



Go Further

## Sustainability 2011/12



YEAR IN REVIEW



OUR BLUEPRINT FOR SUSTAINABILITY



FINANCIAL HEALTH



CLIMATE CHANGE AND THE ENVIRONMENT



WATER



VEHICLE SAFETY



SUPPLY CHAIN



PEOPLE



FORD AROUND THE WORLD

## WATER

Progress in Reducing Water Use

Water Impacts, Risks and Opportunities

Operating in Water-Stressed Regions

Water Strategy Approach

Water Consumption in the Vehicle Lifecycle

Data

Case Study: Zero Water Discharge in Chennai, India

Voice: Jamie Bartram



## Water

Water availability, quality and access are critical global issues that extend well beyond environmental concerns. Water is essential to every element of existence. It is vital for health, indispensable for agriculture and biodiversity, necessary for industry and critical for community development. The need for clean water cuts across all social, economic, environmental and political boundaries.

With water pollution increasing and the world's population growing, access to clean water is growing ever more uncertain. Ford Motor Company can play a role in developing and implementing solutions to the global water challenge.

Water conservation is an integral part of Ford's sustainability strategy, alongside greenhouse gas reduction. Many vehicle manufacturing processes require water, and water is used at every point in our supply chain. Our water-related risks come not only from being a direct water consumer, but from being a large purchaser of water-intensive materials, parts and components.

In recent years, we have been refining our water strategy, which examines our water use from both an environmental and a social perspective. We prioritize facility water reductions based on local needs, while using a global, company-wide approach. To better understand our impacts, we have been assessing our water footprint throughout the [lifecycle](#) of our vehicles. We also have been taking a close look at which areas of Ford operations are located in [water-stressed regions](#). And, we're participating in [social programs](#) that provide better access to water in India and parts of Africa and Central America.

Our water strategy actions – which include a new, water-use-per-vehicle reduction goal of 30 percent from 2009 to 2015 – aim to meet a number of objectives. These include:

- Minimizing water use and consumption at Ford facilities
- Finding ways to use alternative, lower-quality water sources
- Prioritizing our water technology investments based on local water scarcity and cost effectiveness
- Meeting either local quality standards or Ford global standards for wastewater discharge – whichever is more stringent
- Ensuring a stable water supply for our manufacturing facilities while working with local communities to minimize our impact

Approximately

1 billion

people around the world lack access to safe, clean drinking water.

About

2.5 billion

people globally lack sanitation facilities.<sup>1</sup>

## Water Efficiency



We have developed additional year-over-year water-efficiency targets as part of our annual environmental business planning process.

## Water Achievement



We reduced water use per vehicle by 8 percent from 2010 to 2011.

At Ford, we recognize water as a human rights issue – in other words, as a “right to water.” Companies that underperform on water issues will face scrutiny over human rights violations – especially those companies operating in water-stressed areas. Our Company’s water strategy is integrated into our overall [Code of Human Rights, Basic Working Conditions and Corporate Responsibility](#).

---

1. Sources: UN-Water, WHO/UNICEF

Home > Water



Go Further

## Sustainability 2011/12



- WATER**
- Progress in Reducing Water Use
- ▶ Investing in New Technologies
- Water Impacts, Risks and Opportunities
- Operating in Water-Stressed Regions
- Water Strategy Approach
- Water Consumption in the Vehicle Lifecycle
- Data
- Case Study: Zero Water Discharge in Chennai, India
- Voice: Jamie Bartram

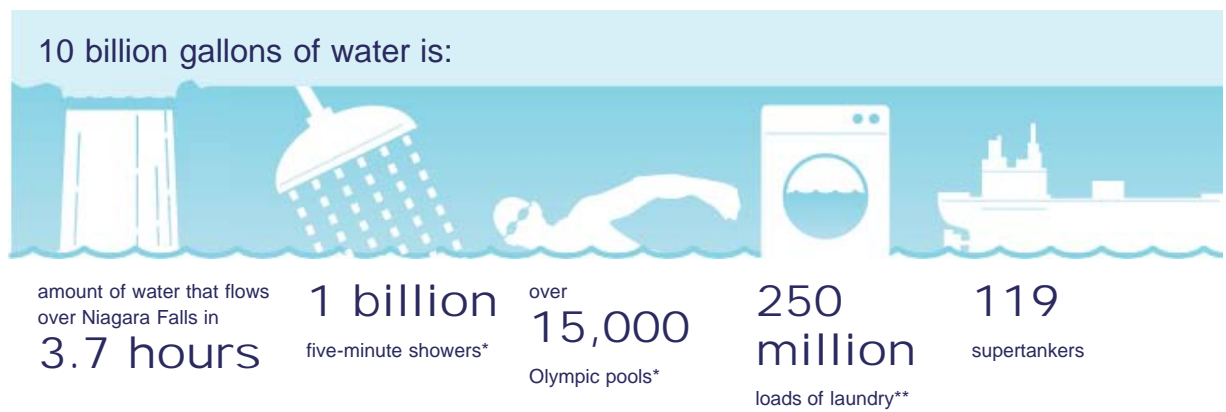
### Progress in Reducing Water Use

For more than a decade, Ford has been committed to decreasing our water use. We began our Global Water Management Initiative in 2000, setting a target of 3 percent year-over-year reductions. Between 2000 and 2011, we reduced our global water use by 60 percent, or approximately 10 billion gallons (see graphic below). That's equivalent to the water used annually by 100,000 average U.S. residences, based on figures from the U.S. Environmental Protection Agency. Over the same period, water use per vehicle decreased by 49 percent.

