

***Ensuring the Smart Future of the Smart Grid:  
Embedding Privacy, by Design***

**Ann Cavoukian, Ph.D.**

**Information and Privacy Commissioner  
Ontario**

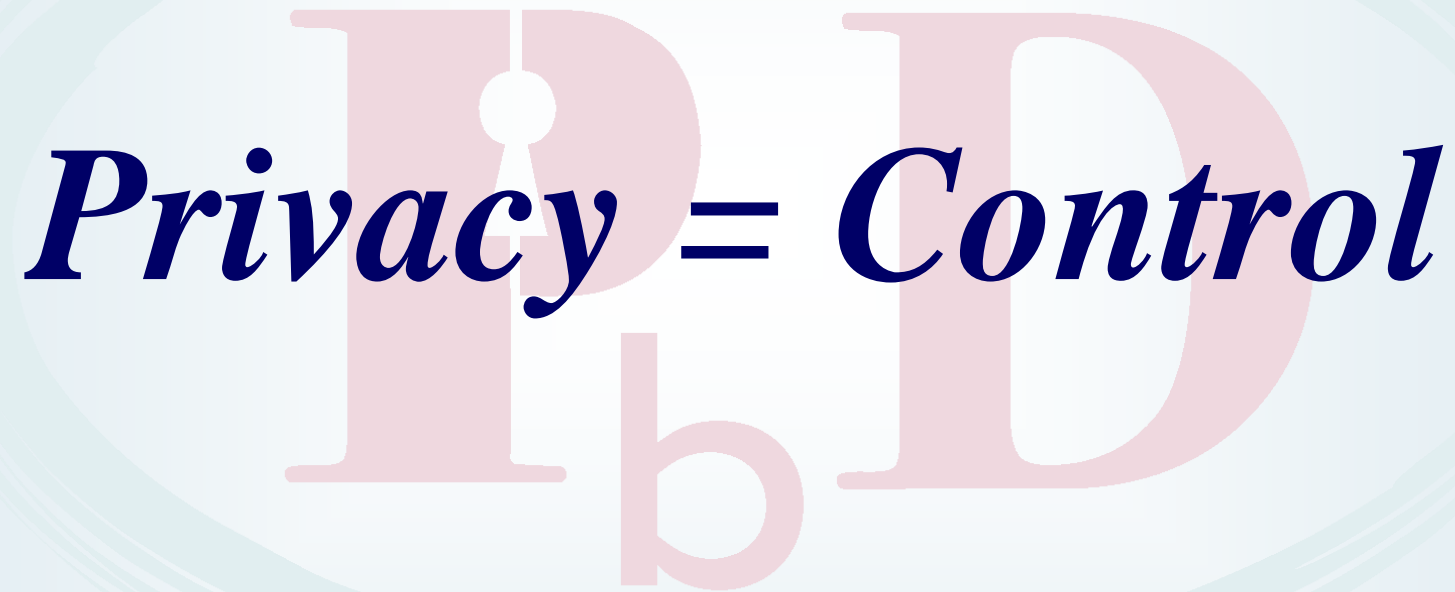
**11<sup>th</sup> Annual Ontario Power Summit**

**May 8, 2012**

[www.privacybydesign.ca](http://www.privacybydesign.ca)

# Presentation Outline

- 1. Privacy = Control*
- 2. The Issue: Privacy and the Smart Grid*
- 3. Why Utilities Should be Concerned*
- 4. Change the Paradigm to Positive-Sum*
- 5. Privacy by Design: The Gold Standard*
- 6. Embedding Privacy at the Design Stage*
- 7. Conclusions*



***Privacy = Control***

PbD

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# Why Are We Involved?

- As a Privacy Regulator, we need to ensure that privacy is never overlooked, especially in emerging technologies;
- We have embedded *Privacy by Design* into Smart Meters and issued multiple joint publications with our biggest utilities Hydro One and Toronto Hydro;
- Partnered with:
- GE, IBM and Telvent;
- San Diego Gas & Electric (SDG&E);
- Germany – Vattenfall;
- Sacramento Municipal Utility District.

# The Issue:

## *Privacy and the Smart Grid*

- The creation of an entirely new “library” of personal information; (Elias Quinn, 2009)
- Increase in the granular collection, use and disclosure of personal energy information;
- The data linkage of personally identifiable information with detailed consumer energy use.

www.privacybyd

ON Q10 WEDNESDAY, MAY 12, 2010 • TORONTO STAR • A23 CANADA

### Can smart grid know too much?

Hydro meter info a boon for thieves, marketers, and must be protected, privacy czar says

**TANYA TALAGA**  
QUEEN'S PARK BUREAU

The time you jump into the shower in the morning, the time you finally flick off that TV at night — even the time you set your home security alarm.

