

About RainGrid Inc.



RainGrid is a climate adaptation firm with a mission to transform city stormwater infrastructure into smart OneWater systems.

Our *Aggregated Rain Grid Network (ARGoN) System* harnesses the power of weather predictive artificial intelligence to manage networks of property-based Internet of Things controlled rain harvesting.

In doing so, we transform conventional urban stormwater management into intelligent networks of flood and drought resilience.

RainGrid is recognized by the IWRA as a globally significant smart water management technology for achieving the SDGs in water, climate, cities and infrastructure; and a designated Intelligent Water Technology by the Water Environment Federation/Water Research Foundation (WEF/WRF) *Leaders Innovation Forum for Technology (LIFT)*.

Established in 2014 and headquartered in Toronto, Canada, RainGrid is a graduate fellow of the prestigious MaRS Impact 8 cleantech program. As a "world-changing municipal-issue startup", RainGrid took first place in the Challenge Cup (Toronto, 2014) Smart Cities business competition.

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Why You Need RainGrid

Water utilities need predictable and measurable compliance from their green infrastructure investments.

RainGrid's cloud-based ARGoN Systems provide secure, cost-effective infrastructure and real-time data to de-risk properties and cities against climate variable drought & flood exposure by:

- significantly eliminating rooftop runoff contributing to legacy stormwater infrastructure failure
- creating secure distributed aquifer recharge capacity
- generating property and city-wide micro-climate data visualization and analytics
- building community-scale climate resilience

RainGrid makes it easy to adopt the a property-based, smart OneWater utility within a *design, finance, build and operate* community-based public private partnership.

Reliable, measurable and effective - ARGoN Systems scale-up from pilot to mega-project without significant resource alignment.

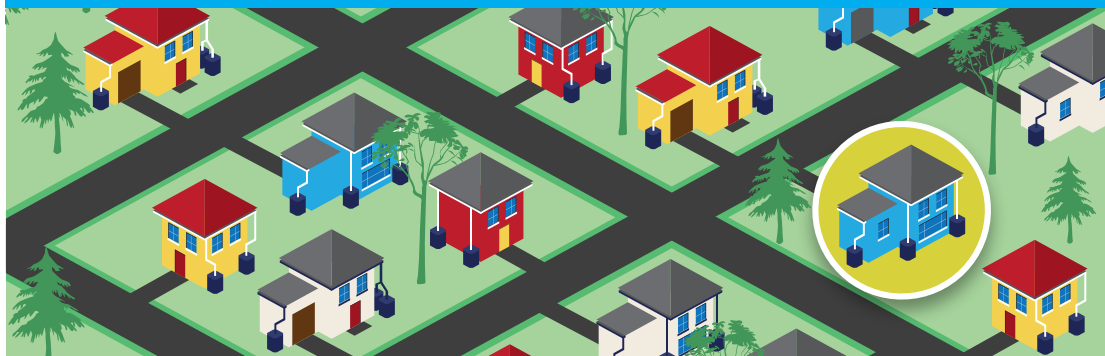
RainGrid Inc. ARGoN Systems help you achieve climate adaptive seasonal flood and drought resilient water security.



RainGrid Inc.

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What Are "ARGoN Systems"?



Aggregated Rain Grid Network (ARGoN) Systems

Infinitely scalable AI-powered, IoT-managed networks of property-based rain harvesting cisterns or smartBlu Roof systems.

ARGoN Systems supplement or replace legacy conveyance, pond/tunnel infrastructure by managing rain where it falls—at the lot level.

Too much water: **stormwater = flooding**

Residential/commercial rooftops account for ~45-57% of urban gross impermeable area.

ARGoN Systems significantly mitigate urban flooding and hydraulic surcharging by taking rooftops offline from the sewer system. ARGoN is a powerful source control tool to reduce localized runoff flooding and sewer backups.

Not enough water: **stormwater = drought**

Most water-stressed regions lose the aquifer recharge opportunity from annual wet weather to runoff. ARGoN Systems harvest rooftops for groundwater recharge to rebalance water resources. Alternately, ARGoN Systems provide real-time managed potable water offsets.

Outdoor water use accounts for >30 percent of total household water use, on average, but can be as much as 60 percent of that total in arid regions.

What Are ARGoN Systems?

How ARGoN Systems Work

ARGoN Systems utilize a weather predictive Quantitative Precipitation Forecast AI to correlate raw weather and building roof area data against storage volumes of residential and commercial property internet of things (IoT) managed cisterns or blue roofs. Installed as a community-scale utility, ARGoN Systems diversify runoff storage otherwise requiring regional tunnel or pond infrastructure.