**Related Links**

This Report

- [Greening Our Operations](#)

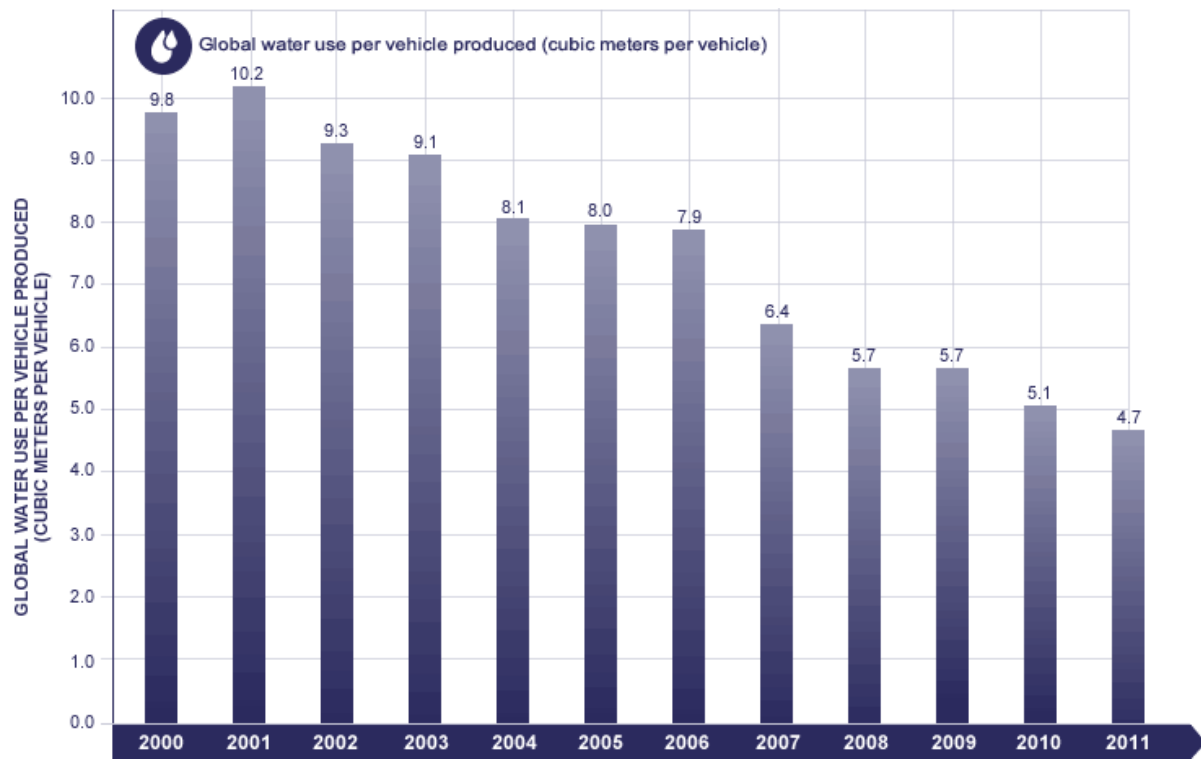


\* U.S. Environmental Protection Agency    \*\* California Energy Commission

In late 2011, we announced a goal to build on our water-reduction successes to date. We're now aiming to cut the amount of water used to make each vehicle by 30 percent globally by 2015, compared to a 2009 baseline. This includes continuing to develop year-over-year efficiency targets as part of our annual environmental business planning process. For 2012, for example, we have set a target of a 5 percent water-use reduction per vehicle. If we meet our 30 percent reduction goal by 2015, we will have decreased the amount of water used to make a vehicle from approximately 9.8 cubic meters in 2000 to approximately 4.0 cubic meters in 2015.

We report on our progress toward this goal not only in this annual Sustainability Report, but through our participation in the [Carbon Disclosure Project's Water Disclosure](#), which we joined in 2010 – the first automaker to do so.

We're aiming to make our vehicles more efficient, while making our own operations more efficient, too. Water remains one of our top environmental priorities, and our aggressive reduction target helps to ensure continued focus on this critical resource.



Home > Water > Progress in Reducing Water Use



Go Further

## Sustainability 2011/12



YEAR IN REVIEW



OUR BLUEPRINT FOR SUSTAINABILITY



FINANCIAL HEALTH



CLIMATE CHANGE AND THE ENVIRONMENT



WATER



VEHICLE SAFETY



SUPPLY CHAIN



PEOPLE



FORD AROUND THE WORLD

## WATER

Progress in Reducing Water Use

▶ Investing in New Technologies

Water Impacts, Risks and Opportunities

Operating in Water-Stressed Regions

Water Strategy Approach

Water Consumption in the Vehicle Lifecycle

Data

Case Study: Zero Water Discharge in Chennai, India

Voice: Jamie Bartram

## Investing in New Technologies

In 2004, we opened the rebuilt Dearborn Truck Plant at the Ford Rouge Center as a model of sustainable manufacturing. The facility incorporates extensive natural stormwater management systems and what was then the largest green roof in the world. As we invest in new and existing facilities globally, we have been building on what we learned at the Ford Rouge Center and implementing other sustainable manufacturing technologies that use water more efficiently and provide environmental benefits.

