

# 2013

## ANNUAL REPORT

IVL Swedish Environmental Research Institute

*Resource-efficient*  
**PRODUCTS & WASTE**

**AIR &  
Transport**

**CLIMATE &  
ENERGY**

**SUSTAINABLE  
PRODUCTION**

**SUSTAINABLE  
BUILDING**

*Water*  
**SOIL &**

THE YEAR IN BRIEF // MESSAGE FROM THE CEO // SUSTAINABILITY &  
SOCIAL RESPONSIBILITY // THIS IS IVL // IVL FOCUSES ON LEADERSHIP  
TRAINING // RESEARCH AT IVL // THEME AREAS // ANNUAL REPORT

IVL Swedish Environmental Research Institute  
Annual Report 2013

Graphic Design & Production: Blomquist, [www.blomquist.se](http://www.blomquist.se)  
Printed by: Kaigan  
Cover Photo: Magnus Hallgren  
Paper: Inner Munken Polar Rough 120 g. Cover Galerie Art Volume 200 g.

# 2013

*ANNUAL REPORT*

IVL Swedish Environmental Research Institute

# THE YEAR IN BRIEF

2013 WAS CHARACTERISED BY ROBUST DEVELOPMENT, SUBSTANTIAL ACHIEVEMENTS IN OUR CHINESE OPERATIONS AND A STRENGTHENING OF OUR MARINE SECTOR. IN THE COURSE OF THE YEAR WE ALSO LAUNCHED A MAJOR TRAINING INITIATIVE TO BOOST LEADERSHIP SKILLS.

#### **New facility in Lysekil**

In January 2013, the establishment of a new marine facility in Lysekil strengthened IVL's marine operations. Three marine biologists, who previously ran N-research consultancy in Lysekil for ten years, have been recruited to staff the facility.

#### **Investment in new laboratory system**

More than SEK3 million has been invested in a new information system that will serve all laboratory operations. The new system, LabWare LIMS, will improve efficiency and further enhance the quality of IVL's laboratories.

#### **Sweden Water Innovation Center**

In 2013, Sweden launched the Water Innovation Centre (SWIC), which is based at Hammarby Sjöstadsvärk. The initiative for this was taken by IVL and KTH along with 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.

#### **Leadership development**

2013 saw the start of an internal focus on leadership training. The one-year programme targets executive leadership, unit managers and team leaders. This focus on leadership development should be seen as a contribution to the planned expansion of the company.

#### **Air pollution and climate research programmes**

In 2013, IVL was tasked with leading the Swedish Clean Air & Climate Research Programme (SCAC), which will investigate how air pollution affects climate. The programme has received a grant of EUR25 million from the Swedish Environmental Protection Agency.

#### **Success in China**

In 2013, the success of IVL's China operations continued. For example, in collaboration with Scania, Malmberg and Xylem, IVL has started a consortium whose purpose is to offer complete solutions for

wastewater treatment and sludge management. Sludge from treatment plants is processed to generate biogas that is subsequently refined, and used to fuel buses. This greatly improves the air quality in large cities.

#### **IVL leads major EU water initiative**

In 2013, the EU approved the R3Water research programme. The aim of this programme, which is coordinated by IVL, is to streamline municipal wastewater treatment. The programme has a budget of over SEK70 million.

#### **Profit for the year**

The financial result for 2013 shows a net profit of SEK10.4 million, an increase of 26 per cent compared to the previous year.

#### **Key indicators**

	2013	2012	2011
Net sales (SEK MILLION)	255	248	240
Profit after financial items	10,4	7,7	12
Number of employees (employee years)	215	197	186
Return on equity (%)	12,3	9,7	17,5
Investments (SEK MILLION)	10,8	6,2	3,1

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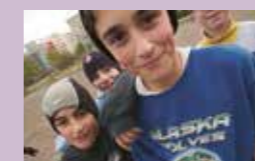
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CEO, Tord Svedberg

# WE MAKE SCIENCE REAL

AS CEO OF IVL I LOOK BACK ON 2013 WITH GREAT SATISFACTION AS YET ANOTHER SUCCESSFUL YEAR FOR THE COMPANY, WITH INCREASED SALES AND VISIBILITY AS WELL AS CONTINUED IMPROVEMENT OF KEY FINANCIAL INDICATORS.



## OUR UNIQUE TEST AND DEMONSTRATION PLANT

Hammarby Sjöstadswerk continues to expand and evolve. At the end of the year IVL, in collaboration with the Swedish Association of Graduate Engineers and numerous other partners, established the Sweden Water Innovation Center, SWIC. The goal of this initiative is to re-establish Sweden as a global leader in water purification technology. The mobilisation and development of the widespread expertise already found in the country will facilitate the export of water and wastewater engineering technologies and make it possible to deliver sustainable solutions to the global market – a market amounting to 3,000 billion Swedish crowns with an estimated annual growth of between 2 and 10

per cent. A driving force behind SWIC that attracts many stakeholders is the manifested need to transform today's inefficient sewage treatment plants into facilities for the production of clean and reusable water, nutrients and energy.

## Europe

The EU Emissions Trading System (EU ETS) is the cornerstone of Europe's climate policy. But questions are being raised about its efficacy. In a report to the government IVL investigated emissions trading and the way in which the international emissions market can be developed over the long term. The background to this is the fact that the EU report *The State of the European Carbon Market*, published this year concluded that there are way too many permits, which risks

making the trading system ineffective. The Commission proposes six structural measures to reduce the surplus of emission permits. One of our researchers, Lars Zetterberg has together with a colleague from VTI analysed the way in which these proposals affect the trading system and its effectiveness. In their report they listed a number of possible actions. One option is to scrap a number of these permits. Another possibility might be to introduce a minimum price – a price floor.

## Domestic

How high are the levels of contaminants in fish caught close to Stockholm? How much pollution has accumulated in the seabed and are levels increasing or decreasing over time? To answer this IVL initiated a project that excited a lot of media coverage – exploratory fisheries and sediment sampling in an area from Eastern Lake Mälaren, across Stockholm's inner and middle archipelago, and on to the outer islands. The purpose of these surveys is to assess to what extent cities like Stockholm impact the waters that surround them. With the exception of studies on mercury

contamination in the area there have been few attempts to determine how much pollution ends up in the fish population. The results will be used to evaluate the environmental situation in the waters around Stockholm, as a basis for assessing the need for additional environmental protection measures and to establish whether there are grounds for recommending consumption bans of fish from the region.

## Global

Our activities in China continue to develop positively and IVL now has seven employees at our offices in Beijing and six employees at SEC in Tianjin, a company we own jointly with a Chinese partner. Today there is a growing interest in addressing issues of poor air quality in China, and we hope to contribute to this effort. IVL, together with a domestic research institute, has set up a joint laboratory working with air quality monitoring in China. The Chinese Research Academy of Environmental Sciences (CRAES), one of the principal advisors to the Chinese government, sees this laboratory as a tool to promote collaborative research between Sweden and China in air quality monitoring and analysis. Above all, our Chinese partners are interested in monitoring zones where at the present there are no automatic monitoring networks deploying so-called passive diffusion samplers – an area of expertise in which IVL is a world leader.

IVL also has a mandate from the Swedish Environmental

Protection Agency for capacity building to limit mercury emissions in the Chinese metals industry. SEPA has entered into a new collaborative mercury programme with the Chinese Ministry of Environment. In step with the country's rapid economic development China has become the world's largest producer, user and emitter of mercury. According to a newly published UNEP report co-authored by IVL, China accounts for over 30 per cent of global anthropogenic emissions to air and about 50 per cent of world consumption. In the new mercury collaborative effort IVL is tasked with capacity building to limit mercury emissions in the metals industry, which at present is one of the largest sources of mercury releases to air in China. We have undertaken to compile an emissions inventory and provide training in prevention and control measures.

Together, these examples illustrate how IVL's research contributes to social benefit in a variety of ways. It is put to practical use. Or as we say in our mission statement: "We make science real".

IVL's activities and brand are based on our core values – credibility, an all-inclusive perspective and vision, commitment and benefit. Our diversity is reflected in the fact that we constantly work within a systematic and holistic perspective based on competences. This means that there is a lot riding on the IVL leadership and in 2013 we initiated a leadership development programme for executive

management, unit managers, and group leaders.

## Finally a look ahead

Both the market and the importance of our services are increasing. If we are to be in the forefront and turn opportunity into services and products it is vital that we are aware of and analyse changes in our surroundings. At IVL we continuously analyse the market and we have adopted a systematic approach that will enable us to anticipate changes that will affect our activities.

Focus on leadership development and improved external

monitoring are two examples of initiatives that are part of the continuous development of IVL's efforts to reach out and meet future needs. We make science real. In everything we do we strive to extend the boundaries of current knowledge and make it useful. With innovative, competitive and customer-oriented solutions for today's and tomorrow's environmental and sustainability issues, we will continue to be the leading player in Sweden and an important player in Europe and the world. ❖

Tord Svedberg



PHOTO: ANETTE ANDERSSON

# IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE

## – Research & Development

IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE IS THE OLDEST ENVIRONMENTAL AGENCY IN SWEDEN. SINCE 1966 WE HAVE DEDICATED OURSELVES TO APPLIED R&D FOR ENVIRONMENTALLY FRIENDLY, EFFECTIVE AND SOCIALLY SUSTAINABLE GROWTH.

### Autonomous status

IVL Swedish Environmental Research Institute was jointly founded by the Swedish state and the business sector. IVL has operated as a limited company since 1982 and is owned by the Foundation of the Swedish Environmental Research Institute (SIVL). The Foundation's purpose is to promote long-term prospects for environmental research, and through ownership guarantee IVL's autonomous status.

### We span the entire field of sustainability

IVL spans the entire sustainability field. Our technical environmental expertise is wide-ranging, and in addition we employ social and behavioural scientists as well as economists. Since the early 90s, IVL has operated extensively in the international arena with a focus on China and Europe. We have approximately 230 employees at five offices in Stockholm, Gothenburg, Lysekil and Beijing. Nearly a third of these have doctorates.

### Both research and assignments

R&D is at the core of IVL's business operations. Over half of our activities consist of research assignments that are either jointly funded by state and industry, or supported by grants from government research agencies, research foundations and the EU. We are also a frequent consultant and contractor to municipalities, government agencies and industry. As a bridge between academia and commerce, we are able to promptly translate research into practical applications – from science to reality.

### Alliances and networks

Part of IVL's strategic approach is to sustain and develop close partnerships with industry, international research bodies and universities. For this reason IVL is active in a number of



international research networks and alliances. In Sweden IVL works in close contact with Chalmers University of Technology, Lund University and the Swedish Royal Institute of Technology (KTH).

### Laboratories and pilot plants

We perform advanced chemical tests – both organic and inorganic – in our own labs, and in our experimental laboratory we develop new technologies for lean manufacturing. Our indoor environment lab has the expertise and equipment needed for the advanced analysis of particle emissions,

asbestos and a wide variety of micro-organisms, especially moulds. IVL and KTH dispose over the Hammarby Sjöstadsvärk facility, which is a unique test and pilot plant for advanced water treatment technologies.

### Communication and knowledge

In addition to publishing a series of reports and scientific journals, IVL disseminates knowledge through lectures and participation in seminars, and we regularly organise seminars and conferences regarding the environment and sustainability issues. Our research also reaches a wide

audience via opinion articles and through newspapers, television and radio feature stories.

### Environmental and quality issues

IVL deals with environmental and quality issues within the framework of an integrated management system. IVL is certified in accordance with the environmental and quality management standards ISO 14001 and ISO 9001 respectively. Goals are set and evaluated following a fixed set of procedures established in the management system. ❖

*IVL focuses on leadership training*

# “GOOD LEADERSHIP CREATES AN ATTRACTIVE WORKPLACE”

IN 2013 IVL INVESTED IN A LEADERSHIP DEVELOPMENT PROGRAMME. THIS INITIATIVE IS PART OF THE COMPANY'S LONG-TERM GROWTH STRATEGY, IN WHICH A FORWARD-THINKING LEADERSHIP WILL STRENGTHEN THE ORGANISATION, FOSTERING CREATIVITY AND INNOVATION. WE GOT TOGETHER WITH SOME IVL MANAGERS TO DISCUSS THEIR EXPERIENCES IN THE LEADERSHIP PROGRAMME.

**F**OR CLOSE ON A YEAR, starting September 2013, all IVL managers have taken part in a customised training programme. In order to formulate and follow a shared definition of what good leadership means at IVL, participants were provided with tools and support for both personal and company-wide leadership skills.

The process builds on strengths already present in the organisation. Based on the values IVL stands for it focuses on a number of leadership success factors especially suited to IVL: smoothly functioning teams and creative personnel, innovation-driven leadership and business sense.

What has the leadership programme meant to you so far?

**Karin Persson:** The most rewarding thing has been comradeship with other group managers. We have gotten to know each other surprisingly well during the programme. On top of the training sessions we have created our own forum where we can continue discussing things. The position of manager feels less lonely now. Now I have plenty of sounding boards, and many new friends.

**Anna Widheden:** The feeling of community and closeness to other managers means that we can begin to build bridges between groups. I think this will lead to more overarching projects and this will bene-

fit the whole company. I believe that in the long run the leadership programme will empower employees.

**Katarina Hansson:** This also means that we will lead our own groups in a similar way. We are able to agree on what good leadership at IVL is, and together we will have more of a chance to suggest improvements to executive management.

**Ulla Hagestöm:** I've been group manager for four years, but it is only now that I can fully take on the role of leader. I have been given a new set of tools that help me deal with a variety of different situations. This may involve setting the ground rules for the group, not just dishing out the “truth” but letting dia-

logue show the way – being able to kick off a meeting positively. These things are pretty obvious but it's easy to get stuck in outdated stereotypes.

**Karin:** Hitherto leadership at IVL has to some extent been oriented toward results and administration. This new role will focus more on soft values. You can't underestimate the importance of being seen by your boss and colleagues.

What does this investment mean for IVL?

**Anna:** Good leadership rests ultimately on the ability to build creative and effective teams. A creative team must feel secure and trust their manager. If employees are not able to rely on management, they will not be capable of carrying out the tasks they have been assigned effectively.

**Karin:** One of the main reasons why IVL is investing in leadership at this time is that the business is growing rapidly and this places greater demands on leadership. In a well-functioning team everyone pulls together, and feels independent and responsible, this in turn frees up time and benefits the entire organisation.

**Ulla:** Managers are given



clearer roles. Because the management group attends this course alongside team leaders, the gap between the different organisational levels shrinks, and this makes it easier for the groups to understand each other.

**Katarina:** Good leadership makes for an attractive workplace. I think it is an absolute necessity for a knowledge-intensive and growing businesses like IVL.

How has the programme changed your views on leadership?

**Anna:** Someone once said that a good leader should be able to make himself expendable. I think there is a lot in that, getting the group to lead itself, encouraging responsibility and individual initiative.

**Karin:** For my own part, it's more fun being a manager now. I'm more comfortable in a lot of situations. But it isn't all easy. You have to cope with difficult situations and at the same time be professional and bold enough to make decisions. An unclear boss creates uncertainty in the group.

**Katarina:** But just because you're in charge you don't have to be good at everything. You have to see other people's abilities and delegate responsibility.

**Ulla:** You have to give it time and figure out exactly how you personally want to be as a leader. Good leadership is shaped by you yourself, your co-workers and by circumstance. It requires equal parts intuition and presence in the moment. ❖



# SUSTAINABILITY & SOCIAL RESPONSIBILITY

IVL'S MISSION IS TO WORK FOR SUSTAINABLE ECONOMIC, ECOLOGICAL AND SOCIAL GROWTH THROUGHOUT THE COMMUNITY. SUSTAINABILITY IS THEREFORE FULLY INTEGRATED INTO THE DAILY OPERATIONS OF THE COMPANY.

**I**VL'S RESEARCH PROJECTS AND CONTRACT ASSIGNMENTS range from the mapping of environmental problems to the development of solutions and preventive measures, including the economic and social aspects. As a result we have great potential for making a positive sustainability impact, through the advice we give our clients and by ensuring that our research is of practical use in the community.

## Code of conduct

IVL's Code of Conduct is predicated on company values, and the UN Global Compact's ten principles in the area of human rights, labour, the environment, and anti-corruption. This code of conduct has been adopted by the IVL Board and governs the company's relationship with employees, suppliers, business partners and other stakeholders. When evaluating

current and future suppliers the principles contained in the code of conduct are applied. The code of conduct is available in full on IVL's website.

