Research guides city climate change policy

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University of Western Ontario professor Slobodan Simonovic sees the City of London on the leading edge of addressing climate change. And he should know. The civil and environmental engineering professor and his team of Western researchers are helping inform city policy on the subject.

In the latest example of the partnership, the London City Council recently accepted recommendations made by two studies conducted by Simonovic. The studies looked into storm water and the city's infrastructure preparedness for flooding as a result of climate change.

"Municipalities realized the rubber hits the road with them," says Simonovic, who serves as director of Western's Institute for Catastrophic Loss Reduction. "They need to put the pipe in the ground; they need to deal with the potential damage. So they decided to proceed with these studies to give them a stronger base for decision-making."

For years, Simonovic has been studying the impact of climate change on the Upper Thames Valley watershed, an area of 3,482 square kilometres. Mainly rural, the area features the urban centres of London, Stratford and Woodstock.

"We wanted to bring the global impacts of climate change down into a smaller scale, to the watershed level," Simonovic says.

In an earlier study, funded by the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS), his team identified flooding – larger and more frequent flooding – as the primary way London would be threatened by climate change.

That study, presented to the London mayor and council in September 2007, would inform London's Climate Change Adaptation Strategy, a developing method of addressing the issue of climate change using academic, professional and civic expertise to address the issue.

"It's been a good partnership to use the expertise locally at Western," says Pat McNally, executive director, Planning, Environmental & Engineering Services for the City of London. "We think the municipality is being responsible, even leading edge, in addressing this issue. It's all about bringing it, the impacts, down to what it means locally."

McNally credited Berta Krichker, London's storm water management manager, as a leading force in moving this project forward from the city.

After his initial presentation, the city returned to Simonovic, engaging him on two new studies:

1. An update of the city's rainfall intensity duration frequency (IDF) curves, a set of guidelines which informs the design and implementation of everything from pipe size to pump strength and construction practices; and
2. A detailed look at the vulnerability of the city's infrastructure to climate change, taking into account the full range of bridges and roads, barriers and pollution control plants. In total, more than 5,000 elements were explored.

“You can see how research served the policy; they made a decision; then they came back for more research to inform more policy,” Simonovic says. “That’s why I found this to be an interesting cooperation.”

Those findings – and resulting recommendations – were delivered to and accepted by the city last week.

“They are, as you might guess, quite significant,” Simonovic says.

According to the findings, climate change increases the city’s vulnerability to flooding by 70 per cent. That number, on top of a city already facing serious flooding issues, translates into billions of dollars in potential damage to infrastructure.

It is something we should have, but didn’t, see coming.

“The development of the municipalities was done over a long period of time,” Simonovic says. “And in those moments when you start populating near the rivers, basing those development decisions on a history of flooding from that time, would lead to a different decision now with an extra 50 years of data. And now we can add climate change impacts on top of the existing information and you can see how far off we can get.”

Even so, this number surprised Simonovic. He expected a bump, but not this much.

As a result, the city accepted the study’s recommendations which included an updating of subwatershed studies (Dingman Creek, Stoney Creek, Mud Creek, Medway Creek and Pottersburg Creek); developing a green infrastructure plan to incorporate an environmental/ecological approach to water resources management; and drafting a long-term climate change adaptation strategy.

Simonovic saw another accepted recommendation, using 21 per cent IDF for modeling purposes, as perhaps the most important measure taken.

A shift in these IDF curves reflects an increase in regional rainfalls as a result of climate change; more rainfall means more flooding which means more potential for damage. Based on Simonovic’s analyses, the city council decided to increase the IDF curves by 21 per cent, a huge number backed up by the findings.

“This is a very significant decision that will require larger pipes, higher dikes, bigger pumps and, therefore, result in higher costs of urban water infrastructure management,” he says.

Simonovic stresses it’s all about being prepared structurally, socially and financially for the challenges of the future and, so far, London has been on the leading edge.

We cannot prepare for everything, or stop every bit of damage from happening, but we can prepare in smarter ways, he says.