In recent years, we have taken a broad range of actions that have helped us minimize our water footprint. For example, we implemented a reverse-osmosis process to recycle water in a number of our production plants, allowing us to avoid using high-quality water suitable for human consumption in our manufacturing processes. We've employed an innovative parts-washing system to reduce wastewater and cut energy consumption. We have also looked to new technologies, including a process known as "dry-machining" that lubricates cutting tools with a fine spray of oil, rather than the conventional "wet-machining" that required large amounts of metal-working fluids and water to cool and lubricate the tools. For a typical production line, dry-machining can save more than 280,000 gallons of water per year.

Actions like these don't attract many headlines – but they make an impact. And they reflect our commitment to reduce our environmental footprint.

We have come a long way since we began our water conservation initiative in 2000. Back then, many of our facilities had little ability to even track their water usage. When the initiative started, our engineers developed patented software – called the Water Estimation Tool (or WET) – to predict water usage. Another kind of software was developed to track water use at each facility and generate a monthly report that would identify successes and potential opportunities for improvement.

We began building reduction actions into our Environmental Operating System (EOS), which provides a globally standardized, streamlined approach to meeting all environmental requirements, including sustainability objectives and targets. The EOS allows us to track basic water-reduction actions, such as uncontrolled water loss and cooling tower optimization, at every manufacturing site worldwide.

As we continue to reduce our water footprint, we are implementing a more global approach that cascades best practices from our own plants – and from other industries. We have been benchmarking our peers and other manufacturers to look for water-saving techniques that can be adapted to Ford locations. We are also investigating how to better monitor water use and integrate new technologies into facility upgrades.

In addition, through our ongoing [water footprinting work](#), we have realized that the amount of water we use in office buildings and labs can be significant. Therefore, we're examining how to reduce our water use in these facilities, too.

## Related Links

This Report

- [Greening Our Operations](#)



Go Further

## Sustainability 2011/12



YEAR IN REVIEW



OUR BLUEPRINT FOR SUSTAINABILITY



FINANCIAL HEALTH



CLIMATE CHANGE AND THE ENVIRONMENT



WATER



VEHICLE SAFETY



SUPPLY CHAIN



PEOPLE



FORD AROUND THE WORLD

## WATER

Progress in Reducing Water Use

Water Impacts, Risks and Opportunities

Operating in Water-Stressed Regions

Water Strategy Approach

Water Consumption in the Vehicle Lifecycle

Data

Case Study: Zero Water Discharge in Chennai, India

Voice: Jamie Bartram

## Water Impacts, Risks and Opportunities

Water scarcity can have a sizeable impact on our manufacturing operations. Although we do not need as much water as some other industries, we use water in many key manufacturing phases in our plants. We cannot be certain that we will always have access to the water we need. Already, some of our facilities are located in regions where water supplies are under stress. And global climate change has the potential to further impact the availability and quality of water.

The cost of using water is expected to continue to increase in the coming decades. For a manufacturing company like ours, this would mean higher operating costs. Already, in some locations, rate increases from 2000 to 2011 outpaced water reductions, and our costs will continue to rise if we don't make further improvements.

Increasing water scarcity means industrial needs can be at odds with community and environmental needs. Industrial facilities in water-stressed areas will have reduced access to water and/or may endure rising water costs. Suppliers within water-stressed areas will also be affected. Working on solutions helps us to secure a "license to operate" in diverse global locations and can enhance our reputation in local communities.

Another possible risk for Ford is the water intensity of alternative fuels, such as biofuels and electricity, which may require greater amounts of water to produce than gasoline and diesel fuel. We are assessing the consequences for water quality and availability that may result from the increased production of electrified vehicles, including hybrid, plug-in hybrid and battery electric vehicles.

Tracking and reporting our water usage helps us to manage water-related risks and, as a result, allows us to play a significant role in developing and implementing solutions to the water challenge going forward. We see opportunities for:

- Reduced manufacturing costs through process improvements and new technologies that better track our water usage and enable us to target improvements
- Improved water efficiency

Water services are the most capital-intensive of all utilities, requiring more infrastructure for the delivery of water than the delivery of electricity, for example. According to the World Bank, a \$400 billion to \$600 billion investment will be needed in global water infrastructure in the next two decades. Meanwhile, the United Nations Educational Scientific and Cultural Organization (UNESCO) estimates that between \$111 billion and \$180 billion will be needed per year to meet Millennium Development Goals for sanitation by 2015.<sup>1</sup>

In the U.S., the Environmental Protection Agency estimates the country will need to invest \$202.5 billion over the next 20 years in wastewater facilities, and an additional \$122 billion to ensure safe drinking water supplies.

## Related Links

This Report

- [Greening Our Operations](#)

1. In 2000, the United Nations set eight goals for development, called the Millennium Development Goals, to improve the global human condition by 2015.



Go Further

# Sustainability 2011/12

- YEAR IN REVIEW
- OUR BLUEPRINT FOR SUSTAINABILITY
- FINANCIAL HEALTH
- CLIMATE CHANGE AND THE ENVIRONMENT
- WATER
- VEHICLE SAFETY
- SUPPLY CHAIN
- PEOPLE
- FORD AROUND THE WORLD

- WATER
- Progress in Reducing Water Use
- Water Impacts, Risks and Opportunities
- Operating in Water-Stressed Regions
- Water Strategy Approach
- Water Consumption in the Vehicle Lifecycle
- Data
- Case Study: Zero Water Discharge in Chennai, India
- Voice: Jamie Bartram

## Operating in Water-Stressed Regions

Ford has been growing in many areas of the world where water access and availability are a concern. We have identified which of our operations are located in water-stressed regions using data from the World Resources Institute's EarthTrends project. Water-stressed regions are considered to be those with a per capita water supply of less than 1,700 cubic meters per year. According to our analysis, about 10 percent of our operations are located in regions that are considered to be at risk.