## Dialogue with stakeholders

Because IVL's aim is to promote sustainable development, it is important that we interact and maintain a dialogue with all key stakeholders in society. This we do in particular within the framework of theme committees, which reflect our six business areas; *Water & Soil, Air & Transport, Resource-efficient Products & Waste, Sustainable Building, Climate & Energy* and *Sustainable Production*. The theme committees are made up of representatives from government, public authorities and various sectors of industry. Theme committees have the dual purpose of identifying future research needs and communicating key findings of current R&D projects undertaken by IVL. These

meetings are also opportunities for committee members to comment and ask questions about ongoing operations.

Regular customer surveys in the form of in-depth personal interviews are held to ensure that customers are satisfied with the company's services. Customers representing business, local authorities and government agencies were interviewed in the 2013 survey, in which the customer satisfaction index was 4.0 (4.0) compared with a maximum rating of 5.0

## Environmental activities

IVL works with environmental issues within the framework of an integrated management system certified to ISO 14001. In this context customer advisory services, company travel and energy usage have been identified as the most significant environmental aspects. Attempts are being made to develop tools for the assessment of the potential benefits

of our advisory services to customers. In 2013 75 assessments were made, of which 55 evidenced positive change or reduced environmental impact.

## Less travel

The environmental impact of domestic travel by train and plane fell by 14.4 per cent in 2013 compared to 2012. For foreign travel the environmental load has fallen by 5.9 per cent as ongoing international projects have been in a production phase that required fewer meetings. The number of rail journeys fell by 9.9 per cent between 2012 and 2013. A contributing factor may be the expansion of video capacity from six to eight rooms.

## Social responsibility

Most of IVL's activities take place in Sweden and here the framework that regulates labour in the form of laws and collective bargaining agreements is a minimum commitment. We impose the equivalent requirements on subcontractors. The same applies to our operations in Beijing.

## Equal opportunity and diversity

Equality is self-evident at IVL and efforts to this end are guided by a comprehensive

policy and plan for gender equality and equal treatment. Leadership, managers and employees must all work towards integrating the diversity perspective and equal opportunity into all company activities and corporate culture, thus contributing to IVL's credibility as an advisor on sustainability issues.

IVL has a gender balance of 49 per cent men and 51 per cent women. Men and women are also represented equally in the management group.

## An attractive workplace

Our goal is to be an attractive workplace today, and continue in the future to attract top talent, and for IVL to be perceived as a partner with the highest ethical standards in terms of both behaviour and the way contract assignments are fulfilled. IVL's goal is to expand steadily in both number of employees and combined expertise. In 2013, the company grew by approximately 10 per cent and reached 215 in the three offices in Stockholm, Gothenburg and Beijing.

## Employee survey

Since 2008 biannual employee surveys have been conducted by an outside organisation. In 2013 we switched provider in



an attempt to achieve a better basis for improvement. The new survey provides indices on leadership, work environment and commitment. With this as starting point all groups in the company are required to implement a development agenda. The overall results of the survey show great commitment on the part of staff but indicate that company must be clearer regarding goals and strategies.

## Competence development

The company's take on skills competence development can be summed up as the "70-20-10" model, which means that 70 per cent of skills development takes place during daily research activities, 20 per cent by learning from experienced colleagues, and 10 per cent through identified training activities. One of IVL's objectives is for all employees to have at least two days identified

training activities per year and that target was achieved in 2013.

Virtually all work at IVL is conducted in project form and special project management training has been brought into play to improve quality and further professionalise company project leaders.

## Occupational health and safety

IVL's work environment activities are conducted on the basis of yearly plans and delegated responsibility and all employees are covered by healthcare agreements. Regular health checks are provided, as is medical care in the event of sickness or work-related issues. The company also offers employees subsidised gym membership, or the equivalent. IVL contributes to staff well being and health by supporting the company's extremely active sports and cultural clubs. ❖

Research Director, John Munthe

# ENVIRONMENTAL RESEARCH & PUBLIC BENEFIT

**T**

**THE ABILITY TO CARRY OUT R&D FOR PUBLIC BENEFIT**

is a prerequisite for IVL's continued success. Fortunately, our research activities expanded in 2013 with several start-up projects backed by Swedish funding agencies and EU research programmes. Our co-funded research conducted with funding from the Swedish government and the business sector continues to be successful and is an integral part of IVL's total operations.

**Co-funded research and development**

IVL's co-funded research is a unique form of financing that facilitates collaboration between companies and authorities.

By collaborating on funding research carried out by IVL, an independent player, industry and government can make a joint contribution to solving the challenges we face and uphold a dialogue around research issue priorities and developments in the environmental and sustainability field.

Notably, in 2013 our R&D continued to target water issues, focusing on both water point mapping and pollution dispersion and the development of next-generation water treatment

and biogas extraction from sewage sludge.

**Grant-funded research**

In 2013 IVL received research grants for new projects on issues related to air pollution, ecosystem services, the work environment, transport and energy systems. Funding agencies included the Swedish Environmental Protection Agency, Vinnova, Forte, and the Swedish Energy Agency. IVL is also one of the partners in a research cooperation with China, targeting atmospheric chemistry and urban air quality funded by the Swedish Research Council.

**EU-funded research**

IVL was successful in the last call for the Seventh Framework Programme and in 2013 eight new projects were launched, which means that at the end of 2013 IVL participated in a total of 33 European programmes. The newly established programmes include the Solutions Project, a major investment in research on hazardous substances within the Water Framework Directive. The ambitious goal of this programme is to integrate knowledge of the sources, occurrences, effects and risks of chemicals in order to furnish solutions to current

and future chemical pollution issues in European waters. In late 2013, we also started to prepare applications to the new EU research programme Horizon 2020, a programme that poses new challenges and opportunities.

**Challenge and opportunity**

One of environmental science's major challenges is to deliver knowledge and solutions for a changeover to a resource and energy efficient society. Research also plays an important role in identifying and communicating opportunities for increased global prosperity and growth, while still respecting nature's boundaries. Here the challenge is to achieve cooperation between different research disciplines and society at large.

An important question is how social benefit brought about by our activities and the results of our research efforts are to be presented. In the simplest cases, our research is designed to find specific solutions to technical challenges. Things become much more difficult when research is about knowledge creation and a greater understanding of nature, or the interaction between man and nature.

As scientists we shouldn't be satisfied with merely complying with the requirements of some funders to provide a description of the research benefits, but take the lead ourselves in a discussion that attempts to develop the thrust, implementation and documentation of research. This in order to ensure that the benefit we actually achieve is made clear and can be communicated to the outside world. In respect to research quality assessment there are a wide range of measurement and

inspection procedures that can be used to evaluate applications, results and the merits of individual researchers. When it's a question of benefit assessment, we lack comparable, unequivocal tools and the issue of how research benefits accrue to society would benefit from a broader discussion and the involvement of the research community.

At IVL this discussion is ongoing and it will be necessary for it to continue and develop over time and in multiple forums. ❖

»One of the major challenges facing environmental science is to provide knowledge and solutions for a changeover to a resource and energy efficient economy.«

**RESEARCH PROJECTS INITIATED IN 2013**

PROJECT	FUNDER	PURPOSE	BUDGET
ZenN – Nearly Zero Energy Neighbourhoods	EU	Research project aimed at reducing energy consumption in existing buildings and city districts.	IVL's share: 5,2 SEK MILLION
LOCINAP – The EU Low Carbon Industrial Manufacturing Parks project	EU	Integration of energy flows between different industries and activities with the aim of reducing total energy use.	IVL's share: 1,9 SEK MILLION
SCAC – Swedish Clean Air and Climate Research Program	Swedish Environmental Protection Agency	Programme to support national and international efforts targeting air pollution and climate.	25 SEK MILLION
A-TEAM – Advanced Tools For Exposure Assessment and Biomonitoring	EU/Marie Curie ITN	Increase understanding of how people are exposed to and affected by chemicals in consumer products.	IVL's share: SEK9 MILLION
ESBESIA – Integrating Ecosystem Services and Biodiversity into Environmental and Socio Economic Impact Assessments	Swedish Environmental Protection Agency	Explore the possibilities of integrating ecosystem services into the Swedish EIA process.	4 SEK MILLION
Biofuel market factors	Swedish Energy-Agency	Analyse how the demand for solid biofuels is affected by different external factors.	1,2 SEK MILLION
Traffic emissions	Vinnova	Extend knowledge about emissions from road transport and shipping.	5 SEK MILLION
Environmental impact of ports	Vinnova	Prepare a holistic EIA targeting ports and infrastructure.	3,4 SEK MILLION
Beyond BNP growth	Formas	Investigate the impact of a downturn in the economy.	Total budget 23 SEK MILLION

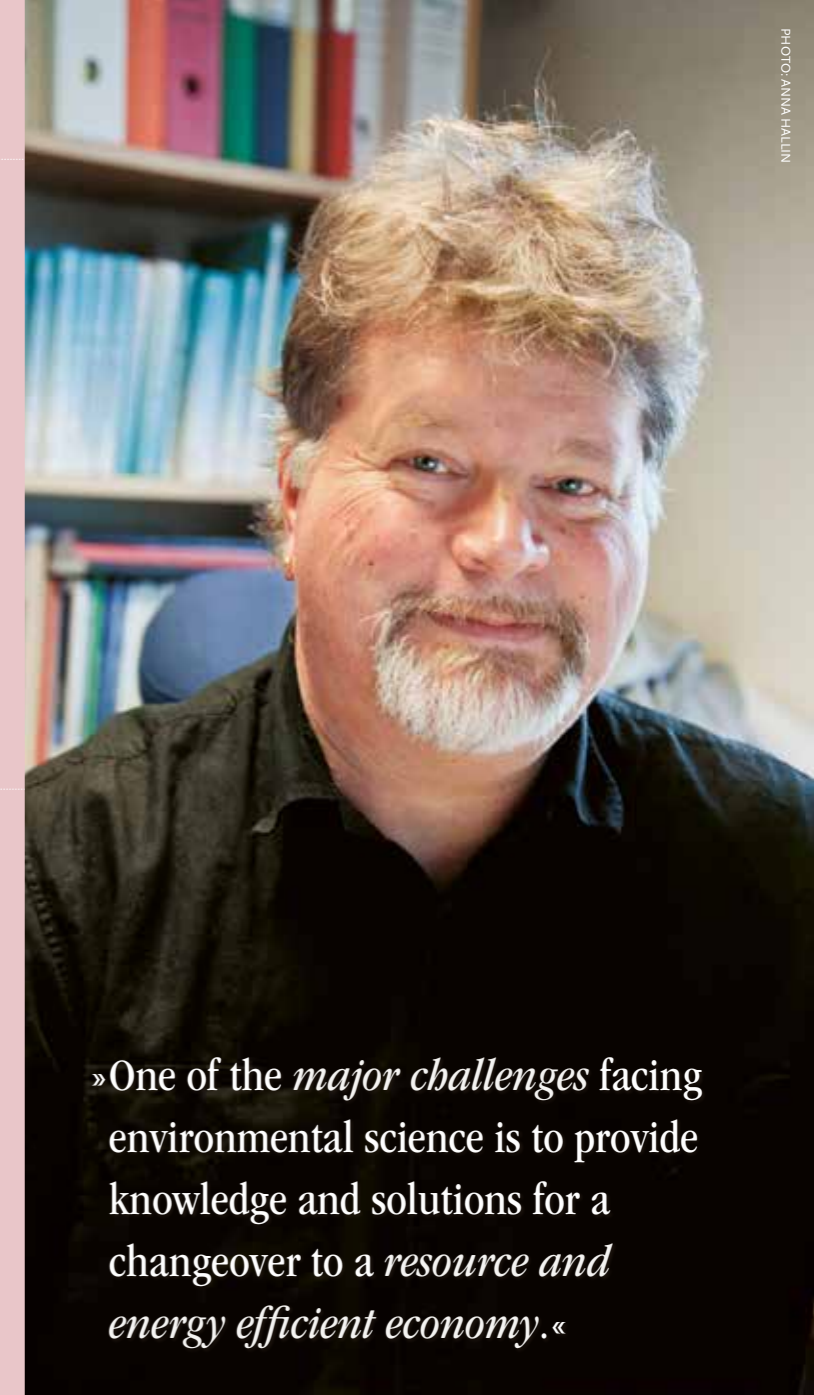


PHOTO: ANNA HALLIN

*Theme:*

# RESOURCE-EFFICIENT PRODUCTS & WASTE

## THEME FOCUS

The overarching focus of this theme is the development of methods and tools for sustainable products and closed-loop cycles. An important task is to identify both obstacles and opportunities for a more sustainable consumption. Frequently there is need to explore practices for decision making related to complex issues, where systems analysis and life-cycle thinking are necessary components – as are consequence analyses of action outcomes, product or manufacturing changes and policy instruments.

Ecolabelling and the carbon footprint concept have had a considerable impact, but if we are to achieve further improvements in a resource-efficient and non-toxic closed-loop cycle, additional tools and incentives are necessary.

### Research areas within

#### Resource-efficient Products & Waste :

- Systems analysis of goods and services.
- Closed-loop recycling and waste.
- Innovation.
- Sustainable consumption and new business models.

# *Fusions will reduce food waste in Europe*

STRAIGHT CUCUMBERS, REGIMENTED BANANAS AND TOMATOES. PRODUCE THAT DOESN'T CONFORM IS DISCARDED ALREADY AT HARVEST TIME. THE FUSIONS PROJECT INVESTIGATES THE WHOLE FOOD CHAIN AND WORKS TO REDUCE ACCELERATING FOOD WASTE.

**I**T'S NOT AN EASY TASK that Åsa STENMARCK, a researcher at IVL, is attempting. The project spans numerous research groups, government agencies, interest groups and companies from the food industry as well as commercial interests across 13 countries, and aims, through social innovation, to discourage food loss and waste across the whole supply chain.

–Just finding a common definition for the term food waste is difficult. It can be broken down – things you should throw away, such as apple cores, and things that are discarded unnecessarily, for example, if an apple is discoloured and for that reason we don't think it can be eaten. A lot depends on cultural differences

and whereabouts in the food chain you are. At a slaughterhouse, for example, skin and bones aren't considered food waste, but for the consumer the skin of a salmon is just garbage, Åsa Stenmarck observes.

IVL has had waste issues on its agenda for almost 30 years and recently the amount of food wasted is rising steeply. Because we throw away more and more food this problem is growing across the whole of the EU. In 2012, according to statistics, we binned 127 kilos of food per capita, an increase of ten kilos since 2010. So, politically speaking, there is considerable interest in resolving this issue. A lot of food is wasted because we have a pre-conceived idea of how things



ÅSA STENMARCK

Åsa is a graduate engineer and one of IVL's waste experts with extensive international experience..

should be, and what they should look like. Mostly we throw away bread, fruit and vegetables, as well as perishable goods like milk, but we discard a lot of meat as well.

–One problem is that we are so far removed from food nowadays – it's just so easy to go down to the shops and buy more. And today food is so very cheap, so there is no great financial loss involved in throwing it away, says Åsa.

Åsa compares to the past when people had to produce their own food. If you slaughtered a pig you had to use every little bit, no one would even think of discarding the

tinest of ears.

–But even the best-before labelling is a problem with certain goods that last significantly longer than the date stamped on them would suggest. For example, dates on eggs are for when they are stored at room temperature, but in Sweden they are usually kept in the fridge, which means they can last up for up to a month longer, so a lot of food is thrown away quite unnecessarily. We must identify these flaws and address them, says Åsa Stenmarck.

**A holistic approach is vital**  
Establishing guidelines for a uniform approach to food

»Establishing guidelines for a uniform approach to food waste across the EU is important, but there is also a lot to do in the home market.«

waste across the EU is important, but there is still a lot to do here at home. IVL is very much engaged at a Nordic level with focus on sustainable waste management. Issues range from making things easier for consumers by designing better waste bags, to instructing municipalities on how to measure and evaluate the resource efficiency of waste management.

When IVL addresses waste issues, the focus is on inclusivity and resource efficiency. This was especially true of the six-year Sustainable Waste research programme that combined economics with behav-

oural and future studies, and law and ethnology.

The same approach has been adopted in ongoing projects that investigate the potential for efficient collection, sorting and recycling of plastic waste in the building industry. An illustration of the breadth of IVL's research with regards to lean products and waste is a project which turns fish offal and bycatch into renewable energy in the form of biogas or biodiesel, which is then used to fuel fishing boats. The aim is to achieve more sustainable fisheries through increased resource utilisation. ❖

*Theme:*

# CLIMATE & ENERGY

## **THEME FOCUS**

Work in the Climate & Energy thematic area has a scientific foundation. However, our focus is primarily on actions, policy issues and instruments designed to reduce greenhouse gas emissions, as well as on the causes and consequences of climate change.

The issue of adaptation to climate change is important, and we focus predominantly on risk and vulnerability analyses. We also investigate how policy decisions at local, regional and global levels impact climate – both directly and indirectly.