Ontario's privacy czar wants to keep the information secret.

Personal privacy must remain paramount as the "smart grid" electricity system is built around the province, said Ann Cavoukian, Ontario's information and privacy commissioner.

As the grid collects information on power usage and smart meters are installed in Ontario homes to track consumption data, that personal information could represent a treasure trove for hackers, thieves or marketers, said Cavoukian, in her annual report released Tuesday.

"Imagine the enormous interest in this information — not only by marketers and companies but unauthorized third parties like the bad guys, thieves who'll know when you are not at home," Cavoukian said in an interview.

Now is the time to continue to install privacy safeguards around the grid as it grows, she said.

So far, Ontario is "leading the game," she said. But the modernization of the grid is in its infancy and if vigilance isn't maintained, personal habits could become everyone's business.

Energy Minister Brad Duguid said he is taking Cavoukian's advice "very seriously" and is putting measures in place by controlling who has access to the information.

"We've taken the advice of the privacy commissioner upfront before the smart grid is even put in place," he said.

Yet before the switch was flicked on the program, all bases should have been examined and covered, said Progressive Conservative energy critic MPP John Yakabuski.

"We've talked about them having a serious rethink about smart meters from the get-go and every day we find more reasons why they should be doing that," Yakabuski said.

The infrastructure supporting the smart grid system will be soon be capable of letting consumers know their hourly and real-time energy use, Cavoukian said. "They can develop patterns of behaviour when you are away from the home," she said. "This thing has to be protected like Fort Knox."

In the not-so-distant future, "smart" appliances will be able to send in even more gritty details on how we live our lives to companies that provide electrical power. The sharing of that data should concern consumers, Cavoukian said.

"Think about every single appliance in your house reporting in real time, your energy use. What will develop over time is a library of personal information relating to a profile of your personal energy use. When you watch TV, what time of day, when you eat, when you sleep and wake," she said.

Ontario must stay proactive on this, she said. "Right now is the ideal time to ensure no one gets this information other than the people who get it now — Toronto Hydro and Hydro One."

The privacy commissioner is working with both on how electrical companies should set standards. The companies should not give out any personal data without the consent of the consumer, she said.

"This is a treasure trove of information. We want to make sure privacy is the default."

**THEY KNOW WHEN YOU ARE SLEEPING ...**



SHUTTERSTOCK IMAGE

**THEY KNOW WHEN YOU'RE IN THE SHOWER**



SHUTTERSTOCK IMAGE

**THEY KNOW WHEN YOU'RE AWAKE ...**



RICHARD LAUTING/TORONTO STAR FILE PHOTO

# *“Assets Beyond the Meter – Who Should Own Them?”*


*“There are sound reasons why consumers should remain in control of the energy consumption information they produce, even if there isn’t a law that requires this. The underlying rationale is that consumer confidence and trust in the Smart Grid, and in one’s local electricity distributors, is **vital** in achieving the vision of a more energy efficient electrical grid.”*

— Commissioner Cavoukian,  
*Electric Light & Power Magazine*

[www.elp.com](http://www.elp.com)

# Why Utilities Should be Concerned

- *Consumer confidence and trust is often lacking:*
- Residents of Marin County, California, created a prominent road blockade to prevent PG&E trucks from going into their town to install smart meters;
- Residents were worried about privacy, with one saying, *“I don't want to be watched all the time;”*
- **79%** of people knew little or nothing about the smart grid; **76%** didn't know anything about smart meters; (*Market Strategies International Study, 2010*);
- As a result, consumers are wary, and at times, hostile.



*Smart Privacy*  
SPD

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***Setting the Stage:***  
***We Need to***  
***Change the Paradigm***

# Positive-Sum Model

*Change the paradigm  
from a zero-sum to  
a “positive-sum” model:  
Create a win-win scenario,  
not an either/or (vs.)  
involving unnecessary trade-offs  
and false dichotomies ...*

*replace the “vs.” with “and”*

# *The Decade of Privacy by Design*



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# *Privacy by Design:* *The 7 Foundational Principles*

1. ***Proactive*** not ***Reactive***:  
Preventative, not Remedial;
2. Privacy as the ***Default*** setting;
3. Privacy ***Embedded*** into Design;
4. ***Full*** Functionality:  
Positive-Sum, not Zero-Sum;
5. End-to-End ***Security***:  
***Full*** Lifecycle Protection;
6. Visibility and Transparency:  
Keep it ***Open***;
7. Respect for User Privacy:  
Keep it ***User-Centric***.



