Driving Deployment with Demand

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NEUP: DDCA

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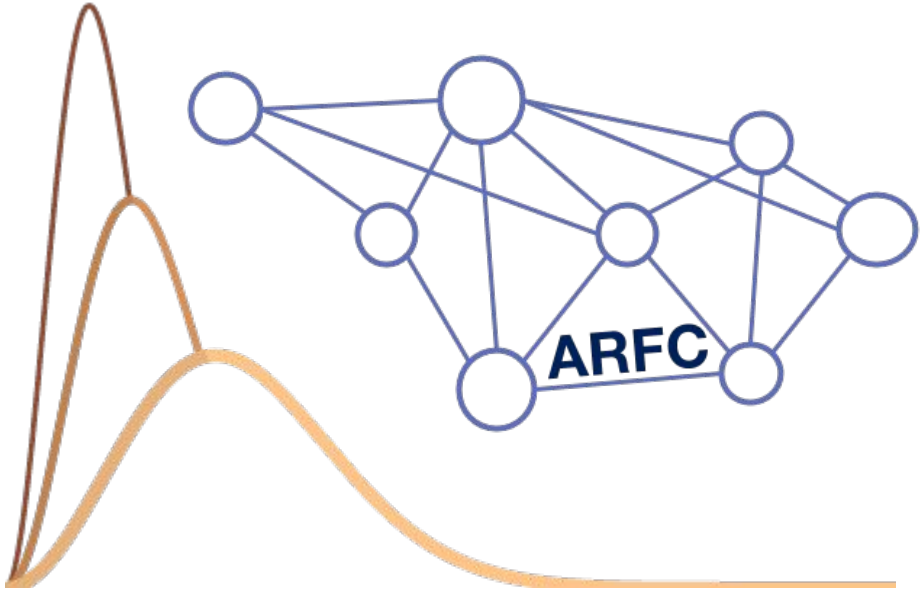

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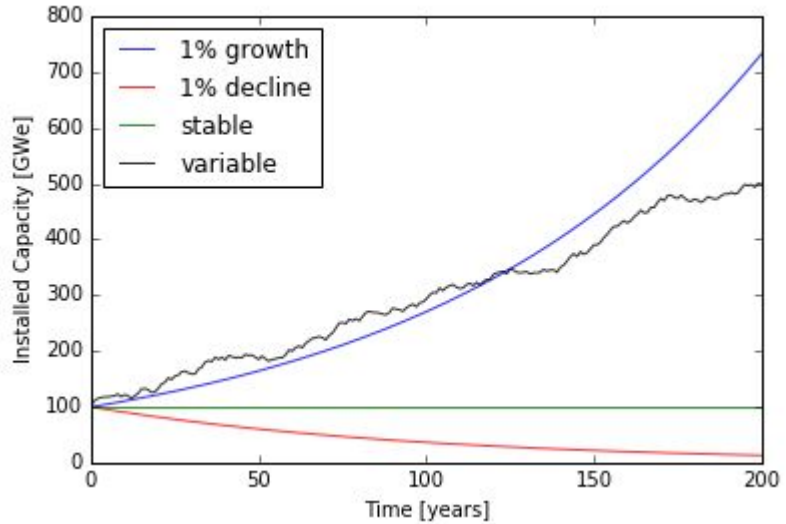
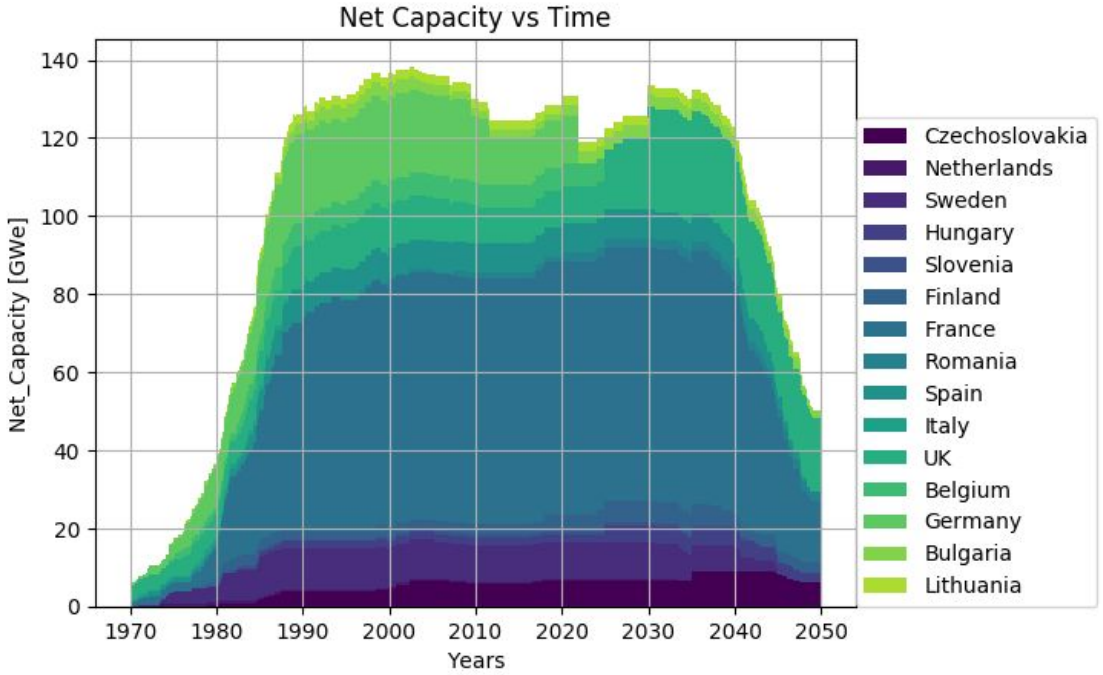
Driving reactor deployment (straightforward)