Energy systems analysis is a key activity at IVL and we place a great emphasis on resource efficiency and minimal environmental impact throughout the entire chain. Particularly relevant is the issue of the climate performance of biofuels, and we help agencies and companies to interpret and calculate biofuel sustainability criteria.

### **Research areas within Climate & Energy:**

- Policy, decision support and climate strategies.
- Energy system and measures.
- Causation and effects.
- Renewable energy.

# *Emissions trading – a toothless colossus or a giant with potential?*

THE CLIMATE & ENERGY THEMATIC AREA TARGETS POLICY ISSUES AND INSTRUMENTS DESIGNED TO REDUCE GREENHOUSE GAS EMISSIONS. OVER THE PAST YEAR THE EU EMISSIONS TRADING SCHEME – EU ETS HAS BEEN A HOT TOPIC OF DISCUSSION.

**T**O DATE EU ETS HAS BEEN VIRTUALLY USELESS. This is no exaggeration. Since 2011, the price of emission permits has fallen from around EUR 15 per ton carbon dioxide to EUR 6 per ton. By comparison, the Swedish carbon tax is somewhere in the region of EUR 120. As far as Sweden is concerned the system has hitherto failed to achieve any substantial reduction in emissions or encourage any green changeovers. But

the system is still not without value.

This is what Lars Zetterberg says, and he has studied EU ETS since its introduction in 2005, and written a thesis on the subject. He was also involved when IVL began to map and evaluate Swedish carbon dioxide emissions as far back as twenty years ago. Like many others, he thinks that the price of carbon dioxide is much too low, but at the same time he stresses that the fact that there is now

a price on carbon in 31 countries means there has been some degree of success. Emissions trading is just an empty vessel to be filled with content. EU ETS can be a great tool but it must be honed to a fine edge if it is to function as intended.

– In itself emissions trading works; permits are bought and sold on a single market. Other countries and regions have followed suit; there are now a dozen ETS globally and more are on the way. The system is

»EU ETS is changing all the time, new systems are emerging across the world and the climate issue in all its aspects will become increasingly important.«

#### LARS ZETTERBERG

Lars Zetterberg is a passionate skier and has carried out extensive research on climate policy and policy instruments such as the EU Emissions Trading System.

duplicated and improved upon, in some places a price floor has been introduced to guarantee a minimum price and the volume of emissions covered by the trade has increased.

#### Policy instruments research important at IVL

Emissions trading has become somewhat of an IVL speciality, some time ago we began to assemble research expertise on policy instruments. Ten years ago, IVL was granted funds by the non-profit Mistra foundation to research emissions trading under the Clipore programme, and in particular to build up a network of international research institutes.

One of the lessons to be

learned from Clipore and its follow-up programme Mistra Indigo, is that emissions trading shows us that reducing emissions is cheaper than we thought. But everything indicates that under EU ETS the carbon price will be low for quite some time, and that a major reform is required if the trading system is to stimulate truly climate-friendly investments.

Lars Zetterberg believes that we can expect even greater global emissions trading in about a decade's time, provided that the EU trading system can be salvaged.

–I believe at least 20 per cent of global emissions will be covered by ETS, probably more. China's ambition is to cover all

emissions in a proprietary trading system, and China accounts for 25 per cent of global emissions. It is doubtful whether the U.S. is moving in this direction; at the moment they seem to favour the introduction of a carbon tax. EU ETS is changing all the time, new systems are emerging across the world and the climate issue in all its aspects will become increasingly important, particularly for industry. IVL will continue to be an important player in climate policy research, says Lars Zetterberg.

Today, IVL's policy research has been broadened to include areas other than climate, such as waste management and sustainable consumption.

Energy systems analysis is a

particular area of strength in the energy sector, as is scenario planning. In this respect, for example, IVL has analysed the possible implications of climate change for the energy sector.

More recently, a number of studies on CCS (Carbon Capture and Storage) have broken new ground regarding the impact of peat on climate. Exchanges with international partners have been consistently high, through, among other things, the ongoing research program Mistra Indigo. Throughout 2013 IVL worked closely with the government and the Environment Minister, Lena Ek, on an analysis of Swedish and EU-wide climate policy. ❖



*Theme:*

# SUSTAINABLE BUILDING

## THEME FOCUS

Sustainable building is the scope of action at IVL that affects most aspects of society, although the construction and property sector still constitutes the main market. Since this sector accounts for a large part of society's environmental impact – not least in terms of resource, energy, and chemical use, there is huge potential for improvement.

IVL's role is to help create socially and economically sustainable urban environments, and that includes wholesome and healthy indoor environments. This means among other things that we will help to cut down on the use of scarce resources in the urban environment and reduce the spread of things that have a negative impact on people and the environment.

In conclusion, we research everything from urban planning to energy efficiency, materials and the indoor environment.

### Research areas within Sustainable Building:

- Urban settlements.
- Buildings.
- Building elements and material.

# Social sustainability is the greatest challenge

IMAGINE SHAPING YOUR OWN WORLD, HAVING A SAY IN HOW YOUR NEIGHBOURHOOD IS TO BE MODERNISED. THE RESIDENTS OF ALBY, A SUBURB TO THE SOUTH OF STOCKHOLM, TAKE PART IN A MAKEOVER OF THE AREA, BUILT DURING THE SO-CALLED MILLION HOMES PROGRAMME. THIS COMMUNITY LIKE MANY OTHERS OF A SIMILAR NATURE IS NOW IN DIRE NEED OF RENEWAL AT THE SAME TIME AS IT FACES MAJOR SOCIAL AND ECONOMIC CHALLENGES.

**T**HE MILLION PROGRAMME WAS AN OFFENSIVE DRIVE implemented throughout the 1960s and 70s. Housing shortages were acute, vigorous economic growth and rising real incomes induced politicians to try new solutions. Overcrowding in the cities and substandard housing was to be eradicated.

—But things did not quite turn out as planned. Today, a large percentage of apartment blocks built under the million programme are in dire need of

repair due to lack of maintenance, and in addition a lot of them badly leak energy, says Anja Karlsson, deputy project manager of the SubUrbanLab project, tasked with developing the so-called Urban Living Labs in Alby, one of the largest million program areas in the Stockholm region

But it's not "just" about overhaul. Many of the Million programme areas also face major challenges in terms of high unemployment and children and teenagers leaving school before completing their edu-

cation. Renovation and refurbishment often raise rents, which means that many residents may be forced to move.

—On the other hand something must be done if these dwellings are to be habitable in the future. There is a brief window of opportunity during which it is feasible to improve energy efficiency and make these homes environmentally friendly, at the same time as we target social sustainability, says Anja Karlsson.

In Alby, where about 12,000 people live, 20 young people between 12 and 18 years of age have been given the task of renewing an area under the aegis of the Shape Your World-initiative. This is to be a site of their own choice and a place they feel is in need of rejuvenation. The prime focus is urban gardening – the planting and cultivation of a piece of land where co-creation is important. The youngsters are provided with guidelines and a budget, but otherwise they are pretty much left to do as they like.

—It's mostly about learning and creativity. The entire SubUrbanLab project is concerned with developing methods of interaction and investigating how communities can be renewed in collaboration with residents and other stakeholders.

The hope is that by elaborating and implementing measures in this partnership it will be possible to reinforce renewal and hence the area's social, economic and environmental sustainability. It's exciting that everything is so open, but it's hard to say what we will finish up with, says Anja Karlsson.

Anja has previous experience of working in an active dialogue when she was involved in the EU-funded project GreenClimeAdapt in Malmö, that showed how it was possible

»There is a brief window of opportunity during which it will be possible to improve energy efficiency and make homes environmentally friendly, while simultaneously working with social sustainability.«



ANJA KARLSSON

Anja is a social scientist. She is concerned with the renewal of residential neighbourhoods and together with the people who live there she works to make them more attractive and sustainable.

to adapt cities to climate using green solutions, such as green stormwater runoffs and green vegetated roofs. This included an ongoing dialogue with a broad group of stakeholders regarding the management of increased water flows in Risebergabäcken, Malmö.

Many of the projects and assignments carried out under the Sustainable Building

thematic area are concerned with energy efficiency. These include a major research programme funded by the EU Seventh Framework Programme that also deals with Million programme areas in great need of renewal. The project aims at finding techniques, methods and business models suitable for large-scale renovation to meet a near-zero

energy standard.

In a couple of projects in China and Inner Mongolia, IVL implements methods leveraging energy-efficient and socially-sustainable building, as well as a "greener" construction industry. Similarly, the experiences gained in the SubUrbanLab project will be spread further afield in Europe, says Anja Karlsson. ❖



*Theme:*

# SUSTAINABLE PRODUCTION

## THEME FOCUS

Our focus on Sustainable Production spans from environmental technology solutions to organisational measures to promote a good working environment, effective management, and the social aspect of enterprise – something that influences working conditions in our customers' own facilities and those of their subcontractors.

Our goal is to assist and analyse the needs of businesses to evaluate and develop operations and production to high environmental and safety standards, and simultaneously maximise profitability and market advantage.

IVL works closely with a range of companies and industries to develop systems for lean environmental solutions, as well as technical and organisational measures designed to promote a good working environment and effective environmental management practices.

Effective innovation and smart environmental technologies are needed if we are to meet global environmental challenges in a sustainable manner.

Here the way in which IVL works with demonstrators at the Hammarby Sjöstadsvärk test facility has proven to be extremely successful.

### Research areas within Sustainable Production:

- Resource Efficient production and process optimisation.
- Corporate sustainability and sustainable working life.
- Environmental technology and innovation.

# The dream of clean water drives technological change

GREEN WATER AND SANITATION TECHNOLOGIES ARE BIG AND GROWING BUSINESS FOR IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE. THE HUB OF THIS DEVELOPMENT IS HAMMARBY SJÖSTADSVERK. HERE COLLABORATION BETWEEN RESEARCHERS AND COMPANIES GIVES RISE TO CREATIVE AND INNOVATIVE THINKING AND NEW BUSINESS OPPORTUNITIES.

**T**HE HAMMARBY SJÖSTADSVERK PILOT facility teems with activity. It seethes with researchers from IVL, KTH and the universities, as well as companies testing new technologies. Lars Bengtsson and Elin Ottosson are completely at home here. – I'm involved in most of the projects, because among other

things I do a lot of analyses. It's a very exciting environment for a newly graduated engineer like me, says Elin Ottosson.

Lars Bengtsson, Director of Operations and Development Engineer at the plant agrees.

– The people in the water and wastewater sector have a dream job. Imagine working in a creative environment together with committed and knowledgeable colleagues, who are attempt-

ing to solve some of the world's major challenges, he says.

Lars is especially engaged in projects that are trying to increase biogas extraction within the purification process; an undertaking that fits in well with IVL's overall vision, the transformation of wastewater treatment plants into net producers of energy, clean water and nutrients.

In 2013 several of the actors

## ELIN OTTOSSON

Elin Ottosson is a newly graduated engineer and has found her dream job in the creative environment at Hammarby Sjöstadverk.



PHOTO: MAGNUS LAM KARLSSON

involved in the Hammarby Sjöstad facility decided to cooperate under an umbrella project, SWIC – Sweden Water Innovation Centre.

One of the more interesting results spawned in the creative environment at the pilot plant is a consortium consisting of IVL and a group of companies – Scania, Malmbergs and Xylem – which is able to offer Chinese cities a complete solution for wastewater treatment technology, public transport and cleaner air.

Several of the projects at the facility are related to new policy

requirements from the EU Water Framework and others. Today, demands for the improved purification of pharmaceutical residues are well known, as are requirements for full nitrogen removal the year round – something that many of today's wastewater treatment plant have found difficult to manage without a huge investment. This is also the case for several of the treatment plants in Stockholm, and to meet increased loads and tougher requirements, Stockholm Water, in collaboration with IVL, has tested a Membrane

Biological Reactor (MBR) at the Hammarby Sjöstad facility. The experiment has been a success and the city of Stockholm has decided to invest over six billion in re-building the Henriksdal sewage plant.

Much of IVL's competence and many of its skill sets in the Sustainable Production thematic area are beneficial to, and benefit from activities at Hammarby Sjöstadverk. Here can be mentioned the vast field of research tasked with increasing resource efficiency and process optimisation. The working environment is also

under the microscope; IVL researchers have developed a knowledge platform that addresses occupational issues at wastewater treatment plants.

R&D experience at the Hammarby Sjöstad plant was one of the main reasons that IVL was appointed last year to coordinate the EU-funded R3Water research programme, with a budget of over SEK70 million. The goal of the programme is to improve the efficiency of municipal water treatment across Europe. ❖

*Theme:*

# AIR & TRANSPORT

**THEME FOCUS**

Here the focus is on air quality and transport issues, and includes research on emissions and the dispersion of air pollutants, emissions from the various modes of transport and in particular the consequences for air quality and particulate fallout and their effects on ecosystems.

Research on air pollution and the development of intervention strategies is one of the areas where IVL has extensive experience and broad expertise. In addition to recurring work with air quality monitoring and emission inventories, we have recently targeted research and development in the transport sector with an emphasis on environmental and climate issues. For example, models and tools to analyse the environmental and climate impact of various transport and logistics solutions and to calculate both the direct cost and the external costs for society.

**Research areas within Air & Transport:**

- Air quality and exposure.
- Air pollution and ecosystems.
- International air pollution control strategies.
- Sustainable transports, fuel and logistics solutions.

# From volcanoes in the Congo to roads in China

NOT MUCH LARGER THAN A TWO EURO COIN AND WEIGHING LESS THAN TEN GRAMMES THEY CAN BE STORED AT ROOM TEMPERATURE, WITHSTAND ALL TYPES OF WEATHER CONDITIONS AND NEED NO ELECTRICITY. SINCE 1989 IVL PASSIVE SAMPLERS HAVE BEEN USED WORLDWIDE TO MEASURE AIR POLLUTION. NOW THEY'RE A HOT ITEM IN CHINA.

# A

growing number of local authorities are interested in continuous and comprehensive monitoring, especially of particulates. Following efforts to

**S FAR BACK AS 1989** IVL started to use passive samplers to measure air pollution in China. Back then this was fairly small scale, and air pollution was only just starting to attract attention. Today, Chinese air quality issues are of an entirely different dimension and a

establish a Swedish-Chinese air-monitoring laboratory in China several large cities have shown an interest in passive samplers.

This doesn't surprise Martin Ferm, who developed IVL's first passive samplers in 1989. To this day he is still working on improving them.

– IVL passive samplers are in great demand all over the world and we dispatch them back and forth across the globe, he says.

The technique used is based on thermal diffusion. Molecules are collected in the sampler, which shows a concentration value over time.

In Sweden you can find the

samplers mounted under protective stove covers, at cross-roads and in urban squares where urban air monitoring is in progress. Most orders are sent abroad, mainly to other countries in Europe. But passive samplers have also ended up in unexpected places such as the Congolese volcanoes, the basement archives of libraries and museums, and in fertilized fields where ammonia emissions are considerable. They are also popular in parts of South America, Africa and in the Arab countries. When the sampler was new measurements were made in countries where

air pollution had never previously been studied, such as Papua New Guinea.

The samplers are prepared and analysed at the IVL lab in Gothenburg. Each year, more than 15,000 samplers are analysed. And the number is on the increase.

Last year over a hundred large and medium sized cities across China were ranked as severely affected by air pollution. Just now technologies for monitoring of air pollution are of especial interest to China. Through the Chinese research institute CRAES (Chinese Research Academy of Environmen-

tal Science) IVL has established a partnership with Chinese environmental regulators for air monitoring using passive samplers.

– Perhaps the most important contribution we can make is our organisational skills – from how to compile an emission inventory that meets international standards, all the way through measuring techniques to decision support and response tools. It's here that China takes a particular interest. They already have first-rate air pollution monitoring, at least intermittently. However, they lack the ability to measure

cost-effectively at multiple points simultaneously, and this passive samplers are able to do, says Karin Sjöberg, Head of Air Pollution and Abatement Strategies at IVL.

After a successful measurement campaign in Taiyuan in September 2013, more cities have expressed an interest, including China's fourth largest city, Tianjin, which is located just to the south of Beijing. The ability to map large geographic areas over time and to identify hotspots is an important complement to China's long-term ambition to improve air quality. ♦



#### MARTIN FERM

Martin Ferm developed the first IVL passive air pollution samplers back in 1989. Every year 15,000 samplers are analysed at the IVL lab.

*Theme:*

# WATER & SOIL

## *THEME FOCUS*

Our operations target entire water systems – freshwater and marine environments as well as groundwater, wastewater and stormwater. We do everything, we identify pollution sources, carry out sampling and analysis, develop early warning systems, conduct risk assessments and build contaminant transport models.