**Privacy by Design**

*The 7 Foundational Principles*

Ann Cavoukian, Ph.D.  
Information & Privacy Commissioner  
Ontario, Canada

*Privacy by Design* is a concept I developed back in the 90's, to address the ever-growing and systemic effects of Information and Communication Technologies, and of large-scale networked data systems.

*Privacy by Design* advances the view that the future of privacy cannot be assured solely by compliance with regulatory frameworks; rather, privacy assurance must ideally become an organization's default mode of operation.

Initially, deploying Privacy-Enhancing Technologies (PETs) was seen as the solution. Today, we realize that a more substantial approach is required — extending the use of PETs to *PETS Plus* — taking a positive-sum (full functionality) approach, not zero-sum. That's the "*Plus*" in *PETS Plus*: positive-sum, not the either/or of zero-sum (a false dichotomy).

*Privacy by Design* extends to a "Trilogy" of encompassing applications: 1) IT systems; 2) accountable business practices; and 3) physical design and networked infrastructure.

Principles of *Privacy by Design* may be applied to all types of personal information, but should be applied with special vigour to sensitive data such as medical information and financial data. The strength of privacy measures tends to be commensurate with the sensitivity of the data.

The objectives of *Privacy by Design* — ensuring privacy and gaining personal control over one's information and, for organizations, gaining a sustainable competitive advantage — may be accomplished by practicing the following 7 Foundational Principles (*see over page*):

# **Embedding Privacy at the Design Stage:** *The Obvious Route*

- *Cost-effective;*
- *Proactive;*
- *User-centric;*
- *It's all about control – preserving personal control and freedom of choice over one's data flows and data-related decisions.*

# SmartPrivacy for the Smart Grid

*“The smart grid is certainly a good idea, which I strongly support. But the focus has been so singularly on controlling energy use that I think the privacy issue is a sleeper – it is not top-of-mind.”*

— Commissioner Cavoukian,  
Toronto Star,  
*Smart grid saves power, but can it thwart  
hackers?*, August 3, 2009

## SmartPrivacy for the Smart Grid: Embedding Privacy into the Design of Electricity Conservation



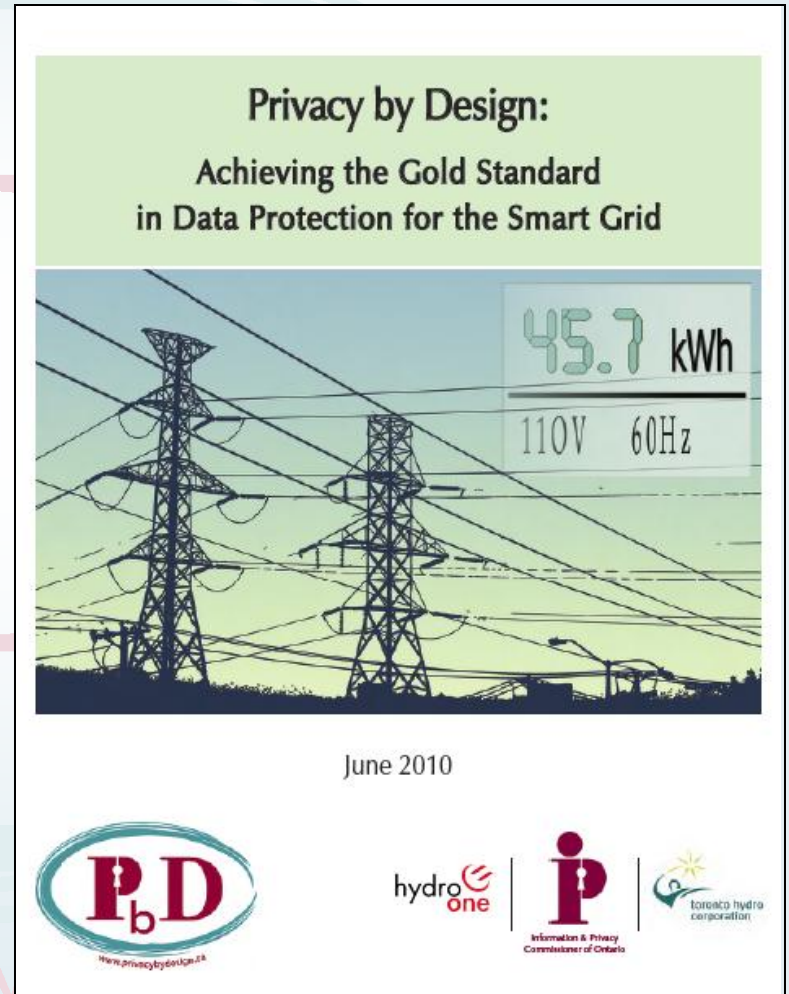
November 2009

THE FUTURE OF PRIVACY FORUM  
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Information and Privacy Commissioner,  
Ontario, Canada