Our facilities in Mexico are located in water-stressed regions; our manufacturing facility in Cuautitlan, Mexico, for example, is already subject to water-withdrawal limitations. Several of our facilities in our Asia Pacific and Africa region are in regions that are currently water-stressed, or are expected to be in the near future. Approximately 26 percent of our operations are projected to be in water-scarce regions (defined as areas of extreme scarcity or scarcity) by 2025, according to our analysis using the World Business Council for Sustainable Development Global Water Tool. (See map below.)

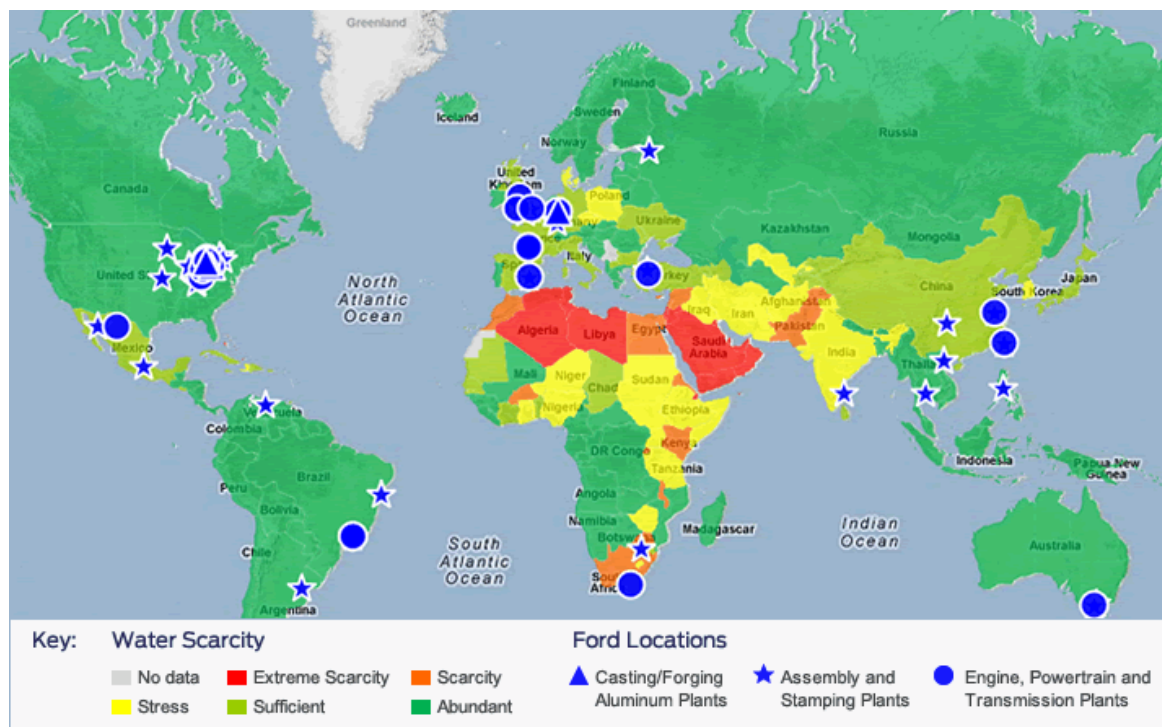
At the vast majority of our manufacturing locations, Ford is not the only entity withdrawing water from a source, making it impossible to determine the impact of our operations.

### Related Links

This Report

- [Greening Our Operations](#)

### Ford Operations: 2025 Projected Annual Renewable Water Supply per Person



Ford used the World Business Council for Sustainable Development's (WBCSD) Global Water Tool to evaluate which of our operations are projected to be in water-scarce regions by 2025. According to the analysis, approximately 26 percent of our operations are projected to be in such regions

(defined as areas of extreme scarcity or scarcity). The WBCSD's free tool enables companies to map their water use and assess water-related risks. For more information on the tool and how it works, see the [WBCSD website](#).

*Sources:* World Business Council for Sustainable Development's Global Water Tool (GWT) v2. GWTv2 uses the Food and Agricultural Organization of the United Nations AQUASTAT dataset.

Home > Water > Operating in Water-Stressed Regions





Go Further

## Sustainability 2011/12



<b>WATER</b>
Progress in Reducing Water Use
Water Impacts, Risks and Opportunities
Operating in Water-Stressed Regions
<b>Water Strategy Approach</b>
▶ Water as a Community Issue
Water Consumption in the Vehicle Lifecycle
Data
Case Study: Zero Water Discharge in Chennai, India
Voice: Jamie Bartram

# Water Strategy Approach

Water conservation is increasingly important to our stakeholders and to our own operations, particularly in our areas of operation that face challenges such as drought and significant population growth. By reporting our progress, we support positive social change and reduce the environmental impacts of our facilities.

Ford's water strategy, which looks at our water use from both an environmental and a social perspective, is evaluated at the highest levels of our Company. Our Board of Directors reviewed our water-related progress in 2011.