- Meet power demand
  - Growth (1%, 2%)
  - Decline (-X GW, -1%, -2%)
  - Variable
  - Steady



Driving reactor deployment (straightforward)

- Regional demand
- Replace decommissioned capacity
  - Immediately
  - After construction delay



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Deploying Fuel Cycle Capacity

Facility deployment strategies:

1. no automated deployment at all
2. based on deterministic forecasting
3. something more clever

No Automated Deployment

1. Deploy reactors according to demand
2. Deploy infinite capacity of supporting fuel cycle facilities
    a. Infinite natural uranium
    b. Infinite conversion and enrichment capacity
    c. Infinite fuel fabrication capacity
    d. Infinite reprocessing
    e. Infinite storage and disposal
3. Run Simulation
4. Back-calculate/observe the amounts actually used

Strengths:
- Straightforward implementation
- No under-supply

Challenges:
- Can't capture market economics
- Unrealistic intermediate mass flows

Deterministic Forecasting (look-ahead)

1. Deploy reactors according to demand
2. Estimate needed capacity of supporting fuel cycle facilities
    a. Determine fuel needs (f)
    b. Determine enrichment and reprocessing needs (e) and (r)
    c. Determine natural uranium needs (n)
    d. Determine storage and dispossal needs (s) and (d)
3. Run Simulation
4. Actual needs are likely close to deployed needs

Strengths:
- Can capture market economics
- Realistic intermediate mass flows

Challenges:
- Occasional under-supply
- Implementation non-trivial

Something more clever

1. Deploy reactors according to demand
2. Run Simulation
3. Dynamic response to fuel cycle needs
    a. Just In Time (JIT) facility deployment
    b. Market interrogation
    c. Respond to unexpected shutdowns
4. Dynamic needs closely match deployed needs

Strengths:
- No under-supply (probably)
- Can capture market economics
- Realistic intermediate mass flows

Challenges:
- Implementation can be complex

Also: Stochastics

1. Deploy reactors according to demand
2. Run Simulation
3. Reset parameters randomly
4. Rerun Simulation
5. Return to 2
6. Under-supply simulations and over-supply simulations are dropped

Strengths:
- Captures market economics
- Realistic intermediate mass flows
- Reasonable implementation

Challenges:
- Compute time

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