It's vital to implement the EU Water Directive, the Marine Directive and the REACH Chemicals Directive, and that's why we engage in projects that will enable us to develop support-planning tools and leverage the change-over to the new environmental requirements spelled out in these directives. Here, an important question is how industry can use less water and at the same time minimise the discharge of chemicals to the environment.

In recent years we have begun to stress the impact of agriculture and forestry issues on natural resources and the environment.

In addition we have clearly seen how there is an increasing need for a comprehensive analysis that includes both effects on the ecosystem and the socioeconomic sector. For this reason we work actively to develop the concept of ecosystem services.

### **Research areas within Water & Soil:**

- Water management and climate adaptation.
- Forestry and Agriculture, environmental impact of agricultural industry.
- Chemicals, effects, incidence and dispersion in the environment.
- Risk assessment.
- Marine environment.

# The fish are telling researchers more about toxins

IS IT SAFE TO EAT FISH CAUGHT NEAR STOCKHOLM OR ARE THEY TOO FULL OF TOXIC POLLUTANTS? HOW CONTAMINATED IS THE SEA AND SEABED AND ARE LEVELS INCREASING OR DECREASING OVER TIME? PERCH AND SEDIMENT SAMPLES FROM THE EASTERN END OF LAKE MÄLAREN AND THE OUTER ISLANDS GIVE RESEARCHERS SOME ANSWERS.

**R** **RESEARCHER MAGNUS KARLSSON** empties a net in Steninge bay outside Stockholm. He'll take the catch back to the IVL lab where it will be analysed to determine the level of pollution.

—In this study we want to find out how a big city like Stockholm affects the surrounding waters. We sample 19 different locations and work our way closer and closer to the source. Since environmental toxins accumulate in fish and sediments this will give us a good picture of how contaminated things really are, he says.

The study can be used to help water management stakeholders and authorities assess the need for additional environmental protection measures, as well as advisory recommendations for fish consumption in the region.

For me it is important that we contribute to rational conservation practices and in this respect the extensive experience at IVL is an asset. It gives us a perspective on things, not only do we identify environmental problems, but we can also place them in the bigger picture and predict the effects of different courses of action, Magnus Karlsson says.

Historically, a lot of toxins have leaked into the waters around Stockholm. High concentrations of older pollutants such as mercury are often found near dock areas while emissions linked to urbanisation, and drug residues can be found near sewage plant outlets. Researchers analyse both older, known contaminants such as mercury, PCB, dioxins, DDT and PAHs, and newer substances such as organotin compounds from antifouling paints, brominated flame retardants and pharmaceutical residues. IVL has its own lab and Magnus Karlsson finds this a great advantage.

— It means you can be in constant touch with chemists, and follow up on interesting results, and it also means that the company is able to maintain rigorous sampling standards.

PFOS has been in the news a lot since the discovery that it has leaked into the drinking water at several locations in Sweden. The highly fluorinated substance, previously a component of fire foam, is now prohibited. IVL has researched PFOS for many years, in the RE-PATH research project and elsewhere. PFOS is highly persistent in the environment and IVL's models indicate that it will take 60–70 years before concentrations at contamina-

ted sites are down to background levels.

— Conservationists have successfully combatted the earlier environmental toxins and it is extremely gratifying and that, for example, seals and sea eagles are returning. But when these substances were banned society replaced them with new chemicals and these are the substances we see turning up in the environment now.

In an analysis of seabird eggs IVL carried out together with the Norwegian Institute for Air Research, NILU, researchers discovered 158 different pollutants. Many of these substances, including the new flame retardants, had been

considered as better alternatives to now-banned substances.

— We see that the levels of certain substances are increasing, but we don't always know how toxic they really are. And it's also alarming how often we find a cocktail of different chemicals. Low concentrations of multiple substances can have a combined effect.

The development of new water treatment technologies is high on IVL's agenda. At the IVL and KTH joint research facility Hammarby Sjöstadsvärk new purification methods are being tested, including the use of membrane technology to make the purification of organic pollutants, nitrogen

and phosphorus more effective. It is also hoped that this technology will lead to an improved sanitisation of drug residues, which may become necessary in the future.

— In the short run treatment plants make a big difference to our aquatic environment; however, in the long run we must get rid of pollution emission sources. Consumer demand plays an important role here, and the products we choose to buy. We need to change our consumption patterns and influence things that way, Magnus Karlsson says. ❖

## MAGNUS KARLSSON

Magnus is a civil engineer and has written his Ph.D. on pollution transport in the archipelago. For him personally, it is important to make a contribution to rational conservation management.



PHOTO: MAGNUS HALGREN

# DIRECTORS' REPORT

THE BOARD AND CEO OF IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE LTD. HEREBY SUBMIT THEIR REPORT AND STATEMENT OF ACCOUNTS FOR THE OPERATING YEAR 1 JANUARY 2012 TO 31 DECEMBER 2012, THE COMPANY'S THIRTY-SECOND FISCAL YEAR.

## Consolidated Operations

IVL Swedish Environmental Research Institute undertakes applied research and contract assignments across the entire environment and sustainability area. Our customers can be found in all sectors of industry, government agencies and organisations. Operations are based in Sweden and Europe, but our customers are located throughout the world, particularly in China where IVL has been active for more than 25 years.

IVL was founded in 1966 and is owned by the Foundation of the Institute for Water and Air Research (SIVL). The Swedish government and the Swedish business sector appoint directors to serve on IVL and SIVL boards. IVL has operated as a limited company since 1982.

In addition to the parent company the group consists of the subsidiary BASTAonline AB and the joint venture company SEC in China. Operations are predominantly carried under the auspices of the parent company.

### PARENT COMPANY

The purpose of IVL's operations is to promote ecological, economic and socially sustainable growth within business and society at large by performing research and contract assignments. The operation is organised into four operational units, together with research, business development and marketing units operating laterally across the organisation. IVL's research activities are defined in a long-term plan that is updated continuously by a research council. All units interact in a matrix organisation covering six thematic areas: Climate and Energy; Water and Soil; Air and Transport; Sustainable Building; Sustainable Production, and Resource-efficient Products and Waste.

IVL's working methodology is characterised by an interdisciplinary and holistic approach.

The company works actively across the entire area of sustainability. In addition to its traditional expertise in the environmental field, IVL now employs behavioural and social scientists, financial and communications experts.

Our activities range across the entire industrial spectrum and our customers represent Swedish society in its entirety, from small and medium enterprises to large multinationals, industrial and trade organisations, public agencies – of which the Swedish EPA is the biggest single principal – local authorities and other organisations.

### International operations

IVL conducts extensive international operations concentrated mainly on China and India, Russia and the EECCA countries. During 2013, the potential for closer collaboration with South American countries was investigated. Europe is regarded as the company's domestic market.

### Communication, training and seminars

Communication, and the organisation of courses and seminars, falls under Business Development & Marketing. This means that communication is an integral part of the company's business development.

Communication has become increasingly important, both as a component in research programmes and in general terms as a means of spreading information about IVL's activities. In this regard courses and seminars are essential, particularly as a means to consolidate IVL's role as an arena where stakeholders from the research, industry, public and political worlds can meet. This was especially the case with, "The Baltic Sea – sustainable growth, collaboration and new initiatives," "The state of the environment", "The road to non-toxic building" and "Sustainable transports" conferences. In 2013, IVL produced over 60 courses and seminars for both internal and external customers.

### COLLABORATION WITH UNIVERSITIES AND INSTITUTES OF TECHNOLOGY

The establishment and development of close collaborative undertakings with the business sector, international research bodies and tertiary institutions is a core component in IVL's strategic approach. As part of this, IVL has formalised its collaboration with the Royal Institute of Technology, Stockholm (KTH), Chalmers University of Technology, Gothenburg (CTH), and the Faculty of Engineering at Lund University (LTH).

In 2013 IVL and KTH signed a letter of intent outlining a long-term partnership for the mutual promotion of research, education and innovation. Special attention is to be given to the development of research partnerships in areas such as renewable energy, transport, sustainable urban planning, resource-efficient products and waste, and recycling, together with environmental engineering and ergonomics.

Together with Chalmers University of Technology IVL has initiated a dedicated programme aimed at developing an infrastructure for long-term competence development and research in the transport and logistics area.

# ANNUAL REPORT

IVL's primary role is to develop a database and support function for long-term data processing, and to initiate and pursue transport research studies in collaboration with CTH.

At present, four IVL employees hold adjunct professorships at KTH, CTH and the University of Gothenburg, while a fourth holds a VINNMER fellowship at CTH under the auspices of the Chalmers Energy Initiative.

### Hammarby Sjöstadsverk

IVL and KTH are joint owners of the Hammarby Sjöstadsverk R&D facility, which is a national resource for the development of waste-water treatment technologies. The facility is used both by IVL and KTH for their own research, and by outside stakeholders for testing new treatment technologies on effluents of various types.

In 2013, Sweden launched the Water Innovation Centre (SWIC), which is based at Hammarby Sjöstadsverk. In addition to IVL and KTH the initiative for this was taken 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.

A large proportion of activities revolve around the project "Tomorrow's municipal water treatment – a production plant for public goods", funded by Vinnova. This project incorporates the four-year SEK47 million research project currently being carried out jointly by IVL, Xylem and the Swedish Association of Graduate Engineers.

Hammarby Sjöstadsverk is member of a collaborative partnership with KTH, Uppsala University, the Swedish University of Agricultural Sciences (SLU) and Mälardalen University, a centre for municipal wastewater treatment with funding from the Swedish Water & Wastewater Association (SWWA), and municipal authorities in the Mälardalen region.

### Other cooperative ventures and important networks

IVL's role is to act as bridgebuilder between the research and business communities, and to create arenas of interaction between different social actors. This is one of the reasons why IVL leads or participates in networks and cooperative ventures of various kinds, some of which are featured above. Others include:

- **ENERO** – European Network of Environmental Research Organisations, a group of European research institutes operating under the umbrella of the European Research Area (ERA). IVL is an active member.
- **EurAqua** – the European Network of Freshwater Research Organisations. IVL is the Swedish representative.
- **NORMAN** – a network of reference laboratories and research organisations involved in the screening of new, environmentally hazardous chemicals. Established in 2005 with support from the EU's Sixth Framework Programme, NORMAN is now a permanent network financed by its membership. IVL has been a founding member since 2009.
- **NTM** – the Swedish Network for Transport and Environment. As member of the network, IVL has worked in formal collaboration with NTM since 2009. The aim is to strengthen cooperation by placing IVL's expertise at the disposal of NTM members and working groups.
- **SMED** – the Swedish Environmental Emissions Database, 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 compile and develop Swedish

competence in emission statistics relating to action programmes in the fields of air and water pollution, waste, and hazardous substances and chemicals. Since 2006 SMED has supplied all data required for Sweden's international reporting in these areas.

- **Stockholm Cleantech** – a development of the Stockholm Environmental Technology Centre was initiated by IVL and is administrated by the company. Stockholm Cleantech interconnects visitors, stakeholders projects, technologies, companies and researchers in the environmental technology field in the Stockholm/Mälardalen region.
- **SGBC** – Sweden Green Building Council, a non-profit organisation open to all Swedish building and property sector companies and organisations wishing develop and influence sustainability activities in the sector. SGBC was jointly founded by IVL, Skanska, NCC, Fastighetsägarna and Akademiska Hus.

## Group Companies

### BASTAONLINE AB

Bastaonline AB (CIN 556719-5697) Since 2007 the company is owned by IVL (60%) and the Swedish Construction Federation (40%) The company manages and develops the BASTA system for evaluating and phasing out particularly hazardous substances in building materials. Totalling 58 initially, the number of suppliers joining the system had increased to 314 by the end of 2013, at which time 19,000 products, corresponding to over 85,000 individual items, were registered.

In 2013 BASTA launched an educational outreach programme targeting users of the BASTA system and BASTA suppliers. Five courses were held during the year with a total of 70 participants.

Strategic collaboration between Skanska, the Swedish Transport Administration and IVL in the "Building with Basta" project continued in 2013. The project aims to develop a working methodology for non-toxic construction.

Net sales for the year rose by 44% to SEK 4,786 (3,326) thousand and a profit after financial items of SEK 429 (90) thousand.

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

For more than ten years, IVL and the Tianjin Academy of Environmental Sciences (TAES) have been joint owners of the Sino-Swedish Environmental Technology Development Centre (SEC), based in Tianjin. SEC has helped a large number of Swedish environmental technology companies to enter the Chinese market.

### IVL IN BEIJING

IVL has had an office in Beijing for six years. The company will now launch a wholly owned subsidiary. In recent years activities in the China office have increased dramatically and at the end of 2013 there were seven employees. This expansion is expected to continue in the years to come. An important reason for establishing a subsidiary in China is to make it possible for IVL to tender for Chinese projects, as well as to provide an opportunity for the transfer of funds between companies.

## Financial Performance

### THE GROUP

Consolidated revenues for the fiscal year increased by 3% and amounted to SEK255,353 (247,827) thousand and a profit after financial items of SEK10,381 (7,692) thousand. Net profit after tax amounted to SEK8,176 (5,304) thousand. Return on equity was 12.3 (9.7)% and return on assets 5.7 (5.5)%. Average return on equity over the last five years is 8.5%.

The group's total assets increased to SEK182,359 (151,199) thousand and equity increased to SEK70,519 (61,171) thousand. Cash flow was positive at 40,579 (6,956) thousand.

Investments in tangible and intangible fixed assets amounted to SEK10,789 (6,215) thousand. The equity ratio is somewhat lower 38.7 (39.4)%.

### THE PARENT COMPANY

IVL's net sales for the financial year increased by 3%, totalling SEK254,148 (247,139) thousand, yielding a net profit after financial items of SEK11,205 (8,009) thousand. Net profit after taxes was SEK6,678 (4,265) thousand.

Total assets amounted to SEK178,084 (150,744) thousand and total equity capital to SEK 47,640 (40 961) thousand. Adjusted equity capital was estimated at SEK54,800 (45,711) thousand. Cash flow for the year was SEK40,477 (7,125) thousand. At the end of the year a substantial advance of 22.5 million from an EU project for which IVL is Coordinator explains 55% of the cash flow. The project with start date 1 January 2014 is IVL's biggest EU project to date with a budget of EUR7.7 million of which IVL's share is EUR1.8 million.

The return on adjusted equity was 17.4 (13.7)% and the return on capital employed 6.9 (6.0)%. Average yield on equity for the last five years was 8.6%.

Capital investment in inventories and equipment totalled SEK7,264 (6,208) thousand. The equity ratio increased to 30.8 (30.3)%.

For a more detailed multi-year overview and key figures refer to Note 2.

## Organisation and Corporate Governance

### OWNERS

IVL is a wholly owned by the Foundation Institute for Water and Air Research (SIVL), CIN 802006-2611, with head office in Stockholm. The aim of the foundation is to promote the long-term conditions required for environmental research and, through ownership, guarantee the autonomous status of IVL.

SIVL is governed by a representative board of directors, of whom the chairman and six members are appointed by the Swedish state, and seven members by the Swedish business community. SIVL is the sole owner of IVL and proposes members to the board of IVL, partly by inviting nominations from industry representatives, and partly by inviting nominations from government.

### BOARD ACTIVITIES

In 2013 the board held four ordinary meetings, in addition to an inaugural meeting and a strategy meeting, which were held in September in conjunction with the Board of SIVL.

Board activities are primarily focused on strategic issues, financial statements, major investments and acquisitions. The board receives regular accounts of the performance of the company's operations and finances. Additionally, in 2013 the board decided to implement a revised investment policy. Selections of the company's operations are presented at regular meetings. The CEO reports to the board meetings.

The board appoints a remuneration committee that is tasked to submit compensation guidelines and other terms of employment for the CEO and other members of executive management. The remuneration committee shall consist of at least two members, appointed for a term of two years.

### EXECUTIVE MANAGEMENT

The company's executive management group is comprised of the CEO, two executive vice presidents, the CFO and the Vice President of Research. From and including April 2014 the company will have a single vice president instead of two. The management group includes four unit heads, with the Director of Human Resources, Communications Director and Director of Quality and Environment as adjunct members.

### ORGANISATION

IVL's activities are organised in four operational units, which in turn are divided into a number of groups. Group managers, tasked with leading staff and with human resource capacity planning, are in charge of these groups. In addition there are Business Development and Marketing and Research units; the latter operating laterally across the entire organisation. IVL's research activities are defined in a long-term plan that is updated continuously by a research council. All units interact in a matrix organisation covering six thematic areas: *Climate & Energy, Water & Soil, Air & Transport, Sustainable Building, Sustainable Production and Resource-efficient Products & Waste*. The thematic areas also constitute IVL's market offering and are reflected in the so-called Theme Committees with external stakeholder members, established by the owner foundation SIVL.