# *Privacy by Design: Achieving the Gold Standard in Data Protection for the Smart Grid*

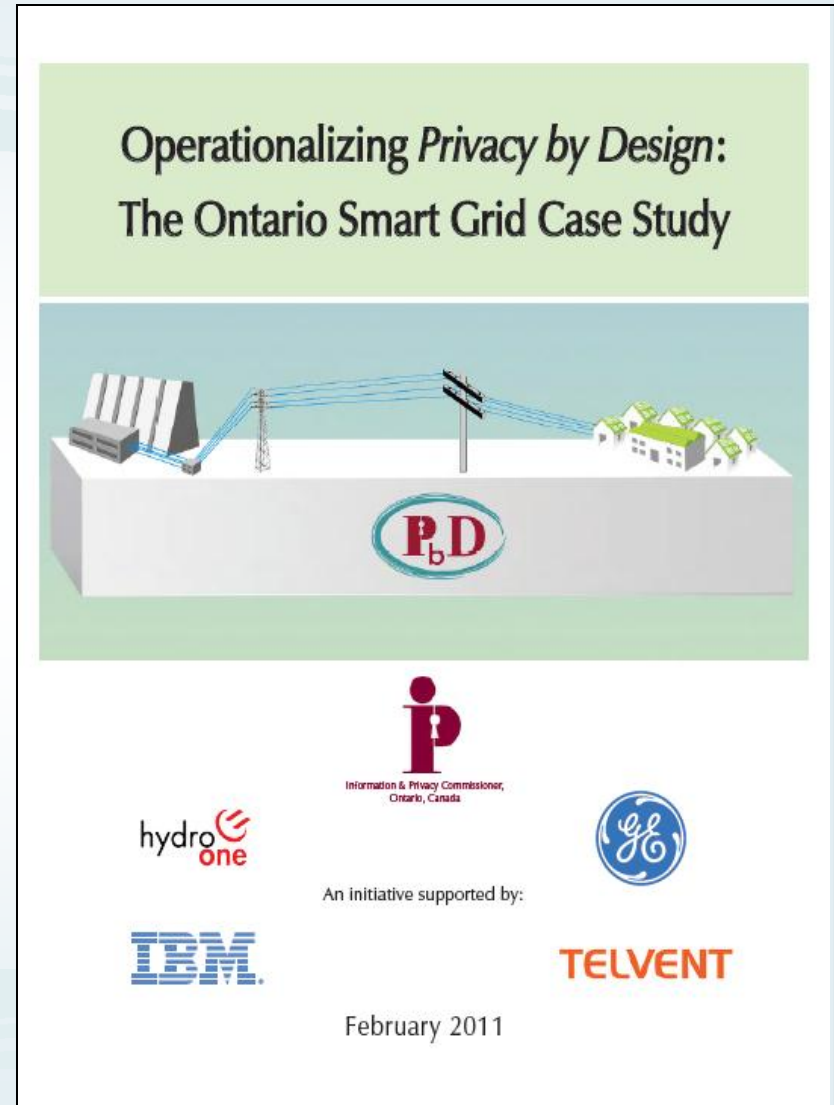
- The Smart Grid in Ontario
- *Best Practices for the Smart Grid: Privacy by Design – The Gold Standard*
- Smart Grid *Privacy by Design* Use Case Scenarios



# Operationalizing *Privacy by Design*

## Ontario Smart Grid Case Study with *PbD*:

- Methodology for Operationalization;
- Operationalizing *PbD* across Smart Grid Domains;
- Working with partners – Hydro One, GE, IBM, Telvent.





# *Applying Privacy by Design to SDG&E's Smart Pricing Program*

- California's Privacy Vision;
- Smart Grid Deployment Plan;
- *Privacy by Design* and Smart Pricing.