We have established a cross-functional team from across Ford divisions, including our environmental quality, manufacturing, purchasing, research and community engagement functions, to review water issues in a holistic way. This team has been meeting with a variety of groups – such as the Interfaith Center on Corporate Responsibility (ICCR), the U.N. Global Compact, the U.S. State Department and the Global Water Challenge (GWC) – to gain a better appreciation of outside stakeholder perspectives.

In 2012, we intend to sign the United Nations' CEO Water Mandate, a public/private initiative designed to assist companies in the development, implementation and disclosure of water sustainability policies and practices. And to further increase our engagement around global water issues, we recently became a founding partner of the U.S. Water Partnership.

Our water strategy actions work toward several objectives, including the following:

- Minimizing water use and consumption at Ford facilities
- Finding ways to use alternative, lower-quality water sources
- Prioritizing our water technology investments based on local water scarcity and cost effectiveness
- Meeting either local quality standards or Ford global standards for wastewater discharge – whichever is more stringent
- Ensuring a stable water supply for our manufacturing facilities while working with local communities to minimize our impact

### Our Platforms for Water Leadership



*We're aiming to be an industry leader on issues of water. To do so, we're improving our own operational footprint, engaging with our communities, and working with researchers, policy makers and nongovernmental organizations on ways to make an impact*



Go Further

## Sustainability 2011/12



YEAR IN REVIEW



OUR BLUEPRINT FOR SUSTAINABILITY



FINANCIAL HEALTH



CLIMATE CHANGE AND THE ENVIRONMENT



WATER



VEHICLE SAFETY



SUPPLY CHAIN



PEOPLE



FORD AROUND THE WORLD

## WATER

Progress in Reducing Water Use

Water Impacts, Risks and Opportunities

Operating in Water-Stressed Regions

Water Strategy Approach

► Water as a Community Issue

Water Consumption in the Vehicle Lifecycle

Data

Case Study: Zero Water Discharge in Chennai, India

Voice: Jamie Bartram

## Water as a Community Issue

For many years, we have demonstrated our commitment to water issues primarily through our own operations, focusing on water efficiency, effluent quality and water reuse. But we also are committed to moving beyond our own fences to address water issues within our communities of operation. We are working with stakeholders to better understand issues around water accessibility and sanitation, in water-stressed communities especially. We're investing in community water stewardship projects in India, with plans to make similar investments in Mexico, China, South Africa and elsewhere.

We are committed to mobilizing opportunities for communities in the developing world through clean water. We have joined the Global Water Coalition (GWC), a group of leading organizations committed to achieving universal access to safe drinking water, sanitation and hygiene. Through the GWC, Ford and others are funding water and sanitation programs in Africa and Central America. The GWC is also launching a "Women for Water" campaign to address critical water needs. In the developing world, the burden of collecting water falls primarily upon women and girls, who often must spend several hours a day carrying water.

Another area where we are focusing is education. Ford India, for example, helped to refurbish two schools in villages near our plant in Maraimalai Nagar, a suburb of the southern city of Chennai. The refurbishment included new sanitation facilities and drinking water fountains.

Our Ford Motor Company Volunteer Corps, meanwhile, is placing a priority on water-based community projects during our Global Week of Caring and Accelerated Action Days. In 2011, for example, the staff at the Ghana Mechanical Lloyd Company, Ltd. dealership paid for a new water tank for the students and staff of Konkord Academy, a school for children with mental and physical disabilities. And in Honduras, the Yude Canahuati dealership replaced the aging wastewater pipes at the Pilar Salinas School for the Blind to improve drainage, reduce environmental pollution and eliminate a health hazard. (See the [Communities](#) section for more on Ford's volunteer programs.)



Students and staff of Konkord Academy, a school for children with mental and physical disabilities in Ghana, where a Ford dealership paid for a new water tank

## Related Links

This Report

- [Communities](#)
- [Ford Volunteer Corps](#)
- [Greening Our Operations](#)



Go Further

## Sustainability 2011/12

- YEAR IN REVIEW
- OUR BLUEPRINT FOR SUSTAINABILITY
- FINANCIAL HEALTH
- CLIMATE CHANGE AND THE ENVIRONMENT
- WATER
- VEHICLE SAFETY
- SUPPLY CHAIN
- PEOPLE
- FORD AROUND THE WORLD

- WATER
- Progress in Reducing Water Use
- Water Impacts, Risks and Opportunities
- Operating in Water-Stressed Regions
- Water Strategy Approach
- Water Consumption in the Vehicle Lifecycle
- Data
- Case Study: Zero Water Discharge in Chennai, India
- Voice: Jamie Bartram

# Water Consumption in the Vehicle Lifecycle

To better assess our water-related impacts, we have been working to quantify water consumption over the life of a typical light-duty vehicle in the U.S. The Georgia Institute of Technology's Sustainable Design and Manufacturing program recently conducted a literature survey to estimate the water footprint of a typical light-duty vehicle in the U.S. The analysis included water used in material production, production of parts, vehicle assembly, vehicle use (fuel production and distribution) and vehicle disposal at end-of-life. Georgia Tech has also worked with Ford on a number of other multidisciplinary issues related to sustainable development.