## IT

A smoothly working IT infrastructure is indispensable and critical to the company's operations and the management of digital material, data, communication and information. It therefore vital to deploy robust login routines in order to restrict access to data and software to authorized persons. Backups are taken regularly to ensure that data can be restored with as little loss as possible. Some critical systems are built so that the in some measure business can continue to function as usual in the event of damage to the system and in addition provide support to the company's crisis management continuity plan.



## The environment and quality management

IVL deals with environmental and quality issues within the framework of an integrated management system. IVL is certified in accordance with ISO environmental and quality management standards ISO 14001 and ISO 9001 respectively. These certificates are maintained annually and re-certified by an accredited certification agency.

Part of the company's work and methods relating to sampling, field measurement and analysis is accredited and inspected regularly by SWEDAC (the Swedish national accreditation authority) in accordance with SS-EN ISO 17025:2005.

### QUALITY

IVL's quality activities have a customer relations focus. For this reason activities are monitored continuously to ensure that customers are satisfied with company services. The follow-up takes the form of telephone interviews. At least two customers per operational unit are interviewed. These are representative of business, local authorities and government agencies. Customer satisfaction index for 2013 was 4.0 (4.0). In addition to several improvement proposals, the internal report on the interviews revealed a positive image of IVL as a professional and important working partner and supplier.

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

### EU INVESTS IN MAJOR WATER INITIATIVE

In 2013, EU approved the R3Water research programme. The aim of this programme, coordinated by IVL, is to streamline municipal wastewater treatment. The programme has a budget in excess of SEK70 million.

### SUCCESSSES IN CHINA

In 2013, the success of operations in China continued. Business is expanding and a number of new projects and partnerships have been initiated. For example, IVL has started a consortium in collaboration with Scania, Malmberg and Xylem, whose purpose is to offer complete solutions for wastewater treatment and sludge management. Sludge from treatment plants is processed to generate biogas that is subsequently refined and used to fuel buses. This greatly improves air quality in large cities.

### AIR POLLUTION AND CLIMATE RESEARCH PROGRAMMES

In 2013, the six-year Swedish Clean Air Research Programme (SCARP), coordinated by IVL, whose objective has been to investigate the long-term impact of air pollution on health and the environment, came to a close. Later in the year, IVL was entrusted to lead the follow-up Swedish Clean Air & Climate Research Programme (SCAC), which will investigate how air pollution affects climate. The programme has received a grant of SEK25 million from the Swedish Environmental Protection Agency.

### INVESTMENT IN NEW LAB SYSTEM

More than SEK3 million has been invested in a new information system that will serve all lab operations. The new system, LabWare LIMS, will improve efficiency and further enhance the quality of IVL's laboratories.

### NEW FACILITY IN LYSEKIL

In January 2013, the establishment of a new marine facility in Lysekil strengthened IVL's marine operations. Three marine biologists, who previously ran the Lysekil N-research consultancy, have been recruited to staff the new facility.

### LEADERSHIP TRAINING

2013 saw the start of an internal focus on leadership training. The one-year programme targets executive leadership, unit managers and team leaders. This focus on leadership development should be seen as a contribution to the planned expansion of the company.

### VAT CASE

A 2010 court judgement prohibited IVL from claiming relief for tax paid on costs attributable to the company's grant-funded activities. In addition, the judgement was made retrospective over a period of five years. In 2012 an appeal by IVL against that part of the judgement was dismissed both by the Administrative Court in Stockholm and Administrative Court of Appeal in Stockholm. This decision is now the subject of a further appeal by the company to the Supreme Administrative Court of Appeal. The amount in question (approximately SEK7.7 million) has been paid to the Swedish Tax Board 2012.

## Expected development in the future and significant risks and uncertainties

Among the company's long-term goals, adopted by the Board of Directors, there is an explicit expansion target that envisions a doubling of sales by 2020, or a growth of 10 per cent per year. This growth is to be accomplished both organically and through acquisitions. However, it is not to be achieved by lowering the quality of research and contract assignments. This expansion is necessary if IVL is to continue contributing to sustainable growth in the business sector and society in general, as well as in the international market.

### MARKET

Europe, especially the Scandinavian countries, is IVL's largest market. Customers are located in a variety of industries, the energy, public and industrial sectors and the construction and property industries, among others. This means that the company is dependent on stable development in these areas to achieve its targets and manage the risks attendant on economic and structural change, as well as evolving market trends. At the same time, the fact that IVL is active in multiple markets, and in branches and industries subject to different business cycles, lessens the company's sensitivity to short-term fluctuations. Systematic and periodic assessments of the company's position in relation to the outside world means a constant readiness to deal with rapid change.

All in all therefore, IVL has been able to meet 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 European countries, IVL is in a relatively strong position. It should be noted,

however, that many European research institutions, several of which are IVL partners, been forced to cut back on their activities due to economic constraints.

### COMPETITORS

In each market where IVL is a player the company is forced to contend with major international competitors as well as smaller local ones. This poses a risk, as there is fierce competition for the most attractive commissions and the most competent employees. A continuous assessment of these risks is therefore necessary.

In order to attract and retain highly skilled employees the company invests in continual occupational training, and skills and leadership development. IVL can also offer large and highly sophisticated international projects, which is attractive to prospective employees.

Since 2013, IVL has been able to benefit from a certain amount of core funding for skill building and maintenance, something that most of the company's competitors have had access to for years. This reinforces the company's long-term ability to remain at the forefront of environmental research, which in turn increases competitiveness.

### FINANCIAL RISKS

The business activities of the IVL Group are exposed to financial risks, i.e., fluctuations in earnings and cash flow due to changes in exchange and interest rates, and credit risks. However, on the whole the financial risks are relatively low. Nonetheless, currency risks related to fluctuations in expected and contracted payments in EU projects amount to EURO6.2 million. A change of 10 cents in the exchange rate of the US dollar will impact the outcome by SEK867 thousand.

The company's credit risks consist of outstanding and non-invoiced consulting. IVL's 30 principal customers, accounting for approximately 73% of turnover, are large international companies, the European Commission and Swedish or foreign governmental institutions.

### SENSITIVITY ANALYSIS

IMPACT ON	CHANGE, % (ALL ELSE EQUAL)	EFFECT ON INCOME, SEK THOUSAND		
		2013	2012	2011
Chargeability rate	1	2 959	2 739	2 544
Hourly rate	1	1 965	1 812	1 729
Payroll expenses	1	1 314	1 227	1 129
Overheads	1	529	532	513
Annualised employees	1	844	809	761

## R&D

### DISTRIBUTION BETWEEN RESEARCH AND CONTRACT ASSIGNMENTS

During the year generated fees and expenses are distributed between IVL's research and contracted assignments, 57 (49) % and 43 (51) %, respectively. In this context research refers to both co-funded research between government and business through the Foundation Institute for Water and Air Pollution Research, and activities funded through grants awarded by government research agencies, research foundations, the EU, or comparable institutions. Jointly financed activities amount to 24 (17) % accrued fees for the year and expenses and activities funded through grants to 33 (32) %.

IVL's research is an integral part of the company's operations and is a prerequisite for IVL's ability to carry out assignments with excellence.

IVL's business services take in short consultancies and analysis assignments as well as more comprehensive research and development assignments both nationally and internationally.

### Assignments

IVL has, in addition to assignments for industry, municipalities and organisations, major assignments for the Swedish Environmental Protection Agency and its tasks include responsibility for data collected by national and regional monitoring systems in air and precipitation chemistry, air in urban areas, concentrations of environmental toxins and metals in biological materials. IVL also maintains a screening database of environmental toxins and metals.

### Current EU projects

In 2013, several projects partly funded by various EU bodies have been granted and launched, principally the EU Seventh Framework Programme for Research. The programme will end in 2014.

### EU research programmes in which IVL is involved and which were launched in 2013 include:

- **Transparens** – The goal of the project is to increase awareness and understanding of Energy Performance Contracting (EPC).
- **ZenN** – Zero energy Neighbourhoods.
- **A-TEAM** – Advanced Tools for Exposure Assessment and Biomonitoring.
- **LOCIMAP** – Low carbon industrial parks.
- **TBNA** – The project will support the development of sustainable water management in the coastal cities of the Chinese Hai River basin.

Currently IVL is involved, either as coordinator or partner, in nearly 40 European 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 SEK25 million. In 2013 the Entwined programme, also led by IVL, which for a period of six years has investigated the interaction between international environmental policies and global trade, was completed. IVL is also involved in Closing the loop, another major research project within the framework of the MISTRA programmes.

IVL also leads research programs funded by the Swedish Environmental Protection Agency. In 2013 the SCARP programme – Fresh air in Sweden – and the programmes Towards sustainable waste management and Chemitechs. At the same time the SCAC programme, which like SCARP deals with air pollution but which also investigates links to climate issues, was approved. SCAC is also led by IVL.

AFA Insurance is owned by Sweden's labour market parties and funds several IVL research projects related to workplace safety issues. In 2013, grants of nearly SEK5 million for diverse projects were awarded, among these a project on health and safety issues in civil emergency services.

### CO-FUNDED RESEARCH

The Foundation for Water and Air Pollution Research(SIVL) is owner of the company and principal of IVL's co-financed activities. In 2013, research was conducted in six thematic areas:

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

Operations are audited by an external evaluation team who investigate two thematic areas annually. The 2013 evaluation focused on Climate and Energy and Water and Soil. The purpose of the audits is to ensure that IVL's research maintains a high standard of excellence and is relevant to the issues at hand.

Among other things, the auditors highlighted benefits derived from IVL's close cooperation with industry, through research projects and thematic committees. The evaluators underlined the need for a distinct long-term strategy related to each theme, as well as a clearer communications strategy.

In 2013, SIVL had a total of SEK37 (34) million at its disposal for co-funded research, these funds were made available by government appropriations to the EPA, SEK17 (17) million, and Formas, SEK20 (17) million. The aggregate volume of co-funded research consists of these funds and of SEK25.2 (22.6) million from industry and SEK 16.6 (23.4) million from the EU. Formas supports scientific specialisation and opens up the possibility of additional funding (> 50%) for scientific publishing.

In 2014, SIVL will have SEK42 million at its disposal for co-funded research, of which SEK5 million is available for core funding.

### Examples of co-funded research

The following are examples of co-funded research projects approved and/or commenced in 2013 in the respective thematic areas:

- **Climate & Energy:** Environmental classification of district heated buildings, NEPP – North European Power Perspectives, BASTOR2 – Baltic Storage of CO<sub>2</sub>.
- **Air & Transport:** Maritime shuttles, F3 Life Cycle Inventory data 2013.
- **Resource-efficient products & waste:** Recycling of plastic waste in the building sector, Weighing waste? A guide to weight-based waste tariffs.
- **Sustainable Building:** Emissions in passive dusting of horse allergens, Improving energy efficiency of historical buildings.
- **Sustainable Products:** Monitoring and fault detection in municipal sewage treatment plants, Safety measures when working on the grid.
- **Water & Soil:** Forestry industry – environmental impact on receiving bodies of water, Degradation in sewage plants – evaluating the model, Environmentally harmful substances in fish, Micro-debris in waste water.

## International Branches

In recent years operations at IVL's China office have increased dramatically and at the end of 2013, there were seven employees. Cooperation with the Chinese Research Institute CRAES, one of the main advisors to the Chinese government, continues to evolve in the environmental field. IVL and CRAES measure emissions to air and are engaged in building up a joint air monitoring laboratory. IVL collaborates with the University of Gothenburg, Chalmers and a Chinese institution in research on photochemical smog in Beijing and Hong Kong.

2013 ushered in a new project funded by Europe Aid to promote sustainable water treatment in the coastal towns of the Hai River basin. IVL has for some time coordinated a Europe Aid Project that aims to advance China's environmental governance by facilitating public access to redress in connection with environmental crime in the Guizhou Province.

## Non-financial Information

### ENVIRONMENTAL IMPACT

Under the Environmental Code the company's operations are not subject to licensing. Nonetheless, IVL has permission to handle asbestos subject to Swedish Work Environment Authority regulations as well as permission to handle flammable and explosive chemicals at the Hammarby Sjöstadssverk facility, subject to the regulations related to protection against fire and explosion risks.

Since neither of the two laboratories in Stockholm and Gothenburg occupies more than 5000 square meters the notification requirement stipulated by EIA regulations is not applicable.

Customer advice, travel recommendations and energy use have been identified as the company's most significant effects with respect to the environment. It is therefore considered important to evaluate the environmental impact that may result from the advice IVL gives its customers; a sustainability assessment is under preparation to this effect.

To encourage travel-free meetings IVL has invested in video conferencing equipment in the majority of conference rooms. In 2013, the environmental impact of domestic travel by train and air decreased by 14% compared to 2012. However, the company's international operations, mean that a certain amount of air travel is inevitable. In 2013, the total environmental load decreased by 6% compared to 2012. Environmental impact calculated as grams carbon dioxide per kilometre has fallen steadily over the six year period (2008–2013), from 127 g/km to 120 g/km (-5%), this is probably due to more efficient aircraft types. Flights index calculated in grams CO<sub>2</sub> per earned Swedish crown has simultaneously fallen 7.6 (8.1).

### EMPLOYEES

#### Structure and personnel turnover

During the operating year, the number of employees averaged 215 (197), of whom 49 (48) per cent were men and 51 (52) per cent women. Of the workforce, 30 (28) per cent hold research qualifications, while 64 (64) per cent hold masters degrees in engineering or other academic qualifications.

During the year, 6 (10) permanent employees left the company for other positions. New recruitment totalled 21 (14) persons.

#### Equality and parity of treatment

IVL implements an overall policy and plan to ensure equality and parity of treatment. Developed by a representative group, this is implemented in the form of a yearly plan. Executive management, managers and employees must all work to ensure that our activities and corporate culture are characterised by a diversity perspective and by parity of treatment, contributing to IVL's credibility as an adviser on sustainability issues.

#### Chargeability rate

The chargeability rate for the period was 66,4 (66,2) per cent. Chargeability rate is defined as the proportion of total attendance time that is invoiced to the customer. The remaining (in-house) time is devoted to marketing, training, technical maintenance, management and administration.

#### Absences and holidays

During the year, total absences, including holidays, accounted for 25,8 (23,5) per cent of normal working time. Sick leave accounted for 3,6 (2,7) per cent and holiday time for 8,3 (8,8) per cent. Leave of absence accounted for 11,5 (9,6) per cent, of which 7,6 (6,6) per cent was parental leave. Normal working time is defined as working time including holiday time and overtime worked, less absences due to sick leave, sickness of a child, parental leave or other leave of absence, as well as compensatory leave. The same basis is used to calculate the average number of paid-up years in Note 7, Personnel costs.

#### Competence development

One of IVL's objectives is for employees to have at least two days of professional development during the year and the target was achieved in 2013.

In 2013, 123 employees took part in IVL's internal five-step project management training course on 18 separate occasions. Virtually all IVL work takes place inside projects and this training is designed to further professionalise project management.

A leadership programme led by an external consultant was launched in 2013. This programme involves all IVL managers and builds on three critical success factors for effective leadership within the company, identified during the past year, and will run for approximately one year until June 20.

#### Attractive workplace

The Attractive workplace is an in-house project made up of employees from across the entire organisation, as well as union representatives.

During the year, one of the team's tasks has been to find a new employee satisfaction survey provider. The employee survey conducted in November shows that IVL employees are extremely dedicated and motivated, and that they identify with company values.

#### Occupational health and safety

IVL's work environment activities are conducted on the basis of yearly plans and delegated responsibilities approved by the management group. The work environment plan is based on safety inspections carried out each year at the company's facilities; physical and ergonomic safety inspections are also conducted annually. An inventory of chemical substances handled within the company is updated every year.

### OTHER HUMAN RESOURCES ACCOUNTING

#### PERSONNEL TURNOVER,

PER CENT	2013	2012
Percentage of employees who quit in relation to average number of employees during year	5,6	5,0
– excluding pension	3,6	5,0

#### LENGTH OF SERVICE, PER CENT

YEARS	2013	2012
< 2	25	20
2–10	58	45
> 10	17	35

*Average length of service 10 (10) years.*

#### AGE DISTRIBUTION, PER CENT

AGE	2013	2012
20–29	8	13
30–39	36	36
40–49	27	23
50–59	18	16
60–69	10	12

*Average age 42 (42) år*

#### Qualification

QUALIFICATION, PER CENT	2013	2012
Ph.D.	29	26
Other research qualification	1	2
MSc	34	33
Other academic qualification	30	31
Secondary education	6	8

#### FINANCIAL INDICATORS/EMPLOYEE

SEK 1000	2013	2012
Sales, exclusive expenses	1 002	1 051
Payroll	611	617
Result after financial items	52	40

# PROPOSED APPROPRIATION OF PROFITS

THE FOLLOWING FUNDS ARE AVAILABLE TO THE AGM (SEK):

Profit carried forward	32,561,559
Profit for year	6,677,985
<b>Total</b>	<b>39,239,544</b>

THE BOARD AND CEO PROPOSE THE TOTAL PROFIT BE DISTRIBUTED AS FOLLOWS

To be carried forward	39,239,544
<b>Total</b>	<b>39,239,544</b>

See the income statement, balance sheet, cash flow statement, and notes to financial statements and accounts for information on the results reported by the parent company and group for the financial year, as well as the general financial position as of 31 December 2013.

