	1.66	1.64	1.51	1.46	1.33	1.32	1.29	1.24
<b>PROFITABILITY</b>										
Return on adjusted equity, %	13.0	12.3	9.7	17.5	Neg.	15.8	17.4	13.7	12.4	Neg.
Return on adjusted equity, 5-year mean, %	9.5	8.5	8.1	7.0	-	11.1	8.6	7.8	6.0	-
Return on total capital, %	7.3	5.7	5.5	9.1	Neg.	7.0	6.9	6.0	4.8	Neg.
<b>OTHER</b>										
Investments in non-current assets	7,074	10,789	6,215	3,145	3,296	6,736	7,264	6,208	3,145	3,296
Invoicing/employee, incl. expenses	1,157	1,177	1,239	1,290	1,090	1,175	1,182	1,242	1,299	1,097
Invoicing/employee, fees and analysis	996	992	1,049	1,097	969	1,010	1,002	1,051	1,104	974
Chargeability ratio, %	66.3	66.4	66.2	67.0	66.1	66.3	66.4	66.2	68.0	66.1
Full-year employees	228	217	198	186	178	224	215	197	184	176
Payroll costs per employee	616	606	614	608	613	625	611	617	614	618

**PROFIT MARGIN**

Profit/loss after net financial items, as % of net turnover

**RETURN ON TOTAL CAPITAL**

Profit after net financial items with interest expenses added back, as % of average balance sheet total.

**ADJUSTED EQUITY**

Equity plus untaxed reserves, less tax at standard rate of 22%.

**CHARGEABILITY RATIO**

Hours charged to customer, as % of total hours of attendance.

**EQUITY RATIO**

Adjusted equity, as % of balance sheet total.

**FULL-YEAR EMPLOYEES**

The number of employees during the year, expressed as full-year positions. The actual number of employees is higher, partly because the organization has part-time employees and partly because certain employees work during part of the year.

**RETURN ON EQUITY**

Profit after net financial items and after tax at a standard 22%, as % of total adjusted equity.

**CURRENT RATIO**

Current liabilities divided by current liabilities.

NOTE  
3

## NET TURNOVER

SEK th.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
Net turnover, by				
Invoiced fees and analysis	227,550	216,528	226,334	215,329
Invoiced expenses	36,938	38,825	36,938	38,825
<b>Total net turnover</b>	<b>264,488</b>	<b>255,353</b>	<b>263,272</b>	<b>254,154</b>

Of net turnover for the year, invoicing to other Group companies – comprising remuneration for co-funded research that the Company has conducted on a contract basis – accounted for 24.4 per cent (27.1). In addition, compensation was received from Group companies for personnel services performed.

NOTE  
4

## CHANGE IN WORK IN PROGRESS/WORK IN PROGRESS ON BEHALF OF OTHERS

SEK TH.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
Project costs	496,305	537,077	476,477	517,550
Advance invoicing	-534,505	-597,601	-534,505	-597,601
Book value	38,200	60,524	58,028	80,051
Change recognized in				
Income Statement	22,794	20,684	23,095	19,595
Balance Sheet	-470	-7,319	-1,072	-7,316
<b>Total change for year</b>	<b>22,324</b>	<b>13,365</b>	<b>22,023</b>	<b>12,279</b>

NOTE  
5INCOME EARNED BUT NOT INVOICED/  
INCOME INVOICED BUT NOT EARNED

SEK TH.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
Income earned but not invoiced				
Project costs	37,832	39,742	37,832	39,742
Advance invoicing	-32,860	-36,007	-32,860	-36,007
<b>Book value</b>	<b>4,972</b>	<b>3,735</b>	<b>4,972</b>	<b>3,735</b>
Income invoiced but not earned				
Project costs	23,454	17,713	23,454	17,713
Advance invoicing	-26,470	-20,911	-26,471	-20,911
<b>Book value</b>	<b>3,017</b>	<b>3,198</b>	<b>3,017</b>	<b>3,198</b>

NOTE  
6

## OTHER EXTERNAL EXPENSES

## Auditors' fees

SEK TH.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
R3 Revision KB				
Audit assignment	225	-	225	-
Rödl & Partner Nordic AB				
Audit assignment	22	226	22	226
Other auditing services	100	110	100	110
Other services	405	188	405	188
Other auditors				
Audit assignment	8	8	-	-
<b>Total</b>	<b>760</b>	<b>532</b>	<b>752</b>	<b>524</b>