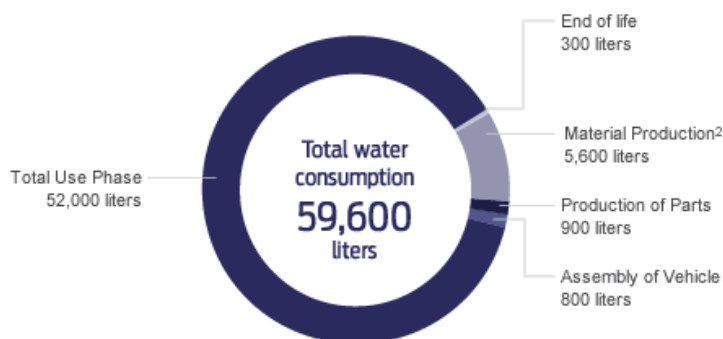
The analysis found that the greatest water consumption occurs during the use phase, when consumers are driving. This is largely due to the amounts of water required for fuel production. In the supply chain, the production and processing of metals (in particular steel and aluminum) require the most water. Identifying which portions of the supply chain are most water-intensive allows us to better assess the business risk associated with using different suppliers in potentially water-stressed areas.

Estimation of water use in the lifecycle of a vehicle is a difficult task because of incomplete data sets, as well as nonstandardized definitions (e.g., for "water use" and "water consumption") used in earlier studies. Although water use is typically metered at the factory level, water consumption (i.e., water lost through evaporation and/or incorporation into a material, part and/or product) is much harder to quantify and requires data on water discharge in addition to water input. The Georgia Tech study was based on the average vehicle composition from an older study that did not fully reflect the material composition of current vehicles. We view the latest data as preliminary, but directionally correct. We are working to gain a better understanding of water use and consumption in all aspects of the vehicle lifecycle (including alternative fuels such as biofuels and new vehicle technologies such as electric vehicles) and plan to report updated assessments in the future.

### Related Links

- This Report
- [Greening Our Products](#)

## Lifecycle Water Consumption<sup>1</sup>



Stage	Approximate Water Consumption (Liters)	Percentage
Material Production <sup>2</sup>	5,600	9%
Production of Parts	900	1.5%
Assembly of Vehicle	800	1.3%
Total Use Phase	52,000	87%
End of Life	300	0.5%
Total	59,600	100%

## Notes to Data

1. Source: B. Bras, F. Tejada, J. Yen, J. Zullo, T. Guldborg, *Quantifying the Life Cycle Water Consumption of a Passenger Vehicle*, SAE Technical Paper 2012-01-0646.
2. Indirect, upstream water consumptions were not included in the material production stage.

Water Consumption = Freshwater withdrawals that are evaporated or incorporated in products and waste.

Water Use = All water that goes into a system. Most of this typically leaves the system as wastewater.

Georgia Tech is also helping us conduct research on the water intensity of the production of biofuels and battery materials, such as lithium. And, researchers there are helping us identify the best manufacturing technologies to improve our stationary water use.



Go Further

# Sustainability 2011/12

- YEAR IN REVIEW
- OUR BLUEPRINT FOR SUSTAINABILITY
- FINANCIAL HEALTH
- CLIMATE CHANGE AND THE ENVIRONMENT
- WATER
- VEHICLE SAFETY
- SUPPLY CHAIN
- PEOPLE
- FORD AROUND THE WORLD

- WATER
- Progress in Reducing Water Use
- Water Impacts, Risks and Opportunities
- Operating in Water-Stressed Regions
- Water Strategy Approach
- Water Consumption in the Vehicle Lifecycle
- Data
- Case Study: Zero Water Discharge in Chennai, India
- Voice: Jamie Bartram

## Data

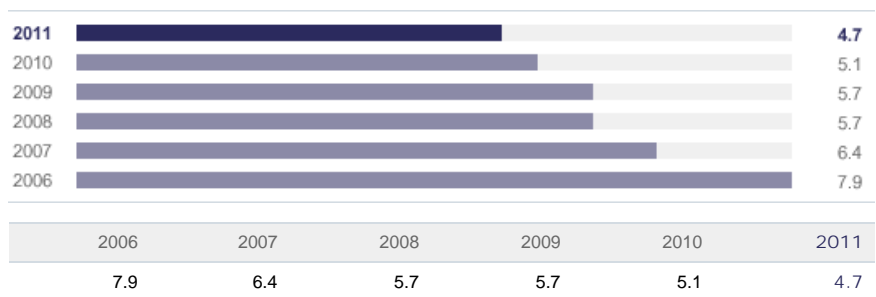
### DATA ON THIS PAGE

- A. [Global Water Use per Vehicle Produced](#)
- B. [Global Water Use by Source](#)
- C. [Regional Water Use](#)

View all data on this page as [charts](#) | [tables](#)

### A. Global Water Use per Vehicle Produced

*Cubic meters per vehicle produced*



Data managed through the [Global Emissions Manager database](#)

### Notes to Data

Data has been revised to reflect acquisitions and divestitures of facilities.