# INCOME STATEMENT

SEK THOUSAND		GROUP		PARENT COMPANY	
		2013	2012	2013	2012
<b>OPERATING INCOME</b>					
Net sales	Note 3	255,353	247,827	254,148	247,139
Change in work in progress	Note 4	-20,684	-28,416	-19,595	-28,027
Other operating income		918	274	918	274
		<b>235,587</b>	<b>219,685</b>	<b>235,471</b>	<b>219,386</b>
<b>OPERATING EXPENSES</b>					
Project costs		-35,652	-34,397	-35,652	-34,397
Other external expenses	Note 6	-49,627	-46,110	-48,809	-45,577
Personnel costs	Note 7	-136,004	-126,674	-135,863	-126,567
Depreciation of tangible and intangible assets	Note 8	-4,595	-4,975	-4,592	-4,971
		<b>-225,878</b>	<b>-212,156</b>	<b>-224,916</b>	<b>-211,512</b>
<b>OPERATING PROFIT/LOSS</b>		<b>9,709</b>	<b>7,529</b>	<b>10,555</b>	<b>7,874</b>
<b>EARNINGS FROM FINANCIAL INVESTMENTS</b>					
Interest income	Note 9	751	938	728	910
Interest expenses	Note 9	-79	-775	-78	-775
<b>PROFIT/LOSS AFTER FINANCIAL ITEMS</b>		<b>10,381</b>	<b>7,692</b>	<b>11,205</b>	<b>8,009</b>
Appropriations	Note 10			-2,735	-1,727
Tax on profit for year	Note 11	-2,205	-2,388	-1,792	-2,017
<b>NET PROFIT/LOSS</b>		<b>8,176</b>	<b>5,304</b>	<b>6,678</b>	<b>4,265</b>

# BALANCE SHEET

SEK THOUSAND		GROUP	
		2013	2012
<b>ASSETS</b>			
<b>FIXED ASSETS</b>			
Intangible fixed assets	Note 12		
Capitalized software costs		3,092	1,915
Goodwill		-	150
Tangible fixed assets	Note 13		
Plant and equipment		16,897	11,728
Financial fixed assets	Note 14		
Other long-term securities		10	10
<b>Total fixed assets</b>		<b>19,999</b>	<b>13,803</b>
<b>CURRENT ASSETS</b>			
Current receivables			
Accounts receivable, trade		40,168	53,315
Receivables from group companies		12,504	17,791
Income taxes, recoverable		3,350	2,871
Other receivables		111	293
Recognised but not invoiced income	Note 5	3,735	-
Prepayments	Note 15	5,680	6,836
<b>Total current receivables</b>		<b>65,548</b>	<b>81,106</b>
Cash and bank balances		96,812	56,290
<b>Total current assets</b>		<b>162,360</b>	<b>137,396</b>
<b>TOTAL ASSETS</b>		<b>182,359</b>	<b>151,199</b>
<b>EQUITY AND LIABILITIES</b>			
Equity	Note 16		
Share capital (7000 shares)		7,000	7,000
Other equity including profit for the year		63,519	54,171
<b>Total equity</b>		<b>70,519</b>	<b>61,171</b>
Provisions	Note 18	6,355	7,145
Long-term liabilities			
Liabilities to credit institutions	Note 20	1,126	-
Current liabilities			
Liabilities to credit institutions	Note 20	2,378	-
Advance payments for work in progress	Note 4	60,524	47,159
Accounts payable, trade		16,925	12,193
Other liabilities		9,030	11,897
Recognized but not invoiced income	Note 5	3,198	-
Accrued expenses and deferred income	Note 19	12,304	11,634
<b>Total current liabilities</b>		<b>104,359</b>	<b>82,883</b>
<b>TOTAL EQUITY AND LIABILITIES</b>		<b>182,359</b>	<b>151,199</b>
<b>MEMORANDUM ITEMS</b>			
Pledged assets	Note 21	5,000	5,000

# BALANCE SHEET

SEK THOUSAND	PARENT COMPANY	
	2013	2012
<b>ASSETS</b>		
<b>FIXED ASSETS</b>		
<b>Intangible fixed assets</b>	Note 12	
Capitalized software costs	3,092	1,915
Goodwill	–	150
<b>Tangible fixed assets</b>	Note 13	
Plant and equipment	13,349	11,704
<b>Financial fixed assets</b>	Note 14	
Group companies	641	641
Other long-term securities	Note 14	10
<b>Total fixed assets</b>	<b>17,092</b>	<b>14,420</b>
<b>CURRENT ASSETS</b>		
<b>Current receivables</b>		
Accounts receivable, trade	39,948	53,136
Receivables from group companies	12,730	18,020
Income taxes, recoverable	3,102	2,897
Other receivables	121	132
Recognized but not invoiced income	Note 5	3,735
Prepayments	Note 15	5,574
<b>Total current receivables</b>	<b>65,210</b>	<b>81,021</b>
Cash and bank balances	95,782	55,303
<b>Total current assets</b>	<b>160,992</b>	<b>136,324</b>
<b>TOTAL ASSETS</b>	<b>178,084</b>	<b>150,744</b>
<b>EQUITY AND LIABILITIES</b>		
Equity	Note 17	
<b>Restricted equity</b>		
Share capital (7,000 shares)	7,000	7,000
Statutory reserve	1,400	1,400
<b>Total unrestricted equity</b>	<b>8,400</b>	<b>8,400</b>
Unrestricted equity		
Profit brought forward	32,562	28,296
Profit for the year	6,678	4,265
<b>Total unrestricted equity</b>	<b>39,240</b>	<b>32,561</b>
<b>Total equity</b>	<b>47,640</b>	<b>40,961</b>
Untaxed reserves	Note 10	9,180
<b>Current liabilities</b>		–
Advance payments for work in progress	Note 4	80,051
Accounts payable, trade	16,887	12,082
Other liabilities	9,028	11,956
Recognised but not invoiced income	Note 5	3,198
Accrued expenses and deferred income	Note 19	12,100
<b>Total current liabilities</b>	<b>121,264</b>	<b>103,339</b>
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>178,084</b>	<b>150,744</b>
<b>MEMORANDUM ITEMS</b>		
Pledged assets	Note 21	5,000

# CASH FLOW STATEMENT

SEK THOUSAND (DIRECT METHOD)	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
<b>OPERATING ACTIVITIES</b>				
Profit/loss after financial items	10,381	7,692	11,205	8,009
Adjustments for non-cash items	5,630	-3,870	6,425	-3,846
Income tax paid	-1,456	-77	-1,997	-175
<b>Cash flow from operating activities before changes in working capital</b>	<b>14,555</b>	<b>3,745</b>	<b>15,633</b>	<b>3,988</b>
<b>CASH FLOW FROM CHANGES IN WORKING CAPITAL</b>				
Decrease / increase in receivables	14,881	-2,835	14,754	-2,501
Increase / decrease in accounts payable, trade	4,732	-1,197	4,805	-1,284
Decrease of other liabilities	-489	-1,472	-2,928	-1,411
Increase in advance payments for work in progress	16,563	14,930	15,477	14,541
<b>Cash flow from operating activities</b>	<b>50,242</b>	<b>13,171</b>	<b>47,741</b>	<b>13,333</b>
<b>INVESTMENT ACTIVITIES</b>				
Acquisition of tangible assets	-9,612	-4,300	-6,087	-4,293
Acquisition of intangible assets	-1,177	-1,915	-1,177	-1,915
<b>Cash flow from investment activities</b>	<b>-10,789</b>	<b>-6,215</b>	<b>-7,264</b>	<b>-6,208</b>
<b>FINANCING ACTIVITIES</b>				
<b>Cash flow from operating activities</b>	<b>1,126</b>	<b>–</b>	<b>–</b>	<b>–</b>
<b>Cash flow for year</b>	<b>40,579</b>	<b>6,956</b>	<b>40,477</b>	<b>7,125</b>
<b>Opening cash and bank balances</b>	<b>56,290</b>	<b>49,354</b>	<b>55,303</b>	<b>48,179</b>
<b>Exchange rate differences in liquid assets</b>	<b>-57</b>	<b>-20</b>	<b>2</b>	<b>-1</b>
<b>Closing cash and bank balances</b>	<b>96,812</b>	<b>56,290</b>	<b>95,782</b>	<b>55,303</b>

# NOTES

## accounting principles and comments to the statements

### Note 1

#### ACCOUNTING PRINCIPLES

#### 1.1 Compliance with standards and regulations

The consolidated financial statement has been prepared in accordance with BFNAR 2012:1 *Annual Report and Consolidated Accounts* (K3). The company has voluntarily chosen to implement K3 in 2013. This early implementation is intended to facilitate the regulatory transition to K3 in 2014. Comparative information from 2012 has not been adjusted to K3, as these accounting standards will only be mandatory at the start of 2014.

In cases where guidance could not be found in the K3 regulations accounting practices established under the Annual Accounts Act (1995:1554) have served as guidelines.

The Parent company applies the same accounting principles as the Group with the exception of the cases listed below under "Parent Company". Inconsistencies between the Parent Company and the Group are caused by limitations in the applicability of K3 to the Parent Company as a result of the Annual Accounts Act and, in some cases, tax considerations.

#### 1.2 Prerequisites for preparing the financial statements of the Parent company and Group

The parent company's functional currency is the Swedish krona, which is also the reporting currency for the Parent Company and the Group. This implies that financial statements are presented in Swedish kronor. Assets and liabilities are stated at historical cost with the exception of certain financial assets and liabilities measured at fair value.

The preparation of financial statements in accordance with K3 regulations makes it necessary for Management to make judgments, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, revenues and expenses. These estimates and assumptions are based on historical experience and other factors that are deemed reasonable under current conditions. The results of these estimates and assumptions are used to determine the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates. Typically, these estimates and assumptions are made when annual and semi-annual financial statements are made. Incurred events within the company or its business environment may make it necessary to revise these estimates and assumptions

#### 1.3 Changes in accounting principles and disclosure requirements

In 2013 no new accounting policies have come into force that impact the Group. According to the regulatory system K3 will become mandatory from the financial year beginning 2014.

#### 1.4 Classifications, etc.

Fixed assets and financial liabilities of the Parent Company consist almost entirely of amounts that are expected to be recovered or settled after more than twelve months from the balance sheet date. Current assets and current liabilities of the Parent Company and the Group consist largely of amounts expected to be recovered or settled within twelve months from the balance sheet date.

#### 1.5 Consolidation principles

Subsidiaries are entities over which IVL exerts a controlling influence. A controlling influence implies the power to control, directly or indirectly, financial and operating policies in order to gain economic benefits. When evaluating the scope of this controlling influence, potential voting rights currently exercisable or convertible are taken into consideration.

Subsidiaries are reported using the proportional method. This method implies that a large share of the jointly owned company's income, expenses, assets and liabilities are recognised in the consolidated financial statements.

The reason for choosing the consolidation method is that IVL played an active role in the inception of the subsidiary group of companies and did not acquire them over or under value.

Inter-company balances and transactions, income and expenses and unrealised gains or losses arising from transactions between group companies are eliminated in full when the consolidated financial statement is prepared.

#### 1.6 Foreign currency

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

Exchange differences arising on translation are recognised in the income statement. Non-monetary assets and liabilities reported at historical cost are translated using the exchange rate prevailing at the transaction date.

Non-monetary assets and liabilities reported at fair value are re-translated to the functional currency at the exchange rate prevailing at the date of valuation at fair value, exchange differences are recognised in a way similar to other changes in assets or liabilities. Functional currency is the currency of the countries in which the Group Companies operate. The Parent Company's functional and reporting currency is the Swedish krona. The Group's reporting currency is the Swedish krona.

Foreign operations assets and liabilities are translated into Swedish kronor at the exchange rate prevailing at the balance sheet date. Foreign operations revenues and expenses are translated into Swedish kronor at

an average rate that approximates the exchange rates at respective transaction dates. Translation differences arising in connection with translation of foreign net investments are recognised under other comprehensive income.

#### 1.7 Revenues

Successive revenue recognition is applied to all those assignments whose outcome can be satisfactorily calculated. Revenues from assignments carried out on current account basis are recognised at the pace of completion, and are normally invoiced to the customer the following month. When assignments are carried out at a fixed price, revenues are recognised in the income statement based on the degree of completion on the closing day. The degree of completion of an assignment is determined by comparing costs incurred to date with the estimated total contract costs. If it is probable that total assignment costs will exceed total contract revenue, the expected loss is immediately recognised as an expense in full. Revenue is not recognised if it is probable that the economic benefits will not accrue to the group. If there is significant uncertainty regarding payment or associated costs, no revenue is recognised.

In grant projects where IVL is the contracted party towards the research funder and will distribute project funding to other participants in the project these funds are not reported as income but are recorded directly in the balance sheet item, ongoing work on behalf of others.

This means that invoicing and costs for expenses will decrease parallel to funds received and are subsequently disbursed to other project partners.

#### 1.8 Operating expenses, financial income and expenses

During the leasing period parent company operating leases costs are recognised on a straight-line basis in the income statement.

Benefits obtained in conjunction with contract signing are recognised in the income statement as part of the total lease expense. Variable costs are expensed in the time period in which they are incurred.

Minimum lease payments under finance lease contracts for the group are allocated between interest expense and reduction of the outstanding liability.

Interest costs are amortised over the leasing time so that each accounting period is charged an amount equal to a fixed interest rate for the balance of the liability. Variable costs are expensed in the period they are incurred.

Financial income and expenses consist of interest income on bank deposits and receivables and supplier interest costs.

#### 1.9 Receivables and liabilities

Accounts receivable are recorded at the amount expected to be paid, i.e., after the deduction of bad debts that have been assessed individually. Impairment of trade receivables is recorded as operating expenses. Other receivables are classified as non-current assets if the holding period exceeds one year, and if they are shorter, as other receivables. Liquid assets consist of cash on hand and demand deposit accounts held in banks and similar institutions, and short-term liquid investments with original maturities of three months or less, and which only risk insignificant changes in value.

Loans and other financial liabilities, such as accounts payable, are carried at amortised cost. Accounts payable have a short expected term and are valued at nominal value. Long-term liabilities have an expected term of more than one year while current liabilities have a maturity of less than one year.

#### 1.10 Tangible fixed assets

##### 1.10.1 Assets owned

Tangible fixed assets are recognized as assets if it is probable that economic benefit will accrue to the company at a future date and if the acquisition value of the asset can be measured reliably. Tangible fixed assets are recognised at cost less accumulated depreciation and any impairment losses. The acquisition value includes the purchase price and costs directly attributable to bringing the asset on site in working condition according to the purpose of its acquisition.

The carrying amount of property, plant and equipment is de-recognised on disposal or when no future economic benefits are expected from the use or disposal/sale of the asset. The gain or loss arising on the disposal or scrapping of an asset is determined as the difference between the sale proceeds, net of selling costs. Gains and losses are recognized as other operating income/expense.

##### 1.10.2 Leased assets

In the consolidated financial statement leases are classified as either finance or operating leases. A finance lease is when the risks and rewards incidental to ownership are substantially transferred to the lessee, if this is not the case the lease is an operating lease. Assets held under finance leases are recognised as assets in the consolidated balance sheet. Obligations to pay future leasing fees are recorded as long-term liabilities. Leased assets are depreciated according to plan and lease payments are recorded as interest and repayment of debt. Operational leasing implies that lease payments are expensed on a straight-line basis over the lease term.

#### 1.11 Intangible assets

##### 1.11.1 Goodwill

Goodwill is the purchase price subtracted by the book value of the company acquired, i.e., the fair market value of identifiable assets, liabilities and contingent liabilities.

Goodwill is allocated to cash-generating units and tested annually for impairment. Goodwill is stated at cost less any accumulated impairment.

##### 1.11.2 Capitalised expenses for software development

Other intangible assets acquired by the group are recognised at cost less accumulated amortisation. Subsequent expenditure on capitalised intangible assets is recognized as an asset only when this increases the future economic benefits of the asset to which it relates. All other expenditure is expensed as incurred.