## Lease costs

Lease fees for operating leases during 2014 totalled SEK 15,275 thousand (15,016). Lease fees include charges for leases on properties, company cars used by the Company's personnel, computers and some office equipment. The costs relating to future lease payments on these contracts are payable in the following years:

SEK th.	2015	2016	2017	2018	2019
Other lease fees	2,176	947	700	23	
Rent for office and other premises	13,253	13,452	13,653	13,858	14,066
<b>Total</b>	<b>15,429</b>	<b>14,399</b>	<b>14,353</b>	<b>13,881</b>	<b>14,066</b>

NOTE  
7

## PERSONNEL EXPENSES

## Group

SEK th.	2014		2013	
	Salaries and other remuneration	Social security expenses (including pension expenses)	Salaries and other remuneration	Social security expenses (including pension expenses)
Board of Directors and CEO	2,543	1,870 (863)	2,349	1,550 (669)
Other employees	92,592	43,884 (12,260)	87,087	40,977 (11,292)
<b>Total</b>	<b>98,135</b>	<b>45,755 (13,123)</b>	<b>89,436</b>	<b>42,527 (11,292)</b>

## AVERAGE NUMBER OF EMPLOYEES\* IN THE GROUP DURING THE YEAR:

GROUP	2014			2013		
	MEN	WOMEN	TOTAL	MEN	WOMEN	TOTAL
Stockholm	72	56	128	66	54	120
Gothenburg	35	51	86	35	50	85
Lysekil	1	2	3	1	2	3
Malmö	-	1	1	-	-	-
Beijing	3	4	7	4	3	7
Tianjin	2	1	3	1	1	2
<b>Total</b>	<b>113</b>	<b>115</b>	<b>228</b>	<b>108</b>	<b>110</b>	<b>217</b>

\*defined as number of salaried full-year employees.

## Parent Company

SEK th.	2014		2013	
	Salaries and other remuneration	Social security expenses (including pension expenses)	Salaries and other remuneration	Social security expenses (including pension expenses)
Board of Directors and CEO	2,476	1,850 (863)	2,285	1,550 (669)
Other employees	92,328	43,487 (12,260)	87,010	40,977 (11,292)
<b>Total</b>	<b>94,804</b>	<b>45,697 (13,123)</b>	<b>89,295</b>	<b>42,527 (11,292)</b>

## AVERAGE NUMBER OF EMPLOYEES\* IN THE PARENT COMPANY DURING THE YEAR:

PARENT COMPANY	2014			2013		
	MEN	WOMEN	TOTAL	MEN	WOMEN	TOTAL
Stockholm	72	56	128	66	54	120
Gothenburg	35	51	86	35	50	85
Lysekil	1	2	3	1	2	3
Malmö	-	1	1	-	-	-
Beijing	3	3	6	4	3	7
<b>Total</b>	<b>111</b>	<b>113</b>	<b>224</b>	<b>106</b>	<b>109</b>	<b>215</b>

\*defined as number of salaried full-year employees.

## Number of employees in Company's management group (of whom, in executive management):

	2014		2013	
	Men	Women	Men	Women
Men	5 (4)	7 (5)	5	6
Women	7 (0)	5 (0)	5	4

## Senior executives

## PARENT COMPANY

In accordance with a decision by the AGM, Board of Directors' fees totalling SEK 781 thousand (601), including social security expenses, were recognized as costs. Of this amount, SEK 88 thousand (54), excluding social security expenses, was paid to the Chair.

The period of notice for CEO of the Parent Company is 12 months and severance pay in an amount corresponding to 12 times the CEO's fixed monthly salary is due if employment is terminated by the Company. Should the CEO's role or areas of responsibility be altered as a result of material changes in the Company's operations or as a result of any change in the ownership structure affecting the majority of shares in issue, the CEO is entitled to terminate his/her employment by giving 6 months' notice and is entitled to receive severance pay corresponding to 18 times his/her fixed monthly salary. The CEO is entitled to retire from the age of 62 years. The CEO's pension is of the defined-contribution type and an annual allocation is made in amount corresponding to 35 per cent of the salary for the particular year, including company car benefit. At retirement on attainment of the age of 62 years, retirement pension premium payments will be paid up as if the CEO had worked until attaining the age of 65 years.