## **Applying *Privacy by Design* Best Practices to SDG&E's Smart Pricing Program**



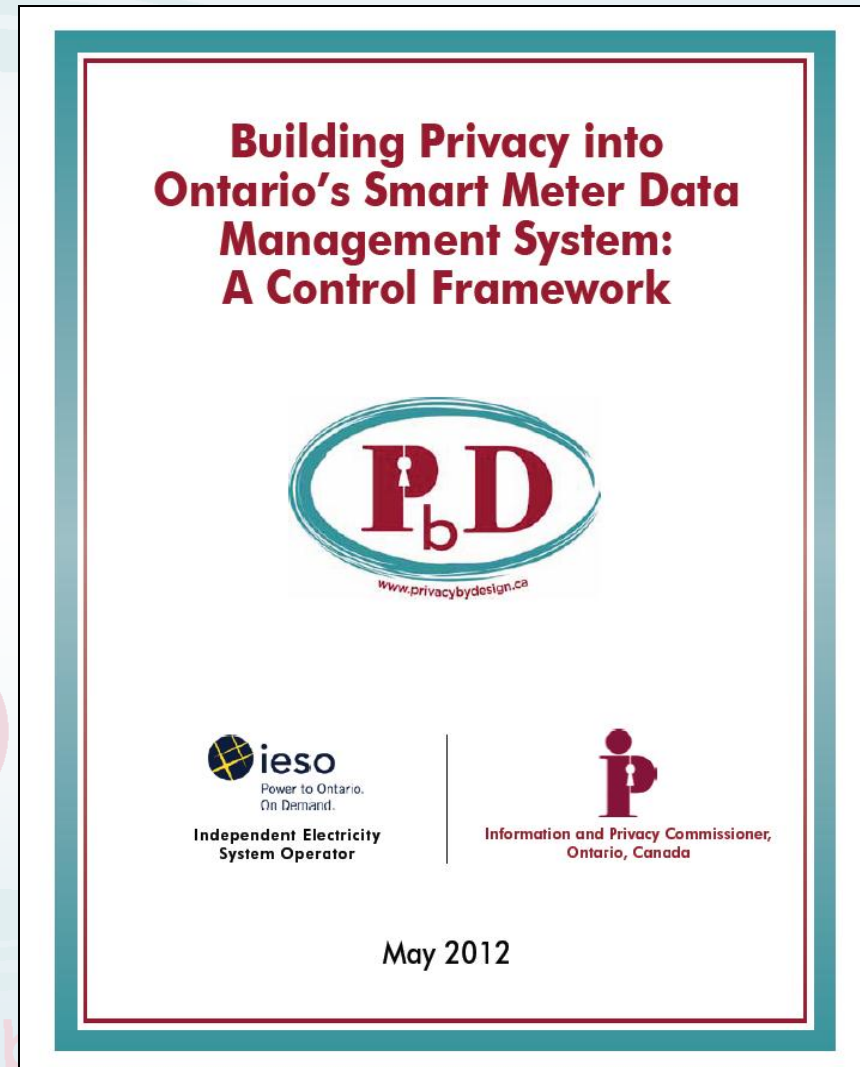
March 2012



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# Building Privacy into Ontario's Smart Meter Data Management System

- Written in collaboration with the Independent Electricity System Operator (IESO);
- *Privacy by Design* and the Smart Metering Entity Control Framework;
- *Privacy by Design* Control Objectives.



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# Privacy by *ReDesign*

## *PbRD*



1. **Rethink:** review existing risk mitigation strategies and systems, considering alternatives that will be more privacy protective;
2. **ReDesign:** develop and enable improvements in the system that will deliver original function and privacy in a doubly-enabling, positive-sum manner;
3. **Revive:** re-launch the newly improved, more privacy protective system.

## **Privacy by ReDesign: Building a Better Legacy**



May 2011

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- Identifying potential targets for *Privacy by ReDesign*;
- Framework for implementing *Privacy by ReDesign*;
- Laying the foundations for proactive success.

## ***Privacy by ReDesign:*** **A Practical Framework for Implementation**



November 2011

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President and CEO,  
Informatica Corporation  
Founder, Informatica Research

# Conclusions

- Lead with *Privacy by Design*, featuring control over customer energy usage data – gain consumer confidence and trust;
- Enable both the Smart Grid *and* Privacy to grow in tandem – not one at the expense of the other – prevent the data breach ... enable the service;
- Get smart about privacy – embed privacy into your technical specifications, architecture, systems, devices and business practices.
- If you don't lead with *Privacy by Design*, you may end up with privacy by chance – or worse, Privacy by Disaster!
- Be proactive – get Smart about Privacy!

# How to Contact Us

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