Some reminders

1. All: Progress reports due 5 pm, day previous to meeting. Please read them, and provide constructive comments.

2. All: Next meeting 3/26, w/ PAB. Give slides by 3/25, 5 pm.
   - Each PI (or designated student) gets 10 minutes
   - Speak to project goals on next slide if you can
   - Report significant findings, web-posted info, next steps
   - Also address “soft” progress


4. Students: Participate in SD team if you have one.

5. PIs: If no SD team now, start one next fall if possible.

6. PIs: Meet with your faculty counterpart, lunch?

Each year is a hybrid network flow/DC-flow LP that minimizes cost for the given investment plan.

Need: Do we need to bring in DC-flow? Combine Eduardo’s formulation in paper with Yang Gu’s

Need: Identify how to structure this using decomposition methods & distributed/parallelized computing.
Proposed Model Diagram (II)

Cost Minimization

Sustainability
Metrics

Resiliency
Metrics

Need: Identify how to compute these metrics.
Proposed Model Diagram (III)

**Need:** Formulate this MO problem.

- **Multiobjective evaluation**
  - Select front of solutions
  - Generate new generation

- **Cost Minimization**
  - **Sustainability Metrics**
  - **Resiliency Metrics**

**Investment biases**
- Minimum investment
- Subsidies
- Limit emissions
- ...

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National Energy & Transportation Sustainability, Cost, & Resiliency

IOWA STATE UNIVERSITY
Proposed Model Diagram (IV)

- **Multiobjective evaluation**
  - Select front of solutions
  - Generate new generation

- **Cost Minimization**
  - Sustainability
    - Metrics
  - Resiliency
    - Metrics

Need: intelligence to identify investment bias strategies from sustainability/resiliency/cost results

- Weak links, economic opportunities, sustainable alternatives...

Investment biases
- Minimum investment
- Subsidies
- Limit emissions
...
Proposed Model Diagram (V)

Need: Provide reasonable forecasts on most significant parameters.

Need: Provide plausible policy options that will heavily impact solutions.

Need: Provide plausible, creative, promising technology options.

Policies

Forecasts

Technologies

Scenarios

Multiobjective solver

Analysis

Visualization

Interdependencies

Contingencies
How to develop “scenarios”

1. Think in terms of policies, forecasts, technologies
2. Predict the expected
3. Better yet, *create* the unexpected!
In Energy in America — A Tour of Our Fossil Fuel Culture and Beyond, Ingrid Kelley delivers a concise (288-page) yet comprehensive explanation of the key intersections of energy, the environment, the economy, and sustainability. (The book was published late last year by the University of Vermont Press). Kelley describes how our power is generated and delivered, how to cut our still profligate use of it, what renewable energy options are open to us, and — most important to this audience — how planners can apply the lessons of sustainability in their communities.

Kelley has accumulated considerable expertise over more than 20 years as a designer of energy systems, policy analyst, and planner. (She chairs APA's Environment, Natural Resources and Energy Division.) But along the way, she writes, she discovered that many practitioners of sustainable community design were lacking in practical knowledge on energy issues. This book helps to address that problem.

The first two chapters offer a history of the energy business since the Industrial Revolution kicked into gear in the mid-19th century. Kelley soberly discusses the details of public health and environmental impacts of fossil fuels and nuclear power. She notes that such "externalities" are often ignored in figuring the costs of our energy infrastructure. Writing of nuclear power, for instance, she says, "If we begin to account for the social costs of promoting a technology that many do not trust, we may decide to invest our effort in other generation choices."

In the chapter on energy conservation and efficiency, we are reminded of the difference between the two and the critical importance of both. But it's the chapter titled "Community Energy and Sustainability" that is a goldmine for planners. Using APA's Growing Smart Legislative Guidebook as a template, she draws up an energy-conscious smart growth plan. In the last chapter of the book, on clean energy policy, Kelley zeroes in on key guidelines to follow in addressing climate change and ensuring long-term sustainability in our communities.

INGRID KELLEY has promoted renewable energy, energy efficiency, permaculture, and sustainable community design for over twenty years. She has a Masters in Community and Regional Planning, and is a LEED Accredited Professional. Currently a project manager at the Energy Center of Wisconsin, she serves as chair of the Environment, Natural Resources and Energy Division of the American Planning Association.