## GROUP

The CEO of the joint venture company has an employment relationship of 1 year from 1 July 2014. There is no entitlement to any pension other than the statutory pension.

## NOTE 8 DEPRECIATION OF INTANGIBLE AND NON-CURRENT ASSETS

## Group and the Parent Company

Capitalized expenditure for software development is depreciated according to plan annually at a rate of 20 per cent of acquisition cost, from the date of completion during the year.

Business goodwill is depreciated at 20 per cent of acquisition cost. Any impairment is assessed on the basis of the present value of future surpluses.

Machinery and equipment is depreciated according to plan at an annual rate of 10 to 20 per cent of acquisition cost, from the date of acquisition by the Parent Company during the year.

Machinery and equipment is also depreciated according to plan on the basis of the remaining economic life of the asset, in accordance with a measurement conducted specifically for an international joint venture.

## NOTE 9 INTEREST INCOME AND EXPENSE

## Group and the Parent Company

The Group recognizes bank interest income of SEK 1,781 thousand (739), and the Parent Company SEK 1,762 thousand (716), while interest expense for the Parent Company includes SEK 81 thousand (45) pertains to Group companies.

## NOTE 10 APPROPRIATIONS AND UNTAXED RESERVES

SEK th.	PARENT COMPANY	
	31/12/2014	31/12/2013
<b>Opening balance, untaxed reserves</b>	<b>9,180</b>	<b>6,444</b>
Change in acc. depreciation acc. to plan (machinery & equipment)	232	-41
Changes in tax allocation reserve	2,954	-2,694
<b>Total appropriations</b>	<b>3,186</b>	<b>2,735</b>
<b>Closing balance, untaxed reserves</b>	<b>12,366</b>	<b>9,180</b>

## NOTE 11 INCOME TAXES ON PROFIT FOR YEAR

ESTIMATE OF EFFECTIVE TAX RATE, SEK TH.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
<b>Profit/loss before tax</b>	<b>12,543</b>	<b>10,382</b>	<b>8,784</b>	<b>8,470</b>
Tax at current tax rate, 22%	2,001	1,892	1,932	1,863
Non-taxable income	-2	-211	-2	-211
Non-deductible expenses	436	142	436	142
Tax from previous year(s)	4	-92	4	-92
Current tax cost, foreign operations	116	93	116	90
Deferred tax	781	375	-	-
<b>Recognized effective tax</b>	<b>3,336</b>	<b>2,205</b>	<b>2,486</b>	<b>1,792</b>
<b>Recognized effective tax rate</b>	<b>26.6 %</b>	<b>21.2 %</b>	<b>28.3 %</b>	<b>21.2 %</b>

## NOTE 12 INTANGIBLE NON-CURRENT ASSETS

## Group

SEK th.	DEVELOPMENT EXPENDITURE		GOODWILL	
	2014	2013	2014	2013
<b>Opening balance, acquisition value</b>	<b>4,369</b>	<b>3,192</b>	<b>1,800</b>	<b>1,800</b>
Acquisitions during the year	1,620	1,177	166	-
<b>Closing balance, accumulated acquisition costs</b>	<b>5,989</b>	<b>4,369</b>	<b>1,966</b>	<b>1,800</b>
Opening balance, amortization	-1,277	-1,277	-1,800	-1,650
Depreciation for the year	-	-	-17	-150
<b>Closing balance, accumulated depreciation</b>	<b>-1,277</b>	<b>-1,277</b>	<b>-1,817</b>	<b>-1,800</b>
<b>Closing balance, planned residual value</b>	<b>4,712</b>	<b>3,092</b>	<b>149</b>	<b>-</b>