### Related Links

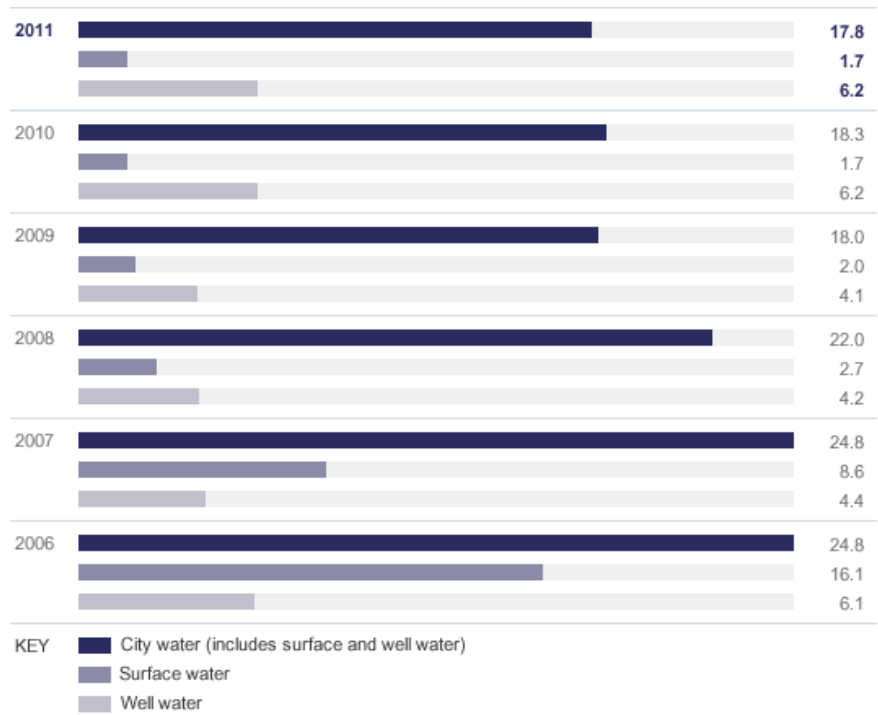
In This Report:

- [Progress in Reducing Water Use](#)

[▲ back to top](#)

## B. Global Water Use by Source

Million cubic meters



	2006	2007	2008	2009	2010	2011
City water (includes surface and well water)	24.8	24.8	22.0	18.0	18.3	17.8
Surface water	16.1	8.6	2.7	2.0	1.7	1.7
Well water	6.1	4.4	4.2	4.1	6.2	6.2

 Data managed through the [Global Emissions Manager database](#)

### Notes to Data

Data has been revised to reflect acquisitions and divestitures of facilities.

### Related Links

In This Report:

- [Progress in Reducing Water Use](#)

[▲ back to top](#)

## C. Regional Water Use

Million cubic meters

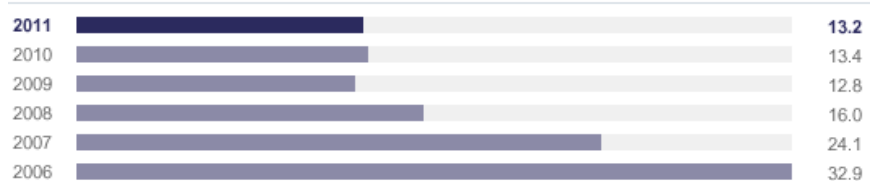
### Asia Pacific and Africa



### Europe



### North America



### South America



	2006	2007	2008	2009	2010	2011
Asia Pacific and Africa	3.0	4.0	4.5	3.9	3.7	3.6
Europe	7.5	6.7	5.9	5.0	6.6	6.6
North America	32.9	24.1	16.0	12.8	13.4	13.2
South America	2.5	2.4	2.5	2.4	2.5	2.4

 Data managed through the [Global Emissions Manager database](#)

### Notes to Data

Data has been revised to reflect acquisitions and divestitures of facilities.

### Related Links

In This Report:

- [Progress in Reducing Water Use](#)

[▲ back to top](#)



Go Further

## Sustainability 2011/12



YEAR IN REVIEW



OUR BLUEPRINT FOR SUSTAINABILITY



FINANCIAL HEALTH



CLIMATE CHANGE AND THE ENVIRONMENT



WATER



VEHICLE SAFETY



SUPPLY CHAIN



PEOPLE



FORD AROUND THE WORLD

## WATER

Progress in Reducing Water Use

Water Impacts, Risks and Opportunities

Operating in Water-Stressed Regions

Water Strategy Approach

Water Consumption in the Vehicle Lifecycle

Data

Case Study: Zero Water Discharge in Chennai, India

Voice: Jamie Bartram

## Case Study: Zero Water Discharge in Chennai, India

The Chennai region of India has been likened to “the Detroit of Asia,” thanks to the large number of automotive and vehicle component companies that operate there. As a manufacturing hub, the region is also home to dozens of multinational firms in computers, technology and healthcare, to name a few other prominent industries.

With an estimated population of more than 9 million, the metropolitan Chennai area ranks among the top-four most populous regions in India – and can be counted among the 40 largest metropolitan areas in the world.

But growing industry and burgeoning population have put considerable stresses on a part of the world that already suffered from chronic water scarcity. And the demand for water has quickly outpaced the limited supplies.

Like other auto companies, Ford has been expanding our operations and production in Chennai in an effort to serve one of the world’s fastest-growing auto markets. One challenge, however, has been finding ways to do so without adding to the water burdens of the region.

With pressures on water supplies expected to continue, government authorities have been requiring manufacturers to achieve zero liquid discharge in their operations, as a way to encourage them to reuse water and reduce their overall water use. Our Ford assembly plant in Maraimalai Nagar, 45 kilometers southwest of Chennai, was able to achieve that goal, thanks to an innovative process that treats the plant’s wastewater and recycles it back into our manufacturing processes. Reaching the zero-discharge goal has helped us understand and gain experience with new technologies that are likely to become increasingly important as water scarcity and quality issues grow more urgent around the globe. (Our recently updated [water strategy](#) focuses on regions – like Chennai – where water is scarce).