#### 1.12 Asset impairment and impairment assessment

The carrying values of the group's assets are reviewed at every closing date to determine whether there is any indication of impairment. If any such indication exists, the asset's recoverable value is estimated. An impairment loss is charged to the income statement.

The recoverable value is the greater of fair market value less costs to sell and value in use.

Value in use is calculated by discounting future cash flows using a rate that takes the current risk-free interest rate into account, as well as the risk associated with that particular asset.

The recoverable value of goodwill and other intangible assets with indeterminate useful lives and intangible assets not yet ready for use are estimated annually.

At each reporting date, the company assesses whether there is objective evidence that a financial asset or group of assets is impaired.

Objective evidence consists in part of observable events that have had a negative bearing on the ability to recover the acquisition value, and in part a significant or prolonged decline in the fair value of an investment in a financial instrument classified as a financial asset held for sale.

### 1.13 Employee benefits

Obligations for defined contribution pension plans are recognised as expenses in the income statement as incurred. IVL does not offer defined benefit pension plans.

A provision in connection with termination of personnel is only recognised if the company is demonstrably obligated to terminate employment before normal retirement date, or when remuneration is offered to encourage voluntary redundancy. When the company is obligated to terminate an employment a termination plan detailing workplace, function and the approximate number of employees affected, the benefits applicable for each job classification or function and an implementation schedule is required.

### 1.14 Provisions

A provision is recognised when the Group has an existing legal or informal obligation as a consequence of a past event, and it is probable that an outflow of financial resources will be required to settle this liability, and it is possible to make a reliable estimate of the amount involved.

### 1.15 Taxes

Income tax comprises current and deferred tax. Income tax is recognised in the income statement.

Current tax is the tax payable or refundable for the current year using the tax rates that have been enacted or substantively enacted at the balance sheet date, including adjustment of current tax attributable to previous periods. Deferred tax is calculated using the balance sheet method, providing for temporary differences between the tax bases of assets and liabilities. The amount of deferred tax provided is based on the expected manner of realisation or settlement of the carrying amount of assets and liabilities.

Deferred tax is calculated using tax rates and tax rules enacted or substantively enacted at the balance sheet date.

### 1.16 Parent Company accounting principles

The Parent Company has prepared its annual accounts according to BFNAR 2012:1 *Annual and Consolidated Accounts (K3)* and the Swedish Annual Accounts Act (1995:1554)

#### Differences between Group and Parent Company accounting principles

Investments in subsidiaries and associates are accounted for in accordance with the cost method. Dividends received are recognised as income. In the Parent Company, all leases are recognised according to the regulations governing operating leases. The Parent Company recognises untaxed reserves including deferred tax. In the consolidated accounts, untaxed reserves are divided into deferred tax liability and equity.

## Note 2

### FINANCES AND SUMMARY OF KEY INDICATORS

	GROUP					PARENT COMPANY				
	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009
SEK THOUSAND										
<b>TURNOVER AND RESULT</b>										
Net sales	255,353	247,827	239,924	193,986	204,542	254,200	247,139	239,014	193,022	203,939
Operating earnings after depreciation	9,709	7,529	11,308	-3,322	5,338	10,555	7,874	5,527	-1,965	1,496
Operating profit after net financial items	10,381	7,692	12,053	-3,322	5,401	11,205	8,009	6,270	-1,822	1,706
Profit margin, %	4,1	3,1	5,0	Neg	2,6	4,4	3,2	2,6	Neg	0,8
<b>CAPITALIZATION</b>										
Fixed assets	19,999	13,803	12,564	14,233	16,636	17,092	14,420	13,182	14,837	17,225
Current assets	162,360	137,396	128,116	111,329	126,489	160,992	136,322	127,074	110,247	125,779
Equity	70,519	61,171	55,889	45,527	50,079	47,640	40,962	36,696	30,642	30,517
Untaxed reserves						9,180	6,444	4,717	4,666	9,578
Current liabilities	104,369	82,883	78,000	73,857	84,204	121,264	103,336	98,843	88,892	101,031
Long-term liabilities	1,126					-				
Provisions	6,355	7,145	6,791	6,178	8,842	-	-	-	884	1,878
Total assets	182,359	155,199	140,680	125,562	143,125	178,084	150,744	140,256	125,084	143,004
Adjusted equity						54,800	45,711	40,172	34,081	37,576
Equity annual mean	65,845	58,530	50,708	47,803	48,050	50,226	42,292	37,127	35,828	36,949
Total equity annual mean	168,779	147,940	133,121	134,344	140,147	164,414	145,500	132,670	134,044	139,821
Solidity, %	38,7	39,4	39,7	36,3	35,0	30,8	30,3	28,6	27,2	26,3
Current ratio liquidity, times	1,56	1,66	1,64	1,51	1,50	1,33	1,32	1,29	1,24	1,24
<b>PROFITABILITY</b>										
Return on adjusted equity, %	12,3	9,7	17,5	Neg	8,1	17,4	13,7	12,4	Neg	3,4
Return on adjusted equity, average 5 years, %	8,5	8,1	7,0			8,6	7,8	6,0		
Return on total capital, %	5,7	5,5	9,1	Neg	3,9	6,9	6,0	4,8	Neg	1,3
<b>OTHER</b>										
Investment fixed assets	10,789	6,215	3,145	3,296	5,603	7,264	6,208	3,145	3,296	5,595
Invoicing/employee including expenses	1,177	1,239	1,290	1,090	1,175	1,182	1,242	1,299	1,097	1,193
Invoicing//employee remuneration and analysis	992	1,049	1,097	969	1,151	1,002	1,051	1,104	974	1,168
Chargeability rate, %	66,4	66,2	67,0	66,1	67,7	66,4	66,2	68,0	66,1	67,7
Employees, annualised	217	198	186	178	174	215	197	184	176	171
Wage costs per employee	606	614	608	613	611	611	617	614	618	622

#### Profit margin

Net profit after financial items as proportion of net sales.

#### Return on capital employed

Profit after net financial items plus interest expenses relative to average balance sheet total.

#### Adjusted equity

Total equity plus untaxed reserves, less deduction of flat tax 22 (26.3)%.

#### Chargeability rate

Time charged to client as a proportion of total work attendance.

#### Solidity

Current assets divided by current liabilities.

#### Annualised employees

The number of employees during the year converted into full year services. The actual number of employees is higher due to part-time services and the fact that some employees only work part of the year.

#### Return on equity

Profit after net financial items and deduction of flat tax at 22% relative to average adjusted equity.

#### Current liquidity ratio

Current assets divided by current liabilities.

## Note 3

### NET INCOME

SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Net income distributed by				
Invoiced fees and analyses	216,528	209,833	215,329	209,145
Invoiced expenses	38,825	37,994	38,825	37,994
<b>Total net income</b>	<b>255,353</b>	<b>247,827</b>	<b>254,154</b>	<b>247,139</b>

27.1 (19.9) % of net income consists in invoicing to companies inside the Group for the provision of co-funded research, performed on contract basis.

Furthermore compensation was received from Group companies for human resource services rendered.

## Note 4

### CHANGES IN ADVANCE PAYMENTS FOR WORK IN PROGRESS/EXTERNAL WORK IN PROGRESS

SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Assignment costs	537,077	692,916	517,550	673,303
Invoiced in advance	597,601	-740,075	-597,601	-740,075
<b>Book value</b>	<b>60,524</b>	<b>47,159</b>	<b>80,051</b>	<b>67,772</b>
Change reported in				
Income statement	20,684	28,416	19,595	28,027
Balance statement	-7,319	-13,486	-7,316	-13,486
<b>Total change for year</b>	<b>13,365</b>	<b>14,930</b>	<b>12,279</b>	<b>14,541</b>

## Note 5

### RECOGNISED BUT NOT INVOICED REVENUE/INVOICED IN EXCESS OF RECOGNISED REVENUE

SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Recognised but not invoiced revenue				
Assignment costs	39,742	–	39,742	–
Invoiced in advance	-36,007	–	-36,007	–
<b>Book value</b>	<b>3,735</b>	<b>–</b>	<b>3,735</b>	<b>–</b>
Invoiced in excess of recognised revenue				
Assignment costs	17,713	–	17,713	–
Invoiced in advance	-20,911	–	-20,911	–
<b>Book value</b>	<b>3,198</b>	<b>–</b>	<b>3,198</b>	<b>–</b>

## Note 6

### OTHER EXTERNAL COSTS

#### Fees to auditors

SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Rödl & Partner Nordic				
Audit assignment	226	270	226	270
Other audit activities	110	92	110	92
Other services	188	153	188	153
Other auditors				
Audit assignment	8	6	–	–
<b>Total</b>	<b>532</b>	<b>521</b>	<b>524</b>	<b>515</b>

#### Leasing costs

Lease payments for operating leases in 2013 amounted to SEK15,016 (15,386) thousand. Lease payments include building leases for property, company cars to staff, computers and some office equipment. Costs of future lease payments under these agreements are allocated to the following year:

SEK 1000	2014	2015	2016	2017	2018
Leasing payments, other	2,378	966	160	–	–
Offices space and premises	13,057	13,163	13,451	13,653	13,858
<b>Total</b>	<b>15,435</b>	<b>14,129</b>	<b>13,611</b>	<b>13,653</b>	<b>13,858</b>

## Note 7

### PERSONNEL COSTS

#### Parent Company

SEK 1000	2013		2012	
	Salaries and remunerations	Social costs (incl. pension costs)	Salaries and remunerations	Social costs (incl. pension costs)
Board and CEO	2,285	1,550 (669)	2,296	1,535 (655)
Other employees	87,010	40,977 (11,292)	81,078	38,249 (10,340)
<b>Total</b>	<b>89,295</b>	<b>42,527 (11,292)</b>	<b>83,374</b>	<b>39,784 (10,995)</b>

#### Group

The Group also pays the salaries of the joint-venture company CEO, amounting to SEK64 (90) thousand, and other permanent employees, amounting to SEK77 (60) thousand.

#### The average number of employees\* for the year was as follows:

##### Parent company

	2013			2012		
	MEN	WOMEN	TOTAL	MEN	WOMEN	TOTAL
Stockholm	66	54	120	60	51	111
Göteborg	35	50	85	31	50	81
Lysekil	1	2	3	–	–	–
Beijing	4	3	7	3	2	5
<b>Total</b>	<b>106</b>	<b>109</b>	<b>215</b>	<b>94</b>	<b>103</b>	<b>197</b>

\*defined as full-time, salaried employees

#### Number of employees in management (of which executive managers):

	2013	2012
Men	6 (5)	6 (5)
Women	5 (0)	5 (0)

#### Board Members:

	2013	2012
Men	6	6
Women	4	4

The group employs an additional 4 (1) persons, whereof one man in a managerial capacity.

### Management

#### Parent Company

In accordance with the decision of Annual General Meeting, a total of SEK601 (605) thousand in fees was paid to members of the board. Of this, the chair received SEK 54 (60) thousand.

The position of CEO of the Parent Company is subject to a period of notice of 12 months by the company, as well as a severance payment equivalent to 12 times the fixed monthly salary of the incumbent. Should the position or responsibilities of the CEO be altered as a result of significant changes in the company's operations, or by a change in ownership structure affecting the majority of company shares, the CEO shall be entitled to resign subject to notice of six months and to receive a severance payment equivalent to 18 times his or her fixed monthly salary. The CEO shall be entitled to a pension from the age of 62. The CEO pension is of the defined contribution type and an amount equivalent to 35 per cent of salary for the particular year, including the benefit of a company car, is allocated annually for this purpose. If the pension is taken after age 62, old-age pension contributions shall be paid in full as though the CEO had continued to work until age 65.

#### Group

The CEO of the joint-venture company is employed on a full-time basis for one year as of 1 July 2013. Other than a statutory pension, no pension entitlement applies.

## Note 8

### DEPRECIATION OF INTANGIBLE AND TANGIBLE FIXED ASSETS

#### Group and Parent Company

Depreciation according to plan of capitalised expenditure for soft-ware development is applied annually at a rate of 20 per cent of acquisition value, from the date of completion during the year.

Depreciation of business goodwill is applied at 20 per cent of acquisition value. The need for depreciation is assessed on the basis of the current value of future surpluses.

Depreciation according to plan of inventories and equipment is applied annually at a rate of 10 to 20 per cent of acquisition value, from the date of acquisition by the parent company during the year.

Depreciation according to plan of inventories and equipment is applied on the basis of the remaining economic life of the asset, in accordance with a valuation developed specifically for the international joint venture.

## Note 9

### INTEREST INCOME AND COSTS, GROUP AND PARENT COMPANY

The item includes bank interest income of 716 (919) SEK thousand. Of the interest costs for the Parent Company 46 (63) SEK thousand relates to Group Companies.

## Note 10

### APPROPRIATIONS AND UNTAXED RESERVES

SEK 1000	PARENT COMPANY	
	2013-12-31	2012-12-31
Opening untaxed reserves	6,444	4,717
Accumulated depreciation in excess of plan (machines, inventories)	-41	786
Change in tax allocation reserve	-2,694	-2,513
<b>Total appropriations</b>	<b>2,735</b>	<b>1,727</b>
<b>Closing untaxed reserves</b>	<b>9,180</b>	<b>6,444</b>

## Note 11

### TAX ON PROFIT FOR YEAR

ESTIMATE OF EFFECTIVE TAX RATE, SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Profit before tax	10,382	7,692	8,470	6,282
Tax at current tax rate 22 (26,3) %	1,892	1,661	1,863	1,652
Non-taxable income	-211	-3	-211	-3
Non deductible expenses	142	325	142	325
Tax from previous year	-92	-4	-92	-4
Current tax expenses, international	93	54	90	47
Deferred tax	375	355	–	–
<b>Effective tax</b>	<b>2,205</b>	<b>2,388</b>	<b>1,792</b>	<b>2,017</b>
<b>Effective tax rate</b>	<b>31,0 %</b>	<b>31,0 %</b>	<b>21,2 %</b>	<b>32,1 %</b>

## Note 12

### INTANGIBLE FIXED ASSETS

SEK	DEVELOPMENT-COSTS		GOODWILL	
	2013	2012	2013	2012
Opening acquisition value	3,192	1,277	1,800	1,800
Acquisitions for year	1,177	1,915	–	–
<b>Closing accumulated acquisition value</b>	<b>4 369</b>	<b>3 192</b>	<b>1 800</b>	<b>1 800</b>
Opening depreciation	-1,277	-1,107	-1,650	-1,290
Depreciation for year	–	-170	-150	-360
<b>Closing accumulated depreciation</b>	<b>-1,277</b>	<b>-1,277</b>	<b>-1,800</b>	<b>-1,650</b>
<b>Closing residual value according to plan</b>	<b>3,092</b>	<b>1,915</b>	<b>–</b>	<b>150</b>

## Note 13

### TANGIBLE FIXED ASSETS

SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Opening acquisition value	89,915	85,625	89,728	85,435
Acquisitions for year including financial leasing agreements	9,612	4,300	6,087	4,293
Exchange difference	5	-10	-	-
<b>Closing accumulated depreciation</b>	<b>99,532</b>	<b>89,915</b>	<b>95,815</b>	<b>89,728</b>
Opening depreciation	-78,187	-73,751	-78,025	-73,584
Exchange difference	-3	9	-1	1
<b>Depreciation for year</b>	<b>-4,445</b>	<b>-4,445</b>	<b>-4,442</b>	<b>-4,441</b>
<b>Closing accumulated equipment depreciation</b>	<b>-82,635</b>	<b>-78,187</b>	<b>-82,466</b>	<b>-78,025</b>
<b>Closing residual value according to plan</b>	<b>16,897</b>	<b>11,728</b>	<b>13,349</b>	<b>11,704</b>

#### Financial leasing

Equipment held under finance leases is included in the Group with a carrying amount of SEK 3,503 (o) thousand. Future payments in respect of the liabilities are expensed as lease obligations under short and long-term liabilities in the consolidated balance sheet. See Note 20 "Liabilities to credit institutions".