## Parent Company

SEK th.	DEVELOPMENT EXPENDITURE		GOODWILL	
	2014	2013	2014	2013
<b>Opening balance, acquisition value</b>	<b>4,369</b>	<b>3,192</b>	<b>1,800</b>	<b>1,800</b>
Acquisitions during the year	1,140	1,177	166	-
<b>Closing balance, accumulated acquisition costs</b>	<b>5,509</b>	<b>4,369</b>	<b>1,966</b>	<b>1,800</b>
Opening balance, amortization	-1,277	-1,277	-1,800	-1,650
Depreciation for the year	-	-	-17	-150
<b>Closing balance, accumulated depreciation</b>	<b>-1,277</b>	<b>-1,277</b>	<b>-1,817</b>	<b>-1,800</b>
<b>Closing balance, planned residual value</b>	<b>4,232</b>	<b>3,092</b>	<b>149</b>	<b>-</b>

## NOTE 13 TANGIBLE NON-CURRENT ASSETS

SEK th.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
<b>Opening balance, acquisition value</b>	<b>99,532</b>	<b>89,915</b>	<b>95,815</b>	<b>89,728</b>
Purchases for the year, finance leases	5,293	9,612	4,846	6,087
Exchange difference	39	5	-	-
<b>Closing balance, accumulated acquisition value</b>	<b>104,864</b>	<b>99,532</b>	<b>100,661</b>	<b>95,815</b>
Opening balance, depreciation	-82,635	-78,187	-82,466	-78,025
Exchange difference	-32	-3	-1	-1
<b>Depreciation for the year</b>	<b>-4,113</b>	<b>-4,445</b>	<b>-4,101</b>	<b>-4,442</b>
<b>Closing balance, accumulated depreciation for equipment</b>	<b>-86,780</b>	<b>-82,635</b>	<b>86,568</b>	<b>-82,466</b>
<b>Closing balance, planned residual value</b>	<b>18,084</b>	<b>16,897</b>	<b>14,094</b>	<b>13,349</b>

## Finance leases

In the Group, equipment held under finance leases is recognized in a carrying amount of SEK 3,941 thousand (3,503). The headings of current and non-current liabilities in the Group's balance sheet includes future payments in connection with lease commitments recognized as costs. See also Note 20, "Liabilities to credit institutions".

**NOTE 14** GROUP COMPANIES AND OTHER LONG-TERM SECURITIES

## Shares and participations

COMPANY	GROUP		BOOK VALUE	PARENT COMPANY	
	NUMBER	%		QUOTIENT VALUE	BOOK
Share in IVL Svenska Miljöinstitutet AB Personnel Foundation	1		5	5	5
Basta Online AB	600	60%	-	60	60
EPD International AB	500	100%	-	50	50
Sino-Swedish (Tianjin) Environmental Technology Development Co., Ltd	1	50%	-	581	581
IVL Environmental Technologies (Beijing) Company Ltd	1	100%	-	539	539
<b>Total</b>			<b>5</b>	<b>1,235</b>	<b>1,235</b>

**NOTE 15** PREPAID EXPENSES

SEK th.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
Rent for offices and other premises	3,445	3,396	3,445	3,396
Other prepaid expenses	2,045	2,284	2,036	2,178
<b>Closing balance</b>	<b>5,490</b>	<b>5,680</b>	<b>5,481</b>	<b>5,574</b>

**NOTE 16** EQUITY

## Group

SEK th.	SHARE CAPITAL	REST-RICHTED RESERVES	UNREST-RICHTED RESERVES	NET PROFIT/LOSS FOR THE YEAR	
				2014	2013
<b>Opening balance</b>	<b>7,000</b>	<b>25,101</b>	<b>30,242</b>	<b>8,176</b>	<b>70,519</b>
Appropriation of profit by decision of AGM			8,176	-8,176	
Transfer between unrestricted and restricted equity		1,632	-1,632		
Translation difference			139		139
<b>Net profit/loss for the year</b>				<b>9,207</b>	<b>9,207</b>
<b>Closing balance</b>	<b>7,000</b>	<b>26,733</b>	<b>36,925</b>	<b>9,207</b>	<b>79,865</b>

**NOTE 17** EQUITY

## Parent Company

SEK th.	SHARE CAPITAL	REST-RICHTED RESERVES	UNREST-RICHTED RESERVES	NET PROFIT/LOSS FOR THE YEAR	
				2014	2013
<b>Opening balance</b>	<b>7,000</b>	<b>1,400</b>	<b>32,562</b>	<b>6,678</b>	<b>47,640</b>
Appropriation of profit by decision of AGM			6,678	-6,678	
<b>Net profit/loss for the year</b>				<b>6,299</b>	<b>6,299</b>
<b>Closing balance</b>	<b>7,000</b>	<b>1,400</b>	<b>39,240</b>	<b>6,299</b>	<b>53,939</b>

