Device for wet cleaning of polluted air in urban areas features a cylindrical body with gas inlet and outlet ducts, two tiers of spray nozzles, a nozzle layer between the spray nozzle tiers, a Venturi tube on the gas inlet duct with a water supply fitting, an exhaust fan in the gas outlet duct, a mist extractor, an ozone supply system and a water circulation system with a circulation pump. The water circulation system of the device consists of two independent water circulation loops with separate circulation pumps; the first loop, where coarse dust is captured from the air and nitrogen monoxide is oxidized by ozone, is formed within the interior of the inner cylinder with a conical bottom, which is coaxially installed inside the outer cylinder body, has a smaller diameter, and whose outer edge is lower than the first spray nozzle tier; inside the inner cylinder, there is a Venturi tube with a water inlet fitting to the diffuser and a bubbler for ozone supply. Water is drawn from the conical bottom of the inner cylinder through a fitting by a circulation pump and fed into the Venturi tube diffuser; in the second water circulation loop of the device, where chemisorption of nitrogen dioxide and capture of fine dust occur, two tiers of spray nozzles and a ring-shaped nozzle assembly are located; wherein, water is drawn from the conical bottom of the outer body through a fitting by a circulation pump and fed into the distribution manifold of both tiers of spray nozzles; additionally, the device is equipped with an automatic alkali dosing system to maintain an optimal pH of 6.5-7.0 in the second water circulation loop of the device.