## Note 14

### GROUP COMPANIES AND OTHER LONG-TERM SECURITIES

#### Shares and holdings

COMPANY	QTY	GROUP		PARENT-COMPANY	
		SHARE	BOOK VALUE	QUOTA-VALUE	BOOK VALUE
IVL Swedish Environmental Research Institute's Employee Benefit Trust	1		5	5	5
Basta Online AB	600	60%	-	60	60
WEREC Water Eco-system Recovery AB	100	10%	5	5	5
Sino-Swedish (Tianjin) Environmental Technology Development Co., Ltd	1	50%	-	581	581
<b>Total</b>			<b>10</b>	<b>651</b>	<b>651</b>

## Note 15

### PREPAID COSTS

SEK 1000	GROUP		PARENT COMPANY	
	2013	2012	2013	2012
Rents offices and premises	3,396	3,309	3,396	3,09
Other prepaid costs	2,284	3,526	2,178	3,526
<b>Balance at end of year</b>	<b>5 680</b>	<b>6 835</b>	<b>5 574</b>	<b>6 835</b>

## Note 16

### EQUITY

#### Group

SEK 1000	SHARE CAPITAL	STATUTORY RESERVES	NON-RESTRICTED RESERVES	PROFIT (LOSS) FOR YEAR	TOTAL
Opening balance	7,000	21,429	27,438	5,304	61,171
Appropriation of profits according to AGM			5 304	-5304	
Transfer between restricted and non-restricted equity		2,504	-2,504		
Change deferred tax		1,168			1,168
Currency translation difference			4		4
<b>Profit (loss) for year</b>				<b>8,176</b>	<b>8,176</b>
<b>Balance at end of year</b>	<b>7,000</b>	<b>25,101</b>	<b>29,070</b>	<b>8,176</b>	<b>70,519</b>

## Note 17

### EQUITY, SEK 1000

#### Parent Company

SEK 1000	SHARE CAPITAL	STATUTORY RESERVES	RETAINED EARNINGS	PROFIT (LOSS) FOR YEAR	TOTAL
Opening balance	7,000	1,400	28,297	4,265	40,962
Appropriation of profits according to AGM			4,265	-4,265	
<b>Profit (loss) for year</b>				<b>6,678</b>	<b>6,678</b>
<b>Balance at end of year</b>	<b>7,000</b>	<b>1,400</b>	<b>32,562</b>	<b>6,678</b>	<b>47,640</b>

## Note 18

### PROVISIONS

kSEK	GROUP		PARENT COMPANY	
	31 Dec 2013	31 Dec 2012	31 Dec 2013	31 Dec 2012
Deferred tax liability	6 534	7 145	-	-
<b>Belopp vid årets utgång</b>	<b>6 534</b>	<b>7 145</b>	<b>-</b>	<b>-</b>

IVL believes that in 2014 latent tax debt maturity will be low as the company will continue to maintain high investment levels, and low interest rates will make it profitable to continue utilizing allocation reserves for consolidation purposes. In 2014 more rapid project revenue recognition may entail some 500 SEK thousand in deferred tax dissolution. In any event during the subsequent five-year period a total of 553 SEK thousand will be dissolved from the 2012 tax allocation reserves.

## Note 19

### ACCRUED COSTS

SEK 1000	GROUP		PARENT COMPANY	
	31 Dec 2013	31 Dec 2012	31 Dec 2013	31 Dec 2012
Holiday and overtime liabilities	5,858	5,715	5,858	5,715
Accrued social costs	5,185	4,743	5,185	4,43
Other accrued costs	1,261	1,176	1,057	1,071
<b>Balance at end of year</b>	<b>12,304</b>	<b>11,634</b>	<b>12,100</b>	<b>11,529</b>

Stockholm 3 may 2014

Annika Helker Lundström,  
Chair of the Board

Lars-Göran Bergquist

Peter Nygårds

Christer Forsgren

Johan Strandberg,  
Staff Representativet

Gunilla Saltin  
Tord Svedberg,  
CEO

Kerstin Cederlöf

Birgitta Palmberger

Kurt Palmgren

Håkan Stripplé,  
Staff Representative

Our audit report was submitted 2014  
Rödl & Partner Nordic AB

Ulf H Davéus  
Authorised Public Accountant

## Note 20

### LIABILITIES TO CREDIT INSTITUTIONS

SEK THOUSAND	GROUP	
	31 Dec 2013	31 Dec 2012
Long-term liabilities		
Liabilities to credit institutions	1,126	-
<b>Balance at end of year</b>	<b>1,126</b>	<b>-</b>
Current liabilities		
Liabilities to credit institutions	2,378	-
<b>Balance at end of year</b>	<b>2,378</b>	<b>-</b>

## Note 21

### PLEGGED ASSETS AND CONTINGENT LIABILITIES, GROUP AND PARENT COMPANY

SEK 1000	31 Dec 2013	31 Dec 2012
Assets pledged to secure debt to credit company		
Floating charges	5,000	5,000
<b>Total</b>	<b>5,000</b>	<b>5,000</b>
Contingent liabilities	None	None



# AUDITOR'S REPORT

TO THE ANNUAL GENERAL MEETING OF IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE LTD. CORPORATE IDENTITY NUMBER 556116-2446

WE HAVE AUDITED THE ANNUAL ACCOUNTS AND CONSOLIDATED ACCOUNTS OF IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE LTD. FOR THE FINANCIAL YEAR 2013.

## REPORT ON ANNUAL AND CONSOLIDATED ACCOUNTS

### Responsibility of Board and CEO for annual and consolidated accounts

The board and CEO are responsible for preparing annual accounts and consolidated accounts providing a true representation of the company's situation in accordance with the Swedish Annual Accounts Act, and for such internal control as deemed necessary by them to prepare annual accounts and consolidated accounts not containing material errors, whether due to impropriety or inaccuracy.

### Auditor's responsibility

Our responsibility is to express an opinion on the annual accounts and consolidated accounts on the basis of our audit. The audit was conducted in accordance with International Standards on Auditing (ISA) and with accepted auditing practice in Sweden. These standards require us to observe the norms of professional ethics, and to plan and perform the audit in a manner offering reasonable assurance that the annual accounts and consolidated accounts do not contain material errors.

An audit involves the sourcing, by various means, of audit evidence relating to figures and other information given in the annual accounts and consolidated accounts. The auditor specifies any measures that require to be taken, among other things by assessing the risk of material errors in the annual accounts and consolidated accounts, whether due to impropriety or inaccuracy. As part of this risk assessment, the auditor takes cognisance of those internal control aspects that are relevant to the manner in which the company prepares the annual accounts and consolidated accounts in order to provide a true representation of its situation, with the aim of formulating inspection measures that are appropriate to the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control procedures. An audit also includes an assessment of the suitability of the accounting principles used, and of the reasonableness of the estimates made by the board of directors and CEO in the accounts, as well as their overall presentation in the annual accounts and consolidated accounts.

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

### Opinion

In our opinion, the annual accounts and consolidated accounts have been prepared in accordance with the Swedish Annual Accounts Act and, in all essential respects, provide a true representation of the financial position of the parent company and group as of 31 December 2013, and of their financial performance and cash flow for the year in accordance with the said act.

The directors' report is consistent with the other parts of the annual report.

We recommend, therefore, that the Annual General Meeting adopt the income statements and balance sheets of the parent company and group

## REPORT ON OTHER LEGAL AND STATUTORY REQUIREMENTS

In addition to our audit of the annual accounts and consolidated accounts, we have audited the proposal concerning the allocation of the company's profit or loss, and the administration of IVL Swedish Environmental Research Institute by the board and CEO in the year 2013.

### Responsibility of Board and CEO

The board is responsible for the proposed allocation of the company's profit or loss, while the board and CEO are responsible for the administration of the company under the Swedish Companies Act.

### Auditor's responsibility

Our responsibility is to express a reasonably certain opinion on the proposed allocation of the company's profit or loss, and on the administration of the company, on the basis of our audit. The audit was conducted in accordance with accepted auditing practice in Sweden.

As a basis for our opinion on the board's proposed allocation of the company's profit or loss, we have examined whether the proposal is consistent with the Swedish Companies Act.

As a basis for our opinion concerning discharge from liability, we have, in addition to our audit of the annual accounts and consolidated accounts, examined significant decisions and actions of the company, as well as its circumstances, in order to determine the liability for damages to the company, if any, of any board member or the CEO. We have, furthermore, examined whether any board member or the CEO has, in any other way, acted in contravention of the Swedish Companies Act, the Swedish Annual Accounts Act or the company's articles of association.

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

### Opinion

We recommend that the Annual General Meeting allocate the profit in accordance with the proposal made in the directors' report, and discharge the members of the board of directors and the CEO from liability for the financial year.

Stockholm 9 April 2014  
Rödl & Partner Nordic AB

Ulf H Davéus, Authorised Public Accountant

# CORPORATE GOVERNANCE

THE CORPORATE GOVERNANCE OF IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE IS FOUNDED ON SWEDISH LAW AND BEST PRACTICE, TAKING ACCOUNT OF THE SWEDISH CODE OF CORPORATE GOVERNANCE. THE CODE IS NOT IMPLEMENTED FULLY SINCE IT HAS BEEN FRAMED MAINLY FOR PUBLICLY QUOTED COMPANIES AND COMPANIES WITH SPREAD OWNERSHIP.

## OWNERS

IVL Swedish Environmental Research Institute has been wholly owned by the Foundation Institute for Water and Air Research (SIVL) since 2004. On conversion of the former Institute for Water and Air Pollution Research (IVL) into a limited company in 1982, the original share capital was allocated equally to the foundation by agreement between the Swedish government and the Swedish business sector.

The aim of the foundation is to promote the long-term conditions required for environmental research and, through its ownership, guarantee the independent status of IVL. The foundation is responsible for the funds allocated by the Swedish government and the Swedish business sector for co-financed environmental and sustainability research carried out by IVL.

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

## ANNUAL GENERAL MEETING

IVL's Annual General Meeting is routinely held at the end of May. Members are notified of the AGM by post. The owner, SIVL, is represented at the AGM by its chair.

All board members were re-elected at the AGM held at the end of May 2013.

## NOMINATION PROCEDURE

SIVL is the sole owner of IVL and proposes members to the board of IVL, partly by inviting nominations from business interests for four ordinary members and one deputy member, and partly by inviting nominations from government for the position of chair, as well as for three ordinary members and one deputy member.

The board of IVL shall comprise at least four and no more than eight ordinary members, together with at least one and no more than two deputy members. In addition, the staff shall be entitled to appoint two ordinary and two deputy members.

IVL board members are presented on page 65.

## BOARD ACTIVITIES IN 2013

The board is responsible, under the Swedish Companies Act and the company's articles of association, for the organisation and administration of the company. Every year, the board draws up rules of procedure, together with a working instruction for the CEO, governing the division of work between the board and the CEO.

In 2013, under the rules of procedure, the board held four ordinary meetings in addition to the May inaugural meeting. As usual, the ordinary board meetings were held in conjunction with the announcement of the company's interim or annual results.

Among other things, the May AGM adopted new rules of procedure for the board and a working instruction for the CEO. Items on the agenda at the December meeting included the company's budget for 2014, as well as its goals and strategy document. An extended board meeting in September discussed the company's long-term strategy.

In October a decision was made to apply to the Swedish Administrative Court for leave to appeal with respect to the VAT issue.

## Remuneration Committee

Under the rules of procedure for the board of IVL Swedish Environmental Research Institute, the board is charged with appointing a remuneration committee to deal with issues relating to employment and salary conditions. The committee proposes the salary, other forms of remuneration and other conditions of employment for the CEO, which are submitted to the board for ratification. The corresponding conditions for other members of the company's executive management are proposed by the CEO and ratified by the remuneration committee. The company does not operate an incentive scheme.

## Board Remuneration

The remuneration of the chair and board members was determined by the 2013 AGM, which approved the payment of SEK54 (60) thousand to the chair and a total of SEK547 (545) thousand to the board members. Staff representatives on the board do not receive remuneration.

## EXTERNAL AUDIT

The task of the auditors is, on behalf of the owners, to carry out an independent audit of the administration of the board and the CEO, and of the annual accounts and financial statements.

Rödl & Partner, with Ulf Davéus as chief auditor, have been appointed as auditors for the period up to the 2014 AGM. An authorised public accountant, Ulf Davéus has been responsible for IVL's financial audits since 1994.

## COMPANY MANAGEMENT

The CEO is responsible for the ongoing administration of the company in accordance with the guidelines and other instructions of the board. The CEO's working instruction was adopted on 29 May 2013 in conjunction with the board's inaugural meeting.

The company's executive management group is made up of the CEO, two executive vice presidents, the CFO and the Vice President, Research. The management group includes four unit heads, with the Director of Human Resources, Information Director and Director of Quality and Environment as adjunct members.

**Tord Svedberg**, born in 1958, received his MSc in chemistry from KTH in 1983 and has been CEO of IVL Swedish Environmental Research Institute since 2008. Prior to that, he held various top management positions at Pharmacia (1984-90), Astra (1990-99) and AstraZeneca (1990-2007), including head of manufacturing in Sweden and member of group management. A member of the Royal Swedish Academy of Engineering Sciences, he also sits on the boards of Unimed AB (since 2008) and Galilaeus Oy (since 2010).

**Mats Ridner**, born in 1955, holds a BSc in economics from Stockholm School of Economics and has been CFO since 1994.

**Åke Iverfeldt**, born in 1954, was awarded a doctorate in chemistry by the University of Gothenburg in 1986, and is executive vice president and head of the Business Development and Marketing unit. He has been with the company since 1985 with the exception of a break from 1992 to 1993, when he worked as a section head at Stockholm County Council. Åke Iverfeldt leaves the company March 15, 2014 to take up a new position as CEO of MISTRA.

**Östen Ekengren**, Östen Ekengren, born in 1952, received his MSc in chemistry from KTH in 1978, and is executive vice president and head of the Business Development and Marketing unit. He joined the company in 1978.

**John Munthe**, John Munthe, born in 1960, received his doctorate in chemistry from the University of Gothenburg in 1992 and has been Vice President of Research since 2010. He joined the company in 1992 and has been a department head since 1994.

The unit heads, CFO and Vice President, Research report to the CEO. The executive management group is supported by Finance, HR, Communication and Business Development staff functions, as well as by quality and environmental management systems.

## INTERNAL CONTROL

Internal control of the company is based on IVL's operational and management system. This also comprises the company's integrated quality and environmental management systems, which are certified under ISO 9001 and ISO 14001 respectively. Focusing on the core activity of 'offering/selling and carrying out research and contract assignments in the environmental sector', the management system embodies guideline documents, procedures and tools relating to all company processes. Internal control of financial reporting is provided by the control environment, including the organisation, decision paths, authorities and responsibilities that are documented and communicated in guideline documents. All guideline documents, procedures and tools are available on the company Intranet.

Every year, the board draws up rules of procedure that govern the division of responsibilities between the board and the CEO, as well as financial reporting to the board. The board is provided with financial reports at every meeting. These contain out-turn and budget figures for the relevant period, including comparison with the corresponding period the previous year, as well as details of orders in hand, investments and a number of key performance indicators.

## RISK ANALYSIS AND MANAGEMENT

The management system also includes procedures and a methodology for performing annual risk analyses covering every aspect from financial risks and conditions, IT security, business climate factors and customer relations, to competence losses and risks associated with image and brand. Risk analyses are accompanied by action plans. The management system is subject to a biannual internal audit, and to continuous monitoring by independent quality and environmental inspectors.

## Board of Directors



**Annika Helker Lundström**  
Chair  
Member since 2010  
CEO – Svensk Vindenergi



**Lars-Göran Bergquist**  
Member since 2000  
Chair – SIVL



**Kerstin Cederlöf**  
Member since 2004  
Director – Swedish  
Environmental  
Protection Agency



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



**Peter Nygårds**  
Member since 2008  
Director – Swedbank



**Birgitta Palmberger**  
Member since 2005  
Head of Department –  
Swedish Energy Agency



**Kurt Palmgren**  
Member since 2003  
Director



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



**Johan Strandberg**  
Member since 2011  
Staff Representative



**Håkan Stripple**  
Member since 2011  
Staff Representative

## Deputy Members

**Lars Ekecrantz**  
Assistant Undersecretary – Ministry of the Environment  
**Pernilla Bengtsson**  
Staff Representative

**Jonas Fejes**  
Staff Representative

## Management Group



**Tord Svedberg**  
President and CEO



**Östen Ekengren**  
Executive Vice President,  
Business Development  
and Marketing



**Åke Iverfeldt**  
Executive Vice President  
(UTA1 15 mar 2014)



**Mats Ridner**  
Chief Financial Officer



**John Munthe**  
Vice President, Research



**Elin Eriksson**  
Director – Sustainable  
Organisations, Products  
and Processes



**Anna Jarnehammar**  
Director – Climate and  
Sustainable Cities



**Björne Olsson**  
Director – Natural Resources  
and Environmental Effects

### Co-opted Members



**Karin Sjöberg**  
Director, Air Pollution  
and Abatement Studies



**Eva Bingel**  
Director, Communications



**Anna Westberg**  
Director, Human Resources



**Per-Olof Skough**  
Director, Environment  
and Quality

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# Scientific Articles 2013

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