**NOTE 18** PROVISIONS

SEK th.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
Deferred tax liability	7,143	6,354	-	-
<b>Closing balance</b>	<b>7,143</b>	<b>6,354</b>	<b>-</b>	<b>-</b>

IVL takes the view that deferred tax due for payment in 2015 will be low, as IVL's investment levels will continue to be high and interest rates low. As a result, use of tax allocation reserves for consolidation purposes will continue to be advantageous. In the subsequent five-year period, the tax allocation reserves for 2012 and 2013, totalling SEK 5,206 thousand, will in any event be dissolved.

**NOTE 19** ACCRUED EXPENSES

SEK th.	GROUP		PARENT COMPANY	
	2014	2013	2014	2013
Holiday and overtime liabilities	5,662	5,858	5,662	5,858
Accrued social costs	5,426	5,185	5,426	5,185
Other accrued expenses	1,535	1,261	1,103	1,057
<b>Closing balance</b>	<b>12,623</b>	<b>12,304</b>	<b>12,191</b>	<b>12,100</b>

**NOTE 20** LIABILITIES TO CREDIT INSTITUTIONS

SEK th.	GROUP	
	31/12/2014	31/12/2013
<b>Long-term liabilities</b>		
Liabilities to credit institutions	1,765	1,126
<b>Closing balance</b>	<b>1,765</b>	<b>1,126</b>
<b>Current liabilities</b>		
Liabilities to credit institutions	2,176	2,378
<b>Closing balance</b>	<b>2,176</b>	<b>2,378</b>

**NOTE 21** PLEDGED ASSETS AND CONTINGENT LIABILITIES

SEK th.	GROUP AND PARENT COMPANY	
	31/12/2014	31/12/2013
<b>Collateral pledged for liabilities to credit institutions</b>		
Corporate mortgages	5,000	5,000
<b>Total</b>	<b>5,000</b>	<b>5,000</b>
<b>Contingent liabilities</b>	<b>None</b>	<b>None</b>

**NOTE 22** SHORT-TERM INVESTMENTS

SEK th.	GROUP		PARENT COMPANY	
	31/12/2014	31/12/2013	31/12/2014	31/12/2013
Opening balance	25,007	-	25,007	-
Short-term investments	-	25,000	-	25,000
Change in value	1,485	7	1,485	7
<b>Closing balance</b>	<b>26,492</b>	<b>25,007</b>	<b>26,492</b>	<b>25,007</b>

Stockholm 11 March 2015

Annika Helker Lundström,  
Chair of the Board

Gunilla Saltin Peter Nygårds Johan Kuylenstierna

Anders Furbeck Bo Olsson Christer Forsgren

Maria Ågren Anders Björk, Employee Representative Pernilla Bengtsson, Employee Representative

Tord Svedberg  
Chief Executive OfficerOur Auditors' Report was submitted on 7 May 2015  
R3 Revisionsbyrå KBTomas Nöjd,  
Authorized Public  
AccountantChristina Kallin,  
Authorized Public  
Accountant

# Auditors' Report

To the Annual General Meeting of IVL AB, CIN 556116-2446

We have conducted an audit of the annual report and the consolidated accounts of IVL Svenska Miljöinstitutet AB (publ) for the year 2014.

## REPORT ON THE ANNUAL REPORT AND CONSOLIDATED ACCOUNTS

### Responsibilities of the Board of Directors and the CEO for the annual report and consolidated accounts

The Board of Directors and the CEO are responsible for preparing an annual report and consolidated accounts that provide a true and fair view in accordance with the Swedish Annual Accounts Act, and for the internal systems of control that the Board of Directors and CEO deem to be necessary, in order to prepare an annual report and consolidated accounts that are free of material misstatement, whether caused by irregularity or error.

### Responsibilities of the auditor

Our responsibility is to express an opinion on the annual accounts and the consolidated accounts based on our audit. We conducted our audit in accordance with International Standards on Auditing and generally accepted auditing practice in Sweden. Those standards require that we observe the requirements of professional ethics and that we plan and perform the audit to obtain reasonable assurance that the annual report and the consolidated accounts are free from material misstatement.