Real-time sensors monitor cisterns or roofs in six minute intervals and correlate storage capacity to the five-day precipitation forecast data for each individual property. IoT controllers automate drainage valve/pump operation to ensure maximum cistern/roof retention for groundwater recharge or property based reuse.

ARGoN cloud-data dashboards provide real-time visualization and analytics of property and grid-scale weather forecasts, operational and diagnostic data. ARGoN monitors 6 minute hourly, daily, monthly and annual data for rainfall, retention, overflow and reuse volumes as well as micro-climate data for temperature and barometric pressure.

Browser-based dashboards at *my.raingrid.com* for individual properties and *manage.raingrid.com* for utility-scale users provide real-time operational and diagnostics monitoring accessible from mobile or desktop applications.



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ARGoN Data Advantage



When installed as a grid utility, ARGoN Systems generate real-time, lot-by-lot, and cumulative data visualization and decision-making analytics across a range of parameters.

In addition to the operational 5 day predictive weather forecast, correlated to cistern/rooftop storage capacity; over time, utility scale ARGoN Systems can be designed as *neural networks* capable of providing intuitive flood and drought data correlated to regional climate models.

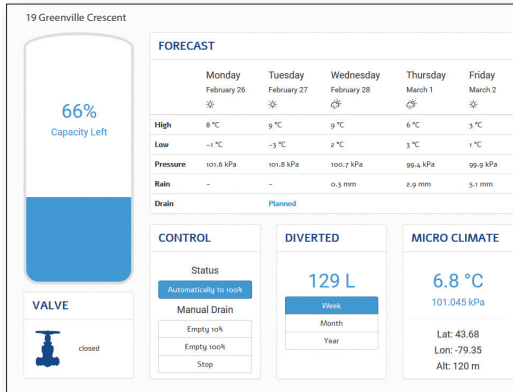
Residential Property Based Cistern Controller



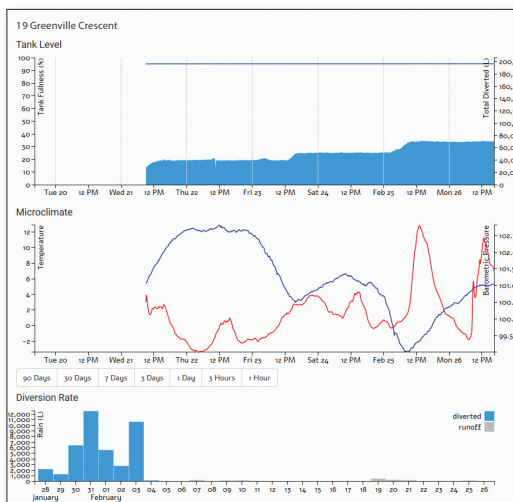
- Sensor Platforms
 - 6 sec. ultrasonic
 - 6 sec. pressure transducer
 - 6 second laser level
- Drainage Platforms
 - Three phase electrically-actuated drain valve
 - Variable speed pump
- Power Platforms
 - AC
 - DC-Solar
 - PoE
- IoT Communications Platforms
 - 5G DataCell
 - 4G ISM Radio-WiFi
 - ZigBee Mesh

ARGoN Systems Data Advantage

My.RainGrid View



- Real-time individual property based data monitoring & visualization
- Micro-climate predictive weather forecast
- Autonomous AI operation



ARGoN Data Cloud

- Property-based and community-wide precipitation mapping, System-wide diagnostics,
- Mobile or Desktop Web-based Access



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Smartgrid Planning and Cost Recovery



Designed, financed, implemented and operated as an asset-managed by a community-based public private partnership stormwater utility, ARGON Systems provides municipalities with reliable, measurable and effective “green stormwater infrastructure” capacity.

RainGrid Inc. provides a turnkey service utility to design, finance, install, and operate both hardware and software/data services:

- Custom property or utility scale design and optional Environmental Impact Bond financing
- Community social marketing and installation for utility applications
- Community utility operations/maintenance
- Data visualization, analytics and reporting

ARGON Systems installations operate as a community-based public-private partnership (CBP3). We treat property owners as partners. RainGrid builds social capital and positive stormwater utility fee feedback into your green infrastructure program. Voluntary rebate programs evolve into community utilities as intensive social marketing closes participation gaps.