To reach zero liquid discharge, Ford India implemented a combination of physical, chemical and biological treatment operations. Wastewater streams from the assembly and engine plants are individually pretreated before being mixed with sanitary and cafeteria wastewaters. Following biological treatment, the stream passes through media filtration and activated carbon before it is ultrafiltered. This final stream is sent to a three-stage reverse-osmosis system, where it is separated into an ultrapure water phase and highly concentrated brine stage. The brine is distilled until it results in a solid salt, which is disposed of as waste.

Even before our recent upgrades, we were treating nonindustrial wastewater, such as toilet and sink water, for reuse in toilets. Overall, the plant’s water usage is extremely low – the lowest among all of Ford’s plants. In 2011, the plant’s average usage was 1.15 kiloliters (or 1.15 cubic meters) per vehicle.



Ford's production plant in Chennai, India

## Related Links

This Report

- [Asia Pacific Africa](#)
- [Greening Our Operations](#)

## Chennai Assembly Plant Facts

- Recent investment: \$500 million
- Annual production capacity: 200,000 units
- Year opened: 1996
- Year renovated: 2010
- Total employment: about 2,000



- Products: Ford Fusion, Ikon, Fiesta and Endeavour
- Site size: 350 acres
- Per vehicle water reduction: 72 percent per vehicle between 2007 and 2011
- Waste: Zero solid waste facility
- Suppliers on site: Visteon Corporation, TATA Johnson Controls, YAPP Automotive Parts, Cooper

[Home](#) > [Water](#) > [Case Study: Zero Water Discharge in Chennai, India](#)



Go Further

## Sustainability 2011/12



YEAR IN REVIEW



OUR BLUEPRINT FOR SUSTAINABILITY



FINANCIAL HEALTH



CLIMATE CHANGE AND THE ENVIRONMENT



WATER



VEHICLE SAFETY



SUPPLY CHAIN



PEOPLE



FORD AROUND THE WORLD

## WATER

Progress in Reducing Water Use

Water Impacts, Risks and Opportunities

Operating in Water-Stressed Regions

Water Strategy Approach

Water Consumption in the Vehicle Lifecycle

Data

Case Study: Zero Water Discharge in Chennai, India

Voice: Jamie Bartram

## Jamie Bartram

Director  
The Water Institute at UNC  
University of North Carolina  
UNC Gillings School of Public Health



If you look back a few decades, the idea of water as a potentially limiting factor for businesses and the economy simply wasn't there. Companies didn't recognize that water is critical to their business. Within the last decade, water internationally has increasingly been seen as important, but it didn't get sexy overnight. Today, of course, water conservation is mainstream but water safety is still a lagging issue.

The Water Institute at UNC works at the triangulated point that fits between water, health and development. We take great care to say that water resources, sanitation and water supply aren't just concerns for developing countries; even the most developed nations face constraints.

Two years ago, the United Nations recognized water as a human right. That doesn't mean glibly that an individual can knock on a door and say, "I demand my right to water." What it does mean is that governments, within their means, need to allocate resources to equitably provide services to their populations in a way that is reasonable and fair.

We're so under-ambitious about what we do with water that it's quite scary. How on earth can we be sitting here in the 21st century and have a United Nations Millennium Development Goal – the height of human ambition – of reducing the proportion of people who *only* have to walk half an hour to collect water, a single bucket at a time. Is that a serious ambition for the 21st century? Our ambition shouldn't be anything less than reliable, safe water in every house, every hospital, every school and every public marketplace around the globe.

Here at the Water Institute, we believe that if we are to solve water problems, we must confront head-on the "elephants in the room." One of the biggest "elephants" is the flush toilet. We all crank that handle on the porcelain pedestal and think it's a marvelous, modern thing. But if you think about it, it's really a very silly way for us to manage waste. We use enormous volumes of water to dilute material, which then goes through hugely expensive pipes buried underground and which then must be separated out at great cost. And even then, we're not very good at it; every year there are outbreaks of diseases when sanitary waste gets into the environment and contaminates our water, food or land. Part of the problem is the huge investment that should be made each year to keep up the infrastructure but is often delayed.

Another "elephant" is the way that we manage our water systems. In many parts of the world – even in some wealthier nations – we often have water management systems that are undermanaged and underperforming because of system fragmentation, underfunded systems and an unwillingness to look at more comprehensive, newer management approaches.

To take water and public health issues to a new level, we need commitments from governments, from non-governmental organizations (NGOs) and from corporations alike.

The NGOs are out there trying to make the world a better place, and many are doing terrific things. These organizations can bring better performance and more impact from critical self-reflection, but their focus on household water use addresses only a small fraction of overall water use.

### Related Links

External Websites:

- [The Water Institute at UNC](#)

Transformational solutions to the water crisis can come from companies that have the skills and resources to address the problem. Whether it's the utilities that deliver services or the companies that provide materials or the large manufacturers that are the heaviest users and dischargers of water, businesses know how to track performance, evaluate improvements and optimize the use of scarce resources.

For both NGOs and companies to be effective, governments have a role in creating the frameworks and regulations, as well as their own direct roles.

I always say that the role of any agency starts at home, and that's true for corporations, too. Water has a big role in the workplace, even just in terms of making sure that a company's employees have access to safe, drinkable water and to clean private toilet facilities.

Companies that are leading on water issues have essentially done three things. They are practicing good management in their workplaces by providing their workers with clean water and clean sanitation. They are improving internal efficiencies and reducing their water footprint. And they are examining their external impacts as a user of water on the communities around them. They're not treating water as an issue of corporate social responsibility or philanthropy. They are relating it back to how they do business.