An audit includes obtaining, by variety of measures, accounting evidence supporting the amounts and disclosures in the annual report and consolidated accounts. The auditor decides which actions should be taken, for example by determining the risks of material misstatements in the annual report and the consolidated accounts, whether caused by irregularity or error. In

determining risks in this way, the auditor considers which aspects of internal systems of control are relevant to how the company prepares the annual report and the consolidated accounts in order to provide a true and fair view, in order to devise audit measures that are fit-for-purpose with regard to the circumstances, but not in order to state an opinion as to the efficacy of the company's internal systems of control. An audit also includes an assessment of the suitability of the accounting policies applied and of the reasonableness of the estimates by the Board of Directors and the CEO in the accounts, as well as an assessment of the overall presentation of the annual report and the consolidated accounts.

We believe that the accounting evidence we have obtained provides an adequate and appropriate basis for our opinions.

### Statement

In our view, the annual report and the consolidated accounts have been prepared in accordance with the Swedish Annual Accounts Act and provide in all material respects a true and fair view of the parent company's and the group's financial position on 31 December 2014 and of its financial results and cash flows for the year in accordance with the Swedish Annual Accounts Act. The statutory administration report is consistent with the other parts of the annual accounts and the consolidated accounts.

We therefore recommend to the Annual General Meeting that the parent company and consolidated income statements and balance sheets be adopted.

## OTHER INFORMATION

The 2013 annual report was audited by a different auditor, who submitted an auditor's report dated 9 April 2014 including unmodified comments in the Report on the annual report and consolidated accounts.

## REPORT ON OTHER REQUIREMENTS UNDER LEGISLATION AND OTHER REGULATIONS

In addition to our audit of the annual report and consolidated accounts, we have examined the proposed treatment of the company's profit or loss and the administration by the Board of Directors and the CEO of IVL Svenska Miljöinstitutet AB for the 2014 financial year.

### Responsibilities of the Board of Directors and the CEO

The Board of Directors is responsible for the proposed treatment of the company's profit or loss, and the Board and CEO are responsible for administration under the Swedish Annual Accounts Act.

### Responsibilities of the auditor

Our responsibility is to express an opinion with a reasonable degree of assurance as to the proposed treatment of the company's profit or loss and as to the administration based on our review. We conducted our audit in accordance with generally accepted auditing practice in Sweden.

As a basis for our opinion on the Board of Director's proposed treatment of the company's profit or loss, we have

examined whether such arrangements are consistent with the Swedish Annual Accounts Act.

As a basis for our opinion concerning discharge from personal liability, we examined, in addition to our review of the annual report and the consolidated accounts, significant decisions, actions taken and circumstances of the company in order to be able to determine the liability, if any, to the company of any director or the CEO. We also examined whether any director or the CEO has, in any other way, acted in contravention of the Companies Act, the Annual Accounts Act or the Articles of Association.

We believe that the accounting evidence we have obtained provides an adequate and appropriate basis for our opinions.

### Statement

We recommend to the Annual General Meeting that the profit be dealt with in accordance with the proposal in the administration report and that the members of the Board of Directors and the CEO be discharged from personal liability for the financial year.

Stockholm, 7 May 2015

Tomas Nöjd  
Authorized Public Accountant

Christina Kallin  
Authorized Public

Accountant

# Corporate Governance

Corporate Governance at IVL Svenska Miljöinstitutet AB is based on Swedish legislation and generally accepted practices, with due account taken of the Swedish Code of Corporate Governance. The reason why the Code is not observed in every respect is that it is mainly designed for listed companies and companies with diversified ownership.

## OWNERSHIP

IVL has been wholly owned by the Swedish Institute of Water and Air Conservation Research Foundation (SIVL) since 2004. At conversion of the then Swedish Institute of Water and Air Conservation Research Foundation into public limited company form in 1982, SIVL's original share capital was allocated in equal part by an agreement between, the Swedish government and the Swedish business sector.

SIVL's purpose is to develop the long-term conditions for environmental research and, through ownership, to guarantee IVL an independent status. SIVL is responsible for the funds provided for environment- and sustainability-related research at IVL co-funded by the Swedish government and the Swedish business sector.