Smartgrid Planning and Cost Recovery

ARGoN Systems offers utilities a tangible reduction in gross community and property based impermeable coverage or equivalent runoff units (ERUs). ARGoN Systems install for a fraction of the \$150K/permeable acre compared to public ROW green infrastructure. ARGoN Systems are an ideal solution for housing developers and greenfield builders seeking net zero-impact design. Houses with built-in ARGoN Systems are more attractive to buyers in both the resale and new property markets, as they achieve climate de-risking against flood and drought insurance risk and costs.



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ARGoN Systems Applications



Repairing or upgrading pond stormwater systems takes a big bite out of utility budgets. ARGoN Systems relieves stresses on legacy centralized infrastructure, enhancing capacity and lifespan. Even under extreme 100-year storm conditions, ARGoN Systems optimize downstream infrastructure to significantly reduce catastrophic flooding.

ARGoN Systems cost a fraction of a conventional piped system, and can be scaled to manage 100% of rooftop runoff volume. Implemented on a utility scale, a typical Rain Grid system can be installed for US\$0.45/G.

In comparison, centralized infrastructure costs significantly more:

- Underground super-pipes (\$2,500/m³)
- Mega-tunnel storage (\$50,000/m³)

Typical subdivision and regional stormwater facilities range between \$100-300/m³, excluding land costs, landscaping treat-ment or municipal maintenance upgrades. Regulatory requirements for 100-year stormwater capacity increase this cost significantly.

Smartgrid Extends Infrastructure Life

Conversely, ARGoN System costs decrease with the greater percentage of property penetration.

ARGoN Systems cost advantages

The ARGoN Systems development process always begins with a feasibility study to determine the key cost drivers of an installed system. Part of this includes comparing conceptual final stormwater infrastructure design of existing developments with and without a Rain Grid system.

The straight-cost advantage of installing ARGoN Systems (not including aggregated permit credit benefits), is measured in avoided costs, either by replacing other systems or by minimizing the scope and materials costs of conventional stormwater.

For example, a fully installed ARGoN Systems allows for smaller collection pipe diameters on streets, and a smaller, if at all necessary, stormwater management pond.

Cost advantages expand exponentially when RainGrid eliminates or reduces the need for retrofit expansions of stormwater systems using storage in underground tanks, super-pipes or tunnels. Reduced maintenance costs are also a major cost advantage in comparison to conventional stormwater ponds or other green infrastructure requiring periodic dredging or rebuild.



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Frequently Asked Questions



Q: What is a RainGrid ARGoN Systems?

ARGoN Systems are private property-based networks of intelligent rain harvesting cisterns/blue roofs installed to eliminate rooftop runoff and deliver reliable stormwater source control for groundwater recharge, potable water offset or flood/drought resilience.

RainGrid's cloud-based SaaS monitors real-time weather and cistern sensors manage runoff volume storage with optimized drainage to achieve water balance objectives. Interactive RainGrid dashboards give real-time (desktop/mobile) web-browser operational data visualization and analytics for individual property cistern operations and network-wide utilities.

Q: How much rainfall does a RainGrid installation store?

ARGoN Systems are typically sized to store a minimum 35-45 mm storm event—about 90-95% of annual average runoff from residential and small IC&I rooftops. The smartBlu Roofs option for commercial rooftops can effectively replace 100% of stormwater management.

Q: Who operates it?

ARGoN Systems are community-based public-private partnership (CBP3) asset-managed infrastructure on private property installed by RainGrid and operated on behalf of the water utility. This extends municipal infrastructure capacity to the 45-57% of gross impermeable area made up of residential/small commercial private properties.

Frequently Asked Questions

Q: Where does the water go?

There are several discharge options: overflows and automated cistern drainage can be discharged for groundwater/aquifer recharge; connected to irrigation systems for lawn or garden watering to offset municipal supply, or the water can be filtered for reuse in toilets and other non-potable fixtures within the building.

Q: What are the environmental advantages?

ARGoN Systems offer reliable, centrally managed potable offset demand capacity. In wet weather, ARGoN Systems maintain urban watershed balance by significantly reducing peak runoff and replicating pre-development hydrologic conditions. This may be the best way to prevent erosion impacts to creeks and streams. Adding residential property runoff retention significantly contributes to TMDL discharge compliance.

Q: Must it work perfectly? Is there room for error?

When installed as a distributed community-wide utility, ARGoN Systems offer significant operational network redundancy and resiliency. The Network is constantly monitored to ensure peak operational effectiveness.

Q: Will the significant environmental benefits of RainGrid be recognized at the Permit Approval stage?

YES. ARGoN Systems are recognized by the IWRA as a globally significant smart water technology for achievement of the SDGs applicable to water, community, infrastructure and climate. ARGoN is suitable for both post-disaster and preventative flood and drought resilience planning.



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