SIVL is governed by a representative board of directors, of whom the chair and six members are appointed by the Swedish government and seven members by the Swedish business community. The Chair has the casting vote.

## ANNUAL GENERAL MEETING (AGM)

The AGM is generally held at the end of May. Members are notified of the AGM by post. The owner, SIVL, is represented at the AGM by SIVL's Chair.

At the end of the 2014 AGM, held in late May, four Board members were re-elected and seven new members were elected.

## NOMINATION PROCEDURE

SIVL, the sole owner of IVL, proposes members for IVL's Board of Directors, partly by inviting nominations from business sector representatives for four regular members and one deputy member for IVL's Board of Directors, and partly by inviting nominations from the government for the Chair and three regular members and one deputy for IVL's Board of Directors.

IVL's Board of Directors shall consist of no less than four and no more than eight members, plus no less than one and no more than two deputies. In addition, the trade union representatives are entitled to nominate two members and two deputies. The members of IVL's Board of Directors are presented on page 74.

## BOARD OF DIRECTORS AND ITS WORK IN 2014

Under the Swedish Companies Act and the Company's Articles of Association, the Board of Directors is responsible for the organization and administration of the Company. Every year, the Board adopts rules of procedure. This document is accompanied by instructions for work by the CEO, governing the allocation of tasks between Board and CEO.

In accordance with the rules of procedure, the Board held four ordinary meetings in 2014 in addition to the statutory meeting held in May. As is customary, the ordinary Board meetings were held in conjunction with reporting of the Company's full-year or interim results.

Items on the agenda for the Board meeting in May included adoption of new rules of procedure for the Board and instructions for work by the CEO. At the Board meeting in December, the agenda included the Company's budget for 2015, as well as goals and strategy documents. At an extended meeting in September, the Board discussed the Company's long-term strategy.

## REMUNERATION COMMITTEE

Under the rules of procedures for IVL Svenska Miljöinstitutet AB's Board of Directors, the Board is to appoint a remuneration committee to deal with issues relating to terms and conditions of employment and remuneration. The committee proposes salary, other forms of remuneration and other terms and conditions of employment for the CEO, which are then presented to the Board of Directors for approval. Similarly, terms and conditions for other members of executive management of the Company are proposed by the CEO, which are then presented to the Remuneration Committee for approval. The Company does not operate any incentive programme.

## BOARD OF DIRECTORS' REMUNERATION

At the 2014 AGM, fees were approved for the Chair and members of the Board. The fees approved were SEK 88 thousand (54) for the Chair and a total of SEK 693 thousand (547) for the other members of the Board. No fee is payable to the employee representatives.

## EXTERNAL AUDIT

The auditors' task is, on behalf of the owner, to conduct an impartial review of the administration by the Board of Directors and the CEO, as well as of the Company's annual report and accounting records.

R3 Revisionsbyrå KB, represented by Tomas Nöjd and Christina Kallin as senior auditors, has been elected as auditor to serve during the period until the 2015 AGM. Tomas Nöjd and Christina Kallin are authorized public accountants and have conducted the auditing assignment on behalf of IVL since 2014.

## COMPANY MANAGEMENT

The CEO is responsible for the day-to-day administration of the Company in accordance with the guidelines and other instructions issued by the Board. The instructions for the work of the CEO were adopted on 21 May 2014 at the Board's statutory meeting.

The Company's executive management group consists of the CEO, Executive Vice President, CFO and Director of Research.

The Company's management group also includes the Director, Business Development, four heads of unit, and Director of Human Resources, Director of Communication and Director of Quality and Environmental Issues as co-opted members.

- **Tord Svedberg**, born 1958, M. Sc. in Chemistry, KTH (1983) has served as Chief Executive Officer at IVL since 2008. He formerly served in a range of executive roles at Pharmacia (1984-1990), Astra (1990-1999) and AstraZeneca (1990-2007), including as head of production at the company in Sweden and member of executive management. Member of the Royal Swedish Academy of Sciences, Department IV, and Board member at Unimedica AB (since 2008).
- **Mats Ridner**, born 1955, MBA, Stockholm School of Economics, has served as CFO since 1994.
- **Östen Ekengren**, born 1952, M. Sc. in Chemistry, KTH (1978), serves as Executive Vice President and Head of the Business Development and Market Unit. Employed since 1978.
- **John Munthe**, born 1960, Ph. D. in Chemistry at the University of Gothenburg in 1992, has been Head of Research since 2010. He joined the Company in 1992 and was appointed head of department in 1994.

The unit heads, CFO and head of research report to the CEO.

Management is supported by executive staff functions for financial management, HR, communication, business development and quality and environmental management systems.

## INTERNAL CONTROL

Internal control at the Company is based on IVL's operational and management system. At the same time, this represents the Company's integrated quality and environmental management systems, which are certified in accordance with ISO 9001 and ISO 14001. The management system focuses on IVL's core operations, that is to say, "to offer/market and conduct research and consultancy projects in the environmental field", and includes governing documents, procedures and tools for all processes within the Company. Internal control of financial reporting consists of the control environment of organization, decision-making paths, powers and responsibilities that are documented and communicated via governing documents. All governing documents, procedures and tools are available via the Company's intranet.

Every year, the Board adopts rules of procedure that govern the division of responsibilities between Board and CEO, and the Company's financial reporting to the Board. Financial reports are presented to the Board at every meeting. These comprise outcomes, budget and comparison with the preceding year, as well as order backlog, investments and a number of key ratios.

## RISK ANALYSIS AND MANAGEMENT

The management system also includes procedures and methodology for annual risk analysis of everything from economic risks and conditions, IT security, external factors and customer relations to loss of skills/expertise and image- and brand-related risks. The risk analyses are accompanied by action plans. The management system is subject to internal audit twice a year, as well as ongoing checks by independent quality and environmental auditors.

# Board of Directors



**Annika Helker Lundström**  
Chair  
Member since 2010  
National Environmental Goal Coordinator



**Anders Björk**  
Member since 2014  
Employee Representative



**Christer Forsgren**  
Member since 2008  
Director, Stena Metall



**Anders Furbäck**  
Member since 2014  
Director, LKAB



**Johan Kuylenstierna**  
Member since 2014  
CEO, Stockholm Environmental Institute



**Hanna Ljungkvist**  
Member since 2014  
Employee Representative



**Peter Nygårds**  
Member since 2008  
Chair, Swedish Institute of Water and Air Conservation Research Foundation



**Bo Olsson**  
Member since 2014  
Head of Innovation and Safety, IKEM



**Gunilla Saltin**  
Member since 2010  
CEO, Södra Cell



**Maria Ågren**  
Member since 2014  
Director-General, Swedish Transport Agency

## DEPUTIES



**Pernilla Bengtsson**  
Employee Representative



**Christina Lindbäck**  
Head of Sustainability, NCC



**Maria Ohlman**  
Assistant Under-Secretary, Swedish Ministry of the Environment



**Linda Åmand**  
Employee Representative

# Management Group



**Tord Svedberg**  
CEO



**Östen Ekengren**  
Executive Vice President



**Mats Ridner**  
Chief Financial Officer



**John Munthe**  
Vice-President, Research



**Anna Jarnehammar**  
Director – Business Development & Market



**Elin Eriksson**  
Director – Organizations, Products and Processes



**Mona Olsson Öberg**  
Director – Natural Resources & Environmental Impact



**Karin Sjöberg**  
Director – Air Pollution & Abatement Strategies



**Jenny Gode**  
Head of Unit – Climate & Sustainable Social Systems

## CO-OPTED



**Eva Bingel**  
Director – Communication



**Anna Westberg**  
Director – Human Resources



**PO Skough**  
Director of Environment & Quality

# Scientific Articles

Classified into the most appropriate of IVL's six thematic areas:

## CLIMATE & ENERGY

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Bengtsson, S., Magnusson, M., Fridell, E., Andersson, K. *Review of the possibilities to comply with the coming ECA regulations through the use of abatement technologies or change of fuels*. Transportation Research D, 28, 6 (2014)

Haege Eugensson M., Ferm M., Elfman L. *Use of a 3-D dispersion model for calculation of dispersion of horse allergen and odor around horse facilities*. International Journal of Environmental Research and Public Health 11, 3599–3617; doi:10.3390/ijerph110403599

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